



The University of
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UNITED KINGDOM • CHINA • MALAYSIA

**PREVENTION OF SECOND-HAND SMOKE
EXPOSURE AMONG PREGNANT WOMEN AND
CHILDREN IN EGYPT AND THE REST OF THE
MIDDLE EAST: A MIXED-METHODS
INVESTIGATION.**

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ABSTRACT

Second-hand smoke (SHS) exposure is a major public health concern. Pregnant women and children are a priority population for tobacco control efforts because second-hand smoke (SHS) exposure during pregnancy/childhood poses serious risks to foetal/child health. Due to strong cultural constraints against women smoking in many Middle Eastern countries, the prevalence of tobacco smoking is higher among men than women, which puts non-smoking women and children on risk of exposure to SHS. The Middle Eastern countries are Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen.

In Egypt, daily SHS exposure among pregnant non-smoking women and children is estimated to be more than 50% at home and more than 70% in public places. The aim of the current thesis is to investigate the experience of SHS exposure among pregnant women and children in Middle Eastern countries with focus on Egypt, barriers and facilitators to reduce it, and to come up with recommendations on how to reduce this exposure. Three studies were conducted to achieve this aim.

The first study aimed to identify, appraise, and synthesize the evidence related to experiences and views of parents, children, and

professionals on the prevention of second-hand smoke exposure to women and children in Middle Eastern countries by conducting a qualitative systematic review. Six databases and grey literature were searched from inception to January 2021 to identify published and unpublished studies. No language restrictions were applied. The JBI guidelines for qualitative systematic reviews were followed in conducting the review, with a meta-aggregation process was used to synthesize findings and ConQUAL used to summarise the confidence in the findings. Of 5229 records identified, two qualitative studies (in three publications) met the eligibility criteria and were included in the review. One study was conducted in Turkey and the other study (reported in two papers) was conducted in Israel. The methodological quality of the studies was high based on the JBI critical appraisal tool for qualitative research. The participants in the included studies were parents (n=118 participants) aged between 18 and 42 years. One of the included studies did not differentiate in quotations between mothers and fathers. The methods used for data collection within the included studies were interviews, which were analysed using thematic analysis. A total of 50 findings were extracted and aggregated into eight categories, based on the similarity of meaning. Three synthesized findings were generated, all with moderate confidence: i) Parents were aware of SHS exposure and that exposure is harmful, although the health dangers of SHS exposure were not commonly discussed with parents by Healthcare Professionals (HCPs) during pregnancy; ii)

Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home. Parents also reported personal psychological barriers to quitting smoking; iii) Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place at home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective. As this systematic review found that SHS exposure is not commonly discussed with parents during pregnancy by HCPs, it recommends standardized guidelines to be available for HCPs in primary health centres to help them to guide parents regarding SHS exposure during pregnancy and childhood.

HCPs are well placed to help reduce exposure to SHS in pregnant women and children. HCPs spend a significant amount of time in contact with pregnant women throughout their pregnancy and can therefore enquire about their SHS exposure, advise them to prevent SHS exposure, and encourage their husbands to quit smoking. Advice from HCPs on managing and reducing SHS has been shown to be effective in previous studies and it is advisable to be implemented in Middle Eastern countries.

Thus, the second study in this thesis aimed to explore knowledge, attitudes and counselling practices of HCPs working in maternal and child health (MCH) clinics in Egypt in relation to the prevention of SHS

exposure among pregnant women and children. A survey of HCPs working in public maternal and child health clinics in Assiut city, Egypt was conducted in August 2020. Descriptive and regression analyses were performed to identify the factors related to high levels of knowledge, supportive attitudes and self-reported good counselling practice. 367 HCPs participated in the study (response rate=68.5%), 12% of whom were smokers. The majority of respondents were nurses (45%). Approximately half of HCP reported a high level of knowledge about the dangers of SHS exposure (56%), a supportive attitude towards preventing SHS exposure (53%), and having good counselling practice regarding SHS exposure (52%). Being a General Practitioner (GP) (OR 15.29, 95%CI 4.12-56.86), serving urban communities (OR 2.53, 95%CI 1.53-4.18) and being exposed to SHS at home (OR 2.36, 95%CI 1.48-3.78) were significantly associated with high knowledge compared to gynaecologists/obstetricians, and HCPs serving urban communities, respectively. Being female (OR 2.02, 95%CI 1.27-3.24), serving rural communities (OR 1.58, 95%CI 1.01-2.49), and not being exposed to SHS at home (OR 2.36, 95%CI 1.29-3.10) were significantly associated with a supportive attitude towards the prevention of SHS exposure compared to male HCPs, serving urban communities, and exposed to SHS at home, respectively. Being female (OR 1.53, 95%CI 1.15-2.63), serving a rural population (OR 2.37, 95%CI 1.41-4.01), receiving previous training on smoking cessation services (OR 2.80, 95%CI 1.50- 5.22), not being exposed to SHS at

home (OR 2.35, 95%CI 1.42-3.89), and having a supportive attitude (OR 5.51, 95%CI 3.40-8.94) towards prevention of SHS exposure were significantly associated with good counselling practice compared to being male HCPs, serving urban population, not receiving previous training on smoking cessation, being exposed to SHS at home and not having supportive attitude towards prevention of SHS exposure respectively. The main obstacles to providing counselling as reported by HCPs were lack of time and training, unavailability of relevant materials, and absence of reimbursement. This study concluded that knowledge, attitudes and practice of HCPs regarding the risks of SHS to pregnant women and children in Egypt should be improved. Training for HCPs alone is unlikely to be sufficient due to the range of issues identified as needing to be addressed, including the lack of time and unavailability of relevant materials. Moreover, clear specification of SHS counselling service should be incorporated in the job description of HCPs working in public MCH centres by health system governors.

The third study was a qualitative study which aimed to explore barriers to preventing SHS exposure among pregnant women/children and smoking behaviour at home in Egypt. Six focus group discussions (FGDs) with pregnant women/mothers of children residing in urban/rural areas were conducted in August 2020. Data were coded and analysed using the framework approach. Sixty-one participants were recruited, aged 18–49 years. All participants reported being never

smokers and the place of exposure to SHS to themselves and their children was mainly in the home. Pregnant women and mothers had some general knowledge of the dangers of SHS. The most commonly reported barriers to preventing SHS exposure/adopting a smoke-free home or workplace were social acceptance of smoking and SHS exposure, masculinity and gender norms of accepting smoking among men as a normative behaviour, fear of damaging their relationship with family, women resigning themselves to SHS exposure, and doctors not being supportive of smoking cessation. The majority of interviewees' families were reported to allow smoking anywhere in the home; others implemented some measures to prevent SHS; however, these tended to be inconsistently implemented and were unlikely to be effective. This study concludes that changing the gender norm of accepting men to be smokers as a normative behaviour among Egyptian society could protect pregnant women and children from SHS and help to reduce burden caused by tobacco use. Where household smokers are unwilling or unable to quit, families should be offered support to make their homes completely smoke-free.

The current thesis concludes that there is a need for de-normalization of SHS exposure in Egyptian society. Better enforcement of smoke-free policies is essential. There are missed opportunities for HCPs to provide guidance and support to pregnant women and mothers regarding reducing and managing exposure to SHS exposure;

therefore, there is an urgent need for HCPs to support smoking cessation services in primary health centres settings. SHS policy, practice and research should focus on educating and providing smoking cessation support to husbands/fathers since they are identified as the main the source of SHS. It is important that the wider environment is made conducive to increase the awareness and willingness of HCPs to provide support on smoking cessation and prevention of SHS exposure, such as the enforcement of smoke free polices and other population level intervention such as anti-tobacco mass media campaign.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

PUBLICATIONS FROM THESIS WORK

Hassanein, Zeinab M; Langley, Tessa; Murray, Rachael L;
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CONTENT

ABSTRACT.....	II
PUBLICATIONS AND CONFERENCE PRESENTATIONS.....	IX
PUBLICATIONS FROM THESIS WORK.....	IX
CONFERENCE AND SEMINAR PRESENTATIONS.....	XI
Oral presentations.....	XI
Poster presentations.....	XII
ACKNOWLEDGEMENTS.....	XIV
CONTENT.....	1
LIST OF FIGURES.....	12
LIST OF TABLES.....	14
GLOSSARY.....	17
1 CHAPTER 1 BACKGROUND.....	20
1.1 The global tobacco epidemic.....	21
1.2 Global tobacco control policies.....	22
1.2.1 Monitor tobacco use and prevention policies.....	23
1.2.2 Protecting people from tobacco smoke.....	24
1.2.3 Offering help to quit tobacco use.....	25
1.2.4 Warning about the dangers of tobacco.....	26

1.2.5	Enforcing bans on tobacco advertising, promotions and sponsorship (TAPS).....	28
1.2.6	Raising taxes on tobacco products.	29
1.3	Secondhand smoke (SHS) exposure.....	30
1.4	Health hazards of SHS	30
1.4.1	Health hazards of SHS exposure for the foetus	31
1.4.2	Health hazards of SHS exposure among children.....	34
1.4.3	Summary.....	43
1.5	Prevalence of SHS exposure, with a focus on Eastern Mediterranean countries	44
1.5.1	SHS exposure among non-smoking women	44
1.5.2	SHS exposure among children.....	45
1.5.3	Summary.....	46
1.6	Factors related to SHS exposure among pregnant women and children	47
1.6.1	Factors related to SHS exposure among children and pregnant women globally	47
1.6.2	Factors related to SHS exposure among pregnant women and children in Eastern Mediterranean countries.....	48
1.7	Reducing SHS exposure among pregnant women and children	

1.7.1	Barriers and facilitators of preventing SHS exposure among pregnant women and children in the home and in public places	50
1.7.2	Role of Health care professionals in prevention of SHS exposure among pregnant women and children	52
1.8	Conclusion	55
1.9	Thesis rationale	56
1.10	Thesis aim and specific objectives	57
1.11	Outline of thesis chapters	58
2	CHAPTER 2 CASE STUDY OF TOBACCO USE, AND CONTROL POLICES IN EGYPT	59
2.1	Introduction	60
2.2	Rationale and aims of the chapter	61
2.2.1	Overall aims	62
2.3	Methods	62
2.3.1	Case Study Methodology	62
2.3.2	Literature Search Strategy and Data Sources	63
2.4	Basic country information	64
2.4.1	Geography	64
2.4.2	Demography	66
2.4.3	Economy	67

2.4.4	Politics.....	68
2.4.5	Healthcare system in Egypt.....	69
2.5	Results.....	73
2.5.1	How data on tobacco use in Egypt are collected.....	73
2.5.2	Prevalence of tobacco use in Egypt.....	75
2.5.3	Any tobacco use.....	76
2.5.4	Cigarettes.....	78
2.5.5	Waterpipe (Shisha) smoking.....	78
2.5.6	Smokeless tobacco use.....	80
2.5.7	Egyptian youth tobacco use.....	80
2.5.8	Second-hand smoke (SHS) exposure in Egypt.....	81
2.5.9	Cessation attempts.....	82
2.5.10	Tobacco industry in Egypt.....	84
2.5.11	Health burden of tobacco consumption in Egypt.....	85
2.5.12	Egyptian tobacco control policy.....	88
2.6	Discussion.....	94
2.7	Strengths and limitations.....	96
2.8	Implications and future research.....	97
2.8.1	Policy research.....	97
2.8.2	Research in vulnerable and under researched groups....	98

2.9	Conclusions	99
3	CHAPTER 3 EXPERIENCES AND VIEWS OF PARENTS ON SECOND-HAND SMOKE EXPOSURE PREVENTION IN MIDDLE EASTERN COUNTRIES: A QUALITATIVE SYSTEMATIC REVIEW	101
3.1	Introduction	102
3.2	Review question	105
3.3	Methods.....	105
3.3.1	Inclusion and exclusion criteria	106
3.3.2	Search strategy	107
3.3.3	Study selection.....	108
3.3.4	Assessment of methodological quality	109
3.3.5	Data extraction	109
3.3.6	Data synthesis.....	110
3.3.7	Assessing confidence in the findings	111
3.4	Results.....	115
3.4.1	Study inclusion	115
3.4.2	Methodological quality.....	116
3.4.3	Characteristics of included studies.....	116
3.4.4	Review findings	118
3.4.5	Synthesized finding 1	119

3.4.6	Synthesized finding 2	121
3.4.7	Synthesized finding 3	122
3.5	Discussion	126
3.6	Strengths and limitations of the review	131
3.7	Conclusion	133
3.8	Recommendations for practice	133
3.9	Recommendations for policy	134
3.10	Recommendations for research	135
3.11	Acknowledgments	135
4	CHAPTER 4 HEALTHCARE PROFESSIONALS' KNOWLEDGE, ATTITUDES AND COUNSELLING PRACTICE REGARDING PREVENTION OF SECONDHAND SMOKE EXPOSURE AMONG PREGNANT WOMEN AND CHILDREN IN ASSIUT, EGYPT	153
4.1	Introduction	154
4.2	Rationale for the study and study aims	157
4.3	Methods	157
4.3.1	Study participants and recruitment	158
4.3.2	Data management	160
4.3.3	Data analysis	164
4.3.4	Ethical approval	165
4.4	Results	165

4.4.1	Participant demographics, smoking behaviours and SHS exposure	165
4.4.2	Knowledge of HCPs regarding SHS exposure	168
4.4.3	Attitudes of HCPs towards smoking and SHS exposure among pregnant women and children.....	169
4.4.4	HCPs counselling practice regarding prevention of SHS exposure among pregnant women and children	171
4.4.5	Factors associated with HCPs' knowledge, attitude and counselling practice regarding SHS exposure among pregnant women and children.....	172
4.4.6	Barriers to provision of counselling and HCPs' needs to improve the delivery of counselling.....	182
4.5	Discussion	185
4.6	Strengths and limitations	189
4.7	Conclusion and recommendation	190
5	CHAPTER 5 A QUALITATIVE STUDY OF BARRIERS AND MOTIVATORS TO PREVENT SECOND-HAND SMOKE EXPOSURE AMONG PREGNANT WOMEN AND CHILDREN IN EGYPT: IDENTIFYING APPROPRIATE APPROACHES FOR CHANGE	192
5.1	INTRODUCTION	193
5.2	Objectives.....	196
5.3	METHODS.....	197

5.3.1	Qualitative methodology.....	197
5.3.2	Approvals	198
5.3.3	Settings	198
5.3.4	Sampling and participant recruitment.....	199
5.3.5	Data collection.....	201
5.3.6	Data collection methods.....	203
5.3.7	Data Storage	205
5.3.8	Data analysis.....	205
5.3.9	Reflexive Statement	210
5.4	RESULTS	215
5.4.1	Participant characteristics	215
5.4.2	List of themes and subthemes of the qualitative study ..	216
5.4.3	Knowledge, perceptions and attitudes about and towards SHS	217
5.4.4	Barriers to preventing SHS exposure/adopting a smoke- free home or workplace	221
5.4.4.2	Women’s fears about asking smokers not to smoke near them	224
5.4.5	Measures taken to prevent SHS exposure.....	225
5.4.6	Potential interventions to reduce SHS exposure at home/ workplace.....	227

5.5	DISCUSSION	231
5.5.1	Mothers' knowledge of the health hazards of SHS and barriers to prevent it	231
5.5.2	Household smoking rules	234
5.5.3	Smoke free policies	237
5.6	STRENGTHS AND LIMITATIONS.....	238
5.7	IMPLICATIONS	239
5.8	CONCLUSION.....	240
6	CHAPTER 6 SUMMARY CONCLUSIONS AND FUTURE DIRECTIONS FOR RESEARCH	241
6.1	Summary of findings	242
6.2	Consideration of findings across thesis studies	249
6.2.1	Social acceptance of smoking, masculinity and gender norms	249
6.2.2	Poor enforcement of smoke free polices	251
6.2.3	High rates of male smoking compared to females	252
6.2.4	Allowing smoking in the home.....	255
6.2.5	Role of HCPs	256
6.3	Methodological considerations	259
6.3.1	Mixed method research approach.....	259
6.3.2	Reliability and validity in this study	263

6.4	Conclusion	265
6.5	Recommendations for future research.....	267
6.5.1	Recommendations for research	267
6.5.2	Recommendations for policy	271
6.5.3	Recommendations for practice for designing an intervention.	274
7	References	285
8	Appendices	339
8.1.1	Appendix 1 Protocol for qualitative systematic review...	340
8.1.2	Appendix 2 Qualitative systematic review	347
8.1.3	Appendix 3.1 Search strategy	379
8.1.4	Appendix 3.2 Studies ineligible following full-text review 392	
8.1.5	Appendix 3.3 Study findings and illustrations.....	394
8.1.6	Appendix 3.4 2020 PRISMA Check list.....	403
8.1.7	Appendix 4.1 Ethical and data collection approvals	408
8.1.8	Appendix 4.2 Covid 19 impact statement.....	411
8.1.9	Appendix 4.3 Participant information sheet.....	422
8.1.10	Appendix 4.4 Questionnaire English and Arabic versions 426	

8.1.11	Appendix 4.5: sensitivity analysis of multivariable regression model of knowledge, attitude and counselling practice of HCPs	436
8.1.12	Appendix 4.6: Published version of HCPs' study	441
8.1.13	Appendix 5.1 participant information sheet for FGDs	452
8.1.14	Appendix 5.2 Consent form for FGDs	456
8.1.15	Appendix 5.3 FGDs guide for with pregnant women/mothers of children	457
8.1.16	Appendix 5.4 An illustrative sample of the framework matrix used in NVivo during analysis	463
8.1.17	Appendix 5.5 Detailed characteristics of each participant in the qualitative study in chapter 5	464

LIST OF FIGURES

Figure 1 Map of Egypt, Source: Demographic and Health survey 2014, Egypt	65
Figure 2 Density of selected health professionals in Egypt, source WHO Health workforce snapshot: Egypt.....	72
Figure 3 Waterpipe (Shisha), a common form of tobacco smoking in Egypt.....	79
Figure 4 Adapted from GATS Egypt 2009: Prevalence of SHS exposure among Egyptian adults in public places	82
Figure 5 Percentages of deaths and DALYS caused by tobacco use in Egypt 2019, source: Global Burden of Disease (GDB) database.	86
Figure 6 Percentages of deaths and DALYS caused by different diseases as a result of tobacco use risk in Egypt 2019, source: Global Burden of Disease (GDB) database	87
Figure 7 Numbers of deaths caused by SHS exposure in Egypt 2019, source: Global Burden of Disease (GDB) database	88
Figure 8 PRISMA flow chart, Search results and study selection and inclusion process	114
Figure 9 Behavioural change wheel, source: Michie, Atkins, et al. ...	276

Figure 10 Stages involved in the development of an intervention using the behavioural change wheel, source: Michie, Atkins, et al..... 277

LIST OF TABLES

Table 1 Prevalence of tobacco consumption among Egyptian adults ≥ 15 years by forms of tobacco consumed with specific demographic factors, GATS 2009	77
Table 2 Prevalence of tobacco use among Egyptian youth (13-15) years old by type of tobacco used and gender, GYTS 2014	80
Table 3 Methodological quality of included studies in experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review	136
Table 4 Characteristics of included studies in experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review	137
Table 5 Summary of Findings of experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review	140
Table 6 Synthesized findings and categories of experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review	142

Table 7 Ranking of the ConQual score of included studies in qualitative systematic review	151
Table 8 Grades of recommendations of the current review which are specific to the Middle Eastern countries	152
Table 9 Summary of Knowledge index of HCPs regarding SHS exposure among pregnant women/children in Egypt	162
Table 10 Summary supportive index of HCPs regarding prevention of SHS exposure among pregnant women/children in Egypt	163
Table 11 Summary of counselling practice index of HCPs regarding prevention of SHS exposure among pregnant women/children in Egypt	163
Table 12: Demographics, smoking behaviours, and SHS exposure of HCPs, Assiut, Egypt	166
Table 13 Health care professionals' knowledge regarding SHS exposure during pregnancy and childhood, Assiut, Egypt	168
Table 14 Health care professionals' attitude regarding SHS exposure during pregnancy and childhood, Assiut, Egypt	169
Table 15 Health care professionals' counselling practice regarding SHS exposure during pregnancy and childhood, Assiut, Egypt	171

Table 16 Multivariate regression of factors associated with HCPs knowledge regarding SHS exposure among pregnant women and children	175
Table 17 Multivariate able regression of factors associated with HCPs supportive attitude regarding prevention of SHS exposure among pregnant women and children	177
Table 18 Multivariate regression of factors associated with HCPs counselling practice regarding prevention of SHS exposure among pregnant women and children	179
Table 19 Barriers of HCPs for provision of counselling and their needs to improve the delivery of counselling to pregnant women and mothers to avoid SHS exposure, Assiut, Egypt	183
Table 20 The procedure and steps of the framework method of analysis conducted in NVivo Steps	208
Table 21 Demographic characteristics of pregnant women/mothers of children, Assiut, Egypt.	215
Table 22 Implementation of behavioural change wheel to suggest potential SFHs intervention adapted from Michie, Atkins, et al.	280

GLOSSARY

AUC Area under ROC curve

CAPMS Central Agency of Public Mobilization and Statistics

CDC United States Centres for Disease Control

DALYs Disability adjusted life years

DHS Demographic and Health Survey

ETC Eastern Tobacco Company

ETS environmental tobacco smoke

FGDs Focus group discussions

GATS Global Adult Tobacco survey

GBD Global burden of diseases

GCC Gulf cooperation council countries

GDP Gross domestic product

GP General Practitioner

GYTS Global Youth Tobacco Survey

HCPs health care professionals

HIO Health Insurance Organization

LBW low infant birth weight

LMIC Low- and Middle-Income Countries

MCH Maternal and child health

MOHP Ministry of Health and Population

NRT Tobacco replacement therapy

OOP Out-of-pocket

OR Odds Ratio

PHCs Primary health care centres

RCP Royal College of Physicians

RTIs Respiratory tract infections

SIDS Sudden infant death syndrome

SHS Second hand smoke

SDQ Strengths and Difficulties Questionnaire

SES Socio-economic status

SFHs Smoke-free homes

THE Total health expenditure

UAE United Arab Emirates

UHC Universal health coverage

WHO FCTC World Health Organization Framework Convention on
Tobacco Control

WHO World Health Organization

1 CHAPTER 1 BACKGROUND

1.1 The global tobacco epidemic

Tobacco use, including smoking and smokeless tobacco, is a major cause of preventable diseases and deaths globally with more than one billion individuals consuming it.⁴ Worldwide, tobacco use is a leading cause of more than eight million deaths annually and this number is predicted to double by 2030.⁴ Tobacco use causes many preventable morbidities and costs the global economy US\$ 1.4 trillion each year.⁵ Life expectancy is lower among long term tobacco consumers, whether these are smokers or smokeless tobacco users, by 20 years compared to non-consumers.^{4,6}

The global prevalence of tobacco use is declining, but progress is not uniform across countries and by gender. The majority of the decrease in prevalence since 2007 has been seen in high-income countries;⁷ while other countries have experienced either a much lower rate of decreasing tobacco use or an increase in the prevalence.⁷ For example, tobacco use declined in WHO Americas Region from 21% in 2010 down to 16% in 2020.⁸ However, WHO Eastern-Mediterranean Region is where tobacco use is increasing; e.g. in Egypt it increased from 19.7 in 2010 to 22.8 in 2021.^{9,10} WHO Eastern-Mediterranean Region includes 22 countries: Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, State of Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, and Yemen. This increase in

prevalence is largely attributable to relatively low tobacco prices, extended tobacco company marketing, ignorance of the health hazards of tobacco use and lack of comprehensive implementation of tobacco control policies.⁷ Thus, to ensure better tobacco control in Eastern-Mediterranean Region, it is essential for policy makers to understand the patterns and trends of tobacco use.

1.2 Global tobacco control policies

The United Nations developed a treaty called the World Health Organization Framework Convention on Tobacco Control (WHO FCTC), to counter the tobacco epidemic. The FCTC is considered as the world's first public health treaty and was launched in 2005.¹¹ Since 2005 many countries have adopted the FCTC treaty and there are now 181 signatories.¹² The WHO FCTC is considered a unique opportunity to tackle the tobacco epidemic and to offer tools to develop tobacco control policies which are effective in reducing the health and economic burden of tobacco use.¹¹

To achieve the goals of FCTC measures, it is crucial that ratification should be followed by comprehensive implementation.¹² Although there are 181 countries that have ratified the FCTC treaty, there are many countries where legislation and implementation of FCTC are still challenging, e.g. some Eastern-Mediterranean countries including Egypt.¹³

To facilitate better implementation of FCTC requirements, the World Health Organization (WHO) in 2008 introduced a tool to measure the proper implementation of FCTC. This tool is known as the MPOWER package and consists of six strategies for universal control of the global tobacco epidemic. This package contains six strategies as following.¹¹

1.2.1 Monitor tobacco use and prevention policies

Article 20 of the WHO FCTC states: "...Parties should integrate tobacco surveillance programmes into national, regional and global health surveillance programmes so that data are comparable and can be analysed at the regional and international levels..."¹⁴

Monitoring pattern of tobacco use, and smoke exposure are fundamental to combat the tobacco epidemic. Reliable, regular data is essential to detect the effects of tobacco control measures already in place and to provide evidence for policymakers to advocate for new policy legislation or more efforts and resources to enforce the implementation of current tobacco control policies.⁵

According to WHO FCTC, there are key elements to track regarding tobacco use: i) cigarettes and other forms of smoked tobacco e.g., cigar, and water pipe; ii) smokeless tobacco products; iii) novel and emerging tobacco products; and iv) non-tobacco forms of nicotine e.g., e-cigarettes. Additionally, tobacco industry's activity should be monitored and tracked.

According to the latest report of WHO about global tobacco epidemic in 2021, 78 countries with more than half of the world's population have recent and representative tobacco use monitoring systems for both adults and adolescents. Out of those 78 countries, 46 are high-income ones. No recent surveys (since 2014) were completed in 37 of the world's countries.⁵ Regarding Eastern Mediterranean countries, only half of the countries in the region have surveyed their adult or youth populations in the past 5 years.⁹

1.2.2 Protecting people from tobacco smoke

Article 8 of the WHO FCTC states: "...Parties shall adopt and implement measures providing for protection from exposure to tobacco smoke in indoor workplaces, public transport, indoor public places and, as appropriate, other public places".¹⁴

Fully implemented, smoke-free laws (with no exceptions) are highly effective in decreasing secondhand smoke exposure and enhancing indoor air quality for all individuals. Moreover, smoke-free regulations may encourage smokers to decrease their tobacco use, make a quit attempt, and remain tobacco-free in the long-term.^{15,16} Prevention of secondhand smoke exposure is the focus of this thesis and section 1.4 discusses the health hazards of tobacco smoke exposure.

According to the latest report of WHO about global tobacco epidemic in 2021, there are only 67 countries with 1.8 billion people (24% of the

world's population) covered by best-practice smoke-free laws which is defined as 'all public places completely smoke-free or at least 90% of the population covered by complete subnational smoke-free legislation'.⁵ The complete absence of smoke-free laws or just having minimal laws are not enough to protect people from the harms of second-hand smoke which was the situation in 56 countries covering 30% of global population (18 high-income, 25 middle-income, and 13 low-income countries).⁵ The Eastern-Mediterranean region is the last one in ranking among all WHO regions in implementing smoke free bans in public places with only 15 countries having implemented partial smoke free ban policies.⁹

1.2.3 Offering help to quit tobacco use

Article 14 of the WHO FCTC states: "... Each Party shall ... design and implement effective programmes aimed at promoting the cessation of tobacco use..."¹⁴

When a tobacco user visits a health care centre, it is an opportunity for the health care professionals to provide them with advice regards tobacco quitting and this counselling was evidence to increase the quit rate among tobacco users.¹⁷ Quit lines (e.g., phones) are considered another convenient method for smokers who attempt to quit tobacco use to access counselling. Users of quit lines have increased success chance to quit tobacco than those who attempt to quit without

assistance from quit lines.¹⁸ The use of pharmacotherapy such as nicotine replacement therapy (NRT) to assist quitting tobacco has better chance for success than people who do not use these medications.⁵

In 2021, comprehensive tobacco cessation services are implemented in only 26 countries serving 2.5 billion people who resembles 32% of the world's population. 17 high-income countries and nine middle-income countries offering comprehensive cessation support (National quit line, and both NRT and some cessation services cost-covered). No low-income country currently offer best-practice services.¹⁴ Regarding Eastern Mediterranean region, smoking cessation medications are fully covered in only 5 out of 22 countries (Bahrain, Jordan, Kuwait, Qatar and Saudi Arabia). Smoking cessation programmes remain limited in many Eastern Mediterranean countries including Egypt. Moreover, despite WHO recommendations, cessation services regarding waterpipe smoking is insufficiently addressed.⁹

1.2.4 Warning about the dangers of tobacco

1.2.4.1 Health warning labels

Article 11 of the WHO FCTC states: “.... Each Party shall ... adopt and implement ... effective measures to ensure that ... tobacco product packaging and labelling do not promote a tobacco product by any means that are false, misleading, deceptive or likely to create an

erroneous impression about its characteristics, health effects, hazards or emissions”.¹⁴

An anti-tobacco health warning is most effective when it is pictorial, graphic, comprehensive, large, cover at least half of a package’s surface and strongly worded.¹⁹ Anti-tobacco health warnings can increase risk awareness and quit attempts.²⁰ It can also reduce tobacco consumption.²¹ According to the latest report of WHO about global tobacco epidemic in 2021, strong graphic package warnings are in place in over half of all countries (101 countries) covering over half of the global population (60%). These countries resemble 69% of high-income countries, 50% of middle-income countries and 24% of low-income countries. Regarding Eastern Mediterranean region, health warnings on cigarettes packs are implemented in all countries except one (Somalia). Pictorial health warning labels have been implemented in several countries in the region including Egypt. In 2019, Saudi Arabia became the first country in the region and among the first worldwide countries to introduce plain tobacco packs.⁹

1.2.4.2 Anti-tobacco mass media campaign

Article 12 of the WHO FCTC states: “.....Each Party shall ... promote ... broad access to effective and comprehensive educational and public awareness programmes on the health risks including the addictive characteristics of tobacco consumption and exposure to tobacco

smoke; ... [Each party shall promote] public awareness about the risks of tobacco consumption and exposure to tobacco smoke, and about the benefits of the cessation of tobacco use and tobacco-free lifestyles.....”¹⁴

In 2021, almost half of the world’s population (3.3 billion people) live in a country that has implemented at least one national anti-tobacco mass media campaign including airing on TV and/or radio in the past 2 years.⁵ Tobacco control mass media campaigns have been conducted across most Eastern Mediterranean countries.⁹

1.2.5 Enforcing bans on tobacco advertising, promotions and sponsorship (TAPS)

Article 13 of the WHO FCTC states: “... Comprehensive ban on advertising, promotion and sponsorship would reduce the consumption of tobacco products. Each Party shall ... undertake a comprehensive ban of all tobacco advertising, promotion and sponsorship. ... ”¹⁴

TAPs include ban on all forms of direct and/or indirect advertising and at least 90% of the population should be covered by complete subnational bans according to FCTC. In 2021, only 57 countries (21% of the world’s population) have comprehensive bans on TAPS; 12 are low-income, 31 are middle-income, and 14 are high-income countries. This means that, only one third of low and middle-income countries (LMIC) are covered by comprehensive TAPS bans.⁵ All countries in

Eastern Mediterranean region, except Somalia, have adopted partial or complete countries TAPS bans.⁹

1.2.6 Raising taxes on tobacco products.

Article 6 of the WHO FCTC states: "... [P]rice and tax measures are an effective and important means of reducing tobacco consumption... [Parties should adopt]...measures which may include:...tax policies and...price policies on tobacco products so as to contribute to the health objectives aimed at reducing tobacco consumption"¹⁴

Increased taxes are highly cost-effective in reducing tobacco use as it lead to raise the price of tobacco. Thus, governments should monitor tobacco prices and tax rates relative to real individuals' income.

Government should significantly raise tax rates at regular intervals to ensure that tobacco products do not become more affordable. Two of the main keys of successful tobacco tax administration are to control the supply chain and to use clearly defined procedures to follow after detecting illicit trade of tobacco which should include penalties.²²

In 2020, only 13% of the world's population were protected by tax rates at 75% or more of the price of the most popular brands of cigarettes.

More than half of Eastern Mediterranean countries have total taxes accounting for more than 50% of the retail price, however, waterpipe (shisha) tobacco products are not taxed at the same levels as cigarettes.⁹

1.3 Secondhand smoke (SHS) exposure

SHS exposure is the involuntary inhalation of other people's tobacco smoke by non-smokers.²³ It also known as environmental tobacco smoke (ETS) or passive smoking.

SHS consists of the mainstream smoke (exhaled by a smoker) and side-stream smoke (emitted from the burning end of a cigarette or waterpipe tobacco holder between inhalations). SHS consists of over 4,000 chemicals, more than 70 known to be carcinogenic.²⁴

SHS exposure is responsible for more than one million premature deaths, and more than 36 million disability adjusted life years (DALYs) globally every year.^{6,25,26} In 2021, as discussed in section 1.2.2, The Eastern-Mediterranean region is the last one in ranking among all WHO regions in implementing smoke free bans in public places.⁹ Thus, the implementation of smoke free legislation is still less than optimal in all Eastern-Mediterranean countries including Egypt, which is the focus of this thesis.

1.4 Health hazards of SHS

SHS exposure resembles an earnest public health threat worldwide. The latest report of US General Surgeon published in 2014 reported that there was sufficient evidence to support a causal relationship

between exposure to SHS and increased risk of stroke, coronary heart diseases and lung cancer among non-smoking adults.²⁷

Pregnant women and children are one of the most at risk groups to tobacco smoke due to the great health burden,^{28–30} which maximize the need for scientific research to explore opportunities to reduce SHS exposure among them and other vulnerable groups.

1.4.1 Health hazards of SHS exposure for the foetus

SHS exposure represents a significant threat to the health of pregnant women and their infants.^{31–33} The detrimental effects of SHS exposure begin in utero as the placenta does not provide a barrier to SHS exposure.³⁴

1.4.1.1 Low birth weight

There is growing evidence that SHS exposure increases the risk of low infant birth weight (LBW) infant which is defined as birth weight <2500 g. The 2006 US Surgeon General report about the health consequences of involuntary exposure to tobacco smoke stated that the evidence is sufficient to conclude that there is a causal relationship between maternal exposure to SHS during pregnancy and a reduction in birth weight.³⁵ A meta-analysis conducted in 2016 by J Leonardi-Bee et al. reported that SHS exposure was associated with an increased risk of low birth weight by 32% in prospective studies (odds ratio (OR)

1.32, 95% confidence interval (CI) 1.07 to 1.63) and by 22% in retrospective studies (OR 1.22, 95% CI 1.08 to 1.37),³⁶ which is similar to another meta-analysis conducted in 2010 and reported increased risk of LBW (LBW, < 2,500 g; relative risk (RR) 1.16; 95% CI 0.99–1.36).³⁷

1.4.1.2 Spontaneous abortion and perinatal mortality

The 2006 US Surgeon General report reported that the evidence is inadequate to infer the presence or absence of a causal relationship between exposure to SHS and spontaneous abortion, and neonatal mortality.³⁵ However, a report published in 2010 by the Royal College of Physicians (RCP) concluded that maternal SHS exposure may increase foetal and perinatal mortality.³⁸ The 2014 US Surgeon General report confirmed that the evidence is sufficient to infer that nicotine adversely affects maternal and foetal health during pregnancy, contributing to multiple adverse outcomes such as stillbirth.³⁹ A systematic review and meta-analysis of 98 studies reported that secondhand smoke exposure during pregnancy increased the risk of abortion by 11% (95% CI: 0.95, 1.31).⁴⁰

1.4.1.3 Congenital abnormalities

The 2006 US Surgeon General report reported that the evidence is inadequate to infer the presence or absence of a causal relationship between exposure to SHS and congenital malformations.³⁵ However,

the report published by RCP in 2010, reported that maternal SHS exposure may increase the risk of some congenital abnormalities (particularly of the face and genitourinary system), though the available evidence is not yet conclusive.³⁸

Since the publication of the 2010 RCP report, Salmasi et al. have conducted a systematic review and meta-analysis in 2011 which included 76 articles and reported that SHS exposure during pregnancy increases the risk of congenital anomalies (OR 1.17; 95% CI 1.03–1.34) and a trend towards smaller head circumferences (–0.11 cm; 95% CI –0.22 to 0.01 cm).³⁷ Another systematic review by Sabbagh et. al. in 2015 included 14 articles and reported that maternal SHS exposure was associated with a doubling in the risk of orofacial clefts (OR 2.11, 95% CI 1.54–2.89); however after adjustment for potential confounders, the magnitude of association was a 1.5 fold increase in risk.⁴¹

1.4.1.4 Preterm delivery

The 2006 US Surgeon General report reported that evidence is suggestive but not sufficient to infer a causal relationship between maternal exposure to secondhand smoke during pregnancy and preterm delivery.³⁵ However, a cohort study that included 10,095 non-smoking women in 2014 reported that exposure to SHS during pregnancy was associated with an increased risk of preterm birth (<32

completed weeks of gestation; OR 1.98, 95% CI 1.41, 2.76). The authors reported that the association was consistent for both medically indicated and spontaneous preterm births.⁴² Another recent case control study in 2020 confirmed similar association as the authors reported that, after adjusting confounders, SHS exposure during pregnancy was associated with an increased risk of preterm delivery (OR: 1.92; 95% CI 1.31, 2.81).⁴³

1.4.2 Health hazards of SHS exposure among children

Children's SHS exposure has been linked to an increased risk of a range of health hazards among children; the most important of these are discussed below.

1.4.2.1 Sudden infant death syndrome

The 2006 US General Surgeon report stated that there was sufficient evidence to support causal relationships between SHS exposure and increased risks of sudden infant death syndrome (SIDS),³⁹ which is defined as "the sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history".^{44,45}

The 2010 RCP report concluded that having one or more smokers living in the household more than doubled the risk of SIDS. It reported

that maternal smoking after birth was associated with a more than threefold increase in the risk of SIDS (OR 3.15, 95% CI 2.58-3.85). Smoking among other household members including fathers also increased the risk more than twofold (OR 2.31, 95% CI 1.95-2.73), which was reduced to an OR of 1.45 (95% CI 1.07-1.96) after adjusting for maternal smoking.

1.4.2.2 Respiratory tract infections

The 2006 US Surgeon General reported that the evidence is sufficient to infer a causal relationship between SHS exposure from parental smoking and lower respiratory illnesses in infants and children.

Respiratory tract infection (RTI) is a common childhood illness and it is a public health concern as it can result in severe infections that require hospitalisation.³⁵

A systematic review and meta-analysis including 60 studies explored the association between SHS exposure among children and lower RTIs (bronchitis, bronchiolitis and pneumonia).⁴⁶ There were significantly increased risks of lower RTIs for those infants or young children exposed to any household smoker (OR 1.54, 95% CI, 1.40-1.69), smoking by both parents (OR 1.62, 95% CI 1.38-1.89), father's smoking (OR 1.22, 95% CI 1.10-1.35) and mother's smoking (OR 1.58, 95% CI, 1.45-1.73).⁴⁶ The strongest association was between

bronchiolitis and exposure to tobacco smoke by any household smoker (OR 2.51, 95% CI 1.96-3.21).⁴⁶

1.4.2.3 Wheeze and asthma

There is a substantial evidence to infer a causal relationship between SHS exposure from parental smoking and cough, having asthma, wheeze, and breathlessness among children of school age. A meta-analysis conducted by Tinuoye in 2013 included 20 studies and reported an association between SHS exposure and childhood asthma, with a pooled odds ratio of 1.32 (95% CI 1.23-1.42).⁴⁷ Burke et al. conducted a meta-analysis of 79 studies which concluded that exposure to pre or post-natal SHS was associated with between 30-70% increase in the risk of wheeze, and 21- 85% increase in the risk in asthma, with the strongest effect from prenatal maternal smoking on asthma in children aged 2 years and under (OR = 1.85, 95% CI = 1.35-2.53).⁴⁸ Regarding wheeze, the authors reported that exposure to SHS at home was associated with an increased risk of wheeze among children aged 5 -18 years (OR 1.32, 95% CI 1.12- 1.55) and in infants aged 2 years and under (OR 1.35,95% CI 1.10-1.64).⁴⁸

1.4.2.4 Middle ear infections

There is robust evidence that exposure to SHS increases the risks of middle ear disease in children. The 2006 US Surgeon General report concluded that the evidence is sufficient to infer a causal relationship

between SHS exposure and middle ear disease in children, including acute and recurrent otitis media and chronic middle ear effusion.³⁵ A meta-analysis conducted by Jones et al. in 2012 concluded that exposure to maternal smoking among children was associated with an increased risk of middle ear infections (OR 1.62, 95% CI 1.33-1.97), however, children's exposure to SHS from other household smoker (not the mother) increase the risk of middle ear infection by 37% (OR 1.37, 95% CI, 1.25-1.50).⁴⁹ Middle ear infections among children have multiple complications including decreasing hearing ability, which can negatively affect academic performance of children and might result in behavioural problems in school.⁵⁰

1.4.2.5 Invasive meningococcal disease

Invasive meningococcal disease is a significant cause of morbidity and mortality among children and young adults.⁵¹ The fatality rate is just under 5% of cases; however, around 16% of cases have increased risk of intellectual disability, deafness, epilepsy or spasticity.⁵² Murray RL et al. conducted a systematic review and meta-analysis which included 18 studies and reported that exposure to SHS in the home increased the risk of invasive meningococcal disease among children more than twofold (OR 2.18, 95% CI 1.63-2.92). The strongest association was for children aged 5 years and under (OR 2.48, 95% CI 1.51-4.09).⁵³

1.4.2.6 Psychological and behavioural problems

The 2006 US Surgeon General report reported that the evidence was inadequate to infer the presence or absence of a causal relationship between exposure to secondhand smoke and cognitive functioning and behavioural problems among children. Since the publication of this report, Huang et al. conducted a systematic review and meta-analysis in 2018 to explore the association between SHS exposure among children and attention-deficit/hyperactivity disorder (ADHD) in offspring with fifteen cohort studies and 5 case-control studies included. The authors found that maternal smoking increased the risk of offspring ADHD (OR: 1.60; 95% CI: 1.45–1.76). The risk of ADHD was greater for children whose mothers were heavy smokers (OR: 1.75; 95% CI: 1.51–2.02) than for those whose mothers were light smokers (OR: 1.54; 95% CI: 1.40–1.70).⁵⁴

1.4.2.7 Increased likelihood of smoking uptake

2010 RCP report “The Passive Smoking and Children” reported that having a role model in the household like parents, siblings or other household members who smoke and exposure to SHS resulted from their smoke as a substantial risk factor for smoking initiation among children and adolescents.³⁸ Since the publication of this report, a more recent meta-analysis including 58 studies evidenced that smoking of both parents, raised the risk of smoking uptake among children by

almost three folds (OR 2.73, 95% CI 2.28-3.28).⁵⁵ The risk of smoking uptake among children was 72% (95% CI 1.59-1.86) if there were one parent who smoke, however the risk raised to be more than two folds if that parent who smoke was the mother (OR 2.19, 95% CI 1.73-2.79). Paternal smoking (OR 1.66, 95% CI 1.42-1.94) and sibling smoking (OR 2.3, 95% CI 1.85-2.86) were significantly associated with increased risk of smoking uptake.⁵⁵

More recently, a robust systematic review reported that SHS exposure was associated with greater likelihood of being a smoker, increased susceptibility and initiation of smoking, greater nicotine dependence among non-smokers, and poorer smoking cessation.⁵⁶

Lee et.al.⁵⁷ in 2016 examined the relation between SHS exposure at home and in public places and the susceptibility to initiate smoking among never smoking adolescents. They used 2006-2011 Global Youth Tobacco Survey (GYTS) data from 29 African countries (with 56,967 students were included). Among never smokers, the prevalence of susceptibility to initiate cigarette smoking was 1.2 to 2.6 higher among those exposed to SHS at home compared to those not exposed at home. Moreover, the prevalence of susceptibility to initiate cigarette smoking was 0.5 to 3.5 higher among those exposed to SHS in public places compared to those not exposed in public places. The authors concluded that never smokers who were exposed to SHS at home and

in public places had a higher susceptibility to initiate smoking than those that were not exposed to SHS at home and in public places.⁵⁷

The evidence highlights that beside causing direct health hazards, children's exposure to SHS at the home can have behavioural consequence as smoking uptake which leads to preventable further morbidities and mortalities associated with being a smoker.⁵⁵

1.4.2.8 Social cost of child SHS exposure

As discussed above, SHS exposure among children increases the risk of a range of diseases. Thus it could be expected that exposure of children to SHS in the home may be one of the reasons of children's absenteeism from school due to health reasons. Missing days in school is a significant social cost of children's SHS exposure at home. There is robust evidence that SHS exposure at home causes respiratory tract diseases as mentioned above.

Gilliland et.al.⁵⁸ explored the risk factors for respiratory-illness-related school absences among children in 2003. After adjusting for sociodemographic factors, the authors reported that SHS exposure was associated with an increased risk of respiratory-illness-related school absences (RR 1.27, 95% CI 1.04, 1.56). Children living in a home with two or more smokers were at increased risk of such absences (RR 1.75, 95% CI: 1.33, 2.30). Children with asthma were at increased risk of respiratory-illness-related school absences when

exposed to SHS from one (RR 2.35, 95% CI: 1.49, 3.71) or two or more (RR 4.45, 95% CI: 2.80, 7.07) households who smoke.⁵⁸ Children without asthma also had an increased risk of school absences because of respiratory illness if exposed to two or more households who smoke (RR = 1.44, 95% CI: 1.04, 2.00) compared with unexposed children without asthma. Therefore, the authors concluded that SHS exposure is associated with increased respiratory-related school absenteeism among children.⁵⁸

More recently, Levy et al.⁵⁹ in 2011 emphasised that children who lived with two or more household smokers had 1.54 (95% CI 0.95-2.12) additional days absent from school compared to children who did not have household members who smoke. Children who were exposed to SHS by at least one household member who smoke had 1.06 (95% CI 0.54-1.55) additional days absent from school annually.⁵⁹

It is difficult to control all possible confounding factors when investigating the association between SHS exposure and children's school absence due to the effect of familial, parental psychological or social factors which might not have been included in the analysis in the above literature. Thus, further research is needed to explore the role of different family and home circumstances more widely. Given that, as mentioned in the 2021 WHO global tobacco epidemic report,⁵ SHS exposure is more common among Eastern Mediterranean countries,

and SHS exposure might increase the risk of respiratory-illness-related school absences.

1.4.2.9 Economic cost of child SHS exposure

The economic cost associated with SHS exposure in children is significant. The 2010 RCP report estimated the annual the cost of child SHS exposure to the United Kingdom National Health System (UK NHS) to be approximately £9.1 million due to primary care consultations and asthma treatment costs and £13.6 million due to hospital admissions.³⁸ The authors estimated the future national healthcare costs associated with the increase in smoking uptake among UK population (who starts consuming tobacco as a result of exposure to parental smoking) to be £5.7 million per year. They added work breaks due to smoking-related disease are expected to attribute to £72 million as a future workplace costs.³⁸ In Germany, the healthcare costs of children exposed to SHS inside home and on patios/balconies are higher than those not exposed by 45% and 26%, respectively.⁶⁰

As Middle Eastern countries have a high prevalence of SHS exposure among adults and children, the cost is expected to be higher.

Koronaïou et al. explored the economic burden of SHS exposure in the Gulf countries. The health care costs associated with treating health

conditions due to SHS exposure are estimated to be approximately \$7.1 billion in 2021 in the Gulf Cooperation Council countries.⁶¹

1.4.3 Summary

SHS exposure during pregnancy is a preventable risk factor for foetal developmental problems; it contributes to adverse perinatal and postnatal outcomes, often with a lasting and negative impact during infancy and beyond. Childhood SHS exposure is a significant cause of ill health and mortality, and poses a substantial economic burden through associated health costs, behavioural issues and increased likelihood of smoking uptake in adulthood. There is substantial evidence that SHS exposure among infants and children increase risk of SIDS, respiratory tract infections, asthma and wheezing, middle ear infection, invasive meningococcal disease, behavioural and psychological problem, and smoking uptake. Many of these illnesses may require hospitalisation, which, if prolonged, could impact upon child development. Thus, the impact of these diseases could have a wide-ranging negative impact on a child's life, for example, academic performance and behaviour which could be completely preventable. Therefore, preventing SHS exposure among pregnant women and children should be a public health priority.

1.5 Prevalence of SHS exposure, with a focus on Eastern Mediterranean countries

According to a retrospective analysis of data from 192 countries, an estimated 40% of children, 33% of non-smoking men, and 35% of non-smoking women globally were exposed to SHS in 2004.⁶² In a study conducted by WHO across 11 Eastern Mediterranean countries in 2012, SHS exposure was reported in about 30% of educational facilities, health care facilities and indoor offices; however, it was about 50% on public transport and almost 66% at recreational venues. According to this survey, in Egypt SHS exposure was reported in nearly 99% of public transport vehicles, 70% of recreational venues, 70% of health venues, and 10% of public offices.⁶³

1.5.1 SHS exposure among non-smoking women

A global survey conducted in 2006 among adult non-smoking women in Latin America, Asia, Eastern Europe, and the Middle East using nicotine concentration in hair as a SHS exposure measure reported that nicotine was found in 78% of women living with a smoker, and in approximately 60% of women not living with a smoker as they were exposed to SHS outside the home.⁶⁴ In Eastern Mediterranean countries, proportions of women exposed to SHS outside the home in, as a percent of all women, were 60% (Egypt), 67% (Syria), and 79% (Turkey).⁶⁴

A recent study in 2022 exploring the prevalence of SHS exposure at home among women in 57 LMICs reported that the prevalence was highest in Eastern Mediterranean countries (41.9%, range: 41.1% – 42.7%) with higher prevalence of daily SHS exposure at home among pregnant women than non-pregnant women in most countries.⁶⁵

A population-based study in 2019 analysed data from Demographic and Health Survey (DHS) from 30 LMICs and reported that SHS exposure among pregnant women ranged from 7% in Nigeria to 81% in Armenia. In all 30 included countries, daily SHS exposure was highest among Egyptian pregnant women (47%). Moreover, the authors reported that in Egypt, household SHS exposure was 156 times more prevalent than active smoking in pregnancy (0.5%).⁶⁶ Data from individual studies confirms that a high proportion (more than 80%) of pregnant women in Middle Eastern countries are exposed to SHS.^{67,68}

1.5.2 SHS exposure among children

A recent retrospective analysis of data from 142 countries based on the most recent surveys (2010 - 2018) reported that the global prevalence of SHS exposure among adolescents aged 12–16 years at home was 33.1% (95% CI 32.1–34.1) on 1 or more days, and 12.3% (11.7–13.0) daily during the past 7 days; and in public places the prevalence of SHS exposure was 57.6% (56.4–58.8) on 1 or more days, and 23.5% (22.5–24.5) daily during the past 7 days.⁶⁹

A survey in 2016 including 21 countries reported that SHS exposure at home ranged from 4.5% to 79% (Indonesia) among children aged 15 years and under.³⁰ The authors reported that 64% of Egyptian children were exposed to SHS in the home.³⁰ Another study in 2016 included 26 LMICs reported that 32% (range 6% to 70% in Indonesia) of children aged 0–5 years were exposed to SHS on a daily basis at home.⁷⁰

1.5.3 Summary

Despite the above data coming from a variety of data sources, countries and measured in different ways, the key message is consistent which is that SHS exposure is a global prevalent public health problem and the situation is worse in Eastern Mediterranean countries including Egypt.

Regarding non-smoking pregnant women and children in Eastern Mediterranean region including Egypt, they are exposing to SHS at home and in public places more than other regions globally which reflect what has been mentioned in section 1.2.2 that Eastern Mediterranean region is the last one in ranking among all WHO regions in implementing smoke free bans in public places.

1.6 Factors related to SHS exposure among pregnant women and children

1.6.1 Factors related to SHS exposure among children and pregnant women globally

Regarding SHS exposure among children, parental smoking,⁵¹ poverty and low socioeconomic status (SES),⁷⁰⁻⁷³ lack of knowledge of parents about health risks of SHS on children,⁷⁴⁻⁷⁷ lower parental educational status have been reported to significantly increase the risk of SHS exposure among children at home.⁵¹ The strongest predictor of children's SHS exposure at home — as reported by a systematic review of 41 studies from 20 different countries — was having two smoking parents.⁵¹ Parents who had negative attitudes and beliefs regarding SHS exposure were less likely to let their children be exposed.⁵¹

Regarding SHS exposure among non-smoking pregnant women, having smoked previously, having more than one household smoker, women's low educational level, low socio-economic class, being unemployed, being primiparous, unwanted pregnancies, older age, lower educational levels and unemployment of husbands were reported as risk factors of SHS exposure among non-smoking pregnant women.^{73,78-81} A recent systematic review added that lack of awareness among family members regarding harms of SHS exposure

on pregnant woman and her foetus, lack of knowledge about measures for protection from SHS among women, no smoking restrictions in home or workplace, helplessness among women and a feeling of being not supported by other family members for a smoke free home, and health professionals not providing any information and advice were classified as predictors of SHS exposure among women and children.⁸²

1.6.2 Factors related to SHS exposure among pregnant women and children in Eastern Mediterranean countries

Due to strong cultural constraints against women's smoking in many Eastern Mediterranean countries,^{32,83} the prevalence of tobacco smoking is much higher among men than women,^{32,83} which puts non-smoking women and children at high risk of SHS exposure. Many people in Eastern Mediterranean region have not acquired negative attitudes toward SHS exposure and many social norms are linked to smoking in Eastern Mediterranean countries. The social norm of “perceived smoking as an important character” among cigarettes smokers (OR 1.35, 95% CI 1.05-2.70) and among shisha smokers (OR 1.58, 95%CI 1.09-2.27) and the norm of “smoking makes gatherings friendly” among cigarettes smokers (OR 3.62, 95%CI 2.46-12.51) and among shisha smokers (OR 6.16, 95% CI 2.37-9.01) were associated with cigarettes and shisha smoking among Iranian adolescents.⁸⁴

Smoking ban in homes was significantly higher for employed mothers, for those who did not have any smoker friends or relatives, for those smoking a smaller number of cigarettes, and for parents who were worried about the health hazards of smoke exposure to their infant in Iran and Turkey.^{80,81,85}

The level of awareness of the hazards of SHS exposure varies significantly across Eastern Mediterranean countries. Although there have been studies that reported that women were aware of the danger of SHS in Saudi Arabia, Iran, and Jordan,^{32,86,87} studies carried out in Iran, Kuwait, and Egypt reported that lack of knowledge was one of the barriers to preventing SHS exposure among women and children.^{88–90} Interestingly, even in studies reporting a good level of knowledge about the health hazards of SHS, women's behaviour related to avoidance of SHS exposure was minimal,³² with no restrictions on indoor home smoking of residents and guests in spite of the presence of children.^{87,91} It is also reported that women, who agreed with prohibiting smoking in public places, family events and at home, felt less comfortable with asking smokers not to smoke next to them.⁹² School children are aware as well of dangers of exposure to smoke, however they found it is "not easy" to avoid SHS exposure.⁹³ Exploring barriers and facilitators of pregnant women/mothers of children to avoid SHS exposure in one of Eastern Mediterranean countries — Egypt — is discussed in chapter 5.

1.7 Reducing SHS exposure among pregnant women and children

1.7.1 Barriers and facilitators of preventing SHS exposure among pregnant women and children in the home and in public places

Supporting smoke-free homes (SFHs) is an effective strategy to protect children and adults from SHS exposure.⁹⁴ Being smoke-free can improve the air quality of the home environment, and can increase the attempts among parents who smoke to quit smoking.⁹⁵

Two previous qualitative systematic reviews have investigated the barriers and motivators to establishing SFHs in developed countries.^{75,96} The authors reported the following barriers to adopting SFHs: (i) presence of many family members who were smokers living in the same home, especially if they perceived benefits of smoking; (ii) lack of confidence among women to ask family members or guests not to smoke in the home; (iii) feelings of powerlessness in women to modify their environment; (iv) social norms and gender imbalances contributing to a lack of personal agency of women; (v) cultural considerations when socializing and sharing cigarettes; and (vi) fear among women of damaging a relationship with family members and

guests as a result of adopting a SFH, especially where there were socioeconomic issues, such as unemployment and overcrowding.^{75,96}

The authors also identified the following themes as motivators of adopting SFHs: (i) success stories and role modelling of elders who had quit smoking; (ii) presence of a new-born baby or an elder in the home; (iii) wider community norms of SFHs as individuals influence each other to adopt SFHs and avoid stigma; (iv) sense of guilt; and (v) perceived benefits of having SFHs. Individuals who were aware of the dangers of SHS exposure were motivated to adopt SFHs.

The perceived barriers and facilitators for preventing SHS exposure among women and children in the home or public places may be different in Eastern Mediterranean countries compared with developed countries.^{32,97} Eastern Mediterranean countries generally have conservative cultures,³² specific social norms, and male-dominated societies; moreover, SHS exposure among non-smoking women and children in these countries is high.^{64,66,98} Several qualitative studies and cross-sectional surveys have been conducted in Eastern Mediterranean countries regarding SHS exposure among women and children,^{32,86–88,91,97} thus, the qualitative systematic review in chapter 3 synthesizes this evidence.

1.7.2 Role of Health care professionals in prevention of SHS exposure among pregnant women and children

There is growing international evidence on the positive effects of interventions aimed at decreasing SHS exposure among pregnant women. Two systematic reviews of clinical interventions to reduce SHS exposure among pregnant women which included studies from the USA, China, Iran and Australia reported that the clinical interventions delivered by health care professionals in prenatal care settings found that a higher percentage of pregnant women avoided SHS exposure, and stopped their husbands from smoking in front of them, and a higher percentage of husbands attempted to quit in intervention group; all included interventions encouraged household members to quit smoking.^{99,100} The interventions conducted in all these studies were different health education programs for pregnant non-smoking women about the health hazards of SHS. Some of the included interventions delivered a follow-up reminder with promotion of creating SFHs. The authors recommended that HCPs should, as a minimum, deliver enough information to pregnant women about the dangers of SHS exposure from all types of smoked tobacco, besides providing them with strategies about how to reduce SHS exposure at home and how to encourage their household smokers to quit smoking.^{99,100} A more recent systematic review published in 2017 reported that behavioural change interventions led to increased knowledge about the harms of

SHS among pregnant women, increased smoking quit rate among husbands, and increased positive attitude and practice to reduce SHS at home.¹⁰¹ These interventions included one or more of the following: "advice from doctors", "a telephone hot-line", "face-to-face consultation" session, "motivational interviews, video, role play, information booklet", and reminder text messages about the negative impacts of SHS.¹⁰¹

Regarding the reduction of SHS exposure among children, a systematic review published in 2018 did not conclusively demonstrate the effectiveness of any interventional approach to reduce children's SHS exposure, and thus the authors concluded that there remains a need for novel, evidence-based interventions in this area.¹⁰² However, another systematic review in 2020 which included sixteen controlled trials to reduce parent/caregiver smoking or SHS exposure among children less than 12 years demonstrated a statistically significant benefit on providing interventions using behaviour change techniques to reduce SHS exposure among children compared to providing another interventions or usual care by HCPs at health care centres. The authors defined "promising" behaviour change interventions as those present in at least 25% of effective interventions in reducing SHS exposure among children 6 months or more from baseline. All trials used counselling in combination with self-help or other supporting materials. The identified promising behaviour change interventions

centred on education, setting goals and planning, or support to reach goals.¹⁰³

Little evidence is available regarding the effectiveness of interventions delivered by HCPs to decrease SHS exposure among pregnant women and children in East Mediterranean countries. A randomized controlled trial was conducted in 2016 in Saudi Arabia to compare the effectiveness of face-to-face counselling and health education using a written pamphlet only, in improving pregnant women's perceptions, behaviour to avoid SHS and change in exposure to SHS. All included women identified their husband as a source of SHS exposure. Following the intervention, the intervention group had significantly higher scores regarding perceived susceptibility/severity of SHS exposure. However, there was insignificant change in the exposure to SHS after the intervention in both intervention and control groups; where the majority of women in both groups continued to be exposed to SHS.¹⁰⁴

Some South Asian countries suffers from high level of SHS exposure among pregnant women and children.⁶⁶ Evidence from these countries might be beneficial for the current thesis. An adapted smoke free home (SFHs) intervention has been delivered in a semi-rural community to primary school children in Pakistan by HCPs and community leaders. This intervention designed to encourage families to voluntary restrict smoking at home to decrease SHS exposure. The authors reported an

increase in the proportion of SFHs from 43% (95%CI 37.4–48.2) to 85% (95%CI 80.9–89.2) after three months from implementation of the intervention and there was a reduction in self-reported smoking prevalence from 44% (95%CI 39–48) to 28% (95%CI 24–33) among adult males.¹⁰⁵ However this study has some limitations. It was not a controlled trial, compared self-reported smoking behaviour and smoking restrictions and did not use objective measures (e.g., salivary cotinine levels) to validate change in exposure to SHS.

1.8 Conclusion

SHS exposure during pregnancy and childhood is the cause of significant health morbidity among pregnant women and children. These adverse effects are entirely avoidable. Therefore, it is a public health priority to prevent SHS exposure among pregnant women and children. For pregnant women it has potential negative impacts on women's reproductive health, antenatal, and postnatal outcomes; these adverse effects may last during infancy and beyond. For children, SHS exposure causes many physical, behavioural and psychological drawbacks that interfere with their wellbeing. More than one third of non-smoking women and children are exposed to SHS globally; the percentages are higher (more than 60%) in many East Mediterranean countries, including Egypt.

1.9 Thesis rationale

Given the entirely avoidable health hazards of SHS exposure to non-smoking pregnant women and children, high prevalence of exposure among them in Middle Eastern countries, and the high economic burden for treating health conditions due to SHS exposure, it is essential for scientific research to explore this issue to suggest approaches to decrease SHS exposure among pregnant women and children in Middle Eastern countries. Thus, the current research was conducted to explore the current situation of SHS exposure among pregnant women and children in Middle Eastern countries with focus on Egypt, barriers and facilitators for prevention of SHS exposure, and to suggest possible approaches to achieve this.

There is clear evidence that Egyptians are suffering from high level of SHS exposure,¹⁰⁶ thus a case study was performed using published studies and reports to provide a comprehensive overview of tobacco use, its consequences, and legislations of tobacco control in Egypt, and to explore how current situation complies with international recommendations. For in-depth understanding of barriers and facilitators for preventing that exposure among pregnant women and children in whole Middle Eastern countries, a systematic review for synthesis of qualitative evidence was performed. There is robust evidence that HCPs can help pregnant women and children to decrease or even prevent her exposure to SHS.^{99,101} Therefore, a

survey was conducted to explore the knowledge, attitude and counselling practice of HCPs in antenatal care clinic in Egypt regarding prevention of SHS exposure among pregnant women and children. Moreover, a qualitative study was conducted to explore Egyptian pregnant women's/mothers' of children knowledge about dangers of SHS exposure, barriers and facilitators for SHS exposure, their experiences and views regarding that exposure, smoking behaviour at home.

1.10 Thesis aim and specific objectives

The overall aim of this thesis is to investigate SHS exposure among pregnant women and children in Middle Eastern countries with focus on Egypt, barriers and facilitators to reduce it, and to come up with recommendations on how to reduce the exposure. The specific objectives are:

1. To explore tobacco use and tobacco control policies in Egypt.
2. To synthesize the experiences and views of parents on SHS exposure prevention in Middle Eastern countries.
3. To assess Egyptian healthcare professionals' knowledge, attitudes and practice regarding SHS exposure among pregnant women/children.
4. To explore experiences, barriers and motivators to prevent SHS exposure among pregnant women and children in Egypt.

1.11 Outline of thesis chapters

Chapter 2 identifies, through a case study, tobacco use patterns and tobacco control policies in Egypt. (Objective 1)

Chapter 3, through a systematic review of the literature identifies, appraises, and synthesizes the evidence related to experiences and views of parents on the prevention of SHS exposure to pregnant women and children in Middle Eastern countries. (Objective 2)

Chapter 4 identifies, through a cross sectional study, Egyptian healthcare professionals' knowledge, attitudes and practice regarding SHS exposure among pregnant women/children (Objective 3)

Chapter 5 describes qualitative focus group discussions conducted with pregnant women/mothers of children to report the experiences of pregnant women/mothers of children regarding SHS exposure, the barriers and motivators to preventing SHS exposure and suggestions for the best approach to reduce their SHS exposure. (Objective 3)

Chapter 6 summarises the key findings from the research, highlights the implications for the development of future interventions and policy to prevent or reduce SHS exposure among pregnant women and children and suggests directions for future research.

2 CHAPTER 2 CASE STUDY OF TOBACCO USE, AND CONTROL POLICES IN EGYPT

2.1 Introduction

As described in chapter 1, tobacco use is a major preventable cause of morbidity and mortality.^{25,107} According to WHO statistics globally, more than eight million people die annually due to the use of tobacco and this number is expected to be 450 million deaths during the upcoming 50 years. Globally, more than one million die annually from exposure to SHS.^{4,107} Aside from the years of potential life lost, an estimated US\$ 616 million were spent yearly in Egypt for treatment of diseases caused by tobacco use.¹⁰⁶

In Egypt, as in many middle-income countries, efficient tobacco control and prevention system were hindered by unreliable statistics on tobacco use until the launch of The Global Adult Tobacco Survey (GATS) in 2009.¹⁰⁶ To monitor the tobacco epidemic, an effective surveillance system is a critical component of a comprehensive tobacco control programme. GATS provided the first reliable and comprehensive estimates of tobacco consumption in Egypt as well as data on SHS exposure and the implementation of tobacco control policies.¹⁰⁶

Essential steps have been taken in controlling tobacco use in Egypt but smoking and in particular SHS exposure remains highly prevalent. Due to the health and economic burdens of tobacco use and SHS

exposure, it is important for Egypt to take further measures to tackle tobacco use.⁷

2.2 Rationale and aims of the chapter

In Egypt, existing data confirms that tobacco use and more specifically SHS exposure is a major problem requiring urgent action.^{106,108–110}

Therefore, this case study has been performed using published studies and reports with the goal of providing a comprehensive overview of tobacco use, its consequences, and legislations of tobacco control in Egypt, exploring how current situation complies with international recommendations e.g. WHO FCTC. The case study could guide future studies to be conducted later in this PhD. It might also help to inform the future tobacco related research in Egypt and will be valuable to policymakers trying to tackle the burden of tobacco use in Egypt.

Egypt is selected as it is one of the biggest Arab countries. it is the 3rd most populous country in Africa, the 15th most populous in the world.¹¹¹ Geographically it is situated in a strategic site in the middle of Arab world and has a good political relation with other countries. It is also the researcher's home country.

2.2.1 Overall aims

1. To describe data on patterns of tobacco use, the burden of tobacco-attributable mortality, and health and economic burden of consuming tobacco.
2. To explore existing tobacco control legislations and policies, besides the implementation and enforcement of these policies in Egypt.

2.3 Methods

2.3.1 Case Study Methodology

Using Raw, McNeill & Murray's case study methodology as a guide,¹¹² the present case study reported basic country data – such as information on the population, economy and healthcare system; a situational analysis of tobacco use; and key elements of the country's legislations for tobacco control. Basic country data could help in understanding social and economic factors related to tobacco use and how tobacco related morbidities could be managed through the health system. The data on the population consisted of the median age of the population, percentage of population aged younger than 15 years and the official language. The data on the economy comprised information on the principal economic sectors in terms of budgetary incomes and size of workforce and national employment statistics. The section covering the system of health care in Egypt reported data on the organization of the healthcare system, its population coverage, and

governmental expenditure on health system. The data regarding tobacco use covered the levels of and trends in tobacco use including differences by gender, age, and education, types of tobacco used and frequency of tobacco use. The case study also described the health and economic burden of tobacco use in Egypt. Finally, it provided an overview of existing tobacco control policies and the implementation, enforcement of these policies, with reference to the FCTC, and tobacco taxations and economics.

2.3.2 Literature Search Strategy and Data Sources

Data were identified through an extensive search of relevant online sources in 2020. Published sources (Google and Google Scholar) and bibliographic databases (PubMed) were searched in 2020. The Global burden of diseases (GBD) database was searched to provide data on health burden of tobacco use in Egypt.²⁶ GBD uses Disability Adjusted Life Years (DALYs) to measure the burden of disease by that the years of life lost to disease and the years of life lived with disability as a result of disease can be valued, and the tool also can combine both.²⁶ The WHO universal health coverage database (UHC) was also searched to provide data about health service coverage in Egypt.¹¹³ The websites of the following organizations were searched: World Data Bank,¹¹⁴ WHO,¹¹⁵ the Egyptian Ministry of Health,¹¹⁶ Central Agency of Public Mobilization and Statistics (CAPMS) for Egyptian census,¹¹⁷ Economist Intelligence Unit,¹¹⁸ and Centres for Disease Control and Prevention.¹¹⁹

Various combinations and permutations of the following keywords were used to obtain relevant literature: Egypt, tobacco, cigarette, smoking, waterpipe or Shisha smoking, second-hand smoke, incidence, prevalence, tobacco control policy, survey, tobacco-related, smoking-related, morbidity, mortality and population.

Identified publications included also web pages, electronic reports such as GATS report in Egypt,¹⁰⁶ demographic and Health Surveys,^{110,120,121} and WHO reports about tobacco epidemic.^{10,107,122}

2.4 Basic country information

2.4.1 Geography

Egypt, officially The Arab Republic of Egypt, is located on the northeast corner of Africa. Egypt is a Mediterranean country, with an extension into Sinai. It is bordered by the Red Sea to the east, Libya to the west, Sudan to the south, and the Mediterranean Sea to the north.¹²³

MAP OF EGYPT

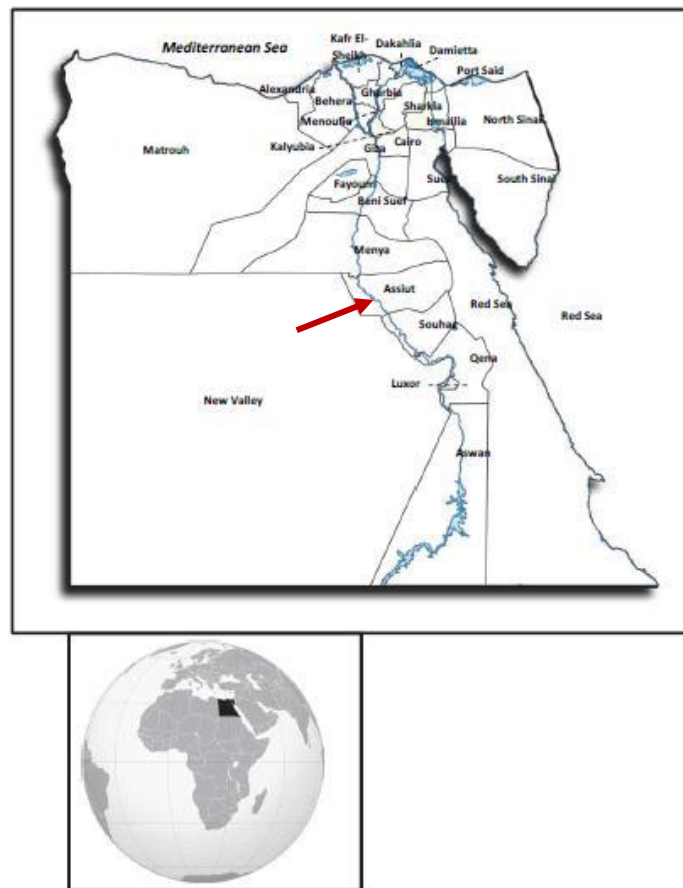


Figure 1 Map of Egypt, Source: Demographic and Health survey 2014, Egypt ¹¹⁰

Egypt the most populous country in the Arab world, which consists of 22 countries. The whole area of the country covers nearly one million square kilometres. The desert forms most of the land, and only about 8% of Egypt's area is inhabited. Most of Egyptians live either in the Nile Delta (the northern part of the country) or in the narrow Nile Valley south of Cairo, the capital. ^{123,124}

Administratively, Egypt is made up of 27 governorates (Figure1). There are four Urban Governorates with no rural community (Cairo, Alexandria, Port Said, and Suez). The other 23 governorates consist of urban and rural areas. The "Nile Delta" (Lower Egypt) consists of nine governorates and, the "Nile Valley" (Upper Egypt) consists of another nine governorates, and the remaining five governorates are located on both eastern and western Egyptian boundaries. Egypt lies primarily between latitudes 22° and 32° N, and longitudes 25° and 35° E. Regarding total area, Egypt is considered to be the world's 30th-largest country.¹²³

2.4.2 Demography

In 2006, the population of Egypt was 72 million. Then, the population increased rapidly reaching nearly 84 million by 2013. Nearly 57% of the Egyptians lived in rural areas in 2013. The distribution of the population by urban-rural residence has been static since the mid-1990s.^{110,116,117}

In 2022 the estimated Egyptian population was 103.58 million with a median age of 24.6 years and 34% under the age of 15 years.^{114,117}

The life expectancy at birth male/female (years) was 70/75.¹¹⁴ Arabic is the official language. The illiteracy rate was 25.8% in 2017.¹¹⁷ The literacy rate in Egypt is considered relatively low compared to some Middle Eastern countries such as Jordan, Lebanon, Oman, and Tunisia where the literacy rate exceeded 95% .¹²⁵

2.4.3 Economy

Occupying the northeast corner of Africa, Egypt is divided by the highly fertile Nile valley in which most economic activity takes place. Egypt's economy was highly centralized during the period from 1956-1970 but opened from 1970 – 2011. Agriculture, tourism, hydrocarbons, manufacturing, media, and other service sectors command the country's diverse economic activity.¹²⁴ Egypt is considered a middle-income country, relying on remittances from Egyptians working abroad mainly in Libya, Saudi Arabia, the Persian Gulf and Europe, and revenues from the Suez Canal and oil, as its main sources of income.¹²⁶

Over the past three decades Egyptians have suffered from poor living conditions and restricted job opportunities. These social and economic issues were a predominant factor leading to the January 2011 revolution that drove out the former president Mubarak. Due to the unsteadiness of security, policy, and political environment since 2011, economic growth has stalled leading to failure to reduce persistent unemployment, especially among the youth.¹²⁷

In late 2016, Cairo turned to the International Monetary Fund for a 3-year, \$12 billion loan program. To secure the deal of the loan program, Cairo floated the Egyptian pound, imposed new taxes, and cut energy aids - all of which pushed inflation to more than 30% for most of 2017.

The foreign investment in Egypt's high interest treasury bills has risen exponentially, since the currency float and this has resulted in soaring up both dollar availability and central bank reserves.^{124,128}

The Central intelligence Agency has reported that the industrial production growth rate in Egypt was 3.5%, labour force was 24.1 million and unemployment rate in Egypt was 7.9% in 2019.¹²⁴ CAPMAS survey addressing income and expenditures reported that about 28% of the Egyptian population is currently living below the poverty line. The poverty line is defined as the minimum income considered adequate for an individual to meet his basic needs and in Egypt it is estimated to be LE 833 (36.99 £) per month in 2019.¹²⁹

Gross domestic product (GDP) is a quick measure of the market value of all the final goods and services produced in a specific period of time, often annually. Egypt GDP in 2020 was 404.14 billion USD according to the world bank compared to 815.27 billion USD of a neighbouring country (Turkey).¹³⁰ GDP growth averaged 4.07 % from 1992 until 2017, reaching an all-time high of 7.70 % in 2007, a record low of -3.80 % in 2011 and 3.3 % in 2021 compared to 11% in 2021 in Turkey.¹³⁰

2.4.4 Politics

The current prime minister and head of government, in office since 2018 is Mustafa Madbouly. The politics of Egypt is based

on republicanism, The House of Representatives, whose members are elected to serve five-year terms, specializes in legislation.¹³¹

In 2014, the government declared economic recovery and re-establishing public security as governmental priorities. To achieve these two main goals the government defined five core axes to be tackled: 1) Protection of national security, 2) Improving the standard of living of citizens taking into account the rights of the poorest and mostly marginalized groups, 3) Economic development and efficiency of the government's performance, 4) Developing and building the Egyptian citizen, and 5) Developing Egypt's foreign policy.¹³²

2.4.5 Healthcare system in Egypt

2.4.5.1 Health expenditure in Egypt

Governmental health expenditure represented approximately one-third of the total health expenditure (THE). THE as a percentage of GDP was 5.6% in 2014, representing a decrease from 6.3% in 2011.¹³³ In 2014 total expenditure on healthcare estimated to be around US\$ 16 billion meaning that health care expenditure per capita was only US\$ 178, compared to over US\$ 1,000 in most of the Gulf cooperation council (GCC) countries, for example United Arab Emirates (UAE) had health expenditure per capita of US\$ 1,611.¹³³

2.4.5.2 Health service coverage

Egypt has a highly complicated health care system, with many different public and private providers and financing agents. According to WHO UHC tool in 2015, the service coverage index in Egypt was 68%.¹¹³

The UHC service coverage index is an indicator of coverage of essential health services based on interventions which include maternal and child health services, infectious diseases, non-communicable diseases health services and service capacity and access among the general and the most disadvantaged population.¹¹³

This health coverage is lower than high income countries such as the UK, which has a UHC index of $\geq 80\%$, but similar to many Middle Eastern countries such as Saudi Arabia and UEA where UHC is 68% and 63%, respectively.¹¹³

The Egyptian Ministry of Health and Population (MOHP) is currently the major provider of primary, preventive, and curative care, the following three sectors direct, finance and provide the health services in Egypt.^{134,135}

The government sector: receives funding from the Ministry of Finance and uses integrated delivery system to manage the governmental health services which are directed and provided by the MOHP.¹³⁶

The private sector includes non-governmental organizations such as religiously affiliated clinics, charitable organizations and profit

organizations. These organizations cover everything from traditional midwives, private doctors, private pharmacies, and private hospitals. All of these organizations are registered with the Ministry of Social Affairs.¹³⁷

The parastatal sector: In this sector the government ministries share in decision making and this sector includes the Health Insurance Organization (HIO), the Curative Care Organization, the Teaching Hospitals in the universities and Institutes Organization.^{136,137} HIO is the primary provider of insurance in Egypt, established by ministry of health and population (MOHP) in 1964 as a parastatal government-owned establishment with intent to provide health insurance coverage to Egyptians.¹³³

2.4.5.3 Health care financing

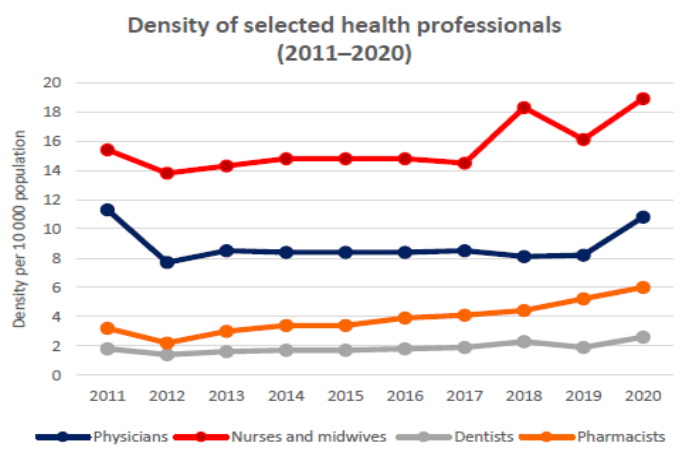
In 2010 the number of people insured by the HIO was 45 million and reached 50.2 million in 2014, which represents nearly 60% of the Egyptian population.¹³³ The HIO covers governmental employees, retirees, widows of governmental employees, new-borns and school children.¹³⁸ Unfortunately, only about 6% of Egyptians insured by the HIO utilize its services due to dissatisfaction with the level of services it provides.³⁵ In 2019, 62.7% of health care expenditure in Egypt was paid out-of-pocket by people requesting treatment.¹¹³ A systematic review healthcare financing in Egypt conducted by Fasseeh et al. in

2022 included data from 56 published record and reported that the primary healthcare financing source in Egypt is out-of-pocket (OOP) expenditure which represents more than 60% of THE, followed by Egyptian Ministry of Finance which represents around 37% of THE. The authors concluded that while THE as an absolute number is increasing, the THE as a percentage of GDP is declining.¹³⁹

2.4.5.4 Health workforce in Egypt

Information on the health workforce in Egypt remains fragmented and incomplete. In 2020, the density of physicians to 10,000 of population was 11, and the density of nurses and midwives was 19 (Figure 2). Around 80% of physician are working in public sector. Regarding gender distribution, about 50% of physicians and 90% of nurses and midwives are females. Ratio of nurses and midwives per physician was 1.8 in 2020.¹⁴⁰

Figure 2 Density of selected health professionals in Egypt, source WHO Health workforce snapshot: Egypt¹⁴⁰



2.5 Results

2.5.1 How data on tobacco use in Egypt are collected

With support from WHO and the United States Centres for Disease Control (CDC), Egypt implements tobacco use monitoring and surveillance surveys. The Global Adult Tobacco Survey (≥ 15 years) has been carried out only once in 2009,¹⁰⁶ and the Global Youth Tobacco Survey (GYTS) has been carried out in Egypt in 2001, 2005, 2009 and 2014.¹⁴¹ Moreover, the stepwise survey for risk factors of non-communicable disease, including tobacco use prevalence, has been carried out in 2011.¹¹⁵ Additionally, WHO has published several reports on the global tobacco epidemic in Egypt. Data for these reports came from Demographic and Health surveys (DHS) which are carried out every five years. The latest DHS carried out in 2014.^{7,107,108}

Although WHO reports about tobacco use are more recent, the results in this chapter were presented mainly from GATS survey in Egypt 2009. That is because the WHO data come from the DHS, which is not specifically about tobacco and therefore does not provide much detail beyond prevalence.

The GATS is a global standardized survey for systematic monitoring tobacco use among adults and policies for tobacco control. It is considered a nationally representative survey of adults aged ≥ 15 years across countries. In Egypt, the GATS was conducted once (2009), and

it used a 3-stage stratified cluster sample design to represent the Egyptian adults (≥ 15 years). The data were collected electronically. For adaptation of the GATS questionnaire, pilot testing was done and the feedback from pilot test was used to adjust the questionnaire words before implementation and several trainings were done to data collectors.

The GATS survey sample included 20,924 interviews and the survey covered current tobacco use and types of tobacco products consumed. Current tobacco user was defined as a daily or occasional user. The data were weighted to be more representatives to the Egyptian population and the prevalence were reported as a percentage, with a 95% confidence Interval.

DHS is a regular survey in Egypt to obtain data on maternal and child health, fertility and contraceptive practice. It also provides demographic and health data including tobacco use and exposure to SHS. It is implemented with support of MOHP, USAID/Cairo which was the main contributor of funding, UNICEF and UNFPA. In DHS survey, questions about tobacco use confined to prevalence of use of tobacco product by household member and exposure to information about health effects of SHS and the source of that information. Therefore, data from GATS 2009 were used in this chapter to explore tobacco use by subgroups.¹⁰⁶

GYTS in Egypt used a multistage sample design to select schools proportional to enrolment size and simple random sample from classrooms were chosen within selected schools to give representative data for all students aged 13-15. All pupils in the selected classes who attended schools in the survey day were eligible to participate in this survey but their participation was voluntary.¹⁴² As mentioned above, GYTS has been carried out in Egypt in 2001, 2005, 2009 and 2014; the last one included 2,141 pupils with response rate 89.2%. The GYTS core questionnaire was adapted, translated, and back translated, then piloted for accuracy with pupils aged 13–18 years. Pupils filled this self-administered questionnaire and their responses were anonymized to ensure confidentiality. The survey covered tobacco use (smoked and smokeless), knowledge and attitudes about tobacco, exposure to SHS, availability and accessibility of tobacco products, receiving educational messages inside or outside schools about smoking consequences, and susceptibility to smoking.¹⁴²

2.5.2 Prevalence of tobacco use in Egypt

The most recent data on the prevalence of tobacco use in Egypt were published in 2021 in the WHO Global Tobacco Epidemic report showing that 22.8% of Egyptian adults use tobacco, and that prevalence is rising over time,¹⁰ as it was 20.9% in 2017.¹⁰⁷ A scoping review which was done in 2018 to address tobacco smoking epidemiology and tobacco control measures in Egypt,¹⁰⁸ reported that

the prevalence of tobacco consumption ranged from 19.7% in the GATS 2009 report ¹⁰⁶ to 30% in some population-based studies.¹⁴³

The authors attributed these variations in the prevalence to the difference in recruiting methods, age range of respondents and survey years and settings.¹⁰⁸

2.5.3 Any tobacco use

According to GATS 2009, the prevalence of tobacco use was 19.4% (95% CI 18.8 – 20.2). Among them, 16.3% smoked cigarettes, 3.3% smoked shisha and 2.6% used smokeless tobacco (Table 1). Tobacco use was predominantly concentrated in males; 38% of Egyptian men used tobacco compared to 0.6% of women.^{7,106,107}

Among male tobacco users 74.1% smoked only cigarettes; about 14% smoked only shisha; and 7.4% used cigarettes with smokeless tobacco. This distribution was different among women as 37% smoked just shisha; about 19% smoked just cigarettes; and nearly 14% used both smokeless tobacco and cigarettes.¹⁰⁶ These figures were similar to another study conducted between 2015-2017.¹⁴⁴

*Table 1 Prevalence of tobacco consumption among Egyptian adults ≥ 15 years by forms of tobacco consumed with specific demographic factors, GATS 2009*¹⁰⁶

Specific demographic factors (% and confidence intervals)		Any tobacco use	Cigarettes	Shisha	Smokeless tobacco
Overall	%	19.7%	16.3%	3.3%	2.6%
	CI	(19.0 - 20.4)	(15.7 - 17.0)	(3.0 - 3.7)	(2.2 - 3.1)
	N	9803	8 116	1643	1 100
Sex					
Male	%	38%	31.8%	6.2%	4.8%
	CI	(36.8 - 39.4)	(30.6 - 33.1)	(5.6 - 6.9)	(4.0 - 5.7)
Female	%	0.6%	0.2%	0.3%	0.3%
	CI	(0.4 - 0.9)	(0.1 - 0.4)	(0.2 - 0.6)	(0.2 - 0.5)
Age (years)					
15-24	%	11.2%	10.4%	1.2%	1.5%
	CI	(10.0 - 12.6)	(9.2 - 11.7)	(0.8 - 1.9)	(1.1 - 2.1)
25-44	%	23.1%	19.8%	3.5%	3.1%
	CI	(22.1 - 24.1)	(18.8 - 20.8)	(3.1 - 4.0)	(2.6 - 3.8)
45-64	%	25.2%	19.6%	5.7%	3.1%
	CI	(23.7 - 26.9)	(18.1 - 21.1)	(4.8 - 6.7)	(2.3 - 4.1)
+65	%	19.5%	14.5%	9.4%	3.7%
	CI	(17.0 - 22.0)	(12.3 - 17.0)	(3.6 - 6.7)	(2.5 - 5.5)
Education					
No formal	%	21.4%	16.1%	5.1%	2.8%
	CI	(19.6 - 22.4)	(14.8 - 17.5)	(4.3 - 6.0)	(2.1 - 3.7)
Some primary	%	25.5%	20.3%	5.3%	4.4%
	CI	(22.8 - 27.6)	(18.2 - 22.6)	(4.3 - 6.6)	(3.3 - 5.9)
≥ primary and <secondary	%	16%	14%	2%	2.3%
	CI	(14.6 - 17.7)	(12.7 - 15.5)	(1.6 - 2.6)	(1.7 - 3.0)
Completed secondary	%	11%	10%	0.8%	1%
	CI	(9.4 - 12.5)	(8.7 - 11.7)	(0.5 - 1.2)	(0.6 - 1.8)
Diploma	%	24.7%	21%	2.3%	3.3%
	CI	(22.8 - 26.3)	(20.0 - 23.4)	(2.5 - 4.0)	(2.5 - 4.3)
≥University graduate	%	16.2%	14%	1.6%	1.6%
	CI	(14.6 - 17.7)	(13.3 - 16.3)	(1.2 - 2.0)	(1.1 - 2.3)

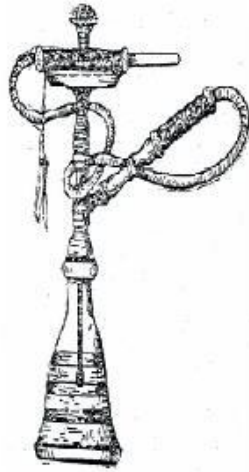
2.5.4 Cigarettes

Among Egyptian adults who smoke, women (0.2%) were less likely to smoke cigarette than men (31.8%) in GATS 2009.¹⁰⁹ With regards to age, the percentage of cigarettes smokers among men increased with age from 15 to 64 years, and then declined for age group ≥ 65 years. Men with no or some primary education consumed cigarettes more than those with higher education (Table 1).¹⁰⁶ Moreover, in GATS 2009, about 60% of ever daily cigarette smokers started to smoke daily before the age 18 years, which is the legal age for purchasing any type of tobacco in Egypt.¹⁰⁶

2.5.5 Waterpipe (Shisha) smoking

General description of the waterpipe:

Waterpipe is a common form of tobacco smoking in Egypt. It comes in different shapes and the most famous one is the shisha. Its structure consists of a small container half filled with water, which acts as a smoke filter that drawn by suction from a funnel-shaped tobacco holder. The tobacco is usually burned by any type of charcoal which is placed on top of the tobacco holder (Figure 3).¹⁴⁵



*Figure 3 Waterpipe (Shisha), a common form of tobacco smoking in Egypt*¹⁴⁵

In GATS 2009, 3.3% of Egyptian adults smoked shisha (1.6 million Egyptians). Like with cigarette smoking, women (0.3%) were less likely to smoke shisha than men (6.2%) among adult Egyptians.¹⁰⁶ Shisha smoking among men increased with age and it was also higher among those with no formal education (about 12%) than those with university degree (2.6%) (Table 1). Moreover, 60% of shisha smokers reported having more than one session per day and only 40% reported having just one session per day.¹⁰⁶

More than 40% of ever daily shisha smokers initiated daily shisha smoking before the age of 18.¹⁰⁶ Furthermore, the majority of female shisha smokers (98%) reported having their shisha sessions at home, which was a preferred smoking place for them. However, male shisha smokers reported smoking shisha likely in cafés, followed by homes.¹⁰⁶

2.5.6 Smokeless tobacco use

The prevalence of smokeless tobacco use in 2009 was 2.6% among Egyptian adults aged ≥ 15 years (1.1 million). The distribution by gender varied as 4.8% of men (about 1 million) and 0.3% of women (about 69,000) used smokeless tobacco.¹⁰⁹ Daily use of smokeless tobacco increased among higher age groups. Smokeless tobacco consumption was more common among adults with some primary education than those with university degree (Table 1).¹⁰⁶

2.5.7 Egyptian youth tobacco use

According to the GYTS carried out in Egypt in 2014 nearly 18.1% of boys and 8.2% of girls aged 13-15 used tobacco; Table 2 represented the percentages of different types of tobacco use between them.

*Table 2 Prevalence of tobacco use among Egyptian youth (13-15) years old by type of tobacco used and gender, GYTS 2014*¹⁴¹

Various types of tobacco	Overall (%)	Boys (%)	Girls (%)
Any tobacco use	13.6	18.1	8.2
Smoked tobacco	10.1	16.3	3.1
Smokeless tobacco	4.1	2.7	5.4

2.5.8 Second-hand smoke (SHS) exposure in Egypt

GATS 2009 reported that about 71% of Egyptian adults lived in houses where smoking was permitted. Exposure to SHS at home was higher in rural than urban regions; among women than men; among adults aged 15–44 years than adults aged ≥ 65 years. SHS exposure was more among adults with some primary or lower education than those with university degree.^{106,109} About 61% of adults who were working indoors reported exposure to SHS at the indoor worksites. At work, SHS exposure was higher among men (about 62%) than women (54%).¹⁰⁶

For Egyptian adults who work indoors, SHS exposure at work depended on the smoking regulation at workplace. In working sites where smoking was banned, nearly one third (31.1%) of the workers were exposed to SHS. However, in working sites where smoking was allowed everywhere 87.8% of the workers were exposed to SHS; and in working places where smoking is allowed in some closed areas about 72% of workers were exposed; and in working places with no smoking policy about 62% of workers were exposed to SHS.¹⁰⁹

Regarding public places, exposure to SHS exceeded 70% in restaurants, shopping malls, government buildings, public transportation and private non-government buildings (Figure 4).

Worryingly, SHS exposure was reported to be about 49% in health-care facilities.^{106,109}

In GYTS 2014, about 34.9 % of school children aged 13-15 reported being exposed to SHS at home and 55.2% said they were exposed to SHS inside enclosed public places.¹⁴¹

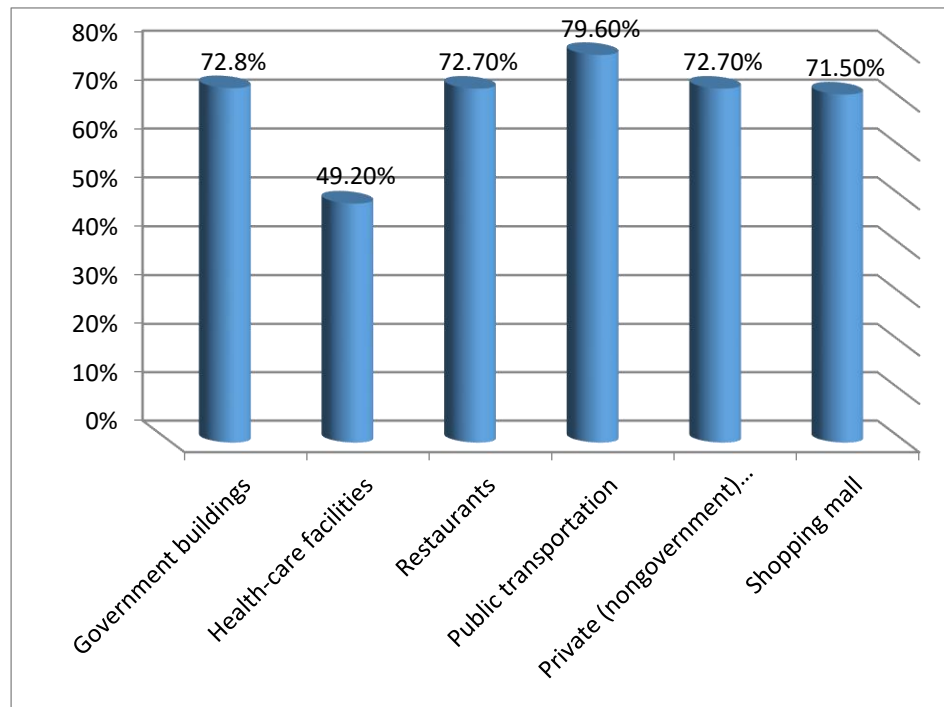


Figure 4 Adapted from GATS Egypt 2009: Prevalence of SHS exposure among Egyptian adults in public places¹⁰⁶

2.5.9 Cessation attempts

Overall, in 2009, almost 41% of Egyptian smokers made a quit attempt in the past year. Nearly 18% of those who tried to quit were successful; with time since quitting being ≤ 1 year.¹⁰⁶

GATS 2009 reported that only 20% of smokers visited a health care facility in the last 12 months; almost 74% among them were asked by the health care provider about their smoking status. Health care providers were more likely to ask men than women about their smoking status. Most of those smokers (90.5%) were advised to quit smoking, but only 7.8% followed the advice and successfully quit smoking. Among smokers who made a quit attempt, 2% used nicotine replacement therapy, 4% used just counselling or advice, and 93.9% did not use any of these methods.¹⁰⁶

Some research studies explored quit attempts among Egyptian population. An intervention study implemented in Cairo in 2019 reported higher successful quit rate among intervention group who was subjected to a brief verbal therapy for smoking cessation (30%) than control group who received usual care without verbal therapy regarding smoking cessation.¹⁴⁶ Another intervention implemented by Mohlman.¹⁴⁷ in 2013 to improve knowledge about health hazards of smoking and SHS among Egyptian rural community. The intervention included educational messages to women, students, and religious leaders. Although, the intervention did not result in a decline in smoking prevalence, it improved participants' awareness about health hazards of smoking and modified beliefs about where smokers can smoke. Moreover it encouraged non-smokers to protect themselves and their families from smoking and to ask smokers to stop smoking.

2.5.10 Tobacco industry in Egypt

The public sector dominates cigarette production in Egypt. The Eastern Tobacco Company (ETC) dominates the tobacco industry in Egypt; it is the largest cigarette manufacturer in the Middle East and is owned by the government.¹⁴⁸ ETC has a share of at least 57 % of the Egyptian cigarette market in 2020.¹⁴⁹ Employment in tobacco industry in Egypt raised from 13,100 workers in 1970 to 17,900 in 2015, which represents only 1% or even less of total employment.^{150,151} ETC company provided 75 billion EGP as tobacco tax return to the national budget in 2020/2021 which was 0.06% of Egyptian total tax revenue. ETC produced 94 billion cigarettes in 2020/2021. The company sold 69 billion cigarettes in the domestic market and exported to neighbouring 12 countries. Philip Morris International has a share of at least 15% and British American Tobacco (BAT) Middle East has a share of 10% of the Egyptian cigarette market in 2020.¹⁴⁹

Tobacco cultivation is not legal in Egypt, therefore tobacco companies which produce tobacco products must rely on imported raw tobacco. A small but increasing quantities Egyptian cigarettes were exported to neighbouring countries, to serve mainly Egyptians who were working abroad.¹⁵² Egypt is the 9th largest raw tobacco importer globally. The Egyptian government currently dominate the market through ETC, which produces its own local cigarette brands, and various

multinational brands as well. The local brand (Cleopatra) is considered the most popular brand in Egypt.¹⁵⁰

2.5.11 Health burden of tobacco consumption in Egypt

Tobacco consumption causes various health hazards, therefore health care cost for treating these health conditions is significant.¹⁵³ In 2009, nearly 170,000 deaths resulted from tobacco use in Egypt and were mainly among men due to their higher rates of tobacco use. Most of these deaths in Egypt were attributed to lung and other cancers, strokes, ischemic heart and respiratory diseases and tobacco use was the main risk factor of these diseases.¹⁰⁶ An estimated US\$ 616 million were spent yearly in Egypt for treatment of diseases caused by tobacco use.^{106,154}

In this case study, GBD database was used to explore the disease burden of tobacco use and SHS exposure in Egypt. In 2019, tobacco use was responsible for about 11 % of DALYs and 17% of deaths (figure 5). Tobacco use increased risk of death due to cancers by 20%, non-communicable diseases by 18%, communicable, maternal, neonatal, and nutritional diseases by 12% (Figure 6). Regarding SHS exposure, it was responsible for 19,500 deaths and 650,000 DALYs in Egypt in 2019 (Figure 7).²⁶

Figure 5 Percentages of deaths and DALYS caused by tobacco use in Egypt 2019, source: Global Burden of Disease (GDB) database. ²⁶

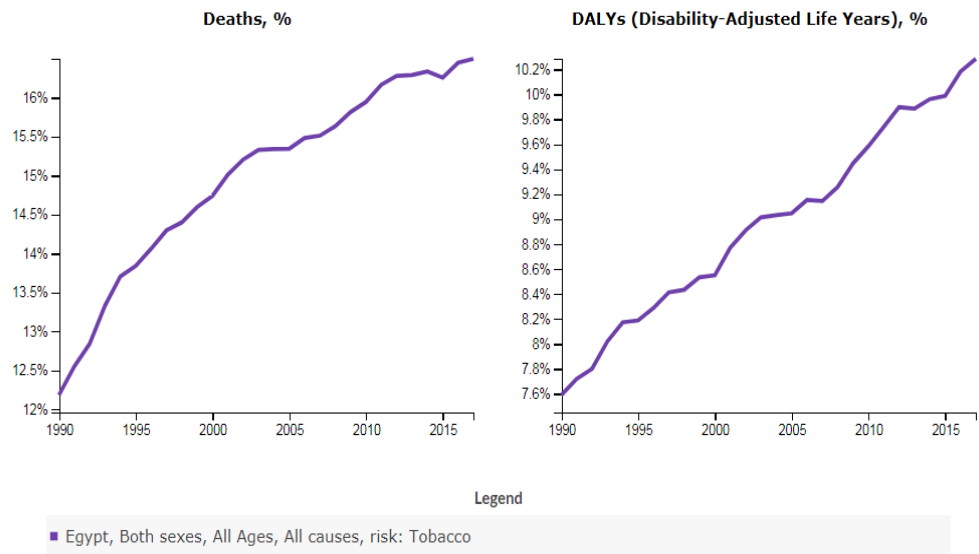


Figure 6 Percentages of deaths and DALYS caused by different diseases as a result of tobacco use risk in Egypt 2019, source: Global Burden of Disease (GDB) database.²⁶

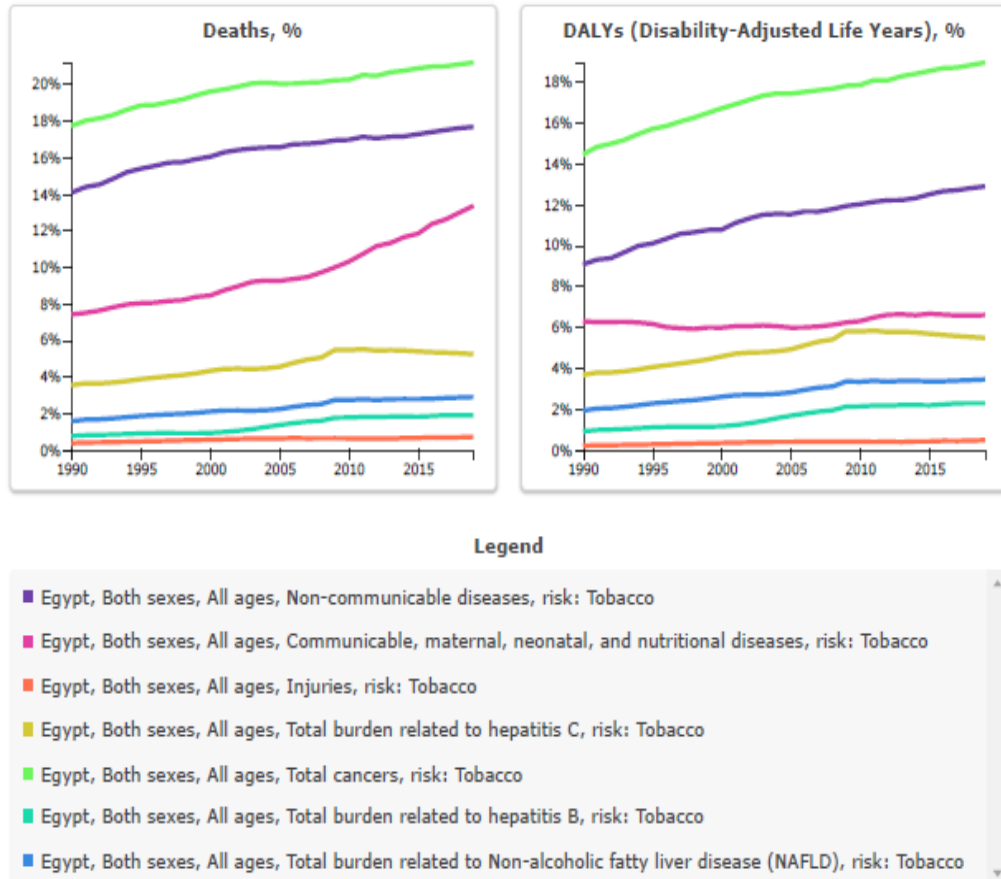
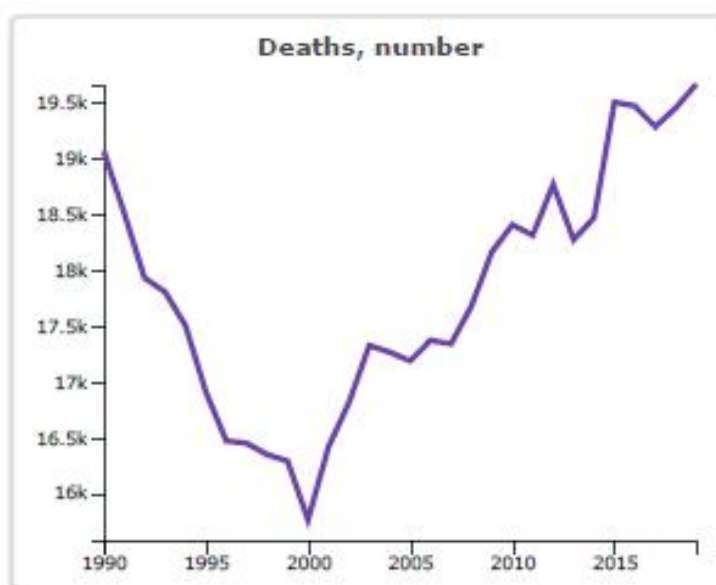


Figure 7 Numbers of deaths caused by SHS exposure in Egypt 2019, source: Global Burden of Disease (GDB) database ²⁶



Legend

■ Egypt, Both sexes, All ages, All causes, risk: Secondhand smoke

2.5.12 Egyptian tobacco control policy

As outlined above, the burden of tobacco use in Egypt is significant, particularly among men in terms of tobacco use and women and children in terms of SHS exposure. Therefore, policymakers have made efforts to implement measures to tackle the harms caused by tobacco.

2.5.12.1 Tobacco control legislation in Egypt

There have been many initiatives to decrease tobacco use in Egypt prior to ratification of the FCTC. In 1981 Egypt adopted the first

tobacco control legislation. This legislation was the first step to ban smoking across the country.¹⁵⁵ This legislation covered the following: 15 mg is the maximum quantity of tar per one single cigarette, warning that smoking is destroying the health and causing death must occupy half of the space at least on both sides of the cigarette package with illustrating pictures for tobacco health hazards, and advertisement of all types of tobacco is totally forbidden in all advertising means.¹⁵⁵

Additionally, there was another try in 1993 to approve legislation which prohibited all types of tobacco advertising in Egypt, but unfortunately the strong tobacco industry that was connected to the highest authorities and decision makers defeated this legislation and led to its failure. In 2001, the WHO report 'Voice of Truth' disclosed the tobacco industry's role in obscuring the 1993 smoking legislation.^{156,157}

Egypt is considered one of the first countries that signed the WHO FCTC in 2003 and its ratification was in 2005.⁷ For proper implementation of FCTC and evaluation of the trends, governments require reliable information on the exact prevalence of various types of tobacco use, So, The Global Adult Tobacco Survey was launched in 2009.¹⁰⁶

All current tobacco control legislations in Egypt can be summarized as follows:¹⁵⁵

- Smoking is prohibited in the following specified public places: health and educational facilities, governmental venues, sporting and social clubs, youth centres, and public transport. Smoking is permitted in specially designated areas in industrial establishments and tourism related establishments. The Manager of any of those buildings shall implement all necessary measures to prevent smoking. The law outlines, warning that they would be fined between 1,000 and 20,000 Egyptian pounds (\$40-\$811) for violating the rules. Smokers who violate the ruling may be fined between 50-100 Egyptian pounds (\$2-\$4).¹⁵⁸
- Egypt prohibits many forms of tobacco advertising and promotion in all public media. The law does not specifically address financial contributions and other forms of sponsorship by the tobacco industry.
- Regarding packaging and Labelling, health warnings are pictorial and text and must occupy 50 percent of the front and back panels of tobacco product packaging. Misleading terms such as “light” and “low tar” are prohibited on tobacco packaging, but other misleading packaging like numbers or symbols is not prohibited.
- Regarding cigarette contents and disclosures, 15 mg is the maximum quantity of tar permitted per one single cigarette. The law does not grant the authority to regulate other contents of cigarettes, nor does the law require that manufacturers and

importers disclose to government authorities information on the contents or emissions of their products.

- Regarding sales restrictions, however, the sale of tobacco products is prohibited to persons under the age of 18, there are no restrictions on the sale of single cigarettes, small packets of cigarettes, tobacco products based on internet sales.

2.5.12.2 MPOWER policies

As has been discussed in chapter 1, the MPOWER package comprises WHO-recommended strategies for effective tobacco control. The WHO published a report in 2017 summarizing the MPOWER package implementation in Egypt.

Regarding smoke free policy, there were five public places that were completely smoke-free.¹⁰⁷ This is considered below the standard legislation that confirms all public places should be totally smoke-free (or at least 90% of the population covered by absolute smoke free legislation)

In terms of a smoking cessation program in Egypt, counselling programs are offered for free at cessation clinics, but no nicotine replacement therapy is offered. A free telephone quit line/help line is available to discuss tobacco cessation. Nicotine replacement therapy (e.g., patch, gum, spray) can be legally sold in the country in any pharmacy with no need for a prescription but national health insurance

does not cover the cost. Bupropion (e.g. Zyban, Wellbutrin) and Varenicline cannot be legally sold in Egypt.¹⁰⁷ Therefore the government should be more supportive for smoking cessation by offering NRT for free to encourage smokers to quit. This could be difficult to be implemented because of the financial aspects, but the government can at least partially support that.

Standard warnings with all appropriate characteristics were available on all tobacco packs (Pictorial and textual). There were no national campaigns from 2014 to 2016 with duration of three weeks at least. Regarding advertising bans, tobacco advertising was banned on national television, radio and print media only and these bans were actually implemented. Since 2008, cigarettes were less affordable than before but it still more affordable than other neighbouring countries.¹⁰⁷

2.5.12.3 Taxations and economics of tobacco in Egypt

All forms of tobacco products are considered affordable in Egypt, in comparison with other neighbouring countries.¹⁵⁹ Waterpipe tobacco has become more affordable since 2016, and is more affordable in Egypt than in other countries.¹⁵⁹ ETC company, which dominates the tobacco industry, provided 75 billion EGP (3.8 billion US\$) as tobacco tax return to the national budget in 2020/2021.¹⁴⁹

In 2022, the Egyptian Tobacco Company's most popular local brands were sold for US\$ 1.01–1.2; however, the prices for locally

manufactured foreign brands were about US\$ 2.02–2.23 per package.¹⁰⁶ Tobacco taxation that is applied on tobacco products in Egypt was 59% of the price in 2008,⁷ this percentage decreased to 26–50% of retail price in 2017,¹⁰⁷ however, it reached the WHO-recommended 75% of the retail price in 2020.⁹

In July 2010, Egypt moved from a tobacco tax system with multi-level specific tax based on the retail price of cigarettes, to simpler and more uniform tax structure introducing a uniform specific excise tax of 1.25 Egyptian pound (0.063\$) per pack and an ad valorem excise of 40% on retail prices.¹⁵⁰ In 2014, three tiers of specific excise tax based on the retail price of a pack were introduced. Ad valorem tax remained at a uniform 50% of the market price of cigarettes. There is no excise specific tax on waterpipe tobacco in Egypt. The excise ad valorem tax is tiered for domestic and imported tobacco.¹⁵⁹ In 2021, Egypt began collecting an additional one Egyptian pound (\$0.051) for every pack of cigarettes sold in the local market (local and international cigarette brands). This new law was imposing "an additional 25 Egyptian piasters (\$0.016) every three years, until the total increase hits 1.5 Egyptian pounds (\$0.095) by July 2027."

The state's revenue from tobacco taxes have increased over the past five years by nearly 100%. During the financial year 2016-17 it amounted to about 35 billion Egyptian pounds (\$1.78 billion), while it amounted to 50 billion Egyptian pounds (\$2.54 billion) in 2017/18,¹⁶⁰

and 75 billion Egyptian pounds in 2020 (3.8 billion US\$).¹⁴⁹ Though the tax share in price for the most famous brand is much higher than many Middle Eastern countries (e.g. Iraq, Lebanon), and it reached the international WHO recommendations of 75% of retail price, there is no excise specific tax on waterpipe tobacco in Egypt,²⁵ and the excise ad valorem tax is tiered for domestic and imported tobacco.^{106,150}

2.6 Discussion

Overall, this case study indicated that prevalence of tobacco smoking in Egypt is high, particularly among men. Cigarette and shisha smoking and smokeless tobacco use among men increased with age and were higher among men with lower educational levels; these findings are similar to many neighbouring Middle Eastern countries such as Saudi Arabia and Jordan,^{161,162} where tobacco use increased with age and reported being higher among men with some primary education than those with university education or higher.

Among Egyptian youth, tobacco use is higher among boys (18.1%) than girls (8.2%), which again is similar to many Middle Eastern countries such as Jordan where greater proportion of boys (27.5%) consumed tobacco compared to girls (15.2%).¹⁶² In the current study, the percentage of tobacco use among Egyptian girls aged 13-15 years old is 8.2% in comparison to 0.6% among adult females and the percentage of tobacco use among Egyptian boys aged 13-15 years old

is 18.1% in comparison to 38% among adult males. This comes in line with a recent evidence emphasized that male adolescents are more likely to smoke than female adolescents in Egypt. The authors reported predictors of adolescents smoking to be age, low educational level of fathers, poor self-confidence to refuse friends' smoking offers, absence of restriction on selling cigarettes to adolescents near their schools, and observing teachers' smoking inside schools.¹⁶³ The authors also evidenced that adolescents' access to information about hazards of smoking through schools helped in countering smoking initiation.¹⁶³

Exposure to SHS is high among Egyptian adults (over 70%) which is much more than other Middle Eastern countries.^{63,65} There is no evidence about SHS exposure among children less than 13 years; however, it is about 34.9% at home and 55.2% in public places among school children aged 13-15.¹⁴¹ Exposure to SHS among pregnant women and young children in Egypt is not previously studied; hence need to be explored.

Tobacco cultivation is not legal in Egypt and tobacco companies rely on imported raw tobacco. The largest tobacco company in Egypt owned by the government and has a share of at least 57% of tobacco market in Egypt.¹⁴⁹ Although applied taxation on tobacco products is 75% of retail price, tobacco product still more affordable in Egypt compared to other Middle Eastern countries.¹⁵⁰ Although it could be difficult because of the strong tobacco industry (basically state owned)

in Egypt, regulating the tax on shish and ensuring that tobacco products are less affordable might improve the tobacco control in Egypt.

According to GBD database, tobacco use is responsible about 11% of DALYS and 17% of deaths among Egyptians. Tobacco use increases risk of many diseases globally, e.g., cancers, stroke, diabetes, lower respiratory tract infection, and asthma. This reflects the economic burden of tobacco use related diseases. Moreover, in Egypt SHS exposure caused 19,500 deaths and 650,000 DALYs in 2019.²⁶

The implementation of tobacco control legislations in Egypt is still a considerable challenge for many reasons. The main obstacle poor enforcement of a well-defined tobacco control policy; another obstacle is cultural factors, as smoking is considered socially acceptable in Egypt as many Middle Eastern countries.^{157,162,164}

2.7 Strengths and limitations

This case study provided a comprehensive review of the state of tobacco use and tobacco control in Egypt, using available published sources. Some of the data used were not very up to date; however, including these data was essential to highlight areas for improvement and future research focus. A limitation of this study is that there is lack of regular monitoring system, which is specific for tobacco use in Egypt. The standardized survey specified for tobacco use like GATS

was implemented once in 2009.¹⁶⁵ Thus, the current case study reported data from different surveys e.g. DHS which used methodologies and sample sizes different to GATS; hence the variation in prevalence of tobacco use. Moreover, there were no available national data about SHS exposure among Egyptian children less than 13 years old. Due to unavailability of online data about recent tobacco related surveys reporting different sociodemographic characteristics of smokers in Egypt, I tried to identify local data in Egypt; however, limited resources hindered this.

2.8 Implications and future research

2.8.1 Policy research

Prevalence of tobacco use is high among Egyptian adults possibly due to inadequate implementation of effective tobacco control policies and this requires measures urgently. Research should be done to investigate tobacco cessation motivators and how to encourage adult men in Egypt to quit smoking. Future search can also explore why policies are not properly enforced. SHS exposure is extremely high at home and in public places which requires urgent exploration. Exposure of vulnerable groups such as pregnant women and children to SHS is a public health priority and is the focus of the current thesis.

As described in chapter 1, HCPs can help in educating pregnant women and prospective parents about dangers of SHS exposure

among children. Knowledge, attitude and counselling practices of HCPs has been not studied before, so by investigating that, the needs and barriers of HCPs to deliver counselling services could be defined.

It is essential to repeat tobacco monitoring surveys more frequent in Egypt and these surveys should be specific for tobacco as GATS survey not just part of DHS surveys.

2.8.2 Research in vulnerable and under researched groups

Smoking prevalence among Egyptian adolescents is high, therefore school-based interventions targeting young people should be implemented. These interventions could help to decrease tobacco smoking initiation among school students as evidenced before,^{166,167} and therefore consequently decrease the smoking prevalence.

However, it should be considered that the social environment is considered as a strong motivator for initiation of tobacco use among adolescents. Qualitative research could be performed to find the best way for implementation of these programs and to provide students with needed information to persuade them not to smoke; this information is not yet available in Egypt.

SHS exposure represents a serious public health threat in Egypt and an important threat to pregnant women and children in particular given the major health hazards caused by SHS among those vulnerable groups. In Egypt, there are limited efforts towards controlling pregnant

women and children exposure to SHS and they considered as one of the least protected groups. Thus, exploring how to protect those groups from the preventable health hazards caused by SHS is a public health concern in Egypt that requires urgent action.

Knowledge, attitudes and practices of pregnant women toward SHS exposure in Egypt have never been thoroughly studied in Egypt. Thus, qualitative research could investigate experiences of pregnant women towards SHS exposure. This could help to formulate smoke free intervention to protect pregnant women and children from dangers of SHS.

Moreover, exposure of children to SHS is not thoroughly studied in Egypt. Future research could be done to provide evidence for the best way to implement smoke free home interventions to protect children from health hazards of SHS exposure.

2.9 Conclusions

More research is needed to understand various aspects of tobacco control in Egypt. Frequent and regular national monitoring of tobacco use among adolescents and adults is needed to understand the magnitude as well as the characteristics of tobacco users and how to help them to quit. Data on SHS exposure among young children and pregnant women is limited. Data on tobacco use and SHS exposure are crucial for performing further interventions (school based or

community based), tailoring treatment provision, and tobacco control policy. The implementation of tobacco control legislations in Egypt especially smoke free policy is not adequately enforced. Reviewing evidence on the experiences and views of parents on SHS exposure prevention in Middle Eastern countries can obtain a broad perspectives of the region and is the focus of the next chapter.

**3 CHAPTER 3 EXPERIENCES AND VIEWS OF
PARENTS ON SECOND-HAND SMOKE
EXPOSURE PREVENTION IN MIDDLE
EASTERN COUNTRIES: A QUALITATIVE
SYSTEMATIC REVIEW**

3.1 Introduction

As discussed earlier in this thesis SHS is a major public health problem and causes health morbidities and mortalities. It leads to adverse reproductive effects, poor foetal outcomes and major morbidities to children.^{24,38} In the Middle East and North Africa, it is estimated that 42.6 individuals who smoke for 24 years are associated with the death of one individual who did not smoke.¹⁶⁸ According to the Global burden of disease database, SHS exposure was responsible for 96,000 deaths and 3 million DALYs in the Middle East and North Africa in 2020.²⁶ Smoking prevalence in Middle Eastern countries is high among men compared to women.^{106,162,169} Women aged 15 to 49 years and children younger than 11 years in Middle Eastern countries suffer from high SHS exposure both inside and outside the home.⁶⁶ In 2019 about 50% of pregnant non-smoking women and more than 55% of children in some Middle Eastern countries were exposed daily to SHS.^{64,66}

Enforcement of tobacco control policies is essential to prevent SHS exposure among non-smokers, especially pregnant women and children, as there is no safe level of exposure.^{39,98} In many Middle Eastern countries, the legislation banning smoking in public places, including public transportation, health care facilities, and vehicles (where children often present), is not enforced.^{165,170}

As discussed in chapter 1, qualitative evidence from developed countries (the UK, Australia, the USA, Canada, and China) reported barriers to the prevention of SHS exposure at home. The authors highlighted the presence of household smokers; lack of confidence to ask smokers not to smoke in the home; lack of power to modify the environment; fear of damaging relationships; social norms and gender imbalances; and cultural socializing and sharing cigarettes as the most common barriers.^{75,96} The level of awareness of the health hazards of SHS exposure affected families' decision to prevent SHS exposure at home, as families who were more knowledgeable about the hazards of SHS were more willing to prevent SHS exposure in their homes.^{75,96}

Parental perception of SHS exposure and their knowledge about the health hazards of SHS exposure could help in the prevention of SHS exposure among their children.¹⁷¹ If parents do not understand that their children are exposed to SHS when they smoke next to them, they are likely to continue to smoke in the presence of children. In a Middle Eastern study, the authors reported that parents who smoked regularly believed that children's SHS exposure was less dangerous than parents who did not smoke regularly,¹⁷² which reflects low parental risk perceptions of child exposure to SHS.

Middle Eastern communities generally have conservative cultures and male-dominated concepts,³² which is considered different to Western communities. Moreover, SHS exposure among non-smoking women

and children in these countries is high.^{64,66,98} Thus, the qualitative evidence from Western communities cannot be directly translated to Middle Eastern ones. The available qualitative evidence from Western countries explored SHS exposure among children only in homes and did not include other places like public settings or personal vehicles, and the evidence was not specific for women and children. In Middle Eastern countries, the barriers and facilitators for preventing SHS exposure among women and children in the home or public places may be different, which reinforces the need for this review to explore these experiences.^{32,97} Mixed-methods review could enhance the evidence as it would add the predictors of SHS exposure among pregnant women and children in Middle Eastern countries. However, due to an existing published narrative systematic review which summarizes the predictors of SHS exposure among children worldwide,⁵¹ it was appropriate to consider only conducting a qualitative systematic review method to enrich the evidence base.

Qualitative research can enhance understanding of complex areas of research that are not easily addressed using quantitative research methods alone, and can assist in the interpretation of quantitative findings.¹⁷³ A preliminary search of International Prospective Register of Systematic Reviews (PROSPERO), MEDLINE, Joanna Briggs Institute (JBI) Evidence Synthesis, and Cochrane databases was conducted and no current or in-progress qualitative systematic reviews

on the topic were identified. Therefore, a qualitative systematic review was conducted to identify, appraise, and synthesize evidence about the experiences and views of parents, children, and professionals regarding the prevention of SHS exposure among women and children in the home, workplace, schools, personal vehicles, and public places in Middle Eastern countries as qualitative research can allow exploration of meanings of social phenomena as experienced by individuals themselves, in their context.¹⁷⁴ The protocol of this systematic review was registered in PROSPERO (CRD42019137006) and published online in JBI Evidence synthesis Journal in January 2021 (Appendix 1) and the full review in August 2022. (Appendix 2)

3.2 Review question

What are the experiences and views of parents, children, and professionals on SHS exposure prevention among women and children in the home, workplace, school, personal vehicles, and public places in Middle Eastern countries?

3.3 Methods

This systematic review was conducted in accordance with the JBI methodology for systematic reviews of qualitative evidence.¹⁷⁵ This review was conducted following an a priori protocol;¹⁷⁶ however, one deviation from the protocol was that the participants were expanded to include both parents (fathers and mothers), instead of just mothers.

During data extraction, it was noted that authors did not differentiate in quotations between mothers and fathers when reporting their findings from parents. In response to this, we expanded the eligible participants of this review to include parents (i.e., fathers and mothers) to give a comprehensive overview of experiences and views on SHS exposure prevention.

3.3.1 Inclusion and exclusion criteria

This review considered studies that included the views and experiences of i) parents (including pregnant women); ii) children (primary and secondary school-aged children); and iii) professionals (including, but not limited to, clinicians, nurses, midwives, and policymakers). The review included studies that explored experiences and views, including attitudes and understandings, of prevention of SHS exposure among women and children in homes, workplaces, schools, personal vehicles, and public places. This review considered studies conducted in any settings in any of the 17 Middle Eastern countries: Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen. This review included studies that focus on qualitative data, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative descriptive, and feminist research. Papers that did not report primary qualitative data were excluded.

3.3.2 Search strategy

The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilized.¹⁷⁷ First, an initial limited search of MEDLINE and Embase was undertaken followed by an analysis of the text words contained in the title and abstract and the index terms used to describe articles. The search results were screened to ensure that the relevant articles were identified. The search strategy, including all identified keywords and index terms, was adapted for each included information source as described in Appendix 3.1 and a second search was undertaken in January 2021. A mix of subject heading and free text words was used which based on secondhand smoking, environmental tobacco smoke, women, children, pregnancy, parent, middle eastern countries terms, and qualitative study design terms. The full search strategies are provided in Appendix 3.1. The reference lists of all studies included in the review were screened for additional studies.

Studies published in all languages were included. Studies published from database inception to January 2021 were included. The databases that were searched included MEDLINE (Ovid), Embase (Ovid), CINAHL (EBSCO), PsycINFO (Ovid), Web of Science, and Scopus (Elsevier). Sources of unpublished studies and gray literature searched included EthOS (British Library), OpenGrey, ProQuest Dissertations and Theses (ProQuest), and the Egyptian Knowledge

Bank. These search strategies were developed through consultation with an information specialist/librarian at the University of Nottingham.

3.3.3 Study selection

Following the search, all identified citations were collated and uploaded into EndNote v.X8 (Clarivate Analytics, PA, USA), and duplicates were removed. Titles and abstracts were uploaded into Rayyan (Qatar Computing Research Institute, Doha, Qatar) software for systematic reviews to facilitate the title and abstract screening process.¹⁷⁸

Following a pilot test, titles and abstracts were screened by two independent reviewers (ZH and GN) for assessment against the inclusion criteria for the review. Potentially relevant studies were retrieved in full. GN is a systematic reviewer and PhD student at University of Nottingham. Full-text studies that did not meet the inclusion criteria were excluded and reasons for their exclusion are provided in Appendix 3.2. Any disagreements that arose between reviewers were resolved through discussion or with a third reviewer (JLB). JLB is one of the supervisors of the current PhD thesis.

The reference lists of all studies included in the full-text screening were screened for additional studies. The results of the study selection process are presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram 2020 (Figure 8) and check list (Appendix 3.4).¹⁷⁹ For all papers excluded due to

ineligible study design, authors were contacted for missing qualitative data; however, none of them reported that these studies collected qualitative data.

3.3.4 Assessment of methodological quality

Eligible studies were critically appraised for methodological quality by two independent reviewers (ZH, JLB) using the JBI critical appraisal checklist for qualitative research,¹⁷⁵ which consists of 10 questions, and each criterion was scored as either being met (Yes), not met (No), unclear (U), or not applicable (N/A). Data extraction and synthesis were conducted for all studies that met the inclusion criteria regardless of their methodological quality. Where multiple papers including the same population were identified, methodological quality was assessed for all papers. Any disagreements that arose between the reviewers were resolved through discussion or with another reviewer (GN). All studies were included regardless of methodological quality.

3.3.5 Data extraction

Data were extracted from studies included in the review by two independent reviewers (ZH and JLB) using the standardized JBI data extraction tool for qualitative reviews.¹⁷⁷ The data extracted included specific details about the populations, context, geographical location, study methods, and phenomena of interest relevant to the review question. Findings, and their illustrations, were extracted from the

results of included studies by repeated reading of text where a theme or subtheme was considered a finding. Findings were assigned a level of credibility as following: ¹⁷⁷

- Unequivocal (U): findings with illustrations beyond reasonable doubt and, hence, not open to challenge;
- Credible (C): findings with illustrations that lack clear association with data, so open to challenge;
- Not supported (NS): findings not supported by illustrations.

Disagreements regarding the level of credibility of the findings arose between the reviewers (ZH, JLB) and were resolved through discussion with a third author (GN).

3.3.6 Data synthesis

Qualitative research was, where possible, pooled using the JBI qualitative evidence synthesis approach, and presented in tabulated form.¹⁷⁵ Data is considered a finding when it is reported as a theme or subtheme by authors of included studies.¹⁷⁵ Findings were identified by selection of themes and subthemes from the results section. The process involved the aggregation or synthesis of findings to generate a set of statements representing that aggregation, through assembling the findings and categorizing these findings based on similarity in meaning/wording.

These categories were then subjected to synthesis to produce a single comprehensive set of synthesized findings that could be used as a basis for evidence-based practice. Where textual pooling was not possible, the findings were presented in narrative form. Only unequivocal and credible findings were included in the synthesis. During data extraction, it was noted that authors did not differentiate between quotations from mothers and fathers when reporting their findings from parents. In response to this, the eligible participants of this review were expanded to include parents (i.e., fathers and mothers) to give a comprehensive overview of experiences and views on SHS exposure prevention.

3.3.7 Assessing confidence in the findings

The final synthesized findings were graded according to the ConQual approach for establishing confidence in the output of qualitative research synthesis and presented in a Summary of Findings (Table 6).¹⁸⁰ The Summary of Findings includes the major elements of the review and details how the ConQual score was developed. Included in the table are the title, population, phenomena of interest, and context for the specific review. Each synthesized finding from the review is presented, along with the type of research informing it, scores for dependability and credibility, and the overall ConQual score. Table 7 provides the details of how the ConQual score was calculated for each

synthesized finding and includes details on the dependability and credibility scoring and final ConQual score.

Dependability evaluates whether the process of research is logical, and clearly documented, particularly on the methods chosen and the decisions made by the researcher. So, it is relates to methodological quality of included studies. JBI critical appraisal checklist for qualitative research was used to assess the methodological quality of the included studies including 10 questions. For ConQual score ranking, if the study get 4-5 'yes' responses out of 10, the finding remains unchanged. If the study get 2-3 'yes' responses, the finding downgraded one level. If the study get 0-1 'yes' responses, the finding downgraded two levels.

Credibility evaluates the congruence between the author's interpretation and the supporting data considers whether the findings comprehensively reflect the phenomenon of interest. So, it is an evaluation of the 'fit' between the primary data and the reviewer's interpretations. As mentioned in data extraction section, findings were assigned a level of credibility: unequivocal (U) or credible (C) or not supported (NS). For ConQual score ranking, if the synthesized finding contain only unequivocal finding, the rank remains unchanged. If the synthesized finding contain mixture of unequivocal and credible findings, the rank downgraded by one level. If the synthesized finding contain only credible findings, the rank downgraded by two levels. If the synthesized finding contain mixture of credible and not supported

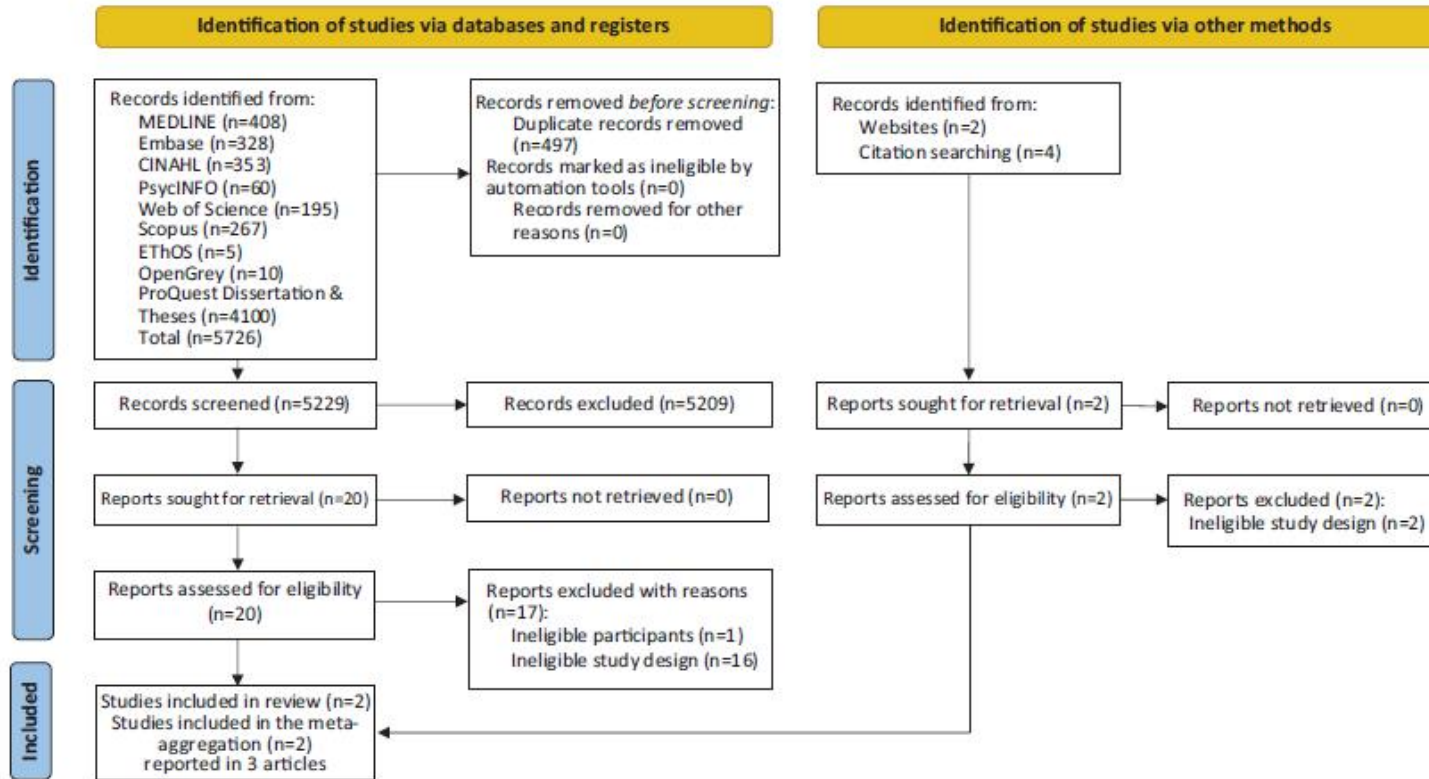
findings, the rank downgraded by three level. If the synthesized finding contain only not supported findings, the rank downgraded by four levels.

Based on the evidence highlighted in the Summary of Findings (Table 5), the JBI grades of recommendations were used to assist in the development of the recommendations shown in Table 8.¹⁸¹ A binary system for grading the recommendations was used: a strong recommendation (Grade A) or a weak recommendation (Grade B).¹⁸²

Grade A: A strong recommendation for ascertain health management strategy where: i) it is clear that desirable effects outweigh undesirable effects of the strategy; ii) where there is evidence of adequate quality supporting its use; iii) there is a benefit or no impact on resource use, and iv) values, preferences and the patient experience have been taken into account.

Grade B: A weak recommendation for ascertain health management strategy where: i) desirable effects appear to outweigh undesirable effects of the strategy, although this is not as clear; ii) where there is evidence supporting its use, although this may not be of high quality; iii) there is a benefit, no impact or minimal impact on resource use, and iv) values, preferences and the patient experience may or may not have been taken into account.

Figure 8 PRISMA flow chart, Search results and study selection and inclusion process



3.4 Results

3.4.1 Study inclusion

A total of 5726 titles were identified from the databases, unpublished sources, and gray literature searches. After removing duplicates, 5229 titles and abstracts were screened. The reasons of excluding studies after screening abstracts were mainly due to ineligible country or study design. Twenty papers were identified as potentially eligible for inclusion and assessed for eligibility in the full text screening stage. Seventeen papers were excluded, due to either ineligible population (n=1)¹⁸³ or ineligible study design (n=16).^{32,73,80,81,85,172,184–193} Two papers used the same population^{194,195}; however, the results focused on different aspects of the phenomena of interest and, therefore, both papers were included in the review. Thus two studies (comprising of three papers) were included in the systematic review. Four additional papers were identified after checking the reference lists of the papers included in the review, however, all were excluded after the abstract screening. See Figure 8 for an overview of the study selection and inclusion process.

3.4.2 Methodological quality

The methodological quality of the studies was high (Table 3), with one study having an overall score of 100% (reported in two papers),^{194,195} and one study having an overall score of 90% due to not reporting ethical approval.⁹⁷ All studies demonstrated congruities between the methodology and research question/objectives, methods used to collect data, representation and analysis of data, and interpretation of research findings. Other areas of strength were the representation of participants and their voices, and having conclusions flowing from the analysis or interpretation of findings.

3.4.3 Characteristics of included studies

One study was conducted in Turkey in 2008⁹⁷ and one study (reported in two papers) was conducted in Israel in 2018 and 2020^{194,195} (Table 4). Both studies used interviews to collect data. The participants in all included studies were mothers and fathers aged 18 to 42 years. The total sample size was 118 participants (96 mothers and 22 fathers).

In the Turkish study, the study location was Burhaniye, which is a district in Balıkesir Province where the economy relies largely on the production of olives and tourism. Participants were selected randomly from parents of under-five-year-old children living in the region served by the health centre through health centre enrolment. Most of the interviews were done in the homes of families and the authors reported

that all children were clearly exposed to SHS in various locations in the home.

In the study from Israel, parents of children younger than seven years old with at least one parent who smoked were eligible for inclusion. Purposive sampling was used to select participants from different geographical areas in central Israel, to ensure the recruitment of participants from a variety of socioeconomic, ethnic, and religious groups. The phenomenon of interest focused on the parents' knowledge regarding the risks of SHS to children, barriers to reduce children's SHS exposure, rules to decrease SHS exposure among children, parental perceptions regarding SHS exposure, and parental misconceptions of exposure.

The first study focused on the assessment of parents' knowledge regarding the risks of SHS to children's health and the barriers to reducing SHS exposure among children.⁹⁷ The second study was included in two publications; the first publication focused on parental perceptions and misconceptions regarding tobacco smoke exposure among children in smoking families.¹⁹⁵ The second publication focused on parental smoking behaviour around children from the parents' perspective.¹⁹⁴ All studies analysed data using thematic content analysis. No studies were found investigating the views and experiences of children or professionals on the prevention of SHS

exposure, nor were any studies found that reported on exposure to SHS among women.

3.4.4 Review findings

A total of 55 findings were extracted from the two included studies (from three papers), with 14 assigned as credible, 36 assigned as unequivocal. A further five were assigned as not supported and not included in the meta-synthesis. The extracted findings with illustrations are listed in Appendix 3.3. The 50 findings assigned as credible or unequivocal were aggregated into eight categories and resulted in the following three synthesized findings: i) Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy by health care professionals; ii) Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking; and iii) Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective. All three synthesized findings were rated as moderate, using the ConQual approach. (Table 5)

3.4.5 Synthesized finding 1

Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy by health care professionals.

This synthesized finding relates to parents' awareness of SHS and where they perceive exposure to SHS to happen. This synthesized finding was derived from 15 findings from two categories in two studies (see Table 6).^{97,195}

3.4.5.1 Category 1.1: Knowledge, risk awareness, and perception of smoking and SHS exposure:

This category was derived from 13 findings identified in two studies.^{97,195} It represents the findings related to risk awareness and perception of smoking and SHS exposure among parents. Parents appeared to be aware that children were exposed to SHS. Some parents reported that exposure to SHS occurs when a child is next to them when they are smoking even if it is outdoors, when the child inhales/smells the smoke or the scent of someone's cigarette, or when smoking in the car. Parents were aware that smoking and exposure to SHS are harmful, and that children may mimic their parents and try to smoke cigarettes.

“Passive exposure, however, they call it, when the child inhales the smoke or the scent of someone’s cigarette when they’re smoking.”^{195(p.1371)} *“Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us....”*^{97(p.46)}

3.4.5.2 Category 1.2: Sources of information regarding health dangers of SHS exposure

This category was derived from two findings in one study.⁹⁷ It represents the parents’ sources of information regarding the health hazards of SHS exposure for children. Mothers stated that the health dangers of SHS exposure were not commonly discussed with them during pregnancy, where they reported that health care professionals did not inform them about the dangers of SHS and smoking.⁹⁷ The majority of parents also reported that the most common source of information was television.

“There are always programs on TV about smoking hazards, immediately I am zapping. I cannot resist hearing the smoking hazards. Any way I know what the hazards are, but I cannot quit smoking.”^{97(p.468)}

3.4.6 Synthesized finding 2

Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.

This synthesized finding was derived from 10 findings from three categories from two studies (see Table 6).^{97,194}

3.4.6.1 *Category 2.1: Perceived barriers to quitting smoking and decreasing SHS exposure among children*

This category represents the findings related to perceived barriers to quitting smoking and decreasing SHS exposure among children. This category was derived from four findings identified in two studies.^{97,194}

The barriers were: smoking was considered as a sign of manhood or act of modernity, smoking was accepted socially, and judgement of others. Moreover, according to tradition, making guests comfortable, with no negative comments directed at the guest were essential components of hospitality, as it would be disrespectful or offensive to ask friends or relatives not to smoke.

“It is disgraceful to say friends or relatives not to smoke here. They are our guests” Mother^{97(p.470)}

3.4.6.2 *Category 2.2: Psychological and personal barriers to quit smoking and decrease SHS exposure among children*

This category represents the findings related to psychological and personal barriers to quitting smoking and decreasing SHS exposure for children. This category was derived from six findings identified in two studies.^{97,194} These barriers were lack of willpower to quit smoking or reduce SHS exposure, acceptance of imperfection without guilt, perceived conflicts with the family, perceived lack of control/low self-efficacy, and belief that restrictions could not be implemented.

“During Ramadan, we do not smoke for hours and hours. But after breaking the fast, I jumped down the cigarettes” Father^{97(p.469)}

3.4.7 Synthesized finding 3

Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.

This synthesized finding was derived from 25 findings from three categories in two studies (from three publications; see Table 6).^{97,194,195}

3.4.7.1 *Category 3.1: Physical restrictions to decrease SHS exposure among children*

This category represents the findings related to participants' physical restrictions to decrease SHS exposure among children. This category was derived from five findings identified in two studies.^{97,194}

Parents implemented some physical restrictions on smoking to limit SHS exposure among their children, such as smoking in specified places in homes like the balcony, smoking in a separate room with the door closed, smoking in the kitchen under the aspirator, exhaling the smoke into the coal stove, smoking in the same room with children but with the door open, putting their head out of the window while smoking, or smoking in the bathroom. Parents reported restrictions of smoking in the car, limitations of smoking when strolling with babies, or adopting a smoke-free home. Additionally, some parents reported that there were no complete smoking restrictions in the home.

"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in."^{194(p.697)}

"Only in the kitchen under the aspirator in winter, in the balcony in the summer"^{97(p.469)}

3.4.7.2 Category 3.2: Misperception of SHS exposure

This category was derived from nine findings from one study.¹⁹⁵ This category represents parents' misperceptions about SHS exposure among children. Some parents believed that SHS exposure could not occur in open areas, if they smoke far away from children, at the window, or in a car where the windows are open and the air conditioner is on. They believed also that SHS exposure could not occur if they smoke on a balcony with the door closed, smoke when walking with a child in a stroller, blow the smoke away from children, move the stroller away from the bench and smoke, and smoke half an hour before picking the children in the car with open windows and there is an air freshener.

“the smoke, I blow it away a bit, the cigarette isn't close to them, I don't put the cigarette near them and when I breathe out the smoke, I don't blow in their direction, I exhale normally but not in their direction”^{195(p.1372)}

3.4.7.3 Category 3.3: Uncertainty/confidence regarding protective measures

This category represents the findings related to participants' uncertainty/confidence regarding protective measures. It was derived from six findings identified in one study.¹⁹⁴ Some parents were confident about their protective measures to limit SHS exposure among

children, like smoking with all windows open, smoking in open places while walking with the stroller, smoking while opening the overhead protective covering during smoking in the travel carriage, or smoke but not above children's heads (just a little bit away from children). However, others were uncertain regarding their protective measures. Some parents thought that partially effective protective measures are enough. These protective behaviours are maintaining distance, personal hygiene, and smoking at the window.

"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough"^{194(p.697)}

3.4.7.4 *Category 3.4 Psychological motivators to decrease SHS exposure among children*

This category represents the findings related to participants' psychological motivators to decrease SHS exposure among children. This category was derived from five findings identified in two studies.^{97,194} The psychological motivators were having younger children, feelings of self-criticism, being a good vs bad parent, trying to make an effort to decrease SHS exposure among children, feeling in control through high self-efficacy to change the habit, and welcoming a smoking ban because they think it will help them.

“It makes me feel bad and I know it’s bad. I get so mad at myself but...it’s a conflict, a huge conflict... I mean it goes against everything that... as a parent, you want only good for your children, and here you’re sticking poison in their face....”^{194(p.698)}

3.5 Discussion

The synthesized findings support the view that parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy by health care professionals. Smoking was a socially and culturally accepted norm in the included studies, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking. Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.

This review provides a comprehensive overview of parents’ views on SHS exposure among their children. The first synthesized finding comprised two categories relating to the level of awareness among parents regarding their children’s SHS exposure and the health

hazards of that exposure. This review found that parents knew that SHS exposure was generally harmful. This supports quantitative evidence from other Middle Eastern countries (Saudi Arabia, Iran, and Jordan, Kuwait, and Egypt),^{32,86,87} which reported that women were aware of the dangers of SHS in general. The authors reported that the lack of knowledge about specific dangers of SHS exposure acted as a barrier to prevent SHS exposure among women and children.⁸⁸⁻⁹⁰ This is congruent with the second category in this synthesized finding, as health care professionals did not commonly discuss the health hazards of SHS exposure during pregnancy.

The second synthesized finding comprises two categories relating to perceived barriers to reducing SHS exposure to children in homes. The first category reports the perceived barriers to quitting smoking and decreasing SHS exposure among children. The barriers identified related to smoking being considered a sign of manhood or act of modernity, the judgment of others relating to the difficulties of asking visitors to keep the home smoke-free since smoking was socially acceptable, and the importance of making guests comfortable with no negative comments as this can have a negative effect on hospitality, which is considered an important tradition. This finding is congruent with quantitative evidence from Turkey and Jordan where social and cultural norms and traditions were identified as barriers to preventing

SHS exposure among children at home,⁹⁷ and for non-smoking women in the workplace.³²

Psychological and personal barriers to quit smoking and decrease SHS exposure among children were identified in the second category. The barriers were attributed to a lack of will power to quit smoking or reduce SHS exposure, the acceptance of imperfection with no guilt, perceived conflicts with family, perceived lack of control or low self-efficacy, and believing that smoking restrictions could not be implemented, thereby reflecting the sense of nonchalance and loss of hope to reduce SHS among children. The barriers could be minimized through the implementation of a theory-based behaviour-change intervention to reduce SHS exposure in the home through increasing knowledge about SHS harms and positively impacting the husband's smoking habits, either through reduction or quitting.¹⁰¹

The above barriers are quite similar to qualitative evidence from the UK, Australia, the USA, Canada, and China where authors reported a lack of confidence to ask smokers not to smoke in the home; lack of power to modify the environment; fear of damaging relationships; social norms and gender imbalances; and cultural socializing and sharing cigarettes.^{75,96}

The third synthesized finding comprises four categories relating to parents' physical restrictions on smoking and having rules to limit

children's SHS exposure. The physical restrictions, which were implemented by parents, included having rules, such as smoking in specific places in the home, avoiding smoking in the car and when strolling with babies, and adopting smoke free homes. In this review some parents reported no restrictions on smoking in the home, which is consistent with quantitative evidence from Middle Eastern countries where it was reported that, even with a good level of risk awareness of SHS, women's behaviour related to avoidance of SHS exposure was minimal.³² There were no restrictions on indoor home smoking for residents and guests, despite of the presence of children.^{87,91} The second category of the third synthesized finding represents the misperception of parents regarding where and how SHS exposure to their children could happen. Some parents reported that SHS exposure does not occur when smoker is at a (specified) distance, the window is open, the door is closed, blowing smoke away from children, in a moving car, if time elapsed after smoking, while walking with a stroller and smoking, or if the child is moved away from the smoker. These findings reflect that the level of awareness of parents regarding SHS exposure among their children is inadequate, which is in line with the quantitative findings from Iran, Kuwait, and Egypt.⁸⁸⁻⁹⁰ Quantitative evidence from Iran reported one of the barriers for pregnant women protecting themselves from SHS was that they did not understand the risks of SHS on the foetus and were not aware of how to protect themselves against SHS.⁸⁸ The third category reflects parents'

uncertainty/confidence regarding protective measures, whereby some parents felt confident of their protective measures (for example, smoking at the window, personal hygiene, and maintaining distance), but others felt less certain that partially effective protective measures were sufficient. This reflects the need for a health education intervention to improve parents' risk awareness and knowledge regarding the most effective protective measures to reduce SHS exposure among their children.

The psychological motivators for parents to decrease SHS exposure to children were identified in the fourth category, where the most prominent motivators were having younger children, having self-efficacy to change the habit, being self-critical, feelings of being a good vs bad parent, the acceptance of the smoking ban as it was perceived to help parents quit, and trying or making the effort to decrease SHS exposure among children. Some of those motivators were quite different from motivators reported by qualitative evidence from the UK, Australia, the USA, Canada, and China where the authors mentioned success stories and role modelling of elders who had quit smoking; the presence an elder in the home; perceived benefits of preventing SHS exposure; wider community norms accepting prevention of SHS.^{75,96} However, having new-born baby or sense of guilt which was reported as a motivators from that western communities' evidence was quite

similar to having younger child, being self-critical and feelings of being a good vs bad parent reported from the current review.

Identified motivators should be taken into account when designing interventions to decrease SHS exposure among children, as a previous systematic review and meta-analysis¹⁹⁶ reported that interventions designed to protect children from SHS are effective in reducing tobacco smoke pollution in homes, but some residual exposure remained, thus signalling the need for other regulatory measures to help reduce and eliminate SHS exposure in childhood. This finding is congruent with a further systematic review,¹⁰¹ which reported that theory-based behaviour-change interventions led to increased knowledge about SHS harms, a reduction in husbands' smoking, an increase in husbands' quitting smoking, and an increased susceptibility or change in the level of actions in the home to reduce SHS.

3.6 Strengths and limitations of the review

To researcher knowledge, this is the first systematic review to synthesize experiences and views of parents regarding SHS exposure prevention in Middle Eastern countries. This systematic review was conducted following a robust systematic process set out by JBI, and reporting adhered to the PRISMA guidelines.²¹ All steps were completed by two reviewers independently and any disagreements that arose between the reviewers were resolved through discussion. Ten

databases were searched, and no date or language restrictions were applied; therefore it is unlikely that any eligible studies were missed.

During data extraction, it was noted that authors did not differentiate in quotations between mothers and fathers when reporting their findings from parents. In response to this, we expanded the eligible participants of this review to include parents (i.e., fathers and mothers) to give a comprehensive overview of experiences and views on SHS exposure prevention. However, this meant that the researcher (ZH) was unable to compare and contrast findings between fathers and mothers. The methodological quality of the included studies was high. A limitation of the review relates to the small number of included studies; however, this is commonly seen in systematic reviews of qualitative research.^{197–201} Additionally, as reported in the Ranking of the ConQual score of included studies table (Table 7), the ConQual scores of the three synthesized findings are moderate; hence, the recommendations derived from the synthesized findings were also lowered one grade. Moreover, all qualitative evidence available includes views from parents, not from professionals or children, and the researcher was unable to explore the perceptions of women's exposure to SHS as no studies reporting this phenomena being identified.

3.7 Conclusion

Parents in Middle Eastern countries were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy by health care professionals. Parents implemented some physical restrictions on smoking, such as having rules of limitation to where smoking can take place in the home and outdoors. There were conflicting views regarding whether exposure to SHS would happen in the outdoors/open spaces or when using techniques to minimize exposure. There was great uncertainty or a lack of confidence regarding whether protective measures were effective at reducing exposure to children. Smoking is very socially accepted, and cultural beliefs about traditional values and personal psychological factors were perceived barriers to reducing SHS exposure. Parents had psychological motivators (e.g., protect smaller children, self-efficacy, and self-criticism) to decrease SHS exposure among children in home.

3.8 Recommendations for practice

This review provides important insights into the needs of parents to help them to reduce SHS exposure among children. The synthesized findings, as illustrated in the Summary of Findings (Table 5), indicate that there are many misconceptions among parents regarding their children's SHS exposure, which reflects their need for further

information about how exposure occurs, the ways to limit it, and the best protective approaches to take to minimize SHS exposure to children. This review recommends implementation of effective health education sessions to increase knowledge about SHS harms, reduce exposure to smoking in children, and increase smoking quit rates in households.

3.9 Recommendations for policy

In Middle Eastern countries, many tobacco control policies are not comprehensively implemented or enforced, especially banning smoking in public places. Moreover, the policies do not include any recommendations for preventing smoking in homes or personal vehicles in which children are usually present.^{165,170} This is particularly pertinent given the current review findings that children are exposed to SHS in homes and personal vehicles and parents have misconceptions about their children's SHS exposure. In addition, parents are uncertain about the protective measures they use protect their children from SHS. (Table 8)

Further enforcement of tobacco control policies in Middle Eastern countries is needed, including strengthening bans on smoking public places, and supporting parents to quit smoking, thereby preventing exposure to SHS in children. Standardized guidelines should be available for health care professionals in primary health centres to help

them to guide parents regarding SHS exposure during pregnancy and childhood as this review found that SHS exposure is not commonly discussed with parents.

3.10 Recommendations for research

The studies included in this review only focused on the perspective of parents; therefore, qualitative research is needed to explore barriers and facilitators of prevention of SHS among pregnant women and children from the perspective of pregnant women and children themselves and health care professionals. Moreover, only three published papers relating to two studies on the experiences and views of parents on SHS exposure among children in the Middle Eastern countries were found, which reflects the need for further research on this topic.

3.11 Acknowledgments

Elizabeth Doney who have contributed to the development of search strategies.

Table 3 Methodological quality of included studies in experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review

Publication	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total % per paper
Gursoy ST, et al (2008) ⁹⁷	Y	Y	Y	Y	Y	Y	Y	Y	U	Y	90%
Myers V, et al (2020) ¹⁹⁴	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%
Rosen LJ, et al (2018) ¹⁹⁵											

Y: yes; N: no; U: unclear; JBI Critical Appraisal Checklist for Qualitative Research

- Q1. Is there congruity between the stated philosophical perspective and the research methodology?
- Q2. Is there congruity between the research methodology and the research question or objectives?
- Q3. Is there congruity between the research methodology and the methods used to collect data?
- Q4. Is there congruity between the research methodology and the representation and analysis of the data?
- Q5. Is there congruity between the research methodology and the interpretation of the results?
- Q6. Is there a statement locating the researcher culturally or theoretically?
- Q7. Is the influence of the researcher on the research, and vice-versa, addressed?
- Q8. Are participants, and their voices, adequately represented?
- Q9. Is the research ethical, according to current criteria, or for recent studies, is there evidence of ethical approval by an appropriate body?
- Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Table 4 Characteristics of included studies in experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review

Study, Country	Methods and methodology	Participant characteristics and sample size	Phenomena of interest	Setting/ context/ culture	Author conclusion
Gursoy ST, et al (2008) ⁹⁷ Turkey	Individual semi-structured interviews with open-ended questions. The interviews were tape-recorded and transcribed verbatim. Thematic analysis.	Participants were 48 mothers and five fathers living at 48 houses. Interviews were conducted in the homes of families. The mean age was 27.4±5.42 years. (range 18–41) (N=53). Seven mothers were non-smokers, but their husbands smoked.	To assess knowledge regarding the risks of SHS to the health of children and the barriers to reducing children's SHS exposure in order to better understand why parents still smoked in the home before a smoking ban.	Homes of participants or at the health centre.	Parents are aware that exposure to tobacco smoke can harm their children as well as themselves. Parents stated they wanted to stop smoking but most of them feel they are barely coping with existing responsibilities. In addition, some parents stated that they lacked resources to allow them to obtain professional counselling or nicotine replacement therapy. All parents were attempting to reduce their children's exposure to tobacco but the strategies they used were in general ineffective. The knowledge, relationships with family and friends and the social and cultural context in which they live play an important role in the management of smoke exposure in the homes.
Rosen LJ, et al	Face-to-face semi-structured	Parents in which at least one parent smoked, and with a	Rosen LJ, et al (2018) ¹⁹⁵ aimed to assist with the	Health care organization that	Myers V, et al (2020): ¹⁹⁴ Parents are sometimes aware that their 'rules' but mitigating practices are limited. Parents described

Study, Country	Methods and methodology	Participant characteristics and sample size	Phenomena of interest	Setting/ context/ culture	Author conclusion
(2018) ¹⁹⁵ Israel And Myers V, et al (2020) ¹⁹⁴ Israel	interviews. Purposive sampling to select clinics in different geographical areas. Thematic analysis. Further analysis was performed to create a conceptual framework.	child below the age of 7 years. Respondents included 48 mothers and 17 fathers, of whom 54 were smokers and 11 were non-smokers. The mean age was 33.3 years (Standard Deviation (SD): ± 4.8 , range: 24–42], with an average of 1.91 (range:1–4) children per family. (N=65)	design of the intervention program and program evaluation to help parents reduce exposure of young children to tobacco smoke. To report on parental perceptions regarding tobacco smoke exposure among parents in smoking families. To identify parental misconceptions of exposure and compared parental misconceptions	provides services to the population under the National Health Insurance Law	smoking around their children in certain areas of the home, outdoors, and in what they consider to be open or ventilated areas. Mitigating practices were common and parents held mixed views as to how effective these practices are in protecting their children from exposure to tobacco smoke. Parents who continue to smoke around their children despite understanding the health risks may feel powerless to effect change, as well as being uncertain as to the effectiveness of their protective strategies. Incomplete knowledge about exposure and low self-efficacy gives parents a false sense of security that they are protecting their children when in fact exposure may still be occurring. Better understanding of how and why parents smoke around their children can facilitate the design of interventions and creation of educational materials for parents to help them reduce children's SHS exposure. Guidelines should be provided explaining how and when exposure occurs and how to keep children safe, emphasizing the importance of smoke-free homes and cars. Providers including paediatricians and MCH clinics could be well placed to provide relevant information to parents. Armed with more comprehensive knowledge, smoking parents who are

Study, Country	Methods and methodology	Participant characteristics and sample size	Phenomena of interest	Setting/ context/ culture	Author conclusion
			<p>with objective assessment of exposure as reported in the scientific literature.</p> <p>Myers V, et al (2020) ¹⁹⁴ focused on exploration of parental smoking behaviour around children from parents' perspective.</p>		<p>unwilling or unable to quit may feel more confident in their abilities to protect their children.</p> <p>Rosen LJ, et al (2018):¹⁹⁵</p> <p>Parents relied on sensory perceptions and physical factors to assess whether or not their children were exposed to SHS. Yet, sensory perceptions are unreliable. The scientific evidence presented in this article may be used by health professionals to provide parents with accurate information about exposure in common situations. Provision of objective evidence to parents from measurement of child exposure and air quality in the home, car, and near children outdoors could further help parents realize the true extent of exposure and so motivate them and the surrounding society to protect children from the enormous and entirely preventable burden of harm due to tobacco smoke exposure.</p>

MCH, maternal child health; SHS, second-hand smoke

Table 5 Summary of Findings of experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review

Experiences and views of parents, children, and professionals on second-hand smoke exposure prevention in Middle Eastern countries					
Bibliography: Hassanein ZM, Nalbant G, Langley T, Murray RL, Bogdanovica I, Leonardi-Bee J. Experiences and views of parents on second-hand smoke exposure prevention in Middle Eastern countries: a qualitative systematic review. JBI Evid Synth. 2022; 20(8):1969–2000.					
Synthesized finding	Type of research	Dependability	Credibility	ConQual score	Comment
1: Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	Dependability: All studies scored 5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded one level due to a mix of unequivocal and credible findings: U=8, C=7
2: Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	Dependability: All studies scored 5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded due to a mix of unequivocal and credible findings: U=6, C=4

Synthesized finding	Type of research	Dependability	Credibility	ConQual score	Comment
<p>3: Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.</p>	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	<p>All studies scored 5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded one level due to a mix of unequivocal and credible findings: U=23, C=2</p>
<p>U, unequivocal; C, credible</p>					

Table 6 Synthesized findings and categories of experiences and views of parents on SHS exposure prevention in Middle Eastern countries: a qualitative systematic review

Synthesized finding	Categories	Findings	Illustrations
<p>1. Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.</p>	<p>1.1. Knowledge, risk awareness, and perception of smoking and SHS exposure</p>	<p>1.Smoking causes harmful health effects (U)</p>	<p><i>“Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us....”</i> Father^{97(p.468)}</p>
		<p>2.Passive smoking was not well recognized term (C)</p>	<p><i>“I think I am a passive smoker because I don’t inhale; I am just a “lip smoker”</i> Mother^{97(p.468)}</p>
		<p>3.Children, whose parents smoke, should have desire to smoke (C)</p>	<p><i>“My daughter put pretzel stick cracker between her fingers like smoking a cigarette while playing”</i> Mother^{97(p.468)}</p>
		<p>4.Smoking cigarettes had a negative impact on adult’s and children’s health and participants stated that they would like to quit smoking (C)</p>	<p><i>“I want to quit smoking for my health. I could not tell a lie to say quitting for my child’s health, for God sake. I have sensation problem on my feet and hands.”</i> Mother^{97(p.469)}</p>

Synthesized finding	Categories	Findings	Illustrations
		5. Breathing in smoke, inhaling smoke, smoke enters the body as sensory perception of smoking (C)	<i>Passive exposure, however they call it, when the child inhales the smoke or the scent of someone's cigarette when they're smoking.</i> ^{195(p.1371)}
		6. Exposure involves being near a smoke (up to a certain distance) as a physical aspect of exposure (U)	<i>"Just being next to smokers, like when my children are near me and I'm smoking. Then they're exposed whether they like it or not."</i> ^{195(p.1372)}
		7. Exposure occurs outdoors as physical perception of smoking (U)	<i>"When I go to the playground with her and another mother might be standing at the second swing, swinging her child with a cigarette in her mouth, it also reaches my daughter."</i> ^{195(p.1372)}
		8. Exposure occurs in closed spaces (U)	<i>"No matter how much you air it out, the car's interior is a small and closed space and the odour remains."</i> ^{195(p.1372)}
		9. Exposure occurs while smoking and walking with stroller (U)	<i>"When I open the overhead protective covering ...the smoke goes over it and not beneath it. So he [the child] is somewhat exposed; sometimes he even coughs a bit."</i> ^{195(p.1372)}
		10. Seeing smoke, seeing someone smoking, seeing a lit cigarette, seeing a package of	<i>"I don't believe that it is possible to be exposed to smoking without seeing the action"</i> ^{195(p.1371)}

Synthesized finding	Categories	Findings	Illustrations
		cigarettes as sensory perception of smoking (U)	
		11.Smells the smoke, someone's clothes smell of smoke as sensory perception of smoking(U)	<i>"When someone smokes near then, it doesn't matter if here or two meters away, if they smell it, it is exposure"</i> ^{195(p.1371)}
		12. Feeling or sensing smoke, smoke is 'on' someone as sensory perception of smoking(U)	<i>"When I'm near my father-in-law I can feel he's been smoking..."</i> ^{195(p.1371)}
		13.Combination of different sensory perceptions of exposure (C)	<i>"Exposure is when the child breathes or smells the cigarette which someone else is smoking"</i> ^{195(p.1371)}
	1.2. Sources of information regarding health dangers of SHS exposure	1.Dangers of SHS were not regularly communicated during pregnancy and childbearing (C)	<i>One fifth of the participants reported that the health care professions did not inform them about the dangers of Environmental Tobacco Smoke and smoking even during pregnancy and child bearing.</i> ^{97(p.468)}
		2. Dangers of SHS were commonly learnt from television and health care professions (C)	<i>"There are always programs on TV about smoking hazards, immediately I am zapping. I cannot resist hearing the smoking hazards. Any way I know what the hazards are, but I cannot quit smoking."</i> Mother ^{97(p.468)}
2. Smoking is a socially and culturally accepted	2.1. Perceived barriers to quitting smoking and decreasing SHS	1.Smoking is considered as sign of manhood or act of modernity even by health professionals (U)	<i>A father from a village explained that smoking was the sign of "being a man"</i> Father ^{97(p.469)}

Synthesized finding	Categories	Findings	Illustrations
norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.	exposure among children		<i>"Nobody asked me if I was smoking during the visits, so no information was given. They have never thought I could smoke because I am veiled so I am not a modern woman..."</i> Mother ^{97(p.469)}
		2.Participants stated that they had difficulties to ask respect and cooperation from friends and family who were visiting in order to keep the home smoke free (Smoking is accepted socially) (C)	<i>"During Ramadan, my uncle visited us. I told him not to smoke at home. He said that; he would blow the smoke through the coal stove, that smoking was his unique pleasure in his life, it was none of my business."</i> Mother ^{97(p.469)}
		3.According to traditions, it is attached an important value to the hospitality. Make guests comfortable, no critics; no comments are the essentials of the hospitality (U)	<i>"It is disgraceful to say friends or relatives not to smoke here. They are our guests"</i> Mother ^{97(p.470)}
		4.Judgement of 'others' (C)	<i>"I see it when they're [others] looking at me. When I'm walking around with the carriage and I'm holding a cigarette... No, it doesn't affect me...Maybe bothers me for a moment, but it passes."</i> ^{194(p.698)}
	2.2. Psychological and personal barriers to quit smoke and	1. The lack of will power as barriers to quitting smoking or reducing SHS exposure (C)	<i>"During Ramadan, we do not smoke for hours and hours. But after breaking the fest, I jumped down the cigarettes"</i> Father ^{97(p.469)}

Synthesized finding	Categories	Findings	Illustrations
	decrease SHS exposure among children	2. Acceptance of imperfection – no guilt (U)	<i>"I'm not sorry for smoking nor am I trying to obtain anyone's approval. I don't have guilt feelings over smoking. That doesn't mean that I need to smoke more. I'm aware that I need to do something"</i> ^{194(p.698)}
		3. Conflicts with family (C)	<i>There are arguments about that for example, about my mother, we argue about her smoking, me and my partner, it upsets her [my partner] that she [my mother] doesn't make an effort not to smoke around the kids"</i> ^{194(p.698)}
		4. Perceived lack of control/low self-efficacy (U)	<i>"I have this fantasy of not smoking next to them, but I don't have that privilege. It's like...smoking in secret. Or there might be an instance where I can do it without them being on top of me or next to me. So if I'm with them for 12 h a day on weekends it's like hiding from them."</i> ^{194(p.698)}
		5. Perceived lack of control/low self-efficacy – practical barriers (U)	<i>"I try to go out on the balcony but it's cold, and it sucks to stand out in the cold with a cigarette, so I smoke near them - it's not great but it is what it is."</i> ^{194(p.698)}
		6. Most of participant don't believe that the [smoking ban] restrictions could be implemented (C)	<i>"I don't believe that smokers will obey the rules. Our society doesn't matter any law, there is a statement which says – the laws are made to be destroyed" Mother</i> ^{97(p.470)}
		3. Parents implemented	3.1. Physical restrictions to

Synthesized finding	Categories	Findings	Illustrations
different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.	decrease SHS exposure among children	2. Limitations of smoking in the car (U)	<i>"Do you ever smoke with the kids in the car?" "No, that's the limit"</i> ^{194(p.697)}
		3. Limitations of smoking when strolling with babies (U)	<i>"A lot of mothers stroll with the baby carriage and smoke freely. No way will I do that"</i> ^{194(p.697)}
		4. Protective behaviours: smoke-free home (U)	<i>"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in."</i> ^{194(p.697)}
		5. There were no complete smoking restrictions in the home (U)	<i>"Only in the kitchen under the aspirator in winter, in balcony in the summer"</i> Mother ^{97(p.469)}
	3.2. Misperception of SHS exposure	1. Exposure doesn't occur when the smoker is at a (specified) distance (U)	<i>"Far...there's absolutely no way the smoke will reach her"</i> ^{195(p.1372)}
		2. Exposure doesn't occur outdoors/in open spaces (U)	<i>"Not in a building, or in the house, or in the entrance, I have no problem with open areas...I don't smoke near my children, I can smoke only if.... We are in an open area, in an open area I can smoke a cigarette."</i> ^{195(p.1372)}
		3. Exposure doesn't occur when the window is open (U)	<i>"My husband smokes in the car but makes sure to open the window because he says that way the odour doesn't remain."</i> ^{195(p.1372)}

Synthesized finding	Categories	Findings	Illustrations
		4. Time elapsed after smoking prevents SHS exposure (C)	<i>"If I know that I have to get one of the kids I try not to smoke for half an hour before this... if I light up then all the windows for sure will open and there is an air freshener"</i> ^{195(p.1372)}
		5. Exposure doesn't occur when the door is closed (U)	<i>"I smoke only on the balcony and I always close it off (from the rest of the house)...I do everything to avoid anything reaching my daughter."</i> ^{195(p.1372)}
		6. Exposure doesn't occur while walking with stroller and smoking (U)	<i>"I don't really think that any of it reaches her when we're walking with her in the stroller and smoking, it doesn't seem reasonable to me that it would reach her."</i> ^{195(p.1372)}
		7. Exposure doesn't occur in a moving car (U)	<i>"There's no way I'll smoke when it's raining say, only with all the windows open and the car's moving so there's air and the air conditioner is on to get it out"</i> ^{195(p.1372)}
		8. Exposure doesn't occur when blowing smoke away from children (U)	<i>"the smoke, I blow it away a bit, the cigarette isn't close to them, I don't put the cigarette near them and when I breathe out the smoke, I don't blow in their direction, I exhale normally but not in their direction"</i> ^{195(p.1372)}
		9. Exposure doesn't occur if the child is moved away from the smoker, or the smoker moves away from the child (U)	<i>"If I'm sitting with her on a bench then I'll move the stroller away a bit and I'll move to the other side of the bench."</i> ^{195(p.1372)}

Synthesized finding	Categories	Findings	Illustrations
	3.3. Uncertainty/confidence regarding protective measures	1. Confidence in protective measures (U)	<i>"Do you think it's effective to reduce exposure to passive smoking?"; "Opening the windows? ...Of course it is!"^{194(p.697)}</i>
		2. Uncertainty regarding protective measures (U)	<i>"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough"^{194(p.697)}</i>
		3. Acceptance of partially effective protective measures are enough (U)	<i>"If I smoke in the car on my way to picking up the kids, I say to myself: 'OK, it'll air out by the time I put them in the car'. But that's a bunch of bull. It doesn't totally disappear, even if you leave the window open."^{194(p.697)}</i>
		4. Protective behaviours: maintaining distance (U)	<i>"I smoke next to them outside, but I don't smoke 'on top of their heads'."^{194(p.697)}</i>
		5. Protective behaviours: at the window (U)	<i>"I smoke at the window...my whole head is outside, I'm almost falling out"^{194(p.697)}</i>
		6. Protective behaviours: personal hygiene (U)	<i>"I change my shirt after smoking, thoroughly wash my hands, rinse my mouth with mouthwash and try very hard to have no smoke odour on me."^{194(p.697)}</i>
	3.4. Psychological motivators to decrease	1. Greater importance of protecting smaller children (U)	<i>"So while he's small it's very important for me that he not be near an environment of smokers... suddenly he</i>

Synthesized finding	Categories	Findings	Illustrations
	SHS exposure among children		<i>seems like a big boy, so it seemed like it was OK to smoke near him</i> ^{194(p.697)}
		2. Feeling in control – high self-efficacy to change the habit (U)	<i>“You simply need to change the habit...From smoking in the car to not smoking in the car. It’s a habit that you have to give up. There are habits you need to get rid of – to decide and to give them up.”</i> ^{194(p.698)}
		3. Self-criticism/ Being a good vs bad parent (U)	<i>“It makes me feel bad and I know it’s bad. I get so mad at myself but...it’s a conflict, a huge conflict... I mean it goes against everything that... as a parent you want only good for your children, and here you’re sticking poison in their face....”</i> ^{194(p.698)}
		4. Trying – making an effort to decrease SHS exposure among children (U)	<i>“I try not to smoke next to them, but they’re always coming in and out, in and out. I always tell them to go in and stay inside.”</i> ^{194(p.698)}
		5. Many welcome the [smoking] ban because they think it will help them (C)	<i>“We are tradesmen so men from lower classes... we are not well informed. I think the punishment will help us to quit smoking... so we support with all out heart the laws...”</i> Father ^{97(p.470)}

C, credible, SHS, second-hand smoke; U, unequivocal

Table 7 Ranking of the ConQual score of included studies in qualitative systematic review

Synthesized finding 1: Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.		
Dependability	Credibility	ConQual score
<i>Gursoy et al.</i> ⁹⁷ (High) <i>Rosen et al.</i> ¹⁹⁵ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	15 findings, 2 categories 8 unequivocal; 7 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility
Synthesized finding 2: Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.		
Dependability	Credibility	ConQual score
<i>Gursoy et al.</i> ⁹⁷ (High) <i>Myers et al.</i> ¹⁹⁴ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	10 findings, 2 categories 5 unequivocal; 5 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility
Synthesized finding 3: Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.		
Dependability	Credibility	ConQual score
<i>Gursoy et al.</i> ⁹⁷ (High) <i>Myers et al.</i> ¹⁹⁴ (High) <i>Rosen et al.</i> ¹⁹⁵ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	25 findings, 4 categories 23 unequivocal; 2 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility

Table 8 Grades of recommendations of the current review, which are specific to the Middle Eastern countries

Recommendation	Grade
Further enforcement of tobacco control policies in Middle Eastern countries such as strengthening bans on smoking in public places is needed	Grade A
Societies within Middle Eastern countries should be educated on dangers of SHS exposure on health, in particular in relation to children.	Grade A
Policy makers should consider implementing accessible health education programs to pregnant women and parents of children in Middle Eastern countries, to improve their knowledge about hazards of SHS exposure, and minimize the social acceptance of smoking and SHS exposure.	Grade A
Governments within Middle Eastern countries should consider reviewing educational resources available to parents regarding the definition of SHS exposure, how exposure occurs, and how to minimize it to improve knowledge and understanding in parents.	Grade A
Governments/ministries of health within Middle Eastern countries should consider providing evidence-based assistance to parents to quit and to who have successfully quit smoking to prevent relapse.	Grade A

**4 CHAPTER 4 HEALTHCARE PROFESSIONALS'
KNOWLEDGE, ATTITUDES AND
COUNSELLING PRACTICE REGARDING
PREVENTION OF SECONDHAND SMOKE
EXPOSURE AMONG PREGNANT WOMEN AND
CHILDREN IN ASSIUT, EGYPT**

4.1 Introduction

As mentioned in chapter 1, SHS exposure causes significant harm to children and adverse pregnancy outcomes.^{38,39,202} The health care costs associated with treating health conditions due to SHS exposure are estimated to be approximately \$7.1 billion in some neighbouring countries to Egypt (Gulf Cooperation Council countries),⁶¹ and it is estimated to cost US\$ 616 million yearly in Egypt to treat health conditions caused by tobacco use.^{106,154}

In Egypt, tobacco smoking is widely accepted in homes and public places,¹⁰⁶ and in 2020, 43.4% of males and 0.5% of females were smokers.¹⁰ Despite the presence of smoke-free legislations in Egypt and previous evidence linking reductions in acute coronary event hospitalizations to the implementation of smoke free legislation,²⁰³ in 2019 tobacco use was responsible for about 11% of DALYs and 17% of deaths in Egypt, and exposure to SHS was responsible for 19,500 deaths and 650,000 DALYs.²⁶

Low prevalence of smoking among females in Egypt is due to traditional gender roles which depict women's smoking as disrespectful to society, and as a result there is stigma around women who smoke.²⁰⁴ While only a small proportion of women are active smokers, the high rates of male smoking put non-smoking females at risk of SHS exposure.

As mentioned in chapter 2, in Egypt smoking is banned in indoor workplaces, public transport and indoor public places; however, there are no mechanisms or infrastructure to ensure enforcement of smoke-free legislation, and exposure to SHS is therefore high.²⁰⁵ The prevalence of SHS exposure among women in reproductive age (15 to 49 years) in Egypt is estimated to be 65%,⁹⁸ and about 50% of pregnant non-smoking women in Egypt are exposed daily to SHS⁶⁶, compared to 29% of non-smoking adults in the European Union.²⁰⁶ Previous evidence reported a significant association between SHS exposure reductions in public places such as schools and in private places as cars and lower hospital admissions due to respiratory illness among children, following a comprehensive smoke-free policy.²⁰⁷ In 2014, 35% of Egyptian school students (aged 13-15) were exposed to SHS at home and 55% in enclosed public places.¹⁴¹

A lack of knowledge about the health risks of SHS for family members, especially children, is an important risk factor for SHS exposure.⁷⁴⁻⁷⁷ HCPs, especially nurses and midwives, are well placed to help reduce exposure to SHS in pregnant women and children.²⁰⁸⁻²¹⁰ They spend a significant amount of time in contact with pregnant women and can therefore ask about their SHS exposure, advise them to prevent SHS exposure and encourage their husbands to quit smoking; this HCPs advice has been shown to be effective in previous studies.²⁰⁸⁻²¹⁰

A recent systematic review and meta-analysis demonstrated that providing counselling by HCPs (RR 1.31, 95% CI 1.10-1.55), cost-free

smoking cessation medications (RR 1.36, 95% CI 1.05-1.76), and tailored printed materials (RR 1.29, 95% CI 1.04-1.59) as part of smoking cessation support in primary care centres increased smoking quit rates compared to just receiving standard health care.²¹¹

As mentioned in chapter 1, there is growing international evidence on the positive effects of interventions aimed at decreasing SHS exposure among pregnant women. Previous systematic reviews of clinical interventions to reduce SHS exposure among non-smoking pregnant women reported reduction in self-reported SHS exposure, increase in the attempt to quit rate among partners, and to have decreased the number of cigarettes smoked by partners daily in intervention group compared with the control group. Some of the included interventions encouraged household members to quit smoking. The authors recommended that HCPs should, as a minimum, deliver enough information to pregnant women about the dangers of SHS exposure from all types of smoked tobacco besides, providing them with strategies about how to reduce SHS exposure at home and how to encourage their household smokers to quit smoking.^{99,100}

A further systematic review found that behavioural change interventions led to increased knowledge about the harms of SHS among pregnant women, increased an quit rate among husbands, and increased positive attitude and practice to reduce SHS at home.¹⁰¹

These interventions included one or more of the following: "advice from doctors", "a telephone hot-line", "face-to-face consultation" session,

"motivational interviews, video, role play, information booklet", and reminder text messages about the negative impacts of SHS.¹⁰¹

4.2 Rationale for the study and study aims

Little is known about the knowledge, attitudes and practices of HCPs in Egypt in relation to SHS, and the systematic review in chapter 3 found that the health dangers of SHS exposure were not commonly discussed by HCPs with parents during pregnancy. This study aimed to explore the knowledge, attitudes and counselling practices of HCPs in maternal and child health (MCH) clinics in Egypt in relation to prevention of SHS exposure among pregnant women and children, and identify the factors related to high knowledge, supportive attitudes and counselling practices. This study also aimed to explore barriers to the provision of counselling and the needs of HCPs in relation to improving the delivery of counselling on how to avoid SHS exposure to pregnant women and children.

4.3 Methods

A cross-sectional survey of HCPs was undertaken in Assiut city, one of the largest cities in south Egypt. Assiut city has 47 primary health care centre and 7 secondary health care centres. Undersecretary of the Ministry of Health in Assiut city has agreed for the researcher to perform this research in MCH clinics in primary and secondary health care centres in Assiut (Appendix 4.1). All HCPs working MCH clinics in primary or secondary health care centres in Assiut city were the

sampling frame. There are 535 HCPs working in all public MCH clinics in primary or secondary health care centres in Assiut city. The undersecretary of the Ministry of Health in Assiut city did not provide the researcher the exact number of HCPs in every primary or secondary health centre; just the total number was provided. Survey data were collected using self-administered paper-based questionnaire; the undersecretary advised the researcher to be paper-based questionnaire to get higher response rate. The questionnaire took around 10 minutes to be completed. No incentives were provided.

4.3.1 Study participants and recruitment

An anonymous self-administered paper-based questionnaire was distributed to all 535 HCPs working in all public MCH clinics in primary or secondary health care centres in Assiut city in August 2020. The data collection was planned in May 2020, but because of Covid 19 pandemic, it was delayed to August 2020. The impact statement of Covid 19 pandemic is provided in Appendix 4.2. Participants were approached by the researcher (ZH) and informed about the study. Upon their voluntary agreement to participate, they were given the participant information sheet which were verbally explained. (Appendix 4.3) Completing the questionnaire by HCPs was considered as consent from them to participate in the study. Potential participants in the study were allowed to ask the researcher (ZH) as many clarifying questions as needed if they were in doubt and they were also be made aware that their participation was voluntary and they could opt out should they

wish to do so. The paper questionnaires were distributed and collected by the researcher (ZH). She checked for any missing data before collection of questionnaires. If any data were missing, she asked the HCPs to complete it before collection. Information about the participants were kept in researcher's work desk in University of Nottingham and the highest level of confidentiality was maintained. Data were saved on a password-protected computer and backed up on a secure server accessible only by the researcher. The completed questionnaires and data were maintained exclusively by the researcher throughout the process and stored in a locked cabinet in the researcher's office, accessible only by the researcher. The study has been published in International Journal of Public Health, October 2022. (Appendix 4.6)

Instrument and data collection

The questionnaire development was guided by studies with similar research questions.²¹²⁻²¹⁷ Although a full validation procedure for the questionnaire was not performed, it was translated to Arabic by the lead researcher (ZH) then translated back into English by a second translator and it was piloted on 15 HCPs in Egypt to determine the clarity of questions and length of time needed for questionnaire completion.

The questionnaire collected data on socio-demographic and professional characteristics of HCPs, knowledge and attitude of HCPs regarding SHS exposure among pregnant women and children, and

their current practice regarding provision of counselling service to pregnant women and mothers of children. The questionnaire also covered barriers to the provision of counselling and HCPs perceived needs to allow them to improve the delivery of counselling to pregnant women and mothers to avoid SHS exposure. (Appendix 4.4 Arabic and English versions)

4.3.2 Data management

All data were entered into Microsoft Excel and then exported to STATA v.16 software for data management and analysis.²¹⁸ Similar to the approach used in previous studies,^{172,219–221} indices were created to summarise knowledge, attitudes and practices. To summarise HCPs' knowledge, a knowledge index was constructed by adding the scores of individual items. A similar approach was used to create a HCPs' attitude index. A high score on attitudes corresponded to a highly supportive attitude towards the prevention of smoking and SHS exposure among pregnant women and children. Similarly, a high score on practice corresponded to a high level of offering help (always or sometimes) to pregnant women/children to prevent SHS exposure among them by explaining the hazards of SHS and advising on how to avoid it. After creating scores for the three outcome measures (knowledge, supportive attitude towards prevention of SHS exposure, and counselling practice), each score was grouped into two categories, 'high', and 'low' using the median of every score. No missing data was

found, but if I had any missing data I would handle it with mean substitution when it is normally distributed.

DeCoster, Iselin, and Gallucci (2009)²²² argue that dichotomization via the median split procedure or other cut-off points “makes analyses easier to conduct and interpret” especially if the underlying variable is naturally categorical. Therefore, the median was used as a cut-off point to denote a ‘high’ score for every index. The median of the knowledge index responses was 9/12. The median for supportive attitude towards the prevention of SHS index responses was 7/10, and the median for the counselling practice index responses was 3/5 (Tables 9, 10, and 11). The scores on the outcome measures were analysed separately.

Although dichotomizing a variable based on cut-offs can jeopardize model fit and lead to misleading interpretation of results, sensitivity analysis was performed to ensure that the median cut-off point used in this study is not leading to misinterpretations (Appendix 4.5). Receiver Operating Characteristic (ROC) is a graphical probability curve that illustrates the diagnostic ability of a binary classifier system. Area under ROC curve (AUC) is a measure of the usefulness of a test in general and could be interpreted as follows: 90 - 100 = excellent; 80 - 90 = good; 70 - 80 = fair; 60 - 70 = poor; 50 - 60 = fail. AUC for knowledge index regression analysis is 0.78. AUC for attitude index regression analysis is 0.68. AUC for counselling index regression analysis is 0.82. Therefore, knowledge and attitude regression analysis are considered

acceptable. Counselling practice regression analysis is considered good.

Table 9 Summary of Knowledge index of HCPs regarding SHS exposure among pregnant women/children in Egypt

Score	Frequency	%
Knowledge index (12 questions)		
0	8	2.18
1	7	1.91
2	12	3.27
3	22	5.99
4	24	6.54
5	23	6.27
6	20	5.45
7	18	4.90
8	28	7.63
9	31	8.45
10	41	11.17
11	61	16.62
12	72	19.62
Total	367	100
Median of knowledge index: 9		

Table 10 Summary supportive index of HCPs regarding prevention of SHS exposure among pregnant women/children in Egypt

Score	Frequency	%
Supportive attitude index (10 questions)		
0	4	1.09
1	1	0.27
2	4	1.09
3	10	2.72
4	12	3.27
5	26	7.08
6	116	31.61
7	70	19.07
8	72	19.62
9	31	8.45
10	21	5.72
Total	367	100
Median of supportive attitude regarding prevention of SHS index: 7		

Table 11 Summary of counselling practice index of HCPs regarding prevention of SHS exposure among pregnant women/children in Egypt

Score	Frequency	%
Counselling practice index (5 questions)		
0	134	36.51
1	15	4.09
2	28	7.63
3	20	5.45
4	29	7.90
5	141	38.42
Total	367	100
Median of Counselling practice regarding prevention of SHS index: 3		

4.3.3 Data analysis

Frequency distributions were used to summarise all variables.

Univariate logistic regression analysis was used to explore factors associated with high knowledge, supportive attitude and good counselling practice of HCPs on SHS exposure. The following variables were analysed: gender, age, specialty, smoking status, SHS exposure in the workplace, SHS exposure at home, location of current medical practice i.e. urban/rural, years of post-graduate experience, and receiving previous training on smoking cessation service. Those variables that were statistically significant in univariate analysis at the $p < 0.05$ level were included in the multivariate logistic regression models using stepwise (downward) multivariate analyses to ascertain the factors associated with the three outcome variables (high knowledge, supportive attitude towards prevention of SHS exposure, and counselling practice). Odds ratios, 95% CI, and likelihood ratio test p-values for categorical exposure variables were reported. In the multivariable logistic regression model exploring good counselling practices, in addition to the variables included in univariate regression level, knowledge and supportive attitudes variables were included in the model as co-variables to explore the effect of HCPs' knowledge and attitudes on their counselling practice as the knowledge and attitudes might affect the counselling practice.

4.3.4 Ethical approval

The study was approved by the School of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham, UK and the Research Ethics Committee in the School of Medicine at Assiut University, Egypt. (Appendix 4.3)

4.4 Results

4.4.1 Participant demographics, smoking behaviours and SHS exposure

Out of the 535 HCPs, 367 participated in the study giving a response rate of 68.5% (Table 9). 44.7% were nurses, 20.4% were gynaecologists/obstetricians and 16.1% were paediatricians. A third were male and two-thirds served urban communities. 22% of study participants reported having received training on smoking cessation, mainly in the workplace. 12.5% of HCPs reported being smokers, 70.3% of study participants reported their exposure to SHS in their workplace and 51.8% in their homes (Table 12).

Table 12: Demographics, smoking behaviours, and SHS exposure of HCPs, Assiut, Egypt

Demographic characteristics	N*	%
Specialty		
Gyn/obs	75	20.4
Paediatrician	59	16.1
General Practitioner (GP)	34	9.3
Nurse	164	44.7
Midwife	31	8.5
Other	4	1
Age		
< 30	124	33.8
31-40	149	40.6
41-50	67	18.3
>51	27	7.4
Gender		
Male	118	32.1
Female	249	67.2
Current medical practice		
Rural	124	33.8
Urban	243	66.2
Post-graduate experience		
< 5 years	100	27.3
5-10 years	109	29.7
> 10 years	158	43
Previous training on smoking cessation service		
Yes	81	22.1
No	286	77.9
Type of training (N=81 who responded yes to above question)		
During medical school	10	12.3
Post graduate clinical training	11	13.6
Training at work place	60	74.1
Smoking status		
Current smokers	46	12.5
Ex-smoker	9	2.5
Never smoker	312	85

Demographic characteristics	N*	%
Individual smoking in workplace (Total=46 smoker)		
Yes	20	43.5
No	21	45.6
Prefer not to say	5	10.9
Intentions to quit smoking (Total=46)		
I REALLY want to stop smoking and intend to in the next month	9	19.6
I REALLY want to stop smoking and intend to in the next 3 months	10	21.7
I want to stop smoking and hope to soon	12	26.1
I REALLY want to stop smoking but I don't know when I will	8	17.4
I want to stop smoking but haven't thought about when	0	0
I think I should stop smoking but don't really want to	3	6.6
I don't want to stop smoking	2	4.3
I don't know	2	4.3
Exposure to SHS in your workplace		
Yes	258	70.3
No	109	29.7
Exposure to SHS in your home		
Yes	190	51.8
No	177	48.2

*Total number of participants N=367

4.4.2 Knowledge of HCPs regarding SHS exposure

Most of HCPs knew that SHS exposure increases the risk of congenital anomalies (78.5%), low birth weight (76.8%), spontaneous abortion (70.5%), preterm delivery (69.8%), sudden unexpected death in infancy (64.6%), and stillbirth in pregnant women (63.8%). They knew that SHS increases the risk of respiratory tract infection (88.6%), wheeze and asthma (80.4%), chances of smoking uptake in the future (75.5%), and behavioural problems among children (68.1%) (Table 13). A lower proportion were aware that SHS exposure among children increases the risk of middle ear infection (53.1%) and invasive meningococcal disease (28.6%).

Table 13 Health care professionals' knowledge regarding SHS exposure during pregnancy and childhood, Assiut, Egypt

As far as you are aware, does SHS exposure during pregnancy increase the risk of the following?*	Yes		No		Don't Know	
	N	%	N	%	N	%
Congenital anomalies	288	78.5	23	6.3	56	15.2
Low birth weight	282	76.8	9	2.5	76	20.7
Spontaneous abortion	258	70.3	31	8.5	78	21.2
Preterm delivery	256	69.8	30	8.2	81	22
Sudden unexpected death in infancy	237	64.6	26	7.1	104	28.3
Stillbirth	234	63.8	39	10.6	94	25.6
As far as you are aware, does SHS exposure among children increase the risk of?						
Respiratory tract infection	325	88.6	7	1.9	35	9.5
Wheeze and asthma	295	80.4	17	4.6	55	14.9
Chances of smoking uptake among children in the future	277	75.5	10	2.7	80	21.8
Psychological and behavioural problem	250	68.1	24	6.5	93	25.3
Middle ear infection	195	53.1	48	13.1	124	33.8
Invasive meningococcal disease	105	28.6	98	26.7	164	44.7

*Total N=367

4.4.3 Attitudes of HCPs towards smoking and SHS exposure among pregnant women and children

34.9% of HCPs agreed that SHS exposure is private business and 45.5% agreed that giving advice on avoiding SHS exposure has a low chance of success (Table 14), reflecting the limited supportive attitude of HCPs towards prevention of SHS exposure among pregnant women and children.

Table 14 Health care professionals' attitude regarding SHS exposure during pregnancy and childhood, Assiut, Egypt

Health care professionals' attitudes						
To what extent do you agree with this statement?*	Agree		Disagree		Unsure	
	N	%	N	%	N	%
Health care professionals should not smoke as patients could see them as role models	339	92.4	11	3	17	4.6
Health professionals should routinely advise pregnant women/mothers with children to avoid SHS exposure	339	92.4	3	0.8	25	6.8
Health professionals should routinely ask pregnant women/mothers with children about whether they are exposed to SHS	330	89.9	6	1.6	31	8.5
Compared with other disease prevention activities like obesity and hypertension, tobacco control is important	330	89.9	7	1.9	30	8.2
A pregnant woman's/child's chances of avoiding SHS exposure could increase if a health professional advises pregnant women/mothers with children to avoid it	320	87.1	2	0.5	45	12.3
Health professionals who smoke are less likely to advise pregnant women/mothers with children to avoid SHS exposure	288	78.5	47	12.8	32	8.7

To what extent do you agree with this statement?*	Agree		Disagree		Unsure	
	N	%	N	%	N	%
SHS exposure is private business, therefore there should be no advice from HCPs regarding this topic	128	34.9	215	58.6	24	6.5
Pregnant women/mothers with children are not interested in receiving advice about reducing SHS exposure	172	46.9	106	28.9	89	24.3
Giving advice on avoiding SHS exposure has a low chance of success	167	45.5	102	27.8	98	26.7
In the course of my profession there are other aspects more important than SHS exposure	199	54.2	99	26.9	69	18.8

*Total N=367

4.4.4 HCPs counselling practice regarding prevention of SHS exposure among pregnant women and children

About half of HCPs mentioned that they sometimes or always ask pregnant women/mothers with children if they are exposed to SHS (46.6%), explain the consequences of SHS on health (53.4%), explain the specific adverse health effects of SHS exposure to the foetus during pregnancy (53.4%), explain the specific adverse health effects of SHS on health of children (47.7%), and advise/encourage pregnant women/mother with children to avoid SHS exposure (58%) (Table 15).

Table 15 Health care professionals' counselling practice regarding SHS exposure during pregnancy and childhood, Assiut, Egypt

Health care professionals' counselling practice								
To what extent do you practice the following? *	Always		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%
I ask pregnant women/mother with children if they are exposed to SHS.	32	8.7	139	37.9	80	21.8	116	31.6
I explain the consequences of SHS on one's health to pregnant women/mother with children	60	16.4	136	37.1	132	35.9	39	10.6
I explain the specific adverse health effects of SHS exposure to the foetus during pregnancy	75	20.4	121	32.9	98	26.7	73	19.9
I explain the specific adverse health effects of children's SHS exposure to their mothers	68	18.5	107	29.2	103	28.1	89	24.3
I advise/ encourage pregnant women/mother with children to avoid SHS exposure	85	23.2	129	35.2	69	18.8	84	22.9

*Total N=367

4.4.5 Factors associated with HCPs' knowledge, attitude and counselling practice regarding SHS exposure among pregnant women and children

As mentioned in data analysis section above, univariate logistic regression analysis was used to explore factors associated with high knowledge, supportive attitude and good counselling practice of HCPs on SHS exposure. The following variables were analysed: gender, age, specialty, smoking status, SHS exposure in the workplace, SHS exposure at home, location of current medical practice i.e. urban/rural, years of post-graduate experience, and receiving previous training on smoking cessation service. Those variables that were statistically significant in univariate analysis at the $p < 0.05$ level were included in the multivariate logistic regression models using stepwise (downward) multivariate analyses to ascertain the factors associated with the three outcome variables (high knowledge, supportive attitude towards prevention of SHS exposure, and counselling practice).

In Tables 16, 17, and 18, all above mentioned variables were included in the full multivariate regression model irrespective whether their P-values become greater than 0.05 to allow clear exploration of the association, however, only statistically significant one were included in the final multivariate regression model.

In Table 16, 55.9% of study participants had high knowledge of the dangers of SHS exposure to the health of pregnant women and

children. Being a General Practitioner (GP) (OR 15.29, 95%CI 4.12-56.86), serving urban communities (OR 2.53, 95%CI 1.53-4.18) and being exposed to SHS at home (OR 2.36, 95%CI 1.48-3.78) were significantly associated with high knowledge compared to being gynaecologists/obstetricians, serving rural population, and being not exposed to SHS at home respectively. The strongest observed association was for GPs who were about fifteen fold more likely than obstetricians and gynaecologists to have high knowledge after adjustment for current medical practice and SHS exposure at home.

Only 52.9% of HCPs had a supportive attitude towards the prevention of smoking and SHS exposure among pregnant women or children. Being female (OR 2.02, 95%CI 1.27-3.24), serving rural communities (OR 1.58, 95%CI 1.01-2.49), and not being exposed to SHS at home (OR 2.36, 95%CI 1.29-3.10) were significantly associated with a supportive attitude compared to being male HCPs, serving urban population, and being exposed to SHS at home respectively (Table 17). The strongest observed association was for those not exposed to SHS at home who were more than twice as likely to have supportive attitude towards prevention of smoking and SHS exposure among pregnant women and children compared to those exposed to SHS at home.

About half of HCPs (51.8%) reported good counselling practice regarding counselling pregnant women/mothers with children about SHS exposure (Table 16). Being female (OR 1.53, 95%CI 1.15-2.63),

serving a rural population (OR 2.37, 95%CI 1.41-4.01), receiving previous training on smoking cessation services (OR 2.80, 95%CI 1.50- 5.22), not being exposed to SHS at home (OR 2.35, 95%CI 1.42-3.89), and having a supportive attitude (OR 5.51, 95%CI 3.40-8.94) towards prevention of SHS exposure were significantly associated with good counselling practice compared to being male HCPs, serving urban population, not receiving previous training on smoking cessation, being exposed to SHS at home and not having supportive attitude towards prevention of SHS exposure respectively. The strongest observed association was for those having a supportive attitude towards the prevention of SHS exposure, who after adjusting for covariates were more than five folds more likely to report good counselling practice compared to who do not have supportive attitude towards the prevention of SHS exposure (Table 18).

Table 16 Multivariate regression of factors associated with HCPs knowledge regarding SHS exposure among pregnant women and children

	Total	Good knowledge	Univariate analysis		Full multivariate model **			Final multivariate model ***		
	N	N (%)	OR	95% CI	Adjusted OR	95%CI	P value	Adjusted OR	95%CI	P value
	367	205 (55.86)								
Gender										
Male	118	79 (66.9)	1.00		1.00		0.06			
Female	249	126 (50.6)	0.50	0.32-0.79	0.48	0.23-0.98				
Age										
< 30	124	84 (67.7)	1.00		1.00		0.222			
31-40	149	72 (48.3)	0.45*	0.27- 0.73	0.59	0.25-1.36				
41-50	67	36 (53.7)	0.55*	0.30- 1.02	0.92	0.34-2.42				
>51	27	13 (48.1)	0.44*	0.19- 1.02	0.77	0.22-2.63				
Specialty										
Gyn/obs	75	36 (48)	1.00		1.00		0.003*	1.00		0.003
Paediatrician	59	43 (72.9)	2.9*	1.36- 6.21	3.39	1.52-7.53		3.15	1.48-6.72	
GP	34	31 (91.2)	11.19*	2.77- 45.3	13.01	3.43-49.27		15.29	4.12-56.86	
Nurse	164	80 (48.8)	1.03*	0.60 -1.8	1.42	0.68-2.94		1.09	0.60-1.99	
Midwife	31	14 (45.2)	0.89*	0.38 - 2.1	1.65	0.58-4.73		1.12	0.45-2.79	
Others	4	1 (25)	0.36*	0.03- 3.73	0.35	0.03-4.19		0.35	0.3-3.66	
Current medical practice										
Rural	124	52 (41.9)	1.00		1.00		0.001*	1.00		0.000
Urban	243	153 (62.9)	2.35*	1.51- 3.69	2.48	1.43-4.30		2.53	1.53-4.18	

	Total	Good knowledge	Univariate analysis		Full multivariate model **		Final multivariate model ***			
	N	N (%)	OR	95% CI	Adjusted OR	95%CI	P value	Adjusted OR	95%CI	P value
	367	205 (55.86)								
Post-graduate experience										
< 5 years	100	67 (67)	1.00		1.00		0.350			
5-10 years	109	72 (66)	2.71*	1.65- 4.86	2.07	1.08-3.95				
> 10 years	158	66 (41.7)	2.83*	1.61- 4.58	1.85	0.60-4.14				
Previous training on smoking cessation service										
No	286	163 (56.9)	1.00		1.00		0.259			
Yes	81	42 (51.9)	1.23	0.75- 2.02	1.42	0.77-2.58				
Smoking status										
Never smoker	312	168 (53.9)	1.00		1.00		0.069			
Ex-smoker	9	8 (88.9)	6.86*	0.85- 55.48	8.40	0.84-83.4				
Current smoker	46	29 (63)	1.46*	0.77- 2.77	0.79	0.34-1.81				
SHS exposure at workplace										
No	109	49 (44.9)	1.00		1.00		0.657			
Yes	258	156 (60.5)	1.87*	1.19- 2.96	1.14	0.94-2.0				
SHS exposure at home										
No	177	83 (46.9)	1.00		1.00		0.002*	1.00		0.000
Yes	190	122 (64.2)	2.03*	1.33- 3.11	2.37	1.37-4.08		2.36	1.48-3.78	

*p value of likelihood ratio test is significant; p value \leq 0.05

** Multivariable model adjusted for age, gender, speciality, current medical practice, post-graduate experience, Previous training on smoking cessation service, smoking status, and SHS exposure at home and workplace.

***Multivariable model adjusted for speciality, current medical practice, and SHS exposure at home

Table 17 Multivariate able regression of factors associated with HCPs supportive attitude regarding prevention of SHS exposure among pregnant women and children

	Supportive attitude		Univariate analysis		Full multivariate model **		Final multivariate model ***			
	N	N (%)	OR	95%CI	Adjusted OR	95%CI	P value	Adjusted OR	95% CI	P value
	367	194 (52.9)								
Gender										
Male	118	51 (43.2)	1.00		1.00		0.004*	1.00		0.003
Female	249	143 (57.4)	1.77*	1.14- 2.74	2.56	1.34-4.87		2.02	1.27-3.24	
Age										
< 30	124	67 (54)	1.00		1.00		0.504			
31-40	149	84 (56.4)	1.09	0.68- 1.77	0.76	0.35-1.67				
41-50	67	30 (44.8)	0.68	0.37- 1.25	0.40	0.16-1.03				
>51	27	13 (48.1)	0.98	0.34- 1.81	0.33	0.10-1.08				
Specialty										
Gyn/obs	75	42 (56)	1.00		1.00		0.112			
Paediatrician	59	26 (44.1)	0.62	0.31- 1.23	0.54	0.26-1.12				
GP	34	20 (58.8)	1.12	0.49- 2.55	1.03	0.42-2.51				
Nurse	164	85 (51.8)	0.85	0.48 -1.46	0.51	0.25-1.05				
Midwife	31	20 (64.5)	1.43	0.60 - 3.39	0.77	0.27-2.17				
Others	4	1 (25)	0.26	0.02- 2.63	0.21	0.01-2.34				
Current medical practice										
Rural	124	76 (61.3)	1.68*	1.08- 2.6	1.59*	1.01-2.49	0.021	1.58	1.01-2.49	0.045
Urban	243	118 (48.6)	1.00		1.00			1.00		

	Supportive attitude		Univariate analysis		Full multivariate model **		Final multivariate model ***			
	N	N (%)	OR	95%CI	Adjusted OR	95%CI	P value	Adjusted OR	95% CI	P value
	367	194 (52.9)								
Post-graduate experience										
< 5 years	100	54 (54)	1.00		1.00		0.183			
5-10 years	109	47 (43.1)	0.65*	0.37- 1.11	0.45	0.24-0.84				
> 10 years	158	93 (58.9)	1.22*	0.74- 2.02	0.53	0.21-1.34				
Previous training on smoking cessation service										
No	286	145 (50.7)	1.00		1.00					
Yes	81	49 (60.5)	0.76	0.41- 1.1	1.15	0.64-2.04				
Smoking status										
Never smoker	312	168 (53.9)	1.00		1.00		0.915			
Ex-smoker	9	4 (44.5)	0.69	0.18- 2.6	0.92	0.23-3.77				
Current smoker	46	22 (47.9)	0.79	0.42- 1.46	1.26	0.60-2.66				
SHS exposure at workplace										
No	109	64 (58.7)	1.00		1.00		0.617			
Yes	258	130 (50.4)	0.71	0.45- 1.2	1.14	0.66-1.96				
SHS exposure at home										
No	177	106 (59.9)	1.73*	1.14- 2.62	2.05	1.23-3.41	0.005*	2.36	1.29-3.10	0.002
Yes	190	88 (46.3)	1.00		1.00		1.00			

*p value of likelihood ratio test is significant; p value ≤ 0.05

** Multivariable model adjusted for age, gender, speciality, current medical practice, post-graduate experience, Previous training on smoking cessation service, smoking status, and SHS exposure at home and workplace.

***Multivariable model adjusted for gender, current medical practice, and SHS exposure at home

Table 18 Multivariate regression of factors associated with HCPs counselling practice regarding prevention of SHS exposure among pregnant women and children

	Total	Good counselling practice	Univariate analysis		Full multivariate model **			Final multivariate model ***		
	N	N (%)	OR	95%CI	Adjusted OR	95% CI	P value	Adjusted OR	95% CI	P value
	367	190 (51.8)								
Gender										
Male	118	50 (42.4)	1.00		1.00		0.005*	1.00		0.097
Female	249	140 (56.2)	1.75*	1.12- 2.72	2.82	1.36-5.85		1.53	1.15-2.63	
Age										
< 30	124	58 (46.8)	1.00		1.00		0.505			
31-40	149	86 (57.7)	1.55	0.96- 2.5	1.03	0.54-3.46				
41-50	67	35 (52.3)	1.2	0.68- 2.25	1.18	0.39-3.58				
>51	27	11 (40.7)	0.78	0.33- 1.82	0.51	0.12-2.14				
Specialty										
Gyn/obs	75	41 (54.7)	1.00		1.00		0.974			
Paediatrician	59	30 (50.9)	0.86	0.43- 1.69	1.01	0.34-2.37				
GP	34	14 (41.2)	0.58	0.26- 1.32	0.26	0.09-0.77				
Nurse	164	85 (51.9)	0.89	0.52 -1.45	0.42	0.19-0.95				
Midwife	31	18 (58.1)	1.15	0.49 - 2.68	0.27	0.08-0.94				
Others	4	2 (50)	0.83	0.11- 6.2	1.18	0.11-11.8				
Current medical practice										
Rural	124	85 (68.6)	2.86*	1.82- 4.52	3.33	1.82-6.09	0.000*	2.37	1.41-4.01	0.001
Urban	243	105 (43.2)	1.00		1.00			1.00		

	Total	Good counselling practice	Univariate analysis		Full multivariate model **			Final multivariate model ***		
	N	N (%)	OR	95%CI	Adjusted OR	95% CI	P value	Adjusted OR	95% CI	P value
	367	190 (51.8)								
Post-graduate experience										
< 5 years	100	47 (47)	1.00		1.00		0.838			
5-10 years	109	51 (46.8)	0.99	0.58- 1.7	1.07	0.52-2.23				
> 10 years	158	92 (58.2)	1.57	0.95- 2.6	1.08	0.36-3.25				
Previous training on smoking cessation service										
No	286	131 (45.8)	1.00		1.00		0.001*	2.80	1.50- 5.22	0.001
Yes	81	59 (72.8)	3.17*	1.85- 5.46	3.18	1.61- 6.26		1.00		
Smoking status										
Never smoker	312	161 (51.6)	1.00		1.00		0.792			
Ex-smoker	9	4 (44.4)	0.75	0.18- 2.84	1.24	0.24-6.41				
Current smoker	46	25 (54.4)	1.12	0.59- 2.08	1.53	0.65-3.60				
SHS exposure at workplace										
No	109	56 (51.4)	1.00		1.00		0.922			
Yes	258	134 (51.9)	1.02	0.65- 1.6	1.4	0.31-4.43				
SHS exposure at home										
No	177	109 (61.6)	1.16*	1.42- 3.28	3.25*	1.78-5.93	0.000	2.35	1.42-3.89	0.001
Yes	190	81 (42.6)	1.00		1.00			1.00		
Knowledge										

	Total	Good counselling practice	Univariate analysis		Full multivariate model **			Final multivariate model ***		
	N	N (%)	OR	95%CI	Adjusted OR	95% CI	P value	Adjusted OR	95% CI	P value
	367	190 (51.8)								
Inadequate	162	97 (59.8)	1.00		1.00		0.903			
Good	205	93 (45.4)	0.95	0.53-1.68	0.96	0.54-1.69				
Supportive attitude										
Inadequate	173	51 (29.5)	1.00		1.00		0.000*	1.00		0.000
Good	194	139 (71.7)	6.05*	3.85- 9.50	6.27	3.70- 10.63		5.51	3.40-8.94	

*p value of likelihood ratio test is significant; p value \leq 0.05

**Multivariable model adjusted for age, gender, speciality, current medical practice, post-graduate experience, Previous training on smoking cessation service, smoking status, SHS exposure at home and workplace, knowledge, and supportive attitude.

***Multivariable model adjusted for gender, current medical practice, previous training on smoking cessation service, SHS exposure at home, and having supportive attitude regarding prevention of SHS exposure.

4.4.6 Barriers to provision of counselling and HCPs' needs to improve the delivery of counselling

Lack of time or training, absence of reimbursement and unavailability of materials were the most common barriers to the provision of counselling (Table 19). Lack of time was the first barrier for most gynaecologists/obstetricians (57.3%), paediatricians (72.9%), and GPs (67.7%). However, lack of training was the most common barrier for the majority of nurses (64%) and midwives (54.8%). The majority of HCPs (75%) suggested that it is nurses' job to discuss SHS exposure with pregnant women/ mothers with children. The majority of participants stated that they need training, standard guidelines and materials about SHS health hazards to help them improve the delivery of counselling on SHS. HCPs reported that health education sessions for pregnant women/mothers of children and smokers in their household could help them to reduce SHS exposure.

Table 19 Barriers of HCPs for provision of counselling and their needs to improve the delivery of counselling to pregnant women and mothers to avoid SHS exposure, Assiut, Egypt

Barriers for HCPs to advise pregnant women/mothers with children to avoid SHS exposure	N=367*	%
Lack of time	228	62.1
Lack of training	195	53.1
There is no reimbursement for advising women to avoid SHS exposure	167	45.5
Unavailability of materials (e.g. brochures about health hazards of SHS)	147	40.1
Low chances of success	122	33.2
Pregnant women/mothers with children do not want/expect to receive that advice	92	25.1
SHS exposure counselling is not a part of my job	69	18.8
Feeling uncomfortable discussing as I think it is a sensitive topic	57	15.5
HCPs' opinion regarding barriers for pregnant women/mothers with children to avoid SHS exposure		
Husband smoking at home	317	86.4
Ignorance of the risks of SHS exposure	274	74.7
Another household smoker	221	60.2
Lack of self-confidence to ask smoker in her household to stop smoking	187	50.9
Smoking being accepted in the society	186	50.7
Regulations on smoking in public places are not enforced	181	49.3
Societal attitudes towards women asking her husband/ smoker in her household to stop smoking	116	31.6
Other	1	0.3
Whose job is it to discuss SHS exposure with pregnant women/ mothers with children		
Nurse	276	75.2
Midwife	200	54.5
General practitioner (GP)	184	50.1
Others	53	14.4

What do HCPs' need to deliver/improve the delivery of SHS counselling service among pregnant women/mothers of children?		
Training for HCPs	307	83.7
Availability of standard guidelines in the health centre	237	64.6
Availability of materials about SHS health hazards	211	57.5
Nothing	7	1.9
Other	4	1.3
What is the best way to help pregnant women/mothers with children to avoid SHS exposure?		
Health education sessions for pregnant women/mothers of children	254	69.2
Health information materials for pregnant women/mothers of children	256	69.8
Health education sessions for pregnant women and their household smokers	210	57.2
Offering counselling sessions and nicotine replacement therapy to household smokers	181	49.3
Other	7	1.9

* Respondents were allowed to choose many options

4.5 Discussion

The main findings of this study are that only about half of HCPs in Assiut city in Egypt have good knowledge (55.9%), a supportive attitude (52.9%), and report good counselling practice (51.8%) regarding the prevention of SHS exposure among pregnant women and children. GPs and paediatricians were found to be most aware of the risks of SHS. Female HCPs were more likely to report good counselling practice. HCPs serving a rural population were most likely to have a supportive attitude for the prevention of SHS and report good counselling practice. HCPs who are not exposed to SHS at home were more likely to report good counselling practice and supportive attitude for its prevention among pregnant women and children.

The current study results are consistent with other studies in Egypt and neighbouring countries which have reported that HCPs have vague or inaccurate knowledge about the risk of SHS and poor counselling practice in relation to SHS exposure.^{223–225} Previous studies in Egypt reported better knowledge of the dangers of smoking and more supportive attitudes in relation to the provision of smoking cessation services among HCPs;^{212,226} however, those studies did not investigate in detail the knowledge regarding the specific dangers of SHS to pregnant women and children, which highlights the novelty of this study. This difference could be due to these existing studies being not specific to SHS and being performed in a university hospital and urban family medicine centers in Alexandria, as opposed to a

combination of urban and rural clinics as in the present study, in which HCPs serving rural communities showed lower knowledge.

The limited knowledge of the health risks of SHS may be partly due to a lack of relevant training. Only one in five participants in the current study reported having previous training on smoking cessation, whether during medical school, postgraduate clinical training or training in the workplace, and receiving this training was significantly associated with good counselling practice of HCPs with pregnant women and children regarding their SHS exposure. This figure is lower than previously reported;^{212,226} possibly due to the limited training programs on smoking cessation in South Egypt governorates. In the current study, lack of training was the first barrier for most nurses and midwives to provide the SHS counselling service, suggesting that improvement in training provided to nurses could help to reduce SHs exposure. An interventional study that was done in Port Said (governorate in North Egypt) found that implementation of a training program on smoking cessation counselling resulted in clearly noticeable improved knowledge, attitude, and practice about smoking among primary care physicians working in primary care centres. The most frequent correct pre-post intervention knowledge was consequences of smoking; the most favourable attitude was the importance of smoking cessation, and the best reported correct practice was asking patients about smoking status.²²⁷

It is important to ensure that the wider environment is conducive to increased awareness and willingness to provide support on smoking cessation and prevention of SHS exposure. This may include proper enforcement of smoke-free policy enshrined in law, and other population-level interventions such as mass media campaigns to make the social norms against SHS exposure. In combination with additional training, this may improve the knowledge and attitudes of HCPs, as well as the general population, and change practice of HCPs.

Although Egypt has made important strides in controlling tobacco use, according to World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) report,¹²² SHS exposure remains extremely high (more than 70%) in public places such as restaurants, public transportation, and health care facilities^{106,109} as the smoke-free legislation is poorly enforced.²⁰⁵ This is comparable with the current study results as 70% of HCPs reported exposure to SHS in the workplace. While efforts to support the provision of advice related to SHS is likely to help reduce SHS exposure, these are likely to be most effective if they are made in the context of effective implementation of tobacco control policies, particularly the enforcement of smoke-free legislation.

In the current study about half of HCPs agreed that giving advice on avoiding SHS exposure is unlikely to be successful; this could be because HCPs claimed that they do not have time, training, and materials to deliver this service, or due to a lack of understanding of the

effect that such advice may have. One third disagreed that pregnant women/mothers with children are interested in receiving advice about reducing SHS exposure. As demonstrated in the systematic review in chapter 3, smoking and SHS exposure are socially accepted in Middle eastern countries.²²⁸ Proper enforcement of smoke-free law might contribute to changes in social norms which will facilitate changes in SHS exposure. Enforcement of smoke-free policy might make women more interested in avoiding SHS exposure and could make HCPs feel offering advice can be helpful. Thus, the overall environment is conducive to HCPs giving this sort of advice.

In the present study, the main obstacles for HCPs to help pregnant women/children to avoid SHS exposure were found to be lack of time, lack of training, absence of reimbursement and unavailability of materials. Similar obstacles have been reported in other middle income countries.²²⁹ Previous evidence suggests that providing training for HCPs encourages them to provide counselling to pregnant women to adopt smoke-free environment.²³⁰ Training of HCPs alone is unlikely to be sufficient; a range of issues need to be addressed, including lack of time and unavailability of materials. Additionally, ensuring that HCPs in Egypt have the time and financial resources needed to deliver this type of support is essential. Clear specification of SHS counselling service in the job description of HCPs working in public MCH clinics should be incorporated by the health system governors. In this study, the majority of HCPs suggested that it is nurses' job to discuss SHS exposure with pregnant women, so there is no clear indication of whose responsibility

it is to deliver counselling. However, previous evidence reported that nurses and physicians are ideally placed to provide health advice to pregnant women and mothers with children to influence their SHS exposure.¹⁹⁰ Thus all HCPs in public MCH clinics need training to address their view that it is solely nurses' responsibility to discuss SHS exposure and encourage them to discuss SHS exposure with their patients.

Previous studies have shown that pregnant women who do not smoke are often responsive to counselling regarding reduction of SHS exposure received from HCPs in antenatal care clinics.^{99,100} Moreover, studies have reported that counselling pregnant women not only led to reduction in their SHS exposure but also increased smoking cessation among their husbands, as well as increasing positive attitudes and practices to reduce SHS at home.^{99,101} HCPs' support may therefore contribute to the reduction of SHS exposure in Egypt.

4.6 Strengths and limitations

To researcher's knowledge, this is the first study that provides detailed evidence on the knowledge, attitudes and practice of Egyptian HCPs regarding SHS exposure among pregnant women and children. This study achieved a high response rate by distributing paper questionnaires, though this meant that the study focussed on HCPs working in only one governorate. Despite this, the study included both urban and rural areas. Furthermore, Assiut is the largest city in Upper Egypt; however, the results may not be generalizable because of

differences in sociodemographic characteristics between Assiut and other cities in Egypt. A further limitation, particularly in relation to assessing counselling practice of HCPs, is that the study findings are based on self-report. However, the study identified clear shortcomings in counselling practice, which are unsurprising given the low levels of knowledge and supportive attitudes to SHS prevention. Another source of bias that could be that the majority of study respondents were non-smokers and females; however, multivariable regression analysis were performed and models were adjusted for the main demographic characteristics. Although dichotomizing a variable based on cut-offs can jeopardize model fit and lead to misleading interpretation of results, sensitivity analysis was performed to ensure that the median cut-off point used in this study is not leading to misinterpretations (Appendix 4.5). The undersecretary of the Ministry of Health in Assiut city did not provide the researcher the exact number of HCPs in every primary or secondary health centre; just the total number was provided. Thus comparison between demographics of own sample and total HCPs working on health care in Assiut could not be performed to show if the sample was generalizable to HCPs population working in primary and secondary health care centres in Assiut, Egypt.

4.7 Conclusion and recommendation

Knowledge, attitudes and counselling practice of HCPs regarding the risks of SHS to pregnant women and children in Egypt should be improved. It is important to develop an environment which facilitates

increased knowledge of and willingness to provide support on smoking cessation and prevention of SHS exposure. This includes comprehensive enforcement of smoke-free policy, training programs for HCPs on smoking cessation which should cover SHS exposure. This could also extend to other population-level interventions such as anti-tobacco information mass media campaigns. Other barriers, such as the lack of time must also be addressed. The health system governors should incorporate clear specification of SHS counselling service in the job description of HCPs working in public MCH clinics.

**5 CHAPTER 5 A QUALITATIVE STUDY OF
BARRIERS AND MOTIVATORS TO PREVENT
SECOND-HAND SMOKE EXPOSURE AMONG
PREGNANT WOMEN AND CHILDREN IN
EGYPT: IDENTIFYING APPROPRIATE
APPROACHES FOR CHANGE**

5.1 INTRODUCTION

As discussed in chapter 1, pregnant women and children are a priority population for tobacco control efforts because SHS exposure during pregnancy and childhood poses serious risks to foetal and child health. SHS exposure causes an increase in the risk of SIDS, low infant birth weight, acute respiratory tract infection, asthma and wheezing, middle ear infection, invasive meningococcal disease, poor mental health outcomes, and smoking uptake.^{38,39}

Due to strong cultural constraints against women's smoking in many Middle Eastern countries, the prevalence of tobacco smoking is higher among men than women.²³¹ In Egypt, the prevalence of active smoking among women is 0.6%, however the daily SHS exposure among pregnant non-smoking women is estimated to be about 50%.^{10,66} About 44% of Egyptian men are current tobacco users in 2020.¹⁰ Men are more likely to smoke cigarettes (35.9%) than smoke shisha (7.5%) or use smokeless tobacco (0.4%).¹⁰ The home is considered the primary source of SHS exposure in children,^{64,232} however, 35% of Egyptian school students (aged 13-15) are exposed daily to SHS at home and 55% in enclosed public places.¹⁴¹ A survey exploring SHS exposure among Egyptian children younger than 11 in 2008 reported their high level of exposure to SHS at home (86%) and outside home (63%).⁶⁴ In 2019 SHS exposure among children (14 years and younger) was responsible for 15.5% of DALYs and 16.2% of deaths due to respiratory infections in Egypt.²⁶

Non-smoking pregnant women and children in many developing nations are especially affected by SHS exposure; risk factors for such exposure include poverty, overcrowded houses, husbands or other family members who smoke, smoking being allowed in the home, low socioeconomic status and less educated parents (less than 12 years of education).^{51,231,233} The most reliable way to reduce SHS exposure among children/pregnant women in the home would be to encourage people who smoke to quit smoking. For those people who smoke that cannot or will not quit, the next best option is to promote homes that are completely smoke-free. Nevertheless, there is evidence to suggest that some households, particularly those with low socioeconomic status, may face significant barriers when trying to implement and maintain a smoke-free home (SFH).^{234,235} Women usually face challenges in initiating and maintaining a smoke-free environment for their children due to having a person who smokes living in the household, the physical environment in which they live, and other caring and life responsibilities.²³⁶

As reported in chapter 3, some parents in Middle Eastern countries implemented some physical restrictions on smoking, such as having rules of limitation to where smoking can take place in the home and outdoors, however, there was great uncertainty or a lack of confidence regarding whether protective measures were effective at reducing exposure to children. Parents reported psychological motivators (e.g. protect smaller children, self-efficacy, and self-criticism) to decrease SHS exposure among children in the home. By understanding more

about barriers and motivators to prevent SHS exposure among children and pregnant women, approaches for changing this exposure may be identified. Pregnancy and parenthood have been identified as key 'teachable moments' in which parents are more likely to be successful in positive health behaviour changes.^{237,238}

Furthermore the study described in chapter 4 found that HCPs attributed the high prevalence of SHS exposure among pregnant women and children to the presence of a household smoker (usually husband) at home, ignorance of the health hazards of SHS, lack of women's self-confidence to ask a smoker in her household to stop smoking, smoking being accepted in the society, and regulations on smoking in public places not being enforced. Thus, understanding more about smoking behaviour at home and during pregnancy/with children living in the household may give useful insights about barriers and motivators to adopt smoke free homes.

The pregnancy period may therefore be an ideal time to intervene to reduce or prevent SHS exposure in the home. However, to develop effective targeted interventions, it is essential to understand why people behave the way that they do. Not enough is known about smoking behaviours at home, barriers and motivators to adopt smoke free homes in Egypt and experiences and views of women given that they are not the source of tobacco smoke. This study therefore explored women's knowledge and attitudes to SHS exposure; smoking behaviours at home, especially while they are pregnant, with a

particular focus on how this affected their husband's home smoking behaviours; women's experiences of SHS exposure and barriers and facilitators regarding the prevention of this exposure; and possible suggestions for the best approach to reduce their SHS exposure.

5.2 Objectives

In a group of Egyptian pregnant women or mothers of children under 18 years, aged 15-49 years and exposed to SHS in home or workplace. The current study's objectives were:

1. To explore knowledge of and attitude towards SHS exposure.
2. To explore experiences and behaviour regarding SHS exposure.
3. To explore smoking behaviour at home especially during pregnancy (e.g. household's smoking behaviours, smoking restrictions at home, perceptions of social attitudes towards SHS).
4. To explore sources of information regarding dangers of SHS and women's experiences in receiving advice about SHS exposure by HCPs in primary health care centres (PHCs).
5. To explore barriers and motivators to preventing SHS exposure and suggestions for possible approaches to reduce SHS exposure among pregnant women and children at home.

5.3 METHODS

5.3.1 Qualitative methodology

A qualitative research design was chosen because of its ability to capture complexity, process and the meaning attached to individual action.²⁰⁶ Three components are involved in any qualitative research approach: philosophical assumptions (paradigms), research designs, and research methods.^{174,239,240} This study adopted a qualitative approach using constructivism as a paradigm, phenomenology as a research design, and focus group discussions (FGDs) as a research method.

Constructivism is a theory which argues that humans generate knowledge and meaning from an interaction between their existing knowledge, experiences and ideas. It looks at complexity of views rather than narrowing into a few categories or ideas.²³⁹ Therefore, constructivism is a theory that fits well with the aim and objectives of this study which aiming to explore experiences, attitudes and behaviour.

As a qualitative research design, phenomenology describes the lived experiences of individuals about a phenomenon as described by participants and can be defined as the study of the lived experience. It culminates in the essence of the experiences for several individuals who have experienced the phenomenon, and is concerned not only with the experience itself, but also with how the individual who experiences

it.^{241,242} Therefore, this research design fits well with the current study objectives.

The FGDs method was chosen as it is feasible in terms of attendance of participants in maternal and child health clinics which they already attended to receive services, and it is anticipated that women would be comfortable discussing issues around SHS exposure in front of other women as it is prevalent in Egypt.²⁴³ FGDs are also preferred to personal interviews as they elicit a multiplicity of views, opinions and emotional processes within the group context.²⁴⁴

5.3.2 Approvals

The study was approved by the Faculty of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham, UK (Reference 481 2002) and the Research Ethics Committee in the School of Medicine at Assiut University, Egypt. The undersecretary of the Ministry of Health in Assiut formally approved the research and informed the MCH clinics' managers that the research was happening to facilitate it. (Appendix 4.1)

5.3.3 Settings

Participants were recruited through MCH clinics in PHCs in Assiut, Egypt after receiving care from this clinic. Assiut city has 47 PHCs, 19 urban and 28 rural. These centres are regulated by the Egyptian Ministry of Health and are located in sites accessed by a wide socio-demographic range of populations. They offer medical services including antenatal

care and vaccination services. Vaccination services not available in all private clinics, therefore, recruiting women visiting PHCs is assumed to offer a representative insight into the nature of SHS exposure in Egypt from the perspectives of all socioeconomic groups.

5.3.4 Sampling and participant recruitment

Egyptian women, aged between 15-49 years, who were pregnant or were mothers of children under 18 years, and experiencing SHS exposure in the home or workplace were eligible. Eligible participants were approached through MCH clinics after/during receiving care from this clinic. Evidence suggests that 90% of all discoverable themes are discovered in three to six focus groups,²⁴⁵ so the aim was to conduct six FGDs. Study participants were recruited according to the inclusion criteria from women who attended three urban and three rural randomly selected PHC and volunteered to participate in the study. The researcher (ZH) recruited 8-13 participants to each focus group, which is considered appropriate in general guidance for FGD methods.^{243,246}

Potential participants were informed about the study in face-to-face conversation in meeting rooms in PHCs, and upon their voluntary agreement to participate, they were given the participant information sheets which were verbally explained by the researcher (ZH). Participants were given at least 24 hours to ensure that they had sufficient time to consider participating or not. They were allowed to ask as many clarifying questions as possible if they were in doubt and they

were also be made aware that their participation was voluntary and they could withdraw from the study at any point should they wish to do so.

An experienced field worker (social officer) was responsible for arranging a date, time and place to perform the FGDs. A participant who had read the participant information sheet (Appendix 5.1) and had given written consent (Appendix 5.2) to take part in a semi-structured FGD, which was collected by the researcher (ZH), was eligible to participate. Eligible participants were asked by telephone call to arrange a convenient date and time to perform the FGDs. One copy of the consent form was kept by the participant; another copy was kept by the researcher (ZH).

Regarding homogeneity and heterogeneity of FGD, on the one hand, some homogeneity in FGD construction as sharing social background, educational level, knowledge, and experience, is considered essential for group interaction and dynamics. On the other hand, some heterogeneity of group participants is important to stimulate different points of view and for in depth understanding of topic that comes from listening to participants each other's defending their way of thinking.^{247,248} If the FGD is too homogeneous; this may influence the range and variety of the data that emerges. However, the tension caused by heterogeneity in a FGD can serve to uncover deeper insights and the moderator can use this tension in constructive directions.²⁴⁹ Thus, as general rule, it is advisable that FGD participants should have similar experiences with, or knowledge of, the

research topic, but the level of homogeneity among participants on other parameters can vary depending on the research circumstances.²⁴⁸ Thus, in the current study, the inclusion criteria and composition of focus groups were set as described above (being pregnant/mothers of children under 18 years, aged between 15-49 years and exposed to SHS in the home or workplace). For feasibility and convenience of data collection, we grouped women according their residence (urban or rural), however, we did not group them according other socio-economic and demographic factors.

5.3.5 Data collection

Face-to-face FGDs were conducted in Egypt in August 2020 in meeting rooms in PHCs and lasted in average 40 minutes (25-50). PHC was selected as a place to conduct the FGDs as it is where participants usually receive health care, so a familiar and comfortable environment might be created for the participants to encourage them to share their ideas and experiences.²⁵⁰ FGDs were digitally audio recorded and transcribed verbatim by the second data collector (MK) who signed a confidentiality agreement. MK is a specialist researcher who is interested in public health research. Seating was arranged in such way that everyone could easily see one another, and were conducted in Arabic, which is the country's official language.

Participants were assured that their responses would be anonymized in any subsequent reports or publications. All FGDs were moderated by the researcher (ZH) who has attended the qualitative methodology

module organized by the Division of Epidemiology and Public Health for the Master of Public Health course in University of Nottingham. I have further equipped myself by reading textbooks and peer reviewed articles that have done similar studies. I have previous experience in undertaking FGDs as a part of a previous study in Egypt.

At the start of the FGD, the researcher (ZH) thanked the participants for taking part in the research, explained the purpose of the research and defined SHS exposure. Then, I explained the ground rules to participants such as respecting everyone's opinion by not interrupting, avoiding the use of phones and establishing that there were no right or wrong answers; participants could express their views freely and were free to withdraw from the FGD session at any time without their medical care service being affected. Participants were offered badges with numbers as a means of identification. Participants were assured that their responses would be anonymised in any subsequent reports or publications and the researcher reconfirmed their consent.

A second data collector – who signed confidentiality agreement – attended the FGDs as a note taker to take detailed field notes during the FGD session or immediately after it, to complement FGDs in terms of nonverbal cues as facial expressions that may not be adequately captured through the audio-recording. Capturing nonverbal cues in qualitative research is important as it allows clarification, confirmation, and emphasis of the findings.²⁵¹

5.3.6 Data collection methods

A semi-structured FGD guide was initially developed from existing literature ²⁵² and then refined using the experience of, and discussion within, the university supervision team (Appendix 5.4). The involvement of service users and members of the general public is essential in any health research.²⁵³ Thus, the interview schedule was reviewed and piloted by two women who reported their own exposure to SHS during previous pregnancies. Feedback was given on appropriateness and ease of understanding of written materials (including participant information sheet and consent forms), and the content, style and wording of the interview guide, however, no changes were suggested.

The guide was designed to be semi-structured to allow opportunity to explore areas of interest and flexibility in the ordering of topics discussed. The researcher used funnelling technique during designing the FGD guide, ²⁵⁴ which suggested introducing general questions first then more targeted questions which aimed to elicit responses from participants regarding more specific topics of interest. By using this technique in asking the questions, general exploratory questions were asked first, and more specific prompts questions were asked used later if particular topics had not been spontaneously discussed by participants. The guide remained flexible; preliminary analysis ran in parallel to data collection, which enabled the guide to be modified as more FGDs were conducted and new topics might be raised.

The FGDs questions were open-ended, and covered knowledge of hazards, attitudes towards smoking or SHS, experiences of exposure to smoking at home and the smoking behaviour of household members at home specially during pregnancy and if household smokers tried to quit while having a new baby at home. Participants were asked about the source of their information in relation to hazards of SHS, whether their lived experiences affect their beliefs, and whether they believe SHS exposure is socially accepted and why.

The guide also covered smoking rules at home, factors affecting these rules, the barriers and facilitators to the prevention of SHS at home and adoption of SFHs. Participants were asked about experiences of counselling from HCPs in PHCs related to SHS exposure and their opinions on the delivery of interventions aiming to reduce SHS exposure through PHCs and how this could be best delivered.

Sessions ended with an opportunity to ask questions. To explore household smokers' knowledge, attitudes and behaviour in relation to SHS exposure among pregnant women and children, smoking rules in the home and barriers and facilitators to having smoke free homes, women were asked whether they thought the smokers in their household (typically their husbands) would be willing to participate in our research through telephone interview and if so, they were asked to provide a telephone number to be contacted on. However, all participants thought that their husbands' would not agree to participate in our research and no contact details were provided.

5.3.7 Data Storage

All data were kept confidential and accessible to the research team only. The recording of the interviews were password protected on the investigator's personal laptop. Hard copies of the transcripts were stored securely in locked cabinet in investigator's desk in Division of Epidemiology and public Health University of Nottingham.

5.3.8 Data analysis

A sample of recordings were transcribed verbatim and anonymized by the researcher (ZH) to familiarise herself with the data, and the remaining were transcribed by an external specialist researcher (MK) after signing a confidentiality agreement. Following receipt of the transcripts, ZH checked for accuracy of transcripts by listening to the audio recordings and translating them from Arabic to English then ensured the removal of all personal identifiers. All transcripts were assigned a code that identified the group which they represent (rural or urban population).

The FGD data were analysed using the framework approach,²⁵⁵ alongside the use of memos to support reflexivity.²⁵⁶ Framework analysis was developed in the 1980s by applied qualitative researchers.²⁵⁷ The framework approach is a type of thematic analysis approach which allows the researcher flexibility to use a deductive approach (data generated by the research questions) and an inductive approach (data generated from emergent topics),²⁵⁵ and it is becoming

an increasingly popular approach in analysing qualitative health research.^{255,258} The framework approach was chosen over other approaches, such as grounded theory, for its focus on interpretation of participant's experiences rather than theory development.²⁵⁵ It fits the aims of the current study more than other approaches like discourse analysis and ethnomethodology (which focus on language and how it's used in social interactions).^{259,260}

The framework approach sits within the broad family of thematic analysis which is defined by Braun and Clarke as “a method for identifying, analysing and reporting patterns within data”,²⁶¹ and not tied to any particular theoretical paradigm. Furthermore, thematic analysis has limited interpretative power beyond description.²⁶¹ Whilst framework analysis offers the ability to compare and contrast qualitative data, add more transparency, and offers a systematic structure to identify themes, however, it is too rigid approach which may constrain analysis.²⁵⁸ Using the framework approach enables the study to provide participants' accounts and views. Like in all qualitative data analysis, the framework method is time consuming, resource-intensive and requires specific training.²⁵⁵

The framework method of data analysis consists of five stages. These stages include familiarisation with the data, constructing a thematic framework, indexing and sorting, summarising and displaying the data, and mapping an interpretation (Table 20).²⁶² The stages of analysis are a continuous, flexible and iterative process which can be moved up and

down between the different stages of analysis to identify emerging themes.

The stages of framework approach of qualitative data analysis were followed. NVivo12 software was used to facilitate the analysis.²⁶³ ZH and GN (identified before in chapter 3) independently reviewed each transcript, and initial ideas were noted that identified preliminary codes. The researchers read the transcripts more than once to become familiar with the data and codes were then grouped into potentially emergent themes and sub-themes. Discussion between the two researchers and with the wider research team (PhD supervisors) resulted in an analytical framework or thematic node hierarchy of main themes and sub-themes.

Table 20 The procedure and steps of the framework method of analysis conducted in NVivo Steps

	Steps in NVivo	Comments
1	Importation of transcript and setting each transcript in to a case node	All transcripts were imported as case node that represent each FGD
2	Coding	The coding of some FGDs transcripts
3	Creation of an analytical thematic node hierarchy	A note hierarchy of the themes and sub-themes was created during the coding of the first few FGDs transcripts
4	Applying the analytical thematic node hierarchy and editing it	All transcripts were coded to the theme nodes hierarchy and the hierarchy is edited for any new emerged nodes
5	Charting data in to the framework matrix	A framework matrices was created from the case node (FGD transcript) as rows and the sub-theme nodes as columns. The intersection of each case and thematic node forms matrix cell, and this is where code (data quotation) that relates to the case and sub-theme was identified
6	Mapping and interpreting the data	Summarized framework matrix was created that links to the themes, cases and the supporting source materials (quotations).

Further analysis clarified the specific nature of each theme leading to the development of names and descriptions. Following agreement of the themes identified, extracts were taken from the transcripts to exemplify each theme in order to reflect the experiences of participants.

The process of refining and applying the analytical thematic node hierarchy was repeated until no new codes were generated. The final thematic node hierarchy (including all identified themes and sub-themes) was applied to all transcripts in NVivo. Once all the transcripts were coded using the analytical thematic node hierarchy, the data were summarised in a framework matrix for each of the main themes and sub-themes using NVivo framework matrices. This process allowed the data to be rearranged according to the appropriate part of the thematic framework to which they related and also ensured that all coded data; and context were included.

Finally, the chart matrices were used to identify the differences and similarities across transcripts and within themes; to explore relationships and association between the themes. In the matrix, the each subtheme was assigned in a column and each transcript was allocated in a row. (See appendix 5.5: sample of the matrix)

5.3.9 Reflexive Statement

The researcher plays a central role in qualitative research, influencing and constructing the collection, selection and interpretation of data, highlighting the importance for reflexivity.²⁶⁴ Analysing the data from a constructivist point of view meant that I needed to acknowledge that my past experiences could influence how I interpret the data of FGDs.

Reflexivity enables the researcher to reflect upon how own personal experiences could influence the way in which they interpret what the participants reveal in FGDs. Reflexive practice should be ongoing throughout the data collection and analysis, whereby the researcher applies “immediate, dynamic, and continuing self-awareness”.²⁶⁵ during conduction of the current study, reflexivity was undertaken throughout. My characteristics as an individual and as a researcher can inevitably shape the direction in which research process implemented and my interpretation of the data collected.²⁶⁶

It is important to mention that there was no pre-existing relationship between myself – the researcher – and the participants which increased the likelihood that they provided honest responses to the questions. To be reflexive, it is recommended for the qualitative data researchers to be aware of the following: the personal and professional meanings that the research topics account for them, the perspectives and experiences of research team, and the audiences to whom the research findings will be directed.²⁶⁷ Therefore, I noted some reflexive statements throughout

data collection and analysis. Relevant reflections believed to affect the research process, findings or interpretations are discussed below.

I am an Egyptian mother, fluent in Arabic (the language used in FGDs), have a background in public health, smoking and SHS exposure in pregnancy and am currently undertaking a Ph.D. Whilst a never-smoker, I have been exposed to SHS in public places in Egypt. Very few people in my social circle, and no-one in my immediate family or close friends, are smokers. In my personal life, I know some parents who are smokers. I am a public health researcher and prior to my Ph.D, I spent around 3 years working in the maternal and child health research field.

I feel that these personal characteristics and my background were influential in my initial opinions regarding SHS exposure among pregnant women and children; I am a mother and I feel strongly that parents should prioritise the health of their children by preventing their SHS exposure, and sometimes passed negative judgements about parents who allow SHS exposure for their children especially fathers who are the sole source of that exposure as women seldom smoke in Egypt. Probably due to my own level of education, I found it difficult to empathise with fathers who did not believe their smoking to be harmful to their children.

Personal similarities between myself and research participants, most notably being sometimes exposed to SHS and having children, may have expanded my understanding of certain aspects of participant's subjective accounts.²⁶⁶ Sharing some characteristics or experiences of

my participant group positions me as an 'insider-researcher'.²⁶⁸ There are advantages and disadvantages of being 'insider' or 'outsider' researcher. The insider researcher may find participants more willing to share their experiences due to perceived similarity; however, this can also inhibit the research process as participants may fail to fully explain their experiences because of the assumed understanding of the researcher.²⁶⁸ Similarly, 'outsider researcher' may have influenced the FGDs in both positive and negative ways. An assumption may have been made by participants that as a researcher in the field of smoking and SHS exposure that I may be disapproving of their SHS exposure, particularly during pregnancy.

Being sometimes exposed to SHS is coupled with my extensive reading of literature regarding the link between low socioeconomic status and SHS exposure during pregnancy and childhood in Middle Eastern countries prompted me to question my previously held negative opinions towards SHS exposure among pregnant women and children. Therefore, I wanted to understand the complex difficulties that this group of women faced as they are not the source of smoking, and in turn became more sympathetic to their position. My awareness of the complex personal, economic and social reasons why pregnant women/mothers may struggle enabled me to approach FGDs and analysis from a non-judgemental perspective.

My position as an insider researcher appeared to be beneficial. For example, one mother interviewed had expressed that she accepted SHS

exposure for herself and her children as her husband is a smoker which she cannot control. This participant was able to take on the role of the 'expert', and willingly explained her experience to me, as an audience, and how she and her children were usually exposed to her husband's smoke while watching the TV or after eating lunch. Another participant expressed in detail her experience to successfully prevent SHS exposure for her asthmatic child in public transportation and how she insisted to make the smoker stop smoking. This in turn facilitated a more open dialogue about their experiences with SHS exposure during the FGD.

My previous experience, the experience of my supervisory team, and the background literature guided the development of the FGD guide that I used during FGDs. The FGD guide included questions about women's knowledge regarding health hazards for SHS, then their experiences and smoking behaviour at home, having smoking restrictions at home, barriers and facilitators to adopt SFHs, and finally possible approaches to prevent that exposure. I added some flexibility in ordering of topics, which was helpful to facilitate a more narrative approach to the FGDs.

Furthermore, as face-to-face FGDs were conducted in PHC centres not in the homes of women, I was not able to have any subjective judgement on visibility of husbands' smoking or the smell of cigarettes smoke. The presence of the household smoker in the interview might have interfered with the woman disclosure. So, exploring women experiences in such situations was not challenging.

When there were some discrepancies in the women's narratives, I did not directly ask the participants about that to enable women to tell the story of their experiences in their own words, and to maintain an open discourse. However, my interpretations may have influenced the direction of the FGDs, for example revisiting certain topics to give participants the opportunity to disclose further details about their experiences especially in the part of smoking behaviour and restrictions at home during pregnancy. This was a difficult line to tread as I sometimes felt that revisiting topics previously discussed caused some repetitions.

During analysis process, my position as an 'insider-researcher' might influenced the analysis; the assumptions I made and my subsequent interpretation of the data may be different to those made by either an 'outsider-researcher', or someone who does not have background knowledge about SHS exposure during pregnancy and childhood. This was adjusted by independent coding of the data by another researcher (GN) who did not have research experience in SHS exposure among pregnant women and children. Moreover, the codes and related quotations were revised and interpreted by research team (PhD supervisors) which allowed researcher triangulation.

5.4 RESULTS

5.4.1 Participant characteristics

61 women aged 18 – 49 years attended six FGDs (29 from rural communities and 32 from urban communities; Table 21); 25 were pregnant at the time of the FGDs and all reported being never smokers. Detailed characteristics of each participant is presented in Appendix 5.5.

Table 21 Demographic characteristics of pregnant women/mothers of children, Assiut, Egypt.

Participants characteristics	N	%
Age		
<20	4	6.5
20-24	14	23
25-29	12	19.7
30-34	13	21.3
35+	18	29.5
Residency		
Urban	32	52.5
Rural	29	47.5
Pregnancy		
Pregnant	25	41
Not pregnant	36	59

5.4.2 List of themes and subthemes of the qualitative study

Four themes and 10 subthemes were identified.

1. Knowledge, perceptions and attitudes about and towards SHS

- Sources of SHS exposure and mothers' awareness, perceptions and beliefs regarding dangers of smoking and SHS exposure
- Mothers experiences and attitudes regarding prevention of SHS exposure

2. Barriers to preventing SHS exposure/adopting a smoke-free home or workplace

- Social acceptance, traditions, masculinity and gender norms regarding smoking in Egyptian community
- Women's fears about asking smokers not to smoke near them

3. Measures for prevention of SHS exposure

4. Potential interventions to reduce SHS exposure at home/ workplace

- Role of government
- Education and media
- Participation in a health intervention for smoke-free homes

5.4.3 Knowledge, perceptions and attitudes about and towards SHS

Sources of SHS exposure and mothers' awareness, perceptions and beliefs regarding dangers of smoking and SHS exposure

Participants reported SHS for themselves and children in multiple settings but mainly at home, which was reported by both rural and urban groups. Pregnant women/mothers reported some knowledge that SHS exposure can be harmful for themselves and for their children; however, only a small number of specific diseases in children linked with SHS exposure were identified; mainly respiratory tract diseases. Many participants added that SHS exposure increases the chances of smoking uptake among children as they often imitate their fathers when they grow up.

“My son is 12 years old and he likes to smoke the cigarettes butts after his father. When I advised him not to do that, he told me that my dad smokes, so why I do not....” (P2-F, 42 years) “

Participants had better knowledge about the harm of SHS exposure during pregnancy, identifying morbidities such as congenital anomalies, preterm labour, birth defects and low birth weight as a result.

Knowledge was gained from their social network, TV/media, school curriculum and to a lesser extent from health care providers, which was consistent between both urban and rural groups. Women mostly reported that HCPs did not advise them about specific dangers of SHS

to pregnant women and children. There were no discernible differences in knowledge between urban and rural groups.

“The doctor here in the clinic asked me if I am exposed to tobacco smoke or not but he did not tell me about the dangers of SHS for pregnant women and children.” (P7-C, 25 years, pregnant)

Participants in both urban and rural groups perceived SHS exposure to be equally or more harmful than cigarette smoking, with shisha believed to be more harmful.

“When a smoker smokes one cigarette, it will be as I (not-smoker) smoked 10 cigarettes.” (P1-A, 20 years) “Regarding SHS exposure, the exposed person inhale more smoke than the smoker himself and it is very harmful to health of pregnant women.” (P8-B, 40 years)

“My husband is a shisha smoker. I know that shisha is more dangerous than cigarettes as smoking one shisha hagar equals smoking 20 cigarettes..... It is very difficult for him to quit shisha smoking.” (P11-D, 32 years)

There were contradictory views regarding electronic cigarettes; some women perceived that they have minimal health effects, while others perceived that vaping is as dangerous as cigarette smoking. Some participants reported that smoking is a bad habit and dependent on personal will, whilst others perceived that smoking is an addiction, and had a financial impact on the family.

“Smoking is addictive as some men also do not fast Ramadan because they cannot stop smoking. Here in my community there are many children 10 years old who smoke.” (P8-E, 27 years, pregnant)

“.....My husband spends more than half of his monthly salary on cigarettes.” (P1-D, 22 years, pregnant)

5.4.3.1 Women’s experiences and attitudes regarding prevention of SHS exposure

In general, women’s experience did not differ between urban and rural groups. Some women had adapted to the culture of not caring about SHS exposure. Others did care but kept silent as they did not feel they can ask a smoker to smoke away from them.

“Actually, my husband smokes everywhere even when he is carrying our son...” (P9-F, 30 years, pregnant) “It is normal..... I do not care..... anyone who wants to smoke, he can smoke.” (P1-A, 20 years)

“When I am exposed to SHS in public transportation or public places, I feel embarrassed to ask the smoker to stop.” (P4-D, 49 years)

Some felt upset and frustrated and had disputes with the smoker, mainly the husband. They reported asking them to stop smoking or smoke away from them and the children, and advising them to quit.

“I feel frustrated.....when I ask him to stop smoking beside me, he does not stop and just ignores my speech. (P1-D, 22 years, pregnant)

“.....when I was pregnant, he tried to smoke away from..... After delivery, he returned to smoking everywhere.....We had a big dispute and we were about to have a divorce. Now, he always smokes away from me....” (P5-D, 48 years)

“My husband did not listen to my advice to quit smoking.” (P9-D, 24 years, pregnant)

Others reported leaving the room and asking children to keep away from their father when he smokes. Participants recalled that they experienced being upset and nervous, cannot endure the smell of cigarettes, and feeling suffocated and having shortness of breath when exposed to SHS. Some participants reported their non-acceptance of SHS exposure in public transportation and at work.

“In public transportation, I ask the smoker to stop smoking as I feel shortness of breath. (P10-A, 20 years, pregnant)

“My work colleague is a smoker. I advised him a lot to stop smoking.... When he ignored my advice, I had an argument with him. Then, he stopped smoking next to me, as he was worried that I will tell our manager”. (P6-D, 29 years).

Participants reported that their personal experiences like having children with congenital heart problem or asthma or occurrence of any morbidities or even death of a household member because of smoking affected their beliefs about SHS exposure. One participant in an urban group stated that her children convinced their father to stop smoking next to them.

“My first child had a congenital heart problem and his immunity was weak. The doctor told us that we must not smoke next to him. We used to hear about the harms of smoking from people, but that did not affect our behaviour. After our son’s problem, my husband began to change his smoking behaviour, whether our son was sick or not. He stopped smoking next to me or our son.” (P9-B, 25 years)

“They — participant’s children — used to choose YouTube videos about the health hazards of smoking and let him — participant’s husband — watch these videos. After

they did that, he used to smoke away from them or outside the home.” (P3-D, 39 years)

5.4.4 Barriers to preventing SHS exposure/adopting a smoke-free home or workplace

5.4.4.1 Social acceptance, traditions, masculinity and gender norms regarding smoking in Egyptian community

Consistent findings in both urban and rural groups are that smoking and SHS exposure are prevalent, very socially accepted in Egyptian society, and smoking is seen as a sign of manhood and masculinity which encourages young boys to try smoking.

“SHS exposure is very accepted here in my community. Most of men here smoke.” (P4-E, 50 years)

“Here in my community there are many under 10 year’s old children who smoke.” (P10-F, 39 years)

“Fathers sometimes give their sons cigarettes to be a man. Father will be happy; his son is a man now!” (P10-B, 25 years).

“Egyptian man’s thought in general is that smoking is a sign of masculinity.”(P6-C, 30 years)

Moreover, extended family members who like to smoke together when socializing. Some participants attributed the high prevalence of smoking among men to doctors, saying that they are not supportive of smoking cessation as they do not discourage smoking.

“The biggest problem is that the doctor did not confirm that my husband must quit smoking. The doctor said to him if you want to quit smoking, quit it” (P8-B, 40 years, pregnant)

Offering cigarettes was highlighted to be a way for men to greet each other at celebrations such as Eid and weddings.

“In weddings, men greet themselves by cigarettes. When a man refused to take a cigarette and try smoking, they told his you are scared of your wife! It is a shame!” (P7-B, 32 years, pregnant)

Participants mentioned that it is considered not to be acceptable to ask a visitor to stop smoking as there is a social norm that it is disrespectful to ask visitors to stop smoking. Others added that it is not even socially accepted to ask a husband to stop smoking next to his wife and children.

“It is not accepted socially to ask my husband to stop smoking next to me. He will reply that if you are annoyed, you can leave the room. If we have a smoker visitor, it is not socially accepted to ask him to stop smoking. That is our tradition; we should respect visitors.” (P8-B, 40 years, pregnant)

Some participants reported that their husband had stopped smoking but then relapsed due to societal pressure. Many participants mentioned that the bad influence of friends made their husbands smoke and not want to quit. Friends used to tell some participants' husbands who succeeded in quitting smoking *“it is clear that your wife is bossy, it is a shame”*.

“My husband quit smoking for 2 months and I was very happy, but his friends made him smoke again after that as they used to visit him in our house and smoke. When I objected to that, he told me it is not accepted to deal with them like that.” (P5-A, 28 years)

“I tried to convince my husband to quit smoking, but he told me just make your father and brothers quit first. I replied that I’m living with you not with my father and brothers. After corona virus pandemic, he stopped smoking for one month, however one of his friends make him smoke again.” (P10-A, 20 years, pregnant)

Both urban and rural groups reported that having men who smoke in the household was source of SHS (usually husbands). Masculinity and gender norms was strongest emerging barrier for pregnant women and children to prevent SHS exposure at home. Almost all participants mentioned that that their husbands are aware of the hazards of smoking and SHS but try to ignore them.

“My husband used to put a blank paper over the health warning on the cigarettes packs to obscure the ugly drawing on them.” (P2-F, 42 years, 2 children)

They added that husbands who smoke claimed that cigarette smoking relieved their nervousness as an excuse to smoke in the household. Participants highlighted that men do not comply with smoking bans in public places, which was considered an important barrier to preventing exposure in public places.

“Men are circumventing the smoking control law. They used to smoke in their workplace; in their office but close the door and use air freshener. The law should be enforced.” (P10-F, 39 years, 4 children)

5.4.4.2 Women's fears about asking smokers not to smoke near them

Although it is illegal to smoke on public transportation in Egypt, many respondents from both urban and rural groups reported that being embarrassed to ask a man who smokes in public transportation to stop was a strong barrier to preventing SHS exposure. Even in extended family's houses, participants mentioned being too embarrassed to ask a household smoker or a visitor who smokes to stop smoking. Many women from both urban and rural groups reported not knowing how to convince their husbands to quit smoking or control their behaviour and being worried about disputes, arguments with their husband or even divorce.

"If the husband is a smoker and he did not listen to his wife's advice, what she can do? If she has a divorce, she will suffer from raising her children alone later on." (P13-D, 25 years)

Some participants reported that they were resigning themselves to SHS exposure and they gave up asking smokers to stop smoking next to them. One participant stated that living in small houses is a barrier too, so a wife is compelled to sit next to her husband who smokes.

"I gave up; there is no hope. Although I am pregnant now, my husband normally smokes cigarettes and shisha next to me. What I should do!" (P7-B, 32 years, pregnant).

5.4.5 Measures taken to prevent SHS exposure

The majority of participants from both urban and rural groups mentioned that their families allow smoking anywhere in the home; men (husband/father/brother) smoke everywhere in the home even near children.

“My children are usually exposed to SHS from their father’s cigarette smoking. It is normal.” (P8-C, 33 years, pregnant)

However, some women tried to implement measures to prevent SHS exposure but men who smoke (mainly husbands) did not always follow the rules.

“I always ask him to smoke on the balcony.....sometimes he forgets.....sometimes he stubbornly refused and said stop asking me to do that.” (P10-B, 31 years)

Trying to implement measures to prevent SHS exposure at home did not differ between urban and rural women, however it was an individual variation. Those rules were, for example, smoking being allowed only in specific places such as on a balcony, or smoking being prohibited in children's rooms or next to children.

“There is a room in my house, my husband usually smoke in it, and he usually opens the windows. It is not allowed for him to smoke next to children.” (P4-A, 40 years)

Some women used to open the windows/turn on fans when husbands/visitors started to smoke. Some fathers were reported to ask children to move away from them while they were smoking. Other participants reported having discussions with husbands who smoke

and explaining the hazards of SHS exposure to them to try to convince them to quit smoking.

Some participants in both urban and rural groups reported that nothing changed during pregnancy as husbands continued to smoke everywhere at home, and they were fed up with discussing this issue with them because they believed that household smokers would not listen to them.

“After I got pregnant, I tried to persuade him to smoke away from me but I could not and he continued to smoke in the same place with me during my pregnancy.” (P6-F, 24 years and pregnant)”

Others in both urban and rural groups mentioned that they observed some changes in their husbands' behaviour during their pregnancy such as reducing the number of cigarettes smoked per day, attempting to quit smoking and following the rules in the house (such as smoking on a balcony or away from her and children or outside the home).

“As I'm pregnant, my husband and his brothers worry about my health and my baby's health, so they usually smoke away from me; maybe on the balcony.” (P8-E, 27 years, pregnant)”

Thus, participants added that they (pregnant wives) can be a strong motivator for their husband to quit smoking and they are willing to encourage/help them, however, some smokers don't know how to quit. Other participants commented that quitting smoking depends on personal will.

“Wives are the strongest motivators for their husband to quit smoking. If you helped him to quit, he will quit.” (P11-B, 45 years) “There are some men who want to quit but, they do not know how.” (P6-F, 24 years and pregnant)

“There are some men who want to quit but, they do not know how.” (P6-F, 24 years and pregnant)

5.4.6 Potential interventions to reduce SHS exposure at home/ workplace

5.4.6.1 Role of government to prevent SHS exposure

Many participants in both urban and rural groups emphasized that they felt it is the role of the government to prevent tobacco smoking and SHS exposure by enforcing tobacco control policies. They held the view that the government is the only one responsible for implementing the national smoke-free rules, so men may be encouraged to adopt smoke-free homes. They added that the government should close tobacco factories or decrease the amount of nicotine in cigarettes, and enforce fines for men who smoke in their workplace, though some reported that fines were ineffective.

“We need a radical solution..... the government should close the cigarettes industries How can we prevent SHS exposure? Most of us have a smoking husband.....Where should we go? They are not listening to our advice.” (P3-E, 23 years, pregnant)

“.....The government should enforce fines for men who smoke.” (P2-D, 33 years)

“Fines did not work, they don't mind paying the 50 LE.” (P3-D, 39 years)

Men are reportedly circumventing the smoking control law by smoking in bathrooms, on the balcony or in the garden in their workplace or even in their office. There was consensus that the law should be enforced and the fine should be increased.

5.4.6.2 Education and media

Many participants in both urban and rural groups mentioned that health education sessions (HES) for men would be more effective than self-help tools such as brochures and posters, and might persuade men to quit. Additionally, other participants reported that brochures are better than posters as women can take them home to show husbands who smoke evidence about the dangers of SHS exposure. In Egypt, teams of doctors and nurses sometimes visit areas with poor medical coverage to provide medical services and medicines for a one day visit. A participant suggested that these visits provide a good opportunity to improve awareness, thus doctors can deliver a health message regarding SHS exposure among pregnant women and children.

“I suggest medical convoys. Nurses and doctors go to houses to increase people’s awareness of the dangers of SHS exposure, especially for pregnant women and children. Through that, both men and women will listen to nurses’ and doctors’ advice regarding SHS exposure. If the wife told her husband that smoking and SHS exposure is very dangerous to children’s health, they will not be convinced. But, if they hear that from doctors, they may be convinced.” (P5-C, 18 years, pregnant)

Additionally, they mentioned that TV ads and messages in films and series could improve awareness of the dangers of SHS. Participants

reported that every household owns a TV and all people like to watch movies, so messages about the dangers of SHS exposure in between films would be effective.

Regarding the best delivery of HES, some women in both urban and rural groups did not think that men would travel to sessions or follow the instructions. However, they suggested that if sessions were held in their workplace, it would be more practical and men might attend.

Participants added that it might have a greater effect if people who had morbidities from smoking could attend the sessions and tell attendees about their experiences. Other participants commented that if the sessions could be held after work (after 5 pm) once a month or if men were informed that they could be fined if they did not attend, they would come to HES in the PHC. They added that men could invite others through word of mouth.

A small number of participants mentioned that HES for women, especially pregnant women, would be better than those for men. However, they were not sure that their husband would listen to them and try to quit or smoke away from them and children. Others recommended that HES for both women and their husbands who smoke would be the most effective approach.

5.4.6.3 Participation in a health intervention for smoke-free homes

Many participants in both urban and rural groups suggested that they would be unable to participate in smoke-free home interventions due to

having a male smoker in the household who was not convinced that SHS exposure is an important health hazard.

“If you called him by telephone to invite him, he will say that is not an important topic and men always smoke. That is not a big deal as men in Egypt usually smoke.” (P10-A, 20 years, pregnant)

They queried how they could adopt a smoke-free home whilst they have a smoker in the family. Some participants thought that participation could be encouraged by offering nicotine patches to household smokers. Others commented that if a man who smokes wants to quit, he will participate.

“My husband wishes to quit but he cannot. Therefore, I think he may come. If the ministry of health offered nicotine replacement patches, I think it would help him to quit smoking and participate.” (P3-A, 27 years)

5.5 DISCUSSION

This is the first study to investigate barriers and facilitators of pregnant women/mothers of children regarding the prevention of SHS exposure in Egypt. In spite of some awareness of the major health risks of SHS exposure to pregnant women and children, our study suggests that initiating and maintaining a smoke-free environment for women and children in Egypt is challenging, both in the home and in public places. Although some participants implement some rules, these are not kept to, and therefore do not offer adequate protection to the pregnant women and children living within the household.

5.5.1 Mothers' knowledge of the health hazards of SHS and barriers to prevent it

Parents' poor knowledge of the health hazards of SHS has been linked with exposure in children,^{75,269} yet increased awareness of the risks has not resulted in increased measures to ban smoking at home.³⁸ The current study reported that pregnant women/mothers of children could not or were reluctant to try to prevent SHS exposure despite having some knowledge about its dangers. The most common reported barriers were social acceptance of smoking and SHS exposure, masculinity and gender norms of accepting smoking among men as a normative behaviour, fear of damaging their relationship with family, women resigning themselves to SHS exposure, and doctors not being supportive of smoking cessation. Some of these barriers are similar to

previous evidence,^{75,96} however, some novel barriers raised in the current study as masculinity and gender norms of accepting smoking among men as a normative behaviour, and doctors did not discourage smoking. None of the participants mentioned any specific barriers to SHS exposure resulted from shisha smoking. However, as mentioned above, the majority of tobacco user in Egypt are cigarette smokers.

The source of SHS exposure in the current study is solely men who smoke in the household which is similar to evidence from other Middle Eastern countries.^{87,186} In the current study participants reported that men in their households were reluctant to stop smoking in the house on their request, were not convinced that SHS exposure is a health hazard, and reported high prevalence of relapse after quit attempts due to the effect of peers and society which accept smoking and SHS exposure to be normative. Despite the important role of fathers in protecting their children's health, they were the main source of SHS exposure to their children, which reflects the need to improve fathers' knowledge of the dangers of SHS exposure to their children and encourage them to quit.

Gender norms are recognized as one of the major social determinants of health and can direct individual's health behaviours.²⁷⁰ For example in the current study, it was found to be normative for men in Egyptian culture to smoke tobacco at home, in the workplace and in public places. The gender norms can play a powerful role in an individual's life since deviating from norms associated with individual's biological

sex can be met with censure from peers and sometimes social exclusion.^{271,272} Participants in the current study repeatedly reported relapse among their husbands after quitting smoking due to peer pressure. Moreover, women were concerned that restricting smoking within the home may be seen as inappropriate or unacceptable by their family and peer networks for whom smoking was seen as a normative behaviour. Additionally, the findings reflected the feelings of some participants that they are powerless to affect the smoking practices of husbands or visitors because of the social norms or being concerned that asking their husband to stop smoking or smoke outside home may negatively impact the relationship and the financial support from husbands if they divorced. Risky health behaviours (e.g. smoking among men in the current study) are expressions of masculinity for men, but, for women, gender norms can constrain women's power and limit their ability to take control of their health (e.g. forcing women to accept SHS exposure).^{271,273} Changing such gender norms in Egyptian society has the potential to alleviate inequality of forcing women to accept to be exposed to SHS, and reduce the harms caused by smoking. Previous evidence from other countries has found that anti-tobacco information campaigns about the hazards of SHS and about smoking cessation have reduced the social acceptability of smoking.²⁷⁴ Implementation of an anti-tobacco information campaign in Egypt may help in changing the social acceptance and gender norms regarding smoking and SHS exposure among Egyptian society, which may in

turn help in protecting pregnant women and children from these health hazards.

5.5.2 Household smoking rules

This study confirms previous evidence showing the flexibility of household rules around smoking in some countries,^{235,275} and added that the majority of participants' families did not have any rules about smoking at home. In contrast with other research, where families had attempted to implement strict home smoking rules around pregnant women or newborns,^{275,276} the majority of our participants reported regular exposure to SHS during pregnancy and among children even new-borns.

Previous evidence in UK found that children's caregivers believed that by restricting smoking to only one room or balcony and by applying approaches such as using an air freshener and opening windows the harm to their children was markedly reduced or even eliminated.^{195,275} Some of our study participants employed similar strategies to decrease SHS exposure, as well as leaving the room or asking children to leave the room where their father smokes. They believed that these strategies would protect them and their children; however, the evidence suggests that only complete smoking bans are effective.^{207,277} There is therefore a need to increase the awareness of Egyptian society that the only effective method to protect pregnant women and children from dangers of SHS exposure is complete smoking bans.

There is clearly a need for health care professionals to promote the importance of complete smoking bans at home more consistently,²⁷⁸ especially for men who smoke, as they are the source of SHS exposure for pregnant women and children in Egypt. The most reliable way to reduce pregnant women's and children's exposure to SHS at home in Egypt is to encourage men who smoke in the household (mainly the husband) to quit. Evidence in chapter 4 reported that only about half of HCPs in public primary health care clinics in Assiut (an Egyptian city) provided a health message to pregnant women/mothers of children regarding the harms of SHS exposure,²⁷⁹ thus HCPs should be more supportive of smoking cessation and prevention of SHS in the public primary health care system in Egypt. Previous studies have shown that pregnant women who do not smoke are often responsive to counselling regarding the reduction of SHS exposure received from HCPs.^{99,100} A recent systematic review reported that behavioural change interventions led to increased knowledge about the harms of SHS among pregnant women, increased quitting among husbands, and an increased positive attitude and practice to reduce SHS at home.¹⁰¹ These interventions included household smokers and pregnant women and delivered one or more of the following: advice from doctors to quit smoke/prevent SHS smoke, a telephone hot-line, face-to-face consultation, motivational interviews, video, role play, information booklets, and reminder text messages about the negative impacts of SHS. HCPs' support may therefore contribute to the reduction of SHS exposure in Egypt.

Some of the current study participants mentioned that when they were pregnant they observed some changes in their husbands' behaviour such as reducing the number of cigarettes smoked per day, attempting to quit smoking and following the rules in the house. They added that some smokers don't know how to quit and their wives (participants) can help them to quit and be their motivators. Thus, for implementation any intervention to prevent SHS exposure among pregnant women and children in Egypt, it should target the men who smoke or at least include both pregnant women and their husbands who smoke as suggested by current study participants. It has been reported in chapter 3, that evidence from Western countries and finding of chapter 3 that feelings of being a good vs bad parent was a motivator for parents to stop smoking in presence of children at home.^{75,96} One participant in the current study reported that her children succeeded to convince their father not to smoke at the home. Investigation of views of fathers in Egypt regarding SHS exposure among children, their knowledge about the hazards and their willing to protect their children from that exposure could be the direction of future research.

Caregivers are more strongly motivated by the sight of the impact of SHS exposure on their children to prevent that exposure.²⁷⁵ For example, in the current study, participants reported taking an action and asked smoker to stop smoking next to their children when HCPs attributed their child's ill health to SHS exposure in both public transportation and home. Often, caregivers do not perceive longer term outcomes of SHS exposure to be as a direct result of their current

smoking behaviours and thus do not prompt the need for immediate action.²⁷⁵ However, having a child with chronic health condition or occurrence of morbidity within family members and HCPs attributing this health condition to SHS exposure motivated our study participants to take an action.

5.5.3 Smoke free policies

While exposure to SHS in the home was most common, exposure in public places was also frequent. Enforcement of existing smoke-free laws in public places such as health and educational facilities, governmental venues, public transportation, sporting and social clubs and youth centres should therefore be a public health priority. Our study findings suggest that existing fines are not sufficient to deter smoking in public places. Study participants mentioned that “fines did not work, men who smoke don’t mind paying the 50 LE”. Therefore, fines should be higher and efficiently implemented.

A recent systematic review and meta-analysis reported that enforcement of comprehensive smoke-free policy results in reduction in SHS exposure and in hospital attendances for respiratory tract infection among children.²⁸⁰ Another systematic review which included 44 studies reported reductions in rates of preterm birth and hospital attendance for asthma exacerbations and all respiratory tract infections after implementation of smoke-free legislation.²⁸¹ In light of the novel findings in the current study, identifying the best method to achieve de-normalization of smoking at home among Egyptian society should be

the focus of future research. HCPs delivering information about the health benefits of preventing SHS exposure among pregnant women and children may increase women's confidence to not accept SHS exposure in public places.

5.6 STRENGTHS AND LIMITATIONS

The current qualitative study collected rich and insightful data to express the experiences of women residing in both urban and rural areas regarding SHS exposure. The nature of the qualitative FGDs facilitated in-depth discussion of household smoking behaviours and the motivators and barriers to preventing SHS exposure especially at home and allowed saturation of themes. We used the framework method for analysis which has the strength to produce credible and relevant findings that are based on the participants' views and our results are likely to have utility for policy makers, advocacy organizations, and educators. A limitation of this study is that data was collected from one city (Assiut); however, it is one of the largest cities in South Egypt and participants were recruited through three urban and three rural PHC which are located in sites accessed by a wide socio-demographic range of populations. Another limitation is that during conduction of FGDs for feasibility and convenience of data collection, we grouped women according their residence (urban or rural), however, we did not group them according other socioeconomic and demographic factors which might affect their barriers to preventing SHS exposure. Although the study groups were pregnant women and

mothers of children, some of generated theme might not be specific to these groups only and might apply to wider society; all non-smokers. For practical reasons, we did not include private clinics, whose patients might report different views regarding SHS exposure in Egypt. Another limitation is that we did not collect data regarding other wider socioeconomic factors such as parity, which might affect participants' barriers to preventing SHS exposure and might be important contextual factors for understanding their views.

5.7 IMPLICATIONS

The findings suggest that future interventions to prevent or reduce SHS exposure among pregnant women and children should be directed to both parents given that the household member who smoke is usually the husband/father of the children. Interventions that focus on strengthening a community's social norms against smoking to protect pregnant women and children from SHS exposure are likely to be helpful, for example, by increasing awareness about the dangers of exposing pregnant women and children to SHS and encouraging smoke free homes. However, increased awareness of the risks does not necessarily lead to behaviour change.²⁸²

Enforcement of legislation of smoke free public places may help to change the social norms so that protecting pregnant women/children from SHS becomes embedded and accepted at the household and individual level. Strong normative morals within a community to protect infants and children from SHS may also increase husbands/fathers

agency to prevent their wives/children from other people's smoking. Whilst changing a community's normative beliefs is likely to be challenging, it is evident from previous studies that changing a societal norm — social acceptance of smoking — could be achieved through the spread of individual changing smoking behaviour or successful quitting attempts which can be cascade to others within larger social networks.²⁸³

5.8 CONCLUSION

Social acceptance of SHS exposure, masculinity and the gender norm of accepting smoking among men as normative behaviour, fear of women damaging their relationship with family, doctors not being supportive of smoking cessation and women resigning themselves to SHS exposure were the main barriers for pregnant women/children to avoid SHS exposure at home. Poor enforcement of smoke-free laws was the main barrier to avoiding exposure in public places. Where household smokers are unwilling or unable to quit, families should be offered support to make their homes completely smoke-free. Changing the gender norm of accepting men to be smokers as a normative behaviour among Egyptian society would help to protect pregnant women and children from SHS.

**6 CHAPTER 6 SUMMARY CONCLUSIONS AND
FUTURE DIRECTIONS FOR RESEARCH**

The overall objectives of this thesis were to explore current SHS exposure among pregnant women and children in Egypt; their experiences, barriers and facilitators to reduce it; and to suggest recommendations on how to reduce the exposure. This was done by, first, investigating current tobacco use and control policies in Egypt; then by reviewing evidence on the experiences and views of parents on SHS exposure prevention in Middle Eastern countries to obtain a broad perspective of the region; then by investigating Egyptian healthcare professionals' knowledge, attitudes and practice regarding SHS exposure among pregnant women and children; and lastly by exploring the barriers and motivators to prevent SHS exposure among pregnant women and children in Egypt. This concluding chapter summarises the key findings from the research, suggests directions for future research and highlights recommendations for health practice and policy makers to reduce SHS exposure among Egyptian pregnant women and children.

6.1 Summary of findings

Objective 1: To describe current tobacco use and control policies in Egypt. The case study in Chapter 2 showed that active smoking among men (38%) is much higher than that in women (0.6%); however, the difference is smaller between adolescent boys (18.1%) and adolescent girls (8.2%). Exposure to SHS was extremely high among Egyptians in households, workplaces and public places (more than 70%). Regarding the health burden of tobacco in Egypt, in 2019, tobacco use was

responsible for about 11% of DALYs and 17% of deaths and SHS exposure caused 19,500 deaths and 650,000 DALYs. Moreover in the case study, tobacco products are considered affordable in Egypt, in comparison with other neighbouring countries.¹⁵⁹ Tobacco taxation that is applied on tobacco products in Egypt was 59% of the price in 2008,⁷ this percentage decreased to 26–50% of retail price in 2017,¹⁰⁷ however, it exceeded the WHO-recommended 75% of the retail price in 2020.⁹ There is no excise specific tax on waterpipe tobacco in Egypt. The excise ad valorem tax is tiered for domestic and imported tobacco.¹⁵⁹ Regarding a smoke free policy, there are five public places (health and educational facilities, governmental venues, sporting and social clubs, youth centres, and public transport) that are completely smoke-free.¹⁰⁷ This is considered below the standard legislation that confirms all public places should be totally smoke-free. NRT is not covered by national health insurance and smokers are required to pay for it.¹⁰⁷

Objective 2: to explore the experiences and views of parents, children, and professionals on SHS exposure prevention among women and children in the home, workplace, school, personal vehicles, and public places in Middle Eastern countries.

In the qualitative systematic review in Chapter 3, six databases and grey literature were searched from inception to January 2021. Of 5229 records identified, two qualitative studies (in three publications) met the eligibility criteria and were included in the review. The participants in

the included studies were parents (n=118 participants) aged between 18 and 42 years. This qualitative systematic review concluded that parents in Middle Eastern countries were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed by health care professionals (HCPs) with parents during pregnancy. Parents implemented some physical restrictions on smoking, such as having rules to limit where smoking can take place in the home and outdoors, with psychological motivators reported to be drivers to decrease SHS exposure among children in the home as aiming to be a good parent, but were lacking certainty or confidence regarding whether such protective measures were needed or would be effective.

There was also evidence that smoking was socially accepted, and cultural beliefs about traditional values (e.g. it would be disrespectful or offensive to ask home guests or relatives not to smoke) and personal psychological factors (e.g. lack of willpower to quit smoking) were perceived barriers to reducing SHS exposure. Parents with psychological motivators (e.g., protect smaller children, self-efficacy, and self-criticism) were able to implement changes to decrease SHS exposure among children in home. A prominent finding of this review was that SHS exposure was socially accepted among societies of many Middle Eastern countries, therefore research is needed to address how to change this social norm.

The results of the systematic review highlighted the need to investigate why the health hazards of SHS exposure among pregnant women and children were not commonly discussed by HCPs with parents during pregnancy. Therefore, chapter 4 explored knowledge, attitude and practice of HCPs regarding prevention of SHS exposure among pregnant woman and children.

Objective 3: to explore knowledge, attitudes and counselling practices of HCPs working in maternal and child health (MCH) clinics in Egypt in relation to prevention of SHS exposure among pregnant women and children, and identify the factors related to high knowledge, supportive attitudes and counselling practices. A cross sectional survey of HCPs working in public MCH clinics in Assiut city, Egypt was carried out in August 2020 (chapter 4). 367 HCPs participated in the study, 12% of whom were smokers. The majority were nurses (45%). A considerable proportion of HCPs reported being exposed to SHS in the workplace (70%) and home (52%).

Only about half of HCPs in Assiut city who responded to the survey had good risk knowledge, a supportive attitude, and reported good counselling practice regarding the prevention of SHS exposure among pregnant women and children. GPs and paediatricians were found to be most aware of the risks of SHS. Female HCPs serving a rural population were most likely to have a supportive attitude for the prevention of SHS and report good counselling practice. HCPs who were not exposed to SHS at home were more likely to report good

counselling practice and supportive attitude for its prevention among pregnant women and children. Receiving training on smoking cessation services, and having a supportive attitude towards prevention of SHS exposure were significantly associated with good counselling practice when considering all respondents. The main obstacles for HCPs to help pregnant women/children to avoid SHS exposure were found to be lack of time, lack of training, absence of reimbursement and unavailability of materials. HCPs' knowledge, attitudes and practice regarding the risks of SHS to pregnant women and children in Egypt should be improved. Training for HCPs and enforcement of smoke free policies are needed to improve awareness and facilitate changes in social norms.

Objective 4: explore barriers to preventing SHS exposure among pregnant women/children and smoking behaviour at home in Egypt.

Literature has demonstrated SHS exposure is high among pregnant women and children in home and public places in Egypt; however little is known about the experiences and views of pregnant women/mothers of children in Egypt about this issue and what the smoking behaviours at home are in general and during pregnancy. This is important as women who manage to prevent SHS exposure during pregnancy or husbands/fathers who agree with preventing exposure are potentially motivated groups, who may be more receptive to encouraging a smoking behaviour change at home and adopting smoke free homes to protect their pregnant wives and children from SHS exposure.²⁸⁴

However, the development of effective targeted interventions requires an understanding of why, how and when people behave the way that they do. In an Egyptian setting, not enough is known about smoking behaviours at home, the barriers and motivators to adopt smoke free homes, and the experiences and views of women given that they are not the source of tobacco smoke. This study therefore explored women's knowledge and attitudes to SHS exposure; their smoking behaviours at home, especially while they are pregnant, with a particular focus on how this affected their husband's home smoking behaviours; women's experiences of SHS exposure and the barriers and facilitators regarding the prevention of this exposure; and possible suggestions for the best approach to reduce their SHS exposure.

In this qualitative study, six FGDs with pregnant women/mothers of children under 18 years were conducted and analysed using a framework analysis approach (Chapter 5). This study found that pregnant women/mothers of children could not or were reluctant to prevent SHS exposure despite having some knowledge about its dangers. This reluctance was due to the barriers discussed below. Knowledge was typically gained from their social networks, via the TV/media, school curriculum, or to a lesser extent from health care providers. Women commonly reported that HCPs did not advise them about the specific dangers of SHS to pregnant women and children. Although some participants implemented strategies to decrease SHS exposure, such as opening windows or leaving the room where a smoker is, they reported that these are not adhered to, and therefore

felt they did not offer adequate protection to the pregnant women and children living within the household.

The reported barriers were social acceptance of smoking and SHS exposure, masculinity and gender norms of accepting smoking among men as a normative behaviour, fear of damaging their relationship with family, women resigning themselves to SHS exposure, and doctors not being supportive of smoking cessation. The source of SHS exposure in this study was solely men who smoke in the household (mainly husbands). Participants reported that men who smoke (mainly husbands) were reluctant to stop smoking in the house on their request, were not convinced that SHS exposure was a health hazard, or reported high prevalence of relapse after quit attempts due to the effect of their peers and society.

Women were concerned that restricting smoking within the home may be seen as inappropriate or unacceptable by their family and peer networks for whom smoking was seen as a normative behaviour. Moreover, the findings reflected the feelings of some participants that they are powerless to affect the smoking practices of husbands or visitors because of the social norms or being concerned that asking their husband to stop smoking or smoke outside home may negatively impact the relationship and the financial support from husbands if they divorced. This study confirmed the flexibility of household rules around smoking and added that the majority of participants' families did not have any rules about smoking at home even during pregnancy and

among children including new-borns. While exposure to SHS in the home was most common, exposure in public places was also frequent. Our study findings suggest that existing fines were not sufficient to deter smoking in public places.

6.2 Consideration of findings across thesis studies

In this section, I discuss the main findings of the main four studies of the thesis and compare these findings with previous literature to suggest future recommendations.

6.2.1 Social acceptance of smoking, masculinity and gender norms of accepting smoking among men as normative behaviour

A key finding across chapters of this thesis is that smoking and SHS exposure are socially very accepted in Middle Eastern countries including Egypt. It is evidenced that public behaviour is influenced by social norms.²⁸⁵ In chapter 5, some participants reflected that they felt powerless to affect the smoking practices of husbands or visitors because of the social norm of accepting men smoking as a normative behaviour. Participants added that asking husbands/family members to stop smoking might negatively impact the relationships. That could explain the high prevalence of SHS exposure among adults and children reported in chapter 2.

The gender norms can play a powerful role in an individual's life since deviating from norms associated with individual's biological sex can be met with censure from peers and sometimes social exclusion.^{271,272}

Participants in chapter 5 repeatedly reported relapse among their husbands after quitting smoking due to peer pressure. Moreover, women were concerned that restricting smoking within the home may be seen as inappropriate or unacceptable by their family and peer networks for whom smoking was seen as a normative behaviour. Additionally, the findings reflected the feelings of some participants that they are powerless to affect the smoking practices of husbands or visitors because of the social norms or being concerned that asking their husband to stop smoking or smoke outside home may negatively impact the relationship and the financial support from husbands if they divorced. Risky health behaviours (e.g. smoking among men in the current study) are expressions of masculinity for men, but, for women, gender norms can constrain women's power and limit their ability to take control of their health (e.g. forcing women to accept SHS exposure).^{271,273} Changing such gender norms in Egyptian society has the potential to alleviate inequality of forcing women to accept to be exposed to SHS, and reduce the harms caused by smoking.

Previous evidence in other countries has reported that anti-tobacco information campaigns about the hazards of SHS and about smoking cessation have reduced the social acceptability of smoking.²⁷⁴ Thus, implementation of anti-tobacco information campaign in Egypt may help in changing the social acceptance of smoking and SHS exposure

among Egyptian society which may help in protection of pregnant women and children from these health hazards. In June 2022, a media campaign was launched in Jordan, Palestine, Iraq and Egypt under the title of “United Against Tobacco and COVID-19”. The project was funded by the United States Centers for Disease Control and Prevention (U.S.CDC) and supported by Technical Advisory Committee composed of World Health Organization Eastern Mediterranean Region (WHO-EMRO). Partner organizations include Ministries of Health in Jordan, Palestine, Iraq and Egypt. This campaign aims to reach millions of people across the four countries and will air on television, radio, and social media to counter current tobacco industry marketing and help to encourage tobacco users to make successful quit attempts, increase education about health hazards of tobacco, and advocating for strong tobacco policies.²⁸⁶ By launching such campaigns and other anti-tobacco campaigns in Egypt, the social acceptance of smoking and SHS exposure might be diminished.

6.2.2 Poor enforcement of smoke free polices

Chapter 2 reported poor enforcement of smoke free polices in Egypt which was confirmed from the findings of chapter 4 and 5 by high levels of SHS exposure among research participants in public places. Chapter 5 in this thesis reported also that existing fines are not sufficient to deter smoking in public places as a participant mentioned that ‘Fines did not work, men don’t mind paying the 50 LE’. The

Egyptian law outlines that “*smoking is prohibited in the following specified public places: health and educational facilities, governmental venues, sporting and social clubs, youth centres, and public transport and smokers who violate the ruling may be fined between 50-100 Egyptian pounds (\$2-\$4).*”¹⁵⁸ Therefore, fines should be higher and efficiently implemented. Egypt is a middle income country and one third of its population live in poverty.²⁸⁷ Lower socio-economic status is frequently reported to be associated with poorer health outcomes, and increased morbidities and mortalities.²⁸⁸ Therefore, high levels of SHS exposure among pregnant women and children in Egypt is likely to exacerbate the cycle of disadvantage. Enforcement of existing smoke-free laws in public places should therefore be a public health priority.

Inadequate implementation and enforcement of tobacco control policies were evidenced to result in the persistence of social norms accepting SHS exposure and fewer protections against household SHS exposure.⁶⁶ Furthermore, enforcement of comprehensive smoke-free policy is evidenced to result in reduction in SHS exposure and in hospital attendances for respiratory tract infection among children.²⁸⁰ Thus, in such environments of inadequate enforcement to smoke-free policies in Egypt, with strong tobacco industry as discussed in chapter 2, there is also a potential for future increases in tobacco users.

6.2.3 High rates of male smoking compared to females

Chapter 2 reported high prevalence of smoking among Egyptian male adults and adolescents compared to females. A novel finding in

chapter 5 is that the source of SHS exposure at home is solely men who smoke (usually husbands) and masculinity and gender norm of accepting men smoking as a normative behaviour was the main barrier for pregnant women and children to avoid SHS exposure or adopt smoke free home. Despite the important role of fathers in protecting their children's health, they were the main source of SHS exposure to their children which may indicate that future interventions need to consider the role of husbands/family members who smoke. One of the participants in the qualitative study in chapter 5 reported that her children succeeded to convince their father to smoke outside the home. A smoke free home (SFH) intervention implemented in Pakistan which was delivered to primary school children, community leaders and health professionals in a semi-rural community succeeded to increase the proportion of adopted SFHs and to decrease in self-reported male adult smoking.¹⁰⁵ Given what have been reported in chapter 5 as mentioned above, the delivery of SFHs message to school children might be effective and children can help in changing parents' habits and convincing fathers stop/reduce smoking in Egypt. Another smoke free intervention was delivered to children in schools in Bangladesh. It is a behaviour change intervention delivered to year five children (aged 9–11 years) by teachers who are provided with training and resources. The intervention consisted of two 45-min sessions delivered over two consecutive days. Session 1 focuses on delivering a classroom presentation with discussion (flipchart activity). Session 2 involves storytelling with role-play, quiz, and word search. It aimed to make

children aware of the harms of SHS and motivate them to achieve a SFH. The storytelling and role-play activities focus on building children's confidence in raising their concerns about SHS with their parents and enhance their negotiation skills. Four refresher sessions (15 min each) follow were delivered over the subsequent 4 weeks. Children were provided with take-home promise forms for families that provided graphic representations of the hazards of SHS, pictorial guidance to help in creating a SFH. The authors reported effectiveness and feasibility of study procedures.¹⁴⁰ Similar approach could be followed in Egypt, but testing the feasibility is essential.

Similar to Egypt, some South Asian countries (e.g. India, Pakistan and Bangladesh) suffers from high levels of SHS exposure among pregnant women and children at home.²³¹ Women reported similar barriers as the current thesis to prevent that exposure such as presence of household smoker usually husband, feeling of being not supported by other family members for a smoke free home, and the gender norm of accepting smoking among men (usually husbands) as a normative behaviour. However, the authors reported husbands stopped smoking at home, when their wives were pregnant, and on their children request.²⁸⁹ Thus, the similarity in prevalence of SHS exposure and in barriers to prevent it at home between Egypt and other South Asian countries could direct the future research in Egypt in this topic. As mentioned above, an intervention has been implemented in Bangladesh to adopt SFHs. Such interventions might be helpful for

health governors in Egypt when trying to implement SFHs intervention, but testing the feasibility is essential.

6.2.4 Allowing smoking in the home

The majority of participants in focus groups reported that that their families allow smoking anywhere in the home; men (husband/father/family member) smoke everywhere in the home even near children. Some women tried to implement measures to prevent SHS exposure such as opening windows or allowing smoking in specific places in home, but men who smoke (mainly husbands) did not always follow the rules. Although previous evidence suggested that only complete smoking bans are effective,^{207,277} in chapters 3 and 5 women who tried to follow smoking restrictions measures at home reported lack of certainty or confidence regarding whether such protective measures were needed or would be effective, so they were reluctant to sustain these measures. Additionally in chapter 3, the synthesized findings indicate that there are many misconceptions among parents regarding their children's SHS exposure; how exposure occurs, the ways to limit it, and the best protective approaches to take to minimize SHS exposure to children. Therefore, there is a need for a health education intervention to improve parents' risk awareness and knowledge regarding the most effective protective measures to reduce SHS exposure among their children.

Pregnant women and mothers of children in chapter 5 confirmed the flexibility of household rules around smoking and added that the

majority of participants' families did not have any rules about smoking at home even during pregnancy and among children including newborns in contrast with other countries where families had attempted to implement strict home smoking rules around pregnant women or newborns.^{275,276} Therefore there is a need to increase awareness of Egyptian society of effective method to protect pregnant women and children from dangers of SHS exposure is complete smoking bans and the most reliable way to reduce SHS at home is to encourage men who smoke in the household to quit or adopt smoke free homes.

Participants in chapter 5 highlighted some recommendations for implementation of any intervention aiming to decrease SHS at home. They suggested that intervention directed to both pregnant women and their husbands who smoke would be the most effective. They added that offering nicotine replacement patches to the husbands who smoked would help them to quit, so it would help in preventing SHS at home.

6.2.5 Role of HCPs

The knowledge, attitude to SHS and counselling practices of HCPs in Egypt has been not studied before, so the needs and barriers of HCPs to deliver counselling services was explored in chapter 4. This study which concluded that only about half of HCPs reported asking pregnant women or children about SHS exposure or explain the health hazards or advise them to prevent this exposure. Moreover, in chapter 5 many interviewed women did not report receiving any advice for HCPs

regarding SHS exposure. The main obstacles for HCPs to help pregnant women/children avoid SHS exposure as reported in chapter 4 were lack of time, lack of training, absence of reimbursement and unavailability of educational materials. Training of HCPs cannot work alone. A range of issues need to be addressed including lack of time and unavailability of materials. Additionally, ensuring that HCPs in Egypt have the time and financial resources needed to deliver this type of support is essential. Clear specification of SHS counselling service in the job description of HCPs working in public MCH clinics need to be issued by the health system governors.

Promoting SFHs is evidenced as a successful approach to decrease SHS exposure among pregnant women and to increase the quit rate among partners of non-smoking pregnant women.⁹⁹ In chapter 5, which explored the smoking behaviour at home, many participants reported their inability to participate in SFHs interventions due to having a male smoker in the household who was not convinced that SHS exposure is an important health hazard. Therefore, educating husbands/fathers who smoke about the importance of SFHs in protecting their pregnant wives/children health is essential. HCPs can participate in health education of husbands/fathers and pregnant women about the risks of exposure to SHS during pregnancy and childhood and promote SFHs. The role of HCPs can be expanded to support men to quit. They can take the pregnancy of their wives as a starting point for smoking cessation. As reported in chapter 5, some husbands tried to decrease the number of cigarettes they smoked when their wives were pregnant.

They tried to smoke outside the home or in different room. So, husbands may be motivated to quit smoking during their wives' pregnancy and HCPs can help them with that. Some participants in chapter 5 confirmed that their husbands need help and advice from HCPs to encourage them to quit.

6.3 Methodological considerations

6.3.1 Mixed method research approach

In this study, mixed methods approach was utilized which enabled the researcher to collect and analyse data using both qualitative and quantitative methods in a single thesis. It is expansive and inclusive which allowed exploring corroboration between findings.^{290,291} Different research methods were used to answer the different research questions under the umbrella of the overall aim of the thesis.

Consideration of findings across the methodologies utilised in this thesis and discussed in this chapter, facilitated a more complete understanding of SHS exposure among pregnant women and children in Egypt.

In order to have rigour mixed method approaches, it was essential to understand the process of selecting and constructing mixed methods research design.²⁹² Greene (1989) and Bryman (2006) provided classification of the basis of how qualitative and quantitative data can relate each other by the purposes and rationale of the study.^{293,294} The most important consideration to construct a research design is to consider the unique research situation and questions.²⁹²

Firstly, it was fundamental to consider the purpose of using mixed methods in the study. More expansive and richer information could be obtained from a mixed methods study.²⁹⁰ Secondly, the researcher should consider the timing, in terms of simultaneity and dependence.

Simultaneity refers to whether the components were implemented in the same time which was applied in the current thesis. Dependence refers to whether a later component depended on the results of an earlier one.²⁹⁵ Then, the researcher needed to consider the integration of quantitative and qualitative components. Finally, the chosen research design must be fully specified and justified during the planning of the research study which was discussed in the methods section of each chapter.²⁹² There were a number of possible selected combination of approaches to conduct mixed methods research. The preferred approaches for this study are described below.

Combining both quantitative and qualitative data can provide a more in-depth understanding of the problem than by exploring quantitative and qualitative data alone,²⁹⁶ gaining a more complete picture about the complex issue of SHS exposure among pregnant women and children in Egypt. The researcher carefully designed the research, selected the methods, reflected on the choices made, and reconsidered the research aims.²⁹⁷

This study used qualitative data to provide a detailed understanding experiences and barriers to prevent SHS exposure among Egyptian pregnant women and children and to explore smoking behaviour at home by exploring their perspectives in great depth using FGDs. Qualitative research was used for several reasons; its flexibility, the ability to understand how individuals experience health hazards, and reasons for their behaviours to cope with these hazards, and it could

generate a wide range of ideas and views that individual had about an issue.²⁹⁸ Thus, a qualitative study is useful to understand women's perceptions regarding SHS as influenced by their social experiences,²⁹² and because ability of qualitative research to capture complexity, process and the meaning attached to individual action.²⁰⁶ Focus group discussions were preferred over individual interviews as they elicit a multiplicity of views, opinions and emotional processes within the group context.²⁴⁴

SHS health risk perceptions of Egyptian pregnant women/ mother children, smoking behaviour at home during pregnancy, their experiences regarding SHS exposure and whether receiving advice from HCPs were unexplored in the literature, and the study in chapter 5 intended to address this gap by conducting qualitative research. Moreover, it is the first qualitative research to explore experiences and views of pregnant women/mothers of children regarding SHS exposure in Egypt, thus, this method filled the gap left by quantitative-based studies. Despite the FGDs allowing collection of rich data and in-depth discussion of the SHS exposure issue among pregnant women/mothers of children, individual interviews with pregnant women/mothers from low socio-economic class may be the direction for future research.

Additionally, quantitative data provide more general understanding of SHS exposure problem by examining knowledge, attitude and counselling practice of HCPs regarding prevention of SHS exposure

among pregnant women/children and assessing factors associated with good knowledge, supportive attitude and counselling practice. Quantitative research allowed exploring of factors associated with counselling practice of HCPs regarding SHS exposure with pregnant women/mothers and barriers of HCPs to provide this service. Knowledge, attitude, and practice surveys are popular in the health sciences as it can assess health-related beliefs and behaviours regarding a health hazard and can explore misunderstandings and potential barriers to behaviour change.²⁹⁹

The systematic review reported in Chapter 3 synthesised evidence from studies, which contained qualitative data only. As discussed above, qualitative research can enhance understanding of complex areas of research that are not easily addressed using quantitative research methods alone, and can assist in the interpretation of quantitative findings.¹⁷³ In this thesis, the qualitative systematic review was conducted to describe the views and experiences of parents regarding SHS exposure in all Middle Eastern countries as qualitative research can allow exploration of meanings of social phenomena as experienced by individuals themselves, in their context.¹⁷⁴ Mixed-methods review could enhance the evidence, as it would add the predictors of SHS exposure among pregnant women and children in Middle Eastern countries. However, due to an existing published narrative systematic review which summarizes the predictors of SHS exposure among children worldwide,⁵¹ it was appropriate to consider

only conducting a qualitative systematic review method to enrich the evidence base.

Different participants within this thesis were used to provide different perspectives, to provide a complete understanding of the research problem. Qualitative combined with quantitative methods helps to explain the SHS exposure problem among pregnant women and children in Egypt, and reach the recommendations of possible approaches to prevent this exposure. In this thesis, the researcher was not committed to any philosophy. Instead, the researcher focused on the research aims and used whatever research methods correctly answer the research questions.

This study used “equal-status” mixed method research design, meaning the qualitative and quantitative methods used have equal value. This study was not qualitative or quantitative driven, but both quantitative and qualitative wings had equal status. Related to the timing of qualitative and quantitative components, this study has a concurrent-independent design, meaning that the data collection in this study collected and displayed side-by-side, based on methodological approaches and the implementation of both designs simultaneously and independently.

6.3.2 Reliability and validity in this study

Reliability is the extent to which measurements are repeatable, when different persons perform the measurements, on different times, under

different situations, with alternative instruments which measure the same thing.²⁹⁷ Reliability is concerned with repeatability and consistency of participants accounts as well as the ability of researcher to collect and record data accurately.²⁹⁷ To achieve reliability in this study, the researcher ensured the provision of detailed description of the research strategy and data analysis (described in each study chapter in this thesis). In chapter 6, the details of the considerations of the findings from the studies are provided together with a clear explanation of data triangulation (based on the combined use of findings from different studies which used different methods), and reflexivity, to keep a self-critical account of the research process.

Validity refers to how accurately a method measures what it is intended to measure.²⁹³ Validity were ensured by using well established research methods, familiarisation with Egyptian culture, and providing accurate description of research findings. Additionally, a well-established procedure was used to evaluate the analysis of data, and provided a clear description of each study participants to allow evaluation of which target groups were investigated and to be sure that the findings were the results of data collected, thus, not the preferences of the researcher.

6.4 Conclusion

The Middle Eastern region is suffering from higher levels of SHS exposure and poorer implementation of smoke free bans in public places than other regions around the world. Smoking and SHS exposure are socially accepted in many Middle Eastern countries including Egypt. In Egypt there is a gender norm of accepting smoking among men as a normative behaviour. Offering cigarettes is a way for men to greet each other and it is a sign of hospitality which is an important culture in Egypt. Egyptian pregnant women and mothers have some knowledge that SHS exposure can be harmful for themselves and for their children, although the health dangers of SHS exposure were not commonly discussed by health professionals during pregnancy. The main obstacles for health professionals to help pregnant women/children avoid SHS exposure were lack of time, lack of training, absence of reimbursement and unavailability of materials. The source of SHS exposure at home is usually men who smoke in the household (mainly husbands) since women were found to seldom smoke. The most common reported barriers for pregnant women/children to avoid SHS exposure at home were social acceptance of smoking and SHS exposure, masculinity and gender norms of accepting smoking among men as a normative behaviour, fear of damaging their relationship with family, women resigning themselves to SHS exposure, and the perception that doctors not being supportive of smoking cessation. Many Egyptian families allow smoking anywhere in the home; some women have tried to implement

measures to prevent SHS exposure, however these strategies were not applied consistently, so were perceived to be less effective.

Regarding tobacco control policies in Egypt, many tobacco control policies are not comprehensively implemented or enforced, especially banning smoking in public places. Tobacco taxation policies need to include taxation on shisha products. More governmental support for smoking cessation services is needed as the government does not support providing medications related to smoking cessation.

It is important to develop an environment which facilitates increased awareness of and willingness of health professionals to provide support on smoking cessation and prevention of SHS exposure. This includes comprehensive enforcement of smoke-free policy, training programs for health professionals on smoking cessation which should cover SHS exposure. This could also extend to other population-level interventions such as mass media anti-tobacco information campaigns. Changing the social norm of accepting tobacco smoke exposure in society could be difficult but ensuring that everyone is aware of the health hazards of SHS exposure to children, pregnant women and other vulnerable groups of the society might help to decrease social acceptance of smoking and SHS.

6.5 Recommendations for future research

6.5.1 Recommendations for research

The work in this thesis has highlighted a number of areas for potential future research. There is a general paucity of research exploring SHS exposure in Egypt specifically among pregnant women/children, and whilst this thesis has begun to build a literature base in this area, more research is needed.

Studies included in the systematic review only focused on SHS exposure among children; therefore, qualitative research is needed to explore barriers and facilitators of prevention of SHS among pregnant women given that SHS exposure in public places is still an issue in many Middle Eastern countries. However, this thesis included a qualitative study about barriers and facilitators of prevention of SHS among pregnant women in Egypt, more research from other Middle Eastern countries would enrich the evidence. Moreover, the systematic review included only two studies on the experiences and views of parents on SHS exposure among children in the Middle Eastern countries, which reflects the need for further research on this topic. Additionally, no studies investigating the views of professionals on the prevention of SHS exposure among pregnant women and children in Middle Eastern countries were found. Thus, future research is recommended to examine the views of professionals.

Exploring fathers/husbands views regarding SHS exposure among pregnant women and children may add more insights to the finding of chapter 5; in particular barriers to change their smoking behaviour at home and adopt smoke free home can be a direction for future research. Moreover, women mentioned living in small sized house as a barrier to preventing SHS exposure, thus, exploring the experiences of parents of low-socioeconomic status regarding SHS can enrich the available evidence.

The longer trajectory to reducing overall smoking prevalence in future is to decrease the smoking initiation rate among Egyptian adolescents. It is reported in chapter 2 that the smoking prevalence is 18.1% among adolescent boys and 8.2% among adolescent girls. Recent evidence has emphasized that male adolescents are more likely to smoke than female adolescents in Egypt. The authors reported predictors of adolescents smoking to be increasing age, low educational level of fathers, poor self-confidence to refuse friends' smoking offers, absence of restriction on selling cigarettes to adolescents near their schools, and observing teachers' smoking inside schools.¹⁶³ The authors also evidenced that adolescents' access to information about hazards of smoking through schools helped in countering smoking initiation.¹⁶³

Previous evidence reported that school-based interventions implemented targeting young people could help to decrease tobacco smoking initiation and increase the cessation rate among students.^{166,167} However, for implementation of such interventions in

Egypt, it should be considered that the social environment might be a strong motivator for initiation of tobacco use among adolescents.

Future qualitative or quantitative research can help to identify possible approaches for implementation of these programs to get the best expected outcome and to identify needs of students; this information is not yet available in Egypt.

As discussed in chapter 2 smoking quitting rate among male smokers is low and chapter 5 reported that relapse is prevalent among male smokers, thus future research can investigate barriers, motivators of tobacco use cessation among men given the high prevalence of smoking among them compared to women in Egypt. Recent data about national tobacco use quit rate and its correlates, reasons of failure of quit attempts, and prevalence of relapse is needed. Global adult tobacco survey (GATS) has been implemented once in 2009, thus implementing it again could provide more recent data about tobacco use cessation among Egyptian and its correlates which can direct the health policies.

It is important to understand barriers or enablers for HCPs to incorporate a routine innovation or interventions into their practice. It is reported in chapter 4 that the barriers for HCPs to deliver counselling service about prevention of SHS exposure are mainly lack of time and training, unavailability of materials and absence of reimbursement, however, these may not be the only barriers. Normalisation Process Theory (NPT) provides a framework to understand how interventions

are implemented and incorporated in healthcare setting.³⁰⁰ Several factors could influence HCPs efforts to engage with or implement an intervention. These relate to the degree to which HCPs view the intervention as valuable, the fit of the intervention with current practice or routines, and the degree to which organisational structures and stakeholders facilitate and support staff participation.^{301,302} NPT has four constructs as described by Finch et al.;³⁰³ coherence, cognitive participation, collective action, and reflexive monitoring. These constructs explore the process that individuals and organisations undertake to promote or inhibit the routine embedding of a new practice. To examine the process they followed to engage, enact, and appraise that new practice. Moreover, to assess the work inherent to enable assessment of advantages, disadvantages and effects of the new practice.

The use of NPT in health research is growing. Originally, it was used to evaluate tele-health interventions, however, it is used now in a wide range of health-related interventions.³⁰⁴ NPT could be used in the pilot evaluation of interventions or as a framework for developing interventions. By emphasising the interactions between contexts (e.g. organisational structures and stakeholders), actors (e.g. HCPs), and objects (e.g. introducing SFH advice in primary health care setting), it facilitates examination and understanding of the translational gap between evidence, policy, and practice.³⁰⁰ Future research could use NPT for in-depth understanding of barriers and enablers for HCPs to

incorporate a routine innovation or interventions (e.g. prevention of SHS counselling service or SFHs advice) into their practice.

6.5.2 Recommendations for policy

In Egypt many tobacco control policies are not comprehensively implemented or enforced, especially banning smoking in public places. Moreover, the policies do not include any recommendations for preventing smoking in homes or personal vehicles in which children are usually present.¹⁶⁵ This is particularly pertinent given the findings of chapter 3 and 5 that pregnant women/children were exposed to SHS in homes, private and public spaces. As mentioned in chapter 2, the legislation says that “*smoking is prohibited in the following specified public places: health and educational facilities, governmental venues, sporting and social clubs, youth centres, and public transport. Smoking is permitted in specially designated areas in industrial establishments and tourism related establishments. The Manager of any of those buildings shall implement all necessary measures to prevent smoking, the law outlines, warning that they would be fined between 1,000 and 20,000 Egyptian pounds (\$40-\$811) for violating the rules. Smokers who violate the ruling may be fined between 50-100 Egyptian pounds (\$2-\$4).*”¹⁵⁸

A finding in all chapters is that SHS exposure is prevalent in Egypt. It is essential to implement regular, specific monitoring of SHS exposure among pregnant women and children in Egypt. Presence of a population estimate for pregnant women/children SHS exposure

especially at home would help to assess the associated morbidity and mortality. This would further direct the policy decisions to prioritize the public health resources to tackle this issue. Frequent and regular national monitoring of both adult and adolescent tobacco use is also recommended to understand the magnitude of the tobacco problem as well as the characteristics of tobacco users. Data are crucial in informing further interventions (e.g. school based or community based), tailoring treatment provision and tobacco control policy.

More support from the government to smoking cessation services in Primary Health Care centres to support parents to quit smoking is needed. The fines for invasion of smoke free policy should be efficiently implemented. Adequate resources should be allocated for implementing and supporting these policies.

For HCPs in PHCs, standardized guidelines should be available to help them to guide parents regarding SHS exposure during pregnancy and childhood as a persistent finding across this thesis is that SHS exposure is not commonly discussed with parents. As recommended from a previous systematic review, HCPs should, as a minimum, deliver enough information to pregnant women about the dangers of SHS exposure from all types of smoked tobacco besides, providing her with strategies about how to reduce SHS exposure at home and encourage their household smokers to quit smoking.⁹⁹

Thus, it should be clearly stated in their guidelines that it is their job to ask pregnant women/mothers of children about their SHS exposure

and improve their awareness regarding the dangers and encourage them to prevent SHS exposure. The evidence suggests that only complete smoking bans are effective,²⁷⁸ and men who smoke (usually husbands) are the source of SHS exposure for pregnant women and children in Egypt. The most reliable way to reduce exposure of pregnant women and children to SHS at home in Egypt is to encourage men who smoke in the household (mainly the husband) to quit or temporarily quit whilst in the home. HCPs should be more supportive for smoking cessation services in PHC system. Where household smokers are unwilling or unable to quit, families should be offered support to make their homes completely smoke-free.

Making Every Contact Count (MECC) is an evidence-based approach to improving people's health and wellbeing by helping them change their behaviour, which is implemented by National Health Service (NHS) in UK. Health care professionals applied this approach to pregnant women where they ask them about their smoking status or SHS exposure at each and every appointment.³⁰⁵ Such approach could be implemented in Egypt as health professionals can ask men about their smoking behaviour at every appointment and encourage them quit and they can ask pregnant women about their SHS exposure and smoking behaviours at home and encourage them and their husbands to adopt smoke free home.

6.5.3 Recommendations for practice for designing an intervention.

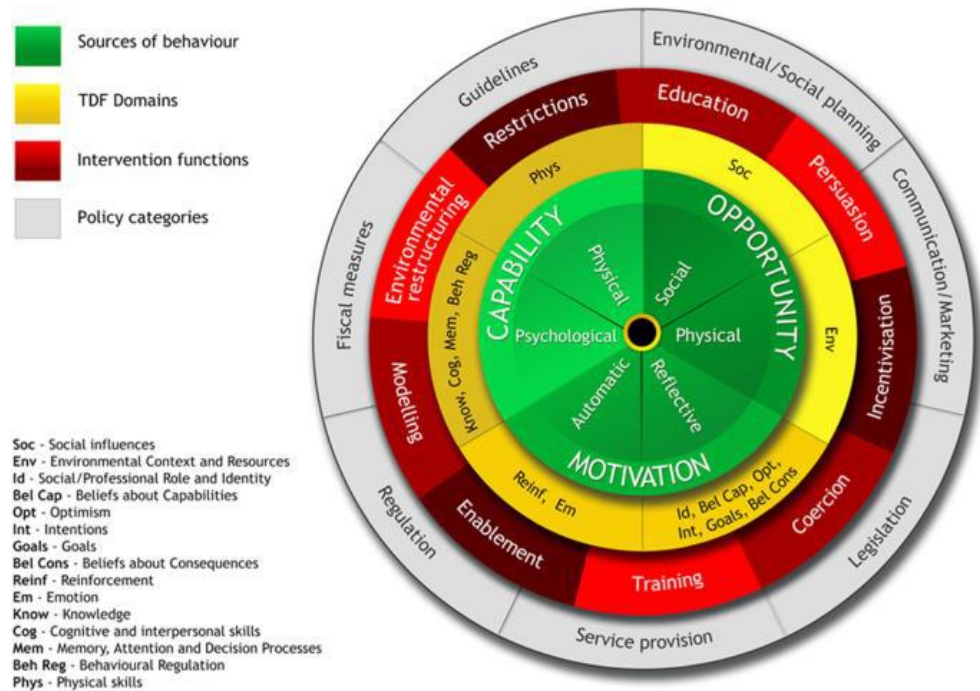
Whilst outside the scope of this thesis, the next step would be to design an intervention to reduce SHS exposure among pregnant women and children in Egypt. Interventions that promote smoking cessation among Egyptian fathers/husbands (the usual smoker at home) would be the most effective way to prevent SHS exposure among non-smoking pregnant women and children. For fathers/husbands who are unable or unwilling to quit smoking, making the home completely smoke-free is the next most effective way to protect their pregnant wives/children from SHS exposure.^{278,306,307}

As mentioned in chapter 1, previous evidence reported positive effectiveness of health education interventions for promotion of smoke free home and decrease SHS exposure at home among non-smoking pregnant women and children.^{99,100,196} Additionally, a recent evidence reported that behavioural change interventions succeeded to increased knowledge about the harms of SHS among pregnant women, increased husbands smoking quit rate, and increased positive attitude and practice to reduce SHS at home.¹⁰¹

The Behaviour Change Wheel (BCW) is a comprehensive guide to designing interventions, informed by behaviour change theory frameworks.³⁰⁸ It recognises that behaviour change occurs as a result of an interacting system with intervention and policy. At the centre of the BCW is the COM-B model, describing Capability, Opportunity, and

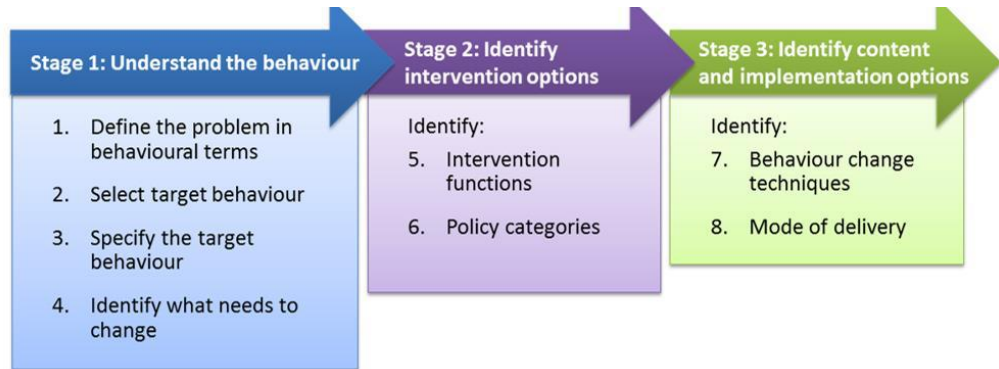
Motivation sources of Behaviour (see green circle in figure 9). The Theoretical Domains Framework (TDF) has since been added to the BCW to allow deeper exploration of the barriers to and facilitators of behaviour change and greater understanding of behaviour to ensure the processes for change are targeted effectively.^{308,309}

Figure 9 Behavioural change wheel, source: Michie, Atkins, et al. ³⁰⁸



According to BCW, there are three main stages to develop an intervention (Figure 10). First, to understand the behaviour (defining the behavioural problem, selecting targeted behaviour, specifying targeted behaviour, and identifying what needs to be changed). Second, to identify intervention options (identifying intervention functions and policy categories). Third, to identify content and implementation options (identifying behaviour change techniques and mode of delivery).³⁰⁸ Using the principles of this approach, the findings of this thesis have been used to suggest potential content for future intervention to prevent SHS exposure among Egyptian pregnant women and children at home through adopting SFHs, which are presented in Table 22.

Figure 10 Stages involved in the development of an intervention using the behavioural change wheel, source: Michie, Atkins, et al. ³⁰⁸



Whilst the demographic characteristics associated with pregnant women or children SHS exposure in the home are not easily modifiable,³¹⁰ they can be used to inform who (husbands/fathers or family members) should be targeted in future interventions which designed to help families adopt and maintain SFHs. The findings from this thesis highlight two groups that could be targeted in future interventions.

Firstly, as reported in chapter 5, male family members (usually husbands) are usually the sole smokers at home. As mentioned by their wives, they had some knowledge about health hazards of SHS exposure; however, they try to ignore that. They were also reluctant in preventing smoking at home. Some of fathers/husbands tried to quit or decreased the number of cigarettes they smoke while their wives were pregnant. Therefore, pregnancy could be perfect timing for delivery of an intervention to adopt SFHs. As evidenced before, a systematic review reported that perception that smoking was incompatible with being a 'good father'; a desire to be a role model encouraged fathers to

put their children's needs first and be motivated to quit smoking while their wives were pregnant.³¹¹

As reported in chapter 5; husbands/fathers who were committed by smoking restriction at home during pregnancy returned to smoke anywhere at home after childbirth, which comes in line with previous evidence reported relaxed smoking restrictions at home after birth and over time.³¹² Thus, this point should be taken in account while designing the intervention.

The second target group for future interventions are husbands/fathers who accepted to implement some protective restrictions of smoking at home even not during the pregnancy of their wives. As mentioned in Chapter 5, some women tried to apply some restrictions for smoking at home and their husbands who smoke agreed and tried to follow these restrictions and restrictions – specifically, one participant reported that their children successfully convinced their father to stop smoking in the home. This group can be targeted by the SFHs intervention, however, to be most effective the intervention should be directed to both husbands and their wives as mentioned in chapter 5. Smokers who have household smoking restrictions are more likely to intend to quit smoking.³¹³ A systematic review evidenced that smokers who had or who newly implemented a SFH were more likely to make a quit attempt and to be quitters.³¹⁴ A SFH intervention implemented in Pakistan which was delivered to primary school children, community leaders and health professionals in a semi-rural community succeeded to increase

the proportion of adopted SFHs and to decrease in self-reported male adult smoking.¹⁰⁵ Given that as reported in chapter 5 that some children succeeded to convince their fathers to stop smoking at home, so delivery of the SFHs message to school children might be effective and children can help in changing parents habits.

Interventions promoting the SFHs, using the behaviour change principles outlined in Table 22, may be more acceptable than quitting smoking by Egyptian husbands/fathers of children. It is essential during intervention development to collect information about the capability, opportunity and motivation to change the targeted behaviour (smoking at home) among target population (husbands/fathers) using wide range of data sources including but not limited to interviews, FGDs, questionnaires, and expert opinion.³⁰⁸ After designing a comprehensive SFH intervention, the next step is to assess the acceptability of the behaviour change techniques outlined in Table 23 through a both qualitative and quantitative approaches.

Best method for delivery of such intervention could be the focus of future research with comparing cost, feasibility, and effectiveness of different types (mass media campaigns or community campaigns or interventions delivered at homes). The finding of such research could help to inform a pilot study to test the feasibility and effectiveness of the SFHs intervention.

Table 22 Implementation of behavioural change wheel to suggest potential SFHs intervention adapted from Michie, Atkins, et al. ³⁰⁸

Behaviour change stage	Design process stage	Evidence from thesis
Understanding the behaviour		
	Defining the problem in Behavioural terms	Smoking in the home where pregnant women and children live.
	Selecting the target behaviour	Husbands/fathers smoking in the home
	Specifying the target behaviour	<p>Making the home smoke-free</p> <p>Maintaining smoke-free home over the long-term:</p> <p><i>What:</i> Support to help husbands/fathers quit smoking, or for those who are unable or unwilling to quit smoking to make the home smoke-free</p> <p><i>Delivered by who:</i> Health care professionals/trained behaviour change specialists</p> <p><i>Delivered where:</i> In homes/ PHC clinics/ husbands or fathers workplace/schools</p> <p><i>Delivered when:</i> during pregnancy of their wives</p>

Behaviour change stage	Design process stage	Evidence from thesis
	<p>Identifying what needs to change</p>	<p>Capability, Opportunity, and Motivation sources of Behaviour (COM-B model) components ³¹⁵ and TDF domains</p> <ul style="list-style-type: none"> • Psychological capability: knowledge, understanding the dangers of SHS exposure to pregnant women/children. Identify and develop strategies to break existing smoking at home habit among Egyptian men. • Physical capability: having the physical strength to quit smoking or at least smoke outside the home as some men tried to quit or decreased the number of cigarettes they smoke while their wives were pregnant. Others agreed and tried to follow smoking restrictions at home. • Physical opportunity: having an outside space in which husbands/fathers can smoke (e.g. Café) and fathers/husbands used to socialize and smoke with friends in Café • Social opportunity: husbands/fathers have the power to influence their smoking behaviour at home. • Reflective motivation: believing pregnant women should be protected from SHS exposure as husbands tried to smoke away from their pregnant wives • Automatic motivation: manage cravings to smoke with opportunity to smoke outside of their homes or away from children
Identify intervention options		
	<p>Intervention functions</p>	<ul style="list-style-type: none"> • Education: increasing knowledge likely to lead to attitude change, e.g. increasing knowledge about the health hazards of pregnant women/children SHS exposure; increasing knowledge about the effectiveness and advantages of home smoking restrictions • Modelling: provide an example for people to aspire to, for example, other households within community or within other city in Egypt (with similar

Behaviour change stage	Design process stage	Evidence from thesis
		<p>socioeconomic status) that have effectively implemented smoke-free home restrictions</p> <ul style="list-style-type: none"> • Enablement: <ul style="list-style-type: none"> ➤ <i>Reducing barriers to increase capability:</i> support to manage smoking cravings (may be by offering nicotine replacement patches), support to manage work or life stresses, increasing acceptance to restrict the smoking of themselves and others in home, increasing the will to reject the social norms and peers effect for acceptance of smoking and SHS exposure at home. ➤ <i>Opportunity:</i> provide comprehensive support from smoking cessation services in primary health care centres to help husbands/fathers who want to quit
	Policy categories	<ul style="list-style-type: none"> • Communication/marketing: using anti-tobacco information TV or social media campaigns. Promoting SFH in TV and all forms of media. • Legislation: enforcing smoke free policies may result in husbands/fathers be more willing to adopt SFH • Service provision: using telephone smoking counselling service support and initiate a new service for health visitors working in Egyptian ministry of Health to deliver smoke-free home advice
Identify content and implementation options		
	Behaviour change techniques and recommended possible implementation options	<p>Education:</p> <p>Credible source for information about health consequences of SHS exposure among pregnant women and children and the importance of maintaining smoke free homes throughout pregnancy and childhood by presenting verbal, visual or written information.</p>

Behaviour change stage	Design process stage	Evidence from thesis
		<p>As mentioned in chapter 4 that in availability of materials was one of the barriers of HCPs to deliver health message about SHS exposure.</p> <p>Modelling:</p> <p>Demonstrating others within community or different city in Egypt (or any Middle Eastern country) or social networks (with similar socioeconomic status) who have effectively implemented smoke-free home restriction</p> <p>Enablement:</p> <ul style="list-style-type: none"> • <u>Social support</u> De-normalization of SHS exposure in Egypt is essential to increase yearning to protect pregnant women/children from SHS exposure in the home. Increase social support to SFHs by anti-tobacco and anti SHS exposure mass media messages or providing information about the advantages adopting SFHs on the health of pregnant women and children. • <u>Facilitate problem solving</u> e.g. identifying barriers to making the home smoke-free for the husbands/fathers point of view • <u>Facilitate action planning</u> e.g. solutions to potential barriers to making the home smoke-free or use of NRT to control cravings to smoke. The main barriers mentioned by pregnant women were masculinity, gender norms, social acceptance of smoking and SHS, and HCPs not supportive for smoking cessation. Thus, the government should spend more resources to allow the Ministry of Health to support smoking cessation and prevention of SHS exposure. • <u>Feedback on outcomes of behaviour</u>, e.g. previous evidence of effectiveness of home smoking restrictions that have been implemented using validated measures, for example, providing home air nicotine monitor feedback. Thus, such measure may be effective among Egyptian community.

Behaviour change stage	Design process stage	Evidence from thesis
		<ul style="list-style-type: none"> • <u>Behavioural practice and habit reversal</u> e.g. encourage husbands/fathers to stop smoking at home and enhance social support for SFHs. • <u>Promote self-identity associated with changed behaviour</u>, e.g. responsible husband/father who protects their pregnant wives/children from SHS exposure in the home <p>Communication/marketing:</p> <ul style="list-style-type: none"> • Goal setting for participants to achieve SFHs. • Verbal persuasion about capability: pregnant wives/children can persuade their husbands to smoke outside the home. Wives can remind their husbands daily to achieve the goal of SFH adoption. • Self-reward: Encourage participants to reward themselves in the future if they have been able to achieve to their goals (make the home smoke free). Also inform participants that they will be recognised and verbally congratulate them for achieving their SFH goal
	Mode of delivery	<ul style="list-style-type: none"> • Population level: broadcast media (television, radio, social media) or PHC clinic interventions • Individual level: in-home intervention or husbands/fathers work space or school intervention

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8 Appendices

Experiences and views of women, children, and professionals regarding second-hand smoke exposure prevention in Middle Eastern countries: a qualitative systematic review protocol

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ABSTRACT

Objective: This systematic review aims to identify and explore the experiences and views of women, children, and professionals regarding second-hand smoke exposure prevention in the home, workplace, school, personal vehicles, and public places in Middle Eastern countries.

Introduction: Exposure to second-hand smoke is a significant public health problem globally, but particularly in Middle Eastern countries. Whilst many Middle Eastern countries have implemented tobacco-control programs and have legislation that bans smoking in public places, the legislation is not always comprehensively implemented or enforced. Therefore, women and children continue to be exposed to second-hand smoke in public and private settings.

Inclusion criteria: This review will consider studies that include the views and experiences of any of the following three groups: (i) women (including pregnant women and mothers), (ii) children (primary and secondary school age), and (iii) professionals (including health professionals and policy makers), regarding the prevention of second-hand smoke exposure in women and children in Middle Eastern countries.

Methods: MEDLINE, Embase, CINAHL, PsycINFO, Web of Science, and Scopus, and sources of grey literature will be searched for eligible studies. Databases will be searched from their inception dates and no language restrictions will be applied. Two reviewers will independently screen studies and assess methodological quality and extract data from the included studies following JBI systematic review guidelines. The JBI process of meta-aggregation will be used to identify categories and synthesize findings. The ConQual approach will be used to assess confidence in the findings.

Systematic review registration number: PROSPERO (CRD42019137006)

Keywords: children; middle east; pregnancy; second-hand smoke; women

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Introduction

Second-hand smoke (SHS) exposure, also known as environmental tobacco smoke exposure and passive smoking, is the involuntary inhalation of

other people's tobacco smoke by non-smokers.¹ Second-hand smoke consists of mainstream smoke (exhaled by a smoker) and side-stream smoke (emitted from the burning end of a cigarette or Shisha tobacco holder between inhalations). Second-hand smoke contains over 4000 chemicals, with more than 70 known to be carcinogenic.²

The latest report of the US Surgeon General, published in 2014,³ stated there was sufficient evidence to support causal relationships between SHS and increased risks of stroke, coronary heart

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diseases, and lung cancer among non-smoking adults. The report also stated there was sufficient evidence to support causal relationships between SHS and increased risks of sudden infant death syndrome (SIDS), low infant birth weight, lower respiratory tract infection, asthma and wheezing, and middle ear infections among children.³ Furthermore, in 2010, the Royal College of Physicians reported that SHS exposure increases the risks of invasive meningococcal disease, poor mental health outcomes, and smoking uptake in children.¹

In women of reproductive age (15 to 49 years) in Middle Eastern countries, the prevalence of active smoking is low (for example, 0.4% in Egypt and 18% in Turkey) in comparison to exposure to SHS (65% in Egypt and 61% in Turkey),⁴ and active smoking in men (37.6% in Egypt and 47.9% in Turkey).⁵ There is evidence of high SHS exposure among women and children both inside and outside the home. For example, a population-based study using data from the Demographic and Health Survey from Middle Eastern countries in 2019 reported that around 50% of pregnant non-smoking women were exposed daily to SHS.⁶ Furthermore, another survey reported high levels of SHS exposure among children outside the home in Middle Eastern countries (63% Egypt, 67% Syria, and 55% Turkey).⁷

There is no safe level of exposure to SHS,³ therefore the promotion of smoking cessation and the prevention of smoking uptake among men, women, and children are crucial to assist in reducing exposure of women and children to SHS.⁴ Whilst many Middle Eastern countries have implemented tobacco control programs and have legislation that bans smoking in public places, the legislation is often not comprehensively implemented or enforced, and does not include banning smoking in personal vehicles in which children are present.^{8,9} Thus, the prevalence of SHS exposure among women and children both inside and outside the home remains high; for instance, in Egypt SHS exposure in public places is above 70% among adults and 63% among children despite the banning of smoking in public places. Moreover 71% of Egyptian adults and 35% of Egyptian children are exposed to SHS in the home.¹⁰

Homes are major source of SHS exposure among non-smoking women and children.¹¹ Supporting smoke-free homes (SFHs) is an effective strategy to protect children and adults from exposure to

SHS. A SFH can improve the air quality of the home environment, and can increase quit attempts in parents who smoke.¹¹

Two previous qualitative systematic reviews have investigated the barriers and motivators to establishing SFHs in developed countries.^{12,13} The authors reported the following as barriers to adopting SFHs: (i) presence of many family member smokers living in the same home, especially if they perceived benefits of smoking; (ii) lack of confidence among women to ask family members or guests not to smoke in the home; (iii) feelings of powerless in women to modify their environment; (iv) social norms and gender imbalances contributing to a lack of personal agency of women; (v) cultural considerations when socializing and sharing cigarettes; and (vi) fear among women of damaging a relationship with family members and guests as a result of adopting a SFH, especially where there were socioeconomic issues, such as unemployment and overcrowding.^{12,13} The authors also identified the following themes as motivators of adopting SFHs: (i) success stories and role modeling of elders who had quit smoking; (ii) presence of a newborn baby or an elder in the home; (iii) wider community norms of SFHs as individuals influence each other to adopt SFHs and avoid stigma; (iv) sense of guilt; and (v) perceived benefits of having SFHs. Individuals who were aware of the dangers of SHS exposure were motivated to adopt SFHs.^{12,13}

The above findings cannot be directly translated to developing countries due to cultural and socio-economic differences between developed and developing countries. The perceived barriers and facilitators for preventing SHS exposure among women and children in the home or public places may be different in Middle Eastern countries compared with developed countries.^{14,15} Middle Eastern countries generally have conservative cultures,¹⁵ specific social norms, and male-dominated societies; moreover, SHS exposure among non-smoking women and children in these countries is high.^{4,6,7} Several qualitative studies and cross-sectional surveys have been conducted in Middle Eastern countries regarding SHS exposure among women and children,¹⁴⁻¹⁹ however, to date this evidence has not been synthesized. For instance, two studies from Turkey and Jordan identified social and cultural norms and traditions as barriers to preventing SHS exposure among children at home¹⁴ and for

non-smoking women in the workplace.¹⁵ A study from Iran found the barriers to pregnant women protecting themselves from SHS were that they did not understand the risks of SHS on the fetus and were not aware of how to protect themselves against SHS.¹⁶

There is conflicting evidence regarding the level of awareness of the hazards of SHS exposure in Middle Eastern countries: although there have been studies that reported that women were aware of the danger of SHS in Saudi Arabia, Iran, and Jordan.^{15,17,19} Studies carried out in Iran, Kuwait, and Egypt suggested that lack of knowledge was one of the barriers to preventing SHS exposure among women and children.^{16,20,21} Interestingly, even in studies reporting a good level of knowledge about the health hazards of SHS, women's behavior related to avoidance of SHS exposure was minimal,¹⁵ with no restrictions on indoor home smoking of residents and guests in spite of the presence of children.^{18,19}

A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Review and *JBI Evidence Synthesis* was conducted and no current or in-progress systematic reviews on the topic were identified. Therefore, the objective of this review is to identify and explore the experiences and views of women, children, and professionals regarding prevention of SHS exposure among women and children in the home, workplace, personal vehicles, and public places in Middle Eastern countries.

Review question

What are the experiences and views of women, children, and professionals on SHS exposure in the home, workplace, school, personal vehicles, and public places in Middle Eastern countries?

Inclusion criteria

Participants

This review will consider studies that include the views and experiences of any of the following three groups: (i) women (any women, including pregnant women and mothers); (ii) children (primary and secondary school-aged children); and (iii) professionals (including health professionals and policy makers).

Phenomena of interest

The review will consider studies that explore experiences and views, including attitudes and

understandings, of prevention of SHS exposure among women and children in relation to SHS exposure in homes, workplaces, schools, personal vehicles, and public places.

Context

This review will consider studies conducted in any settings in any of the 17 Middle Eastern countries: Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen.²²

Types of studies

This review will consider studies that focus on qualitative data, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative descriptive, and feminist research. Mixed-methods papers will be included only where the qualitative results are reported separately. If there is a paucity of rich qualitative data, the review may be supplemented with free text from cross-sectional surveys, however, quantitative findings from these studies will not be included. Studies published in any language will be included; for publications that are in languages other than English or Arabic, the author group will seek translation from a professional translator. Studies published from database inception dates to the present will be included.

Methods

The proposed systematic review will be conducted in accordance with JBI methodology for systematic reviews of qualitative evidence.^{2,3} The review protocol is registered with PROSPERO (registration number CRD42019137006).

Search strategy

The search strategy will aim to locate both published and unpublished studies. An initial limited search of MEDLINE and Embase was undertaken to identify articles on the topic using the initial keywords: "secondhand smoke," "women," "children," and "Middle East." The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for MEDLINE (see Appendix I). The search strategy, including all identified keywords and index terms, will be adapted for each

included information source. The reference list of all studies selected for inclusion will be screened for additional studies.

Information sources

The databases to be searched include MEDLINE (Ovid), Embase (Ovid), CINAHL (Ovid), PsycINFO, Web of Science, and Scopus. These academic databases are considered sufficiently comprehensive to cover the range of topics and disciplines in this review. Sources of unpublished studies and gray literature to be searched include EthOS, OpenGrey, ProQuest Dissertations and Theses, relevant websites, and published conference proceedings.

Study selection

Following the search, all identified citations will be collated and uploaded into Endnote X8.2 (Clarivate Analytics, PA, USA) and duplicates removed. Titles and abstracts will then be screened by two independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant studies will be retrieved in full and their citation details imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia). The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full text studies that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements that arise between the two reviewers at each stage of the study selection process will be resolved through discussion or with a third reviewer. The results of the search will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram.²⁴

Assessment of methodological quality

Eligible studies will be critically appraised for methodological quality by two independent reviewers using the standard JBI Critical Appraisal Checklist for Qualitative Research.²⁵ Authors of papers will be contacted to request missing or additional data for clarification, where required. Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. The results of critical appraisal will be reported in narrative form and in a table. All studies, regardless of

their methodological quality, will undergo data extraction and synthesis (where possible).

Data extraction

Data will be extracted from studies included in the review by two independent reviewers using the standardized JBI data extraction tool.²³ The data extracted will include specific details about the population, context, culture, geographical location, study methods, and the phenomena of interest relevant to the review objective. Findings, and their illustrations, will be extracted and assigned a level of credibility. Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. Authors of papers will be contacted to request missing or additional data, where required.

Data synthesis

Qualitative research findings will, where possible, be pooled using JBI SUMARI with the meta-aggregation approach.²⁶ This will involve the aggregation or synthesis of findings to generate a set of statements that represent that aggregation, through assembling the findings, and categorizing these findings on the basis of similarity in meaning. These categories will then be subjected to a synthesis in order to produce a single comprehensive set of synthesized findings that can be used as a basis for evidence-based practice. Where textual pooling is not possible, the findings will be presented in narrative form. The authors will synthesize all the findings together, irrespective of which group the views and experiences are derived from (women, children, or professionals), but will report any group-specific differences.

Assessing confidence in the findings

The final synthesized findings will be graded according to the ConQual approach for establishing confidence in the output of qualitative research synthesis and presented in a Summary of Findings.²⁷ The Summary of Findings will include the major elements of the review and detail how the ConQual score was developed. Included in the Summary of Findings will be the title, population, phenomena of interest, and context for the specific review. Each synthesized finding from the review will then be presented along with the type of research informing it, score for dependability and credibility, and the overall ConQual score.

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Appendix 1: Search strategy

Medline (Ovid)

Search conducted July 2019

Search statement	Search terms	Results retrieved
1.	exp Tobacco Smoke Pollution/	13,108
2.	exp Smoking/	145,045
3.	("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok*").mp.	16,072
4.	(passive or involuntary or secondhand or "second hand").mp	164,071
5.	2 and 4	3998
6.	1 or 3 or 5	16,530
7.	exp pregnancy/	883,435
8.	exp Pregnant Women/	8000
9.	(pregnan* adj2 (women or woman).mp	113,063
10.	("woman" or "women" or "female" or "girl" or "mother" or "widow").mp.	8,879,192
11.	(child* or infant* or juvenil* or kid? or kids or minors or minors*).	3,189,909
12.	exp Women/	35,935
13.	exp child/	1,883,255
14.	10 or 11 or 12 or 13	10,308,005
15.	7 or 8 or 9 or 14	10,311,968
16.	exp Middle East/	130,865
17.	exp Iran/ or exp Turkey/ or exp Bahrain/ or exp Cyprus/ or exp Egypt/ or exp Iraq/ or exp Jordan/ or exp Kuwait/ or exp Lebanon/ or exp Oman/ or exp Israel/ or exp Qatar/ or exp Palestine/ or exp Saudi Arabia/ or exp Syria/ or exp United Arab Emirates/ or exp Yemen/	137,386
18.	(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*).mp.	220,214
19.	16 or 17 or 18	11,059
20.	6 and 15 and 19	223,750
21.	exp qualitative research/	345
22.	(interview* or interviews or experience* or qualitative or interview: or experience: or survey* or questionnaire* or "cross sectional stud*").mp.	2,582,907
23.	21 or 22	2,582,950
24.	20 and 23	258

Experiences and views of parents on the prevention of second-hand smoke exposure in Middle Eastern countries: a qualitative systematic review

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ABSTRACT

Objective: The objective of this review was to identify, appraise, and synthesize the evidence related to experiences and views of parents, children, and professionals on the prevention of second-hand smoke exposure to women and children in Middle Eastern countries.

Introduction: Second-hand smoke exposure is a major health concern. It is problematic during pregnancy because of potential adverse reproductive effects and poor fetal outcomes. Childhood second-hand smoke exposure is linked to increased morbidity and mortality. Smoking prevalence is high among men in Middle Eastern countries and, as a result, large numbers of non-smoking men, women, and children are exposed to second-hand smoke daily.

Inclusion criteria: Studies were considered for inclusion if they explored experiences and views on the prevention of second-hand smoke exposure among women and children in homes, workplaces, schools, personal vehicles, and public places in 17 Middle Eastern countries. This review included studies that focused on qualitative data, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative descriptive, and feminist research.

Methods: MEDLINE, Embase, CINAHL, PsycINFO, Web of Science, and Scopus databases were searched to identify published studies from inception to January 2021. The search for unpublished studies included ETHOS, OpenGrey, and ProQuest Dissertations and Theses. No language restrictions were applied. The JBI guidelines for qualitative systematic reviews were followed in conducting the review. The JBI process of meta-aggregation was used to identify categories and synthesize findings.

Results: Of 5229 records identified, two qualitative studies (in three publications) met the eligibility criteria and were included in the review. One study was conducted in Turkey and the other study (reported in two papers) was conducted in Israel. The methodological quality of the studies was high. The participants in the included studies were parents (n = 118 participants) aged between 18 and 42 years. The methods used for data collection were interviews analyzed using thematic content analysis. A total of 50 findings were extracted and aggregated into eight categories, based on the similarity of meaning. Three synthesized findings were generated (all with moderate confidence): i) Parents were aware of second-hand smoke and that exposure to second-hand smoke is harmful, although the health dangers of second-hand smoke exposure were not commonly discussed with parents during pregnancy; ii) Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing second-hand smoke exposure in the home and personal psychological factors to quitting smoking; iii) Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease second-hand smoke exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.

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Conclusions: The findings of this study offer an insight into parents' views on second-hand smoke exposure and its prevention in Middle Eastern countries. Parents have conflicting views on second-hand smoke exposure and techniques to minimize it. Interventions are needed to increase parents' knowledge about the harms of second-hand smoke to reduce women's and children's exposure to second-hand smoke.

Systematic review registration number: PROSPERO CRD42019137006

Keywords: children; Middle East; parents; second-hand smoke; women

JBI Evid Synth 2022; 20(8):1969–2000.

Summary of Findings

Experiences and views of parents, children, and professionals on second-hand smoke exposure prevention in Middle Eastern countries					
Bibliography: Hassanein ZM, Nabest G, Langley T, Murray R, Bogdanovska I, Leonardi-Bee J. Experiences and views of parents on the prevention of second-hand smoke exposure in Middle Eastern countries: a qualitative systematic review. <i>JBI Evid Synth</i> . 2022;20(8):1969–2000.					
Synthesized finding	Type of research	Dependability	Credibility	ConQual score	Comment
Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	Dependability: All studies scored 5/5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded one level due to a mix of unequivocal and credible findings: U= 8, C= 7
Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	Dependability: All studies scored 5/5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded one level due to a mix of unequivocal and credible findings: U= 5, C= 5
Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.	Qualitative	High (Unchanged)	Moderate (Downgraded one level)	Moderate	Dependability: All studies scored 5/5 for the questions relating to appropriateness of the conduct of the research Credibility: Downgraded one level due to a mix of unequivocal and credible findings: U= 23, C= 2

U, unequivocal; C, credible; SHS, second-hand smoke

Introduction

Second-hand smoke (SHS) exposure, which is defined as the involuntary inhalation of tobacco smoke, is a major public health concern. SHS contains many carcinogenic chemicals and causes health morbidities and mortalities.^{1,2} For adults, SHS exposure increases the risk of stroke, coronary heart disease, and lung cancer.³ SHS exposure leads to adverse reproductive effects and poor fetal

outcomes. Among children, SHS exposure causes an increase in the risk of sudden infant death syndrome, low infant birth weight, acute respiratory tract infection, asthma and wheezing, middle ear infection, invasive meningococcal disease, poor mental health outcomes, and smoking uptake.^{1,3}

One study estimating worldwide mortality due to SHS found that in the Middle East and North Africa,

42.6 individuals who smoked for 24 years were associated with the death of one individual who did not smoke.⁴ According to the Global Burden of Disease database, SHS exposure was responsible for 96,000 deaths and 3 million disability-adjusted life years in the Middle East and North Africa in 2020.⁵ Smoking prevalence in Middle Eastern countries is higher among men compared to women.⁶⁻⁸ Women aged 15 to 49 years and children younger than 11 years in Middle Eastern countries experience high SHS exposure both inside and outside the home.⁹ In 2019, about 50% of pregnant non-smoking women and more than 55% of children in Middle Eastern countries were exposed daily to SHS.^{9,10}

Enforcement of tobacco control policies is essential to prevent SHS exposure among non-smokers, especially pregnant women and children, as there is no safe level of exposure.^{3,11} In many Middle Eastern countries, the legislation banning smoking in public places, including public transportation, health care facilities, and vehicles (where children often present), is not enforced.^{12,13}

Qualitative evidence from developed countries (the UK, Australia, the USA, Canada, and China) reported barriers of prevention of SHS exposure at home. The authors mentioned the presence of household smokers; lack of confidence to ask smokers not to smoke in the home; lack of power to modify the environment; fear of damaging relationships; social norms and gender imbalances; and cultural socializing and sharing cigarettes as the most common barriers.^{14,15} The level of awareness of the health hazards of SHS exposure affected families' decision to prevent SHS exposure at home, as families who were more knowledgeable about the hazards of SHS were more willing to prevent SHS exposure in their homes.^{14,15}

Parental perception of SHS exposure and their knowledge about the health hazards of SHS exposure could help in the prevention of SHS exposure among their children.¹⁶ If parents do not understand that their children are exposed to SHS when they smoke next to them, they will continue to smoke in the presence of children. In a Middle Eastern study, authors reported that parents who smoked regularly believed that children's SHS exposure was less dangerous than parents who did not smoke regularly,¹⁷ which reflects low parental risk perceptions of childhood exposure to SHS.

Middle Eastern communities generally have conservative cultures and male-dominated concepts,¹⁸

which is considered different to Western communities. Moreover, SHS exposure among non-smoking women and children in these countries is high.⁹⁻¹¹ Thus, the qualitative evidence from Western communities cannot be directly translated to Middle Eastern ones. The available qualitative evidence from Western countries explored SHS exposure among children solely in homes and did not include other places such as public settings or personal vehicles, and the evidence was not specific for women and children. In Middle Eastern countries, the barriers and facilitators for preventing SHS exposure among women and children in the home or public places may be different, which reinforces the need for this review to explore these experiences.^{18,19}

A preliminary search of PROSPERO, MEDLINE, *JBI Evidence Synthesis*, and the Cochrane Database of Systematic Reviews was conducted and no current or in-progress systematic reviews on the topic were identified. Therefore, the objective of this review was to identify, appraise, and synthesize evidence about the experiences and views of parents, children, and professionals regarding the prevention of SHS exposure among women and children in homes, workplaces, schools, personal vehicles, and public places in Middle Eastern countries.

Review question

What are the experiences and views of parents, children, and professionals on SHS exposure prevention among women and children in homes, workplaces, schools, personal vehicles, and public places in Middle Eastern countries?

Inclusion criteria

Participants

This review considered studies that included the views and experiences of i) parents (including pregnant women); ii) children (primary and secondary school-aged children); and iii) professionals (including, but not limited to, clinicians, nurses, midwives, and policymakers).

Phenomena of interest

The review included studies that explored experiences and views, including attitudes and understandings, of prevention of SHS exposure among women and children in homes, workplaces, schools, personal vehicles, and public places.

Context

This review considered studies conducted in any settings in any of the 17 Middle Eastern countries: Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen.

Types of studies

This review included studies that focused on qualitative data, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative descriptive, and feminist research. Papers that did not report primary qualitative data were excluded.

Methods

This systematic review was conducted in accordance with the JBI methodology for systematic reviews of qualitative evidence.²⁰ This review was conducted following an a priori protocol²¹; however, one deviation from the protocol was that the participants were expanded to include parents (fathers and mothers).

Search strategy

The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilized in this review.²⁰ First, an initial limited search of MEDLINE and Embase was undertaken followed by an analysis of the text words contained in the title and abstract and the index terms used to describe articles. The search results were evaluated to ensure that the relevant articles were identified. The search strategy, including all identified keywords and index terms, was adapted for each included information source, and a second search was undertaken in January 2021. The full search strategies are provided in Appendix I. Finally, the reference lists of all studies included in the review were screened for additional studies.

Studies published in all languages were included. Studies published from database inception to January 2021 were included. The databases searched included MEDLINE (Ovid), Embase (Ovid), CINAHL (EBSCO), PsycINFO (Ovid), Web of Science, and Scopus (Elsevier). Sources of unpublished studies and gray literature searched included ETHOS (British Library), OpenGrey, ProQuest Dissertations and Theses (ProQuest), and the Egyptian Knowledge Bank. These search strategies were developed through consultation with an information specialist/librarian at the University of Nottingham.

Study selection

Following the search, all identified citations were collated and uploaded into EndNote v.X8 (Clarivate Analytics, PA, USA), and duplicates were removed. Titles and abstracts were uploaded into Rayyan (Qatar Computing Research Institute, Doha, Qatar) software for systematic reviews to facilitate the title and abstract screening process.

Following a pilot test, titles and abstracts were screened by two independent reviewers (ZH and GN) for assessment against the inclusion criteria for the review. Potentially relevant studies were retrieved in full. Full-text studies that did not meet the inclusion criteria were excluded and reasons for their exclusion are provided in Appendix II. Any disagreements that arose between reviewers were resolved through discussion or with a third reviewer (JLB).

The results of the study selection process are presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram (Figure 1).²² For all papers excluded due to ineligible study design, authors were contacted for missing qualitative data; however, none of them reported that these studies collected qualitative data.

Assessment of methodological quality

Eligible studies were critically appraised for methodological quality by two independent reviewers (ZH, JLB) using the JBI critical appraisal checklist for qualitative research,²⁰ which consists of 10 questions, and each criterion was scored as either being met (Yes), not met (No), unclear (U), or not applicable (N/A). Data extraction and synthesis were conducted for all studies that met the inclusion criteria regardless of their methodological quality. Where multiple papers including the same population were identified, we assessed methodological quality for all papers. Any disagreements that arose between the reviewers were resolved through discussion or with a third reviewer (JLB).

Data extraction

Data were extracted from studies included in the review by two independent reviewers (ZH and JLB) using the standardized JBI data extraction tool for qualitative reviews.²⁰ The data extracted included specific details about the populations, context, geographical location, study methods, and phenomena of interest relevant to the review question. Findings, and their illustrations, were extracted from the

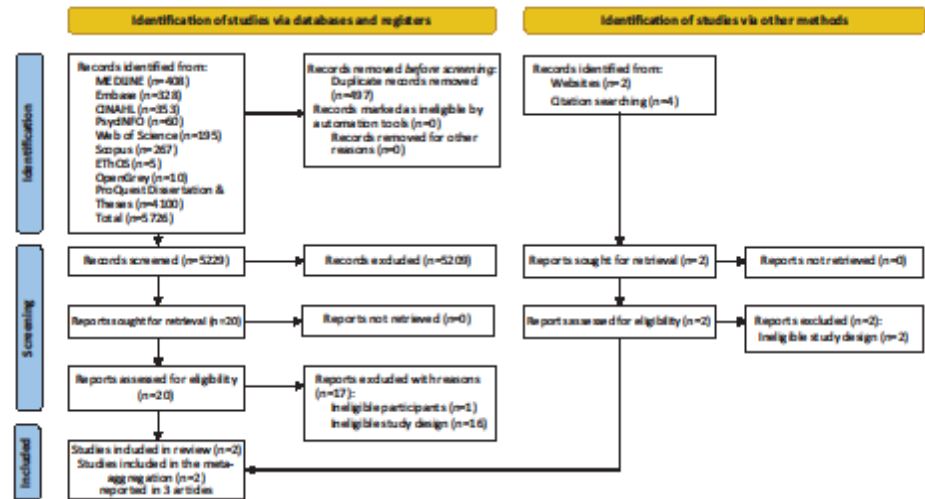


Figure 1: Search results and study selection and inclusion process²²

results of included studies by repeated reading of text where a theme or subtheme was considered a finding. Findings were assigned a level of credibility: unequivocal (U): findings with illustrations beyond reasonable doubt and, hence, not open to challenge; credible (C): findings with illustrations that lack clear association with data, so open to challenge; not supported (NS): findings not supported by illustrations.²³ Disagreements regarding the level of credibility of the findings arose between the reviewers (ZH, JLB) and were resolved through discussion with a third reviewer (GN).

Data synthesis

Qualitative research was, where possible, pooled using the JBI qualitative evidence synthesis approach, and presented in tabular form.²⁰ Data are considered as findings when reported as themes or subthemes by authors of included studies. Findings were identified by selection of themes and subthemes from the results section. The process involved the aggregation or synthesis of findings to generate a set of statements representing that aggregation, through assembling the findings and categorizing these findings based on similarity in meaning/wording.²³

These categories were then subjected to synthesis to produce a single comprehensive set of synthesized findings that could be used as a basis for evidence-based practice. Where textual pooling was not possible, the findings were presented in narrative form. Only unequivocal and credible findings were included in the synthesis. During data extraction, it was noted that authors did not differentiate between quotations from mothers and fathers when reporting their findings from parents. In response to this, we expanded the eligible participants of this review to include parents (ie, fathers and mothers) to give a comprehensive overview of experiences and views on SHS exposure prevention.

Assessing confidence in the findings

The final synthesized findings were graded according to the ConQual approach for establishing confidence in the output of qualitative research synthesis and presented in a Summary of Findings.²⁴ The Summary of Findings includes the major elements of the review and details how the ConQual score was developed. Included in the Summary of Findings are the title, population, phenomena of interest, and context for the specific review. Each synthesized

finding from the review is presented, along with the type of research informing it, scores for dependability and credibility, and the overall ConQual score. Appendix III provides the details of how the ConQual score was calculated for each synthesized finding and includes details on the dependability and credibility scoring and final ConQual score.

Results

Study inclusion

A total of 5726 titles were identified from the databases, unpublished sources, and gray literature searches. After removing duplicates, 5229 titles and abstracts were screened. Of these, 20 full-text papers were identified as potentially eligible for inclusion and assessed for eligibility. Seventeen papers were excluded (Appendix II), due to either ineligible population (n = 1) or ineligible study design (n = 16). Two papers used the same population^{25,26}; however, the results focused on different aspects of the phenomena of interest and, thus, both papers were included in the review. Thus two studies (comprising three papers) were included in the systematic review. Four additional papers were identified after checking the reference lists of the papers included in the review; however, all were excluded after the abstract screening. See Figure 1 for an overview of the study selection and inclusion process.²¹

Methodological quality

The methodological quality of the studies was high (Table 1), with one study having an overall score of 100% (reported in two papers)^{25,26} and one study

having an overall score of 90%.¹⁹ All studies demonstrated congruities between the methodology and research question/objectives, methods used to collect data, representation and analysis of data, and interpretation of research findings. Other areas of strength were the representation of participants and their voices, and having conclusions flowing from the analysis or interpretation of findings. One study did not report ethical approval.¹⁹

Characteristics of included studies

One study was conducted in Turkey¹⁹ and one study (reported in two papers) was conducted in Israel^{25,26} (Appendix IV). Both studies used interviews to collect data. The participants in all included studies were mothers and fathers aged 18 to 42 years. The total sample size was 118 participants (96 mothers and 22 fathers).

In the Turkish study,¹⁹ the study location was Burhaniye, which is a district in Balıkesir Province where the economy relies largely on tourism and the production of olives. Participants were selected randomly from parents of children younger than 5 years living in the region served by the health center and identified through health center enrollment. Most of the interviews were done in the homes of families, and the authors reported that all children were clearly exposed to SHS in various locations in the home.

In the study from Israel,^{25,26} parents of children younger than 7 years with at least one parent who smoked were eligible for inclusion. Purposive sampling was used to select participants from different

Table 1: Critical appraisal of eligible studies

Publication	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total % per paper
Gursay ST et al. (2008) ¹⁹	Y	Y	Y	Y	Y	Y	Y	Y	U	Y	90%
Myers V et al. (2020) ²⁵ Rosen LJ et al. (2018) ²⁶	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%

Y, yes; U, unclear
 JBI critical appraisal checklist for qualitative research
 Q1. Is there congruity between the stated philosophical perspective and the research methodology?
 Q2. Is there congruity between the research methodology and the research question or objectives?
 Q3. Is there congruity between the research methodology and the method used to collect data?
 Q4. Is there congruity between the research methodology and the representation and analysis of the data?
 Q5. Is there congruity between the research methodology and the interpretation of the results?
 Q6. Is there a statement locating the researcher culturally or theoretically?
 Q7. Is the influence of the researcher on the research, and vice-versa, addressed?
 Q8. Are participants, and their voices, adequately represented?
 Q9. Is the research ethical according to current criteria, or for recent studies, is there evidence of ethical approval by an appropriate body?
 Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

geographical areas in central Israel, to ensure the recruitment of participants from a variety of socio-economic, ethnic, and religious groups. The phenomenon of interest focused on the parents' knowledge regarding the risks of SHS to children, barriers to reduce children's SHS exposure, rules to decrease SHS exposure among children, parental perceptions regarding SHS exposure, and parental misconceptions of exposure.

The first study focused on the assessment of parents' knowledge regarding the risks of SHS to children's health and the barriers to reducing SHS exposure among children.¹⁹ The second study was included in two publications; the first publication focused on parental perceptions and misconceptions regarding tobacco smoke exposure among children in smoking families.²⁶ The second publication focused on parental smoking behavior around children from the parents' perspective.²⁵ All studies analyzed data using thematic content analysis.

No studies were found investigating the views and experiences of children or professionals on the prevention of SHS exposure, nor were any studies found that reported on exposure to SHS among women.

Review findings

A total of 55 findings were extracted from the two included studies (from three papers), with 36 assigned as unequivocal and 14 assigned as credible. A further five were assigned as "not supported" and not included in the meta-synthesis. The extracted findings with illustrations are listed in Appendix V. The 50 findings assigned as credible or unequivocal were aggregated into eight categories and resulted in the following three synthesized findings: i) Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy; ii) Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking; and iii) Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective. All three

synthesized findings were rated as moderate, using the ConQual approach.

Synthesized finding 1: Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy

This synthesized finding relates to parents' awareness of SHS and where they perceived exposure to SHS to happen. This synthesized finding was derived from 15 findings from two categories in two studies (see Table 2).^{19,26}

Category 1.1: Knowledge, risk awareness, and perception of smoking and SHS exposure

This category was derived from 13 findings identified in two studies.^{19,26} Parents appeared to be aware that children were exposed to SHS. Some parents reported that exposure to SHS occurs when a child is next to them when they are smoking even if it is outdoors, when the child inhales/smells the smoke or the scent of someone's cigarette, or when smoking in the car. Parents were aware that smoking and exposure to SHS are harmful, and that children may mimic their parents and try to smoke cigarettes.

"Passive exposure, however they call it, when the child inhales the smoke or the scent of someone's cigarette when they're smoking."^{26(p.1371)}

"Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us..."^{19(p.468)}

Category 1.2: Sources of information regarding health dangers of SHS exposure

This category was derived from two findings in one study.¹⁹ Mothers stated that the health dangers of SHS exposure were not commonly discussed with them during pregnancy, where they reported that the health care professional did not inform them about the dangers of SHS and smoking.¹⁹ The majority of parents also reported that the most common source of information was television.

"There are always programs on TV about smoking hazards, immediately I am zapping. I cannot resist hearing the smoking hazards. Any way I know what the hazards are, but I cannot quit smoking."^{19(p.469)}

Table 2: Synthesized finding 1

Synthesized finding	Categories	Findings	Illustrations
1. Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.	1.1. Knowledge, risk awareness, and perception of smoking and SHS exposure	1. Smoking causes harmful health effects (U)	"Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us..." Father ⁽¹⁹⁾⁻⁽²⁴⁾
		2. Passive smoking was not well recognized term (C)	"I think I am a passive smoker because I don't inhale; I am just a tip smoker" Mother ⁽¹⁹⁾⁻⁽²⁴⁾
		3. Children, whose parents smoke, should have desire to smoke (C)	"My daughter put pretzel stick cracker between her fingers like smoking a cigarette while playing" Mother ⁽¹⁹⁾⁻⁽²⁴⁾
		4. Smoking cigarettes had a negative impact on adult's and children's health and participants stated that they would like to quit smoking (C)	"I want to quit smoking for my health. I could not tell a lie to say quitting for my child's health, for God sake. I have sensation problem on my feet and hands." Mother ⁽¹⁹⁾⁻⁽²⁴⁾
		5. Breathing in smoke, inhaling smoke, smoke enters the body as sensory perception of smoking (C)	"Passive exposure, however they call it, when the child inhales the smoke or the scent of someone's cigarette when they're smoking." ⁽²⁵⁾⁻⁽³¹⁾
		6. Exposure involves being near a smoke (up to a certain distance) as a physical aspect of exposure (U)	"Just being next to smokers, like when my children are near me and I'm smoking. Then they're exposed whether they like it or not." ⁽²⁵⁾⁻⁽³¹⁾
		7. Exposure occurs outdoors as physical perception of smoking (U)	"When I go to the playground with her and another mother might be standing at the second swing swinging her child with a cigarette in her mouth, it also reaches my daughter." ⁽²⁵⁾⁻⁽³¹⁾
		8. Exposure occurs in closed spaces (U)	"No matter how much you air it out, the car's interior is a small and closed space and the odor remains." ⁽²⁵⁾⁻⁽³¹⁾
		9. Exposure occurs while smoking and walking with stroller (U)	"When ... I open the overhead protective covering ... the smoke goes over it and not beneath it. So he [the child] is somewhat exposed; sometimes he even coughs a bit." ⁽²⁵⁾⁻⁽³¹⁾
		10. Seeing smoke, seeing someone smoking, seeing a lit cigarette, seeing a package of cigarettes as sensory perception of smoking (U)	"I don't believe that it is possible to be exposed to smoking without seeing the action." ⁽²⁵⁾⁻⁽³¹⁾
		11. Smells the smoke, someone's clothes smell of smoke as sensory perception of smoking (U)	"When someone smokes near them, it doesn't matter if here or two meters away, if they smell it, it is exposure." ⁽²⁵⁾⁻⁽³¹⁾
		12. Feeling or sensing smoke, smoke is 'on' someone as sensory perception of smoking (U)	"When I'm near my father-in-law I can feel he's been smoking..." ⁽²⁵⁾⁻⁽³¹⁾
		13. Combination of different sensory perceptions of exposure (C)	"Exposure is when the child breathes or smells the cigarette which someone else is smoking." ⁽²⁵⁾⁻⁽³¹⁾
1.2. Sources of information regarding health dangers of SHS exposure	1. Dangers of SHS were not regularly communicated during pregnancy and childbearing (C)	One fifth of the participants reported that the health care professions did not inform them about the dangers of Environmental Tobacco Smoke and smoking even during pregnancy and child bearing. ⁽¹⁹⁾⁻⁽²⁴⁾	
	2. Dangers of SHS were commonly learnt from television and health care professions (C)	"There are always programs on TV about smoking hazards, immediately I am zapping. I cannot resist hearing the smoking hazards. Any way I know what the hazards are, but I cannot quit smoking." Mother ⁽¹⁹⁾⁻⁽²⁴⁾	

C, credible; SHS, second-hand smoke; U, unequivocal

Synthesized finding 2: Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking

This synthesized finding was derived from 10 findings from three categories from two studies (see Table 3).^{19,25}

Category 2.1: Perceived barriers to quitting smoking and decreasing SHS exposure among children

This category was derived from four findings identified in two studies.^{19,25} The barriers were as follows: smoking was considered as a sign of manhood or act of modernity, smoking was accepted socially, and judgment of others. Moreover, according to tradition, making guests comfortable, with no negative comments directed at the guest, was an essential component of hospitality, as it would be disrespectful or offensive to ask friends or relatives not to smoke.

"It is disgraceful to say friends or relatives not to smoke here. They are our guests" Mother^{19(p.470)}

Category 2.2: Psychological and personal barriers to quit smoking and decrease SHS exposure among children

This category was derived from six findings identified in two studies.^{19,25} These barriers were lack of willpower to quit smoking or reduce SHS exposure, acceptance of imperfection without guilt, perceived conflicts with the family, perceived lack of control/low self-efficacy, and belief that restrictions could not be implemented.

"During Ramadan, we do not smoke for hours and hours. But after breaking the fast, I jumped down the cigarettes" Father^{19(p.469)}

Synthesized finding 3: Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective

This synthesized finding was derived from 25 findings from three categories in two studies (from three publications; see Table 4).^{19,25,26}

Category 3.1: Physical restrictions to decrease SHS exposure among children

This category was derived from five findings identified in two studies.^{19,25} Parents implemented some physical restrictions on smoking to limit SHS exposure among their children, such as smoking in specified places in homes like the balcony, smoking in a separate room with the door closed, smoking in the kitchen under the aspirator, exhaling the smoke into the coal stove, smoking in the same room with children but with the door open, putting their head out of the window while smoking, or smoking in the bathroom. Parents reported limitations of smoking in the car, limitations of smoking when strolling with babies, or adopting a smoke-free home. Additionally, some parents reported that there were no complete smoking restrictions in the home.

"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in."^{25(p.697)}

"Only in the kitchen under the aspirator in winter, in the balcony in the summer"^{19(p.469)}

Category 3.2: Misperception of SHS exposure

This category was derived from nine findings from one study.²⁶ Some parents believed that SHS exposure could not occur in open areas, if they smoke far away from children, at the window, or in a car where the windows are open and the air conditioner is on. They believed also that SHS exposure could not occur if they smoke on a balcony with the door closed, smoke when walking with a child in a stroller, blow the smoke away from children, move the stroller away from the bench and smoke, or smoke half an hour before picking up the children in the car with open windows and there is an air freshener.

"the smoke, I blow it away a bit, the cigarette isn't close to them, I don't put the cigarette near them and when I breathe out the smoke, I don't blow in their direction, I exhale normally but not in their direction"^{26(p.1372)}

Category 3.3: Uncertainty/confidence regarding protective measures

This category was derived from six findings identified in one study.²⁵ Some parents were confident about their protective measures to limit SHS

Table 3: Synthesized finding 2

Synthesized finding	Categories	Findings	Illustrations
2. Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.	2.1. Perceived barriers to quitting smoking and decreasing SHS exposure among children	1. Smoking is considered as sign of manhood or act of modernity even by health professionals (U)	"A father from a village explained that smoking was the sign of being a man." Father ^{M10-100} "Nobody asked me if I was smoking during the visits, so no information was given. They have never thought I could smoke because I am veiled so I am not a modern woman. . ." Mother ^{M9-100}
		2. Participants stated that they had difficulties to ask respect and cooperation from friends and family who were visiting in order to keep the home smoke free (Smoking is accepted socially) (C)	"During <i>bayram</i> , my uncle visited us. I told him not to smoke at home. He said that he would blow the smoke through the <i>door</i> stove, that smoking was his unique pleasure in his life, it was none of my business." Mother ^{M10-100}
		3. According to traditions, it is attached an important value to the hospitality. Make guests comfortable, no critics; no comments are the essentials of the hospitality (U)	"It is <i>disgraceful</i> to say friends or relatives not to smoke here. They are our guests" Mother ^{M9-100}
		4. Judgement of 'others' (C)	"I see it when the <i>eye</i> [other] looking at me. When I'm walking around with the <i>carriage</i> and I'm holding a cigarette. . . No, it doesn't affect me. . . Maybe bothers me for a moment, but it passes." ^{M10-100}
	2.2. Psychological and personal barriers to quit smoking and decrease SHS exposure among children	1. The lack of willpower as barriers to quitting smoking or reducing SHS exposure (C)	"During <i>Ramadan</i> , we do not smoke for hours and hours. But after breaking the fast, I jumped down the cigarettes" Father ^{M10-100}
		2. Acceptance of imperfection – no guilt (U)	"I'm not sorry for smoking nor am I trying to obtain anyone's approval I don't have guilt feelings over smoking. That doesn't mean that I need to smoke more. I'm aware that I need to do something." ^{M10-100}
		3. Conflicts with family (C)	"There are arguments about that for example, about my mother, we argue about her smoking, me and my partner, it upsets her [my partner] that she [my mother] doesn't make an effort not to smoke around the kids." ^{M10-100}
		4. Perceived lack of control/low self-efficacy (U)	"I have this fantasy of not smoking next to them, but I don't have that privilege. It's like . . . smoking is secret. Or there might be an instance where I can do it without them being on top of me or next to me. So if I'm with them for 12 h a day on weekends it's like hiding from them." ^{M10-100}
		5. Perceived lack of control/low self-efficacy – practical barriers (U)	"I try to go out on the balcony but it's cold, and it sucks to stand out in the cold with a cigarette, so I smoke near them - it's not great but it is what it is." ^{M10-100}
		6. Most of participants don't believe that the [smoking ban] restrictions could be implemented (C)	"I don't believe that smokers will obey the rules. Our society doesn't matter any law, there is a statement which says - the laws are made to be destroyed" Mother ^{M9-100}

C, credible; SHS, second-hand smoke; U, unequivocal

Table 4: Synthesized finding 3

Synthesized finding	Categories	Findings	Illustrations
<p>3. Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivators reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.</p>	<p>3.1. Physical restrictions to decrease SHS exposure among children</p>	1. Rules about smoking at home (U)	<i>"I only smoke on the balcony and I always close it off (from the rest of the house)"^{(M1)(M7)}</i>
		2. Limitations of smoking in the car (U)	<i>"Do you ever smoke with the kids in the car?" "No, that's the limit"^{(M1)(M8)}</i>
		3. Limitations of smoking when strolling with babies (U)	<i>"A lot of mothers stroll with the baby carriage and smoke freely. No way will I do that"^{(M1)(M7)}</i>
		4. Proactive behaviors: smoke-free home (U)	<i>"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in"^{(M1)(M7)}</i>
		5. There were no complete smoking restrictions in the home (U)	<i>"Only in the kitchen under the aspirator in winter; in balcony in the summer"^{(M1)(M8)}</i>
	<p>3.2. Misperception of SHS exposure</p>	1. Exposure doesn't occur when the smoker is at a (specified) distance (U)	<i>"Far... there's absolutely no way the smoke will reach her"^{(M1)(M2)}</i>
		2. Exposure doesn't occur outdoors/in open spaces (U)	<i>"Not in a building, or in the house, or in the entrance, I have no problem with open areas... I don't smoke near my children, I can smoke only I. We are in an open area, in an open area I can smoke a cigarette."^{(M1)(M2)}</i>
		3. Exposure doesn't occur when the window is open (U)	<i>"My husband smokes in the car but makes sure to open the window because he says that way the odor doesn't remain."^{(M1)(M2)}</i>
		4. Time elapsed after smoking prevents SHS exposure (C)	<i>"If I know that I have to get one of the kids I try not to smoke for half an hour before this... if I light up then all the windows for sure will open and there is an air fresher."^{(M1)(M2)}</i>
		5. Exposure doesn't occur when the door is closed (U)	<i>"I smoke only on the balcony and I always close it off (from the rest of the house)... I do everything to avoid anything reaching my daughter."^{(M1)(M2)}</i>
		6. Exposure doesn't occur while walking with stroller and smoking (U)	<i>"I don't really think that any of it reaches her when we're walking with her in the stroller and smoking, it doesn't seem reasonable to me that it would reach her."^{(M1)(M2)}</i>
		7. Exposure doesn't occur in a moving car (U)	<i>"There's no way I'll smoke when it's raining say, only with all the windows open and the car's moving so there's air and the air conditioner is on to get it out."^{(M1)(M2)}</i>
		8. Exposure doesn't occur when blowing smoke away from children (U)	<i>"The smoke, I blow it away a bit, the cigarette isn't close to them, I don't put the cigarette near them and when I breathe out the smoke, I don't blow in their direction, I exhale normally but not in their direction."^{(M1)(M2)}</i>
		9. Exposure doesn't occur if the child is moved away from the smoker, or the smoker moves away from the child (U)	<i>"If I'm sitting with her on a bench then I'll move the stroller away a bit and I'll move to the other side of the bench."^{(M1)(M2)}</i>

Table 4: (Continued)

Synthesized finding	Categories	Findings	Illustrations
	3.3. Uncertainty/confidence regarding protective measures	1. Confidence in protective measures (U)	"Do you think it's effective to reduce exposure to passive smoking?", "Opening the windows? ...Of course it is" ⁽¹⁰⁾⁽¹¹⁾
		2. Uncertainty regarding protective measures (U)	"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough" ⁽¹⁰⁾⁽¹¹⁾
		3. Acceptance of partially effective protective measures are enough (U)	"If I smoke in the car on my way to picking up the kids, I say to myself: 'OK, it'll air out by the time I put them in the car'. But that's a bunch of bull. It doesn't totally disappear, even if you leave the window open." ⁽¹⁰⁾⁽¹¹⁾
		4. Protective behaviors: maintaining distance (U)	"I smoke next to them outside, but I don't smoke 'on top of their heads'." ⁽¹⁰⁾⁽¹¹⁾
		5. Protective behaviors: at the window (U)	"I smoke at the window...my whole head is outside, I'm almost falling out" ⁽¹⁰⁾⁽¹¹⁾
		6. Protective behaviors: personal hygiene (U)	"I change my shirt after smoking, thoroughly wash my hands, rinse my mouth with mouthwash and try very hard to have no smoke odor on me." ⁽¹⁰⁾⁽¹¹⁾
	3.4. Psychological motivators to decrease SHS exposure among children	1. Greater importance of protecting smaller children (U)	"So while he's small it's very important for me that he not be near an environment of smokers... suddenly he seems like a big boy, so it seemed like it was OK to smoke near him" ⁽¹⁰⁾⁽¹¹⁾
		2. Feeling in control – high self-efficacy to change the habit (U)	"You simply need to change the habit... From smoking in the car to not smoking in the car. It's a habit that you have to give up. There are habits you need to get rid of - to decide and to give them up." ⁽¹⁰⁾⁽¹¹⁾
		3. Self-criticism/Being a good vs bad parent (U)	"It makes me feel bad and I know it's bad. I get so mad at myself but... it's a conflict, a huge conflict... I mean it goes against everything that... as a parent you want only good for your children, and here you're sticking poison in their face..." ⁽¹⁰⁾⁽¹¹⁾
		4. Trying – making an effort to decrease SHS exposure among children (U)	"I try not to smoke next to them, but they're always coming in and out, in and out. I always tell them to go in and stay inside." ⁽¹⁰⁾⁽¹¹⁾
		5. Many welcome the [smoking] ban because they think it will help them (C)	"We are tradesmen so men from lower classes... we are not well informed. I think the punishment will help us to quit smoking... so we support with all our heart the laws... "Father" ⁽¹⁰⁾⁽¹¹⁾

C, credible; SHS, second-hand smoke; U, unequivocal

exposure among children, like smoking with all windows open, in open places while walking with the stroller, with the overhead protective covering open in the travel carriage, or not on the top of children's head (just a little bit away from children).

However, others were uncertain regarding their protective measures. Some parents thought that partially effective protective measures were enough. These protective behaviors included maintaining distance, personal hygiene, and smoking at the window.

"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough"^{25(p.697)}

Category 3.4: Psychological motivators to decrease SHS exposure among children

This category was derived from five findings identified in two studies.^{19,25} The psychological motivators were having younger children, feelings of self-criticism, being a good vs bad parent, trying to make an effort to decrease SHS exposure among children, feeling in control through high self-efficacy to change the habit, and welcoming a smoking ban because they think it will help them.

"It makes me feel bad and I know it's bad. I get so mad at myself but... it's a conflict, a huge conflict... I mean it goes against everything that... as a parent, you want only good for your children, and here you're sticking poison in their face ..."^{25(p.698)}

Discussion

This review provides a comprehensive overview of parents' views on SHS exposure among their children. The first synthesized finding comprises two categories relating to the level of awareness among parents regarding their children's SHS exposure and the health hazards of that exposure. Parents knew that SHS exposure is harmful in general, but the health dangers of SHS exposure during pregnancy are not commonly discussed with health care professionals. This supports the quantitative evidence from other Middle Eastern countries (Saudi Arabia, Iran, and Jordan),^{18,27,28} which reported that women were aware of the dangers of SHS. Conversely, other quantitative evidence from Iran, Kuwait, and Egypt reported a lack of awareness of SHS exposure and its dangers of SHS exposure, which acted as a barrier to prevent SHS exposure among women and children.²⁵⁻³¹ This is congruent with the second

category in this synthesized finding, as health care professionals did not commonly discuss the health hazards of SHS exposure during pregnancy. This could be considered one of the causes of lack of awareness among parents regarding SHS exposure among their children.

The second synthesized finding comprises two categories relating to perceived barriers to reducing SHS exposure to children in homes. The first category reports the perceived barriers to quitting smoking and decreasing SHS exposure among children. The barriers identified related to smoking being considered a sign of manhood or act of modernity, the judgment of others relating to the difficulties of asking visitors to keep the home smoke-free because smoking was socially acceptable, and the importance of making guests comfortable with no negative comments as this can have a negative effect on hospitality, which is considered an important tradition. This finding is congruent with quantitative evidence from Turkey and Jordan where social and cultural norms and traditions were identified as barriers to preventing SHS exposure among children at home,¹⁹ and for non-smoking women in the workplace.¹⁸

Psychological and personal barriers to quit smoking and decrease SHS exposure among children were identified in the second category. The barriers were attributed to a lack of willpower to quit smoking or reduce SHS exposure, the acceptance of imperfection with no guilt, perceived conflicts with family, perceived lack of control or low self-efficacy, and believing that smoking restrictions could not be implemented, thereby reflecting the sense of nonchalance and loss of hope to reduce SHS among children. The barriers could be minimized by implementing a theory-based behavior-change intervention to reduce SHS exposure in the home through increasing knowledge about SHS harms and positively impacting the husband's smoking habits, either through reduction or quitting.³²

These barriers are quite similar to qualitative evidence from the UK, Australia, the USA, Canada, and China where authors reported a lack of confidence to ask smokers not to smoke in the home; lack of power to modify the environment; fear of damaging relationships; social norms and gender imbalances; and cultural socializing and sharing cigarettes.^{14,15}

The third synthesized finding comprises four categories relating to parents' physical restrictions on smoking and having rules to limit children's SHS

exposure. The physical restrictions, which were implemented by parents, included having rules such as smoking in specific places in the home, avoiding smoking in the car and when strolling with babies, and adopting smoke-free homes. Conversely, in this review some parents reported no restrictions on smoking in the home, which is consistent with quantitative evidence from Middle Eastern countries where it was reported that, even with a good level of risk awareness of SHS, women's behavior related to avoidance of SHS exposure was minimal.¹⁸ There were no restrictions on smoking inside the home for residents and guests, despite of the presence of children.^{28,33}

The second category of the third synthesized finding represents the misperception of parents regarding where and how SHS exposure to their children could happen. Some parents reported that SHS exposure does not occur when the smoker is at a (specified) distance, the window is open, the door is closed, smoke is blown away from children, the smoker and the child are in a moving car, time has elapsed after smoking, walking with a stroller and smoking, or the child is moved away from the smoker. These findings reflect that the level of awareness of parents regarding SHS exposure among their children is inadequate, which is in line with the quantitative findings from Iran, Kuwait, and Egypt.²⁹⁻³¹ Quantitative evidence from Iran reported one of the barriers to pregnant women protecting themselves from SHS was that they did not understand the risks of SHS on the fetus and were not aware of how to protect themselves against SHS.²⁹

The third category reflects parents' uncertainty/confidence regarding protective measures, whereby some parents felt confident of their protective measures (for example, smoking at the window, personal hygiene, and maintaining distance), but others felt less certain that partially effective protective measures were sufficient. This reflects the need for a health education intervention to improve parents' risk awareness and knowledge regarding the most effective protective measures to reduce SHS exposure among their children.

The psychological motivators for parents to decrease SHS exposure to children were identified in the fourth category, where the most prominent motivators were having younger children, having self-efficacy to change the habit, being self-critical, feelings of being a good vs bad parent, the

acceptance of the smoking ban as it was perceived to help parents quit, and trying or making the effort to decrease SHS exposure among children. These motivators are quite different from motivators reported by qualitative evidence from the UK, Australia, the USA, Canada, and China where the authors mentioned success stories and role modeling of elders who had quit smoking; the presence of a newborn baby or an elder in the home; perceived benefits of preventing SHS exposure; wider community norms accepting prevention of SHS; and a sense of guilt.^{14,15}

Identified motivators should be taken into account when designing interventions to decrease SHS exposure among children. A previous systematic review and meta-analysis³⁴ reported that interventions designed to protect children from SHS are effective in reducing tobacco smoke pollution in homes, but some residual exposure remained, thus signaling the need for other regulatory measures to help reduce and eliminate SHS exposure in childhood. This finding is congruent with another systematic review,³² which reported that theory-based behavior-change interventions led to increased knowledge about SHS harms, a reduction in husbands' smoking, an increase in husbands' quitting smoking, and an increased susceptibility or change in the level of actions in the home to reduce SHS.

Strengths and limitations of the review

To our knowledge, this is the first systematic review to synthesize experiences and views of parents regarding SHS exposure prevention in Middle Eastern countries. This systematic review was conducted following a robust systematic process set out by JBI, and adhered to the PRISMA guidelines.²² All steps were completed by two reviewers independently, and any disagreements that arose between the reviewers were resolved through discussion. Ten databases were searched, and no date or language restrictions were applied; therefore, it is unlikely that any eligible studies were missed.

During data extraction, it was noted that authors did not differentiate in quotations between mothers and fathers when reporting their findings from parents. In response to this, we expanded the eligible participants of this review to include parents (ie, fathers and mothers) to give a comprehensive overview of experiences and views on SHS exposure

prevention. However, this meant that we were unable to compare and contrast findings between fathers and mothers.

The methodological quality of the included studies was high. A limitation of the review relates to the small number of included studies; however, this is commonly seen in systematic reviews of qualitative research.³⁵⁻³⁹ Additionally, as reported in the Summary of Findings, the ConQual scores of the three synthesized findings are moderate; hence, the recommendations derived from the synthesized findings were also lowered one grade. Moreover, all qualitative evidence available was from parents, not from professionals or children, and we were unable to explore the perceptions of women's exposure to SHS due to no studies reporting this phenomenon.

Conclusion

Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy. Parents implemented some physical restrictions on smoking, such as having rules about where smoking can take place in the home and outdoors.

There were conflicting views regarding whether exposure to SHS would happen in the outdoors/open spaces or when using techniques to minimize exposure. There was great uncertainty or a lack of

confidence regarding whether protective measures were effective at reducing exposure to children. Smoking is socially accepted in Middle Eastern countries, and cultural beliefs about traditional values and personal psychological factors were perceived barriers to reducing SHS exposure. Parents had psychological motivators (eg, protect smaller children, self-efficacy, and self-criticism) to decrease SHS exposure among children in home.

Recommendations for practice

This review provides important insights into the needs of parents to help them to reduce SHS exposure among children. The synthesized findings, as illustrated in the Summary of Findings, indicate that there are many misconceptions among parents regarding their children's SHS exposure, which reflects their need for further information about how exposure occurs and the ways to limit it. This review recommends implementation of effective health education sessions to increase knowledge about SHS harms, reduce exposure to smoking in children, and increase smoking quit rates in households. Based on the evidence highlighted in the Summary of Findings, the JBI grades of recommendations were used to develop the recommendations shown in Table 5. A binary system for grading the recommendations was used: a strong recommendation (Grade A) or a weak recommendation (Grade B).⁴⁰

Table 5: Grades of recommendations for practice and policy specific to the Middle Eastern countries

Recommendation	Grade
Further enforcement of tobacco-control policies in Middle Eastern countries, such as strengthening bans on smoking public places, is needed.	Grade A
Policy-makers should consider introducing smoking cessation programs to help parents quit smoking to minimize SHS to children in the home in Middle Eastern countries.	Grade A
Societies within Middle Eastern countries should be educated on dangers of SHS exposure on health, in particular in relation to children.	Grade A
Policy-makers should consider implementing accessible health education programs for pregnant women and parents of children in Middle Eastern countries to improve their knowledge about hazards of SHS exposure, and minimize the social acceptance of smoking and SHS exposure.	Grade A
Governments within Middle Eastern countries should consider reviewing educational resources available to parents regarding the definition of SHS exposure, how exposure occurs, and how to minimize it to improve knowledge and understanding.	Grade A
Governments/ministries of health within Middle Eastern countries should consider the accessibility and affordability of smoking cessation medications, including nicotine replacement therapy, to assist parents to quit or reduce smoking, and the availability of standard quitlines for health care professionals in primary health care clinics.	Grade A
Governments/ministries of health within Middle Eastern countries should consider providing evidence-based assistance to parents who have successfully quit smoking to prevent relapse.	Grade A

SHS, second-hand smoke

Recommendations for policy

In Middle Eastern countries, many tobacco control policies are not comprehensively implemented or enforced, especially banning smoking in public places. Moreover, the policies do not include any recommendations for preventing smoking in homes or personal vehicles in which children are usually present.^{12,13} This is particularly pertinent given our findings that children are exposed to SHS in homes and personal vehicles, and parents have misconception about their children's SHS exposure. In addition, parents are uncertain about whether the protective measures they use actually protect their children from SHS.

Further enforcement of tobacco control policies in Middle Eastern countries is needed, including strengthening bans on smoking public places, and provision of smoking cessation services in primary health care to support parents to quit smoking, thereby preventing exposure to SHS in children. Standardized guidelines should be available for health care professionals in primary health centers to help them inform parents about SHS exposure during pregnancy and childhood. This review found that SHS exposure is not commonly discussed with parents.

Recommendations for research

The studies in this review only focused on the perspective of parents; therefore, qualitative research is needed to explore barriers and facilitators of prevention of SHS exposure among pregnant women and children from the perspective of pregnant women and children themselves and health care professionals. Moreover, we found only three published papers relating to two studies on the experiences and views of parents on SHS exposure among children, which reflects the need for further research on this topic.

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Author contributions

ZH conceptualized, designed, and conducted the study with the help of the other authors, and wrote

the first draft of the manuscript. The other authors contributed significantly to the revision of the manuscript. All authors read and approved the final manuscript.

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39. Macpherson K, Cooper K, Harbour J, Mahal D, Miller C, Nairn M. Experiences of living with long COVID and of accessing healthcare services: a qualitative systematic review. *BMJ Open* 2022;12(1):e0050979.
40. JBI. Supporting document for the Joanna Briggs Institute Levels of Evidence and Grades of Recommendation [Internet]. Adelaide: JBI; 2014 [cited 2021 Jan 28]. Available from: <https://jbi.global/sites/default/files/2019-05/JBI%20Levels%20of%20Evidence%20Supporting%20Documents-v2.pdf>.

Appendix I: Search strategy**MEDLINE (Ovid)**

1946-4th January 2021

Date searched January 4, 2021; 408 results

exp Tobacco Smoke Pollution/ or Tobacco Smoke Pollution.mp.

exp Smoking/

("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok*" or environmental tobacco smoke").mp.

(passive or involuntary or secondhand or " second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

exp Pregnant Women/

(pregnan* adj2 (women or woman).mp

("woman" or "women" or "female" or "girl" or "mother" or "widow").mp.

(child* or infant* or juvenil* or kid? or kids or minors or minors*).

exp Women/

exp child/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

exp Middle East/

exp Iran/ or exp Turkey/ or exp Bahrain/ or exp Cyprus/ or exp Egypt/ or exp Iraq/ or exp Jordan/ or exp Kuwait/ or exp Lebanon/ or exp Oman/ or exp Israel/ or exp Qatar/ or exp Palestine/ or exp Saudi Arabia/ or exp Syria/ or exp United Arab Emirates/ or exp Yemen/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*).mp.

16 or 17 or 18

exp qualitative research/

(interview* or interviews or experience* or qualitative or interview: or experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

("cross-sectional studies" or "cross sectional stud*" or "Surveys and Questionnaires").mp. 20 or 21 or 22 or 23

5 and 15 and 19 and 24

EMBASE (Ovid)1947-4th January 2021

Date searched January 4, 2021; 328 results

exp Tobacco Smoke Pollution/ or Tobacco Smoke Pollution.mp.

exp Smoking/

("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok*" or environmental tobacco smoke").mp.

(passive or involuntary or secondhand or " second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

exp Pregnant Woman/

((pregnan* adj2 women) or woman).mp

(woman or women or female or girl or mother or widow).mp.

(child* or infant* or juvenil* or kid? or kids or minors or minors*).mp

exp female/

exp child/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

exp Middle East/

exp Iran/ or exp Turkey/ or exp Bahrain/ or exp Cyprus/ or exp Egypt/ or exp Iraq/ or exp Jordan/ or exp Kuwait/ or exp Lebanon/ or exp Oman/ or exp Israel/ or exp Qatar/ or exp Palestine/ or exp Saudi Arabia/ or exp Syria/ or exp United Arab Emirates/ or exp Yemen/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*).mp.

16 or 17 or 18

exp qualitative research/

(interview* or interviews or experience* or qualitative or interview: or experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

(cross-sectional studies* or cross sectional stud** or Surveys and Questionnaires*).mp.

20 or 21 or 22 or 23

5 and 15 and 19 and 24

CINAHL (EBSCO)

1961–8th January 2021

Date searched January 8, 2021; 353 results

S1 (MH "Passive Smoking")

S2 TX passive smoking or TX smoking

S3 S1 OR S2

S4 (MH "Pregnancy+") OR "pregnancy"

S5 (MH "Expectant Mothers")

S6 TX Expectant Mothers

S7 TX woman or TX women or TX female or TX girl or TX mother or TX widow or TX father or TX parent

S8 TTX child+ or TX infant or TX juvenil+ or TX kid? or TX kids or TX minors or TX minors

S9 (MH "Women+")

S10 (MH "Child+")

S11 (MH "Father+")

S12 (MH "parent+")

S13 S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12

S14 (MH "Middle East+")

S15 MH "Iran" OR MH "Turkey" OR MH "Bahrain" OR MH "Cyprus" OR MH "Egypt" OR MH "Iraq" OR MH "Jordan" OR MH "Kuwait" OR MH "Lebanon" OR MH "Oman" OR MH "Israel" OR MH "Qatar" OR MH "Palestine" OR MH "Saudi Arabia" OR MH "Syria" OR MH "United Arab Emirates" OR MH "Yemen"

S16 TX "Iran" OR TX "Turkey" OR TX "Bahrain" OR TX "Cyprus" OR TX "Egypt" OR TX "Iraq" OR TX "Jordan" OR TX "Kuwait" OR TX "Lebanon" OR TX "Oman" OR TX "Israel" OR TX "Qatar" OR TX "Palestine" OR TX "Saudi Arabia" OR TX "Syria" OR TX "United Arab Emirates" OR TX "Yemen"

S17 S14 OR S15 OR S16

S18 (MH "Qualitative Studies+") OR "qualitative research or qualitative study or qualitative methods or interview"

S19 (MH "Cross Sectional Studies") OR (MH "Surveys+") OR (MH "Questionnaires+") OR "survey or questionnaire or cross-sectional"

S20 TX "interviews" OR TX "qualitative" OR TX "interview" OR TX "experience" OR TX "survey" OR TX "questionnaires" OR TX "cross sectional studies"

S21 S18 OR S19 OR S20

S22 S3 AND S13 AND S17 AND S21

PsycINFO (Ovid)

1806–4th January 2021

Date searched January 4, 2021; 60 results

exp passive smoking / or passive smoking.mp.

exp Smoking/

(tobacco Smoke Pollut* or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok*" or environmental tobacco smoke" or "Tobacco smoke pollution").mp.

(passive or involuntary or secondhand or "second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

((pregnan* adj2 women) or woman).mp.

(woman or women or female or girl or mother or widow).mp

(child* or infant* or juvenil* or kid? or kids or minors or minors*).mp

exp Human Females/

exp Child Welfare/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13

exp Developing Countries/ or Middle Eastern countries.mp.

exp Arabs/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*).mp.

15 or 16 or 17

qualitative research.mp. or exp Qualitative Methods/

(interview* or interviews or experience* or qualitative or interview: or experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

(cross-sectional studies* or cross sectional stud* or Surveys and Questionnaires*).mp.

19 or 20 or 21 or 22

5 and 14 and 18 and 23

Web of Science1900–10th January 2021

Date searched January 10, 2021; 195 results

TS=(“tobacco Smoke Pollut*” or “second hand smok*” or “secondhand smok*” or “second-hand smok*” or involuntary smok*” or passive cigarette smok*” or passive tobacco smok*” or secondhand cigarette smok*” or secondhand tobacco smok*”)

TS=((passive or involuntary or secondhand or second hand”) near/2 (Smok*))

#1 OR #2

TS=(woman” or women” or female” or girl” or mother” or widow” or parent” or father”)

TS=((pregnan*) near/2 (women or woman))

TS=(child* or infant* or juvenil* or kid? or kids or minors or minors*)

#4 OR #5 OR #6

TS=(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*)

TS=(interview* or interviews or experience* or qualitative or interview: or experience: or survey* or questionnaire* or cross sectional stud*”)

#3 AND #7 AND #8 AND #9

Scopus (Elsevier)1960–10th January 2021

Date searched January 10, 2021; 267 results

TITLE-ABS-KEY (tobacco AND smoke AND pollut* OR second AND hand AND smok* OR secondhand AND smok* OR second-hand AND smok* OR involuntary AND smok* OR passive AND cigarette AND smok* OR passive AND tobacco AND smok* OR secondhand AND cigarette AND smok* OR secondhand AND tobacco AND smok*)

TITLE-ABS-KEY (passive OR involuntary OR secondhand OR second hand”) W/2 (smok*)

TITLE-ABS-KEY (woman OR women OR female OR girl\$ OR mother\$ OR widow\$)

TITLE-ABS-KEY ((pregnan*) W/2 (women or woman))

TITLE-ABS-KEY (child* OR infant* OR juvenil* OR kid\$ OR minor\$)

TITLE-ABS-KEY ((middle AND east* OR iran* OR turkey* OR bahrain* OR cyprus* OR egypt* OR iraq* OR jordan* OR kuwait* OR lebanon* OR oman* OR israel* OR palestine* OR qatar* OR saudi AND arabia* OR syria* OR united AND arab AND emirates* OR yemen*))

TITLE-ABS-KEY (developing AND countries)

#1 OR #2

#3 OR #4 OR #5

#6 AND #8 AND #9

#7 AND #8 AND #9

#10 OR #11

TITLE-ABS-KEY (interview\$ OR experience* OR qualitative OR survey\$ OR questionnaire\$ OR cross sectional stud*)

#12 AND #13

ProQuest Dissertations and Theses

Date searched: January 10, 2021; 4100 results

S1 "tobacco Smoke Pollut*" OR "second hand smok*" OR "secondhand smoke" OR "second-hand smok*" OR "involuntary smok*" OR "passive cigarette smok*" OR "passive tobacco smok*" OR "secondhand cigarette smok*" OR "secondhand tobacco smok*"

S2 ("woman" or "women" or "female" or "girl" or "mother" or "widow")

S3 (child* or infant* or juvenil* or kid? or kids or minors or minors*)

S4 (middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*)

S5 (interview OR experience* OR qualitative OR survey OR questionnaire OR cross sectional stud*)

S6 2 OR 3

S7 1 AND 4 AND 5 AND 6

OpenGrey

Date searched: January 10, 2021; 10 results

Single search terms were used.

tobacco Smoke Pollution [any word]

second hand smoke [any word]

secondhand smoke [any word]

second-hand smoke [any word]

involuntary smoke [any word]

passive cigarette smoke [any word]

passive tobacco smoke [any word]

secondhand cigarette smoke [any word]

secondhand tobacco smoke [any word]

ETHOS

Date searched: January 11, 2021; 5 results

Single search terms were used.

tobacco Smoke Pollution [any word]

second hand smoke [any word]

secondhand smoke [any word]
second-hand smoke [any word]
involuntary smoke [any word]
passive cigarette smoke [any word]
passive tobacco smoke [any word]
secondhand cigarette smoke [any word]
secondhand tobacco smoke [any word]

Appendix II: Studies ineligible following full-text review

Alghamdi AS, Jokhadar HF, Alghamdi IM, Alsobhani SA, Alqahtani OJ, Abdelmageed WH. Socioeconomic determinants of exposure to secondhand smoke among pregnant women. *Int J Women Health Reproduct Sci.* 2016;4(2):59-63.

Reason for exclusion: quantitative study; no qualitative data

Al-Haddad NM, Hamadeh RR, Bahram SA. Public knowledge and attitudes towards passive smoking. *Saudi Med J.* 2005;26(12):2004-6.

Reason for exclusion: conference abstract with no full paper; ineligible participants

Aslan D, Daymaz D, Gursoy N, Kartal G, Yavuz M. Status of exposure to second-hand smoke at home in children under five years of age: an example from Ankara Province. *Turkish Thor J.* 2015; 16(1):16.

Reason for exclusion: quantitative study; no qualitative data

Azab M, Khabour OF, Alzoubi KH, Anabtawi MM, Quttina M, Khader Y, et al. Exposure of pregnant women to waterpipe and cigarette smoke. *Nicotine Tobacco Res.* 2012;15(1):231-7.

Reason for exclusion: quantitative study; no qualitative data

Baheiraei A, Ghafoori F, Nedjat S, Foroushani AR. Sociodemographic characteristics and secondhand smoke exposure among women. *Tanaffos.* 2013;12(2):41.

Reason for exclusion: quantitative study; no qualitative data

Baheiraei A, Ghasab Shirazi M, Raisi Dehkordi Z, Rahimi Foroushani A, Nedjat S. Prevalence of home smoking bans and its determinants in families with infants. *Int J Pediatr.* 2018;6(1):6987-97.

Reason for exclusion: quantitative study; no qualitative data

Baheiraei A, Kharaghani R, Mohsenifar A, Kazemnejad A, Mota A, Sharifi MH, et al. Factors associated with secondhand smoke exposure in infants. *Tanaffos.* 2010;9(2):43-49.

Reason for exclusion: quantitative study; no qualitative data

Celik M, Ekerbicer HC, Ergun UG, Guler E, Kaya D. Prevalence of passive smoking in children and adolescents in Kahramanmaraş, Turkey. *Saudi Med J.* 2007;28(7):1143-5.

Reason for exclusion: quantitative study; no qualitative data

El Shahawy O, Labib K, Mead E, Hamdy A, Sherman S, Oncken C. Assessment of exclusive and dual cigarette and hookah smoking among a sample of pregnant women in Egypt. *Tob Induced Dis.* 2018;16(1).

Reason for exclusion: conference abstract with no full paper

Gharaibeh H, Haddad L, Alzyoud S, El-Shahawy O, Baker NA, Umlauf M. Knowledge, attitudes, and behavior in avoiding secondhand smoke exposure among non-smoking employed women with higher education in Jordan. *Int J Environ Res Public Health.* 2011;8(11):4207-19.

Reason for exclusion: quantitative study; no qualitative data

Karatay G, Alp N. Evaluation of behavioural change towards smoking in Turkish fathers having 0-1 year old infants during prenatal and postnatal periods. *Asia Pac J Cancer Prev.* 2010;11(1):141-4.

Reason for exclusion: quantitative study; no qualitative data

Mahmoodabad SS, Karimiankakolaki Z, Kazemi A, Mohammadi NK, Fallahzadeh H. Exposure to secondhand smoke in Iranian pregnant women at home and the related factors. *Tob Prev Cessat.* 2019;5(7).

Reason for exclusion: quantitative study; no qualitative data

Merrill RM, Madanat H, Kelley AT, Layton JB. Nurse and physician patient counseling about tobacco smoking in Jordan. *Promot Educ.* 2008;15(3):9-14.

Reason for exclusion: quantitative study; no qualitative data

Motallebnejad M, Pouramir M, Jenabian N, Bijani A, Salehi M, Ranjbar M, et al. Frequency of passive smoking among 12-15 year school children (Babol, Iran 2011). *J Babol Uni Med Sci.* 2014;16(1):106-11.

Reason for exclusion: quantitative study; no qualitative data

Rosen L, Kostjukovsky I. Parental risk perceptions of child exposure to tobacco smoke. *BMC Public Health.* 2015;15(1):1-1.

Reason for exclusion: quantitative study; no qualitative data

Tamim H, Akkary G, El-Zein A, El-Roueiheb Z, El-Chemaly S. Exposure of pre-school children to passive cigarette and narghile smoke in Beirut. *Eur J Public Health.* 2006;16(5):509-12.

Reason for exclusion: quantitative study; no qualitative data

Ziyab AH, Almari M, Al-Taiar A. Exposure to household secondhand smoke among adolescents in Kuwait: results from two school-based cross-sectional studies. *Tob Induced Dis.* 2020;18.

Reason for exclusion: quantitative study; no qualitative data

Appendix III: Ranking of the ConQual score

Synthesized finding 1: Parents were aware of SHS and that exposure to SHS is harmful, although the health dangers of SHS exposure were not commonly discussed with parents during pregnancy.		
Dependability	Credibility	ConQual score
Guray et al. ²⁶ (High) Roan et al. ²⁸ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	15 findings, 2 categories 8 unequivocal; 7 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility
Synthesized finding 2: Smoking is a socially and culturally accepted norm, with parents reporting cultural beliefs about traditional values as a barrier to reducing SHS exposure in the home and personal psychological factors to quitting smoking.		
Dependability	Credibility	ConQual score
Guray et al. ²⁶ (High) Myers et al. ²⁹ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	10 findings, 2 categories 5 unequivocal; 5 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility
Synthesized finding 3: Parents implemented different physical restrictions on smoking, such as having rules about where smoking can take place, with psychological motivations reported as drivers to decrease SHS exposure among children in the home, but tended to lack certainty or confidence regarding whether such protective measures were needed or would be effective.		
Dependability	Credibility	ConQual score
Guray et al. ²⁶ (High) Myers et al. ²⁹ (High) Roan et al. ²⁸ (High) Dependability is high: remain at this level due to high level of dependability among all studies (2 high)	25 findings, 4 categories 23 unequivocal; 2 credible Credibility of findings is moderate: downgraded one level due to a mixture of unequivocal and credible findings	Confidence of findings is moderate: downgraded one level due to high dependability and moderate credibility

SHS, second-hand smoke

Appendix IV: Characteristics of included studies

Study, country	Method and methodology	Participants' characteristics and sample size	Phenomena of interest	Setting, context, culture	Authors' conclusions
Gency <i>et al.</i> (2008) ¹⁸ Turkey	Individual semi-structured interviews with open-ended questions. The interviews were tape-recorded and transcribed verbatim. Thematic analysis.	Participants were 48 mothers and 5 fathers living at 48 houses. Interviews were conducted in the homes of families. The mean age was 27.4 ± 5.42 years (range 18–41) (N = 53). Seven mothers were non-smokers, but their husbands smoked.	To assess knowledge regarding the risks of SHS to the health of children and the barriers to reducing children's SHS exposure to better understand why parents still smoked in the home before a smoking ban.	Homes of participants or at the health center	Parents are aware that exposure to tobacco smoke can harm their children as well as themselves. Parents stated they wanted to stop smoking but most of them feel they are barely coping with existing responsibilities. In addition, some parents stated that they lacked resources to allow them to obtain professional counseling or nicotine replacement therapy. All parents were attempting to reduce their children's exposure to tobacco, but the strategies they used were, in general, ineffective. The knowledge, relationships with family and friends, and the social and cultural context in which they live play an important role in the management of SHS exposure in the home.
Rosen <i>et al.</i> (2018) ²⁴ Israel Myers <i>et al.</i> (2020) ²⁵ Israel	Face-to-face semi-structured interviews. Purposive sampling to select clinics in different geographical areas. Thematic analysis. Further analysis was performed to create a conceptual framework.	Parents in which at least one parent smoked, with a child younger than 7 years. Respondents included 48 mothers and 17 fathers, of whom 54 were smokers and 11 were non-smokers. The mean age was 33.3 ± 4.8 years (range: 24–40), with an average of 1.91 (range 1–4) children per family (N = 65).	Rosen <i>et al.</i> ²⁴ aimed to assist with the design of the intervention program and program evaluation to help parents reduce exposure of young children to tobacco smoke. To report on parental perceptions regarding tobacco smoke exposure among parents in smoking families. To identify parental misconceptions of exposure and compare parental misconceptions with objective assessment of exposure as reported in the scientific literature. Myers <i>et al.</i> ²⁵ focused on exploring parental smoking behavior around children from the parents' perspective.	Health care organization that provides services to the population under the National Health Insurance Law	Rosen <i>et al.</i> ²⁴ : Parents relied on sensory perceptions and physical factors to assess whether their children were exposed to SHS. Yet, sensory perceptions are unreliable. The scientific evidence presented in this article may be used by health professionals to provide parents with accurate information about exposure in common situations. Provision of objective evidence to parents from measurement of child exposure and air quality in the home, car, and near children outdoors could further help parents realize the true extent of exposure and motivate them and the surrounding society to protect children from the harm due to tobacco smoke exposure. Myers <i>et al.</i> ²⁵ : Parents are sometimes aware that there are "rules" but mitigating practices are limited. Parents described smoking around their children in certain areas of the home, outdoors, and in what they consider to be open or ventilated areas. Mitigating practices were common, and parents held mixed views as to how effective these practices are in protecting their children from exposure to tobacco smoke. Parents who continue to smoke around their children despite understanding the health risks may feel powerless to effect change, as well as being uncertain of the effectiveness of their protective strategies. Incomplete knowledge about exposure and low self-efficacy gives parents a false sense of security that they are protecting their children when, in fact, exposure may still be occurring. Better understanding of how and why parents smoke around their children can facilitate the design of interventions and creation of educational materials for parents to help them reduce children's SHS exposure. Guidelines should be provided explaining how and when exposure occurs and how to keep children safe, emphasizing the importance of smoke-free homes and cars. Providers, including pediatricians and maternal-child health clinics, could be well placed to provide relevant information to parents. Armed with more comprehensive knowledge, smoking parents who are unwilling or unable to quit may feel more confident in their abilities to protect their children.

SHS, secondhand smoke

Appendix V: Study findings and illustrations

Gurses ST, Soyler MT, Ozak Z, Cokkaleglu M, Asku F. Why are Turkish children at risk of exposure to environmental tobacco smoke in their homes? <i>Asian Pac J Cancer Prev.</i> 2008;9:467–72. ¹⁷	
Finding	Smoking causes harmful health effects (U)
Illustration	"Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us" Father ^(P-40)
Finding	Passive smoking was not well recognized term (C)
Illustration	"I think I am a passive smoker because I don't inhale; I am just a tip smoker" Mother ^(P-40)
Finding	Children, whose parents smoke, should have desire to smoke (C)
Illustration	"My daughter put pretzel stick cackler between her fingers like smoking a cigarette while playing" Mother ^(P-40)
Finding	Dangers of SHS were not regularly communicated during pregnancy and child bearing (C)
Illustration	Nine of the participants reported that the health care professions did not inform them about the dangers of ETS and smoking even during pregnancy and child bearing. ^(P-40)
Finding	Dangers of SHS were commonly learnt from television and health care professions (C)
Illustration	"There are always programs on TV about smoking hazards, immediately I am zapping. I can not resist hearing the smoking hazards. Any way I know what the hazards are, but I can not quit smoking." Mother ^(P-40)
Finding	There were no complete smoking restrictions in the home (U)
Illustration	"Only in the kitchen under the aspirator in winter, in balcony in the summer" Mother ^(P-40)
Finding	Smoking cigarettes had a negative impact on adults' and children's health and participants stated that they would like to quit smoking (C)
Illustration	"I want to quit smoking for my health. I could not tell a lie to say quitting for my child's health, for god sake. I have sensation problem on my feet and hands." Mother ^(P-40)
Finding	The lack of willpower as barriers to quitting smoking or reducing SHS exposure (C)
Illustration	"During Ramadan, we do not smoke for hours and hours. But after breaking the fast, I jumped down the cigarettes." Father ^(P-40)
Finding	Smoking is considered as sign of manhood or act of modernity even by health professionals (U)
Illustration	A father from a village explained that smoking was the sign of "being a man." Father ^(P-40) "Nobody asked me if I was smoking during the visits, so no information was given. They have never thought I could smoke because I am veiled so I am not a modern woman..." Mother ^(P-40)
Finding	Participants stated that they had difficulties to ask respect and cooperation from friends and family who were visiting in order to keep the home smoke free (Smoking is accepted socially) (C)
Illustration	"During bakram, my uncle visited us. I told him not to smoke at home. He said that he would blow the smoke through the coal stove, that smoking was his unique pleasure in his life; it was none of my business." Mother ^(P-40)
Finding	According to traditions, it is attached an important value to the hospitality. Make guests comfortable, no critics; no comments are the essentials of the hospitality (U)
Illustration	"It is disgraceful to say friends or relatives not to smoke here. They are our guests" Mother ^(P-40)
Finding	Most of participants don't believe that the [smoking ban] restrictions could be implemented (C)
Illustration	"I don't believe that smokers will obey the rules. Our society doesn't matter any law, there is a statement which says - the laws are made to be destroyed." Mother ^(P-40)
Finding	Many welcome the [smoking] ban because they think it will help them (C)
Illustration	"We are tradesmen so men from lower classes... we are not well informed. I think the punishment will help us to quit smoking... so we support with all our heart the laws..." Father ^(P-40)

Finding	Secondhand smoke is harmful to people's health (NS)
Illustration	When the child was coughing during the interview, the smoker mother mentioned "He is coughing, because he has just came back from his grandma." Mother ^{P-448} On the other hand, ten participants said that they know children who got chronically ill because their parents smoke beside them. ^{P-448}
Finding	All children were exposed to SHS in their homes (NS)
Illustration	All of the smoking parents reported smoking inside the home to some extent ^{P-449}
Finding	The majority of smoking parents attempted to reduce their child's exposure to ETS (NS)
Illustration	34 of them stated that they wish smoke free houses. While 37 have desire to quit smoking, 31 participants described a struggle with the desire to quit smoking and their addiction to cigarettes. ^{P-449}
Finding	Cigarettes help deal with troubles, loneliness, stress, and other unfortunate circumstances in life (NS)
Illustration	Many participants especially housewives stated that they continue to smoke cigarettes to help deal with troubles, loneliness, and other unfortunate circumstances in their lives. Most of the smokers stated that smoking helps reduce the stress in their lives and helps to calm their nerves. Many of the parents described extremely stressful lives due to financial troubles. Another barrier to quitting that frequently was mentioned is stress. ^{P-449}
Finding	Some parents stated that they lacked resources to allow them to obtain professional counselling or nicotine replacement therapy. (NS)
Illustration	26 participants mentioned that the strategies are not enough to protect the children from ETS. ^{P-449}
Rosen LJ, Lev E, Guttman N, Tillinger E, Rosenblat S, Zucker DM, et al. Parental perceptions and misconceptions of child tobacco smoke exposure. <i>Nicotine Tob Res.</i> 2018;20(11):1369-77.²⁸	
Finding	Seeing smoke, seeing someone smoking, seeing a lit cigarette, seeing a package of cigarettes as sensory perception of smoking (U)
Illustration	"I don't believe that it is possible to be exposed to smoking without seeing the action." ^{P-1171}
Finding	Smells the smoke, someone's clothes smell of smoke as sensory perception of smoking (U)
Illustration	"When someone smokes near them, it doesn't matter if here or two metres away, if they smell it, it is exposure" ^{P-1171}
Finding	Feeling or sensing smoke, smoke is "on" someone as sensory perception of smoking (U)
Illustration	"When I'm near my father-in-law I can feel he's been smoking..." ^{P-1171}
Finding	Breathing in smoke, inhaling smoke, smoke enters the body as sensory perception of smoking (C)
Illustration	"Passive exposure, however they call it, when the child inhales the smoke or the scent of someone's cigarette when they're smoking." ^{P-1171}
Finding	Combination of different sensory perceptions of exposure (C)
Illustration	"Exposure is when the child breathes or smells the cigarette which someone else is smoking." ^{P-1171}
Finding	Exposure involves being near a smoke (up to a certain distance) as a physical aspect of exposure (U)
Illustration	"Just being next to smokers, like when my children are near me and I'm smoking. Then they're exposed whether they like it or not." ^{P-1172}
Finding	Exposure occurs outdoors as physical perception of smoking (U)
Illustration	"When I go to the playground with her and another mother might be standing at the second swing, swinging her child with a cigarette in her mouth, it also reaches my daughter." ^{P-1172}
Finding	Exposure doesn't occur when the smoker is at a (specified) distance (U)
Illustration	"Far...there's absolutely no way the smoke will reach her." ^{P-1172}
Finding	Exposure occurs in closed spaces (U)
Illustration	"No matter how much you air it out, the car's interior is a small and closed space and the odor remains." ^{P-1172}

Finding	Exposure doesn't occur outdoors/in open spaces (U)
Illustration	"Not in a building, or in the house, or in the entrance, I have no problem with open areas... I don't smoke near my children, I can smoke only if... We are in an open area, in an open area I can smoke a cigarette." ⁹⁻¹³⁷²
Finding	Exposure doesn't occur when the window is open (U)
Illustration	"My husband smokes in the car but makes sure to open the window because he says that way the odor doesn't remain." ⁹⁻¹³⁷²
Finding	Exposure does not occur when the door is closed (U)
Illustration	"I smoke only on the balcony and I always close it off (from the rest of the house)... I do everything to avoid anything reaching my daughter." ⁹⁻¹³⁷²
Finding	Exposure occurs while smoking and walking with stroller (U)
Illustration	"When... I open the overhead protective covering... the smoke goes over it and not beneath it. So he [the child] is somewhat exposed; sometimes he even catches a bit." ⁹⁻¹³⁷²
Finding	Exposure doesn't occur while walking with stroller and smoking (U)
Illustration	"I don't really think that any of it reaches her when we're walking with her in the stroller and smoking. It doesn't seem reasonable to me that it would reach her." ⁹⁻¹³⁷²
Finding	Exposure doesn't occur in a moving car (U)
Illustration	"There's no way I'll smoke when it's raining say, only with all the windows open and the car's moving so there's air and the air conditioner is on to get it out." ⁹⁻¹³⁷²
Finding	Exposure doesn't occur when blowing smoke away from children (U)
Illustration	"The smoke, I blow it away a bit, the cigarette isn't close to them, I don't put the cigarette near them and when I breathe out the smoke, I don't blow in their direction, I exhale normally but not in their direction." ⁹⁻¹³⁷²
Finding	Exposure doesn't occur if the child is moved away from the smoker, or the smoker moves away from the child (U)
Illustration	"If I'm sitting with her on a bench then I'll move the stroller away a bit and I'll move to the other side of the bench." ⁹⁻¹³⁷²
Finding	Time elapsed after smoking prevents SHS exposure (C)
Illustration	"If I know that I have to get one of the kids I try not to smoke for half an hour before this... if I light up then all the windows for sure will open and there is an air fresher." ⁹⁻¹³⁷²
Myers V, Lov E, Guttman N, Tillinger E, Rosen L. "I can't stand it... but I do it sometimes" parental smoking around children: practices, beliefs, and conflicts-a qualitative study. BMC Public Health. 2020;20(1):693.²³	
Finding	Rules about smoking at home (U)
Illustration	"I only smoke on the balcony and I always close it off (from the rest of the house)." ⁹⁻⁴⁸⁷
Finding	Limitations of smoking in the car (U)
Illustration	"Do you ever smoke with the kids in the car?", "No, that's the limit." ⁹⁻⁴⁸⁷
Finding	Limitations of smoking when strolling with babies (U)
Illustration	"A lot of mothers stroll with the baby carriage and smoke freely. No way will I do that." ⁹⁻⁴⁸⁷
Finding	Protective behaviour: maintaining distance (U)
Illustration	"I smoke next to them outside, but I don't smoke 'on top of their heads." ⁹⁻⁴⁸⁷
Finding	Protective behaviour: smoke-free home (U)
Illustration	"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in." ⁹⁻⁴⁸⁷
Finding	Protective behaviour: at the window (U)
Illustration	"I smoke at the window... my whole head is outside, I'm almost falling out." ⁹⁻⁴⁸⁷

Finding	Protective behaviours: personal hygiene (U)
Illustration	"I change my shirt after smoking thoroughly wash my hands, rinse my mouth with mouthwash and try vary hard to have no smoke odor on me." ^(P4487)
Finding	Greater importance of protecting smaller children (U)
Illustration	"So while he's small it's very important for me that he not be near an environment of smokers... suddenly he seems like a big boy, so it seemed like it was OK to smoke near him." ^(P4487)
Finding	Confidence in protective measures (U)
Illustration	"Do you think it's effective to reduce exposure to passive smoking?", "Opening the windows? ... Of course it is!" ^(P4487)
Finding	Uncertainty regarding protective measures (U)
Illustration	"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough." ^(P4487)
Finding	Acceptance of partially effective protective measures are enough (U)
Illustration	"If I smoke in the car on my way to picking up the kids, I say to myself: 'OK, it'll air out by the time I put them in the car'. But that's a bunch of bull. It doesn't totally disappear, even if you leave the window open." ^(P4487)
Finding	Self-criticism/Being a good vs bad parent (U)
Illustration	"It makes me feel bad and I know it's bad. I get so mad at myself but it's a conflict, a huge conflict I mean it goes against everything that... as a parent you want only good for your children, and here you're sticking poison in their face..." ^(P4487)
Finding	Acceptance of imperfection - no guilt (U)
Illustration	"I'm not sorry for smoking nor am I trying to obtain anyone's approval I don't have guilt feelings over smoking. That doesn't mean that I need to smoke more. I'm aware that I need to do something." ^(P4487)
Finding	Judgement of 'others' (C)
Illustration	"I see it when they're [others] looking at me. When I'm walking around with the cartage and I'm holding a cigarette... No, it doesn't affect me... Maybe bothers me for a moment, but it passes." ^(P4487)
Finding	Conflicts with family (C)
Illustration	"There are arguments about that for example, about my mother, we argue about her smoking, me and my partner, it upsets her [my partner] that she [my mother] doesn't make an effort not to smoke around the kids." ^(P4487)
Finding	Perceived lack of control/low self-efficacy (U)
Illustration	"I have this fantasy of not smoking next to them, but I don't have that privilege. It's like... smoking in secret. Or there might be an instance where I can do it without them being on top of me or next to me. So if I'm with them for 12 h a day on weekends it's like hiding from them." ^(P4487)
Finding	Perceived lack of control/low self-efficacy - practical barriers (U)
Illustration	"I try to go out on the balcony but it's cold, and it sucks to stand out in the cold with a cigarette, so I smoke near them - it's not great but it is what it is." ^(P4487)
Finding	Trying - making an effort to decrease SHS exposure among children (U)
Illustration	"I try vary hard to have no smoke odor on me. I do everything to avoid anything reaching my daughter." ^(P4487) "I try not to smoke next to them, but they're always coming in and out, in and out. I always tell them to go in and stay inside." ^(P4487)
Finding	Feeling in control - high self-efficacy to change the habit (U)
Illustration	"You simply need to change the habit... From smoking in the car to not smoking in the car. It's a habit that you have to give up. There are habits you need to get rid of - to decide and to give them up." ^(P4487)

C, credible; ETS, environmental tobacco smoke; NS, not supported; SHS, second-hand smoke; U, unequivocal

8.1.3 Appendix 3.1 Search strategy

MEDLINE (Ovid)

1946– 4th January 2021; 408 results

exp Tobacco Smoke Pollution/ or Tobacco Smoke Pollution.mp.

exp Smoking/

("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok* or environmental tobacco smoke").mp.

(passive or involuntary or secondhand or " second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

exp Pregnant Women/

(pregnan* adj2 (women or woman).mp

("woman" or "women" or "female" or "girl" or "mother" or "widow").mp.

(child* or infant* or juvenil* or kid? or kids or minors or minors*).

exp Women/

exp child/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

exp Middle East/

exp Iran/ or exp Turkey/ or exp Bahrain/ or exp Cyprus/ or exp Egypt/
or exp Iraq/ or exp Jordan/ or exp Kuwait/ or exp Lebanon/ or exp
Oman/ or exp Israel/ or exp Qatar/ or exp Palestine/ or exp Saudi
Arabia/ or exp Syria/ or exp United Arab Emirates/ or exp Yemen/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or
Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or
Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates*
or Yemen*).mp.

16 or 17 or 18

exp qualitative research/

(interview* or interviews or experience* or qualitative or interview: or
experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

("cross-sectional studies" or "cross sectional stud*" or "Surveys and
Questionnaires").mp.

20 or 21 or 22 or 23

5 and 15 and 19 and 24

EMBASE (Ovid)

1947– 4th January 2021;328 results

exp Tobacco Smoke Pollution/ or Tobacco Smoke Pollution.mp.

exp Smoking/

("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok* or environmental tobacco smoke").mp.

(passive or involuntary or secondhand or " second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

exp Pregnant Woman/

((pregnan* adj2 women) or woman).mp

(woman or women or female or girl or mother or widow).mp.

(child* or infant* or juvenil* or kid? or kids or minors or minors*).mp

exp female/

exp child/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

exp Middle East/

exp Iran/ or exp Turkey/ or exp Bahrain/ or exp Cyprus/ or exp Egypt/
or exp Iraq/ or exp Jordan/ or exp Kuwait/ or exp Lebanon/ or exp
Oman/ or exp Israel/ or exp Qatar/ or exp Palestine/ or exp Saudi
Arabia/ or exp Syria/ or exp United Arab Emirates/ or exp Yemen/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or
Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or
Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates*
or Yemen*).mp.

16 or 17 or 18

exp qualitative research/

(interview* or interviews or experience* or qualitative or interview: or
experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

("cross-sectional studies" or "cross sectional stud*" or "Surveys and
Questionnaires").mp.

20 or 21 or 22 or 23

5 and 15 and 19 and 24

CINAHL (ESBCO)

1961– 8th January 2021; 353 results

S1 (MH "Passive Smoking")

S2 TX passive smoking or TX smoking

S3 S1 OR S2.

S4 (MH "Pregnancy+") OR "pregnancy"

S5 (MH "Expectant Mothers")

S6 TX Expectant Mothers

S7 TX woman or TX women or TX female or TX girl or TX mother
or TX widow or TX father or TXparent

S8 TTX child+ or TX infant or TX juvenil+ or TX kid? or TX kids or
TX minors or TX minors

S9 (MH "Women+")

S10 (MH "Child+")

S11 (MH "Father+")

S12 (MH "parent+")

S13 S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR
S12

S14 (MH "Middle East+")

S15 MH "Iran" OR MH "Turkey" OR MH "Bahrain" OR MH "Cyprus"
OR MH "Egypt" OR MH "Iraq" OR MH "Jordan" MH "Kuwait" OR MH
"Lebanon" OR MH "Oman" OR MH "Israel" OR MH "Qatar" OR MH
"Palestine" OR MH "Saudi Arabia" OR MH "Syria" OR MH "United Arab
Emirates" OR MH "Yemen"

S16 TX "Iran" OR TX "Turkey" OR TX "Bahrain" OR TX "Cyprus" OR
TX "Egypt" OR TX "Iraq" OR TX "Jordan" TX "Kuwait" OR TX
"Lebanon" OR TX "Oman" OR TX "Israel" OR TX "Qatar" OR TX
"Palestine" OR TX "Saudi Arabia" OR TX "Syria" OR TX "United Arab
Emirates" OR TX "Yemen"

S17 S14 OR S15 OR S16

S18 (MH "Qualitative Studies+") OR "qualitative research or
qualitative study or qualitative methods or interview"

S19 (MH "Cross Sectional Studies") OR (MH "Surveys+") OR (MH
"Questionnaires+") OR "survey or questionnaire or cross-sectional"

S20 TX "interviews" OR TX "qualitative" OR TX "interview" OR TX
"experience" OR TX "survey" OR TX "questionnaires" OR TX "cross
sectional studies"

S21 S18 OR S19 OR S20

S22 S3 AND S13 AND S17 AND S21

PsycINFO (Ovid)

1806– 4th January 2021; results 60

exp passive smoking / or passive smoking.mp.

exp Smoking/

("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive adj3 smok*" or "smok* adj3 involuntary" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok* or environmental tobacco smoke" or "Tobacco smoke pollution").mp.

(passive or involuntary or secondhand or " second hand").mp

1 or 2 or 3 or 4

exp pregnancy/

((pregnan* adj2 women) or woman).mp.

(woman or women or female or girl or mother or widow).mp

(child* or infant* or juvenil* or kid? or kids or minors or minors*).mp

exp Human Females/

exp Child Welfare/

exp Father/ or father.mp

exp parent/ or parent.mp

6 or 7 or 8 or 9 or 10 or 11 or 12 or 13

exp Developing Countries/ or Middle Eastern countries.mp.

exp Arabs/

(middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or
Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or
Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates*
or Yemen*).mp.

15 or 16 or 17

qualitative research.mp. or exp Qualitative Methods/

(interview* or interviews or experience* or qualitative or interview: or
experience:).mp. or qualitative.tw.

exp Cross-Sectional Studies/

("cross-sectional studies" or "cross sectional stud*" or "Surveys and
Questionnaires").mp.

19 or 20 or 21 or 22

5 and 14 and 18 and 23

Web of Science

1900–10th January 2021; results195

TS= ("tobacco Smoke Pollut*" or "second hand smok*" or "secondhand smok*" or "second-hand smok*" or "involuntary smok*" or "passive cigarette smok*" or "passive tobacco smok*" or "secondhand cigarette smok*" or "secondhand tobacco smok*")

TS= ((passive or involuntary or secondhand or “ second hand”) near/2 (Smok*))

#1 OR #2

TS= ("woman" or "women" or "female" or "girl" or "mother" or "widow" or “parent” or “father”)

TS= ((pregnan*) near/2 (women or woman))

TS= (child* or infant* or juvenil* or kid? or kids or minors or minors*)

#4 OR #5 OR #6

TS= (middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*)

TS= (interview* or interviews or experience* or qualitative or interview:
or experience: or survey* or questionnaire* or “cross sectional stud*”)

#3 AND #7 AND #8 AND #9

Scopus (Elsevier)

1960– 10th January 2021, results 267

TITLE-ABS-KEY (tobacco AND smoke AND pollut* OR second
AND hand AND smok* OR secondhand AND smok* OR second-
hand AND smok* OR involuntary AND smok* OR passive AND
cigarette AND smok* OR passive AND tobacco AND smok* OR
secondhand AND cigarette AND smok* OR secondhand AND
tobacco AND smok*)

TITLE-ABS-KEY (passive OR involuntary OR secondhand OR “second
hand”) W/2 (smok*)

TITLE-ABS-KEY (woman OR women OR female OR girl\$ OR mother\$
OR widow\$)

TITLE-ABS-KEY ((pregnan*) W/2 (women or woman))

TITLE-ABS-KEY (child* OR infant* OR juvenil* OR kid\$ OR minor\$)

TITLE-ABS-KEY ((middle AND east* OR iran* OR turkey* OR
bahrain* OR cyprus* OR egypt* OR iraq* OR jordan* OR kuwait*
OR lebanon* OR oman* OR israel* OR palestine* OR qatar* OR

saudi AND arabia* OR syria* OR united AND arab AND emirates*
OR yemen*))

TITLE-ABS-KEY (developing AND countries)

#1 OR #2

#3 OR #4 OR #5

#6 AND #8 AND #9

#7 AND #8 AND #9

#10 OR #11

TITLE-ABS-KEY (interview\$ OR experience* OR qualitative OR
survey\$ OR questionnaire\$ OR cross sectional stud*)

#12 AND #13

ProQuest Dissertations and Theses

Date searched: January 10, 2021, results 4100

S1 "tobacco Smoke Pollut*" OR "second hand smok*" OR
"secondhand smoke" OR "second-hand smok*" OR "involuntary
smok*" OR "passive cigarette smok*" OR "passive tobacco smok*" OR
"secondhand cigarette smok*" OR "secondhand tobacco smok*"

S2 (("woman" or "women" or "female" or "girl" or "mother" or "widow")

S3 (child* or infant* or juvenil* or kid? or kids or minors or minors*)

S4 (middle east* or Iran* or Turkey* or Bahrain* or Cyprus* or Egypt* or Iraq* or Jordan* or Kuwait* or Lebanon* or Oman* or Israel* or Palestine* or Qatar* or Saudi Arabia* or Syria* United Arab Emirates* or Yemen*)

S5 (interview OR experience* OR qualitative OR survey OR questionnaire OR cross sectional stud*)

S6 2 OR 3

S7 1 AND 4 AND 5 AND 6

OpenGrey

Date searched: January 10, 2021; 10 results. Single search terms were used.

tobacco Smoke Pollution [any word]

second hand smoke [any word]

secondhand smoke [any word]

second-hand smoke [any word]

involuntary smoke [any word]

passive cigarette smoke [any word]

passive tobacco smoke [any word]

secondhand cigarette smoke [any word]

secondhand tobacco smoke [any word]

ETHOS

Date searched: January 11, 2021; 5 results. Single search terms were used.

tobacco Smoke Pollution [any word]

second hand smoke [any word]

secondhand smoke [any word]

second-hand smoke [any word]

involuntary smoke [any word]

passive cigarette smoke [any word]

passive tobacco smoke [any word]

secondhand cigarette smoke [any word]

secondhand tobacco smoke [any word]

8.1.4 Appendix 3.2 Studies ineligible following full-text review

	Study	Reason for exclusion
1.	Alghamdi AS, Jokhadar HF, Alghamdi IM, Alsohibani SA, Alqahtani OJ, Abdelmageed WH. Socioeconomic determinants of exposure to secondhand smoke among pregnant women. <i>Int J Women Health Reproduct Sci.</i> 2016;4(2):59-63.	Quantitative study; no qualitative data
2.	Al-Haddad NM, Hamadeh RR, Bahram SA. Public knowledge and attitudes towards passive smoking. <i>Saudi Med J.</i> 2005;26(12):2004-6.	Conference abstract with no full paper; ineligible participants
3.	Aslan D, Daymaz D, Gürsoy N, Kartal G, Yavuz M. Status of exposure to second-hand smoke at home in children under five years of age: an example from Ankara Province. <i>Turkish Thor J.</i> 2015;16(1):16.	Quantitative study; no qualitative data
4.	Azab M, Khabour OF, Alzoubi KH, Anabtawi MM, Quttina M, Khader Y, et al. Exposure of pregnant women to waterpipe and cigarette smoke. <i>Nicotine Tobacco Res.</i> 2012;15(1):231-7.	Quantitative study; no qualitative data
5.	Baheiraei A, Ghafoori F, Nedjat S, Froushani AR. Sociodemographic characteristics and secondhand smoke exposure among women. <i>TANAFOS.</i> 2013;12(2):41.	Quantitative study; no qualitative data
6.	Baheiraei A, Ghasab Shirazi M, Raisi Dehkordi Z, Rahimi Froushani A, Nedjat S. Prevalence of home smoking bans and its determinants in families with infants. <i>Int J Pediatr.</i> 2018;6(1):6987-97.	Quantitative study; no qualitative data
7.	Bahiraei A, Kharaghani R, Mohsenifar A, Kazemnejad A, Mota A, Sharifi MH, et al. Factors associated with secondhand smoke exposure in infants. <i>TANAFOS.</i> 2010;9(2):43-49.	Quantitative study; no qualitative data
8.	Celik M, Ekerbicer HC, Ergun UG, Guler E, Kaya D. Prevalence of passive smoking in children and adolescents in Kahramanmaras, Turkey. <i>Saudi Med J.</i> 2007;28(7):1143-5.	Quantitative study; no qualitative data
9.	El Shahawy O, Labib K, Mead E, Hamdy A, Sherman S, Oncken C. Assessment of exclusive and dual cigarette and hookah smoking among a	Conference abstract with no full paper

	Study	Reason for exclusion
	sample of pregnant women in Egypt. Tob Induced Dis . 2018;16(1).	
10.	Gharaibeh H, Haddad L, Alzyoud S, El-Shahawy O, Baker NA, Umlauf M. Knowledge, attitudes, and behaviour in avoiding secondhand smoke exposure among non-smoking employed women with higher education in Jordan. Int J Environ Res Public Health. 2011;8(11):4207-19.	Quantitative study; no qualitative data
11.	Karatay G, Alp N. Evaluation of behavioural change towards smoking in Turkish fathers having 0-1 year old infants during prenatal and postnatal periods. Asia Pac J Cancer Prev. 2010;11(1):141-4.	Quantitative study; no qualitative data
12.	Mahmoodabad SS, Karimiankakolaki Z, Kazemi A, Mohammadi NK, Fallahzadeh H. Exposure to secondhand smoke in Iranian pregnant women at home and the related factors. Tob Prev Cessat. 2019;5(7).	Quantitative study; no qualitative data
13.	Merrill RM, Madanat H, Kelley AT, Layton JB. Nurse and physician patient counselling about tobacco smoking in Jordan. Promot Educ. 2008;15(3):9-14.	Quantitative study; no qualitative data
14.	Motallebnejad M, Pouramir M, Jenabian N, Bijani A, Salehi M, Ranjbar M, et al. Frequency of passive smoking among 12-15 year school children (Babol, Iran 2011). J Babol Uni Med Sci. 2014;16(1):106-11.	Quantitative study; no qualitative data
15.	Rosen L, Kostjukovsky I. Parental risk perceptions of child exposure to tobacco smoke. BMC Public Health. 2015;15(1):1-1.	Quantitative study; no qualitative data
16.	Tamim H, Akkary G, El-Zein A, El-Roueiheb Z, El-Chemaly S. Exposure of pre-school children to passive cigarette and narghile smoke in Beirut. Eur J Public Health. 2006;16(5):509-12.	Quantitative study; no qualitative data
17.	Ziyab AH, Almari M, Al-Taiar A. Exposure to household secondhand smoke among adolescents in Kuwait: results from two school-based cross-sectional studies. Tob Induced Dis. 2020;18.	Quantitative study; no qualitative data

8.1.5 Appendix 3.3 Study findings and illustrations

Gursoy ST, Soyer MT, Ocek Z, Ciceklioglu M, Asku F. Why are Turkish children at risk of exposure to environmental tobacco smoke in their homes? Asian Pac J Cancer Prev. 2008;9:467–72⁹⁷	
Finding	Smoking causes harmful health effects (U)
Illustration	“Cigarette is the most hazardous innovation for human maybe like nuclear energy. Most dangerous enemy of us....” Father ^(p.468)
Finding	Passive smoking was not well recognized term (C)
Illustration	“I think I am a passive smoker because I don’t inhale; I am just a “lip smoker” Mother ^(p.468)
Finding	Children, whose parents smoke, should have desire to smoke (C)
Illustration	“My daughter put pretzel stick cracker between her fingers like smoking a cigarette while playing "Mother ^(p.468)
Finding	Dangers of SHS were not regularly communicated during pregnancy and child bearing (C)
Illustration	One fifth of the participants reported that the health care professions did not inform them about the dangers of ETS and smoking even during pregnancy and child bearing; the total number of participant was 48. ^(p.468)
Finding	Dangers of SHS were commonly learnt from television and health care professions (C)
Illustration	“There are always programs on TV about smoking hazards, immediately I am zapping. I can not resist hearing the smoking hazards. Any way I know what the hazards are, but I can not quit smoking.” Mother ^(p.468)
Finding	There were no complete smoking restrictions in the home (U)
Illustration	“Only in the kitchen under the aspirator in winter, in balcony in the summer” Mother ^(p.469)

Finding	Smoking cigarettes had a negative impact on adult's and children's health and participants stated that they would like to quit smoking (C)
Illustration	"I want to quit smoking for my health. I could not tell a lie to say quitting for my child's health, for god sake. I have sensation problem on my feet and hands." Mother ^(p.469)
Finding	The lack of will power as barriers to quitting smoking or reducing SHS exposure (C)
Illustration	During Ramadan, we do not smoke for hours and hours. But after breaking the fest, I jumped down the cigarettes Father ^(p.469)
Finding	Smoking is considered as sign of manhood or act of modernity even by health professionals (U)
Illustration	A father from a village explained that smoking was the sign of "being a man" Father ^(p.469) "Nobody asked me if I was smoking during the visits, so no information was given. They have never thought I could smoke because I am veiled so I am not a modern woman..." Mother ^(p.469)
Finding	Participants stated that they had difficulties to ask respect and cooperation from friends and family who were visiting in order to keep the home smoke free (Smoking is accepted socially) (C)
Illustration	"During bairam, my uncle visited us. I told him not to smoke at home. He said that; he would blow the smoke through the coal stove, that smoking was his unique pleasure in his life, it was none of my business." Mother ^(p.469)
Finding	According to traditions, it is attached an important value to the hospitality. Make guests comfortable, no critics; no comments are the essentials of the hospitality (U)
Illustration	"It is disgraceful to say friends or relatives not to smoke here. They are our guests" Mother ^(p.470)
Finding	Most of participant don't believe that the [smoking ban] restrictions could be implemented (C)
Illustration	"I don't believe that smokers will obey the rules. Our society doesn't matter any law, there is a statement which says – the laws are made to be destroyed" Mother ^(p.470)

Finding	Many welcome the [smoking] ban because they think it will help them (C)
Illustration	"We are tradesmen so men from lower classes... we are not well informed. I think the punishment will help us to quit smoking... so we support with all out heart the laws..." Father ^(p.470)
Finding	Secondhand smoke is harmful to people's health (NS)
Illustration	When the child was coughing during the interview, the smoker mother mentioned "He is coughing, because he has just came back from his grandma". Mother ^(p.468) On the other hand, ten participants said that they know children who got chronically ill because their parents smoke beside them. ^(p.468)
Finding	All children were exposed to SHS in their homes. (NS)
Illustration	All of the smoking parents reported smoking inside the home to some extent ^(p.469)
Finding	The majority of smoking parents attempted to reduce their child's exposure to ETS (NS)
Illustration	34 of them stated that they wish smoke free houses. While 37 have desire to quit smoking, 31 participants described a struggle with the desire to quit smoking and their addiction to cigarettes. ^(p.469)
Finding	Cigarettes help deal with troubles, loneliness, stress, and other unfortunate circumstances in live (NS)
Illustration	Many participants especially housewives stated that they continue to smoke cigarettes to help deal with troubles, loneliness, and other unfortunate circumstances in their lives. Most of the smokers stated that smoking helps reduce the stress in their lives and helps to calm their nerves. Many of the parents described extremely stressful lives due to financial troubles. Another barrier to quitting that frequently was mentioned is stress. ^(p.469)
Finding	Some parents stated that they lacked resources to allow them to obtain professional counselling or nicotine replacement therapy (NS)
Illustration	Some parents stated that they lacked resources to allow them to obtain professional counselling or nicotine replacement therapy ^(p.469)

	26 participants mentioned that the strategies are not enough to protect the children from ETS ^(p.469)
Rosen LJ, Lev E, Guttman N, Tillinger E, Rosenblat S, Zucker DM, et al. Parental perceptions and misconceptions of child tobacco smoke exposure. Nicotine Tob Res. 2018;20(11):1369–77.	
Finding	Seeing smoke, seeing someone smoking, seeing a lit cigarette, seeing a package of cigarettes as sensory perception of smoking (U)
Illustration	“I don’t believe that it is possible to be exposed to smoking without seeing the action” ^(p.1371)
Finding	Smells the smoke, someone’s clothes smell of smoke as sensory perception of smoking (U)
Illustration	“When someone smokes near then, it doesn’t matter if here or two metres away, if they smell it, it is exposure” ^(p.1371)
Finding	Feeling or sensing smoke, smoke is ‘on’ someone as sensory perception of smoking (U)
Illustration	“When I’m near my father-in-law I can feel he’s been smoking...” ^(p.1371)
Finding	Breathing in smoke, inhaling smoke, smoke enters the body as sensory perception of smoking (C)
Illustration	Passive exposure, however they call it, when the child inhales the smoke or the scent of someone’s cigarette when they’re smoking.” ^(p.1371)
Finding	Combination of different sensory perceptions of exposure (C)
Illustration	“Exposure is when the child breathes or smells the cigarette which someone else is smoking” ^(p.1371)
Finding	Exposure involves being near a smoke (up to a certain distance) as a physical aspect of exposure (U)
Illustration	“Just being next to smokers, like when my children are near me and I’m smoking. Then they’re exposed whether they like it or not.” ^(p.1372)
Finding	Exposure occurs outdoors as physical perception of smoking (U)
Illustration	“When I go to the playground with her and another mother might be standing at the second swing, swinging her child with a cigarette in her mouth, it also reaches my daughter.” ^(p.1372)

Finding	Exposure doesn't occur when the smoker is at a (specified) distance (U)
Illustration	"Far...there's absolutely no way the smoke will reach her" ^(p.1372)
Finding	Exposure occurs in closed spaces (U)
Illustration	"No matter how much you air it out, the car's interior is a small and closed space and the odor remains." ^(p.1372)
Finding	Exposure doesn't occur outdoors/in open spaces (U)
Illustration	"Not in a building, or in the house, or in the entrance, I have no problem with open areas...I don't smoke near my children, I can smoke only if.... We are in an open area, in an open area I can smoke a cigarette." ^(p.1372)
Finding	Exposure doesn't occur when the window is open (U)
Illustration	"My husband smokes in the car but makes sure to open the window because he says that way the odor doesn't remain." ^(p.1372)
Finding	Exposure does not occur when the door is closed (U)
Illustration	"I smoke only on the balcony and I always close it off (from the rest of the house)...I do everything to avoid anything reaching my daughter." ^(p.1372)
Finding	Exposure occurs while smoking and walking with stroller (U)
Illustration	"When I open the overhead protective covering ...the smoke goes over it and not beneath it. So he [the child] is somewhat exposed; sometimes he even coughs a bit." ^(p.1372)
Finding	Exposure doesn't occur while walking with stroller and smoking (U)
Illustration	"I don't really think that any of it reaches her when we're walking with her in the stroller and smoking, it doesn't seem reasonable to me that it would reach her." ^(p.1372)
Finding	Exposure doesn't occur in a moving car (U)

Illustration	“There’s no way I’ll smoke when it’s raining say, only with all the windows open and the car’s moving so there’s air and the air conditioner is on to get it out”(p.1372)
Finding	Exposure doesn’t occur when blowing smoke away from children (U)
Illustration	“the smoke, I blow it away a bit, the cigarette isn’t close to them, I don’t put the cigarette near them and when I breathe out the smoke, I don’t blow in their direction, I exhale normally but not in their direction”(p.1372)
Finding	Exposure doesn’t occur if the child is moved away from the smoker, or the smoker moves away from the child (U)
Illustration	“If I’m sitting with her on a bench then I’ll move the stroller away a bit and I’ll move to the other side of the bench.”(p.1372)
Finding	Time elapsed after smoking prevents SHS exposure (C)
Illustration	“If I know that I have to get one of the kids I try not to smoke for half an hour before this... if I light up then all the windows for sure will open and there is an air freshener”(p.1372)
Myers V, Lev E, Guttman N, Tillinger E, Rosen L. “I can’t stand it... but I do it sometimes” parental smoking around children: practices, beliefs, and conflicts—a qualitative study. BMC Public Health. 2020;20:1–10.	
Finding	Rules about smoking at home (U)
Illustration	“I only smoke on the balcony and I always close it off (from the rest of the house)”(p.697)
Finding	Limitations of smoking in the car (U)
Illustration	“Do you ever smoke with the kids in the car?”, “No, that’s the limit”(p.697)
Finding	Limitations of smoking when strolling with babies (U)
Illustration	“A lot of mothers stroll with the baby carriage and smoke freely. No way will I do that”(p.697)
Finding	Protective behaviours: maintaining distance (U)
Illustration	“I smoke next to them outside, but I don’t smoke ‘on top of their heads’.”(p.697)
Finding	Protective behaviours: smoke-free home (U)

Illustration	"I don't smoke inside the house; even if I smoke outside the house I make sure the door is closed so that no smoke comes in." ^(p.697)
Finding	Protective behaviours: at the window (U)
Illustration	"I smoke at the window...my whole head is outside, I'm almost falling out" ^(p.697)
Finding	Protective behaviours: personal hygiene (U)
Illustration	"I change my shirt after smoking, thoroughly wash my hands, rinse my mouth with mouthwash and try very hard to have no smoke odor on me." ^(p.697)
Finding	Greater importance of protecting smaller children (U)
Illustration	"So while he's small it's very important for me that he not be near an environment of smokers... suddenly he seems like a big boy, so it seemed like it was OK to smoke near him" ^(p.697)
Finding	Confidence in protective measures (U)
Illustration	"Do you think it's effective to reduce exposure to passive smoking?", "Opening the windows? ...Of course it is!" ^(p.697)
Finding	Uncertainty regarding protective measures (U)
Illustration	"I don't really think that any of it reaches her when we smoke and walk with the stroller, it doesn't seem reasonable that it would reach her, but it could be that I don't know enough" ^(p.697)
Finding	Acceptance of partially effective protective measures are enough (U)
Illustration	"If I smoke in the car on my way to picking up the kids, I say to myself: 'OK, it'll air out by the time I put them in the car'. But that's a bunch of bull. It doesn't totally disappear, even if you leave the window open." ^(p.697)
Finding	Self-criticism/Being a good vs bad parent (U)

Illustration	"It makes me feel bad and I know it's bad. I get so mad at myself but...it's a conflict, a huge conflict... I mean it goes against everything that... as a parent you want only good for your children, and here you're sticking poison in their face..."(p.698)
Finding	Acceptance of imperfection – no guilt (U)
Illustration	"I'm not sorry for smoking nor am I trying to obtain anyone's approval. I don't have guilt feelings over smoking. That doesn't mean that I need to smoke more. I'm aware that I need to do something"(p.698)
Finding	Judgement of 'others' (C)
Illustration	"I see it when they're [others] looking at me. When I'm walking around with the carriage and I'm holding a cigarette... No, it doesn't affect me...Maybe bothers me for a moment, but it passes."(p.698)
Finding	Conflicts with family (C)
Illustration	"There are arguments about that for example, about my mother, we argue about her smoking, me and my partner, it upsets her [my partner] that she [my mother] doesn't make an effort not to smoke around the kids"(p.698)
Finding	Perceived lack of control/low self-efficacy (U)
Illustration	"I have this fantasy of not smoking next to them, but I don't have that privilege. It's like...smoking in secret. Or there might be an instance where I can do it without them being on top of me or next to me. So if I'm with them for 12 h a day on weekends it's like hiding from them"(p.698)
Finding	Perceived lack of control/low self-efficacy – practical barriers (U)
Illustration	"I try to go out on the balcony but it's cold, and it sucks to stand out in the cold with a cigarette, so I smoke near them - it's not great but it is what it is."(p.698)
Finding	Trying – making an effort to decrease SHS exposure among children (U)
Illustration	"I try very hard to have no smoke odor on me. I do everything to avoid anything reaching my daughter." (p 698)

	"I try not to smoke next to them, but they're always coming in and out, in and out. I always tell them to go in and stay inside." ^(p.698)
Finding	Feeling in control – high self-efficacy to change the habit (U)
Illustration	"You simply need to change the habit...From smoking in the car to not smoking in the car. It's a habit that you have to give up. There are habits you need to get rid of – to decide and to give them up." ^(p.698)

C, credible; NS, not supported, SHS, second-hand smoke; U, unequivocal

8.1.6 Appendix 3.4 2020 PRISMA Check list

Section/topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	104
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	104
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	104
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	105
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	106

Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	107
Selection Process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	107
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process..	108
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. For all measures, time points, analyses), and if not, the methods used to decide which results to collect.	109-110
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	109-110
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	109-110
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	109-113
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	109-113

	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	109-113
	13d	Describe any methods used to synthesise results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	109-113
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	109-113
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesised results.	109-113
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	109-113
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	109-113
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (see fig 1).	114
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	114
Study characteristics	17	Cite each included study and present its characteristics.	114
Risk of bias within studies	18	Present assessments of risk of bias for each included study.	115
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	115

Results of Synthesis	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	116-124
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesised results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	116-124
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	116-124
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	125
	23b	Discuss any limitations of the evidence included in the review.	125-13-
	23c	Describe and explain any amendments to information provided at registration or in the protocol.	125-130
Other information			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	104
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	104
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	105

Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code, and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

8.1.7 Appendix 4.1 Ethical and data collection approvals



**Faculty of Medicine & Health Sciences
Research Ethics Committee**

Faculty Hub
Room E41, E Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham, NG7 2UH
Email: FMHS-ResearchEthics@nottingham.ac.uk

11 March 2020

Ms Zeinab Hassanein
PhD Student
c/o Dr Tessa Langley
Associate Professor in Health Economics
UK Centre for Tobacco and Alcohol Studies
Division of Epidemiology and Public Health
Clinical Sciences Building
Nottingham City Hospital Campus
Nottingham University Hospitals
NG5 1PB

Dear Ms Hassanein

Ethics Reference No: 481-2002 – please always quote	
Study Title: Second-hand Smoke (SHS) exposure among pregnant women and children in Egypt.	
Chief Investigator/Supervisor: Dr Tessa Langley, Associate Professor in Health Economics, UK Centre for Tobacco and Alcohol Studies, Division of Epidemiology and Public Health, School of Medicine.	
Lead Investigators/student: Zeinab Hassanein, PhD Student, School of Medicine	
Other Key Investigators/Collaborators: Dr Rachael Murray, Dr Ilze Bogdanovica, Senior Research Fellow/Cancer Research Fellow, Professor Jo Leonardi-Bee, Head, Division of Epidemiology and Public Health, School of Medicine.	
Location of Study: Assiut, Egypt	
Proposed Start Date: 01/07/2020	Proposed End Date: 01/10/2021

The Committee considered this application at its meeting on 28 February 2020 and the following documents were received:

- FMHS REC Application form and supporting documents version 1.0: 10.02.2020

These have been reviewed and are satisfactory and the study has been given a favourable opinion.

A favourable opinion has been given on the understanding that:

1. All appropriate ethical and regulatory permissions are respected and followed in accordance with all local laws of the country in which the study is being conducted and those required by the host organisation/s involved.
2. The protocol agreed is followed and the Committee is informed of any changes using a notice of amendment form (please request a form).
3. The Chair is informed of any serious or unexpected event.
4. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely



Dr John Williams, Associate Professor
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee



وحدة أخلاقيات البحث العلمي
وممارسة المهنة الطبية والتدريس

FACULTY OF MEDICINE
Medical Ethics Committee
Telephone, Fax +2088 2332278
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<http://afm.edu.eg>
E mail: ethics-committee12 @ aun. Edu.eg/faculty- medicine

IRB no: 17200438

Date: 26/4/2020

This is to certify that "The Committee of Medical Ethics" of the Faculty of Medicine Assiut University reviewed and approved the research proposal submitted by:

Dr/Zeinab Mostafa Abdelghafour Hassanein.

Ph D Student -University Nottingham - Assistant Lecturer at Public Health & Community Department, Faculty of Medicine, Assiut University, Egypt.

Which is titled:

"Secondhand smoke exposure (SHS) among pregnant women and children in Egypt"

The committee has given the agreement on conducting the research

We wish the research all the success it deserves.

Best regards,

Prof. Mahmoud Abdel Aleem

**Chairman, Medical Ethics
Committee, Assiut University**

**Assiut University
Faculty of Medicine
Institutional Review Board**



Prof. Tarek El Gammal

**Dean of the Faculty of Medicine
Assiut University**



Prof. Dr. Mohamed Zein El Din Hafez

Undersecretary of the Ministry of Health, Assiut Governorate

I would like to thank you for agreeing to investigate the knowledge, attitude and practice of pregnant women towards passive smoking. The sample will be collected purely from pregnant women attending antenatal clinics in primary health care centers of the Ministry of Health in Assiut Governorate. Three urban units and three rural units were selected to conduct this research:

- 1- The Primary health unit in the west of the country
- 2- The Primary Health Unit in Kedwany District (Raja Center)
- 3- The Primary health unit in Alwaleediyah area
- 4- The primary health unit in Al-Arbaeen area
- 5- The primary health unit in Bani Talib
- 6- The Primary health unit masraa

Presented from

Zeinab Mostafa Abdelghafour
Zeinab Mostafa
Assistant lecturer of Public health

Faculty of medicine, Assiut University

Faculty of medicine Dean's Signature:

Prof Dr Ahmed Elmanshawey

A. El Manshawey
26/08/2018

Prof. Dr. Mahdi Ra
26/8/2018



26/8/2018

[Handwritten signature]

8.1.8 Appendix 4.2 Covid 19 impact statement



COVID19 Impact Statement 2020
For use by doctoral PGR students registered prior to 1 March 2020 with end dates up to and including 30 September 2023

The University of Nottingham aims to support all PGRs to complete their degrees within their period of study, by meeting their [Doctoral Outcomes](#). We recognise, and aim to take into account, personal circumstances that may affect a PGR's ability to achieve this.

This Impact Statement can be used to provide details and evidence of impact for:

- annual review and progression discussions, processes and decisions;
- confirmation of need for an extension to your registered period of study
- the thesis examination.

Please keep a completed copy of this form as you may want to refer to it as evidence of impact in your thesis examination.

We strongly encourage you to discuss the completion of this form with your supervisors. If there are confidential issues that you prefer not to share with your supervisors, you can alternatively discuss how best to complete this form with an appropriate member of PGR support staff such as your DTP/CDT Director or Manager, DTP/CDT Welfare Officer, School Postgraduate Student Advisor, School PGR Director or other member of the Welfare team.

To ensure that you cover the full impact of the COVID-19 pandemic on you and your research since **March 15th 2020**, we advise inclusion of information in all relevant sections of the form. You can be very brief, using note or bullet form. The information can be dynamic, showing how you have responded to the evolving situation, or a summary of outcomes. How you record this is entirely up to you.

We suggest that you could include the following information relating to the exceptional conditions of the ongoing COVID-19 pandemic but you can include any relevant information here:

- your ability to work effectively under Covid-secure conditions, or if you are not in your usual working environment particularly if your working environment is not entirely suitable for effective working;
- any change in ease or amount of access to research settings or facilities, such as archives, field-sites, laboratories, software, or databases;
- any changes in your personal circumstances or environment resulting from remote working, or national restrictions, including those related to:
 - additional caring responsibilities,
 - disability and/or [being at higher risk from coronavirus](#)
 - impacts on your supervisory team that have affected your research progress
 - your mental health, and whether you have access to mental health support if needed,
 - any financial impacts, either personal or on the research in progress or planned.
 - any other considerations that should be taken into account, whether these do or do not relate to any protected characteristics.

It is allowable, and advised that you include this form in your thesis for submission to examiners. If you do include this form in the thesis submitted for examination, you may remove or redact any information that you wish to remain confidential.

Please remember that if this form is included in the final completed approved thesis, you should ensure that all confidential or personal information is removed, as the thesis will be available to all through eTheses.

If you also use the information contained in this form for any purpose that requires further information sharing, such as in a case for an extension to time or funding, any information you share that may be used for other than the stated purposes will be anonymised, and all personal information through which anyone could be identified removed. Any information contained on this form that you

v.1 06/21

share with the University that could be used to identify you will not be shared with anyone, including supervisory teams, for other than the stated purposes, without your permission.

If the information included in this form is used for a case for an extension to study or thesis pending, other than for the confirmation of need for an exceptional Covid additional of period of study, you should also refer to the University's online [Policy](#) on Circumstances Affecting Students' Ability to Study and Complete Assessments (under Exceptional Guidance to Extenuating Circumstances Panels), section 16 of the PhD Regulations (see [Appendix 2](#), section 1), relating to existing regulations on circumstances that may or may not be usual grounds for an extension, and any other regulations relating to exceptional Covid-19 extensions.

Background Information – your details			
Family Name:	Hassanein	First Name(s)	Zeinab
ID:	20129373	School:	Medicine
Original date thesis due for submission	January 2022		

1. DESCRIBING THE IMPACT
<p>(Please complete this section with more detailed information on the main impacts on your and your research)</p> <p>For example you could write a short clear description of the nature of the impacts or problems that you face/have faced, make making this description as brief, and specific as possible. You could also give more detail on the nature of the impacts on your research progress. If you are in years 2 or 3 of your programme you can write this as either a chronological description, or alternatively you can update the information following discussions with your supervisors as you progress through the programme.</p> <p>We understand that personal and research impacts will be related, so if it helps you should make that clear where appropriate.</p> <p style="text-align: right;">Section 1, additional guidance</p>
<p>The impact on you:</p> <ul style="list-style-type: none"> In usual days, I used to work in my office in clinical science building in city hospital, nor now I am working from home with less concentration due to additional caring responsibilities. My children used to go to school, but due to covid 19, they are at home during periods of lockdown. I was responsible for their home schooling plus taking care of them during my working hours.

The impact on your research:

I was planning to collect data for my research from Egypt in early 2020. Due to Covid 19, lockdown, and travel restriction, data collection was delayed more than 3 months. I managed to travel and collect the data in August 2020, however this delay affect my progress in my research.

2. ACTIONS TAKEN TO MINIMISE THE IMPACT

a) How have you tried to mitigate the risk to your project?

Briefly show how you have tried to minimise the impact of the situation on your research activities and progress.

For example,

- have you discussed how to do this with your supervisors? Include information of the people with whom you have discussed your plans for progression.
- have you considered different ways to get the research done, such as changing your research plans to alter the order in which you do different elements?
- have you altered your research design, for example to conduct research online, or using other digital resources?
- what constraints or barriers did you have to try to remove, modify or overcome?
- If you have not been able to alter your plans, why not? how are you managing your progress if this is the case?

Try to show how/whether your work to date is planned to, or already meets some of the University and QAA [Doctoral Outcomes](#), clarify which doctoral outcomes are not currently met and how your plan will enable you to meet these.

[Section 2](#) additional guidance

I have discussed the situation with my supervisors. They told me to discuss the possibility of collecting the data online with relevant stakeholders in Egypt. I contacted the undersecretary of ministry of health and he told me that online data collection is not practical and feasible in Egypt. He told me that the response rate will be too low.

b) List the aspects of your research plan that you have managed to achieve or progress during the period of impact.

I managed to get the ethical approval from school of medicine research ethics committee, University of Nottingham and Assiut university, Egypt.

I finished preparing all research tools that I used for data collection.

3. NEXT STEPS

Please list / bullet point what you plan to do from now, to both progress your research and in order to continue to lessen the impact on your research, now that you are able to access research facilities and can resume the specific activities listed in Section 1, or start to implement the changes to your research plans. The plan should show how you aim to complete your research and thesis as close to your original end date as possible.

For example, what plans do you have to make sure that elements of your research that you have altered can be completed effectively to meet the doctoral outcomes? What, if any, further changes do you need to make? What impact(s) cannot be effectively mitigated and how will you address those?

As and when your research plans change, it is useful to keep a record of such changes. If you have a research plan from before the Covid pandemic, it is useful to include it in the document, and compare to your revised plans as you move forwards in your programme.

[Section 3](#) additional guidance

I managed to collect data in August 2020, however after 3 months delay. Now I started to analyze this data and write the results. I managed to do my 2nd peer review on time. But I do not think that I will manage to submit my thesis in January 2022. I will need more time. There has been a

v.1 06/21

substantial impact of Covid-19 on my mental and physical health and on my research. I have to delay data collection for my research from Egypt for 3 months. I have documented the impact of Covid-19 on my PhD progress and I will therefore apply for Covid-19 related Phase II time extension and request 6 months extension. As required by the school, I will apply for the extension upon completion of the final year review. The analysis of qualitative study is on progress, and I have not started writing the manuscript yet. Then I will start editing and writing the six chapters. I think that I definitely need the extension for finishing all my publications. I prepared a Covid-19 impact statement and I will submit it with the 6 months time extension form.

4. EVIDENCE

You do not need to provide any evidence supporting the information contained in the form but if you have any available evidence, then you can keep a list of it here as a reminder.

[Section 4](#) additional guidance

5. CONFIDENTIAL INFORMATION

Please use this section to provide any confidential information if you wish to record this as a record for you, and if appropriate your supervisors. You can redact or remove this information if you use this form as evidence of impacts for your examiners.

<p><input checked="" type="checkbox"/> I have completed this form after/in discussion with: (indicate all those that apply, discussion is strongly encouraged with at least one person)</p> <p><input checked="" type="checkbox"/> Primary supervisor/other supervisor <input type="checkbox"/> SPSA <input type="checkbox"/> School PGR Director <input type="checkbox"/> DTP/CDT Director <input type="checkbox"/> DTP/CDT Manager <input type="checkbox"/> DTP/CDT Welfare Officer <input type="checkbox"/> other member of the Welfare Team <input type="checkbox"/> Other (please make a note below)</p>

Appendix 1.

University of Nottingham Criteria for award of PhD and other qualifications at Doctoral Level

- (i) the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication;
- (ii) a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;
- (iii) the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems;
- (iv) a detailed understanding of applicable techniques for research and advanced academic enquiry.

Typically, holders of the qualification will be able to:

- (a) make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences;
- (b) continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches; and will have:
- (c) the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

Appendix 2.

Additional Guidance notes.

What to include:

Section 1, Describing the impact. Please use this form to show how you have planned to adjust the project or use other means to mitigate the impacts of the Covid-19 pandemic, as far as is possible. You should say how you have changed or adjusted your research plans in response to the pandemic, what impacts (if any) you continue to deal with, and if any have been impossible to address.

Please include all research activities that have been impacted by the pandemic, but not those that are attributable to other events. For example, if you had planned a period of research activity at another organisation before or after the pandemic that has had to be cancelled, or postponed and cannot be rescheduled within your registered period of study, this should be recorded, and the way in which you have altered your approach to this part of the research recorded.

Please do not feel that you have to write a large amount in any of the sections of this form. Your record of impact can be brief and to the point but should show the full impact of the pandemic on you and your research for progression purposes and for confirmation of any need for an extension of time of your registered period of study at your final annual review.

This form will continue to be available on the [R&I sharepoint](#) and you can use it to record longer-term impacts of COVID-19 on your work over the coming months or years.

Section 2, Action taken. Please make a note the people with whom you have discussed your research plans and what advice and support you have had in adjusting your activities to mitigate any risk to the progress of your research. You are not obliged to consult or discuss the completion of this form with your supervisors, but we encourage you to do so. Include if and how your plans have changed as a result of either these discussions or your own planning.

Please also detail the aspects of your research plans that you have managed to achieve or move forwards under the pandemic conditions, even if you feel that you haven't managed to achieve as much as you originally planned. Please show how your achievements relate to your previous and future research plans.

Section 3, next steps. It's important to plan both how to deal with a current or any emergent situation that disrupts your research, and also how to get back into 'normal' working once you are able to do so. Back-up plans for how you might deal with further lockdowns or restrictions on access to research facilities are particularly important, so that you can quickly react to changing situations. For example, is there a piece of advanced scholarship, such as writing a narrative or systematic review, that you could move to. These plans should include how you will continue to progress your research, under Covid-secure conditions and taking into account any limitations or constraints that these will impose, and if/as things move back to a more 'normal' situation, including how you plan to complete your research and thesis. Your future/ revised plans do not need to be complicated, nor in Gantt chart form unless this is a planning method that you already use. A simple table of milestones, deadlines, and outputs is more than sufficient.

If there is anything that is still presenting you with a problem, and that is likely to continue to do so, please record it here. Record information on why this might be an ongoing concern, giving brief information on discussions you have had to try and solve the problem. As you progress, you can update this section with any changes, either ways in which you have solved problems or ongoing difficulties, as appropriate.

Section 4 You do not need to provide evidence but if you have any, you can make a note here so that you are reminded if you subsequently use this form to support your thesis examination.

Privacy and confidentiality: We encourage everyone to discuss the information contained in the form, and its completion with a member of the PGR support staff in the University, particularly with your supervisors. We do however recognise that there may be aspects of this form that you might wish to keep confidential, and so you could alternatively discuss things with

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your SPSA, your School PGR Director(s), your DTP/CDT Director, Manager or Welfare Officer, Senior Tutor, mentor or other supportive member of staff.

If the circumstances you describe have an impact on your final thesis assessment, it will probably be necessary to share key information with the examiners/internal assessor. If there is anything that you wish to keep confidential from the examiners please only include it in section 5 of the form. This will enable sharing of the rest of the information in a way that will let the assessors/examiners understand the impact on you and your research while enabling you to remove or redact this confidential information prior to inclusion of the form in your submitted thesis.

For use in progression and thesis assessment: We strongly suggest that you keep a copy of this form updated as you progress through your research and thesis writing. It should be used in annual progression discussions with your supervisors and internal assessor, and we strongly advise you to include a copy in your annual review documents as a record of your challenges and how/if you have managed to solve these. This is particularly important at your final annual review should you require to confirm your need for a Covid-19 extension to your period of registered study at this point. You can also use this form, with any confidential material redacted, for inclusion with your submitted thesis as a record of how you have managed the impact of the COVID pandemic on your achievements during your postgraduate research degree.

8.1.9 Appendix 4.3 Participant information sheet



**University of
Nottingham**
UK | CHINA | MALAYSIA

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Study Title: An exploration of knowledge, attitude and behaviour of HCPs in Assiut city regarding Secondhand Smoke (SHS) exposure among pregnant women.

PARTICIPANT INFORMATION SHEET

Research Ethics Reference:
Version 1.0 Date: 02/02/2020

We would like to invite you to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read this carefully and discuss it with others if you wish. The researcher (ZH) will go through the information sheet with you and answer any questions that you may have.

What is the purpose of the research?

SHS exposure resembles an earnest public health threat worldwide. It is established that SHS exposure is highly prevalent in Egypt. There is a substantial evidence that SHS exposure may cause many adverse effects among non-smokers. Pregnant women and children are vulnerable groups that may be significantly affected by SHS. There is robust evidence that HCPs can help pregnant women to decrease or even prevent her exposure to SHS. Therefore, a survey will be carried out to explore HCPs'

knowledge of and attitude towards SHS exposure among pregnant women and their practice in antenatal care clinics regarding SHS exposure among pregnant women in Assiut, Egypt.

Why have I been invited to take part?

You are a HCP employed by the Egyptian Ministry of Health in Assiut city and you are caring for pregnant women in antenatal care clinics (general practitioner (GP), obstetrician, and nurse)

Do I have to take part?

No. It is up to you to decide if you want to take part in this research. The researcher will describe the study and go through this information sheet with you to answer any questions you may have. If you decided to take part in the study, you would still be free to withdraw from the study at any time, without giving a reason and without any negative consequences, by advising the researchers of this decision. This would not affect your legal rights.

1. What will happen to me if I take part?

We will ask you to complete a questionnaire which will ask questions related to your knowledge of and attitude towards SHS exposure among pregnant women, your practice in antenatal care clinics regarding SHS exposure among pregnant women in Assiut, Egypt. The questionnaire will take approximately 10 minutes to be completed

2. Are there any risks in taking part?

We are not aware of any risks of taking part in this study.

3. Are there any benefits in taking part?

There will be no direct benefit to anyone from taking part in this research but your contribution may help to identify your views about SHS exposure among pregnant women thereby leading to the knowledge of possible interventions that may reduce or prevent SHS exposure among pregnant women in Egypt.

4. Will my time/travel costs be reimbursed?

Participants will not receive an inconvenience allowance to participate in this study.

5. What happens to the data provided?

The research data will be stored confidentially and anonymized in an encrypted electronic storage device/laptop. You will not be identifiable in any report or publication. All research information will only be accessed by the research team [i.e. researcher, supervisor, collaborator / translator / transcribe]. However, we would like your permission to use anonymised data in future studies, and to share our research data (e.g. in online databases) with other researchers in other Universities and organisations both inside and outside Egypt. This would be used for research in health and social care. Sharing research data is important to allow peer scrutiny, re-use (and therefore avoiding duplication of research) and to understand the bigger picture in particular areas of research. All personal information that could identify you will be removed or changed before information is shared with other researchers or results are made public. All research data and records will be stored for a minimum of 7 years after publication or public release of the work of the research.

6. What will happen if I don't want to carry on with the study?

Even after you have accepted to participate in the study, you are free to withdraw at any time without giving any reason and without your legal rights being affected. If you withdraw we will no longer collect any information about you but we will keep the anonymous research data that has already been collected and stored as we are not allowed to tamper with study records. This information may have already been used in some analyses and may still be used in the final study analyses. To safeguard your rights, we will use the minimum personally-identifiable information possible.

7. Who will know that I am taking part in this research?

All information collected about you during this research would be kept strictly confidential. All such data are kept on password-protected databases sitting on a restricted access computer system and any paper information (such research questionnaires) would be stored safely in lockable cabinets in a swipe-card secured building and would only be accessed by the research team. Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally – identifiable information possible. You can find out more about how we use your information and to read our privacy notice at:

<https://www.nottingham.ac.uk/utilities/privacy.aspx/>

Designated individuals of the University of Nottingham may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines.

8. What will happen to the results of the research?

The research will be written up as a doctoral thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published open access. Result of the thesis may also be used for scientific presentation or publication.

9. Who has reviewed this study?

All research involving people is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the Faculty of Medicine and Health Sciences Research Ethics Committee (Reference number: FMHS)

10. Who is organising and funding the research?

The research is being organized by the University of Nottingham and is being funded by Egyptian Ministry of Higher education.

11. What if something goes wrong?

If you have a concern about any aspect of this project, please speak to the researcher Zeinab Hassanein or the Principal Investigator Dr Tessa largely, who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how she intends to deal with it. If you remain unhappy and wish to complain formally, you can do this by contacting the FMHS Research Ethics Committee Administrator, c/o The University of Nottingham, Faculty PVC Office, B Floor, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH. E-mail: FMHS-ResearchEthics@nottingham.ac.uk

12. Contact Details

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

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8.1.10 Appendix 4.4 Questionnaire English and Arabic versions



An exploration of knowledge, attitude and behaviour of Health care professionals (HCPs) in Assiut city regarding SHS exposure among pregnant women/mothers with children.

Thank you for taking part in this study. This questionnaire is for healthcare professionals who are working in antenatal care clinics run by the Ministry of Health in Assiut governorate. It is about second hand smoke exposure among pregnant women/mothers with children.

Section A: HCPs demographic characteristics	
The following questions ask about your personal characteristics, please tick the response that is appropriate to you or fill in the requested information.	
1.	What is your gender? 1. <input type="checkbox"/> Male 2. <input type="checkbox"/> Female
2.	How old are you? 1. <input type="checkbox"/> < 30 2. <input type="checkbox"/> 31-40 3. <input type="checkbox"/> 41-50 4. <input type="checkbox"/> 51-60 5. <input type="checkbox"/> > 60
3.	What is your specialty? 1. <input type="checkbox"/> General Practitioner 2. <input type="checkbox"/> Obstetrician/gynaecologist 3. <input type="checkbox"/> Nurse 4. <input type="checkbox"/> Midwife 5. <input type="checkbox"/> Others (Please specify: _____)
4.	Years of medical experience after graduation 1. <input type="checkbox"/> < 5 years 2. <input type="checkbox"/> 5-10 years 3. <input type="checkbox"/> > 10 years
5.	Average number of women you provide care to per month _____
6.	Current practice location 1. <input type="checkbox"/> Urban 2. <input type="checkbox"/> Rural
7.	Have you received any previous training on smoking cessation? 1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No → Please go to Question 10
8.	When did you last receive training on smoking cessation? 1. <input type="checkbox"/> In the last 12 months 2. <input type="checkbox"/> 1-2 years ago 3. <input type="checkbox"/> More than 3 years ago 4. <input type="checkbox"/> Don't know/ don't remember
9.	Where did you receive that training? (Tick all that apply) 1. <input type="checkbox"/> During medical school

Page 1



	2. <input type="checkbox"/> Post graduate clinical training 3. <input type="checkbox"/> Training at work place 4. <input type="checkbox"/> Others (Please specify: _____)
10.	Which of the following best applies to you? 1. <input type="checkbox"/> I smoke cigarettes (including hand-rolled) every day 2. <input type="checkbox"/> I smoke cigarettes (including hand-rolled), but not every day 3. <input type="checkbox"/> I do not smoke cigarettes at all, but I do smoke tobacco of some kind (eg. Shisha) 4. <input type="checkbox"/> I have stopped smoking completely in the last year 5. <input type="checkbox"/> I stopped smoking completely more than a year ago → Please go to question 14 6. <input type="checkbox"/> I have never been a smoker → Please go to Question 14
11.	Do you smoke at your workplace? 1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No → Please go to question 13 3. <input type="checkbox"/> Prefer not to say
12.	If you smoke at your workplace, do you smoke in the following places? (Tick all that apply) 1. <input type="checkbox"/> Inside workplace premises 2. <input type="checkbox"/> Outside workplace premises 3. <input type="checkbox"/> Inside and outside workplace premises 4. <input type="checkbox"/> At home 5. <input type="checkbox"/> At private vehicle
13.	If you are smoker, regarding your intentions to quit smoking, which of the following best describes you? 1. <input type="checkbox"/> I REALLY want to stop smoking and intend to in the next month 2. <input type="checkbox"/> I REALLY want to stop smoking and intend to in the next 3 months 3. <input type="checkbox"/> I want to stop smoking and hope to soon 4. <input type="checkbox"/> I REALLY want to stop smoking but I don't know when I will 5. <input type="checkbox"/> I want to stop smoking but haven't thought about when 6. <input type="checkbox"/> I think I should stop smoking but don't really want to 7. <input type="checkbox"/> I don't want to stop smoking 8. <input type="checkbox"/> I don't know
14.	Do you expose to secondhand smoke in your workplace? 1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No
15.	Do you expose to secondhand smoke in your home? 1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No

Section B: Knowledge, attitude and practice of Health care professionals (HCP) regarding secondhand smoke exposure among pregnant women and children
 SHS exposure, also known as environmental tobacco smoke exposure and passive smoking, is the involuntary inhalation of other people's tobacco smoke by non-smokers. SHS consists of exhaled smoke as well as side-stream smoke that is released from the burning end of a cigarette between inhalations.



16.	As far as you are aware, does SHS exposure during pregnancy cause the following conditions?	Yes	No	Don't know		
	1. Low birth weight					
	2. Stillbirth					
	3. Spontaneous abortion					
	4. Preterm delivery					
	5. Congenital anomalies					
17.	As far as you are aware, does SHS exposure among children cause the following conditions?	Yes	No	Don't know		
	1. Sudden unexpected death in infancy					
	2. Wheeze and asthma					
	3. Respiratory tract infection					
	4. Middle ear infection					
	5. Invasive meningococcal disease					
	6. Psychological and behavioural problem					
	7. Increases chances of smoking uptake in the future					
18.	To what extent do you agree with the following statements?	Strongly agree	Agree	Unsure	Disagree	Strongly disagree
	1. Health care professionals should not smoke as patients could see them as role models					
	2. A pregnant woman's/child's chances of avoiding SHS exposure are increased if a health professional advises pregnant women/mothers with children to avoid it					
	3. Health professionals should routinely ask pregnant women/mothers with children about whether they are exposed to SHS					
	4. Health professionals should routinely advise pregnant women/mothers with children to avoid SHS exposure					
	5. Health professionals who smoke are less likely to advise pregnant women/mothers with children to avoid SHS exposure					
	6. Compared with other disease prevention activities like obesity and hypertension, tobacco control is important					



	To what extent do you agree with the following statements?	Strongly agree	Agree	Unsure	Disagree	Strongly disagree
	1. SHS exposure is private business, therefore there should be no advice from HCPs regarding this topic					
	2. Pregnant women/mothers with children are not interested in receiving advice about reducing SHS exposure					
	3. Giving advice on avoiding SHS exposure has a low chance of success					
	4. In the course of my profession there are other aspects more important than SHS exposure					
19.	To what extent do you practice the following statements?	Never	Rarely	Sometimes	Always	
	1. I ask pregnant women/mother with children if they are exposed to SHS.					
	2. I explain the consequences of SHS on one's health to pregnant women/mother with children					
	3. I explain the specific adverse health effects of SHS exposure to the foetus during pregnancy					
	4. I explain the specific adverse health effects of Children's SHS exposure to their mothers					
	5. I advise/ encourage pregnant women/mother with children to avoid SHS exposure					
Section C: SHS exposure prevention counselling service						
20.	What are the barriers for you as HCPs to advise pregnant women/mothers with children to avoid SHS exposure? (Tick all that apply)					
	1. <input type="checkbox"/> There is no reimbursement for advising women to avoid SHS exposure					
	2. <input type="checkbox"/> Pregnant women/mothers with children do not want/expect to receive that advice					
	3. <input type="checkbox"/> Low chances of success					
	4. <input type="checkbox"/> Lack of time					
	5. <input type="checkbox"/> Lack of training					
	6. <input type="checkbox"/> Unavailability of materials (e.g. brochures about health hazards of SHS)					
	7. <input type="checkbox"/> Feeling uncomfortable discussing as I think it is a sensitive topic					
	8. <input type="checkbox"/> SHS exposure counselling is not a part of my job					



	9. <input type="checkbox"/> Others (Please specify: _____)
21.	<p>In your opinion, whose job is it to discuss SHS exposure with pregnant women/ mothers with children? (Tick all that apply)</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Midwife 2. <input type="checkbox"/> Nurse 3. <input type="checkbox"/> General practitioner 4. <input type="checkbox"/> Other (Please specify: _____) 5. <input type="checkbox"/> None of the above
22.	<p>In your opinion, what are the barriers for pregnant women/mothers with children to avoid SHS exposure?</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Ignorance of the risks of SHS exposure 2. <input type="checkbox"/> Husband smoking at home 3. <input type="checkbox"/> Another household smoker 4. <input type="checkbox"/> Lack of self-confidence to ask smoker in her household to stop smoking 5. <input type="checkbox"/> Regulations on smoking in public places are not enforced 6. <input type="checkbox"/> Smoking being accepted in the society 7. <input type="checkbox"/> Societal attitudes towards women asking her husband/ smoker in her household to stop smoking 8. <input type="checkbox"/> Other (Please specify: _____)
23.	<p>In your opinion, what do you need to deliver and improve the delivery of counselling pregnant women/mothers with children to avoid SHS exposure?</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Training for HCPs 2. <input type="checkbox"/> Availability of standard guidelines in the health centre 3. <input type="checkbox"/> Availability of materials about SHS health hazards 4. <input type="checkbox"/> Nothing 5. <input type="checkbox"/> Others (Please specify: _____)
24.	<p>What is the best way to help pregnant women/mothers with children to avoid SHS exposure?</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> Health education sessions for pregnant women/mothers of children 2. <input type="checkbox"/> Health information materials for pregnant women/mothers of children 3. <input type="checkbox"/> Health education sessions for pregnant women and their household smokers 4. <input type="checkbox"/> Offering counselling sessions and nicotine replacement therapy to household smokers 5. <input type="checkbox"/> Others (Please specify: _____)



دراسة مدى معرفة وموقف و ممارسة مقدمى الرعاية الصحية في مدينة أسيوط فيما يتعلق بالتعرض للتدخين السلبي بين السيدات الحوامل/أمهات الأطفال

في البدايه نود ان نشكرك على المشاركة في هذه الدراسة. هذا الاستبيان مخصص لمقدمى الرعاية الصحية العاملين في عيادات رعاية الأمهات الحوامل و عيادات الأطفال التي تديرها وزارة الصحة في محافظة أسيوط و هو يتعلق بتعرض السيدات الحوامل/أمهات الأطفال للتدخين السلبي

القسم الأول: الخصائص الديموغرافية لمقدمى الرعاية الصحية، يرجى وضع علامة على الإجابة المناسبة لك أو ملء المعلومات المطلوبة.	
١. كم عمرك؟	١. <input type="checkbox"/> > ٣٠ عاما ٢. <input type="checkbox"/> ٤٠-٣١ عاما ٣. <input type="checkbox"/> ٥٠-٤١ عاما ٤. <input type="checkbox"/> ٦٠-٥١ عاما ٥. <input type="checkbox"/> < ٦٠ عاما
٢. النوع	١. <input type="checkbox"/> ذكر ٢. <input type="checkbox"/> أنثى
٣. ما هو تخصصك؟	١. <input type="checkbox"/> طبيب عام ٢. <input type="checkbox"/> طبيب التوليد / أمراض النساء ٣. <input type="checkbox"/> طبيب أطفال ٤. <input type="checkbox"/> ممرضة ٥. <input type="checkbox"/> زائرة صحية ٦. <input type="checkbox"/> أخرى (يرجى التحديد: _____)
٤. كم عدد سنوات الخبرة الطبية بعد التخرج؟	١. <input type="checkbox"/> > ٥ سنوات ٢. <input type="checkbox"/> ١٠-٥ سنوات ٣. <input type="checkbox"/> < ١٠ سنوات
٥. كم متوسط عدد النساء/الأطفال اللواتي تقدم لهم الرعاية الصحية شهرياً؟	_____
٦. ما هو مكان الممارسة الطبية الحالية؟	١. <input type="checkbox"/> الريف ٢. <input type="checkbox"/> الحضر
٧. هل تلقيت أي تدريب سابق على خدمات الإقلاع عن التدخين؟	١. <input type="checkbox"/> نعم ٢. <input type="checkbox"/> لا، يُرجى الانتقال إلى السؤال ١٠
٨. متى تلقيت آخر تدريب على خدمات الإقلاع عن التدخين؟	١. <input type="checkbox"/> في آخر ١٢ شهراً ٢. <input type="checkbox"/> قبل ١-٢ سنة ٣. <input type="checkbox"/> منذ أكثر من ٣ سنوات ٤. <input type="checkbox"/> لا أعرف / لا أتذكر
٩. أين تلقيت هذا التدريب؟ (ضع علامة على كل ما ينطبق)	١. <input type="checkbox"/> خلال سنوات الدراسة بكلية الطب ٢. <input type="checkbox"/> التدريب إكلينيكي بعد التخرج ٣. <input type="checkbox"/> التدريب في مكان العمل



٤. <input type="checkbox"/> أخرى (يرجى التحديد: _____)	
١٠. أي مما يلي ينطبق عليك بشكل أفضل؟ ١. <input type="checkbox"/> أذخ السجائر (بما في ذلك الملفوفه يدويا) كل يوم ٢. <input type="checkbox"/> أذخ السجائر (بما في ذلك الملفوفه يدويا) ، ولكن ليس كل يوم ٣. <input type="checkbox"/> أنا لا أذخ السجائر على الإطلاق ، لكنني أذخ التبغ من نوع ما (مثل الشيشة) ٤. <input type="checkbox"/> لقد توقفت عن التدخين تماما في العام الماضي ٥. <input type="checkbox"/> توقفت عن التدخين تماما منذ أكثر من عام ، يرجى الانتقال إلى السؤال رقم ١٤ ٦. <input type="checkbox"/> لم أكن مدخنا من قبل ، يرجى الانتقال إلى السؤال ١٤	
١١. هل تدخن في مكان عملك؟ ١. <input type="checkbox"/> نعم ٢. <input type="checkbox"/> لا ، يرجى الانتقال إلى السؤال ١٣ ٣. <input type="checkbox"/> أفضل عدم القول	
١٢. إذا كنت تدخن في مكان عملك ، فهل تدخن في الأماكن التالية؟ (ضع علامة على كل ما ينطبق) ١. <input type="checkbox"/> داخل مبنى العمل ٢. <input type="checkbox"/> خارج مبنى العمل ٣. <input type="checkbox"/> داخل وخارج مبنى العمل ٤. <input type="checkbox"/> في البيت ٥. <input type="checkbox"/> في سيارتي الخاصة	
١٣. إذا كنت مدخنا ، فيما يتعلق بنواياك في الإقلاع عن التدخين ، أي مما يلي يصفك بشكل أفضل؟ ١. <input type="checkbox"/> أنا حقا أريد التوقف عن التدخين وأعزم القيام به في الشهر المقبل ٢. <input type="checkbox"/> أنا حقا أريد أن أتوقف عن التدخين وأعزم القيام بذلك في الأشهر الثلاثة القادمة ٣. <input type="checkbox"/> أريد أن أتوقف عن التدخين وأتمنى ذلك قريبا ٤. <input type="checkbox"/> أنا حقا أريد التوقف عن التدخين لكنني لا أعرف متى سأفعل ٥. <input type="checkbox"/> أريد التوقف عن التدخين ولكنني لم أفكر في متى ٦. <input type="checkbox"/> أعتقد أنني يجب أن أتوقف عن التدخين ولكنني لا أريد ذلك حقا ٧. <input type="checkbox"/> لا أريد التوقف عن التدخين ٨. <input type="checkbox"/> لا أدري ، لا أعرف	
١٤. هل تعرض للدخان السلبي في مكان عملك؟ ١. <input type="checkbox"/> نعم ٢. <input type="checkbox"/> لا	
١٥. هل تعرض للدخان السلبي في منزلك؟ ١. <input type="checkbox"/> نعم ٢. <input type="checkbox"/> لا	
القسم الثاني : معرفة وموقف وممارسة مقدمي الرعاية الصحية فيما يتعلق بالتعرض للتدخين السلبي بين النساء الحوامل والأطفال إن التعرض للتدخين السلبي، المعروف أيضا باسم التعرض لدخان التبغ البيئي ، هو الاستنشاق اللاإرادي لأشخاص غير مدخنين لدخان التبغ من قبل أشخاص آخرين. يتكون هذا الدخان من زفير الشخص المدخن وكذلك دخان التيار الجانبي الذي يتم إطلاقه من الطرف المحترق للسيجارة بين الاستنشاق.	
١٦. بقدر معرفتك ، هل التعرض للتدخين السلبي أثناء الحمل يسبب الحالات التالية؟ ١. <input type="checkbox"/> الوزن المنخفض للجنين عند الولادة ٢. <input type="checkbox"/> ولادة جنين ميت ٣. <input type="checkbox"/> الإجهاض التلقائي ٤. <input type="checkbox"/> الولادة المبكرة ٥. <input type="checkbox"/> التشوهات الخلقية	
١٧. بقدر علمك ، هل التعرض للتدخين السلبي بين الأطفال يسبب الحالات التالية؟ لا <input type="checkbox"/> نعم <input type="checkbox"/>	



				٢. أوضح للمرأة الحامل/ الأمهات مع الأطفال مدى مخاطر التعرض للتدخين السلبي على صحة الفرد
				٣. أشرح للمرأة الحامل المخاطر الصحية على الجنين إذا تعرضت للتدخين السلبي أثناء الحمل
				٤. أشرح للأمهات المخاطر الصحية لتعرض الأطفال للتدخين السلبي
				٥. أنصح/ أشجع المرأة الحامل/ الأمهات مع الأطفال على تجنب التعرض للتدخين السلبي
القسم الثالث: خدمة استشارات لوقاية من التعرض للتدخين السلبي				
٢١				ما هي العوائق التي تعترضك كمقدم رعاية صحية لتقديم النصيحة/ المشورة للسيدات الحوامل/ الأمهات مع الأطفال بتجنب التعرض للتدخين السلبي؟ (ضع علامة على كل ما ينطبق) ١. <input type="checkbox"/> لا يوجد تعويض مادي عن تقديم المشورة للنساء لتجنب التعرض للتدخين السلبي ٢. <input type="checkbox"/> النساء الحوامل/ الأمهات اللواتي لديهن أطفال لا يريدون/ يتوقعون تلقي هذه النصيحة ٢. <input type="checkbox"/> فرص ضئيلة للنجاح ٣. <input type="checkbox"/> ضيق الوقت ٤. <input type="checkbox"/> نقص التدريب ٥. <input type="checkbox"/> عدم توفر المواد (مثل الكتيبات حول المخاطر الصحية للتدخين السلبي) ٦. <input type="checkbox"/> الشعور بعدم الارتياح للمناقشة حيث أعتقد أنها موضوع حساس وخاص ٧. <input type="checkbox"/> المشورة بخصوص التعرض للتدخين السلبي ليست جزءًا من عملي ٨. <input type="checkbox"/> أخرى (يرجى التحديد: _____)
٢٢				برأيك، من هو وظيفته مناقشة التعرض للتدخين السلبي مع السيدات الحوامل/ الأمهات مع الأطفال؟ (ضع علامة على كل ما ينطبق) ١. <input type="checkbox"/> زائرة صحية (القابلة) ٢. <input type="checkbox"/> ممرضة ٣. <input type="checkbox"/> طبيب عام ٤. <input type="checkbox"/> أخرى (يرجى التحديد: _____) ٥. <input type="checkbox"/> لا شيء مما سبق
٢٣				برأيك، ما هي العوائق التي تعترض تجنب السيدات الحوامل / الأمهات مع الأطفال لتعرض للتدخين السلبي؟ ١. <input type="checkbox"/> الجهل بمخاطر التعرض للتدخين السلبي ٢. <input type="checkbox"/> تدخين الزوج في المنزل ٣. <input type="checkbox"/> مدخن آخر في المنزل ٤. <input type="checkbox"/> عدم الثقة بالنفس لطلب من المدخن في المنزل التوقف عن التدخين ٥. <input type="checkbox"/> لا يتم تطبيق اللوائح الخاصة بمنع التدخين في الأماكن العامة ٦. <input type="checkbox"/> يعد التدخين مقبولاً في المجتمع ٧. <input type="checkbox"/> النظرة المجتمعية تجاه النساء التي تطلب من زوجها / المدخن في منزلها التوقف عن التدخين ٨. <input type="checkbox"/> غير ذلك (يرجى التحديد: _____)
٢٤				برأيك، ما الذي تحتاجه لتقديم وتحسين تقديم المشورة للنساء الحوامل / الأمهات مع الأطفال لتجنب التعرض للتدخين السلبي؟ ١. <input type="checkbox"/> تدريب مقدمي الرعاية الصحية ٢. <input type="checkbox"/> توافر إرشادات يتبعها مقدمي الرعاية الصحية في المركز الصحي ٣. <input type="checkbox"/> توافر كتيبات إرشادية حول مخاطر التدخين السلبي ٤. <input type="checkbox"/> لا شيء ٥. <input type="checkbox"/> أخرى (يرجى التحديد: _____)



ما هي أفضل طريقة لمساعدة السيدات الحوامل / أمهات الأطفال لتجنب التعرض للتدخين السلبي؟	٢٥
١. دورات التنقيف الصحي للنساء الحوامل / أمهات الأطفال <input type="checkbox"/>	
٢. جلسات التنقيف الصحي للنساء الحوامل مع المدخنين في الأسرة <input type="checkbox"/>	
٣. مواد إعلامية صحية (مثل الكتيبات) مخصصة للحوامل / أمهات الأطفال <input type="checkbox"/>	
٤. تقديم جلسات استشارية وعلاج بدائل النيكوتين للمدخنين في الأسرة <input type="checkbox"/>	
٥. أخرى (يرجى التحديد): _____ <input type="checkbox"/>	

8.1.11 Appendix 4.5: sensitivity analysis of multivariable regression model of knowledge, attitude and counselling practice of HCPs

Area under ROC curve (AUC) could be interpreted as follows: 90 -100 = excellent; 80 - 90 = good; 70 - 80 = fair; 60 - 70 = poor; 50 - 60 = fail. AUC for knowledge index regression analysis is 0.78. AUC for attitude index regression analysis is 0.68. AUC for counselling index regression analysis is 0.82. Therefore, knowledge and attitude regression analysis are considered acceptable. Counselling practice regression analysis is considered good.

Sensitivity analysis of knowledge level multivariable regression model:

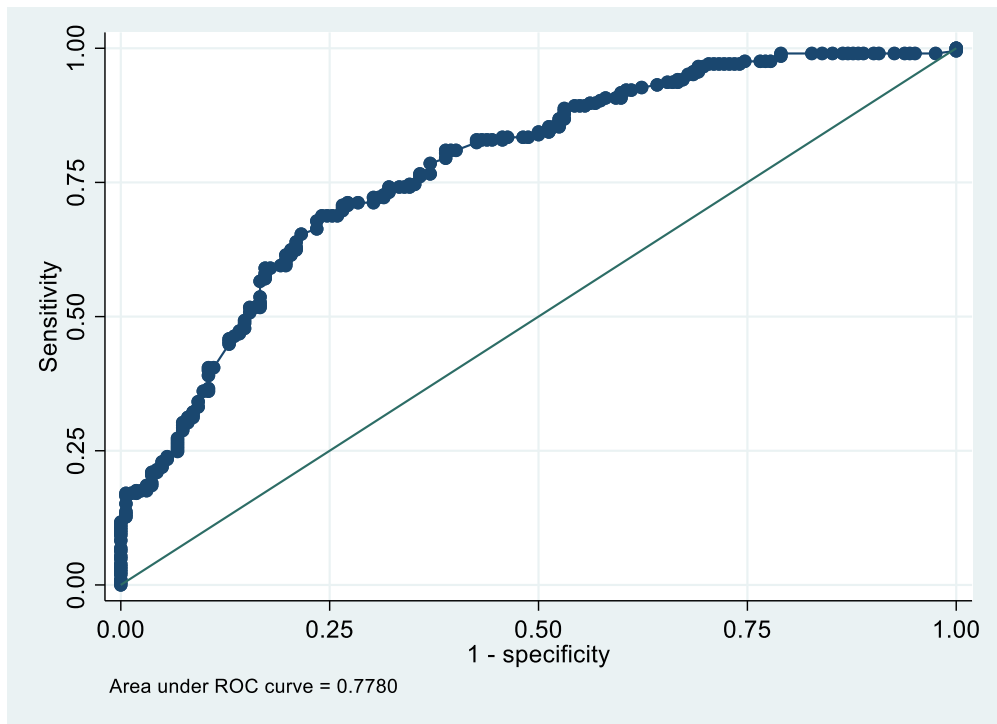
Classified	True		Total
	D	~D	
+	152	52	204
-	53	110	163
Total	205	162	367

Classified + if predicted $\Pr(D) \geq 0.5$

True D defined as Knowledge level! = 0

Sensitivity	$\Pr(+ D)$	74.15%
Specificity	$\Pr(- \sim D)$	67.90%
Positive predictive value	$\Pr(D +)$	74.51%
Negative predictive value	$\Pr(\sim D -)$	67.48%

Correctly classified	71.39%
----------------------	--------



Sensitivity analysis of attitude level multivariable regression

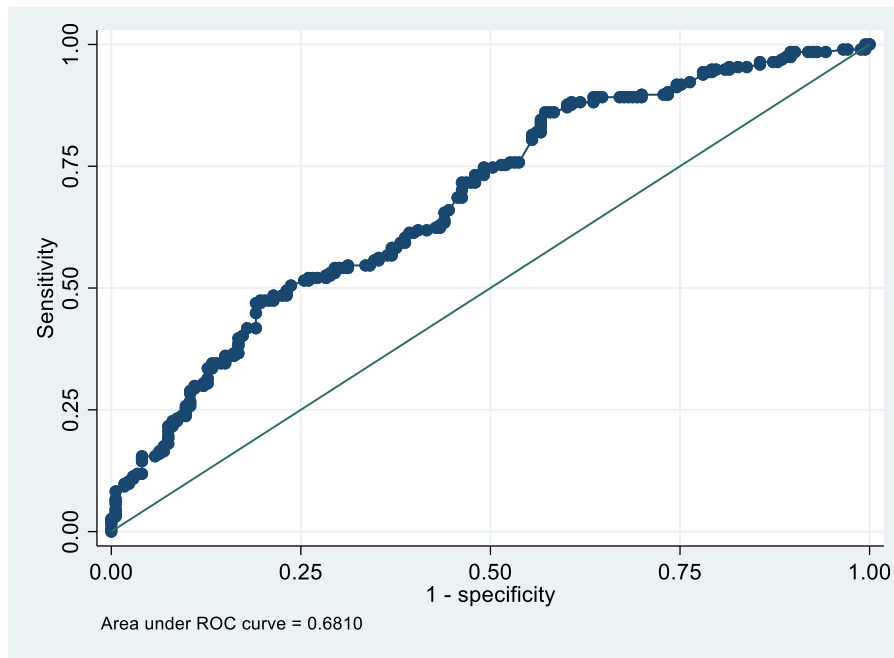
model:

Classified	True		Total
	D	~D	
+	133	79	212
-	61	94	155
Total	194	173	367

Classified + if predicted $\Pr(D) \geq 0.5$

True D defined as Knowledge level! = 0

Sensitivity	$\Pr(+ D)$	68.56%
Specificity	$\Pr(- \sim D)$	54.34%
Positive predictive value	$\Pr(D +)$	62.74%
Negative predictive value	$\Pr(\sim D -)$	60.65%
Correctly classified		61.85%



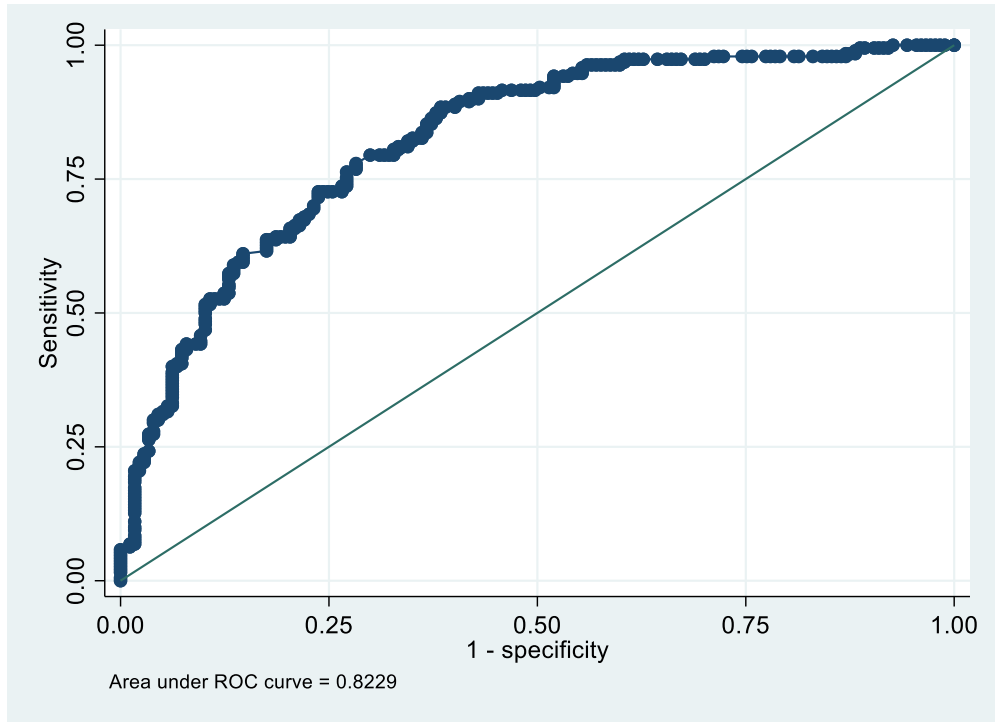
Sensitivity analysis of counselling practice level multivariable regression model:

Classified	True		Total
	D	~D	
+	146	50	196
-	44	127	171
Total	190	177	367

Classified + if predicted $\Pr(D) \geq 0.5$

True D defined as Knowledge level! = 0

Sensitivity	$\Pr(+ D)$	76.84%
Specificity	$\Pr(- \sim D)$	71.75%
Positive predictive value	$\Pr(D +)$	74.49%
Negative predictive value	$\Pr(\sim D -)$	74.27%
Correctly classified		74.39%





Healthcare Professionals' Knowledge, Attitudes and Counselling Practice Regarding Prevention of Secondhand Smoke Exposure Among Pregnant Women/Children in Assiut, Egypt

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Objectives and Methods: A cross-sectional study of HCPs working in public MCH clinics in Assiut city was conducted to explore their knowledge, attitudes and counselling practices regarding prevention of SHS exposure among pregnant women and children. Descriptive and regression analyses were performed.

Results: 367 HCPs participated in the study, 12% of whom were smokers. The majority were nurses (45%). A considerable proportion of HCPs reported being exposed to SHS in workplace (70%) and home (52%). About half HCP reported high SHS knowledge (56%), supportive attitude towards preventing SHS exposure (53%), and having good counselling practice regarding SHS exposure (52%). Being a GP and serving urban communities were significantly associated with high knowledge. Being female, serving a rural population, receiving training on smoking cessation services, not being exposed to SHS at home, and having a supportive attitude towards prevention of SHS exposure were significantly associated with good counselling practice.

Conclusion: Awareness, attitudes and counselling practice of HCPs should be improved. Training for HCPs and enforcement of smoke free policies are needed to improve awareness and facilitate changes in social norms.

Keywords: pregnancy, children, Egypt, second-hand smoke, health care professionals

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INTRODUCTION

Secondhand smoke (SHS) causes significant harm to children and adverse pregnancy outcomes [1–3]. The health care costs associated with treating health conditions due to SHS exposure are estimated to be approximately \$7.1 billion in some Middle Eastern countries [4]. In Egypt, tobacco smoking is a widely accepted in homes and public places [5]. In 2018, 43.4% of males and 0.5% of females were smokers [6]. Despite the presence of smoke-free legislations in Egypt and previous evidence linked between reductions in acute coronary event hospitalizations and implementation of smoke free legislation [7], in 2017 smoking was responsible for about 11% of disability adjusted life years (DALYs) and 17% of deaths in Egypt, and exposure to SHS was responsible for 16,000 deaths and 700,000 DALYs [8]. Low prevalence of smoking among females in Egypt is due to traditional

gender roles which depict women's smoking as disrespectful to society, and as a result there is stigma around women who smoke [9]. While only a small proportion of women are active smokers, the high rates of male smoking put non-smoking females at risk of SHS exposure.

In Egypt smoking is banned in indoor workplaces, public transport and indoor public places; however, there are no mechanisms or infrastructure to ensure enforcement of smoke-free legislation, and exposure to SHS is therefore high [10]. The prevalence of SHS exposure among women in reproductive age (15–49 years) in Egypt is estimated to be 65% [11], and about 50% of pregnant non-smoking women in Egypt are exposed daily to SHS [12] compared to 29% of non-smoking adults in European Union [13]. Previous evidence reported significant relation between SHS exposure reductions on public places as school and in private places as cars and lower hospital admissions due to respiratory illness among children, following a comprehensive smoke-free policy [14]. In 2014, 35% of Egyptian school students (aged 13–15) were exposed to SHS at home and 55% in enclosed public places [15].

A lack of knowledge about the health risks of SHS for family members, especially children, is an important risk factor for SHS exposure [16–19]. Health care professionals (HCPs), especially nurses and midwives, are well placed to help reduce exposure to SHS in pregnant women and children. They spend a significant amount of time in contact with pregnant women and can therefore ask about their SHS exposure, advise them to prevent SHS exposure and encourage their husbands to quit smoking; this HCPs advice has been shown to be effective in previous studies [20–22].

This study aimed to explore the knowledge, attitudes and counselling practices of HCPs in maternal and child health (MCH) clinics in Egypt in relation to prevention of SHS exposure among pregnant women and children, and to identify the factors related to their knowledge, supportive attitudes and counselling practices. We also aimed to explore barriers to the provision of counselling and the needs of HCPs in relation to improving the delivery of counselling on how to avoid SHS exposure to pregnant women and children.

METHODS

A cross-sectional survey of HCPs was undertaken in Assiut city, one of the largest cities in South Egypt. An anonymous self-administered paper-based questionnaire was distributed to all 535 HCPs working in all public MCH clinics in primary or secondary health care centres in Assiut city in August 2020. The study was approved by the School of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham, United Kingdom and the Research Ethics Committee in the School of Medicine at Assiut University, Egypt.

Instrument and Data Collection

A questionnaire development was guided by studies with similar research questions [23–28]. However, we did not perform a full validation procedure for the questionnaire; it was translated to

Arabic by the lead researcher (ZH) then translated back into English by a second translator. It was also piloted on 15 HCPs in Egypt to determine the clarity of questions and length of time needed for questionnaire completion. The questionnaire collected data on socio-demographic and professional characteristics of HCPs, knowledge of HCPs regarding SHS exposure among pregnant women and children, barriers to the provision of counselling and perceived needs of HCPs to allow them to improve the delivery of counselling service to pregnant women and mothers to avoid SHS exposure.

Data Management and Analysis

All data were entered into Microsoft Excel and then exported to STATA v.16 software for data management and analysis. Frequency distributions were used to summarise all variables. Similar to the approach used in previous studies [29–32], indices were created to summarise awareness, attitudes and practices. To summarise knowledge of HCPs, a knowledge index was constructed by adding the scores of individual items. A similar approach was used to create an attitude index. A high score on attitudes corresponded to a high level pronouncing a supportive attitude towards the prevention of smoking and SHS exposure among pregnant women and children. Similarly, a high score on practice corresponded to a high level of offering help (always or sometimes) to pregnant women/children to prevent SHS exposure among them by explaining the hazards of SHS and advising on how to avoid it. After creating scores for the three outcome measures (knowledge, supportive attitude towards prevention of SHS exposure, and counselling practice), each score was grouped into two categories, "high," and "low" using the median of every score. As DeCoster, Sidin, and Gallucci (2009) [33] argued that dichotomization *via* the median split procedure or other cut-off points "makes analyses easier to conduct and interpret" especially if the underlying variable is naturally categorical, we used the median as a cut-off point to denote a "high" score for every index. The median of knowledge index was 9/12. The median for supportive attitude to prevention of SHS index was 7/10, and the median for counselling practice index was 3/5. The scores on the outcome measures were analysed separately (Supplementary Material S1).

Univariate logistic regression analysis was used to explore factors associated with high knowledge, supportive attitude and good counselling practice of HCPs on SHS exposure. The following variables were analysed: gender, age, speciality, smoking status, SHS exposure at workplace, SHS exposure at home, location of current medical practice *i.e.*, urban/rural, years of post-graduate experience, and receiving previous training on smoking cessation service. Those variables that were statistically significant in univariate analysis at the $p < 0.05$ level were included in the multivariable logistic regression models using stepwise (forward) multivariable analyses to ascertain the factors associated with the three outcome variables (high knowledge, supportive attitude towards prevention of SHS exposure, and counselling practice). Odds ratios, 95% CI, and likelihood ratio test p -values for categorical exposure variables were reported. In the multivariable logistic regression model exploring good counselling practices, in addition to the variables included in univariate regression level, knowledge and supportive attitudes variables were included in the model as co-variables to explore the

TABLE 1 | Demographics, smoking behaviours, and SHS exposure of Health care professionals (Rasht, Egypt, 2022).

Demographic characteristics	N = 367	%
Specialty		
Gyn/obs	75	20.4
Paediatrician	59	16.1
GP	34	9.3
Nurse	164	44.7
Midwife	31	8.5
Other	4	1
Age		
<30	124	33.8
31-40	149	40.6
41-50	67	18.3
51-60	23	6.3
>60	4	1
Gender		
Male	118	32.1
Female	249	67.2
Current medical practice		
Rural	124	33.8
Urban	243	66.2
Post-graduate experience		
<5 years	100	27.3
5-10 years	109	29.7
>10 years	158	43
Previous training on smoking cessation service		
Yes	81	22.1
No	286	77.9
Type of training (N = 81 who responded yes to above question)		
During medical school	10	12.3
Post graduate clinical training	11	13.6
Training at work place	60	74.1
Smoking status		
Current smokers	46	12.5
Ex-smoker	9	2.5
Never smoker	312	85
Smoking in workplace (Total = 46 smoker)		
Yes	20	43.5
No	21	45.6
Prefer not to say	5	10.9
Intentions to quit smoking (Total = 46)		
I REALLY want to stop smoking and intend to in the next month	9	19.6
I REALLY want to stop smoking and intend to in the next 3 months	10	21.7
I want to stop smoking and hope to soon	12	26.1
I REALLY want to stop smoking but I do not know when I will	8	17.4
I want to stop smoking but have not thought about when	0	0
I think I should stop smoking but do not really want to	3	6.6
I do not want to stop smoking	2	4.3
I do not know	2	4.3
Exposure to SHS in your workplace		
Yes	258	70.3
No	109	29.7
Exposure to SHS in your home		
Yes	190	51.8
No	177	48.2

TABLE 2 | Health care professionals' knowledge, attitudes and practice regarding SHS exposure during pregnancy and childhood (Asiut, Egypt, 2022).

Health care professionals' knowledge								
As far as you are aware, does SHS exposure during pregnancy increase the risk of the following ^a	Yes		No		Don't Know			
	N	%	N	%	N	%		
Congenital anomalies	288	78.7	23	6.3	55	15		
Low birth weight	282	76.8	9	2.5	76	20.7		
Spontaneous abortion	258	70.5	31	8.5	77	21		
Preterm delivery	256	69.9	30	8.2	80	21.9		
Sudden unexpected death in infancy	237	64.6	26	7.1	104	28.3		
Sstillbirth	234	63.8	39	10.6	94	25.6		
As far as you are aware, does SHS exposure among children increase the risk of the following?								
Respiratory tract infection	325	88.6	7	1.9	35	9.5		
Whooping cough	295	80.4	17	4.6	55	14.9		
Chances of smoking uptake among children in the future	277	75.5	10	2.7	80	21.8		
Psychological and behavioural problem	250	68.1	24	6.5	93	25.3		
Middle ear infection	195	53.1	48	13.1	124	33.8		
Invasive meningococcal disease	105	28.6	98	26.7	164	44.7		
Health care professionals' attitudes								
To what extent do you agree with this statement? ^a	Agree		Disagree		Unsure			
	N	%	N	%	N	%		
Health care professionals should not smoke as patients could see them as role models	339	92.4	11	3	17	4.6		
Health professionals should routinely advise pregnant women/mothers with children to avoid SHS exposure	339	92.4	3	0.8	25	6.8		
Health professionals should routinely ask pregnant women/mothers with children about whether they are exposed to SHS	330	89.9	6	1.6	31	8.5		
Compared with other disease prevention activities like obesity and hypertension, tobacco control is important	330	89.9	7	1.9	30	8.2		
A pregnant woman's/child's chances of avoiding SHS exposure could increase if a health professional advises pregnant women/mothers with children to avoid it	320	87.1	2	0.5	45	12.3		
Health professionals who smoke are less likely to advise pregnant women/mothers with children to avoid SHS exposure	288	78.5	47	12.8	32	8.7		
SHS exposure is private business, therefore there should be no advice from HCPs regarding this topic	128	34.9	215	58.6	24	6.5		
Pregnant women/mothers with children are not interested in receiving advice about reducing SHS exposure	172	46.9	106	28.9	89	24.3		
Giving advice on avoiding SHS exposure has a low chance of success	167	45.5	102	27.8	98	26.7		
In the course of my profession there are other aspects more important than SHS exposure	199	54.2	99	26.9	69	18.8		
Health care professionals' counselling practice								
To what extent do you practice the following? ^a	Always		Sometimes		Rarely		Never	
	N	%	N	%	N	%	N	%
I ask pregnant women/mother with children if they are exposed to SHS.	32	8.7	139	37.9	80	21.8	116	31.6
I explain the consequences of SHS on one's health to pregnant woman/mother with children	60	16.4	136	37.1	132	35.9	39	10.6
I explain the specific adverse health effects of SHS exposure to the fetus during pregnancy	75	20.4	121	32.9	98	26.7	73	19.9
I explain the specific adverse health effects of children's SHS exposure to their mothers	68	18.5	107	29.2	103	28.1	89	24.3
I advise/encourage pregnant women/mother with children to avoid SHS exposure	85	23.2	129	35.2	69	18.8	84	22.9

^aTotal N = 367.

effect of knowledge and attitudes of HCPs on their counselling practice.

RESULTS

Participant Demographics, Smoking Behaviours and Secondhand Smoke Exposure

Out of the 535 HCPs, 367 participated in the study with a response rate of 68.5% (Table 1). 44.7% were nurses, 20.4% were gynaecologists/obstetricians and 16.1% were

paediatricians. A third were male and two-thirds served urban communities. 22% of study participants reported having received training on smoking cessation, mainly in the workplace. 12.5% of HCPs reported being smokers, 70.3% of study participants were exposed to SHS in their workplace and 51.8% in their homes (Table 1).

Knowledge of Health Care Professionals Regarding Secondhand Smoke

Most of HCPs knew that SHS exposure increases the risk of congenital anomalies (78.7), low birth weight (76.8), spontaneous abortion (70.5), preterm delivery (69.9), sudden unexpected

TABLE 3 | Multivariable regression of factors associated with knowledge, attitude and counseling practice of HCPs regarding prevention of SHS exposure among pregnant women

	Total N367	Good knowledge				Good supportive attitude				Good counseling practice			
		N (%) 205 (55.8)	Univariate analysis		Multivariable model ^a		N (%) 194 (52.9)	Univariate analysis		Multivariable model ^b			
			OR	95%CI	Adjusted OR	95%CI		OR	95%CI	Adjusted OR	95%CI	N (%) 190 (51.8)	OR
Gender													
Male	118	79 (66.9)	1.98*	1.25-3.12			51 (43.2)	1.00		1.00		50 (42.4)	1.00
Female	249	126 (50.6)	1.00				143 (57.4)	1.77*	1.14-2.74	2.02	1.27-3.24	140 (56.2)	1.75*
Age													
<30	124	84 (67.7)	1.00				67 (54)	1.00				58 (46.8)	1.00
31-40	149	72 (48.3)	0.45*	0.27-0.73			84 (56.4)	1.11	0.88-1.77			86 (57.7)	1.35
41-50	67	36 (53.7)	0.55*	0.30-1.02			30 (44.8)	0.69	0.38-1.25			35 (52.3)	1.2
51-60	23	10 (43.5)	0.37*	0.15-0.91			12 (52.2)	0.93	0.38-2.26			10 (43.5)	0.88
>60	4	3 (75)	1.43*	0.14-14.17			1 (25)	0.28	0.03-2.80			1 (25)	0.38
Specialty													
Gyn/obs	75	36 (48)	1.00		1.00		42 (56)	1.00				41 (54.7)	1.00
Paediatrician	59	43 (72.9)	2.9*	1.36-6.21	3.15	1.48-6.72	26 (44.1)	0.62	0.31-1.23			30 (50.9)	0.86
GP	34	31 (91.2)	11.19*	2.77-45.31	15.29	4.12-56.86	20 (58.8)	1.12	0.49-2.55			14 (41.2)	0.58
Nurse	164	80 (48.8)	1.03*	0.60-1.8	1.09	0.60-1.99	85 (51.8)	0.85	0.48-1.46			85 (51.9)	0.89
Midwife	31	14 (45.2)	0.89*	0.38-2.1	1.12	0.45-2.79	20 (64.5)	1.43	0.60-3.39			18 (58.1)	1.15
Others	4	1 (25)	0.36*	0.034-3.73	0.35	0.3-3.66	1 (25)	0.26	0.02-2.63			2 (50)	0.83
Current medical practice													
Rural	124	52 (41.9)	1.00		1.00		76 (61.3)	1.68*	1.08-2.6	1.59	1.01-2.49	85 (68.6)	2.86*
Urban	243	153 (62.9)	2.35*	1.51-3.69	2.53	1.53-4.18	118 (48.6)	1.00		1.00		105 (43.2)	1.00
Post-graduate experience													
<5 years	100	67 (67)	1.00				54 (54)	1.00				47 (47)	1.00
5-10 years	109	72 (66)	2.71*	1.65-4.86			47 (43.1)	0.66*	0.37-1.11			51 (46.8)	0.99
>10 years	158	66 (41.7)	2.83*	1.61-4.58			93 (58.9)	1.22*	0.74-2.02			92 (58.2)	1.57*
Previous training on smoking cessation service													
Yes	81	42 (51.9)	1.00				49 (60.5)	1.00				59 (72.8)	3.17*
No	286	163 (56.9)	1.23	0.75-2.02			145 (50.7)	0.67	0.41-1.1			131 (45.8)	1.00
Smoking status	312		1.00					1.00					1.00

TABLE 3 (Continued) Multivariable regression of factors associated with knowledge, attitude and counseling practice of HCPs regarding prevention of SHS exposure among pregnant women (2022).

	Total N 367	Good knowledge				Good supportive attitude				Good counseling practice N (%) OR			
		Univariate analysis		Multivariable model ^a		Univariate analysis		Multivariable model ^b					
		N (%) 205 (55.8)	OR	95%CI	Adjusted OR	95%CI	N (%) 194 (52.9)	OR	95%CI		Adjusted OR	95%CI	N (%) 190 (51.8)
Never smoker		168 (53.9)					168 (53.9)					161 (51.8)	
Ex-smoker	9	8 (88.9)	6.88*	0.85-55.48			4 (44.5)	0.69	0.19-2.6			4 (44.4)	0.75
Current smoker	46	29 (63)	1.46*	0.77-2.77			22 (47.9)	0.79	0.42-1.46			25 (54.4)	1.12
SHS exposure at workplace													
No	109	49 (44.9)	1.00				64 (58.7)	1.00				56 (51.4)	1.00
Yes	258	156 (60.5)	1.87*	1.19-2.96			130 (50.4)	0.71	0.45-1.2			134 (51.9)	1.02
SHS exposure at home													
No	177	83 (46.9)	1.00		1.00		106 (59.9)	1.73*	1.14-2.62	2.36	1.29-3.10	109 (51.8)	1.16*
Yes	190	122 (64.2)	2.03*	1.33-3.11	2.36	1.48-3.78	88 (46.3)	1.00		1.00		81 (42.6)	1.00
Knowledge													
Inadequate		162										97 (59.8)	1.00
Good		205										93 (45.4)	0.95
Supportive attitude													
Inadequate		173										51 (29.5)	1.00
Good		194										139 (71.7)	6.05*

Bold values or * are when p value of likelihood ratio test is significant; p value ≤ 0.05 .

^aMultivariable model adjusted for specialty, current medical practice, and SHS exposure at home.

^bMultivariable model adjusted for gender, current medical practice, and SHS exposure at home.

^cMultivariable model adjusted for gender, current medical practice, previous training on smoking cessation services, SHS exposure at home, knowledge, and supportive attitude.

death in infancy (64.6), and death in infancy (64.6), and stillbirth in pregnant women (63.8). They knew that SHS increases the risk of respiratory tract infection (88.6), wheeze and asthma (80.4), chances of smoking uptake in the future (75.5%), and behavioural problems among children (68.1) (Table 2). A lower proportion were aware that SHS exposure among children increases the risk of middle ear infection (53.1%) and invasive meningococcal disease (28.6%).

55.9% of study participants had high knowledge of the dangers of SHS exposure to health of pregnant women and children. Being a General Practitioner (GP) (OR 15.29, 95%CI 4.12–56.86), serving urban communities (OR 2.53, 95%CI 1.53–4.18) and being exposed to SHS at home (OR 2.36, 95%CI 1.48–3.78) were significantly associated with high knowledge (Table 3). The strongest observed association was for GPs who were more than 15 folds compared to obstetricians and gynaecologists (95%CI 4.12–56.86) to have high knowledge after adjustment for current medical practice and SHS exposure at home.

Attitudes of Health Care Professionals Towards Smoking and Secondhand Smoke Exposure Among Pregnant Women and Children

34.9% of HCPs agreed that SHS exposure is private business and 45.5% agreed that giving advice on avoiding SHS exposure has a low chance of success (Table 2), reflecting the limited supportive attitude of HCPs towards prevention of SHS exposure among pregnant women and children.

Only 52.9% of HCPs had a supportive attitude towards the prevention of smoking and SHS exposure among pregnant women or children. Being female (OR 2.02, 95%CI 1.27–3.24), serving rural communities (OR 1.59, 95%CI 1.01–2.49), and not being exposed to SHS at home (OR 2.36, 95%CI 1.29–3.10) were significantly associated with a supportive attitude (Table 3). The strongest observed association was for those not exposed to SHS at home who were more than two folds compared to those exposed to SHS at home (OR 2.36, 95%CI 1.29–3.10) to have supportive attitude towards prevention of smoking and SHS exposure among pregnant women and children.

Counselling Practice of Health Care Professionals Regarding Prevention of Secondhand Smoke Exposure Among Pregnant Women and Children

About half of HCPs mentioned that they sometimes or always ask pregnant women/mothers with children if they are exposed to SHS (46.6%), explain the consequences of SHS on health (53.4%), explain the specific adverse health effects of SHS exposure to the fetus during pregnancy (53.4%), explain the specific adverse health effects of SHS on health of children (47.7%), and advise/encourage pregnant women/mother with children to avoid SHS exposure (58%) (Table 2).

About half of HCPs (51.8%) reported good counselling practice regarding counselling pregnant women/mothers with children about SHS exposure (Table 3). Being female (OR 1.88, 95%CI 1.15–3.07), serving a rural population (OR 2.44, 95%CI 1.51–3.96), receiving previous training on smoking cessation services (OR 2.59, 95%CI 1.45–4.61), not being exposed to SHS at home (OR 2.66, 95%CI 1.68–4.22), and having a supportive attitude (OR 5.49, 95%CI 3.38–8.90) towards prevention of SHS exposure were significantly associated with good counselling practice. The strongest observed association was for those having a supportive attitude towards the prevention of SHS exposure, who after adjusting for covariates were more than five folds compared to those do not have supportive attitude towards the prevention of SHS exposure (OR 5.49, 95%CI 3.38–8.90) to have good counselling practice.

Barriers to Provision of Counselling and Needs of Health Care Professionals to Improve the Delivery of Counselling

Lack of time or training, absence of reimbursement and unavailability of materials were the most common barriers to the provision of counselling (Table 4). Lack of time was the first barrier for most of gynaecologists/obstetricians (57.3%), paediatricians (72.9%), and GPs (67.7%). However, lack of training was the first barrier for most nurses (64%) and midwives (54.8%). The majority of HCPs (75%) suggested that it is nurses' job to discuss SHS exposure with pregnant women/mothers with children. The majority of participants stated that they need training, standard guidelines and materials about SHS health hazards to help them improve the delivery of counselling on SHS. HCPs reported that health education sessions for pregnant women/mothers of children and smokers in their household could help them to reduce SHS exposure.

DISCUSSION

The main findings of this study are that only about half of HCPs in Assiut city in Egypt have good risk awareness (55.9%), a supportive attitude (52.9%), and report good counselling practice (51.8%) regarding the prevention of SHS exposure among pregnant women and children. GPs and paediatricians were found to be most aware of the risks of SHS. Female HCPs were more likely to report good counselling practice. HCPs serving a rural population were most likely to have a supportive attitude for the prevention of SHS and report good counselling practice. HCPs who are not exposed to SHS at home were more likely to report good counselling practice and supportive attitude for its prevention among pregnant women and children.

Our results are consistent with other studies in Egypt and neighbouring countries which have reported that HCPs have vague or inaccurate knowledge about the risk of SHS and poor counselling practice in relation to SHS exposure [34–36]. Previous studies in Egypt reported better knowledge of the dangers of smoking and more supportive attitudes in relation

TABLE 4 | Barriers to provision of counselling and needs of HCPs to improve the delivery of counselling service (Asiut, Egypt, 2022).

Barriers for HCPs to advise pregnant women/mothers with children to avoid SHS exposure	N = 367*	%
Lack of time	228	62.1
Lack of training	195	53.1
There is no reimbursement for advising women to avoid SHS exposure	167	45.5
Unavailability of materials (e.g., brochures about health hazards of SHS)	147	40.1
Low chances of success	122	33.2
Pregnant women/mothers with children do not want/expect to receive that advice	92	25.1
SHS exposure counselling is not a part of my job	69	18.8
Feeling uncomfortable discussing as I think it is a sensitive topic	57	15.5
HCPs' opinion regarding barriers for pregnant women/mothers with children to avoid SHS exposure		
Husband smoking at home	317	86.4
Ignorance of the risks of SHS exposure	274	74.7
Another household smoker	221	60.2
Lack of self-confidence to ask smoker in her household to stop smoking	187	50.9
Smoking being accepted in the society	186	50.7
Regulations on smoking in public places are not enforced	181	49.3
Societal attitudes towards women asking her husband/smoker in her household to stop smoking	116	31.6
Other	1	0.3
Whose job is it to discuss SHS exposure with pregnant women/mothers with children		
Nurse	276	75.2
Midwife	200	54.5
General practitioner (GP)	184	50.1
Others	53	14.4
What do HCPs' need to deliver/improve the delivery of SHS counselling service among pregnant women/mothers of children?		
Training for HCPs	307	83.7
Availability of standard guidelines in the health centre	237	64.6
Availability of materials about SHS health hazards	211	57.5
Nothing	7	1.9
Other	4	1.3
What is the best way to help pregnant women/mothers with children to avoid SHS exposure?		
Health education sessions for pregnant women/mothers of children	254	69.2
Health information materials for pregnant women/mothers of children	256	69.8
Health education sessions for pregnant woman and their household smokers	210	57.2
Offering counselling sessions and nicotine replacement therapy to household smokers	181	49.3
Other	7	1.9

*Respondents were allowed to choose many options.

to the provision of smoking cessation services among HCPs [23, 37]; however, those studies did not investigate in details the knowledge regarding the specific dangers of SHS to pregnant women and children which highlight the novelty of our study. This difference could be due to these existing studies being not specific to SHS and being performed in one university hospital and urban family medicine centers in Alexandria, as opposed to a combination of urban and rural clinics as in the present study, in which HCPs serving rural communities showed lower knowledge.

The limited awareness of the health risks of SHS may be partly due to a lack of relevant training. Only one in five participants in the current study had previous training on smoking cessation, whether during medical school, post graduate clinical training or training at the workplace and receiving this training was significantly associated with good counselling practice of HCPs with pregnant women and children regarding their SHS exposure. This figure is lower than previously reported

[23, 37] possibly due to the limited training programs on smoking cessation in South Egypt governorates. In the current study, lack of training was the first barrier for most nurses and midwives to provide the SHS counselling service suggesting that improvement in training provided to nurses could help to reduce SHS exposure.

It is important to ensure that the wider environment is conducive to increased awareness and willingness to provide support on smoking cessation and prevention of SHS exposure. This includes proper enforcement of smoke-free policy enshrined in law, and other population-level interventions such as mass media campaigns to make the social norms against SHS exposure. In combination with additional training, this can improve the knowledge and attitudes of HCPs, as well as the general population, and change counselling practice of HCPs.

Although Egypt has made important strides in controlling tobacco use according to World Health Organization's

Framework Convention on Tobacco Control (WHO FCTC) report [6], SHS exposure remains extremely high (more than 70%) in public places such as restaurants, public transportation, and health care facilities [5, 38] as the smoke-free legislation is poorly enforced [10]. This is comparable with our results as 70% of HCPs reported exposure to SHS in the workplace. While efforts to support the provision of advice related to SHS is likely to help reduce SHS exposure, these are likely to be most effective if they are made in the context of effective implementation of tobacco control policies, particularly the enforcement of smoke-free legislation.

In the current study about half of HCPs agreed that giving advice on avoiding SHS exposure is unlikely to be successful; this could be because HCPs claimed that they do not have time, training, and materials to deliver this service, or due to a lack of understanding of the effect that such advice may have. One third disagreed that pregnant women/mothers with children are interested in receiving advice about reducing SHS exposure. As evidenced from previous systematic review, smoking and SHS exposure is socially accepted in many Middle Eastern countries [39]. Therefore, proper enforcement of smoke-free law is expected to contribute to changes in social norms which will facilitate changes in SHS exposure. Enforcement of smoke-free policy could make women more interested in avoiding SHS exposure and could make HCPs feel offering advice can be helpful. Thus, overall environment is conducive to HCPs giving this sort of advice.

In the present study, the main obstacles for HCPs to help pregnant women/children to avoid SHS exposure were found to be lack of time, lack of training, absence of reimbursement and unavailability of materials. Similar obstacles have been reported in other middle income countries [40]. Previous evidence suggest that providing training for HCPs encourage them to provide counselling service to pregnant women to adopt smoke-free environment [41]. Training of HCPs cannot work alone. A range of issues need to be addressed including lack of time and unavailability of materials. Additionally, ensuring that HCPs in Egypt have the time and financial resources needed to deliver this type of support is essential. Clear specification of SHS counselling service in the job description of HCPs working in public MCH clinics should be performed by the health system governors. In this study, the majority of HCPs suggested that it is nurses' job to discuss SHS exposure with pregnant women, so there is no clear description on whose job it is to do counselling service. However, previous evidence reported that nurses and physicians are ideally placed to provide health advice to pregnant women and mothers with children to influence their SHS exposure [42]. Thus, all HCPs in public MCH clinics need training to address their view that it is solely nurses' responsibility to discuss SHS exposure and encourage them to discuss SHS exposure with their patients.

Previous studies have shown that pregnant women who do not smoke are often responsive to counselling regarding reduction of SHS exposure received from HCPs in antenatal care clinics [43, 44]. Moreover, studies have reported that counselling pregnant women not only led to reduction in their SHS exposure but also increased smoking cessation among their husbands, as well as increasing positive

attitudes and practices to reduce SHS at home [43, 45]. Support from HCPs may therefore contribute to the reduction of SHS exposure in Egypt.

Strengths and Limitations

To our knowledge, this is the first study that provides detailed evidence on the knowledge, attitudes and practice of Egyptian HCPs regarding SHS exposure among pregnant women and children. This study achieved a high response rate by distributing paper questionnaires, though this meant that the study focused on HCPs working in only one governorate. Despite this, the study included both urban and rural areas. Furthermore, Assiut is the largest city in Upper Egypt, however the results may not be generalizable because of differences in sociodemographic characteristics between Assiut and other cities in Egypt. A further limitation, particularly in relation to assessing counselling practice of HCPs, is that the study findings are based on self-report. However, the study identified clear shortcomings in counselling practice, which are unsurprising given the low levels of knowledge and supportive attitudes to SHS prevention. Another limitation of bias that could be due to that the study main respondents were non-smokers and females, however, we performed multivariable regression analysis and models were adjusted for main demographic characteristics. Although, dichotomizing a variable based on cut-offs can jeopardize model fit and lead to misleading interpretation of results, we have performed a sensitivity analysis to ensure that the median cut-off point used in this study is not leading to misinterpretations (Supplementary Material S2).

Conclusion and Recommendation

Awareness, attitudes and counselling practice of HCPs regarding the risks of SHS to pregnant women and children in Egypt should be improved. It is important to develop an environment which facilitates increased awareness of and willingness to provide support on smoking cessation and prevention of SHS exposure. This includes comprehensive enforcement of smoke-free policy and training programs for HCPs on smoking cessation which should cover SHS exposure. This could also extend to other population-level interventions such as mass media campaigns. Other barriers, such as the lack of time must also be addressed. More qualitative studies in Egypt are needed also to explore women's views and experiences regarding their SHS exposure and the barriers to preventing this exposure among pregnant women and children.

ETHICS STATEMENT

The current study was reviewed and approved by the School of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham, United Kingdom and the Research Ethics Committee in the School of Medicine at Assiut University, Egypt. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.sph-journal.org/articles/10.3389/jph.2022.1605073/full#supplementary-material>

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8.1.13 Appendix 5.1 participant information sheet for

FGDs



**University of
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UK | CHINA | MALAYSIA

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Supervisors:

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Study Title: An exploration of SHS exposure and establishing smoke free homes among pregnant women and children in Egypt.

PARTICIPANT INFORMATION SHEET

Research Ethics Reference:
Version 1.0 Date: 02/02/2020

We would like to invite you to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. One of our team will go through the information sheet with you and answer any questions you have. Please take time to read this carefully and discuss it with others if you wish. Ask us anything that is not clear.

What is the purpose of the research?

SHS is involuntary exposure of other people tobacco smoke by non-smokers and it poses a serious threat to public health worldwide. It is established that SHS exposure is highly prevalent in Egypt. There is a substantial evidence that SHS exposure may cause many adverse effects among non-smokers. Pregnant women and children are vulnerable groups that may be significantly affected by SHS. Therefore, this study will explore mothers' and pregnant women's knowledge, attitudes and behaviour in relation to SHS exposure, smoking rules in the home and women's experiences in receiving advice about SHS exposure by Health care professionals (HCPs) in primary health centres in Assiut, Egypt.

Why have I been invited to take part?

You are being invited because you are Egyptian pregnant women or mothers of children under 18, aged between 15-49, and exposed to SHS in home or workplace.

Do I have to take part?

No. It is up to you to decide if you want to take part in this research. We will describe the study and go through this information sheet with you to answer any questions you may have. If you agree to participate, we will ask you to sign a consent form and will give you a copy to keep. However, you would still be free to withdraw from the study at any time, without giving a reason and without any negative consequences, by advising the researchers of this decision. This would not affect your legal rights.

1. What will happen to me if I take part?

A researcher will go over the information sheet, explain the procedure which involves having an interview with the researcher. We will ask you about your knowledge, attitudes and behaviour in relation to SHS exposure, barriers and facilitators of smoking rules in the home and your experiences in receiving advice about SHS exposure by Health care professionals (HCPs) in primary health centres in Assiut, Egypt. This FGD will last for approximately 60 to 90 minutes. If you are happy to take part, then you will be asked to sign a consent form.

2. Are there any risks in taking part?

We are not aware of any risks of taking part in this study.

3. Are there any benefits in taking part?

There will be no direct benefit to anyone from taking part in this research. The study is being undertaken to identify mothers' and pregnant women's knowledge, attitudes and behaviour in relation to SHS exposure, smoking rules in the home and women's experiences in receiving advice about SHS exposure by Health care professionals (HCPs) in primary health centres in Assiut, Egypt. By addressing these aims Ministry of health can know the best way to implement health program to prevent SHS exposure among pregnant women and children.

4. Will my time/travel costs be reimbursed?

Participants will not receive an inconvenience allowance to participate in this study as the lead researcher will be going to them.

5. What happens to the data provided?

The research data will be stored confidentially and anonymized in an encrypted electronic storage device/laptop. We will not ask for your name and you will not be identifiable in any report or publication. All research information will only be accessed by the research team [i.e researcher, supervisor]. However, we would like your permission to use anonymised data in future studies, and to share our research data (e.g. in online databases) with other researchers in other Universities and organisations both inside and outside Egypt. This would be used for research in health and social care. Sharing research data is important to allow peer scrutiny, re-use (and therefore avoiding duplication of research) and to understand the bigger picture in particular areas of research. We would like your permission to use fully anonymised direct quotes in research publications. All personal information that could identify you will be removed or changed before information is shared with other researchers or results are made public. Data sharing in this way is usually anonymised. All research data and records will be stored for a minimum of 7 years after publication or public release of the work of the research.

Personal / sensitive data will be stored confidentially using password protected computers. The research team will have access to personal/sensitive data collected in this study. To help ensure your privacy, you will be assigned a volunteer study identification number (for example P01 for participant number 1), and it will be used instead of your name. Your name and any information about you will not be disclosed outside the study centre.

6. What will happen if I don't want to carry on with the study?

Even after you have signed the consent form, you are free to withdraw from the study at any time without giving any reason and without their legal rights being affected. If you withdraw we will no longer collect any information about you or from you but we will keep the anonymous research data that has already been collected and stored as we are not allowed to tamper with study records. This information may have already been used in some analyses and may still be used in the final study analyses. To safeguard your rights, we will use the minimum personally-identifiable information possible.

7. Who will know that I am taking part in this research?

All information collected about you during this research would be kept strictly confidential. All such data are kept on password-protected databases sitting on a restricted access computer system and any paper information (such as your consent form, contact details and any research questionnaires) would be stored safely in lockable cabinets in a swipe-card secured building and would only be accessed by the research team. Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally – identifiable information possible. You can find out more about how we use your information and to read our privacy notice at: <https://www.nottingham.ac.uk/utilities/privacy.aspx/>

Designated individuals of the University of Nottingham may be given access to data for monitoring and/or audit of the study to ensure we are complying with guidelines. With your consent, we will keep your personal information on a secure database in order to contact you for future studies. Anything you say during the interview will be kept confidential, unless you reveal something of concern that may put yourself or anyone else at risk. It will then be necessary to report to the appropriate persons.

8. What will happen to the results of the research?

The research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published open access. Result of the thesis may also be used for scientific presentation or publication. The research will be written up as a dissertation for the degree of PhD.

9. Who has reviewed this study?

All research involving people is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the Faculty of Medicine and Health Sciences Research Ethics Committee (Reference number: FMHS)

10. Who is organising and funding the research?

The research is being organized by the university of Nottingham and is being funded by the Egyptian Ministry of Higher Education.

11. What if something goes wrong?

If you have a concern about any aspect of this project, please speak to the researcher: Zeinab Hassanein or the Principal Investigator Dr Tessa Langley, who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how she intends to deal with it. If you remain unhappy and wish to complain formally, you can do this by contacting the FMHS Research Ethics Committee Administrator, c/o The University of Nottingham, Faculty PVC Office, B Floor, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH. E-mail: FMHS-ResearchEthics@nottingham.ac.uk

12. Contact Details

If you would like to discuss the research with someone beforehand (or if you have questions afterwards), please contact:

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8.1.14 Appendix 5.2 Consent form for FGDs



Faculty of Medicine & Health Sciences
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Hucknall Road
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Participant Consent Form Final version 1.0: 05.02.2020

Title of Study: An exploration of SHS exposure and establishing smoke free homes among pregnant women and children in Egypt

Name of Researchers:

Zeinab Hassanein, Lead investigator

Supervisors: Dr Tessa Langley, Dr Rachael Murray, Dr Ilze Bogdanovica, Prof Jo Leonardi-Bee

Please initial box

Name of Participant:

1. I confirm that I have read and understand the information sheet for the above study which is attached and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I understand that if I withdraw from the study, the information collected will remain and be used in the study analysis.
4. I understand that relevant sections of my data collected in the study may be looked at by the research group and by other responsible individuals for monitoring and audit purposes. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential.
5. I understand that the focus group discussion will be audio recorded using a digital device and that anonymous direct quotes from the interview may be used in the study reports.
6. I understand that what I say during the focus group will be kept confidential unless I reveal something of concern that may put myself or someone else at any risk. It will then be necessary to report this to the appropriate persons.
7. I understand that information about me recorded during the study will be made anonymous before it is stored. It will be uploaded into a secure database on a computer kept in a secure place. Data will be kept for 7 years after the study has ended and then destroyed.
8. I agree to take part in the above study.

Name of Participant Date Signature

Name of Person taking consent Date Signature

2 copies: 1 for participant, 1 for the project notes. An exploration of SHS exposure and establishing smoke free homes among mothers and pregnant women in Assiut, Egypt, Participant consent form, Version 1.0, 10/02/2020

8.1.15 Appendix 5.3 FGDs guide for with pregnant women/mothers of children

We have the pleasure to invite you to take part in this research study. This study is being conducted by researchers based at the University of Nottingham, School of Medicine, Division of Epidemiology and Public Health, in Nottingham England. My name is Zeinab Hassanein and I am currently a PhD student at the University of Nottingham. The aim of the study is to investigate women's attitudes, knowledge and behaviour in relation to SHS exposure in Assiut city and to explore the barriers and facilitators of preventing SHS exposure among them.

To start with, SHS exposure, also known as passive smoking, is breathing in other people's tobacco smoke.

Your participation in this research study will help us to understand your experiences of SHS exposure and the barriers for preventing SHS exposure among pregnant women and children, thereby identifying opportunities to decrease SHS exposure amongst this target group.

You have the right to withdraw at any time from the session. This session will be audio recorded and transcribed and anonymised quotes may be used in future reports or publications. I will ask you some questions to explore your experiences with SHS exposure and there is no wrong or right answer; the idea is to explore your opinions. The session will be 40-60 min long and you can ask me any questions. Some ground rules will be explained by the moderator (ZH) to

participants such as respecting everyone's opinion by not interrupting, avoiding the use of phones and establishing that there are no right or wrong answers; they can express their views freely and they are free to withdraw from the FGD session at any time without their medical care service being affected. The participants will be offered badges with numbers as a means of identification. Participants will be assured that their responses will be anonymised in any subsequent reports or publications.

Knowledge of and attitude towards SHS

1. What do you think about the potential harms of SHS to health?
2. How do you think SHS exposure could affect the health of pregnant women? What could that exposure cause?
3. How do you think SHS affects the health of children? (Do you think it is differs according to a child's age?)
4. Where are you exposed to SHS? (home, work, others)
5. Who is smoking at your home or workplace? Does he/she smoke regularly in front of you?
6. How do you feel about SHS exposure? Why?
7. How do you feel about changing your SHS exposure? Why?
8. Where do you feel that you can change that exposure?

9. Has anything happened that changed your beliefs about SHS? What do you think might change your opinion? (Lived experience, society, etc)

10. How do you think SHS exposure among pregnant women and children is perceived by society? Why? (Any community recommendations of not to smoke in presence of pregnant women or child?)

These were all questions about the section of your knowledge about SHS exposure. Is there anything you want to add?

Smoking rules at home

Are there smokers in your household?

11. Do you have any smoking rules in your home? What are they? Do you have any restrictions in place for smoking in presence of a child in your house? (Are there any specific rules concerning children? Did you change these rules according to the child/children's age? At what age when you changed this behaviour?)

12. For any family, why may they have a smoking ban at home?

13. Tell me more about smoking in your home while you have been/when you were pregnant (Any change in behaviour or frequency? Did your family member (e.g. husband) try to quit smoking? How? What encouraged him?)

14. Have you any measures to reduce SHS exposure among your children? What are these? (Trying to persuade husband to smoke outdoors, away from children)

15. What stops you from adopting a smoke free home? For those who tried, did it work and what were the challenges? For those who were successful, what was helpful?

16. Is there anything, which stops you from preventing SHS exposure among pregnant women and children at home? Work?

17. What measures might help to prevent SHS exposure among pregnant women and children in home? In addition, who should implement those measures?

That are all questions about smoking rules at home. Is there anything you want to add?

SHS reduction counselling services:

18. Where, if at all, did you receive any information about the health risks of SHS exposure?

(G.P/nurse/friends/family/TV/media/advertisement?)

19. Did the doctor/ nurse in primary health care ask you about SHS exposure? What did he/she discuss with you? (What information about SHS did you get from primary health care doctor/nurse?)

20. Did you make any changes in response to such information? (Was this different depending on whether you received this information from

TV and media advertising or from doctors in primary health care centres?)

21. Health education interventions are designed to deliver health information to individuals on their health and wellbeing (like the health education intervention done by Ministry of health regarding importance of breast feeding). Thus, what is your opinion about the delivery of an educational intervention in primary health care centres to reduce SHS exposure among pregnant women and children? What is the best method?

(Face-to-face? Self-help material? Public lectures? Health education sessions to non-smoking mothers? Including husbands in these counselling sessions? Providing smoking cessation aids to husbands, such as nicotine replacement patches – do you think the husband would accept the counselling and the patches?)

22. If the Egyptian Ministry of Health Directorate in Assiut were to implement a health intervention for smoke free homes, would you take part? What would encourage you to participate? What are the difficulties you might face?

23. Thinking specifically about smokers in your household, would he/they be willing to take part in health education interventions?

Closing:

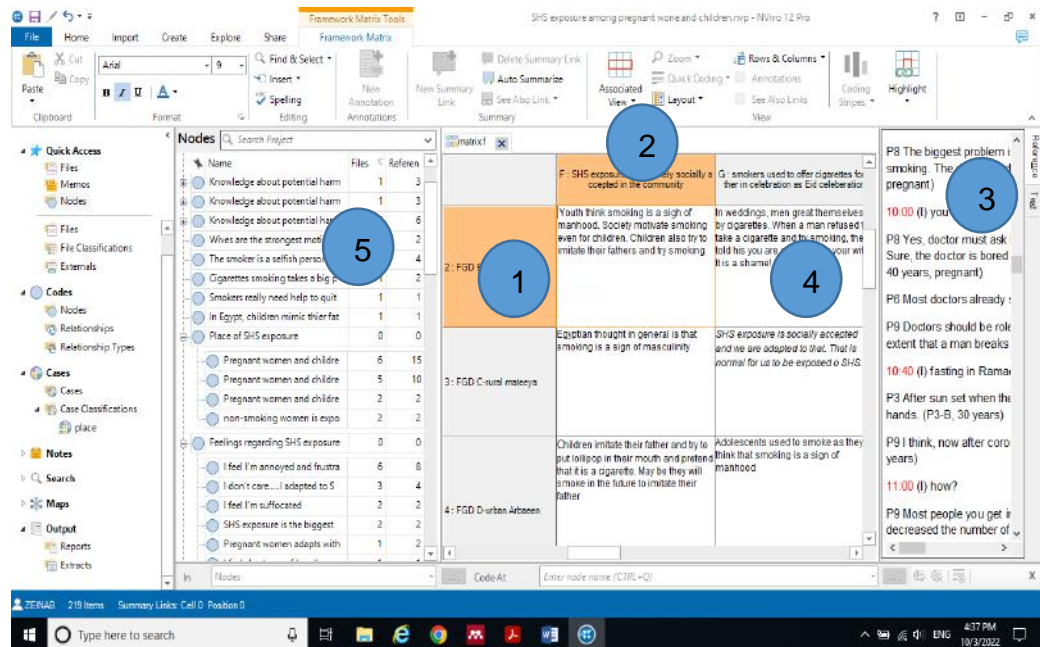
Are there other things that we should have discussed that you think might be helpful, but we didn't? Anything do you want to add? Or do you want to use this to improve your further discussion groups?

Thank you.

N.B At the end of FGD I will ask women if their family members (e.g. husbands) would be willing to take a part in this study by telephone interview?

N.B any text in italics is a prompt for the researcher only if the discussion is not flowing.

8.1.16 Appendix 5.4 An illustrative sample of the framework matrix used in NVivo during analysis



1 Rows: Each of the row represents a case node (transcript). For this example the cases are the transcripts of the FGDs

2 Column: Each column represents a sub-theme node, for this example, the presented sub-themes are for the theme of social norms around SHS exposure in Egyptian society

3 Associated view: This displays the source content that is coded at the row (case)

4 Cells: Each of the cell shows the intersection between a case and theme node.

5 Thematic node hierarchy: Display of the themes and sub-themes map in a chart

8.1.17 Appendix 5.5 Detailed characteristics of each participant in the qualitative study in chapter 5

	Participants	Age	Residency	Pregnant
1.	A1	20	Rural	No
2.	A2	29	Rural	yes
3.	A3	27	Rural	No
4.	A4	40	Rural	No
5.	A5	28	Rural	No
6.	A6	25	Rural	No
7.	A7	35	Rural	No
8.	A8	45	Rural	No
9.	A9	27	Rural	Yes
10.	A10	20	Rural	Yes
11.	B1	31	Rural	No
12.	B2	35	Rural	No
13.	B3	30	Rural	No
14.	B4	32	Rural	Yes
15.	B5	39	Rural	No
16.	B6	24	Rural	Yes
17.	B7	32	Rural	Yes
18.	B8	40	Rural	Yes
19.	B9	25	Rural	No
20.	B10	25	Rural	No
21.	B11	45	Rural	No
22.	C1	20	Rural	No
23.	C2	23	Rural	Yes
24.	C3	37	Rural	No
25.	C4	46	Rural	No

	Participants	Age	Residency	Pregnant
26.	C5	18	Rural	Yes
27.	C6	30	Rural	No
28.	C7	25	Rural	Yes
29.	C8	33	Rural	Yes
30.	D1	22	Urban	Yes
31.	D2	33	Urban	No
32.	D3	39	Urban	No
33.	D4	49	Urban	No
34.	D5	48	Urban	No
35.	D6	29	Urban	No
36.	D7	25	Urban	Yes
37.	D8	19	Urban	Yes
38.	D9	24	Urban	Yes
39.	D10	31	Urban	No
40.	D11	32	Urban	No
41.	D12	31	Urban	No
42.	D13	25	Urban	No
43.	E1	40	Urban	No
44.	E2	20	Urban	Yes
45.	E3	23	Urban	Yes
46.	E4	49	Urban	No
47.	E5	18	Urban	Yes
48.	E6	21	Urban	No
49.	E7	18	Urban	Yes
50.	E8	27	Urban	Yes
51.	E9	21	Urban	Yes
52.	F1	30	Urban	No
53.	F2	42	Urban	No

	Participants	Age	Residency	Pregnant
54.	F3	38	Urban	No
55.	F4	40	Urban	No
56.	F5	32	Urban	No
57.	F6	24	Urban	Yes
58.	F7	24	Urban	Yes
59.	F8	22	Urban	Yes
60.	F9	30	Urban	Yes
61.	F10	39	Urban	No

A (Bani Mour village), B (Bani zeed Village), C (Mateeya Village), D (Arbaeen), E (Megahdeen), E (Megahdeen), F (Waleedyia)