Title of study: Exploring the management of type 2 diabetes in the Caribbean

Student name: Amy L Nixon, BSc (Hons), MPH

Thesis submitted to the University of Nottingham for the degree of Master of Philosophy

Student ID Number: 4312342

Start Date: September 2017

End Date: October 2020

Supervisors: Kaushik Chattopadhyay and Jo Leonardi-Bee

Division of Epidemiology and Public Health,

School of Medicine,

University of Nottingham

Abstract

Introduction

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder with a prevalence that has been increasing steadily and rapidly across the world, including the Caribbean region. It has negatively impacted individuals health and wellbeing, and in addition, it has increased the economic and social burden on the countries. T2DM management is an integral part of positive health outcomes, however, it has been poor in the Caribbean and is resulting in an alarming number of complications. The best way to reduce the negative outcomes associated with T2DM is to ensure that the disease is managed correctly. To do this, issues associated with poor T2DM management must be identified and disseminated to the public.

Aim

This thesis aims to highlight and raise awareness of the disparities impacting T2DM management in the Caribbean region to assist with future research, developmental plans and strategies. From the main aim two study objectives were developed. The first objective was to compare the content and quality of the Caribbean and international clinical guidelines for managing T2DM. The second objective was to summarise the barriers and facilitators to T2DM management in the Caribbean region.

Methods

To address the aim of this research a formative research approach was used, this is to ensure that the Caribbean government, healthcare professionals and researchers are provided with some of the necessary data needed to plan and develop interventions. This formative research included two separate studies and methods, one to address each aim. The first study appraised T2DM management guidelines including the Caribbean guideline which compared the content and quality of guidelines using the AGREE II tool. The second study was a systematic review which summarised the barriers and facilitators to T2DM management in the Caribbean region.

Results

From the appraisal, the Caribbean clinical guideline was found to contain similar levels of T2DM management topics compared to six guidelines (one international and five country-specific guidelines) and contained higher content levels than the remaining three guidelines (two international and one country-specific). Three country-specific guidelines (Canada, England and Wales and Scotland) met the criteria of high-quality and could be recommended for current use in clinical practice. Four were only eligible for use in practice with modifications (two international and two country-specific). However, the country-specific guideline from the Caribbean as well as two additional guidelines (one international and one country-specific) were of low-quality and therefore, they were not recommended for use in practice.

The systematic review included eight studies, all of which focused on the patients' perspective. There were six synthesized findings which included barriers and facilitators of T2DM management. These include, From the participants perspective sociocultural norms, demands and pressures were found to impact self-management and general care of T2DM (moderate certainty evidence); From the participants perspective environmental context and resources were found to impact the management of T2DM (high certainty evidence); From a patients perspective support systems were influential on the general management of T2DM (high certainty evidence); From the participants perspective personal background and circumstances can encourage and limit good self-management and general management of T2DM (high certainty evidence); From the participants perspective emotional factors were found to influence patients' actions towards management of T2DM (high certainty evidence); and from the participants perspective psychological factors were found to influence patients' adherence to T2DM management (moderate certainty evidence).

Summary

With the aim of reducing the number of cases and deaths associated with T2DM, this research successfully addresses knowledge gaps by determining and presenting the quality of published clinical guidelines for T2DM management used by healthcare professionals. It also assesses the information being provided and summarizes the factors that hinder the promotion of good T2DM management in the Caribbean. The findings from these studies provide evidence that the Caribbean islands can use to make informed decisions on future interventions or research to assist in the fight against T2DM.

Acknowledgements

Firstly, I would like to thank God for getting me through the last three years in good health and for providing me with the motivation and mental and physical strength to complete this final aspect of my MPhil degree.

Secondly, I would like to express my gratitude to both my supervisors Kaushik and Jo, who worked tirelessly to ensure that I completed my thesis. Although there were a few bumps along the way you ensured that I got there in the end,

I would like to thank my parents Barry and Sallie-Ann Nixon for providing me with the opportunity to continue my academic career. Your endless support and inspiration is immensely appreciated and has not gone unnoticed.

Thirdly, I would like to thank my family and friends for their encouragement and general support. A special thank you to Heidi, Barry Jr, Ethan, Jesse and Amika for your physical and emotional support throughout the tougher times, your pick-me-ups went a long way.

Lastly, I would like to give special recognition Dr. Winifred Ekezie, Kassie Christopher, Sylburn (Brad) Sylvester, Haiquan Wang, and Dr. Gowsika Yogeswaran and the University of Nottingham librarians who assisted me with different aspects of my research, thank you for your time and efforts. Although no longer with us, I would like to acknowledge librarian Mary Robinson who assisted me in the first year of my research, may she continue to rest in peace.

Thank you all from the bottom of my heart.

Love, Amy L Nixon.

Publications and Presentations arising from work described in this thesis

Peer-Reviewed Publications

1. Comparison of content and quality of the Caribbean clinical guideline for managing type 2 diabetes mellitus. (Submitted and under review)
2. Barriers and facilitators to type 2 diabetes management in the Caribbean region: a systematic review protocol. (Submitted and published online)
3. Barriers and facilitators to type 2 diabetes management in the Caribbean region: a qualitative systematic review. (Submitted, published online)

Conference presentations and posters

1. University of Nottingham Faculty of Medicine Postgraduate Research Forum 2018, UK (27th June 2018) - Oral & E-poster

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AGREE II	Appraisal of Guidelines for Research and Evaluation II
CHD	Coronary Heart Disease
CHRC	Caribbean Health Research Council
DM	Diabetes Mellitus
DPP-4	Dipeptidyl peptidase-4
FPG	Fasting plasma glucose
GDM	Gestational Diabetes Mellitus
GLP-1	Glucagon-like peptide-1
HbA1c	Glycated Haemoglobin A1C
IDF	International Diabetes Federation
IFG	Impaired Fasting Glycaemia
IGT	Impaired Glucose Tolerance
JBI	Joanna Briggs Institute
LEA	Lower Extremity Amputation
LMICs	Low- and Middle- Income Countries
NICE	National Institute for Health and Care Excellence
OGTT	two-hour Oral Glucose Tolerance Test
PAD	Peripheral Arterial Disease
PAHO	Pan American Health Organisation
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
USA	United States of America

Chapter 1: Introduction

1.1. Diabetes mellitus background

The diabetes epidemic is accelerating rapidly and is known as one of the fastest-growing health challenges[1], especially in the Caribbean with its predilection to persons of black ethnicities[2]. Diabetes mellitus (DM) is a chronic metabolic disease which was responsible for over 4.2 million deaths in 2019. DM is a disease where the pancreas cannot make insulin, or when the body is unable to use insulin to effectively regulate blood glucose.[3] There are mainly three common types of DM, type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM), and gestational diabetes mellitus (GDM). All of these result in hyperglycaemia but differ in pathophysiology, complications and treatments. The two most predominant types are T1DM and T2DM.[4–6]

T1DM, which was once known as an insulin-dependent, juvenile or childhood-onset, occurs when the pancreas produces little or no insulin at all, resulting in high blood glucose levels in the body.[4] Although there is no known cause for T1DM, researchers assume that it is instigated by genetical and environmental factors. As one of the known terms “juvenile or childhood-onset” suggest, T1DM is commonly found in children and young adults, and cannot be prevented.[5,7] GDM occurs during pregnancy when a woman’s blood glucose levels are higher than normal, but below the diagnostic cut-off/threshold for diabetes.[4,8] Women diagnosed with GDM are more likely to face complications during pregnancy and delivery. Also, both mother and children are at risk of developing T2DM in the future.[4,8] T2DM is a chronic metabolic condition where the body is unable to use insulin effectively, resulting in higher blood glucose levels. T2DM is the most common type of diabetes, affecting approximately 90% of people diagnosed with diabetes[9] and it is most prevalent among adults; however, the incidence among children has increased in recent years.[10,11]

1.2. Type 2 diabetes mellitus background and diagnosis

Diagnosis of T2DM is based on the presence of the following symptoms: increased thirst (polydipsia), increased appetite (polyphagia), increased urine frequency and volume (polyuria), increased occurrence of infections, fatigue, weight loss, abnormal healing, areas of darkened skin commonly found at the neck or armpits (acanthosis nigricans), tingling or numbness in the hands or feet (paraesthesia), and blurred vision.[12] When one or more of these symptoms are present, a diagnostic test is conducted via laboratory testing of blood plasma glucose concentrations. Screening is used to identify asymptomatic persons and high-risk individuals to ensure that their T2DM are managed and treated. This may include a screening test, which if positive, may indicate a possible diagnosis and hence diagnostic test should be conducted.[13]

According to the National Institute for Diabetes and Digestive and Kidney Diseases and most guidelines (including the International Diabetes Federation (IDF)), the current standard diagnostic criteria for T2DM

includes glycated haemoglobin A1C (HbA1c) test, fasting plasma glucose, two-hour oral glucose tolerance test (OGTT), and random plasma glucose test (**Table 1**). The HbA1c test is now the most common and most recommended test for diagnosing T2DM, it measures the average glucose levels in the blood for the past two to three months. Fasting plasma glucose (FPG) tests the blood glucose level at one point in time after 8-12 hours of fasting. The OGTT is done by using a glucose load containing the equivalent of 75g anhydrous glucose dissolved in water and testing an individual's blood glucose after 8 hours fasting, and 2 hours after ingesting sugary drink. Lastly, random plasma glucose, it can be used at any time, but usually when an individual is experiencing severe diabetes symptoms such as hyperglycaemia.[13–16] The cut-off point for FPG in the diagnostic criteria for T2DM differs according to diabetes organisations; however, the cut-off points presented in **Table 1** are used by WHO and many other diabetes organisations.

Table 1: Standard diagnostic criteria for T2DM by different test types

T2DM diagnosis	Glycated haemoglobin A1C (HbA1c)	Fasting plasma glucose (FPG)	Two-hour plasma glucose oral glucose tolerance test (OGTT)	Random plasma glucose
Normal	Below 5.7%	Below 100 mg/dL (6.1 mmol/L)	Below 140 mg/dL (7.8 mmol/L)	NA
Pre-diabetes	5.7%–6.4%	100–125mg/dL (6.1-7.0 mmol/L)	140-199 mg/dL (7.8-11.0 mmol/L)	NA
Diabetes	6.5% and above	126 mg/dL and above (7.0 mmol/L)	200 mg/dL and above (11.1 mmol/L)	200 mg/dL and above (11.1 mmol/L)

1.3. Risk factors for T2DM

The risk of T2DM increases with the proportion of associated risk factors present.[2,17] Most common risk factors for T2DM are increasing age (especially adults between the age of 40-45), obesity, high waist circumference, coexisting hypertension and hyperlipidaemia (high or unhealthy levels of lipids (triglycerides and cholesterol), family history of T2DM, personal history of gestational diabetes as a mother and child, ethnicity (particularly South Asian, Chinese, African-Caribbean or Black African), unhealthy diet, persons with a sedentary lifestyle and physical inactivity and pre-diabetes.[2,18] Pre-diabetes mellitus is also known as Impaired Glucose Tolerance (IGT) and Impaired Fasting Glycaemia (IFG). These conditions (IGT and IFG) are at the intermediate development phase of the disease. Hence, when individuals with blood sugar levels higher than the normal range of 140 - 199 mg/dL (7.8 - 11 mmol/L) from the OGTT , but not high enough to be diagnosed as diabetes, they may be considered as having IGT or IFG and regarded being at increased risk of developing T2DM.[4,6,19] The three standard blood sugar tests used to diagnose T2DM (HbA1c, FPG and OGTT) are also used to diagnose pre-diabetes.[13–16]

1.4. Global incidence and prevalence of T2DM

Both the incidence and prevalence of DM, particularly T2DM, have increased over the years. Globally, the number of adults living with DM has tripled over the last 20 years and have surpassed the prediction of 438 million in 2025.[20] In 2019, it was estimated that 463 million adults were living with DM, implying approximately 1 in 11 adults had DM; and, this figure is expected to increase by 237 million in 2045.[1,21]

Table 2 shows the world's age-adjusted prevalence of DM for those ages 20 to 79 years, which in 2019 was 8.3%.[22] Of the seven IDF regions, Africa has the lowest age-adjusted prevalence, and this may be as a result of under-nutrition and lower levels of overweight, obesity and urbanisation.[22] Europe also has a low prevalence, falling below the world average; and this may be the result of effective control tools for blood glucose, blood pressure, lipids and associated complications.[23] All the other regions were above the World percentage.

Table 2: Prevalence of diabetes in adults (20-79 years) in IDF Regions, by age-adjusted comparative diabetes prevalence

	World	Africa	Europe	Middle East & North Africa	North America & Caribbean	South & Central America	South-East Asia	Western Pacific
2019	8.3%	4.7%	6.3%	12.2%	11.1%	8.5%	11.3%	11.4%
2030	9.2%	5.1%	7.3%	13.3%	12.3%	9.5%	12.2%	12.4%
2045	9.6%	5.2%	7.8%	13.9%	13.0%	9.9%	12.6%	12.8%

IDF, 2019.[22]

A major concern in 2019 was that China, India and the United States of America (USA) were the three countries which had the largest number of adults with diabetes (116.4, 77.0 and 31.0 million respectively). However, it is predicted that in 2045 Pakistan will take the place of and the USA with (37.1 million), this may be due to Pakistan being a developing country and majority of DM patients are under the age of 64.[22,24] Not only is the increasing numbers of people with diabetes alarming but it is also the fact that the prevalence of DM in low- and middle-income countries (LMICs) is also rapidly rising.[25] According to the IDF, in 2019, 79% of people with DM were living in LMICs.[26]

1.5. Global Impact of T2DM

1.5.1. Health impact of T2DM

The burden of T2DM is considerable, and affects not only the patients but also their families/carers as well as the country's economy and healthcare system.[27] T2DM increases the risk of health complications, which are usually outcomes of poor management[20], and this can be associated with long-term macro- and micro-vascular complications.[28] Macro-vascular complications are due to

damage to large blood vessels (arteries and veins); which includes coronary heart disease (CHD), peripheral arterial disease (PAD) and stroke. Micro-vascular complications are due to damage to the small blood vessels (capillaries), which includes diabetic retinopathy (blindness), diabetic nephropathy (kidney failure), and diabetic neuropathy (foot ulcers, infection and limb amputation). Other additional complications associated with T2DM are diabetic ketoacidosis (high production or build-up of ketones in the body), skin conditions, hearing impairment, oral complications (periodontist), sleep apnea, cancer, sexual problems in men (erectile dysfunction) and women (thrush or urinary tract infection), depression, pregnancy-related conditions (hyperglycaemia, preterm birth, birth defects, and organ dysfunctions) and death.[29]

Generally, T2DM is associated with reduced quality of life and reduced life expectancy.[30] The disease can reduce life expectancy by five to seven years when 55 years old.[10,31,32] The global mortality from T2DM in 2019 was approximately 3.8 million deaths.[26,33] The IDF regions with the highest estimated number of DM-related adult deaths are Western Pacific and South-East Asia regions (1.3 and 1.2 million deaths respectively). While the region with the lowest number of DM-related adult deaths was South and Central America with 0.2 million.[22] Between 2000-2016, premature mortality due to DM steadily increased in LMICs, and as of 2019, 90% of all DM-related premature deaths and 87% of all DM-related deaths were in LMICs.[20] This could be the result of the difficulties faced in accessing care and the very low rate of DM diagnosis and control.[20]

1.5.2. Economic and Social impact

Direct cost

DM has caused a financial strain all over the world, especially in LMICs. This financial strain includes the direct and indirect cost of DM. The annual direct cost of the disease globally is approximately 760 billion US dollars, which equates to 10% of global health expenditure in 2019, this is expected to rise to 845 billion by the year 2045.[17,27,34] As there are a large number of complications associated with DM, 50% of the direct cost is required to treat these complications.[34] The direct cost includes medications, examinations, consultations, hospitalisations, emergency visits and treatment of complications.[35]

In 2019, amongst the IDF regions, North America and the Caribbean region spent the most towards diabetes-related healthcare ($325 billion USD).[34] While among the WHO regions, in 2015, the cost of diabetes-related healthcare in Latin America and the Caribbean was between $102 and $123 billion USD.[36] However, due to the differences in public access to healthcare and wealth amongst the different countries, it is clear that expenditure is not proportionately allocated, or in other words, the Caribbean region makes up a small portion of the total estimated cost of the IDF and WHO regions.[37]

Evidence has also shown that total diabetes-related health expenditure and mean diabetes-related health expenditure per person is higher in high-income countries than in LMICs (high-income countries $494 billion USD and $5339 USD, middle-income countries $264 billion USD and $753 USD and low-

income countries spend $1 billion USD and $138 respectively).[34] It should also be known that in LMICs, patients are more likely to cover the cost of their treatment through out-of-pocket payments.[38,39]

Indirect cost

The second type of financial strain is indirect cost. In 2017, the majority of people with T2DM were between the ages of 40 and 59, which represented a significant proportion of the working population, thus having a negative impact on the economy.[17,27] Labour-force dropouts, absenteeism, mortality (premature death), reduced productivity when at work and inability to work due to disability are the main sources of indirect cost.[34] The indirect costs of T2DM add an additional 35% to the annual global expenditure.

Intangible cost

Intangible cost is a cost that cannot be quantified but can be identified, and this includes the social impact of T2DM. According to IDF, both the psychological and physical effect of T2DM on people living with the disease contributes to the intangible cost. This includes pain, discomfort, worry, fears and concerns of future complications and managing the disease, anxiety and depression.[34] There are some social factors which are known to affect the mental health of T2DM patients.[40,41] T2DM individuals are negatively impacted by social factors such as, employment complications, decreased productivity and education attainment potential health outcomes and increased healthcare cost. All these factors, both psychological and physical, can essentially lead to poor management in the future and affect the overall quality of life.

1.6. Prevention of T2DM

A healthy lifestyle can reduce the risk of developing T2DM especially if diagnosed with pre-diabetes.[11] Approximately 80% of T2DM cases can be prevented or delayed by change in lifestyle behaviours (increased physical activity and healthy diet). Lifestyle interventions are known to have a positive impact on behavioural outcomes and are known to be successful in reducing the incidence of T2DM, especially in patients who are at high risk.[42,43] A 6-year diet and exercise intervention showed a 42% reduction in the risk of developing T2DM.[11]

IDF recommends increased physical activity should include 150 minutes per week at intervals (three to five days a week, 30-45 minutes), this is the same level of activity that is recommended for persons without DM. Individuals who are overweight may require more intensive physical activity to ensure 5%-7% weight loss and avoid regaining weight.[44] A healthy diet is also strongly advised and should consist mainly of high-fibre and low-glycaemic index foods, while sweets, sweetened drinks (including alcohol) and sugar are to be avoided. It is recommended that obese and overweight persons should reduce daily caloric intake by 500-600 calories and if possible, should follow a low-caloric diet of about 800-1200 calories per day with the help of a general practitioner or dietician.[44] In addition, WHO also recommends avoiding the use of tobacco, as smoking increases the risk of diabetes.[25] If a healthy

lifestyle change is not enough or is not successful, medications such as metformin and acarbose may be considered (such medications are discussed in detail in the following section).[44]

1.7. Management of T2DM

T2DM patients can live longer and healthier lives if T2DM is detected early and well managed.[45] The overall aim of T2DM management is to minimise the risk of long-term complications. This includes focuses on control of blood glucose and lipids, blood pressure, weight management, lifestyle factors, regular screening and inspection of eyes, kidneys, feet, oral health, cardiovascular health (to detect any damage and facilitate early treatment if required), medications(drug treatment), and assessing other factors such as mental health and fasting.[10,46–49]

The steps taken to ensure the aims are met include incorporating healthy lifestyle interventions, oral medications and injectable insulin into T2DM patients regime. Both lifestyle changes and pharmacological treatment are necessary to effectively manage T2DM, however, lifestyle changes are usually the initial focus of T2DM management.[50] The same healthy lifestyle interventions used to prevent T2DM are the interventions used to manage it (healthy diet, regular physical activity, not smoking and maintaining healthy body weight).[11,26,44,51]

When lifestyle measures alone do not control blood glucose levels or reduce the development or progression of T2DM complications, it can then be treated with antidiabetic drugs such as metformin, dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagon-like peptide-1 (GLP-1) mimetics, pioglitazone, sulfonylureas (SU), sodium-glucose cotransporter 2 inhibitors (SGLT-2) and insulin.[47] According to the National Institute for Health and Care Excellence (NICE) antidiabetic drugs in general, are medicines used to control blood glucose levels amongst T2DM patients and are often used to intensify lifestyle interventions if HbA1c levels continue to rise.[10,47] Metformin lowers the blood glucose level by reducing the amount of sugar the liver releases into the blood, and it makes the body respond better to insulin; and, it is the first-line treatment for T2DM patients.[52] If HbA1c levels continue to rise metformin can be intensified by combining it with DPP-4, GLP-1, pioglitazone, SU or SGLT-2. When patients are unable to tolerate metformin, the other drugs would be combined and considered the second-line treatment. DPP-4 inhibitors stop the DPP-4 enzyme that destroys the hormone incretin, which is responsible for helping the body produce insulin when needed and reducing glucose production by the liver when it is not needed.[53] GLP-1 stimulates the release of insulin and subdues glucagon release, which causes a reduction in hepatic gluconeogenesis.[54] Hepatic gluconeogenesis is a pathway used by the body to produce glucose, at an increased rate it causes hypoglycaemia, a reduction is important to prevent this. Pioglitazone makes cells become more sensitive to insulin in the body. Sulfonylureas, on the other hand, raises the concentration of plasma insulin, which decreases blood glucose levels.[55] Lastly, SGLT-2 inhibitors inhibit SGLT-2 proteins in the renal tubules of the kidneys which are accountable for reabsorbing glucose back into the blood.

Insulin is used as an intensification drug (on patients who can or cannot take metformin) after all drug combinations have been exhausted and HbA1c. Insulin is used to increase the uptake of glucose by adipose tissue and muscle and suppress hepatic glucose release, this must however be injected as it is inactivated by gastrointestinal enzymes.[56] There are five main types of insulin: rapid-acting, short-acting, intermediate-acting, long-acting, and pre-mixed. The most common types of insulin used in T2DM management are NPH insulin (intermediate-acting), insulin detemir (long-acting), insulin glargine (long-acting), pre-mixed or biphasic (combining intermediate-acting and short-acting insulin).[47] **Appendix I** shows the NICE algorithm for blood glucose-lowering therapy in adults with T2DM. Although the information may not represent what is used by other countries or organisations, it is very detailed and easy to follow.[47]

Nearly all measures to assist withT2DM management are provided during a T2DM annual check-up or doctors visit, upon recommendation or request.[46] T2DM check-ups monitor the patients' overall T2DM control and are vital in T2DM management, and requires health practitioners to provide care to patients by following recommended practice guidelines.[57] When healthcare professionals provide recommended care for T2DM patients, it increases the chances of patients living longer and healthier.[58] Participation of both patients and healthcare practitioners is, therefore, required for successful management of T2DM.[59]

1.8. Burden of T2DM in the Caribbean region

The Caribbean region is made up of multiple islands and has a total population of 43.58 million. All the islands share a similar culture even though they consist of different ethnic groups, languages and social norms. Although some islands are built and managed differently, they have all been significantly impacted by the T2DM epidemic. Most small countries in the region have limited data on T2DM, which has led to estimates provided to be based on extrapolations from studies done in other countries like Jamaica, Trinidad and Tobago, and Barbados.[37] In addition, most epidemiological data for the Caribbean were found merged with other countries to form regions, for example, North America and Caribbean region and Latin America and Caribbean region.

Of the IDF regions, the prevalence of DM in adults (20-79 years) in the North America and Caribbean region was 11.1% in 2019 and is expected to increase by 1.9% by the year 2045. In 2013, the top 10 countries for age-adjusted adult diabetes prevalence estimates in the North America and the Caribbean region consisted of only Caribbean countries.[37] Among the population living with DM in the Caribbean region, 95% of them have T2DM[60], this is higher than the global (90%) population living with DM. The 5% difference may be due to many reasons including the increase in obesity prevalence and sedentarism in the Caribbean societies. The most recent data provided in 2010 highlighted that the prevalence of DM in the Caribbean region is approximately 9%, and this accounts for about 14% of all adult deaths in the Caribbean.[61]

In many Caribbean islands, DM has been one of the top two causes of mortality.[62] T2DM is also associated with substantial morbidity in the North America and Caribbean region. However, as data is more limited on the Caribbean few studies have been published on the high number of complications associated with T2DM. In the Bahamas, Barbados, Jamaica and Trinidad diabetes accounted for roughly 28% end-stage renal disease cases.[37] A study conducted among T2DM patients in Trinidad reported that around half of them had symptoms of diabetic neuropathy, 12% had a history of diabetic foot, and 4% had to undergo amputation.[63] One study conducted in Barbados reported that the cumulative incidence of diabetic retinopathy in people with T2DM was 32% over a four-year period and rose to 40% over a nine-year period.[64,65] Another study conducted in Barbados showed that the incidence of lower extremity amputation (LEA) on diabetic foot was 936 per 100,000 persons-years, these rates are amongst the highest in the world. Compared to North America, European and East Asian women, the Barbadian women amputation rates were only surpassed by women in the U.S Navajo.[66] A systematic review which included multiple nations (such as Ireland, Spain, USA, United Kingdom, Germany, Finland Netherlands and France) identified the incidence of LEA in the diabetic population. The incidence of LAE ranged from 78 to 704 per 100,000 person-years.[67] This evidence emphases the fact that LEA in Barbados is significantly higher when compared to these nations.

Based on global projections of T2DM, if action is not taken immediately, there will be a rise in the number of complications and this can be very detrimental to the overall productivity of the Caribbean region.[65] A study conducted in 2017 highlighted that of the Latin America and Caribbean region approximately 79% of the DM population (over 41 million) lived in Latin America and 2% in the English Caribbean.[36] The total cost of DM Latin America and Caribbean region was approximately between 103-124 billion USD in 2015. English speaking Caribbean indirect cost amounted to 8.3 billion out of 57.2 billion. Although the overall direct cost of DM was not calculated numbers show that the direct cost was also higher in Latin America than the English Caribbean.[36] Other research also emphasised that T2DM has a significant impact on Caribbean individuals living with the disease, in particular the financial strain. As most Caribbean countries fall under LMICs, universal and accessible healthcare is very minimal. T2DM can become very expensive especially since most healthcare payments are out-of-pocket.[37]

1.9. Rationale- factors leading to poor management of T2DM in the Caribbean

It is evident by the prevalence of T2DM complications in the Caribbean region that the disease is being poorly managed. In the 1990s, two studies reported that the overall quality of care of T2DM patients was unsatisfactory in the Caribbean region; more specifically in Barbados, Trinidad, Tobago, Tortola and Jamaica.[68,69] Around 50% of T2DM patients in Jamaica had poor glucose control.[68] Of the care issues reported, there is inadequate guidance on diet and physical activity, monitoring of blood glucose levels, and screening for complications.[64,69,70]

Over the years, one of the major concerns expressed by various healthcare providers in the Caribbean was the poor management of chronic diseases, including T2DM, which need to be addressed urgently.[60,71,72] To achieve healthy results, persons living with T2DM must practice good management. However, there multiple factors such as guideline quality and barriers which prevents this from happening.

1.9.1. The quality of T2DM clinical guidelines

In healthcare, guidelines are used to provide vital information regarding the procedures and resources needed to ensure healthcare practitioners provide optimum care to patients for successful management.[46–49] However, although management guidelines have been around for decades the pace of implementation by healthcare providers has not been equivalent to the increasing prevalence of T2DM.[73] Therefore, the first research study conducted within this thesis is to assess the quality of existing T2DM guidelines and also to identify aspects of care included in the guidelines.

In the Caribbean region, a guideline is available to manage T2DM at the primary care level.[73] This guideline was produced in 1995 and updated in 2006.[73] The current 2006 version of the guideline is formed for T2DM patients, their families/carers and healthcare professionals whose work involves the management of T2DM (such as providers and commissioners). This guideline focuses on patient education, lifestyle advice, managing blood glucose levels, managing cardiovascular risk, and identifying and managing long-term complications.[73] It was created by the Caribbean Health Research Council (CHRC) in collaboration with the Pan American Health Organisation (PAHO) with the aim of promoting evidence-based health policy decisions and best practice. The guideline was distributed throughout the English speaking Caribbean primary healthcare system, but steered more towards all health care practitioners involved in the care of T2DM patients. It was developed based on the economic situation, culture and the healthcare systems in the Caribbean region, and was designed to improve patient care and reduce morbidity and mortality by effective management of diabetes.[73] Since the update of this guideline in 2006, there have been significant advancements in T2DM management; therefore, the guideline should be assessed to ensure that it is suitable for use by healthcare practitioners.[60]

1.9.2. Barriers limiting proper T2DM management

Detecting barriers to T2DM management is vital in improving quality of life and T2DM care, as well as creating interventions.[74] Previous empirical research has identified barriers to successful T2DM management which included attitude, patients not having enough knowledge about the disease and its symptoms and lack of adherence to lifestyle changes.[75] These are aspects of T2DM that should be explained and monitored during routine check-ups. The absence of regular check-ups can lead to misconceptions, lack of follow up and proper monitoring, which often eventually lead to the high blood glucose levels and development of complications.[58] There are many known barriers and facilitators to T2DM management identified by individual studies in different geographical locations. However, there

is no comprehensive description of barriers and facilitators to T2DM management in the Caribbean. The lack of such a comprehensive description can cause challenges when developing and implementing T2DM management recommendations and interventions. Since most reviews on barriers to T2DM management come from high-income countries, environmental factors (socio-cultural and health care) have not been the main focus when developing recommendations and interventions, especially in guidelines.[76] Therefore, the second research study conducted within this thesis is to summarise the barriers and facilitators of T2DM in the Caribbean.

1.10. Research aim and study objectives

Although there is a high number of T2DM related cases, complications and issues identified in management there is still a lack of research on the topic in relation to the management of T2DM in people in the Caribbean. Hence, this research aims to highlight and raise awareness of the disparities impacting T2DM management in the Caribbean region to assist with future research, developmental plans and strategies. The target audiences for the findings are the various governments, health officials and other existing health organisations. It will provide answers to the following questions '*do healthcare practitioners have the appropriate and best quality guidance needed to assist with T2DM management*?' and '*what are the factors hindering or promoting proper T2DM management*?'.

To address the aim as well as identifying responses to the questions outlined, the thesis has taken a formative research approach using two methods. This was divided into two chapters:

1. The first empirical chapter focuses on a critical appraisal of available T2DM management guidelines. The most recent Caribbean T2DM management guideline and other international guidelines are used to determine what is in the T2DM guidelines and what is their overall quality. Comparing all the guidelines will establish what information or knowledge is available or not available to health care providers so they are empowered to provide the best possible care and assist with T2DM management.
   Objective- The objective was to compare the content and quality of the Caribbean and international clinical guidelines for managing T2DM.

2. The second chapter presents a systematic review of the barriers and facilitators to T2DM management in the Caribbean region. All relevant studies on the topic was reviewed and this resulted in the summary of all the barriers and facilitators of T2DM management in the Caribbean region. The information generated can be used and made generalisable to all the islands
   Objective- The objective was to summarise the barriers and facilitators to T2DM management in the Caribbean region.

1.11. Theoretical models or framework

Formative research is used to help inform a program's development or implementation. This formative study would assist in guideline and policy development or adaptation and implementation by gathering useful data such as the quality of T2DM guidelines as well as barriers and facilitators to T2DM management.[77] Although the methods of the two studies weren't developed with a theory or framework initially, the conceptual framework for guideline dissemination and implementation and the theoretical domain framework does align with the scope of this research.[77]

This study aims to improve the effectiveness of guideline dissemination and implementation strategies in improving guideline adherence for T2DM management in the Caribbean. Guideline implementability is directly associated with guideline development, specifically creation of guideline content and the effective communication of this content, hence exploring the quality of T2DM management guidelines.[77] Assessing the quality of the T2DM Caribbean guideline will also assess its guideline developmental process. At the end of this assessment, researchers would be able to identify areas which are poor and needs addressing. This would improve the Caribbean guideline dissemination and implementability to ensure proper management of T2DM.[78] A conceptual framework for guideline dissemination and implementation draws on evidence from systematic literature reviews on the effectiveness of various behaviour change strategies. This framework will allow researchers conducting T2DM clinical guideline quality research to focus on strategies to target T2DM patient.[79]

The advantage of conducting a theory-based analysis of the barriers and facilitators affecting T2DM management by T2DM patients, health care professionals and carers is that it provides a framework for comprehensively understanding the relationship between these factors and the patients, health care professionals and carers behaviour towards T2DM management. The theoretical domain framework of behaviour change is a framework for assessing barriers and facilitators of T2DM management in the Caribbean accounts for the overlapping constructs across behaviour change theories and it can provide categories to capture the factors that influence successful/unsuccessful T2DM management.[80,81] As a result of these frameworks the results from both studies can be successfully linked and can be used to and inform policies and its implementation and further empirical research. The results from the systematic review could be used to help adapt the other guidelines to be appropriate for the Caribbean setting.[79]

The content of the two empirical research chapters are presented as stand-alone peer-review journal articles, therefore there is some repetition in the introduction sections of each research chapter; however, these have been kept to a minimum where possible.

Chapter 2: Appraisal

2.1. Introduction

T2DM is a chronic metabolic condition that has major health, social, and economic consequences.[82] Patients with T2DM are known to be at an increased risk for microvascular and macrovascular complications (such as diabetic retinopathy, diabetic neuropathy/foot, diabetic nephropathy, coronary heart disease, stroke, and peripheral arterial disease), and even death.[83] Approximately 90% of people with diabetes mellitus have T2DM. Globally, in 2019, approximately 417 million adults were living with T2DM.[1] The prevalence of T2DM in the Caribbean region is approximately 9% and T2DM accounts for about 14% of all deaths.[61] The prevalence is 5% higher in the Caribbean than the global average. This could be because of the Caribbean's ethnic makeup, which is predominantly Black or Afro-Caribbean with some people of South Asian descent. These ethnic groups are at a significantly higher risk of developing T2DM than other ethnicities.[84]

Healthcare practitioners are recommended to follow clinical guidelines for managing T2DM, which should contain the best available evidence on how to support and guide both practitioners' and patients' decisions on suitable healthcare.[85] Clinical guidelines can improve health outcomes by reducing morbidity and mortality and enhancing the quality of life, allow patients to make informed healthcare decisions, make new procedures and services available to address healthcare issues, and improve the quality of healthcare decisions.[86] Usually, high-quality clinical guidelines reduce the differences in clinical practice, encourage the use of effective procedures and services, and cut the use of ineffective or less effective procedures and services.[87] Thus, due to the positive impact, a clinical guideline could have on health outcomes and healthcare, its quality is of great significance. To ensure its quality, all the steps to develop a clinical guideline should be systematically followed.[88]

In the Caribbean region, a national clinical guideline is available to manage diabetes mellitus by primary care doctors, nurses, and allied healthcare professionals.[73] The guideline was first introduced over 25 years ago and in spite of the most recent upgrade in 2006, research has shown that the quality of T2DM care in the Caribbean has not improved.[89] To date, the content and quality of the clinical guideline have not been robustly evaluated. Therefore, this study aimed to compare the content and quality of the Caribbean to international and country-specific clinical guidelines for managing T2DM. Assessing its content will allow for the identification and comparison of information and evidence that supports the recommendations. Assessing its quality will allow for the evaluation of the methodological rigour and transparency of its development, and this includes precise recording and reporting of the methods and procedures.[90] The issues identified during this research appraisal could be used to improve the clinical guideline, its dissemination and implementation.

2.2. Methods

2.2.1. Selection of clinical guidelines for managing T2DM

To compare the Caribbean diabetes mellitus clinical guideline[73] with other clinical guidelines for managing T2DM, nine guidelines were identified *a priori* to represent a selection of international countries from renowned associations. As a result these guidelines were more likely to come from high income countries. High income countries and associations in high income countries tend have more access to funding and resources to develop a high quality guideline. As the Caribbean is made up of mainly LMICs, it was important to use these associations from high income countries as a gold standard to make a comparison.[91]

A systematic review approach was not used as the aim was to compare the Caribbean guideline with that of guidelines from renowned international associations. The respective websites of the organisations were searched on 13th May 2020 to find the most recent published version. All clinical practice guidelines had to meet the eligibility criteria (T2DM, management, adults). All the guidelines were available in English. We selected three international guidelines (two published by IDF)[13,46] and one jointly published by the United States and Europe[92]), and six high-income country-specific guidelines (single guidelines from Australia[93], Canada [94], New Zealand[95], and the USA[96], and two from the devolved nations of the United Kingdom (one jointly from England and Wales[47] and one from Scotland[97,98]) **(see Table 3).**

Table 3: Outline of selected clinical guidelines for managing T2DM

Outline of selected clinical guidelines for managing T2DM				
	Publishing societies/organisations/associations	**Geography of the guideline**	**Name of the guideline**	**Last updated**
1	Caribbean Health Research Council (CHRC) and Pan American Health Organisation (PAHO)[73]	Country-specific (Caribbean)	Managing diabetes in primary care in the Caribbean	2006
2	International Diabetes Federation (IDF)[46]	International	Global guideline for type 2 diabetes	2012
3	International Diabetes Federation (IDF)[13]	International	Recommendations for managing type 2 diabetes in primary care	2017
4	American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD)[92]	International (United States and Europe)	Management of hyperglycaemia in type 2 diabetes: a consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)	2018
5	The Royal Australian College of General Practitioners (RACGP)[93]	Country-specific (Australia)	General practice management of type 2 diabetes	2016
6	Diabetes Canada and Canadian Diabetes Association (CDA)[94]	Country-specific (Canada)	Diabetes Canada 2018 clinical practice guidelines for the prevention and management of diabetes in Canada	2018

7	New Zealand Guidelines Group (NZGD)[95]	Country-specific (New Zealand)	Guidance on the management of type 2 diabetes 2011	2011
8	American Diabetes Association (ADA)[96]	Country-specific (United States)	Standards of medical care in diabetes	2020
9	National Institute for Health and Care Excellence (NICE)[47]	Country-specific (England and Wales)	Type 2 diabetes in adults: management	2019
10	Scottish Intercollegiate Guidelines Network (SIGN)[97,98]	Country-specific (Scotland)	Management of diabetes: a national clinical guideline (SIGN 116 and 154)	2017

2.2.2. Comparison of content of selected clinical guidelines for managing T2DM

The content of the following topics was compared between the selected clinical guidelines: blood glucose management, bodyweight assessment and management, blood pressure measurement and management, blood lipids measurement and management, T2DM associated complications assessment and management, and other healthcare-related issues and advice, using a previously piloted data extraction form. Two independent reviewers (AN and GY) were involved in the process, and disagreements were resolved through discussion or with a third reviewer (KC).

2.2.3. Comparison of quality of selected clinical guidelines for managing T2DM

The quality of the selected clinical guidelines was assessed independently by two reviewers (AN and GY) using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) tool, which is a standardised and validated instrument.[90] The tool comprises of 23 items, separated into six domains (scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence) and two global rating items (overall quality score and recommendation for use in practice).[90]

Each item within the AGREE II tool was rated on a seven-point scale (from 1 = strongly disagree to 7 = strongly agree). Disagreements in scores that varied by ≥3 points were resolved through discussion by AN and GY, for scores that didn't vary or varied by <3 points they remained the same. The following formula was used to calculate the score for each domain:

Obtain score = total of all item scores for two reviewers in each domain

Maximum possible score = 7(strongly agree) × y(items within domain) × 2(reviewers)

Minimum possible score = 1(strongly disagree) × y(items within domain) × 2(reviewers)

$$\textit{Domain score} = \frac{(obtained\ score - minimum\ possible\ score)}{(maximum\ possible\ score - minimum\ possible\ score)} \times 100$$

Clinical guidelines with a median threshold of ≥70% across all the six domains were considered to be of high-quality.[99] Clinical guidelines that did not meet this criterion were deemed low-quality.

When reporting the overall assessment of the guideline, ALN and GY compared their responses for the overall quality of the guideline and recommending it for use in practice. If the reviewers scored the same or gave the same recommendation, that score or recommendation was reported. If there were differences, the reviewers discussed it and came to a consensus. The score or recommendation decided on was then reported. This is detailed in **Appendix II**.

2.3. Results

The Caribbean clinical guideline[73] published in 2006 was between five[95] and 14 years[96] older than the other selected guidelines. The Caribbean clinical guideline is a 72-page document. It focused on diabetes mellitus, which included type 1 diabetes mellitus, T2DM, and gestational diabetes in the primary care setting. Two clinical guidelines (country-specific[94,96]) were found to be similar to the Caribbean as they focused on diabetes mellitus in general, which included type 1 diabetes mellitus, T2DM, gestational diabetes, and diabetes mellitus in children. Seven clinical guidelines focused solely on T2DM (three international[13,46,92], four country-specific[47,93,95,97,98]). Three clinical guidelines were <100 pages (two international[13,92] and one country-specific [95]), similar to the Caribbean, and six were >100 pages (one international[46] and five country-specific [47,93,94,96–98]). One of the country-specific clinical guidelines contained two documents[97,98], and this was 211 pages in total. All the clinical guidelines looked at primary care as the setting; however, only three clearly stated this (one international[13] and two country-specific[94,95]).

2.3.1. Comparison of content of selected clinical guidelines for managing T2DM

The clinical guideline from the Caribbean scored well in terms of including a wide range of topics on blood glucose management, bodyweight assessment and management, blood pressure measurement and management, and T2DM associated complications assessment and management but generally scored less well for blood lipid measurement and management and other healthcare-related issues and advice, where limited information was mentioned **(Table 4)**. Comparing the country-specific clinical guideline from the Caribbean with those from international and high-income countries, the guideline from the Caribbean was found to contain similar levels of T2DM management topics compared to seven guidelines (two international and five country-specific guidelines) and contained higher content (>27/44 items) levels than the remaining two guidelines (one international and one country-specific) (<20/44 items) **(Table 4)**.

Table 4: Comparison of content of selected T2DM management clinical guidelines

Comparison of content of selected T2DM management clinical guidelines											
T2DM management		**Guidelines**									
		Country-specific (CHRC/PAHO)[73]	**International (IDF)**[46]	**International (IDF)**[13]	**International (ADA/EASD)**[92]	**Country-specific (RACGP)**[93]	**Country-specific (Diabetes Canada/CDA)**[94]	**Country-specific (NZGD)**[95]	**Country-specific (ADA)**[96]	**Country-specific (NICE)**[47]	**Country-specific (SIGN)** [97,98]
T2DM diagnosis	T2DM diagnosis	★	★	★	…	★	★	…	★	…	★
Blood glucose management	T2DM self-management education	★	★	★	★	★	★	…	★	★	★
	Self-monitoring of blood glucose	★	★	★	★	★	★	★	★	★	★
	Blood glucose targets	★	★	★	★	★	★	★	★	★	★

	Healthy diet	★	★	★	★	★	★	★	★	★	★
	Medical nutrition therapy (tailored diet)[a]	★	★	…	★	★	★	…	★	…	…
	Physical activity	★	★	★	★	★	★	…	★	★	★
	Smoking cessation	★	★	★	…	★	…	…	★	★	★
	Reduction in alcohol consumption	★	★	…	…	★	…	…	★	★	★
	Initial pharmacological treatment- Monotherapy (one oral drug)[b]	★	★	★	★	★	★	★	★	★	★

	Dual therapy (combination therapy, including oral drugs and insulin)[c]	★	★	★	★	★	★	★	★	★	★
	Triple therapy (combination therapy, including oral drugs and insulin)[d]	…	★	★	★	★	★	★	★	★	…
	Insulin therapy (insulin only)	★	★	★	★	★	★	★	★	★	★
Bodyweight assessment and management	Body mass index (BMI) assessment	★	…	…	★	★	★	…	★	★	★
	Waist circumference	★	…	★	…	★	★	★	…	…	…
	Anti-obesity drugs[e]	★	…	★	★	…	…	…	★	…	★
	Bariatric/metabolic surgery[f]	…	…	★	★	…	…	…	★	★	★

Blood pressure measurement and management	Blood pressure checks and targets	★	★	★	…	★	★	★	★	★	★
	Antihypertensive treatment	★	★	★	…	★	★	…	★	★	★
Blood lipids measurement and management	Lipid profile	…	…	★	…	…	★	…	★	…	★
	Lipid modification therapy (e.g., statin)	★	★	★	…	★	…	…	★	…	★
T2DM associated complications (and conditions) assessment and management	Hypoglycaemia	★	★	★	★	★	★	★	★	★	★
	Diabetic ketoacidosis	★	…	…	★	★	★	…	★	★	★
	Diabetic retinopathy	★	★	★	…	★	★	…	★	★	★

	Diabetic neuropathy	★	★	★	…	★	★	…	★	★	★
	Diabetic nephropathy	★	★	★	…	★	★	★	★	★	★
	Cardiovascular disease	★	★	★	…	★	★	…	★	★	★
	Antiplatelet treatment (e.g., aspirin for cardiovascular disease)	★	★	★	…	★	…	…	★	★	★
	Peripheral arterial disease	…	★	…	…	…	★	…	★	…	…
	Diabetic foot (foot care)	★	★	…	…	★	★	…	★	★	★
	Periodontal disease	…	…	…	…	…	…	…	★	…	…
	Cancers	…		…	…			…	…		

			★			★	★			★	★
	Sexual problems in men and women[g]	…	…	…	…	★	★	…	★	★	…
	Mental health (including depression and anxiety)	★	★	★	…	…	★	…	★	★	★
Other healthcare-related issues and advice	Immunisations for influenza, hepatitis B, pneumonia, bacteremia, and meningitis	…	…	…	…	…	★	…	★	…	…
	Skin examination	★	…	…	…	…	…	…	★	…	…
	Older people	…	★	★	…	★	…	…	★	…	…
	Referral to other specialists for advice or treatment	★	…	★	…	…	…	…	…	…	…

	Fasting, including during religious/socio-cultural festivals (e.g., Ramadan)	…	★	★	★	…	★	★	…	…	★
	Driving	…	…	…	…	★	★	…	…	…	★
	Holiday/travel	…	…	…	★	★	…	…	…	…	★
	Insurance	…	…	…	★	★	…	…	★	…	★
	Working/shifts	…	…	…	…	…	…	…	…	…	…
	Principles of providing care	★	★	…	★	★	★	…	★	★	…

★ Found as a heading or sub-heading in the guideline.

✯ Limited information (i.e., briefly mentioned in the guideline but not as a heading or sub-heading).

… Not found in the guideline.

[a] Medical nutrition therapy is a therapeutic approach for treating T2DM and its symptoms by using a specifically tailored diet devised and monitored by a medical doctor or registered dietitian/nutritionist.

[b] Monotherapy is the initial treatment regimen with one oral drug, usually metformin.

[c] Dual therapy is when a second drug is added where one drug for T2DM is not managing a person's blood glucose.

[d] Triple therapy is when a third drug is added were two drugs for T2DM are not managing a person's blood glucose.

[e] Anti-obesity drugs are also known as weight loss medications that reduce or control bodyweight.

[f] Bariatric/metabolic surgery is a weight loss surgery that is used as a treatment for people who are very obese and to reduce the risk of other diseases such as metabolic or cardiovascular disease complications.

[g] Sexual dysfunction in men and women includes low testosterone in men and vaginal dryness in women, respectively.

2.3.2. Comparison of quality of selected clinical guidelines for managing T2DM

The clinical guideline from the Caribbean scored less than 70% for all the domains[73] **(Table 5).** The lowest score of 3% related to the rigour of development, and the highest score of 64% related to stakeholder involvement. The overall quality score for the clinical guideline was 3. When comparing the domain scores to the selected clinical guidelines, the majority of guidelines scored 70% or more for the clarity of presentation (8 out of 10)[13,46,47,92–94,96,97]. However, less than half scored 70% or more for other domains[47,894,97,98]. The overall quality score for the clinical guidelines ranged from 2[13,46,73,92–96] to 7[47,91,92], with seven out of the nine scoring higher than the clinical guideline from the Caribbean. With regards to recommendations for use in clinical practice, the clinical guideline from the Caribbean was not recommended for use; additionally, two further guidelines were also identified for not recommended for use (one international[92] and one country-specific[95]). Four clinical guidelines were recommended for use with modifications (two international[13,46] and two country-specific[93,96]) and the remaining three guidelines were recommended for use without modifications (three country-specific[47,94,97,98]).

Table 5: Comparison of quality of selected T2DM management clinical guidelines

Comparison of quality of selected T2DM management clinical guidelines								
Guidelines	**Domains**						**Overall guideline assessment**	
	Scope and purpose	**Stakeholder involvement**	**Rigour of development**	**Clarity of presentation**	**Applicability**	**Editorial independence**	**Overall quality score**	**Recommended for use in practice**
Country-specific (CHRC/PAHO)[73]	58%	64%	3%	58%	38%	50%	3	No
International (IDF)[46]	67%	53%	30%	94%	63%	21%	4	Yes, with modifications
International (IDF)[13]	100%	61%	23%	94%	35%	4%	4	Yes, with modifications
International (ADA/EASD)[92]	67%	50%	33%	92%	48%	46%	3	No
Country-specific (RACGP)[93]	25%	36%	35%	100%	58%	25%	4	Yes, with modifications

Country-specific (Diabetes Canada/CDA)[94]	94%	94%	85%	100%	73%	71%	6	Yes
Country-specific (NZGD)[95]	25%	42%	16%	58%	31%	25%	2	No
Country-specific (ADA)[90]	69%	64%	51%	100%	65%	46%	5	Yes, with modifications
Country-specific (NICE)[47]	100%	92%	99%	97%	92%	67%	7	Yes
Country-specific (SIGN)[97,98]	100%	100%	91%	97%	92%	92%	7	Yes

2.4. Discussion

This study has identified that the country-specific clinical guideline developed for the Caribbean in 2006[73] contained similar or higher levels of relevant content to selected international and high-income country-specific guidelines; however, the quality of guideline from the Caribbean was poor and therefore, cannot be recommended for use in clinical practice. We identified several high-income country-specific clinical guidelines were of sufficient quality to be recommended for clinical practice, with similar levels of content to that in the country-specific guideline from the Caribbean.[47,94,97,98] However, the quality of the two international clinical guidelines was moderate and hence, recommended for use in clinical practice with modifications. The other international clinical guideline was of poor quality and therefore, was not recommended for use in clinical practice. Other studies have highlighted that although the guidelines address the same health issues, there is variation in the content.[100] In our study, we found that although clinical guideline for the Caribbean and several of the comparator guidelines referred to most of the relevant topics, a few subtopics were missing in some guidelines; which is a common finding with other T2DM management guideline appraisal studies.[100,101] Subtopics such as triple therapy, bariatric/metabolic surgery, lipid profile, peripheral arterial disease, periodontal disease, cancers, sexual problems in men and women, immunisations for influenza, hepatitis B, pneumonia, bacteremia and meningitis, older people, fasting(Ramadan), driving, holiday/travel, insurance, and working/shifts were missing from the Caribbean clinical guideline. It should be noted that the content of a clinical guideline in itself is not enough to be named as a good quality guideline and the guideline development process plays a vital role.[102]

A high-quality clinical guideline can aid in the clinical decision-making process and delivery of high-quality care to T2DM patients in the Caribbean[103]; however, the development of the guideline depends on the availability of resources and following a robust development process.[104] Low-quality clinical guidelines can have non-evidence-based, incorrect, contradictory, or not easily identifiable content (and recommendations)[102]; thereby, impacting on healthcare practitioners' decision-making, which can lead to significant variation in T2DM management.[86] Thus, low-quality clinical guidelines can lead to the use of ineffective interventions, inefficient use of scarce resources, and most importantly, harm to patients.[90,105] Furthermore, the implementation of clinical guidelines can be challenging due to the influence of a complex set of factors, including political, economic, social, cultural, organisational, and technical factors, and the influence patients and the public.[106,107]

Similar to previous research[87,101,103], we found that two domains, rigour of development and editorial independence, scored poorly for the Caribbean country-specific clinical guideline and seven of the nine comparator guidelines; thereby, highlighting this is an area that is generally neglected and requires attention. None of the domains in the country-specific clinical guideline from the Caribbean scored highly, resulting in an overall low-quality score. To improve the quality of this clinical guideline, it is important that it is updated by following a rigorous guideline development process.[88] Additionally, although the Caribbean clinical guideline was first produced in 1995, it was last updated more than a

decade ago, in 2006. The guideline was originally developed after taking into consideration the characteristics of the Caribbean population, including their economic, social, and cultural conditions, and the healthcare systems; however, most of these factors have changed over the intervening period[108–110], and therefore, these need to be taken into consideration when future updates are performed.

As a result of the Caribbean T2DM guideline being low-quality, there has been deep consideration on weather a new T2DM management guideline should be developed or if an existing high-quality guideline from this study should be adapted. Evidence shows that guideline development teams in a limited resource settings often work with significantly less technology as well as human resources and budget restrictions, which is similar to the Caribbean, makes the development of a new guideline less efficient or feasible. However, guideline adaptation is being used as an alternative to developing new guidelines as we are able to tailor high-quality international or national guidelines based on the organisational, local and cultural settings of the Caribbean.([111] According to the ADAPTE Collaboration Network, who's aim is to promote the development and application of clinical guidelines through the adaptation of existing clinical guidelines, the stages of the adaptation processes are grouped into 6 stages.[111,112]

1.Search for existing guidelines

2. Assessment of guideline quality

3.Assessment of applicability and adaptation of recommendations to target setting

4. Literature update

5. Adaptation of guideline format

6. Implementation [111,112]

It is important to note that the needs of the Caribbean clinical guideline development team, topic and setting should be considered without compromising rigour and transparency of the guideline.[111,113] Following these steps will lead to the improvement of guideline implementation in the Caribbean.[112] It should be noted, however there is no validated process for trans-contextual adaptation (the adaptation of guidelines produced in one cultural and organizational setting for use in another) present in the literature.

A strength of this study is that a recognised and validated tool was used to assess the quality of the clinical guidelines. The AGREE II tool was developed to address the variability in guideline quality[90,99,101,103,114], and is recommended by the World Health Organisation (WHO), the Guidelines International Network, and the Council of Europe for its reliability in appraising clinical guidelines.[115] However, there are some limitations. The selection for clinical guidelines was not systematic which could have resulted in a biased sample of guidelines being chosen, however we attempted to overcome this by choosing a range of renowned international associations. Therefore, this process should have minimised the potential for inadvertently identifying low-quality clinical guidelines. Another limitation was that all the comparators guidelines were from high-income countries, two of which were considered to be of low-quality. The reviewers using the AGREE II tool did not receive any formal training; however, this should have had minimal impact on the findings of the study because a robust method of piloting of the tool first was conducted and discrepancies and disagreements were discussed with a third

reviewer. Therefore, it is unlikely that this would have resulted in a systematic bias in our scorings and the findings of the study.

2.5. Conclusion

The content and quality of the Caribbean clinical guidelines for managing T2DM was found to contain a high level of content with regards to relevant topics but was of insufficient quality to be used in clinical practice. Therefore, an existing high-quality clinical guideline (e.g. SIGN) as identified within this study should be adapted and used for the clinical management of T2DM within the Caribbean.

Chapter 3: Systematic Review

3.1. Introduction

T2DM is a chronic condition characterised by high blood glucose levels in the body.[9,14] As a result of a constant increase in the prevalence of T2DM, it is rapidly becoming an epidemic in many countries.[32] There are multiple risk factors associated with T2DM, and the more risk factors a person has, the more likely they are to develop T2DM.[2,17] Some of the common risk factors are ethnicity (South Asian, African-Caribbean/Black African origin and Chinese people are at higher risk), increasing age, a family history of T2DM, unhealthy diet, physical inactivity, overweight or obesity, dyslipidemia, hypertension, a history of gestational diabetes in woman and pre-diabetes.[2] Its chronic hyperglycaemia is associated with long-term complications (macro- and micro-vascular) and even death.[28] T2DM is also associated with reduced quality of life and life expectancy.[30] T2DM places a substantial burden on patients and their families and caregivers as well as on a country's economy and the healthcare system.[32] The general T2DM management strategy includes patient education, lifestyle advice, managing blood glucose levels, managing cardiovascular risk, and identifying and managing long-term complications.[2] If T2DM is detected and managed as early as possible, people with T2DM can live longer healthier lives.[116]

T2DM is one of the most contemporary and important public health challenges in the Caribbean region.[61] In the region, 95% of people living with diabetes have T2DM.[9,14,73] The prevalence of T2DM is roughly 9% in the region.[60] T2DM patients in the region have poor glycaemic control and high T2DM related complications.[68] T2DM is responsible for about 14% of all deaths in the region.[60] Most of the associated morbidity and mortality occurs in adults between the age of 18 and 59 years.[61] T2DM negatively affects the economic growth and overall productivity of the region. The quality of care of T2DM patients is unacceptable in the region and this includes inadequate guidance on diet and physical activity, monitoring of blood glucose levels and screening for T2DM related complications.[68,71]

Several studies have been conducted in the Caribbean region on barriers and facilitators to T2DM management.[68,72,117–122] Some of the barriers identified were poor access to health care, difficulty in maintaining behaviour change, negative attitudes about living with T2DM and lack of support from family members. There have been systematic reviews on T2DM management conducted in other regions. Although their some of the theme names were different the reviews identified similar results. In Nigeria, factors such as non-adherence/non-compliance, self-care, psychological, social, cost and drugs resulted in poor patient health outcome such as elevated glycaemic levels, poor self-management skills, early development of DM complications, and loss of trust in clinical management as well as high mortality rate.[123] In another systematic review which included studies mainly from the US and UK, the patients shared similar factors as in Nigeria as well as limited education, emotions and reliance on medications. The clinicians struggled to meet treatment targets due to limited time and resources, they also lacked confidence in knowledge of guidelines and skills to assist with T2DM management. Their emotions due to frustrations over patient compliance to treatment were also barriers to T2DM

management.[124] Lastly a study conducted in Latin America and the Caribbean identified factors related to the "environmental context and resources", "social influences" and "social/professional role and identity" and patients beliefs as important barriers to T2DM management. It highlighted health care access or lack of resources in the health system, living conditions of the patients, negative impact of lack of support from family and friends and clinicians' paternalistic attitude.[76] We searched MEDLINE and EMBASE, and no systematic review has been conducted on this topic. The systematic review aimed to synthesise existing barriers and facilitators, which can occur at the patient level, family/carers level and healthcare professional level. Considering the region's unique socio-cultural structure and lifestyle, high burden and poor management of T2DM,[37,64,66,70] it was necessary to undertake this systematic review to know whether the perspectives in the region are the same or different from a global perspective. This systematic review might help the health experts to take appropriate actions to address the barriers and promote the facilitators.

3.2. Review question

What are the views, experiences, attitudes, understandings, perceptions and perspectives of T2DM patients, their families/carers and healthcare professionals regarding the barriers and facilitators to T2DM management?

3.3. Inclusion criteria

3.3.1. Participants

This review considered studies that were conducted among adult patients (aged 18 and above) with T2DM, their families/carers (a person who looks after a T2DM patient) and healthcare professionals whose work involves the management of T2DM (such as providers and commissioners). This stakeholder group was most suitable to give the most accurate account of T2DM management. Healthcare practitioners provide healthcare (diagnosis and treatment) and advice/knowledge to T2DM patients including ways to manage their T2DM. T2DM patients are diagnosed with T2DM and would be able to give account of self-management. Family and carers of the T2DM patients provide care and support as they have immediate contact with T2DM patients.

3.3.2. Phenomena of interest

This review considered studies that focused on the views, experiences, attitudes, understandings, perceptions and perspectives regarding the barriers and facilitators to T2DM management.

Operational Definition of T2DM management

According to NICE, T2DM management "focuses on patient education, dietary advice, managing cardiovascular risk, managing blood glucose levels, and identifying and managing long-term complications".[47]

3.3.3. Context

The following countries were considered to represent the Caribbean: Anguilla, Antigua and Barbuda, Aruba, The Bahamas, Barbados, Bonaire, British Virgin Islands, Cayman Islands, Cuba, Curacao, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Barthelemy, Saint Lucia, Saint Vincent and the Grenadines, Sint Maarten/Saint Martin, Trinidad and Tobago, Turks and Caicos Islands, US Virgin Islands.[125] In the Caribbean region, any study setting was considered such as community, primary care, secondary care and tertiary care.

3.3.4. Type of studies

The review considered studies that focused on qualitative data, including, but not limited to, designs such as phenomenology, ethnography, grounded theory and action research. We also considered include cross-sectional surveys where free text relating to the review question were reported within the paper. Qualitative systematic research are known for investigating the culture and social phenomena of communities, exploring how persons experience, perceive and manage their health and journey through the health system. It can also assist with evaluating components and activities of health services such as health promotion and community development and informs important aspects of evidence based healthcare such as T2DM management.[126,127]

3.4. Methods

The systematic review procedure adhered to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA)[128] and the Joanna Briggs Institute (JBI) methodology for qualitative evidence systematic reviews guidelines.[129] It followed a published protocol.[130] The systematic review was also registered with PROSPERO (CRD42018097242).

3.4.1. Search strategy

An initial limited search was carried out in MEDLINE and EMBASE databases using the initial keywords, and the keywords were type 2 diabetes, management, barriers, facilitators and Caribbean. The titles and abstracts of the studies were screened for the same keywords used for the initial limited search,

and the index terms used to describe the article were also identified. The search results were inspected to ensure that the relevant articles were identified.

We searched a wide range of sources, to find both published and unpublished studies. For published studies, the following databases and their platforms were searched from their inception dates to 11th March 2020: MEDLINE (OVID), EMBASE (OVID), CINAHL/BNI (EBSCOhost), PsycINFO (OVID), AMED (OVID), Web of Science and Scopus (Elsevier). The full search strategies for all databases are detailed in **Appendix III**. These search strategies were developed through consultation with an information specialist/librarian at the University of Nottingham. The search for grey literature (unpublished studies) included EthOS (British Library), OpenGrey and ProQuest Dissertations and Theses (ProQuest), which were searched from their inception dates to 11th March 2020. The reference list of all primary studies included in the review was screened for additional studies. We restricted to the following six official languages of the Caribbean; English, Spanish, French, Dutch, Haitian Creole and Papiamento.[125]

3.4.2. Study selection

Following the search, reviewer one collated all citations that were identified and uploaded into EndNote X8.2 (Clarivate Analytics, PA, USA), a reference management software. Reviewer one then removed all the duplicates. Titles and abstracts were independently screened by two reviewers for eligibility using the inclusion criteria. Identified studies that were potentially eligible or those without an abstract had their full-text retrieved by reviewer one. Full-text of the studies were assessed against the inclusion criteria by the two reviewers independently. Full-text studies that did not meet the inclusion criteria were excluded. The reasons for exclusion were reported. A third reviewer was required when disagreements between the two reviewers did not reach a consensus through discussion.

3.4.3. Assessment of methodological quality

All the included studies were critically assessed using the qualitative standardised critical appraisal tool downloaded from JBI SUMARI.[129] The JBI critical appraisal checklist for qualitative studies used a 10 question criteria. The checklists used a scoring system, and each domain 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 which met the inclusion criteria regardless of their methodological quality. High-quality, as well as low-quality studies, can generate potentially valuable insights. Together, they can lead to a richer understanding of the research phenomenon.[129,131] Two independent reviewers were involved in the process. There were disagreements which surfaced between the two reviewers and they were all resolved through discussion. A third reviewer was not required to resolve disagreements.

3.4.4. Data extraction

The data extraction was undertaken independently by two reviewers. Any disagreements between the two reviewers were resolved through discussion. When a consensus was not reached, a third reviewer was required. A data extraction and critical appraisal database (using Microsoft Excel), based on the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI) (Joanna Briggs Institute, Adelaide, Australia) was developed and used for the full text studies retrieved. We extracted study characteristics – authors, year of publication, study title, study period, inclusion and exclusion criteria, study design/methodology, phenomena of interest, country and context, participants (T2DM patients or their families/carers, healthcare professionals), sample size, recruitment methods, data collection, data analysis and authors' conclusion. The specific study findings – barriers and facilitators to T2DM management in the Caribbean region were extracted for the different population groups (patients, family/carers and healthcare professionals). We extracted themes which were recorded as findings and direct quotes from participants which were recorded as illustrations. These were discovered through repeated reading of the results of the included studies. Reviewers searched for (i) any bold text and italic text, tables and diagrams; (ii) data in the form of themes, metaphor or rich descriptions; and (iii) keywords such as themes, sub-themes, phrases, categories, quotes, barriers and facilitators to T2DM management. The data extraction is detailed in **Appendix IV**. Credibility of each finding was also assessed independently by two reviewers. When disagreements surfaced between the two reviewers, they were resolved through discussion. When a consensus was not reached, a third reviewer was involved. The levels of credibility are shown in **Table 6**.

Table 6: Levels of credibility

Unequivocal (U)	The finding is accompanied by an illustration that is beyond a reasonable doubt and is not open to challenge.
Credible (C)	The finding is accompanied by an illustration that is lacking a clear association with it and is open to challenge.
Not supported (N)	When neither unequivocal nor credible can be applied and when the most notable findings are not supported by the data.

3.4.5. Data synthesis

Quotes detailing the views, experiences, attitudes, understandings, perceptions and perspectives of the barriers and facilitators to T2DM management were also extracted to support the findings. The illustrations and findings were the exact words of the participants and authors, respectively, which was located in the results of the included studies. All the extracted findings from the three different populations were synthesised to develop a core set of synthesised statements.

The qualitative study findings from all the studies were pooled using the meta-aggregation approach[129,127], it involved the compiling of all findings irrespective of the level of credibility (U, C, N) and categorising them on the basis of similarity in meaning. The researchers adapted the JBI meta-aggregation approach which normally only includes findings with unequivocal or credible findings, by also including non-supported findings. The reviewers done this to ensure that the phenomena of interest were clearly described. A meta-aggregative approach produces synthesized action statements (e.g. recommendations) to be followed or used by health care professionals and policy-makers. It does not aim to re-interpret the results from original research studies as do other qualitative evidence synthesis. However, it does aim for a reliable representation of the results from primary research and provides an easily accessible overview of the high-quality, qualitative evidence published for researchers, healthcare professionals, and policy-makers. The pragmatic approach ensures the practicality and immediate usability the review's findings.[132-134]

The categories (compiling of findings) were then subjected to a synthesis in order to produce a single comprehensive set of synthesised findings. Three reviewers were involved in data synthesis, the synthesis of findings was done initially by one reviewer (AN) and then discussed with two additional reviewers (KC and JL). One reviewer (AN) compiled all the similar findings into categories. Each finding was written on a separate label, the ones that were related were grouped and given a name or description which represented them all. This was an iterative approach until an agreement between all three reviewers (AN, KC JL) was achieved. All three reviewers (AN, KC JL) then reviewed the categories to ensure that all the findings were placed appropriately. Reviewer one then grouped all similar categories to make synthesised findings. All the reviewers (AN, KC JL) met again to review the synthesised findings and to create appropriate statements to represent each one. When there were disagreements, they were resolved through discussion with all three reviewers (AN, KC JL). The entire meta-aggregation process took approximately 8 hours, including three 60 minutes of group meetings.

3.4.6. Assessing certainty in the findings

The final synthesised findings were graded according to the ConQual approach for establishing confidence in the output of research synthesis and presented in a summary of findings table.[135] The table includes the major elements of the review and the justification of the ConQual score reported. The table also includes the title, population, phenomena of interest and context for this systematic review. Each synthesised finding from the review was presented along with the type of research informing it, a score for dependability, credibility and the overall ConQual score. **Figure 1 and Figure 2** shows how a score for dependability and a score for credibility is developed respectively.

Measurement	Ranking system
Measured by asking the following questions: 1. Is there congruity between the research methodology and the research question or objectives? 2. Is there congruity between the research methodology and the methods used to collect data? 3. Is there congruity between the research methodology and the representation and analysis of data? 4. Is there a statement locating the researcher culturally or theoretically? 5. Is the influence of the researcher on the research, and vice-versa, addressed?	4-5 'yes' responses, the finding remains unchanged  2-3 'yes' responses: move down 1 level  0-1 'yes' responses: move down 2 levels 

Figure 1: Dependability score development

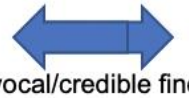
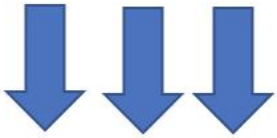
Measurement	Ranking system
Assign a level of credibility to the synthesised finding by cross checking how many findings of what type were included in the categories associate with the synthesized finding: **Unequivocal (U)** – relates to evidence beyond reasonable doubt which may include findings that are matter of fact, directly reported/observed and not open to challenge. **Credible (C)** – those that are, albeit interpretations, plausible in light of data and theoretical framework. They can be logically inferred from the data. Because the findings are interpretive they can be challenged. **Not Supported (NS)** – when 1 nor 2 apply and when most notably findings are not supported by the data.	All unequivocal findings: remains unchanged.  Mix of unequivocal/credible findings: downgraded one (-1)  Credible/not supported findings: downgraded three (-3) 

Figure 2: Credibility score development

3.5. Results

3.5.1. Study inclusion

Following the literature searches, 1322 records were identified. After duplicates were removed, 777 records were screened for eligibility. Following title and abstract screening, a further 671 records were excluded, leaving a total of 106 eligible for full-text screening. Eight studies were identified as eligible for inclusion in the review **(figure 3)**.[121,122,136–141] Ninety-eight studies were excluded at the full-text

stage due to either ineligible participants (5 studies), ineligible phenomena of interest (26 studies), ineligible study context (39 studies), ineligible study design (18 studies) or the full-text paper could not be sourced from the British Library (10 studies, 6 of which were abstracts/poster presentations). Reasons for exclusion can be found in **Appendix V**.

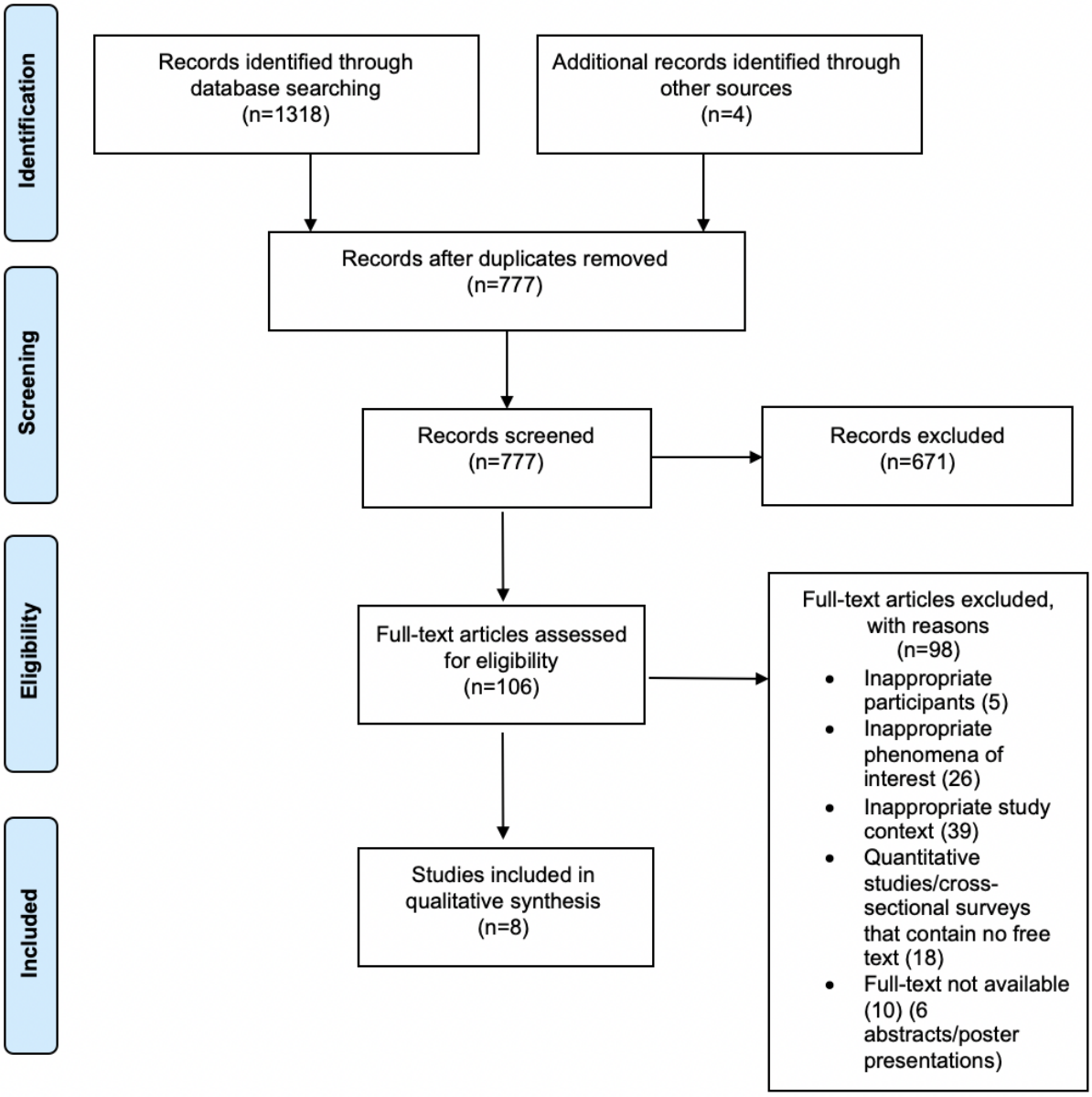


Figure 3: The PRISMA flow diagram

3.5.2. Methodological quality

Overall, all of the qualitative studies scored highly across the methodological quality domains **(Table 7)**. The studies overall quality ranged from 80% (8/10) to 100% (10/10) and the majority of quality domains individually scoring 100% (8/10). However, two of the quality domains had lower scores. “Is

there a statement locating the researcher culturally or theoretically?" (Q6) = 63%, 5/8 studies and "Is the influence of the researcher on the research, and vice-versa, addressed?" (Q7) = 25%, 2/8 studies. Some of the researchers did not declare the beliefs and values and their potential influence on the study, therefore the cultural and theoretical orientation it was not clear. This highlighted the absence of theoretical models and/or framework that would informed or guided the study design and interpretation of the findings. Most studies did not address the relationship between the researcher and participants, examine their role and potential influence during data collection nor reported how events during the study were delt with. This reduces the trust worthiness and the ability to replicate or improve the research.

Table 7: Methodological quality of the included studies

Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**% "yes" responses per paper**
Davila[121]	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	90%
Gonzalez Rodriguez et al.[125]	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	90%
Morrissey-Ross et al.[123]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%
Moss et al.[122]	Y	Y	Y	Y	Y	U	N	Y	Y	Y	80%
Nunez et al.[112]	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	90%
Sadeghzadeh et al.[126]	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	90%
Wallace et al.[124]	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	90%

Wint et al.[113]	Y	Y	Y	Y	Y	N	N	Y	Y	Y	80%
% ''yes'' responses per Q	100 %	100 %	100 %	100 %	100 %	63 %	25 %	100 %	100 %	100 %	

N: No; U: Unclear; Y: Yes; N/A: Not applicable; 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 data?; Q5 = Is there congruity between the research methodology and the interpretation of 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, and 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?

3.5.3. Characteristics of included studies

The eight included studies were published between 2005 and 2019. Two studies were conducted in Jamaica[122,138], three in the Dominican Republic[139–141], and the other three were conducted in Puerto Rico[136], St. Vincent[137], United States Virgin Islands[121]. All of the included studies recruited participants with T2DM. The studies recruited participants from diabetes clinics, health care centres, community centres, an education programme, private physician's patient log or self-referral. Seven of the included studies explicitly stated that the participants were T2DM patients[121,136–141]; however, the eighth study recruited participants with either T1DM or T2DM - this study was included in the review as 99% of the respondents had T2DM.[122] No studies were identified which recruited families/carers or health professionals. Six of the included studies used a qualitative design[122,137–141], one used a mixed-methods design[121] and one reported free text within a cross-sectional survey[136]. When exploring the methodological approaches, four studies focused on phenomenology[122,137,138,141], the other studies mentioned different approaches such as connecting and categorising[139], constant comparative[121], formative[140] and descriptive correlation[136]. The sample size ranged from 14 to 133 participants with a total sample size of 426 participants. Three sampling methods were used in the studies: purposive sampling[121,138–141], convenience sampling[136,137] and random sampling[122]. Data collection included a variety of procedures: focus groups[122,138], semi-structured interviews[121,122,139,141], in-depth interviews[140] and questionnaire with open-ended questions (free text).[121,136] The data analysis methods used in the studies were thematic analysis[137,139], content analysis[136], inductive analysis[140,141], constant comparative method of qualitative analysis[121] and one study used a

combination of thematic and narrative analysis.[1139] Two further studies did not state which specific analysis method they used; however, they reported using coding and identifying themes.[122,138]

The included studies focused on different areas of T2DM management, shown in **table 8**. One study focused on physical activity, explored self-efficacy beliefs and outcome expectancies (perceived benefits and barriers) as possible social cognitive factors affecting physical activity levels in T2DM patients.[136] The second study focused on self-management, diet and medication and how diabetes-related stress impacted it.[140] The third study covered both self-management and lifestyle, focusing on the day-to-day experiences of diabetics and lifestyles that may have caused an onset and progression of T2DM, health beliefs, attitudes and knowledge of the population.[138] The fourth study addressed medication (treatment), focusing on the reasons for the use of non-prescribable medicines in T2DM patients.[137] The fifth study addressed only self-management, where it focused on self-management behaviours among T2DM patients and investigated the impact of culture on self-management attitudes, knowledge, and behaviour.[121] This study also explored whether there was an association between self-management behaviours and patient-level characteristics and the clinical outcome of glycosylated haemoglobin.[121] The sixth explored local approaches to cope with the stress associated with T2DM it also narrowed in on how the approach impacted T2DM patients lifestyle (physical activity and diet), medication and clinic appointments.[141] The seventh study focused on self-management and the role social support plays through exploring the types and sources of social support across diabetes diagnosis and the self-management experiences of T2DM patients.[139] The eighth sixth study focused on two management areas, lifestyle change and glycaemic control through exploring the patients knowledge of T2DM, motivational factors, and identified possible barriers to positive lifestyle changes and glycaemic control.[122]

Table 8: The characteristics of all the included studies

Authors (Year)	Study title	Study period	Country and context	Inclusion and exclusion criteria	Study design and Methodology	Phenomena of interests	Participants characteristics Sample size Recruitment method	Data collection procedure and tools	Data analysis
Davila[136]	Physical activity in Puerto Rican adults with type 2 diabetes mellitus.	Not specified but was done for a PhD during 2008- 2009.	Puerto Rico/ an endocrinology clinic, private medical centre, community centre, education programme.	Puerto Rican (born in PR or one parent born in PR), living in PR for the last five years, between 40-60 years of age, self-reporting as having type 2 DM for six or more months, able to read and write Spanish and answer questionnaires individually or through personal	Quantitative- a descriptive correlation study	The purpose of this study was to explore self-efficacy beliefs and outcome expectancies (perceived benefits and barriers) as possible social cognitive factors affecting physical activity levels in Puerto Rican adults diagnosed with type 2 DM.	110 patients (men=38, women=72) Convenience sampling	Questionnaire (with two open questions).	Qualitative: content analysis.

				interviews. Subjects with orthopaedic or neuromuscular conditions that impede engaging in normal daily physical activity were excluded.					
Gonzalez Rodriguez et al.[140]	Contextualizing Experiences of Diabetes-Related Stress in Rural Dominican Republic.	June to July 2015.	Two nongovernmental organization (NGO) rural health clinics in the Cibao Valley of the DR.	Individuals 18 years and older with a confirmed T2D diagnosis enrolled in the diabetes program were eligible.	Qualitative-Informative qualitative study	To explore the experience of diagnosis and life with diabetes among adult men and women in rural communities in the DR.	28 participants (men=12, women=16) Purposive sampling	In-depth Interviews. We conducted and audio-recorded interviews in Spanish. Interview times ranged from 30 to 120 minutes. Our broad interview guide included questions on	Inductive analysis

								perceptions of the current health situation and transitions in health problems in participants' communities, experiences living with T2D, and use of health services to manage T2D. We wrote field notes for each interview to capture our immediate impressions and interesting themes. Data	

Morrissey-Ross et al.[138]	Living with Diabetes: Experiences from Jamaican Diabetes Clinics in Kingston and Morant Bay.	8 days in March, 2016.	Jamaica/ clinic	• lived in urban or rural areas, • prescribed insulin to control blood sugars (as issues related to using needles might affect adherence to the medical regimen), • prescribed oral medication to control blood sugars, • suffered from long term consequences of the type 2 DM such as blindness, neuropathy, amputation and cardiovascular disease,	Qualitative-Qualitative phenomenological study design	To describe the day-to-day experiences of diabetics living in Jamaica, lifestyles that may have contributed to or detracted from the onset and progression of the disease, health beliefs, attitudes and knowledge unique to this population, and differences between the sexes with regard to these issues.	41 patients (men=12, women=29) Purposive sampling	Semi-structured interview (participants' data) Focus group to establish content validity of interview questions.	Not specified "I used NVivo 11 as the data analysis tool to assist in the identification of themes and important revelations from the interviews."

				• a variety of age groups, • different family roles, • from as wide a variety of religions as possible, • Adults (18 years and older) diabetics attending Diabetes Association of Jamaica, • Diabetics who suffered from the disease for more than one year.					
Moss et al.[137]	Rural Vincentians' (Caribbean) beliefs about the usage of non-	Not specified	St. Vincent/ health centre	Not specified but stated that the population consisted of persons diagnosed with	Qualitative- A qualitative design using phenomenology	To explore reasons for usages of non-prescribable medicines among a rural	Total=14 patients 1) Focus group (women=6) 2) Pre-testing data collection	Focus group discussion.	Thematic analysis

	prescribable medicines for treating Type 2 diabetes.			Type 2 diabetes attending one rural health centre in St Vincent, in the Grenadines.		community of people with Type 2 diabetes in St Vincent, the Grenadines.	tool (n=8). Convenience sampling		
Nunez et al.[121]	Self-management among Patients Living with Diabetes in the United States Virgin Islands.	January 2008-April 2008.	United States Virgin Islands/ Not Specified. Patient panels of private physicians, government clinic appointment schedules, (interviewed at homes).	1) at least 21 years of age; 2) diagnosed with adult-onset diabetes after January 2005; 3) resided in the USVI for at least 10 years and self-identified as a U.S. Virgin Islander; 4) able to identify a medical home; 5) absence of known systemic diabetic complications;	Mixed method (qualitative and quantitative). Constant comparative method of qualitative analysis	1) identify patterns of self-management behaviours among patients with adult-onset diabetes in the USVI; 2) examine the association between self-management behaviours, patient-level characteristics (i.e., level of education, diabetes knowledge,	53 patients (Men=8, women=45) Purposive sampling: Patient panels of private physicians, government clinic appointment schedules, self-referral, and snowballing (one participant refers another community member meeting	Questionnaire/ Semi-structured interview (in-home interviews.	Qualitative: constant comparative method of qualitative analysis.

				6) not pregnant and no history of gestational diabetes.		income, and social support), and the clinical outcome of glycosylated haemoglobin (A1c); 3) characterize the impact of culture on self-management attitudes, knowledge, and behaviour.	inclusion criteria).		
Sadeghzadeh et al.[141]	Coping with diabetes stress among adults in rural Dominican Republic " I don't think about it".	June 2017	The Institute for Latin American Concern (ILAC)/ Chronic Care International (CCI) operate in the Cibao Valley of the DR.	Adults with type 2 diabetes from one rural clinic when patients came for their routine care visits.	Qualitative-formative explore phenomenon	Explored a local phenomenon, "no le doy mente"(I don't think about it), used by adults with type 2 diabetes in the Dominican Republic to	19 people with diabetes (men =10 , women=9). Purposive sampling	Semi-structured interview.	An inductive analytic approach including iterative coding, memos, and matrices.

						cope with diabetes stress.			
Wallace et al.[139]	Types and Sources of Social Support among Adults Living with Type 2 Diabetes in Rural Communities in the Dominican Republic.	June-July 2015.	Dominican Republic/ clinic	Not specified but participants were at least 18 years of age, spoke Spanish, reported a confirmed diabetes diagnosis, and were enrolled in the CCI program.	Qualitative-Connecting and categorizing approach	Explored what are the types and sources of social support across diabetes diagnosis and self-management experiences among rural Dominicans living with type 2 diabetes.	28 patients (men=12, women=16) Purposive sampling	Semi-structured interview.	A combination of narrative and thematic analytic techniques.
Wint et al.[122]	Knowledge, Motivation and Barriers to Diabetes Control in Adults in Jamaica.	Not specified	Jamaica/ Clinic	Not specified but stated that they were Patients with DM.	Qualitative-Descriptive study, phenomenological approach	Explore the Jamaican adult's knowledge of DM, motivational factors, and identify possible barriers to	133 patients (Men=35, women=98). Randomised sampling: A computerized random sample of 35 men and 98 women with	Individual semi-structured interview/ face-to-face.	Patients were asked to describe their lifestyle changes and their personal reasons for making changes. These

						positive lifestyle changes and glycaemic control.	DM was selected from a specialist clinic population of 510 patients (144 men, 366 women)		texts were sorted, coded into themes and interpreted by the research team to identify motivational factors and barriers to therapeutic lifestyle changes.

3.5.4. Review findings

Barriers and facilitators of T2DM management

The synthesised findings collated all barriers and facilitators of T2DM management in the Caribbean from the patients' perspective. None of the included studies identified barriers and facilitators of T2DM management from the perspectives of family/carers level or healthcare professionals level. There were 53 unequivocal findings in total across the studies and three credible findings in total across the studies. Only one study[122] included findings which were not supported, which included 17 findings.

After the aggregation of 77 findings, 23 categories were generated, and following further grouping of similar themes, the 23 categories were grouped into six synthesised findings. The synthesised findings are as followed: From the participants perspective sociocultural norms, demands and pressures were found to impact self-management and general care of T2DM; From the participants perspective environmental context and resources were found to impact the management of T2DM; From a patients perspective support systems were influential on the general management of T2DM; From the participants perspective personal background and circumstances can encourage and limit good self-management and general management of T2DM; From the participants perspective emotional factors were found to influence patients' actions towards management of T2DM; and from the participants perspective psychological factors were found to influence patients' adherence to T2DM management.

Synthesised finding 1: From the participants perspective sociocultural norms, demands and pressures were found to impact self-management and general care of T2DM

Synthesised finding 1 was the result of nine findings which were merged into three categories **(Figure 4)**. The finding expressed how patients continued to consume local unhealthy foods and traditional non-evidence based traditional medicines or therapies despite the repercussions. Social stigma included the shame and judgement passed from others/community to T2DM patients.

- Following an unhealthy diet

Different types of food have different effects on the body of T2DM patients. Participants expressed the importance of balancing different foods, including unhealthy foods to help assist in the management of their T2DM.

"… If I feel drowsy, sick and I take some food and throw it in me mouth, it carry the feelings down. But if you sugar some tea and drink it, throw you down clean, you see." (137)*p.1495*

Some participants develop their own remedy to tackle different symptoms or conditions associated with T2DM in some cases these were not the healthiest options. They also believed some of these foods/ remedies had been used in communities for generations, so they are appropriate to use. In some instances, participants expressed they continue to eat the unhealthy foods because they have been

eating it all their lives and it has not caused any problems to them, neither are they dead yet as a result of it. As such, they believe that foods cannot be unhealthy if it does not affect them or their illness (T2DM).

"I take liberty every day. Right now I have … 3 plantains, 5 or 6 tanya, sweet potatoes, and I plan to take pig tail and cornmeal dumplings and make a big pot of peas soup…. You know the attitude I take. I live 70 years eating the same thing. What, now it's going to kill me?"(121)*p.7*

- Use of traditional non-evidence-based medicines or therapies

Patients reported the use of medicines and therapies that had no scientific evidence to support and prove what it can and cannot do for T2DM management. Different types of ingredients were used to make a medicine, which was believed to tackle certain complications associated with T2DM.

"… If you buy ah egg and you bust it a little and you throw it out in the pan, you know and you beat it with some of the milk and drink it … that is a medicine!"(137)*p.1494*

As these medicines and therapies are not evidence-based, their efficacy for T2DM management cannot be inferred. Patients believed that traditional medicines and therapies were better than conventional medicines. These traditional medicines were also passed along throughout the communities and even from one diabetic patient to the next. Although patients did not have any scientific evidence on the benefits and role of the traditional medicines and therapies, they still consumed them hoping for the best results.

"(My neighbor) is a diabetic too…. Sometimes she buys bush and give me some. I don't know the name of it but it is supposed to help with sugar. So I use that."(121)*p.7*

- Stigma

Stigma was expressed as a barrier to effective T2DM self-management. Most sicknesses come with a stigma attached to it. Peoples reaction to finding out someone has diabetes has resulted in patients becoming uncomfortable and secretive about their disease. Patients expressed that a stigma has been built around the disease because is not discussed out in the open it.

"I think this needs to be more out in the open. Because you can have diabetes and control it and do everything that everybody else does. But it's so secretive … everyone will treat you like you're dying. There's a stigma attached, yes. To being diabetic or having to take medicine for it."(121)*p.7*

The community's reaction towards T2DM patients shows that they do not have enough information or understanding about the disease. It is known that people tend to be afraid of things they do not know or understand.

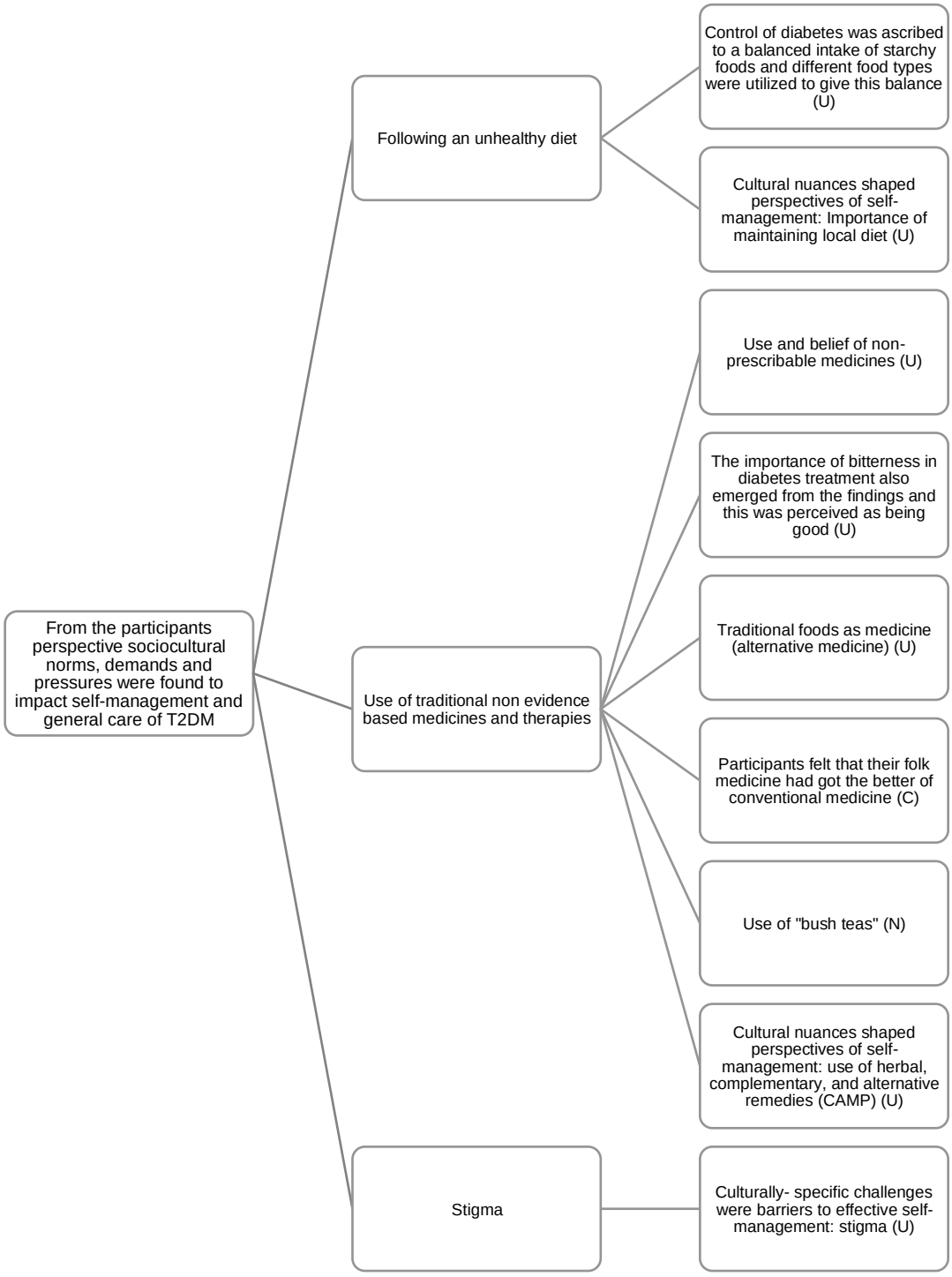


Figure 4: Synthesised finding 1- <u>From the participants perspective sociocultural norms, demands and pressures were found to impact self-management and general care of T2DM</u>

Synthesised finding 2: From the participants perspective environmental context and resources were found to impact the management of T2DM.

Synthesised finding 2 was the result of five findings which were merged into two categories **(Figure 5)**. Environmental context relates to the actual physical space (such as a venue for exercise/gym), and environmental resources can refer to any service, materials or information that a person may find useful to them.

- Safety and wellbeing during physical activity

Another factor highlighted by T2DM patients which hinders physical activity is the safety. Persons do not feel safe travelling to the gym or park to do physical activity because of where it is located. Some environments or places are not safe (this may be because of the high crime rate), and people will not risk the safety going to these places.

"Safety in the area. My husband works and cannot go with me."[136]*p.87*

- Lack of resources

There was a consensus amongst the patients that many resources to aid in T2DM management were not available. There was a lack of financial, educational, healthy food options and exercise or physical activity options, which all hindered proper T2DM management. It is essential that patients, doctors and carers are educated about T2DM and its management. Patients highlighted the lack of educational resources for T2DM patients, especially immediately after diagnosis.

"I think there should be better resources for diabetics. Once you're diagnosed there should be a place that you can go to for regular classes and monitoring. I can't believe we don't have that in this day and age. There isn't even a dietician there (doctor's office)."[121]*p.7*

Patients were knowledgeable of the healthy food options, however, they could not afford it, it was too expensive. The lack of these resources promotes poor self-management.

"Making the good food choices is hard. They're simply not available in stores. Well, sometimes. Now, they tell me blueberries is good. I can eat that. But when you find that, it's five dollars for a little bag so…"[121]*p.7*

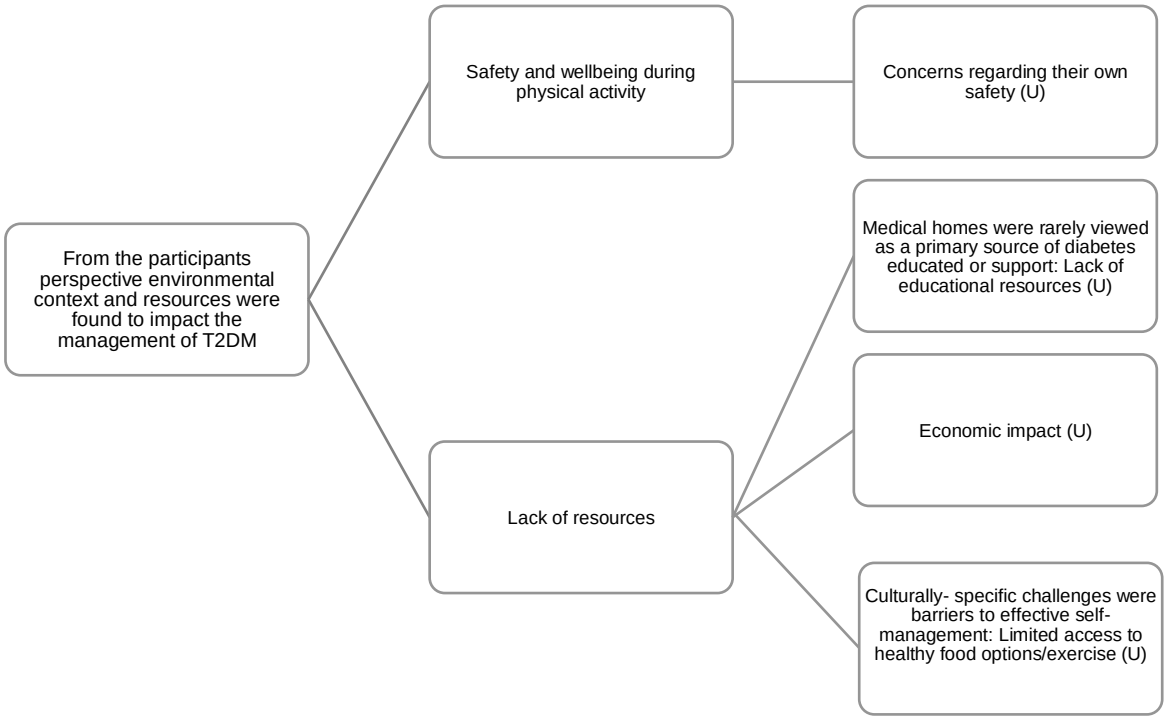


Figure 5: Synthesised finding 2- From the participants perspective environmental context and resources were found to impact the management of T2DM

Synthesised finding 3: From a patients perspective support systems were influential on the general management of T2DM.

This synthesised finding was the result of 13 findings which were merged into four categories **(Figure 6)**. Support systems may include family, friends, spouses and healthcare professionals. They may also offer different types of support such as emotional, informational and instrumental, which consist any physical assistance, e.g. financial, childcare and transportation. This finding showed that family, friends and health care professionals were support systems. Family and friends had both a positive and negative influence on T2DM management. However, health care professionals were perceived to have only a positive influence on the management of T2DM.

- Lack of support from family and friends

Some patients expressed that their family and friends expected them to continue doing everything by themselves as usual with no help, even after being diagnosed with T2DM. They received limited support from family and friends which at times can be inconsistent. Also, patients reported that even if they do receive some level of support from friends, it is only for a short period and not or the long-term management of the T2DM.

"No one supports me, no one. How do I say this, even if I feel bad no one pays attention. Not even my sisters come to visit and lend me a hand. But God gives me strength, because no one else helps me. What happens is that when my sugar levels go up, I cannot sleep well and sometimes I get scared. Sometimes my family does things I don't like, which makes me feel ill, like I have high blood pressure. I don't know. Listen, those who have diabetes have to be careful and so they need someone who will support them so that they feel better."(139)*p.7-8*

- Incorrect/ negative advice from family and friends

T2DM patients reported that although family members were trying to be supportive by providing help, they would advise the patients against the doctor's orders or give their own advice or recommendations. Family and friends were identified as influencers of adjusting the doses of medications. As a result of self-adjustment of medications, T2DM cannot be managed efficiently and effectively.

"Well, the doctor told me to take the insulin two times but my mother tell me I want to know if this is right. He tell me to take twenty five units in the morning and twenty five in the night. But she said it's too much, and just gives me fifteen at night. So that's what I do."(121)*p.7*

- Positive support from family and friends

Although support from family and friends was a barrier to T2DM management it was also a facilitator. Participants expressed how friends were more than willing to offer their help and expertise. Friends would ensure that the T2DM patient would adhere to the healthy diet and stick to their self-management regime. In addition, friends would invite their T2DM friends to programmes and appointment that they thought were beneficial to T2DM patients. At these programmes and appointments, patients are able to learn more about their T2DM and its management.

"How did I first get here? The man sitting in the waiting room brought me. He found out about this program and invited a group of us to go with him. Every month a few of us go in his bus for our appointments."(139)*p.6*

In addition, neighbours provided instrumental support by taking the patient to the doctor and informational support by alerting the patient that they might be ill because of their physical appearance. There the doctor was able to provide informational support by making a diagnosis.

"…She told me, 'you're sick, your clothes are loose and falling off of you.' I agreed. I had a t-shirt that I no longer fit in. Dry, I was getting drier, [...to the point that] a man told others 'be fearful of that man, he could have AIDS.' And I heard that, you see? I went to my partner and told her that I felt ill. After that a neighbour took me to the see a good doctor to see about my condition where the doctor then tells me, 'sir, you are a diabetic."(139)*p.6*

- Good support from healthcare personnel

Participants expressed that male patients tend to avoid doctors making them more vulnerable to T2DM complications. However, healthcare professionals provided informational support which entailed

medical advice to assist patients who were in distress or having complications and also provided health talks on self-management. The support from healthcare personnel is pivotal in T2DM management.

"For men, we can suffer from a problem with (sexual) relations. I spoke with the doctor when I had a problem [erectile dysfunction]. He told me what I need to do to control my sugar otherwise I won't get better."(139)*p.8*

Healthcare professionals also provided emotional support to patients, they spoke to them about their problems which helped them to feel better. This allowed patients to get a better perspective of their T2DM so that they can cope with it.

"Before I came here I felt that everything was crashing around me. Some of us feel like we're drowning in a cup of water because we do not find someone to talk to about our problems. But now I can talk to the cooperadores…to the doctor, and I feel better."(139)*p.8*

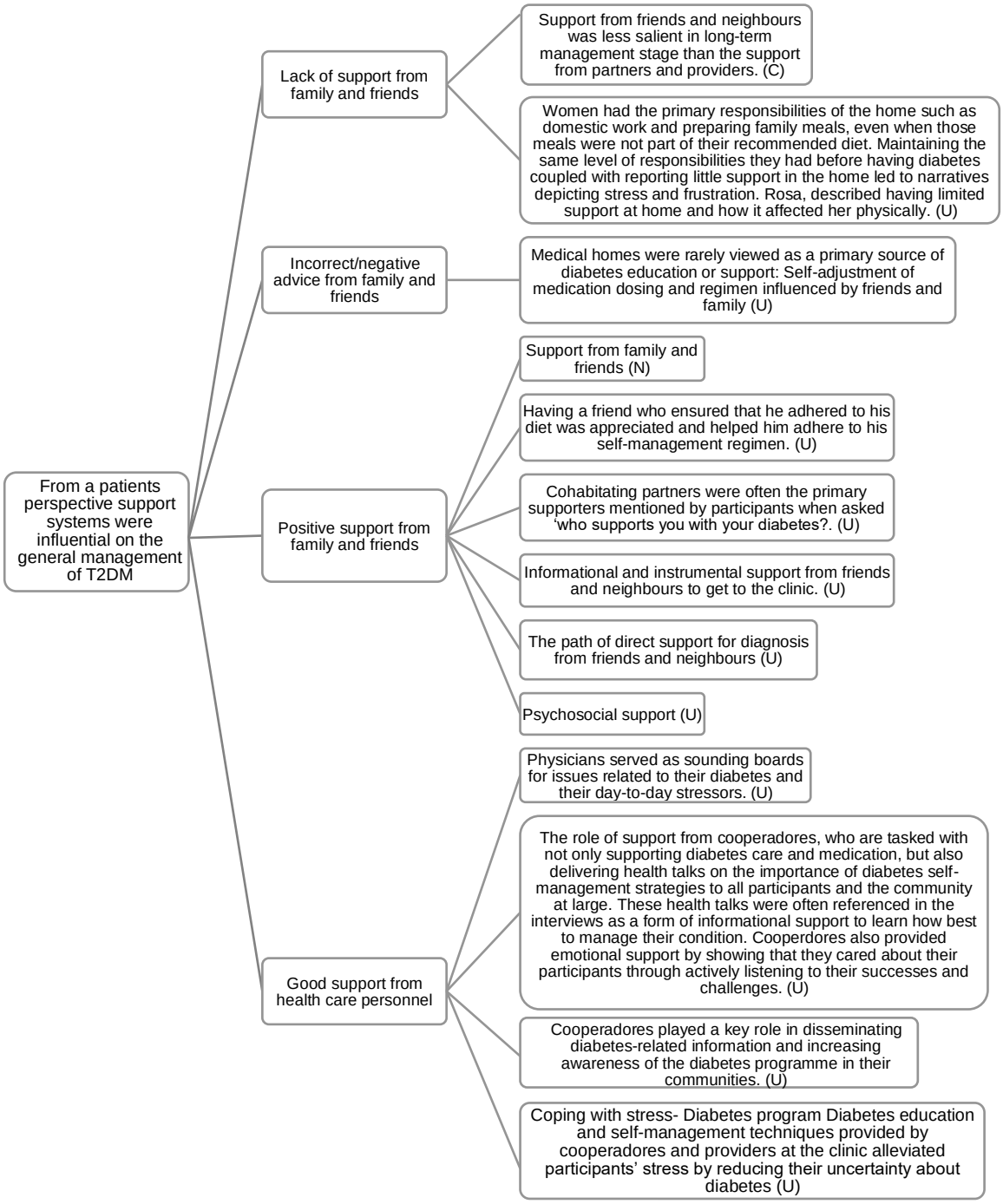


Figure 6: Synthesised finding 3- From a patients perspective support systems were influential on the general management of T2DM.

Synthesised finding 4: From the participants perspective personal background and circumstances can encourage and limit good self-management and general management of T2DM

This synthesised finding was generated from 11 findings which were merged into five categories **(Figure 7)**. Personal background includes a person's heritage, the level of or kind of education they received, and their social and economic status. Personal circumstances are difficulties or issues which may impact a person's ability to accomplish specific tasks. The categories which had a negative impact include competing priorities/ physical activity, co-morbidities/ medical history, and inadequate knowledge. There are some personal circumstances such as increased knowledge and perceived benefits of physical activity which has a positive impact on a person's ability to accomplish certain tasks.

- Impact of competing priorities on physical activity

Physical activity is one method used for managing T2DM. Although the participants are aware of the benefits of physical activity, they have expressed that different factors are serving as obstacles to physical activity. The most common factor was not having the time for physical activity due to other responsibilities.

"My work demands many times do not allow me to get home early."(136)*p.87*

- Co-morbidities and medical history

Due to T2DM patients co-morbidities/medical history, their body is limited to certain actions and based on their conditions or disabilities. As a result of these limitations, T2DM patients are unable to be physically active.

"When my back condition or knee does not allow me to do it."(136)p.87

There are multiple complications associated with T2DM which affects the patients' body in different ways, because of this, patients spirits are dampened and are not their usual selves.

"It's not an easy thing. Having diabetes contributes to other sickness and it's not nice, because it become like a part of you gone."(138)*p.75*

- Inadequate knowledge

It was highlighted by the authors that there was not enough knowledge about T2DM being disseminated amongst the patients, which is essential in the management of T2DM. The patients cannot manage their T2DM if they have no knowledge about it. There were no quotes or illustrations to represent the lack of knowledge.

- Perceived benefits of physical activity

Physical activity is an essential form of T2DM management, and all physically able patients should be physically active. Patients reported that because of the benefits of physical activity they were more

eager to continue being physically active. Patients were able to carry out more tasks in their daily activities and their physical well-being was better.

"I am less tired in my other activities."(136)*p.87*

Being physically active has also allowed patients to form friendships which formed clubs. As a result of the social benefits more T2DM patients were encouraged to become physically active.

"When I exercised outside my house I met new friends and I joined a jogging club."(136)*p.86*

- Increased knowledge

Participants expressed that because of increased knowledge of T2DM they were more motivated to make changes in their lives and manage their diabetes properly.

The motivation that came after increased knowledge was exemplified by Ophelia who said, "So me gets-- me finds out now. So me have diabetes. And from thence on, me started the change. Them give me a diet sheet. And them tell me what to eat, and what not to eat, and so-and-so forth. But you know sometime you may eat what you are not supposed to eat."(138)*p.73*

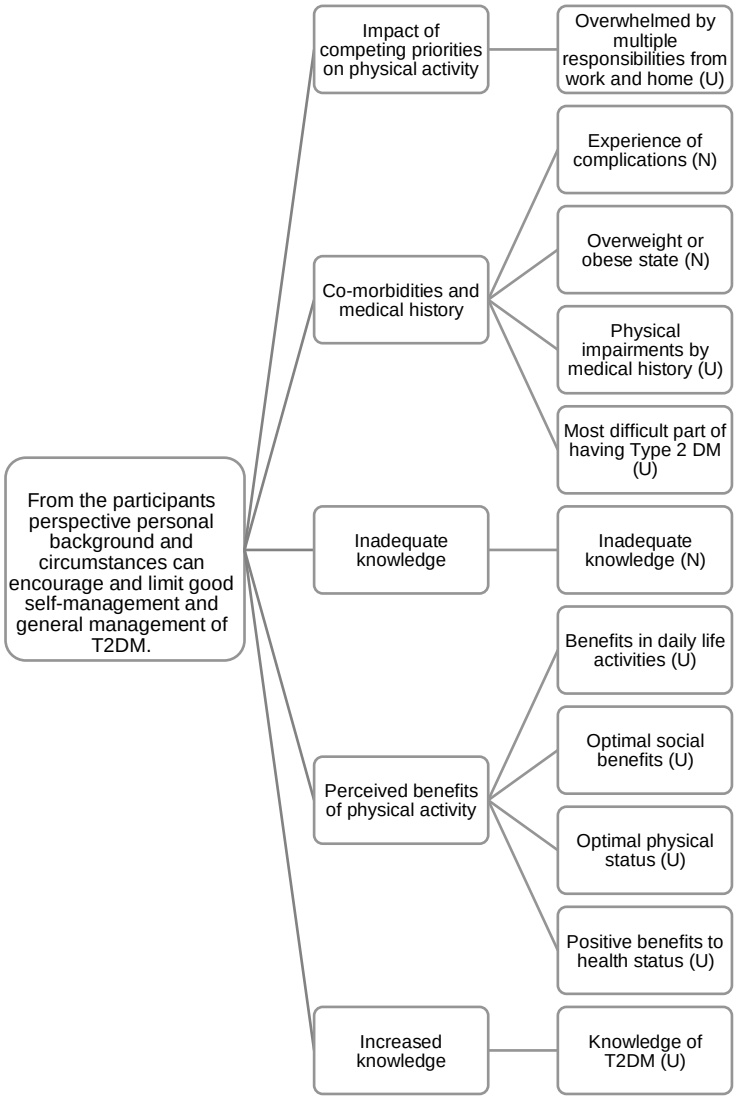


Figure 7: Synthesised finding 4- <u>From the participants perspective personal background and circumstances can encourage and limit good self-management and general management of T2DM.</u>

<u>Synthesised finding 5: From the participants perspective emotional factors were found to influence patients' actions towards management of T2DM</u>

The synthesised finding was generated from 20 findings which were merged into six categories, low mood and low motivation, fear of the disease/ complications and denial. Emotional factors refer to the way persons felt about having the disease and the way that influences his/her action to seek contentment and assistance, resulting in negative or positive results **(Figure 8)**. Categories such as low mood and low motivation, fear of the disease/ complications and denial were factors which negatively

influenced the patient's management of T2DM. The categories which positively influenced the patient's management of T2DM were high mood and high motivation and fear of the disease/ complications.

- Low mood and low motivation

Participants reported an overall lack of motivation and interest when focusing on obstacles to physical activity. As people were not motivated to be physically active, they were not able to use this form of management for T2DM, which is as important as any other form of management.

"Lack of motivation and interest."(136)*p.87*

Due to the toll T2DM and its complications has on the human body, participants were somewhat defeated. Patients also expressed how much they have been suffering and the emotional impact that the disease had on them.

"Ah, diabetes... Whatever I could do first, I cannot do it again…It burdens my body. It's against the body. Walking — I cannot walk straight…The most difficult part is over the body... poor circulation too... It look like it caused that too. …me fall down, as me step, me fall down…Yes, the nerves gone right out… It burn me under the heel and stick me... It can come anywhere… affecting my foot bottom and my heel. It burning me, burning me, burning like pepper...and the eyes, man, I don't know if it's a glaucoma get in the eye and eat out the eye….I can't tell you how long I am suffering, suffering..."(138)*p.77*

- Fear of the disease/ complications

Patients showed concerns about the complications associated with T2DM and the impact it would have on their lives. This hindered them from seeking the appropriate care. Patients were also afraid to visit the doctor for check-ups because they were afraid of the doctors and the unknown of their disease (information/results they were going to receive).

"them don't go for check-ups because them afraid from the doctor."(138)*p.91*

- Stress

Patients reported finding it stressful to adhere to the recommended diet due to accessibility and availability of foods. Patients also reported finding it stressful to cope with knowledge that not adhering to medication would result in complications associated with T2DM, including death. As a result of these stressful scenarios, patients reported not thinking about or dealing with their T2DM management as coping techniques.

"If you have AIDS, HIV, you have treatment. [handclap] Done. If you are in treatment, you can live 100 years and die of something else—you will not die of that [HIV]. But with diabetes, a person without treatment can be sure that one day, he will lose his vision. Through diabetes comes the famous diabetic foot or kidney problems. It is a tragedy for them and their family because now you have lost everything."(140)p.860

''Living with diabetes is worse . . . when you think about it. It is worse because you can even die of depression if you think about that, and [it can affect] your heart and all that.."(140)p.861

- Denial

Patients who did not want to accept that they had T2DM was in denial, and because they did not acknowledge the disease they did not attempt to manage it. Patients thought it was easier to ignore the signs rather than deal with the problem.

"I don't want to think about it (having diabetes). Like I say, I don't say I'm a diabetic. I only say my sugar is a little elevated. I don't even want to call the word."(121)*p.7*

- High mood and high motivation

Although some patients moods and motivations had a negative impact on their T2DM management, some patients reported high mood and motivation. Having T2DM made patients more eager to live a healthier lifestyle, more eager to get better and reduced complications. As a result, patients ensure that they continue their self-management regime to stay in good health.

"I feel good and it cheers me up. My self-esteem increases."(136)*p.86*

- Fear of the disease/ complications as a motivator

Patients reported that the fear of poor health outcomes if T2DM is not managed correctly had motivated them to manage their T2DM properly. Participants expressed that they would continue to take good care of themselves so that they will never have to suffer or develop any complications.

"And feeling healthy, that is the best. My mother, when she was alive, she used to take care of us, and she take care of herself until she leave us. So that's why I said I would take good care of myself just like my mom, and also she take care of her mother."(138)*p.86*

As there are many complications associated with T2DM such as loss of limbs or eyesight. The participants expressed the fear of this happening to them. This fear has motivated them to try and manage their food intake and eat healthier food options as well as stop unhealthy habits, e.g. drinking alcohol.

"I see the struggle when people lose limbs. I play the flute and don't want to lose fingers so I changed everything … I stopped the alcohol. And I cut back on all the starchy, Caribbean foods. You have to make up your mind that you're going to back out of all those foods you grew up with. I grow my own vegetables now. And that is another way I can get exercise."(121)*p.7*

"My concern about having diabetes is when you read up on it, you'll realize that if you don't take care of yourself, you can lose a limb and you can even go blind."(138)*p.74*

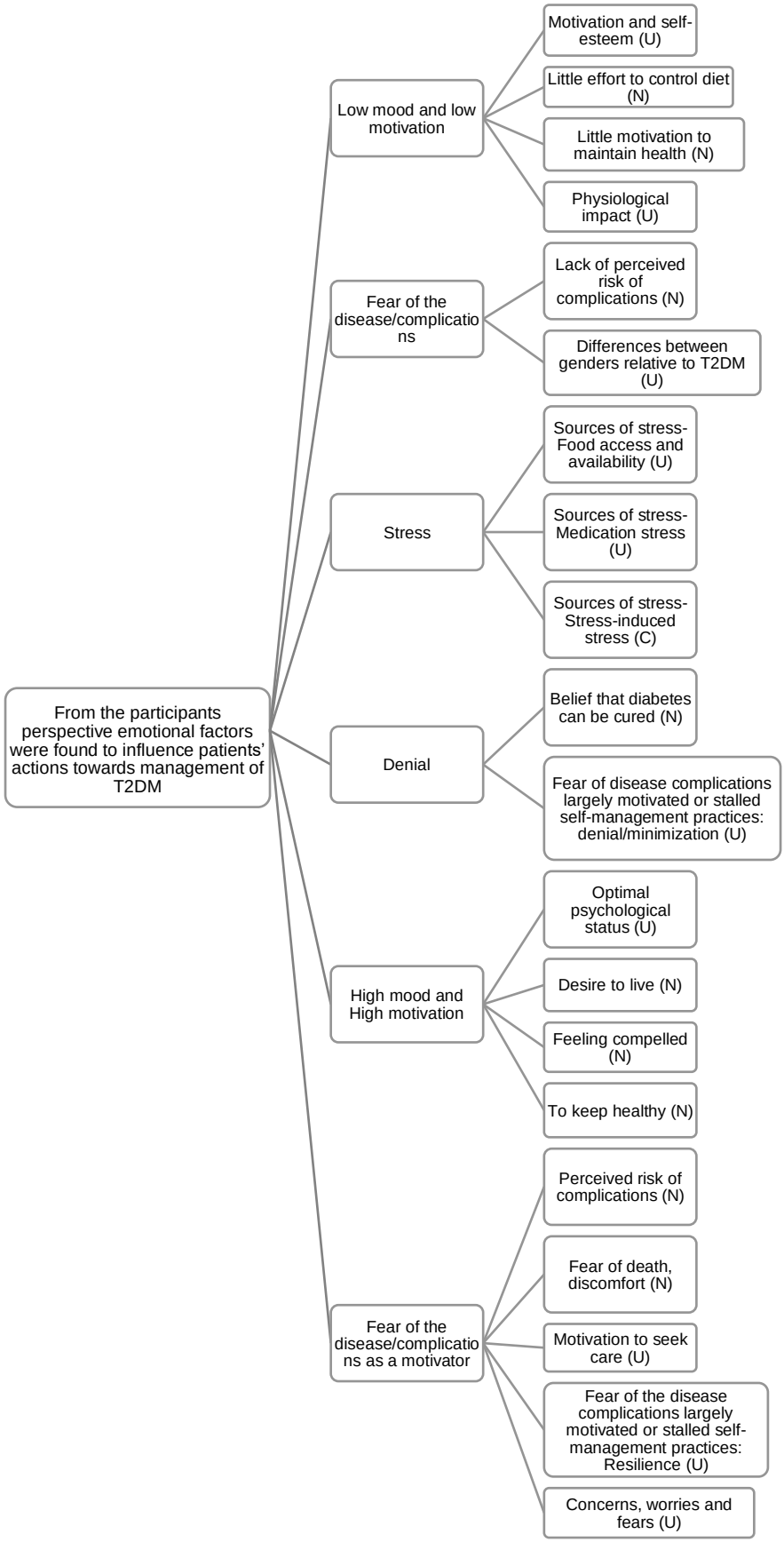


Figure 8: Synthesised finding 5- <u>From the participants perspective emotional factors were found to influence patients' actions towards management of T2DM</u>

Synthesised finding 6: From the participants perspective psychological factors were found to influence patients' adherence to T2DM management.

This synthesised finding was the result of 19 findings which were merged into three categories **(Figure 9)**. Personal attitudes are a way of thinking or feeling which is usually redirected or expressed through a person's behaviour. Both negative and positive attitudes are formed based on values, beliefs and feelings. However, negative attitudes should be avoided.

- Positive personal attitudes and thoughts towards the adherence of good T2DM management

Patients reported that they changed their eating habits to ensure that it coincides with their T2DM management. They have done this to avoid depending heavily on medication. Due to their positive attitude towards T2DM management, they found it easy to succeed in their T2DM management and limit the associated complications.

"*My doctor told me what to eat, so I just stick by that. It's not hard as I cut down on portion size. Good eating habit, I can tell you. And why I know as I talk about the medication, I was following people and see, you can't get up every day just taking tablet, taking tablet.* (138)*p.88*

Patients also ensure that managing their T2DM takes priority over everything else. They ensure to go to their doctors' appointments, follow the doctor's instructions as well as save to purchase their prescribed medications as it is expensive.

"…the medications are very expensive. No matter how small it is, whatever, I have to make sure I put that money aside to fill my prescription. I don't put nothing before it."(138)*p.83*

Some patients were able to adhere to a good T2DM management through not thinking about their illness and keeping busy in their lives. Thus, using these as coping strategies to maintain diabetic control, live normal, happy lives.

"If you are working, your mind will be busy and you won't remember that you're sick. You'll live your normal life."(141)*p.6*

- Positive impact of religion

Results showed that participants found comfort and emotional support by praying to God. They view praying to God as a way of having a conversation to get advice and to feel better about their T2DM condition. It lifts their spirits making it easier to manage and deal with their T2DM.

"If you say you prayers and you go to yuh bedside and you pray you does get yuh own little thing. Sometimes one leaf of bush they will tell you to boil and you know! You feel much better."(137)*p.1494*

"You pray a lot about your condition. A way to get comfort."(138)*p.79*

- Negative personal attitude towards adherence of good T2DM management

Patients struggled to adhere to the management of their T2DM. They did not believe in the prescribable medicines, and so they either did not use it or used it irregularly in combination with their own plant/bush remedies.

"The Doctor medicine is useful … I take it today, tomorrow I take the bush."(137)*p.1494*

Taking prescribable medicines, monitoring of glucose and sticking to the regime are essential aspects of T2DM management which have been dismissed by patients because of their attitudes.

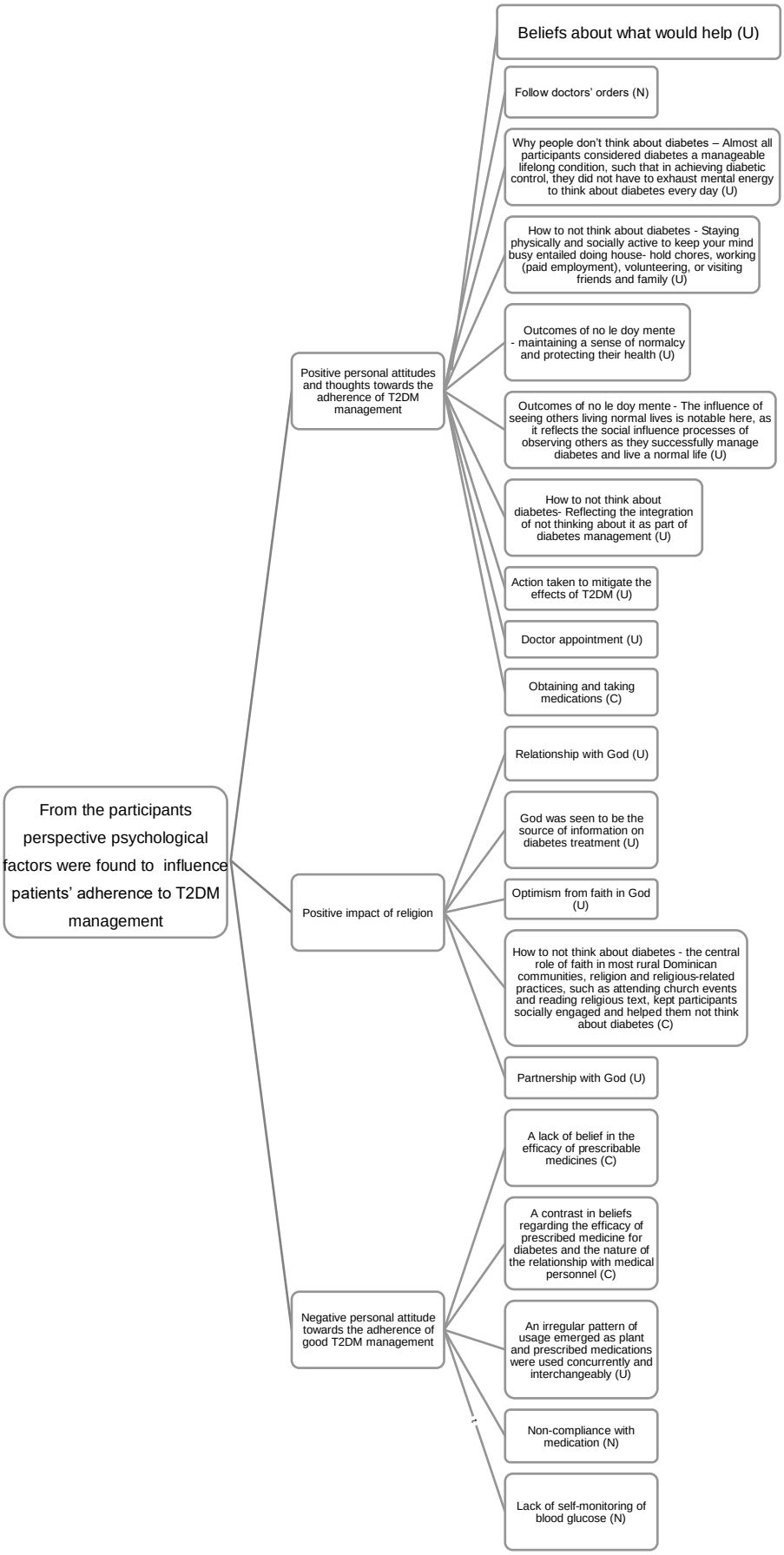


Figure 9: Synthesised finding 6-<u>From the participants perspective psychological factors were found to influence patients' adherence to T2DM management</u>

3.6. Discussion

This is the first systematic review to summarise the barriers and facilitators to the management of T2DM in people from the Caribbean. After an extensive search of the literature, a total of 1322 hits were identified. Following best practice methods, eight papers were included in the review. Overall, the included studies were of high methodological quality. The included studies focused on patient-level barriers and facilitators that affected different aspects of T2DM management (including self-management) in five different Caribbean countries. However, no findings were identified which related to discussing T2DM management from the perspective of family/carers or healthcare professionals. The barriers and facilitators identified were sociocultural norms, demands, pressures impact on self-management and general care of T2DM, environmental context and resources impact the management of T2DM, support systems influence on the general management of T2DM, personal background and circumstances can encourage and limit good self-management and general management of T2DM, emotional factors which influences patients' actions towards the management of T2DM and psychological factors and their influence on patients' adherence to T2DM management. Four of the synthesised findings were considered to be both barriers and facilitators in some areas such as support systems, personal background and circumstances, influence of emotions and psychological factors and personal attitudes. Among these were themes such as moods and motivation, stress, attitudes towards adherence, knowledge, medical history, availability of resources, physical activity benefits and support.

Physical activity is an integral part of T2DM management[142], and so is ensuring that it is part of patients with T2DM management regime. This study showed that the multiple benefits of physical activity, such as improvement in a patients' overall physical and mental health, encourage patients to continue being physically active. A study conducted in India contained supporting evidence which revealed that the awareness of the benefits of exercise also emerged as a facilitator.[143] Despite the benefits of physical activity being a facilitator, there were also barriers associated with physical activity. Patients competing priorities made them unable to be physically active. Patients expressed there was too much going on in their lives to fit any physical activity into their schedule. It was supported by other studies carried out in South Asian populations.[143–146] A study conducted in South Asia found that fear of injury or worsening health with exercise was a barrier to T2DM management, which was consistent with the findings from this review.[145] In South Asia populations, the lack of gender-specific facilities for physical activity was a barrier to T2DM management, however, this was not consistent with this review's findings.[145] In addition, unsafe environments for physical activity was also a barrier to T2DM management in South Asia as participants did not want to risk their lives or risk getting hurt going to gyms which were situated in dangerous areas.[145]

This review found that cultural practices influence the diet of patients negatively, two other studies which highlighted the barriers to self-management and management of T2DM (carried out in the Unites states and United Kingdom respectively) supported this.[147,124] Cultural demands/pressures showed that patients religious beliefs as well as their belief that traditional foods did not aid in the management of T2DM management. This result was consistent with one of the overall themes from a study from South

Asia. They found that social responsibilities to continue with traditional diet and misconceptions on the components of diabetic diet were barriers to T2DM management.[145] This study showed that there were many misconceptions about T2DM and its' management, some findings showed that what patients believed about T2DM and its' management were false or had no scientific evidence to support its' benefit. Some of the procedures followed by patients to manage their T2DM may have been doing more harm than good. Stigma is associated with knowledge as it is usually present when there is a lack of understanding, hence being grouped into this category. People tend to be afraid of what they do not understand or have no knowledge about, and as a result, they do not always adapt to changes.[124,148–150] Nevertheless, there are cases where patients do adapt to cultural changes such as following appropriate dietary advice and exercise regime which facilitates with their T2DM management. This finding was supported by other studies across the world, in South Asia, the United States and the United Kingdom.[145]

Participants displayed negative attitudes towards adherence to good management which was identified as a barrier. Non-compliance consisted of patients not following doctors' orders or using prescribed medications which managed their T2DM. In a study conducted in the United States, communication with healthcare providers was not specifically identified as a synthesised finding. However, patients non-compliance to prescribed medication was a barrier to T2DM management.[147] Similar themes such as communication discordance with healthcare providers, non-compliance to partake in self-management, lack of understanding about medication management and prefer for folk and phytotherapy (herbal/ traditional medicine) were found by another study done in South Asia.[145] Some studies show that non-compliance may have been the result of lack of trust between healthcare professionals and patients, lack of knowledge/education, patients' own beliefs not coinciding with what was told or given by healthcare professionals, and not being able to follow the regimen or not being able to afford the appropriate healthy food or services.[145,151,152] In this study, there was no illustration or theme which highlighted trust in health care providers as a facilitator or lack of trust in healthcare providers as a barrier to T2DM management. However, this does not mean that it does not exist, as one study showed that trust in health care providers was a facilitator to T2DM management.[145]

There were some positive attitudes towards T2DM management adherence where patients expressed the importance of following the doctors' orders, taking their medications, adopting a diabetic diet and ensuring that they were managing their T2DM to the best of their ability. Fear was presented as a barrier and facilitator to T2DM management. Fear as a barrier was supported by Byers et al.[152] however it did not support the findings of fear being a facilitator, participants expressed that the fear of complications was not enough to motivate them to adhere to good T2DM management. Patients have also used their moods and own self-motivation as a barrier and facilitator to negatively and positively influence their T2DM management. Barriers entailed patients not wanting to control their diet and having no motivation to keep healthy. Facilitators entailed patients wanting to live and stay healthy.

Support was identified as both a barrier and a facilitator to T2DM management depending on the circumstances. The support as a facilitator was the richest finding, it had the most themes and many illustrations to support the themes. It also outweighed support as a barrier by having more positive outcomes than adverse outcomes with regards to supports' influence on T2DM management. The facilitators proved that there was support given to patients from immediate and extended family, spouses, friends, neighbours and healthcare professionals. Family support and were facilitators that were consistent in both the Caribbean and South Asia. There was emotional, physical, informational and instrumental support provided to T2DM patients, all of which helped with their disease management. A driving force of this could have been that these persons cared for the patients and wanted them to have the best possible health outcome. Studies have supported the importance of support as a barrier and a facilitator.[143,148,152–156] However, it is also important to note that there was no comments/ evidence that the support from healthcare professionals had a negative impact on T2DM patients' management.

However, the patients also identified some barriers associated with support. One of these barriers was "a lack of emotional support from a cohabitating partner", this could have been anyone living in the patient's household or with them. Another barrier was that "support from friends and neighbours were less prominent in the long-term management stage than the support from partners and providers". One main reason for the occurrence of these barriers could be lack of knowledge. It could be that persons do not know what is required of them when providing support, how long it is needed for and how to give support correctly. It cannot be said for sure what type of support was given more than the other or who gave more support than the other, but from the results, it can be said that support was more of a facilitator to T2DM management than a barrier.[157–160] A study done in the United States identified a lack of active support groups as a barrier to T2DM management.[147] This study did not identify any illustrations or themes where support groups were mentioned. This may be because there are none available or patients are not aware that there are support groups available.

Knowledge was identified as a barrier and a facilitator to T2DM management. Increased knowledge of T2DM was identified as a facilitator. Any knowledge, whether it is big or small, it is essential. A study done in the United States reiterated that "personal understanding of T2DM" was a facilitator T2DM management.[147] However, there was an overall lack of educational resources on T2DM and its management. The lack of educational resources may have been the result of healthcare professionals not knowing the information to deliver to patients or inappropriate medium used to deliver the information. Although one finding stated that some patients acquired knowledge about diabetes, it was done after they began treatment for the disease. Realistically, information on T2DM should have been provided on the diagnosis of the disease, however, this was not the case.[74] Lack of knowledge may have also lead to patients' non-compliance. Studies which focused on South Asia, the United States and the United Kingdom also identified lack of knowledge as a barrier to T2DM management.[145,124] The language barrier between T2DM patients and healthcare providers was identified as a T2DM management barrier in studies conducted in South Asia and the United States but not in the Caribbean.[145,147] Language may not have been a barrier in the Caribbean because the healthcare

providers speak the first language of the country, in most cases this is English. Whereas in countries such as South Asia and the United States, both patients and healthcare providers may speak different languages as they are more likely to have different backgrounds.

The study done in the United States showed that the lack of other resources in the local community was a barrier to T2DM management.[147] In the Caribbean, unsafe environment for physical activity and lack of resources such as affordable healthy foods and medicines and the poor infrastructure to exercise were all additional factors that were as barriers to T2DM management.[143,158,161] Despite the patients' wanting to follow good T2DM management practices, the resources were not available. For example, although healthy foods are available in the Caribbean people could not access it due to the high cost of living. It must me highlighted that key areas of self-management (e.g. footcare) were not mentioned at all by the participants in this research, indicating that more research is needed to focus on this area of T2DM management.

Most of the themes/categories are connected to some degree. For example, being educated or having knowledge about T2DM may affect or change people's belief, views and understanding of the disease's management. It can determine whether patients comply with their doctor's instructions, stick to their prescribed medications in addition to knowing what is required when giving support. This shows that knowledge can eliminate more than one barrier. There were many similarities in the barriers and facilitators to T2DM management when compared to the literature. Although some themes such as "personal understanding of T2DM" and "Knowledge of T2DM" were described differently or had a different heading, their illustrations were similar, and they all came under the same category/ theme. It is now evident that many of the barriers faced in the Caribbean are being faced in other countries, such as South Asia, the United States and the United Kingdom. However, there were some barriers which were identified by patients in other geographical regions but not in the Caribbean. In the Caribbean patients did not express the lack of time spent with physicians and empathy as a barrier to T2DM management, but it was in South Asia. Another barrier T2DM management identified in South Asia was cold weather being a hindrance to physical activity, however, this was not a barrier in the Caribbean. This difference may be the result of geographical location, different cultural background, level of the health care system and health care provided, resources available to healthcare providers and patients and the country's economy.

3.6.1. Strengths and limitations

This study has several notable strengths. The study was carried out using two independent reviewers throughout, which helped to reduced bias from occurring. The level of confidence of the study findings generated were moderate to high. It showed that the results were reliable, accurate and could be trusted. Out of 28 islands in the Caribbean, the six studies in this systematic review was conducted in five Caribbean islands (Puerto Rico, St. Vincent, Jamaica, Dominica Republic and United States Virgin Islands). Although the islands all share similar culture on the surface, they all differ in their unique way. Every island has been influenced by its colonisers or immigrants and as a result the Caribbean is made up of different ethnicities and each island ethic make up is different. Every island has its' own unique

national(main) dish which is made up of different ingredients that are grown or can be found on all the islands. This information shows that although they differ in certain aspects, other things, for example, their staple foods are the same. It is recommended that researchers conduct further research in other Caribbean countries so that a full picture can be sought regarding the barriers and facilitators of T2DM management. The systematic review, however, also had limitations. There were no studies found which covered the views of healthcare providers and family/carers. It is important to have healthcare professionals and family/carers views as there are these are the people directly involved in the management of a patients' T2DM. Whether it may be family/carers assisting with medication regime or healthcare professionals providing care, they all play an essential role in ensuring proper T2DM management.[162–167] Therefore, their views on barriers and facilitators to T2DM management is equally important as those from the patients. Another limitation of this study was the elimination of 11 papers due to no full-text being available, six of these papers were abstracts or poster presentations. These papers may have been beneficial to the study by adding additional patient-reported barriers and facilitators. Finally, the meta-aggregation method followed in the synthesis differed slightly to that recommended by JBI, where we included all findings irrespective of their level of credibility. We did this to ensure that the phenomena of interest was made clear and because the authors of the study described the way they qualitatively explored the phenomenon.[122] The text from the open-ended interviews and patients description were used to form themes which were later interpreted to identify the motivational factors and barriers to therapeutic lifestyle changes. Although there were no text/illustrations reported, quantitative calculations showed how many patients gave a particular response.[122] This resulted in 17 findings from one study[122] being included in the meta-aggregation which had no supported findings, which contributed significantly to the synthesised findings. The researchers did not report the review in terms of ENTREQ as the study did not meet the guidelines,

3.6.2. Implications

Firstly, as this systematic review is now the most recent and comprehensive review of the evidence on barriers and facilitators to guide healthcare practice, the moderate to high confidence in the qualitative results are pivotal in the successful management of T2DM patients in the Caribbean. Secondly, with the information provided, patients should now be able to relate to other patients and have a clearer understanding of what will help them manage their disease and what will not. For example, knowing what actions, beliefs or personal traits are classified as harmful to their health and what is beneficial. Thirdly, the findings will allow T2DM patients to be more effective and efficient in communicating with healthcare professionals to decrease non-compliance and non-adherence. It is also imperative that the T2DM patients are given the appropriate resources and guidance to address the barriers that they face and promote the facilitators, all through education. This may include high-quality T2DM management guidelines, interventions that can be used on patients and policies. Fourthly, the results from this systematic review will allow policymakers to develop evidence-based recommendations/policies which deals with the issues presented. Policymakers may find it useful to ensure that resources are available and affordable, e.g. healthy foods medicines, and there are safe environments for exercise. As well as develop policies to develop and provide supportive environments to T2DM patients to help motivate

them. Policymakers may also find focusing on educating people more and giving advice on the disease, appropriate diet and medicines and physical activity very useful.[168] Some other studies which were conducted in the United States showed that tailored advice and personal guidance are more productive and more consistently associated with good health outcomes and behaviour change.[169–171] Lastly, there were a few issues identified throughout the studies included in the review. Although all the studies were of high quality, the critical appraisal highlighted the common poor reporting of the influence of the researcher on the research amongst the studies.

The Caribbean region is a large multi-cultural/multi-ethnic diverse area. Due to the history of colonisation by many nations and immigrants, multiple ethnic groups from across the world merged. The Caribbean people are mostly descendants from different ethnic backgrounds such as Africans, Europeans, Asians, Tainos and Caribs East Indians. This indicates that the region is not made up of one ethnicity and one culture, therefore, when healthcare professionals are planning ways to eliminate barriers and increase facilitators in the different countries different cultural and ethnic background should be taken into consideration. As the findings were Caribbean T2DM patients, their views and perspectives can be different from other populations such as healthcare professionals and family/carers. However, because healthcare professionals and family/carers are usually the ones caring for T2DM patients, they would be able to assist in promoting the facilitators and tackle the barriers identified as quickly as possible based on this evidence.

3.7. Conclusion

This was the first systematic review to explore the barriers and facilitators to T2DM management in people from the Caribbean. Overall, the findings showed that the barriers of T2DM management amongst patients in the Caribbean are sociocultural norms, demands/pressures and influences, poor environmental context and resources, poor support from the most immediate influences, personal background and circumstances which limit, influence of emotions on T2DM management, influence of psychological factors towards management of T2DM and the adherence to T2DM management. The facilitators to T2DM management amongst patients in the Caribbean are good support from the most immediate influences, personal background and circumstances which encourage good self-management and general management of T2DM, positive influence of emotions, psychological factors and positive personal attitudes of T2DM patients towards the adherence of treatments. Further research is needed which explores the views and experiences of T2DM healthcare professionals and families and carers of people with T2DM so that a more precise picture regarding the barriers and facilitators to the management of T2DM in people from the Caribbean is available.

3.7.1. Recommendation for practice

Based on the evidence highlighted in the summary of findings **(Table 9)**, the JBI grades of recommendations was used to assist in the development of the following recommendations shown in

Table 4. A binary system for grading the recommendations, a ‘strong’ recommendation (Grade A) or a ‘weak’ recommendation (Grade B) was used **(Table 10)**.[172]

Table 9: Summary of findings

Systematic review title: Barriers and facilitators to type 2 diabetes management in the Caribbean region: a qualitative systematic review. Population: Type 2 diabetes patients adults (aged 18 and above), family/carers, healthcare professionals. Phenomena of interest: Views, experiences, attitudes, understandings, perceptions and perspectives regarding the barriers and facilitators to type 2 diabetes management. Context: The Caribbean region.					
Synthesised findings (T2DM patients level)	**Type of research**	**Dependability**	**Credibility**	**ConQual score**	**Comments**
From the participants perspective sociocultural norms, demands and pressures were found to impact self-management and general care of T2DM: Cultural demands/pressures, traditional non-evidence based traditional medicines or therapies and social stigma are barriers to T2DM management. Evidence highlighted how patients continued to consume local unhealthy foods despite the repercussions. Shame and judgement were passed from others/community to T2DM patients.	Qualitative	Downgrade one level	Remains unchanged	Moderate	Dependability: Downgraded one level as 3 out of 5 "yes" responses. Credibility: 7 out of 9 findings were unequivocal.
From the participants perspective environmental context and resources were found to impact the management of T2DM:	Qualitative	Remains unchanged	Remains unchanged	High	Dependability: 4 out of 5 "yes" responses. Credibility: Only

Physical activity/ in built environment and lack of resources are barriers to T2DM management. Patients did not feel safe in the areas in which they had to exercise and in addition, there was a shortage in supplies which are vital in T2DM management.					unequivocal findings.
From a patients perspective support systems were influential on the general management of T2DM: There were different types of support given to T2DM patients which did not help improve their management. Lack of support from family and friends and incorrect/ negative advice from family and friends are barriers to T2DM management. Positive support from family and friends and good support from healthcare personnel are facilitators to T2DM management. Religious, family and friends and health care professionals support systems were provided to T2DM patients.	Qualitative	Remains unchanged	Remains unchanged	High	Dependability: 4 out of 5 "yes" responses. Credibility: Downgraded one level as 11 out of 13 findings were unequivocal.
From the participants perspective personal background and circumstances can encourage and limit good self-management and general management of T2DM:	Qualitative	Remains unchanged	Downgrade one level	Moderate	Dependability: 4 "yes" responses. Credibility: Downgraded one level as 8 unequivocal and 3

Factors such as competing priorities/ physical activity, co-morbidities/ medical history and inadequate knowledge are barriers to T2DM management. Perceived benefits of physical activity, increased knowledge are facilitators to T2DM management. They were personal backgrounds and circumstances which positively impacted patients ability to manage their T2DM.					unsupported findings.
From the participants perspective emotional factors were found to influence patients' actions towards management of T2DM : Emotions or the way persons felt about having the disease affected if and how persons managed their T2DM. Emotional factors influences his/her action to seek contentment and appropriate T2DM management assistance, resulting in negative results. Low mood and low motivation, fear of the disease/ complications and denial are barriers to T2DM management. It includes positive outcomes as a result of a person's thinking that influences his/her action to seek contentment. High mood and high motivation and fear of the disease/ complications as a motivator are facilitators to T2DM management.	Qualitative	Remains unchanged	Downgrade two level	Low	Dependability: 4 "yes" responses. Credibility: Downgraded two levels as 10 unequivocal, 1 credible, and 9 unsupported findings.

From the participants perspective psychological factors were found to influence patients' adherence to T2DM management: Negative and Positive attitudes and beliefs were able to impact weather persons obeyed or follow their T2DM management regimen. Negative personal attitudes is a negative way of thinking or feeling based on experiences, values and beliefs. Negative personal attitude towards adherence of good T2DM management is a barrier to T2DM management. Positive personal attitudes is a positive way of thinking or feeling based on experiences, values and beliefs. Positive personal attitudes towards the adherence of good T2DM management is a facilitator to T2DM management. Religion and persons belief in God also had a positive impact on T2DM management	Qualitative	Downgrade one level	Downgrade one level	Low	Dependability: 3 "yes" responses. Credibility: Downgraded one level as 13 unequivocal, 4 credible, and 3 unsupported findings.

Table 10: Grades of recommendations for practice

Grades of recommendations	
Grade A	Patients should be educated on the appropriate medicines to use for their T2DM management and the risks of using of non-evidence-based medicines.
Grade A	Patients with pre-existing co-morbidities or have a medical history which may impact or may be impacted by T2DM should be given educational resources by their healthcare providers. The educational resources should entail how to manage their co-morbidities with their T2DM.
Grade A	T2DM patients should be educated on T2DM, with special focus on the misconceptions (which has also lead to fear) and possible complications associated with the disease and different ways to deal with it.
Grade A	Long term support (physical and emotional) should be considered and provided by family, friends and spouses to T2DM patients.
Grade A	Educational support should be considered for family, friends and spouses who live with or care for T2DM patients.
Grade A	Faith based groups should consider developing supports groups for T2DM patients.
Grade A	Societies should be educated on T2DM with the aim of reducing the stigma associated with T2DM.
Grade A	Healthcare providers should consider building a rapport with their patients, to develop doctor-patient trust/ relationship so that patients are more likely to adhere to their instructions which should promote good T2DM management.
Grade A	Governments should consider ensuring that educational resources and healthy food options are available to T2DM patients.
Grade A	The Governments or the Ministries of Health should consider the accessibility and affordability of medicines to T2DM patients, by lowering the prices or making them free.
Grade A	The Governments should consider providing professional psychological help/ assistance to T2DM patients who are experiencing any emotional and psychological issues.

Grade A	Policymakers should consider developing health promotion activities based on physical activity targeting T2DM patients who struggle to be physically active due to busy lifestyles. These activities should be tailored to be incorporated into their daily lives.
Grade A	Policymakers should consider implementing accessible and safe physical activity programs for all types of T2DM patients.
Grade A	Policymakers should consider re-introducing healthy diet plans or healthy food options to T2DM patients using more of their native food.

3.7.2. Recommendation for research

Throughout the characteristics of data extraction, it was evident that there was poor reporting of the methodology in more than half of the studies. Some of the characteristics were not reported, and others were not reported in detail. It is recommended that researchers ensure that their methodology is thorough and included all the necessary information. Although a few qualitative studies were identified, there should be more qualitative studies on T2DM management conducted in more Caribbean countries so that a broader range of islands can be included in the summary of evidence. Future qualitative studies should also include healthcare professionals and carers perspectives since this systematic review was only able to synthesise findings from patients' perspective. Hopefully, the experiences, views and perspectives from other individuals may identify more barriers and facilitators that were not identified in this review.

Chapter 4: Discussion

4.1. Summary of the study

The research within this thesis was in response to the documented cases, complications and death from T2DM in the Caribbean region. The findings from this research can assist with future study designs, developmental plans, and strategies to combat these issues. The research conducted in this thesis used an exploratory formative method to highlight and raise awareness of some of the disparities impacting T2DM management in the Caribbean region. It provided answers to the following questions '*do healthcare practitioners have the appropriate and best quality guidance needed to assist with T2DM management?*' and '*what are the factors hindering or promoting proper T2DM management?*'.

The results indicated that the overall content and quality of the Caribbean T2DM guideline published in 2006 was poor when compared to more recent international guidelines. Significant issues were identified in the current Caribbean guideline, which has resulted in the need for improvement. The study identified that patients in the Caribbean region have multiple barriers and facilitators, limiting and promoting effective management of their T2DM. The results suggested that the issues identified (poor quality guideline and barriers) were predominantly responsible for poor T2DM management. The information provided in this research should assist various governments, health officials and other existing health organisations in the fight against T2DM.

Although the proposal of the two studies did not include any theories or framework, this thesis was able to draw on different theories and frameworks such as the framework for guideline dissemination and implementation and theoretical domain framework of behaviour change. These frameworks allowed the researchers to form a link between the barriers and facilitators to T2DM management and the quality of T2DM management guideline in the Caribbean, and provide information to improve the effective dissemination and implementation strategies to ensure successful T2DM management. The domains identified (social influences, environmental context and resources, beliefs about consequences, emotions, motivation and goals, behavioural regulations and knowledge) provide a comprehensive framework to encourage the consideration of good coverage of influencers to behavioural change and, as a result, improves the intervention implementation.[80,81]

4.2. Discussion of findings

4.2.1. Guideline appraisal

It is unknown whether healthcare professionals (clinicians) in all the Caribbean use the current guideline. However, suppose there are countries that still use it. In that care, this may play a significant role in the management of T2DM as there are profound health implications associated with the poor

quality of the Caribbean T2DM guideline. The inadequacies of the Caribbean T2DM guideline may play a significant role in the management of T2DM and, by extension, high mortality and morbidity rate. It is known that one significant limitation of mediocre quality clinical guidelines is incorrect recommendations. This is possible due to scientific evidence provided being misleading, lacking (of information or clarity) or misinterpreted. Some recommendations may be influenced due to the opinions of the guideline development group.[86]The Caribbean T2DM guideline consisted of a policy development group that consisted of different healthcare professionals from various countries and different areas of expertise. There was a lack of T2DM specialists in the guideline development group, which may have led to unsuitable recommendations. Persons were also from different countries within the Caribbean, and though the culture of the countries may be the same, other things may differ, such as their economic status. As a result of minor differences among the islands, persons from the guideline development group could have made recommendations reflecting their experience and country's economic status. Another disadvantage of the poor quality guidelines is their inflexibility.[86] These guidelines do not consider patients with unique circumstances and personal histories, which hinders healthcare professionals from adapting to the patient's needs, thus resulting in unsafe practices.[86]

Studies have shown that the quality of clinical guidelines is usually mediocre due to the procedures followed in its development or lack thereof.[86,173,174] In this case, the Caribbean T2DM guideline did not follow a robust development procedure. For example, it did not include a systematic process to gather and synthesise evidence or methods to formulate the recommendations (e.g. GRADE) and update them. This had a major impact on the guideline quality as there was no scientific evidence or data to justify the recommendations made. The lack of this information implies that the healthcare professionals in the Caribbean are not receiving the appropriate guidance needed to ensure that they provide adequate care to their patients. This may have also led to a lack of trust from the healthcare professionals. It is known that the implementation of guideline recommendations by healthcare providers continue to be challenging.[86,175] Some known reasons associated with why healthcare practitioners may not adhere to guidelines are: lack of awareness and familiarity of its content; not agreeing with it due to lack of interpretation or evidence; lack of self-efficacy due to insufficient training or experience; patient factors such as their awareness and involvement; and lack of consistency amongst guidelines.[107,175,176] This research highlighted that not one aspect of T2DM management was included in all ten guidelines, which proves a lack of consistency among guidelines.

In some Caribbean countries, e.g. Grenada, healthcare professionals do not use the Caribbean T2DM guideline. As a result, they follow other high-quality guidelines, e.g. ADA, and the others may or may not use guidance at all. In addition, some guidelines also lack advice and recommendations to tackle barriers faced by the healthcare providers, e.g. lack of clinical equipment and medications, lack of human resource in polyclinics and lack of coordinated team approach.[89] As most Caribbean countries fall in the LMICs, we can assume that most of them struggle with a lack of T2DM medical resources, especially medications that patients need but cannot afford. It is imperative that healthcare professionals are fully equipped with the necessary tools needed to do their jobs. They would not be

able to follow the recommendations of a guideline if they do not have the tools required to do so. This is likely to lead to poor quality of care of T2DM patients.

As we know, T2DM management does not only entail achieving blood glucose control targets. It also includes preventing and/or reducing the risk of the development of complications.[177] Most guidelines, including the one produced by the Caribbean, included these aspects of T2DM management. However, it must be highlighted that this guideline was last updated in 2006 and does not include new T2DM management technological advances (stick-free glucose testing, insulin pumps and pens) and new ways to improve patient care.[178] This can only mean that T2DM patients are not receiving the best resources available and best care options to manage their diabetes.

4.2.2. Barriers and facilitators of T2DM management

The barriers and facilitators of T2DM management in the Caribbean include sociocultural norms demands and pressures that impact self-management and general care of T2DM; environment context and resources used in management impact the management of T2DM; support systems influence on the general management of T2DM; personal background and circumstances that encourage and limit good self-management and general management of T2DM; emotional factors that influence patients' actions towards management of T2DM; and psychological factors and their influence on patients' adherence to T2DM management. There were more barriers than facilitators faced by Caribbean T2DM patients, which shows that there are more factors to overcome or eliminate to ensure proper T2DM management. These barriers have negatively impacted the quality of care and quality of life of T2DM patients. Factors such as cultural beliefs, knowledge, medical history/comorbidities, lack of resources (money), emotional state(mood, stress, fear) and support, prevents patients from accessing the appropriate care as well as adhering to and practising proper management (including self-management). On the other hand, the facilitators will do the opposite but can also inform and help promote positive actions that lead to positive outcomes, good T2DM management. The evidence has shown that these (beliefs, knowledge, psychological state, support from family/friends and healthcare professionals) are the main factors assisting in or resulting in proper T2DM management. These facilitators should be promoted and, in some cases, they should be improved on for a better outcome.

These results were similar to two recent systematic reviews conducted in Latin America and the Caribbean, and Africa.[76,179] There were some additional barriers (such as insurance coverage, weather conditions and gender role[76], sexual function, self-management practices(foot care), employment problems(179) and facilitators (such as peer support and mass media providing educational messages) that were not identified in this study. This may have been due to the additional countries (Latin America) included in the research. Most of these countries are located on a continent with a different social, economic, and cultural structure to that of the Caribbean. This particular study was also able to summarise healthcare professionals perspectives, most likely because they included Latin America and was able to identify more studies.[76] Some interesting findings were that knowledge was both a barrier and facilitator of proper T2DM management. Insufficient knowledge is a barrier as it led to

miscommunication and poor management of side effects and complications. Updated training being provided to health providers was a facilitator to proper T2DM management.[76] They also highlighted barriers associated with gender roles adopted by men and women. For example, men are associated with high alcohol consumption and prioritising their work which impeded T2DM care, while women prioritised taking care of others in the family. Although this study did not identify these barriers associated with gender roles, it highlighted that male patients were more likely to be afraid of doctors, making them more vulnerable to T2DM complications. The study conducted in Africa highlighted support from family, significant others and religious relationships both negative and positive effects on T2DM management which was also identified in this study.[179] However, this study did not highlight the effects of T2DM on sexual relationships. This may have been due to the sensitive nature of the topic. Persons may not have been comfortable speaking about reduced sexual function. No aspect of foot care was not mentioned by participants in the Caribbean but was mentioned by the participants in Africa. It was made clear that they had not sought specialist medical care, while some attempted to care for it themselves with homemade remedies. Caribbean participants may not have mentioned foot care as it may not be a priority in their T2DM management practices. Employment problems were highlighted in the study from Africa but not from the Caribbean. T2DM resulted in being unwell and unable to work or missing work due to hospital visits, which resulted in unemployment ultimately leading to no source of funds and the inability to afford the necessary medicines to manage T2DM. [179] Another interesting finding was that environmental context and resources (within the health system) was both a barrier and facilitator to successful T2DM management in both studies. [76,179] In the Latin America and Caribbean study, the lack of health insurance/health care access, lack of resources (human and physical) and organisational weakness were identified as barriers. However, some of these were also seen as facilitators; good insurance coverage and health access, strong organisational structure, multidisciplinary teams and sufficient human resources.[76] In Africa, it was found that the attitudes of the healthcare workers and service delivery both assisted and prevented successful T2DM management.[179] The healthcare professionals in the Latin America and Caribbean study also highlighted and agreed on the barriers and facilitators perceived by patients. An example was that faith in God was a barrier and facilitator, this was also identified in this systematic review.[76]

The barriers and facilitators to T2DM management identified in this study can and should influence the evidence and recommendations provided when developing a high-quality Caribbean T2DM guideline.[115] It will allow the guideline development group to create recommendations that address the barriers specifically or consider them when developing recommendations. It will also allow them to provide the evidence to match the circumstances being faced in the Caribbean. For example, the high prices of medication and foods should be taken into consideration when developing guidelines.

4.2.3. Low adoption of T2DM guideline as a potential barrier to T2DM

Although the systematic review did not find any studies with healthcare professionals' perspectives, a study has highlighted that outdated or lacking guidelines can be barriers to T2DM management experienced by healthcare providers.[180] When assessing the quality of T2DM clinical guidelines,

previous research has recognised that poor quality guidelines were mainly seen in Latin America and Caribbean countries guidelines. The author also highlighted the constant efforts needed to produce and update high-quality clinical guidelines to improve T2DM management.[114] Another study also indicated there were some issues concerning the Caribbean T2DM guideline. One of the issues was that the clinical guideline was not tailored to the circumstances or issues faced by healthcare providers.[89] Although the systematic review was unable to identify the barriers experienced by healthcare professionals, from the study conducted in Latin America and the Caribbean, insufficient professional knowledge to manage side effects and communicate with patients and lack of physical resources were barriers experienced by healthcare professionals.[76] The Caribbean T2DM guideline provided limited information on managing side effects and complications and showed no evidence of considering lack of resources. Based on existing evidence which proves that poor guidelines lead to poor quality healthcare and poor health outcomes, the current Caribbean T2DM guideline may also be a barrier to T2DM management in the Caribbean. Although this was not stated as a barrier by the patients, it could be a barrier for healthcare professionals since most guidelines are targeted to them.

4.2.4. Systematic review and guideline appraisal

The results from the systematic review can be used to inform the improvement of the current T2DM Caribbean guideline or the adaptation of other guidelines. For example, the systematic review highlighted a shortage of supplies vital to T2DM management, consumption of local unhealthy foods, the negative impact of emotional and phycological factors and use of non-evidence-based traditional medicines as barriers to T2DM management. Firstly, funding should be arranged and dedicated to future researchers for guideline development or adaptation, as well as guideline developers can ensure that the guideline for the Caribbean includes supplies that are readily available to the population or provide an alternative. Secondly, they may include a section for unhealthy local foods to make clear the foods that should not be consumed. The Caribbean guideline currently contains an overall grouping of foods (cereals, ground provisions, fruits and veg, fats and oils, legumes and nuts) and recommends if its' to be eaten regularly or in moderation. Thirdly, as stress was a significant barrier to T2DM management, a section should be included with materials on how to cope with stress and other psychological factors relating to T2DM or as a result of T2DM. Lastly, alongside the evidence-based medicines/therapies, the guideline can exclusively state the different non-evidence-based traditional medicines (common in the Caribbean, e.g. bush teas) which are not to be used.

There were results from the guideline appraisal, which can be linked to the barriers and facilitators identified in the systematic review. The guideline appraisal showed that the guideline is inadequate in certain aspects of the evidence provided. This may have resulted in insufficient education/knowledge relating to T2DM management, which may have ultimately led to poor self-management and limited/inadequate support received by T2DM patients. From another perspective, due to inadequate knowledge persons (highlighted in the systematic review), persons may not be aware of the guideline and its importance to ensure successful T2DM management.

The results from the two empirical studies conducted within this thesis should now provide evidence to assist with improving of T2DM management in particular dissemination and implementation. They will help address and improve the quality of care received by T2DM patients and their health outcome. It is essential that this information reaches the appropriate people to ensure that a change is made. As knowledge of T2DM and its management was such a significant barrier, it is vital that the evidence provided by this study is shared and received by the target population so that they can make evidence-based decisions. The following section will address the best ways to disseminate the results most effectively.

4.3. Strengths and limitations

4.3.1. Strengths

The content of this thesis has both strengths and limitations. To start, the strengths of the research conducted within the thesis will add to its significance in the literature. One strength was the coverage of countries included, so that the findings can be generalisable for the entire Caribbean rather than one or a few of the countries. Secondly, this thesis used two different types of methodology to produce evidence. One was a systematic review, and the other was a critical appraisal. They both entailed systematic processes to be followed, which increased the results' reliability, quality, and trustworthiness. Thirdly, two paid external research assistants were involved with the two included studies in this thesis. One researcher assisted in the systematic review analysis and the other assisted with the critical appraisal. Lastly, this research project adds significant evidence to the literature. Thus far, no study has appraised the Caribbean's T2DM guideline and no study has summarised the barriers and facilitators of T2DM in the Caribbean region.

4.3.2. Limitations

There were a few limitations identified during this research. These should be used to develop future studies better or used to address knowledge gaps. Firstly, the systematic review did not include barriers and facilitators of T2DM healthcare professionals and family/carers. This was an important factor of the research as their views, thoughts, and perceptions of T2DM management would have been different. As a result, their barriers and facilitators were not identified, and no recommendations were made. Secondly, some of the findings in the systematic review had a low or moderate ConQual score, which highlights the decreased credibility and dependability of some of the evidence. Thirdly, there was insufficient time to conduct a primary qualitative to explore the thoughts, views and experiences of the current Caribbean T2DM management guideline and explore the thoughts, views and experiences of healthcare professionals and family and carers on T2DM management. Finally, there is also a lack of previous research studies conducted within the Caribbean on the topic, and limited access to data. There was minimal background data on T2DM in the Caribbean, therefore a thorough assessment could

not be made. Also, some papers did not have a full-text version, especially for the systematic review. This may have led to new findings or more findings that would have supported and strengthened the results.

4.4. Implications for practice in research

The findings of this thesis can allow for informed decisions to be made on many levels such as patient, family, carers, healthcare professionals, Government (ministries of health), health organisations, policymakers, and research levels. However, dissemination of this research is needed to raise awareness in patients with T2DM, their family and carers and health care professionals; the dissemination strategy of this research can be found in the following section. This research will inform patients, family and carers on the common disparities associated with T2DM, as some of the issues identified here may not be perceived as such to them. As a result of this research and the frameworks highlighted, they are now aware and can make lifestyle changes and seek guidance and help where necessary to ensure that their T2DM is successfully managed. Healthcare professionals can use the experiences and views of patients also to help them make informed decisions which can lead to better medical practices. This study will allow healthcare professionals to better understand their patients and their needs, particularly the areas they struggle with the most, e.g. adherence to medications. As it is now clear that one of the reasons that patients struggle with adherence to medication is their cultural beliefs, healthcare professionals should consider educating them more on the correct medicines and why what they are used to taking is bad and would not work effectively. The evidence from this study will also educate healthcare professionals on the issues of the Caribbean T2DM guidelines and what should be expected from a high-quality guideline. They should also advocate for the current T2DM management guideline to be updated to ensure they are adequately guided with evidence-based recommendations.

Government (Ministries of Health), health organisations, policymakers and health promotion strategists can now work together to achieve the same aim, which is to ensure proper T2DM management. With the information provided from this thesis, they can develop effective T2DM management programs by using the barriers and facilitators to guide them. An example can be to implement group support programmes for T2DM patients, including healthcare professionals and family and carers. Here they will be able to freely talk about the pros and cons of their T2DM and be given advice on ways to deal with the issues they may be facing or even physical help if needed. The Government should consider developing educational programmes for patients, family and carers and healthcare professionals. These educational programmes should address all the disparities identified in this research and ways to overcome them. The educational programmes should also consist of essential information on the disease, for example, what is T2DM, the best ways to manage T2DM (lifestyle measures and medicines) and the complications associated with T2DM. On an environmental level, the Government can raise awareness of health-promoting infrastructures. They can encourage T2DM patients to use parks (some may include weight machines) as well as raise awareness of the designated safe areas

for exercising. Policymakers and health promotion strategists can use the evidence to develop public health policies and health promotion strategies targeting good T2DM management. One study emphasised that successful T2DM management requires a focus on public policies to strengthen healthcare access and resources.(76) Public policies will ensure that all the resources needed to ensure that patients receive the appropriate care are available and accessible, e.g. hospital visits (check-ups), medicines and qualified nutritionists. The health promotion strategy should focus on healthy lifestyle activities. This may include discounts on healthy foods or implementing 5-a-day similar to the United Kingdom. It may also include the development of community exercising groups or sports groups, e.g. netball or football.

As the current Caribbean T2DM management guideline was of poor quality, further research should be conducted to provide more recent evidence to assist in updating it. This should be the same for guidelines from Australia, IDF, IDF global, New Zealand, United States and United States and Europe. After the guidelines have been updated, future researchers should also assess the quality again using the AGEE II tool. The results can then be compared to the results of this study, and changes which highlights improvements or lack thereof can be identified. Once the issues raised from this study are addressed, the guidelines should be of good quality and ready to be used by healthcare professionals, T2DM patients, family, and carers. From this thesis and previous research, it has been deducted that poor quality guidelines can ultimately lead to poor health outcomes of T2DM patients. Therefore, future researchers can also determine if there is a significant association between the quality of the Caribbean T2DM guideline and the poor health outcomes of T2DM patients in the Caribbean region, including both healthcare professionals and T2DM patients as the study population. The results may intensify the findings from this research as well as bring more urgency to the T2DM epidemic in the Caribbean. It is recommended that further qualitative studies on barriers and facilitators to T2DM management in the Caribbean should be conducted as the certainty of some findings were low. Also, qualitative studies should be conducted to identify the barriers and facilitators of T2DM management faced by healthcare professionals and family/carers as no studies which explored their views were identified.

4.5. Dissemination of the results to the target population

It is important that the results from this research are used to inform its target population by using the most appropriate means. A persuasive communication matrix and knowledge translation were used to guide the dissemination of the results of this research.[181] Persuasive communication is described as "*Who says what in which channel to whom with what effect*". Wilson also focused on McGuire's five key attributes: persuasive communication, source, channel, message, audience and setting. Researchers commonly use this to promote and translate the findings of their studies.[182,183]

The appraisal compared the content and quality of ten T2DM management guidelines, including the Caribbean guideline. The results and recommendations from this study should and would be received mainly by the ten countries included in the research, as well as government and health organisations

that focus on T2DM management guidelines. The target audience includes clinical guideline development group (public health experts (including policymakers), ministries of health, healthcare practitioners), T2DM patients and diabetes organisations. The channels used to distribute the results will include electronic communication channels (journal publications, emails and social media), written communication (letters), and personal communication (presentations).[183,184]

The results and recommendations from the systematic review, which highlighted the barriers and facilitators to T2DM management in the Caribbean, would be available to the Caribbean countries, their respective Governments and any other country or organisation that require it. The target audience includes T2DM patients, family/carers, healthcare practitioners, public health experts (including policymakers), Government (including Ministries of Health), and diabetes organisations. The channels used to distribute the results will include electronic communication channels (journal publications, emails and social media), written communication (letters), and personal communication (presentations). To ensure the implementation of recommendations/ targeted activities, the involved parties should ensure that various tasks are completed. They should assess the country's politics to ensure that all interests align and that support would be given to the specific activities. Secondly, they should ensure it is well organised and funded so that resources required by various projects will be available. Lastly, there should be promotional activities to raise awareness throughout the country. Once the recommendations (including various policies and programs) have been implemented, they should be evaluated, and feedback should be given on their impact thus far.[182,185]

4.6. Conclusion

It can be concluded that over the years, T2DM continues to have a profound negative impact on the people in the Caribbean region. T2DM is one of the most significant public health challenges in the Caribbean region in this twenty-first century. Thus far, there is very minimal research available to assist the Caribbean region in tackling the T2DM epidemic. This research highlighted some of the disparities affecting T2DM management in the Caribbean, such as poor quality T2DM management guideline and patient-perceived barriers.

The Caribbean clinical guideline for managing T2DM was found to contain a high level of content regarding relevant topics but was of insufficient quality to be used in clinical practice. Therefore, SIGN T2DM management guideline should be adapted (make changes to ensure applicability in the Caribbean Islands based on the evidence provided from this study) and used for the clinical management of T2DM within the Caribbean. The SIGN guideline was identified within this study as high-quality, which scored over 90% in all domains. As a result, it is the most reliable resource and maybe be easier to adapt. Patients in the Caribbean have multiple barriers and facilitators which limit and promote proper management of their T2DM. Further qualitative studies on barriers and facilitators to T2DM management in the Caribbean which target healthcare professionals and families/carers must be conducted.

Identifying the barriers and facilitators to T2DM management in the Caribbean and the quality of the Caribbean T2DM management guideline will assist policymakers, patients, healthcare professionals, carers, family and friends to develop effective T2DM management programs to ensure the appropriate T2DM management. In addition to the originality of the work presented in this thesis, the knowledge gaps addressed can be used to make a significant impact on T2DM management in the Caribbean and make a momentous contribution to the literature.

References

1. International Diabetes Federation (IDF). IDF - Facts and figures. IDF. 2019 [cited 2020 Feb 16]. Available from: https://www.idf.org/aboutdiabetes/what-is-diabetes/facts-figures.html
2. National Institute for Health and Care Excellence (NICE). Type 2 diabetes prevention: population and community-level interventions. NICE. 2011 [cited 2017 Dec 9]; Available from: https://www.nice.org.uk/guidance/ph35/chapter/2-public-health-need-and-practice
3. IDF - What is diabetes. IDF. 2020 [cited 2020 Sep 17]. Available from: https://www.idf.org/aboutdiabetes/what-is-diabetes.html
4. World Health Organization (WHO). Diabetes. Geneva. 2018 [cited 2020 Jan 22]. Available from: https://www.who.int/news-room/fact-sheets/detail/diabetes
5. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and Centers for Disease Control and Prevention. Diabetes: What is diabetes?. NIDDK. 2016 [cited 2020 Jan 22]. Available from: http://www.niddk.nih.gov/
6. Cosentino F, Grant P, Aboyans V, Bailey CJ, Ceriello A, Delgado V, et al. 2019 European Society of Cardiology (ESC) Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the European Association for the Study of Diabetes (EASD). Eur Heart J. 2020. 41:255-323.
7. NIDDK. Type 1 diabetes. NIDDK. 2017 [cited 2020 Jan 22]. Available from: https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/type-1-diabetes
8. NIDDK. Gestational diabetes. NIDDK. 2017 [cited 2020 Jan 22]. Available from: https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes/gestational
9. Wills J. Promoting health (Vital notes for nurses). John Wiley & Sons, editor. New York: Blackwell Pub. 2011. 78–80.
10. WHO. Diabetes: overview. Geneva. 2017 [cited 2019 Jan 11]. Available from: https://www.who.int/en/news-room/fact-sheets/detail/diabetes
11. IDF. Type 2 diabetes. 2020 [cited 2020 Sep 7]. Available from: https://www.idf.org/aboutdiabetes/type-2-diabetes.html
12. National Health Service (NHS). Type 2 diabetes - symptoms. NHS. 2020 [cited 2020 Jul 24]. Available from: https://www.nhs.uk/conditions/type-2-diabetes/symptoms/#symptoms
13. IDF. IDF Clinical Practice Recommendations for managing type 2 diabetes in primary care. IDF. 2017.132:4-32.
14. WHO. Diabetes: diagnosis and treatment (WHO). Geneva. 2017 [cited 2019 Jun 9]. Available from: https://www.who.int/en/news-room/fact-sheets/detail/diabetes
15. WHO and IDF. Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: report of a WHO/IDF consultation. Geneva. 2006.
16. Edelman S, Henry R. Diagnosis and management of type 2 diabetes. Professional Communications, Inc; 2011. 33-38.
17. Harding A, Griffin S, Wareham N. Population impact of strategies for identifying groups at high

risk of type 2 diabetes. Prev Med (Baltim). 2006. 42(5):364–8.
18. Fodor G. Primary Prevention of CVD: Treating dyslipidemia - clinical evidence handbook - American Family Physician. Am Fam Physician. 2011 [cited 2020 Feb 3]. Available from: https://www.aafp.org/afp/2011/0515/p1207.html
19. American Diabetes Association(ADA). Diabetes Overview - symptoms, causes, treatment. ADA. 2020 [cited 2020 Jan 22]. Available from: https://www.diabetes.org/diabetes
20. IDF. Worldwide toll of diabetes. IDF. 2019 [cited 2020 Sep 25]. Available from: https://www.diabetesatlas.org/en/sections/worldwide-toll-of-diabetes.html
21. Zheng Y, Ley S, Hu F. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. Nature Reviews Endocrinology. Nature Publishing Group. 2018. 14(2):88–98.
22. IDF. Demographic and geographic outline. IDF. 2019 [cited 2020 Sep 28]. Available from: https://www.diabetesatlas.org/en/sections/demographic-and-geographic-outline.html
23. WHO. The mysteries of type 2 diabetes in developing countries. Bull World Health Organ. Geneva. 2016. 94(4):241–2.
24. Akhtar S, Nasir J, Abbas T, Sarwar A. Diabetes in Pakistan: A systematic review and meta-analysis. Pakistan Journal of Medical Sciences. Professional Medical Publications. 2019. 35(4):73–8. Available from: /pmc/articles/PMC6659044/?report=abstract
25. WHO. Diabetes. Geneva. 2020 [cited 2020 Sep 26]. Available from: https://www.who.int/news-room/fact-sheets/detail/diabetes
26. Piemonte L. IDF - Facts and figures. IDF. 2018 [cited 2019 Jan 11]. Available from: https://idf.org/52-about-diabetes.html
27. NICE. Type 2 diabetes | Treatment summary. NICE. 2018 [cited 2020 Feb 3]. Available from: https://bnf.nice.org.uk/treatment-summary/type-2-diabetes.html
28. Cade W. Diabetes-related microvascular and macrovascular diseases in the physical therapy Setting. Phys Ther. 2008. 88(11):1322–35.
29. IDF. IDF North America and Caribbean members. IDF. 2018 [cited 2020 Feb 3]. Available from: https://www.idf.org/our-network/regions-members/north-america-and-caribbean/members/62-grenada.html
30. Chaplin S. NICE guidance on managing type 2 diabetes in adults. NICE. 2016 [cited 2019 Jun 9]. Available from: https://yellowcard.
31. National Collaborating Centre for Chronic Conditions. Type 2 diabetes: national clinical guideline for management in primary and secondary care (update). Royal College of Physicians. 2008 [cited 2018 Apr 8]; Available from: www.rcplondon.ac.uk
32. Olokoba A, Obateru O, Olokoba L. Type 2 diabetes mellitus: a review of current trends. Oman Med J. 2012. 27(4):269–73. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23071876
33. IDF. IDF - Facts and figures. IDF. 2020 [cited 2020 Sep 7]. Available from: https://www.idf.org/aboutdiabetes/what-is-diabetes/facts-figures.html
34. IDF. Individual, social and economic impact. IDF. 2019 [cited 2020 Sep 28]. Available from: https://www.diabetesatlas.org/en/sections/individual-social-and-economic-impact.html
35. ADA. The cost of diabetes. ADA 2020 [cited 2020 Sep 29]. Available from:

https://www.diabetes.org/resources/statistics/cost-diabetes
36. Barcelo A, Arredondo A, Gordillo-Tobar A, Segovia J, Qiang A. The cost of diabetes in Latin America and the Caribbean in 2015: Evidence for decision and policy makers. J Glob Health. 2017. 7(2).
37. Yisahak S, Beagley J, Hambleton I, Venkat Narayan K, Hubert Professor of Global Health O. IDF diabetes atlas- diabetes in North America and The Caribbean: An update. Diabetes Research and Clinical Practice, IDF. 2014 [cited 2020 Apr 13]; Available from: http://dx.doi.org/10.1016/j.diabres.2013.11.009
38. Seuring T, Archangelidi O, Suhrcke M. The economic costs of type 2 diabetes: A global systematic review. PharmacoEconomics. Springer International Publishing. 2015. 33(8):811–31.
39. Ettaro L, Songer TJ, Zhang P, Engelgau M. Cost-of-illness studies in diabetes mellitus. PharmacoEconomics. Springer International Publishing. 2004. 22(3):149–64.
40. Feng X, Astell-Burt T. Impact of a type 2 diabetes diagnosis on mental health, quality of life, and social contacts: A longitudinal study. BMJ Open Diabetes Res Care. 2017. 5(1):1-5.
41. Hill J, Nielsen M, Fox M. Understanding the social factors that contribute to diabetes: a means to informing health care and social policies for the chronically ill. Perm J. 2013. 17(2):67–72.
42. Howells L, Musaddaq B, McKay A, Majeed A. Clinical impact of lifestyle interventions for the prevention of diabetes: An overview of systematic reviews. BMJ Open. 2016. 6(12).
43. NHS. Metformin: medicine to treat type 2 diabetes. NHS. 2019 [cited 2020 Feb 3]. Available from: https://www.nhs.uk/medicines/metformin/
44. IDF. IDF - Prevention. IDF. 2019 [cited 2020 Sep 7]. Available from: https://www.idf.org/aboutdiabetes/prevention.html
45. IDF Clinical Guidelines Task Force. Global guideline for type 2 diabetes: recommendations for standard, comprehensive, and minimal care. Diabet Med. 2006. 23(6):579–93.
46. IDF. Global guideline for type 2 diabetes. Sydney, Australia: IDF. 2012.
47. NICE. Type 2 diabetes in adults: management. England; 2015.
48. ADA. Diabetes care: Standards of medical care in diabetes-2018. IDF 2018. 41.
49. Renders C, Valk G, Griffin S, Wagner E, Van Eijk J, Assendelft W. Interventions to improve the management of diabetes in primary care, outpatient, and community settings: A systematic review. Diabetes Care. 2001. 24(10):1821–33.
50. Marín-Peñalver JJ, Martín-Timón I, Sevillano-Collantes C, Cañizo-Gómez FJ del. Update on the treatment of type 2 diabetes mellitus. World J Diabetes. 2016. 7(17):354.
51. Sumamo E, Ha C, Korownyk C, Vandermeer B. Lifestyle Interventions for Four Conditions: Type 2 Diabetes, Metabolic Syndrome, Breast Cancer, and Prostate Cancer. Agency Healthc Res Qual. 2011; 2-3 [cited 2020 Feb 3]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/25473696
52. Salvo F, Moore N, Arnaudl M, Robinson P, Raschi E, De Ponti F, et al. Addition of dipeptidyl peptidase-4 inhibitors to sulphonylureas and risk of hypoglycaemia: Systematic review and meta-analysis. BMJ. 2016. 3:353.

53. Wilding JPH, Hardy K. Glucagon-like peptide-1 analogues for type 2 diabetes. BMJ. 2011. 342(7794):433–5.
54. Sola D, Rossi L, Schianca G, Maffioli P, Bigliocca M, Mella R, et al. Sulfonylureas and their use in clinical practice. Archives of Medical Science. Termedia Publishing House Ltd. 2015. 11(4):840–8.
55. NICE. Insulin | Treatment summary. NICE. 2018 [cited 2020 Feb 3]. Available from: https://bnf.nice.org.uk/treatment-summary/insulin-2.html
56. Chen L, Magliano D, Zimmet P. The worldwide epidemiology of type 2 diabetes mellitus - Present and future perspectives. Nature Reviews Endocrinology. 2012. 8(4):228–36.
57. Chang T, Jiang Y Der, Chang C, Chung C, Yu N, Chuang L. Accountability, utilization and providers for diabetes management in Taiwan, 2000-2009: An analysis of the National Health Insurance database. J Formos Med Assoc. 2012. 111(11):605–16.
58. Khunti K, Davies M. Glycaemic goals in patients with type 2 diabetes: current status, challenges and recent advances. Diabetes, Obes Metab. 2010. 12(6):474–84.
59. NHS. Type 2 diabetes - Going for regular check-ups. NHS. 2017 [cited 2020 Feb 3]. Available from: https://www.nhs.uk/conditions/type-2-diabetes/going-regular-check-ups/
60. Bennett N, Francis D, Ferguson T, Hennis A, Wilks R, Harris E, et al. Disparities in diabetes mellitus among Caribbean populations: A scoping review. Bennett NR Ferguson TS, Francis DK, Hambleton IR, Harris EN, Hassell C, Hennis AJ, MacLeish MY, Sullivan LW, Wilks RJ, Williams L, Younger-Coleman NO BA, editor. Int J Equity Health. 2015. 14(1):23.
61. Ferguson T, Tulloch-Reid M, Wilks R. The epidemiology of diabetes mellitus in Jamaica and the Caribbean: a historical review. West Indian Med J. 2010. 59(3):259–64.
62. Boyne MS. Diabetes in the Caribbean: Trouble in paradise. Insulin. 2009. 4(2):94–105.
63. Gulliford M, Mahabir D. Diabetic foot disease and foot care in a Caribbean community. Diabetes Res Clin Pract. 2002. 56(1):35–40.
64. Leske M, Wu S-Y, Hennis A, Nemesure B, Schachat A, Hyman L, et al. Nine-year incidence of diabetic retinopathy in the Barbados eye studies. Arch Ophthalmol. 2006. 124(2):250.
65. Leske M, Wu S-Y, Hennis A, Nemesure B, Hyman L, Schachat A, et al. Incidence of diabetic retinopathy in the Barbados eye studies. Ophthalmology. 2003. 110(5):941–7.
66. Hennis A, Fraser H, Jonnalagadda R, Fuller J, Chaturvedi N. Explanations for the high risk of diabetes-related amputation in a Caribbean population of black African descent and potential for prevention. Diabetes Care. 2004. 27(11):2636–41. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15504998
67. Narres M, Kvitkina T, Claessen H, Droste S, Schuster B, Morbach S, et al. Incidence of lower extremity amputations in the diabetic compared with the non-diabetic population: A systematic review. Grabowski A, editor. PLoS One. 2017. 12(8):e0182081. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28846690
68. Wilks R, Sargeant L, Gulliford M, Reid M, Forrester T, Thomas S. Management of diabetes mellitus in three settings in Jamaica. Rev Panam Salud Pública/ Pan Am J Public Heal. 2001. 9(2):65–72.

69. Frame T. National chronic non-communicable disease policy and multisectoral action plan for grenada (2013-2017). Pan American Health Organisation (PAHO). 2013 [cited 2019 Jan 11]. Available from: http://www.iccp-portal.org/system/files/plans/GRD_B3_CNCD Policy and Multisectoral Action Plan_Grenada_FINAL August 21 2013 %281%29 %281%29.pdf
70. Gulliford M, Mahabir D. Diabetic foot disease and foot care in a Caribbean community. Diabetes Res Clin Pract. 2002. 56(1):35–40.
71. Gulliford M, Alert C, Mahabir D, AriyanayagamBaksh S, Fraser H, Picou D. Diabetes care in middle-income countries: A Caribbean case study. Diabet Med. 1996. 13(6):574–81. Available from: http://www.ncbi.nlm.nih.gov/pubmed/8799663
72. Adams O, Carter A. Diabetes and hypertension guidelines and the primary health care practitioner in Barbados: knowledge, attitudes, practices and barriers-a focus group study. BMC Fam Pract. 2010. 11(1):1-9. Available from: https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-11-96
73. PAHO and Caribbean Health Research Council (CHRC). Managing diabetes in primary care in the Caribbean. Washington, DC. 2006 [cited 2019 Jan 11]. Available from: https://extranet.who.int/ncdccs/Data/ATG_D1_Diabetes Guidelines.pdf
74. Nam S, Chesla C, Stotts N, Kroon L, Janson S. Barriers to diabetes management: patient and provider factors. Diabetes Res Clin Pract. 2011. 93(1):1–9.
75. Bregu A, Toçi E, Muja H, Çanaku D, Roshi E. Diabetes management: A literature review. Albanian Medical Journal. 2012. 4:86-90
76. Blasco-Blasco M, Puig-García M, Piay N, Lumbreras B, Hernández-Aguado I, Parker LA. Barriers and facilitators to successful management of type 2 diabetes mellitus in Latin America and the Caribbean: A systematic review. Ugarte-Gil C, editor. PLoS One. 2020: 15(9):1-19.
77. Corey E. Reproductive Health and Research World Health Organization Geneva, Switzerland Training Course in Sexual and Reproductive Health Research Geneva Workshop. 2011.
78. Ridde V, Pérez D, Robert E. Using implementation science theories and frameworks in global health. BMJ Glob Heal. 2020 Apr 16 [cited 2021 Mar 19];5(4):2269.
79. Goldstein A, Venker E, Weng C. Evidence appraisal: A scoping review, conceptual framework, and research agenda [Internet]. Vol. 24, Journal of the American Medical Informatics Association. Oxford University Press; 2017 [cited 2021 Mar 19]. p. 1192–203. Available from: /pmc/articles/PMC6259661/
80. Lawton R, Heyhoe J, Louch G, Ingleson E, Glidewell L, Willis TA, et al. Using the Theoretical Domains Framework (TDF) to understand adherence to multiple evidence-based indicators in primary care: a qualitative study. Implement Sci. 2016;
81. Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. Implement Sci [Internet]. 2017 Jun 21 [cited 2021 Apr 19];12(1):77. Available from: http://implementationscience.biomedcentral.com/articles/10.1186/s13012-017-0605-9
82. Wills J. Promoting health. John Wiley & Sons, editor. New York: Blackwell Pub. 2007. 196.
83. WHO. WHO: Primary Health Care (PHC). WHO. 2019 [cited 2019 Feb 22]; Available from:

https://www.who.int/primary-health/en/

84. NICE. Promoting health and preventing premature mortality in black, Asians, and other minority ethnic groups. NICE, 2018 [cited 2020 May 25]; Available from: https://www.nice.org.uk/guidance/qs167/chapter/Quality-statement-3-Referring-people-at-high-risk-of-type-2-diabetes
85. Hayward R, Wilson M, Tunis S, Bass E, Guyatt G. Users' guides to the medical literature. JAMA. 1995. 274(7):570.
86. Woolf S, Grol R, Hutchinson A, Eccles M, Grimshaw J. Clinical guidelines: potential benefits, limitations, and harms of clinical guidelines. BMJ. 1999. 318(7182):527–30.
87. Holmer H, Ogden L, Burda B, Norris L. Quality of clinical practice guidelines for glycemic control in type 2 diabetes mellitus. Pereira RI, editor. PLoS One. 2013. 8(4):e58625.
88. NICE. Developing NICE guidelines: the manual [Internet]. NICE. 2014
89. Gulliford M. Controlling non-insulin-dependent diabetes mellitus in developing countries. Int J Epidemiol. 1995. 24(suppl. 1):S53-9.
90. Graham ID, Harrison MB. Evaluation and adaptation of clinical practice guidelines. Evid Based Nurs. 2005. 8(3):68–72.
91. Nguyen C, Chernew M, Ostrer I, Beaulieu N. Comparison of healthcare delivery systems in Low- and High-Income communities. Am J Accountable Care. 2019 Dec [cited 2021 Mar 19];7(4):11–8. Available from: https://www.researchgate.net/publication/339106851_Comparison_of_Healthcare_Delivery_Systems_in_Low-_and_High-Income_Communities
92. Davies M, D'Alessio D, Fradkin J, Kernan W, Mathieu C, Mingrone G, et al. Management of hyperglycaemia in type 2 diabetes, 2018. A consensus report by the ADA and the EASD. Diabetologia. 2018;61(12):2461–98.
93. The Royal Australian College of General Practitioners. General practice management of type 2 diabetes:2016-18. East Melbourne; 2016 [cited 2019 Nov 17]. Available from: www.racgp.org.au
94. Diabetes Canada Clinical Practice Guidelines Expert Committee. Clinical practice guidelines for the prevention and management of diabetes in Canada. Vol 42. 2018 [cited 2019 Nov 17]. Available from: http://guidelines.diabetes.ca/docs/CPG-2018-full-EN.pdf
95. New Zealand Guidelines Group. Guidance on the management of type 2 diabetes. Wellington; 2011 [cited 2019 Nov 17]. Available from: www.nzgg.org.nz.
96. American Diabetes Association. Standards of medical care in diabetes—2020. ADA. 2019.
97. Scottish Intercollegiate Guidelines Network(SIGN). SIGN 154 • Pharmacological management of glycaemic control in people with type 2 diabetes. 2017 [cited 2019 Jun 21]. Available from: www.nice.org.uk/
98. SIGN. Management of diabetes: A national clinical guideline. SIGN Guidelines 116. 2013. Available from: www.sign.ac.uk/assets/%0Ahttp://www.sign.ac.uk/pdf/sign116.pdf
99. Brouwers M, Hanna S. Appraisal of Guideline for Research and Evaluation AGREE II Instrument. 2017 [cited 2019 Jan 17]. Available from: www.agreetrust.org

100. Sun M, Zhang M, Shen J, Yan J, Zhou B. Critical appraisal of international guidelines for the management of diabetic neuropathy: Is there global agreement in the internet era? Int J Endocrinol. 2015. 1-11.
101. Bhatt M, Nahari A, Wang P-W, Kearsley E, Falzone N, Chen S, et al. The quality of clinical practice guidelines for management of pediatric type 2 diabetes mellitus: A systematic review using the AGREE II instrument. 2018 [cited 2019 Jan 17]. Available from: https://doi.org/10.1186/s13643-018-0843-1
102. Rosenfeld R, Shiffman R. Clinical practice guideline development manual: a quality-driven approach for translating evidence into action. Otolaryngol Head Neck Surg. 2009. 140(6 Suppl 1):S1-43.
103. Radwan M, Akbari Sari A, Rashidian A, Takian A, Abou-Dagga S, Elsous A. Appraising the methodological quality of the clinical practice guideline for diabetes mellitus using the AGREE II instrument: a methodological evaluation. JRSM Open. 2017: 8(2):1–8.
104. Burgers J, Cluzeau F, Hanna S, Hunt C, Grol R. Characteristics of high-quality guidelines. Int J Technol Assess Health Care. 2003. 19(1):148–57.
105. Graham R, Mancher M, Wolman D, Greenfield S, Steinberg E. Clinical Practice Guidelines We Can Trust. 2011 [cited 2020 Jun 9]. Available from: http://www.nap.edu/catalog.php?record_id=13058
106. Rauh S, Arnold D, Braga S, Curca R, Eckert R, Fröbe A, et al. Challenge of implementing clinical practice guidelines. Getting ESMO's guidelines even closer to the bedside: Introducing the ESMO Practising Oncologists' checklists and knowledge and practice questions. ESMO Open. BMJ Publishing Group; 2018. 3:e000385.
107. Joosen M, Van Beurden K, Terluin B, Van Weeghel J, Brouwers E, Van Der Klink J, et al. Improving occupational physicians' adherence to a practice guideline: feasibility and impact of a tailored implementation strategy. BMC Med Educ. 2011 [cited 2019 Jan 11]; Available from: http://www.rug.nl/research/portal.
108. The World Bank. Caribbean Overview. 2019 [cited 2020 May 25]. Available from: https://www.worldbank.org/en/country/caribbean/overview
109. Macinko J, Guanais FC, Mullachery P, Jimenez G. Gaps in primary care and health system performance in six latin American and Caribbean countries. Health Aff. 2016. 35(8):1513–21.
110. Brissett N. Education for Social Transformation (EST) in the Caribbean: A postcolonial perspective. Educ Sci. 2018. 8(4):197.
111. Salarvand S, Hemati S, Adibi P, Taleghani F, Saleki M. An innovative approach to clinical practice guideline adaptation in the nursing profession in a developing country. Cancer Manag Res. 2020 Mar 25 [cited 2021 Apr 13];Volume 12:2255–64. Available from: https://www.dovepress.com/an-innovative-approach-to-clinical-practice-guideline-adaptation-in-th-peer-reviewed-article-CMAR
112. Fervers B, Burgers JS, Haugh M, Latreille J, Mlika-Cabanne N, Paquet L, et al. Adaptation of clinical guidelines: Literature review and proposition for a framework and procedure. Vol. 18, International Journal for Quality in Health Care. Oxford University Press;

2006 [cited 2021 Apr 15]. p. 167–76. Available from: https://pubmed.ncbi.nlm.nih.gov/16766601/

113. McCaul M, Ernstzen D, Temmingh H, Draper B, Galloway M, Kredo T. Clinical practice guideline adaptation methods in resource-constrained settings: Four case studies from South Africa. BMJ Evidence-Based Med. 2020 Dec 1 [cited 2021 Apr 13];25(6):193–8. Available from: http://ebm.bmj.com/
114. Barcelo A, Jawed M, Qiang A, Cezário Alves Júnior A, Arjona D, Bello Y, et al. A review of the quality of current diabetes clinical practice guidelines [Internet]. Rev Panam Salud Publica. 2017. 41:e90. [cited 2019 Jan 17]. Available from: http://iris.paho.org/xmlui/bitstream/handle/123456789/34070/V41a902017.pdf?sequence=1
115. AGREE Collaboration. Development and validation of an international appraisal instrument for assessing the quality of clinical practice guidelines: the AGREE project. Qual Saf Health Care. 2003. 12(1):18–23.
116. Chan M. World Health Day 2016: Let's beat diabetes. WHO. 2016 [cited 2018 Jan 31]; Available from: https://www.who.int/mediacentre/commentaries/diabetes/en/
117. Von Goeler D, Rosal M, Ockene J , Scavron J, De Torrijos F. Self-management of type 2 diabetes: a survey of low-income urban Puerto Ricans. Diabetes Educ. 2003. 29(4):663–72.
118. Roopnarinesingh N, Brennan N, Khan C, Ladenson P, Hill-Briggs F, Kalyani R. Barriers to optimal diabetes care in Trinidad and Tobago: a health care professionals' perspective. BMC Health Serv Res. 2015. 15(1):396.
119. Adams O, Carter A. Knowledge, attitudes, practices, and barriers reported by patients receiving diabetes and hypertension primary health care in Barbados: a focus group study. BMC Fam Pract. 2011. 12(1):135.
120. Taylor C. Taylor G, Atherley A, Hambleton I, Unwin N, Adams O. The Barbados Insulin Matters (BIM) study: Barriers to insulin therapy among a population-based sample of people with type 2 diabetes in the Caribbean island of Barbados. J Clin Transl Endocrinol. 2017. 8:49–53.
121. Nunez M, Yarandi H, Nunez-Smith M. Self-management among patients living with diabetes in the United States Virgin Islands. J Health Care Poor Underserved. 2011. 22(1):271–83.
122. Wint Y, Duff E, McFarlane-Anderson N, O'Connor A, Bailey E, Wright-Pascoe R. Knowledge, motivation and barriers to diabetes control in adults in Jamaica. West Indian Med J.. 2006. 55(5):330–3.
123. Bosun-Arije F, Ling J, Graham Y, Hayes C. A systematic review of factors influencing Type 2 Diabetes Mellitus management in Nigerian public hospitals. Int J Africa Nurs Sci. 2019 Jan.11:100151. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2214139119300174
124. Rushforth B, McCrorie C, Glidewell L, Midgley E, Foy R. Barriers to effective management of type 2 diabetes in primary care: qualitative systematic review. Br J Gen Pract. 2016 66(643):e114–27.
125. Central Intelligence Agency (CIA). The World Factbook. CIA. 2018 [cited 2018 Jan 6]. Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html

126. Seers K. Qualitative systematic reviews: Their importance for our understanding of research relevant to pain. Br J Pain [Internet]. 2015 Feb 1 [cited 2021 Apr 13];9(1):36–40. Available from: /pmc/articles/PMC4616987/
127. Lockwood C, Munn Z, Porritt K. Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. Int J Evid Based Healthc [Internet]. 2015 Sep [cited 2019 Jun 9];13(3):179–87. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26262565
128. Moher D, Liberati A, Tetzlaff J, Altman D, Group T. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med. 2009. 9;6(7):e1000097.
129. Lockwood C, Porrit K, Munn Z, Rittenmeyer L, Salmond S, Bjerrum M, et al. Chapter 2: Systematic reviews of qualitative evidence. Joanna Briggs Institute Reviewer's Manual. In: Aromataris, E, Munn Z, editor. Joanna Briggs Institute Reviewer's Manual: The Joanna Briggs Institute (JBI). 2017 [cited 2018 Apr 6]. Available from: https://reviewersmanual.joannabriggs.org/
130. Nixon A, Leonardi-Bee J, Chattopadhyay K. Barriers and facilitators to type 2 diabetes management in the Caribbean region. JBI Database Syst Rev Implement Reports. 2019. 17(3):267–72.
131. Dixon-Woods M, Booth A, Sutton A. Synthesizing qualitative research: a review of published reports. Qual Res. 2007. 7(3):375–422.
132. Hannes K, Petry K, Heyvaert M. The meta-aggregative approach to qualitative evidence synthesis: a worked example on experiences of pupils with special educational needs in inclusive education. Int J Res Method Educ. 2018 May 27;41(3):291–305.
133. Munn Z, Dias M, Tufanaru C, Porritt K, Stern C, Jordan Z, et al. Adherence of meta-aggregative systematic reviews to reporting standards and methodological guidance: a methodological review protocol | Article | NursingCenter. JBI Evid Synth. 2019. 17(4):444–50. Available from: https://www.nursingcenter.com/journalarticle?Article_ID=4966873&Journal_ID=3425880&Issue_ID=4966867
134. Tufanaru C. Theoretical foundations of meta-aggregation: Insights from Husserlian Phenomenology and American Pragmatism. The Joanna Briggs Institute and The University ofAdelaide; 2015.
135. Munn Z, Porritt K, Lockwood C, Aromataris E, Pearson A. Establishing confidence in the output of qualitative research synthesis: the ConQual approach. BMC Med Res Methodol. 2014. 14(1):3–6.
136. Davila N. Physical activity in Puerto Rican adults with type 2 diabetes mellitus. University of Arizona. 2010. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=109853337&site=ehost-live
137. Moss M, McDowell J. Rural Vincentians' (Caribbean) beliefs about the usage of non-prescribable medicines for treating type 2 diabetes. Diabet Med. 2005. 22(11):1492–6.
138. Morrissey-Ross M. Living with diabetes: Experiences from Jamaican diabetes clinics in Kingston and Morant Bay. Diss Abstr Int Sect B Sci Eng. 2017. 78(3).

139. Wallace D, Gonzalez Rodriguez H, Walker E, Dethlefs H, Dowd R, Filipi L, et al. Types and sources of social support among adults living with type 2 diabetes in rural communities in the Dominican Republic. Glob Public Health. 2019. 14(1):135–46.
140. Gonzalez Rodriguez H, Wallace DD, Barrington C. Contextualizing experiences of diabetes-related stress in rural Dominican Republic. Adam Anderson, Aponte, Aschner, Aviles-Santa, Barnard, Barnidge, Barrington, Bello-Chavolla, Boden, Budd, Colberg, Cox, Dudas, Due-Christensen, Ekong, El-Sayed, Famuyiwa, Fisher, Frost, Garrett, Gibbs, Govender, Hill-Briggs, Jones, Karlsen, Koetsenruijte A, editor. Qual Health Res. 2019. 29(6):857–67.
141. Sadeghzadeh C, Wallace D, Gonzalez Rodriguez H, Barrington C. Coping with diabetes stress among adults in rural Dominican Republic: "I don't think about it." Chronic Illn. 2019. Available from: http://chi.sagepub.com/archive/
142. Colberg S, Sigal RJ, Fernhall B, Regensteiner J, Blissmer B, Rubin R, et al. Exercise and type 2 diabetes: the American College of Sports Medicine and the American Diabetes Association: joint position statement. Diabetes Care. 2010. 33(12):e147-67.
143. Advika T, Idiculla J, Kumari S. Exercise in patients with type 2 diabetes: Facilitators and barriers - A qualitative study. J Fam Med Prim Care. 2017. 6(2):288.
144. Lawton J, Ahmad N, Hanna L, Douglas M, Hallowell N. 'I can't do any serious exercise': barriers to physical activity amongst people of Pakistani and Indian origin with type 2 diabetes. Health Educ Res. 2006. 21(1):43–54.
145. Sohal T, Sohal P, King-Shier K, Khan N. Barriers and facilitators for type-2 diabetes management in South Asians: A systematic review. Barengo NC, editor. PLoS One. 2015 10(9):e0136202.
146. Netto G, McCloughan L, Bhatnagar A. Effective heart disease prevention: Lessons from a qualitative study of user perspectives in Bangladeshi, Indian and Pakistani communities. Public Health. 2007. 121(3):177–86.
147. Oakes A, Garmo V, Bone L, Longo D, Segal B, Bridges J. Identifying and prioritizing the barriers and facilitators to the self-management of type 2 diabetes mellitus: A community-centered approach. Patient - Patient-Centered Outcomes Res. 2017. 10(6):773–83.
148. Singh H, Cinnirella M, Bradley C. Support systems for and barriers to diabetes management in South Asians and Whites in the UK: Qualitative study of patients' perspectives. BMJ Open. 2012. 2(6):e001459.
149. Lipton R, Losey L, Giachello A, Mendez J, Girotti M. Attitudes and issues in treating Latino patients with type 2 diabetes: views of healthcare providers. Diabetes Educ. 1998. 24(1):67–71.
150. Caban A, Walker E. A Systematic review of research on culturally relevant issues for Hispanics with diabetes. Diabetes Educ. 2006. 32(4):584–95.
151. Bhattacharya G. Psychosocial impacts of type 2 diabetes self-management in a rural African-American population. J Immigr Minor Heal. 2012. 14(6):1071–81.
152. Byers D, Garth K, Manley D, Orr Chlebowy D. Facilitators and barriers to type 2 diabetes self-management among rural African American adults. Journal of Health Disparities Research and

Practice. 2016. Vol. 9, [cited 2019 Aug 20]. Available from: http://digitalscholarship.unlv.edu/jhdrp/

153. Beverly E, Wray L. The role of collective efficacy in exercise adherence: a qualitative study of spousal support and type 2 diabetes management. Health Educ Res 2010. 25(2):211–23.
154. Orr Chlebowy D, Hood S, LaJoie A. Facilitators and barriers to self-management of type 2 diabetes among urban African American adults. Diabetes Educ. 2010. 36(6):897–905.
155. Tang T, Brown M, Funnell M, Anderson R. Social support, quality of life, and self-care behaviours among African Americans with type 2 diabetes. Diabetes Educ. 2008. 34(2):266–76.
156. Utz S, Steeves R, Wenzel J, Hinton I, Jones R, Andrews D, et al. "Working hard with it": Self-management of type 2 diabetes by rural African Americans. Fam Community Health. 2006. 29(3):195–205.
157. Laranjo L, Neves A, Costa A, Ribeiro R, Couto L, Sá A. Facilitators, barriers and expectations in the self-management of type 2 diabetes—a qualitative study from Portugal. Eur J Gen Pract. 2015. 21(2):103–10.
158. Vermeire E, Hearnshaw H, Rätsep A, Levasseur G, Petek D, van Dam H, et al. Obstacles to adherence in living with type-2 diabetes: an international qualitative study using meta-ethnography (EUROBSTACLE). Prim Care Diabetes. 2007. 1(1):25–33.
159. Mayberry L, Osborn C. Family support, medication adherence, and glycemic control among adults with type 2 diabetes. Diabetes Care. 2012. 35(6):1239–45.
160. Dye C, Haley-Zitlin V, Willoughby D. Insights from older adults with type 2 diabetes: making dietary and exercise changes. Diabetes Educ. 2003. 29(1):116–27.
161. Vijan S, Stuart N, Fitzgerald J, Ronis D, Hayward R, Slater S, et al. Barriers to following dietary recommendations in type 2 diabetes. Diabet Med. 2005. 22(1):32–8.
162. Gulliford M, Naithani S, Morgan M, Division of Health and Social Care Research, King's College London. Continuity of care in type 2 diabetes: patients', professionals' and carers' experiences and health outcomes. National Co-ordinating Centre for NHS Service Delivery and Organisation R&D (NCCSDO). 2006. Available from: http://www.netscc.ac.uk/hsdr/files/project/SDO_FR_08-1209-014_V01.pdf
163. Royal College of Nursing. Education, prevention and the role of the nursing team | Diabetes. Royal College of Nursing. 2019 [cited 2019 Oct 1]. Available from: https://www.rcn.org.uk/clinical-topics/diabetes/education-prevention-and-the-role-of-the-nurse
164. Shrivastava S, Shrivastava P, Ramasamy J. Role of self-care in management of diabetes mellitus. J Diabetes Metab Disord. 2013. 12:14.
165. Brown J, Harris S, Webster-Bogaert S, Wetmore S, Faulds C, Stewart M. The role of patient, physician and systemic factors in the management of type 2 diabetes mellitus. Fam Pract. 2002. 19(4):344–9.
166. NICE. Type 2 diabetes in adults: management NICE guideline. NICE. 2015 [cited 2017 Dec 29]. Available from: www.nice.org.uk/guidance/ng28
167. Baig A, Benitez A, Quinn M, Burnet D. Family interventions to improve diabetes outcomes for

adults. Ann N Y Acad Sci. 2015. 1353(1):89–112.

168. Liu J, Davidson E, Bhopal R, White M, Johnson M, Netto G, et al. Adapting health promotion interventions to meet the needs of ethnic minority groups: mixed-methods evidence synthesis. Health Technol Assess (Rockv). 2012. 16(44).
169. Heisler M, Piette J, Spencer M, Kieffer E, Vijan S. The relationship between knowledge of recent HbA1c values and diabetes care understanding and self-management. Diabetes Care. 2005. 28(4):816–22.
170. Persell S, Keating N, Landrum M, Landon B, Ayanian J, Borbas C, et al. Relationship of diabetes-specific knowledge to self-management activities, ambulatory preventive care, and metabolic outcomes. Prev Med (Baltim). 2004. 39(4):746–52.
171. Glanz K, Rimer B, Viswanath K. Health behaviour and health education [Internet]. San Francisco: John Wiley & Sons. 2008. 4th ed. [cited 2019 Aug 20]. Available from: https://is.muni.cz/el/1423/jaro2018/PSY289/um/readings/unit_1/Sallis_Chapter20_Health-Behaviour-and-Health-Education_2008.pdf
172. The Joanna Briggs Institute Levels of Evidence and Grades of Recommendation Working Party. Supporting document for the Joanna Briggs Institute levels of evidence and grades of recommendation. 2014 [cited 2019 Jun 10]. Available from: https://wiki.joannabriggs.org/display/JSW/Resources?preview=%2F28706180%2F37552897%2FJBI+Levels+of+Evidence+Supporting+Documents-v2.pdf
173. Burda B, Norris S, Holmer H, Ogden L, Smith M. Quality varies across clinical practice guidelines for mammography screening in women aged 40–49 years as assessed by AGREE and AMSTAR instruments. J Clin Epidemiol. 64(9):968–76.
174. Greuter M, van Emmerik N, Wouters M, van Tulder M. Quality of guidelines on the management of diabetes in pregnancy: a systematic review. BMC Pregnancy Childbirth. 2012. 12(1):58.
175. Fürthauer J, Flamm M, Sönnichsen A. Patient and physician related factors of adherence to evidence based guidelines in diabetes mellitus type 2, cardiovascular disease and prevention: A cross sectional study. BMC Fam Pract. 2013.
176. Cabana M, Rand C, Powe N, Wu A, Wilson M, Abboud P-A, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA. 1999. Vol. 282, [cited 2019 Jan 11]. Available from: www.jama.com.
177. Winocour P, Bain S, Frcp M, Chowdhury T, De P, Pokrajac A, et al. Managing hyperglycaemia in patients with diabetes and diabetic nephropathy-chronic kidney disease: Summary of recommendations 2018. Royal College of Physicians. 2018 [cited 2019 Feb 9]. Available from: https://renal.org/wp-content/uploads/2017/07/ABCD–RA_Managing-glycaemia-guideline_Recommendations-summary_2018Publication.pdf
178. Diabetes UK. What is diabetes technology? Diabetes.org.uk. [cited 2020 Jun 22]. Available from: https://www.diabetes.org.uk/guide-to-diabetes/diabetes-technology/what-is-diabetes-technology
179. Suglo J, Evans C. Factors influencing self-management in relation to type 2 diabetes in Africa: A qualitative systematic review. Shiyanbola OO, editor. PLoS One. 2020 Oct 22

;15(10):e0240938. Available from: https://dx.plos.org/10.1371/journal.pone.0240938
180. Ross S. Breaking down patient and physician barriers to optimize glycemic control in type 2 diabetes. Am J Med. 2013. 126(9 SUPPL.1):S38–48.
181. Wilson P, Petticrew M, Calnan M, Nazareth I. Disseminating research findings: What should researchers do? A systematic scoping review of conceptual frameworks. Implementation Science. BioMed Central. 2010. 5:91.
182. Greenhalgh T, Robert G, Bate P. How to spread good ideas: A systematic review of the literature on service delivery and organisation. NCCSDO. 2004. [cited 2020 Jun 21]. Available from: http://www.netscc.ac.uk/hsdr/files/project/SDO_FR_08-1201-038_V01.pdf
183. Centre for Reviews and Dissemination. Systematic Reviews: CRD's guidance for undertaking reviews in health care. University of York. 2009 [cited 2020 Jun 21]. 230–232 p. Available from: www.york.ac.uk/inst/crd
184. National Center for the Dissemination of Disability Research (NCDDR). A Review of the Literature on Dissemination and Knowledge Utilization. Austin, TX. 1996.
185. Greenhalgh T, Robert G, Macfarlane F, Bate P, Kyriakidou O. Diffusion of innovations in service organizations: Systematic review and recommendations. Milbank Quarterly. Milbank Memorial Fund. 2004.82:581–629.

Appendix

Appendix I: NICE algorithm for blood glucose lowering therapy in adults with type 2 diabetes

NICE National Institute for Health and Care Excellence

Algorithm for blood gl
adults with type 2 diab

- Reinforce advice on diet, lifestyle and adherence to drug treatment.
- Agree an individualised HbA1c target based on: the person's needs and circumstances including preferences, comorbidities, risks from polypharmacy and tight bloo longer-term risk-reduction benefits. Where appropriate, support the person to aim for the HbA1c levels in the algorithm. Measure HbA1c levels at 3/6 monthly interva an HbA1c target lower than target with no hypoglycaemia, encourage them to maintain it. Be aware that there are other possible reasons for a low HbA1c level.
- Base choice of drug treatment on: effectiveness, safety (see MHRA guidance), tolerability, the person's individual clinical circumstances, preferences and needs, av combinations, and cost (if 2 drugs in the same class are appropriate, choose the option with the lowest acquisition cost).
- Do not routinely offer self-monitoring of blood glucose levels unless the person is on insulin, on oral medication that may increase their risk of hypoglycaemia while or planning to become pregnant or if there is evidence of hypoglycaemic episodes.

If the person is symptomatically hyperglycaemic, consider insulin or an SU. Review treatment when blood glucose control has been achieved.

ADULT WITH TYPE 2 DIABETES WHO CAN TAKE METFORMIN

If HbA1c rises to 48 mmol/mol (6.5%) on lifestyle interventions:
- Offer standard–release metformin
- Support the person to aim for an HbA1c level of 48 mmol/mol (6.5%)

If standard-release metformin is not tolerated, consider a trial of modified–release metformin

FIRST INTENSIFICATION
If HbA1c rises to 58 mmol/mol (7.5%):
- Consider dual therapy with:
  - metformin and a DPP-4i
  - metformin and pioglitazone[a]
  - metformin and an SU
  - *metformin and an SGLT-2i*[b]
- Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%)

SECOND INTENSIFICATION
If HbA1c rises to 58 mmol/mol (7.5%):
- Consider:
  - triple therapy with:
    - metformin, a DPP-4i and an SU
    - metformin, pioglitazone[a] and an SU
    - *metformin, pioglitazone[a] or an SU, and an SGLT-2i*[b]
  - insulin-based treatment
- Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%)

If triple therapy is not effective, not tolerated or contraindicated, consider combination therapy with metformin, an SU and a GLP-1 mimetic[c] for adults with type 2 diabetes who:
- have a BMI of 35 kg/m^2 or higher (adjust accordingly for people from black, Asian and other minority ethnic groups) **and** specific psychological or other medical problems associated with obesity **or**
- have a BMI lower than 35 kg/m^2, **and** for whom insulin therapy would have significant occupational implications, **or** weight loss would benefit other significant obesity-related comorbidities

METFORMIN CONTRAINDICATED OR NOT TOLERATED

If HbA1c rises to 48 mmol/mol (6.5%) on lifestyle interventions:
- Consider one of the following[d]:
  - a DPP-4i, pioglitazone[a] or an SU
  - an SGLT-2i[b] instead of a DPP-4i if an SU or pioglitazone[a] is not appropriate
- Support the person to aim for an HbA1c level of 48 mmol/mol (6.5%) for people on a DPP-4i, SGLT-2i or pioglitazone **or** 53 mmol/mol (7.0%) for people on an SU

FIRST INTENSIFICATION
If HbA1c rises to 58 mmol/mol (7.5%):
- Consider dual therapy[e] with:
  - a DPP-4i and pioglitazone[a]
  - a DPP-4i and an SU
  - pioglitazone[a] and an SU
- Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%)

SECOND INTENSIFICATION
If HbA1c rises to 58 mmol/mol (7.5%):
- Consider insulin-based treatment
- Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%)

Insulin-based
- When starti and continu contraindica need for oth
- Offer NPH i need.
- Consider st either separ insulin (part higher).
- Consider, a insulin dete assistance t recurrent sy would other combination
- Consider pr include sho pre-mixed (acting huma prefers injec hypoglycaer rise marked
- Only offer a insulin with support fron
- Monitor peo regimen.
- *An SGLT-2i other antidi*

Abbreviations: [DPP-4]Dipeptidyl peptidase-4 inhibitor, [GLP-1]Glucagon-like peptide-1, [SGLT-2i]Sodium–glucose cotransporter 2 inhibitors, [SU]Sulfonylurea. Recommendations that cover DPP-4 inh to these groups of drugs at a class level.

a. When prescribing pioglitazone, exercise particular caution if the person is at high risk of the adverse effects of the drug. Pioglitazone is associated with an increased risk of heart failure, factors for these conditions, including increased age, should be carefully evaluated before treatment: see the manufacturers' summaries of product characteristics for details. Medicines an (MHRA) guidance (2011) advises that 'prescribers should review the safety and efficacy of pioglitazone in individuals after 3–6 months of treatment to ensure that only patients who are de

b. See NICE technology appraisal guidance 288 & 418, 315 and 336 on dapagliflozin, canagliflozin and empagliflozin, respectively. All three SGLT-2 inhibitors are recommended as option under certain conditions, as options in triple therapy regimens and in combination with insulin. All three are also options as monotherapies in adults in whom metformin is contraindicated o cases of diabetic ketoacidosis have been reported in people taking SGLT-2 inhibitors (canagliflozin, dapagliflozin or empagliflozin) or shortly after stopping the SGLT-2 inhibitor. MHRA gui in people with symptoms of diabetic ketoacidosis, even if plasma glucose levels are near normal.

c. Only continue GLP-1 mimetic therapy if the person has a beneficial metabolic response (a reduction of HbA1c by at least 11 mmol/mol [1.0%] **and** a weight loss of at least 3% of initial b

d. Be aware that, if metformin is contraindicated or not tolerated, repaglinide is both clinically effective and cost effective in adults with type 2 diabetes. However, discuss with any person fo there is no licensed non-metformin-based combination containing repaglinide that can be offered at first intensification.

e. Be aware that the drugs in dual therapy should be introduced in a stepwise manner, checking for tolerability and effectiveness of each drug.

f. MHRA guidance (2011) notes that cases of cardiac failure have been reported when pioglitazone was used in combination with insulin, especially in patients with risk factors for the deve combination is used, people should be observed for signs and symptoms of heart failure, weight gain, and oedema. Pioglitazone should be discontinued if any deterioration in cardiac statu

g. The recommendations in this guideline also apply to any current and future biosimilar product(s) of insulin glargine that have an appropriate Marketing Authorisation that allows the use

h. A consultant-led multidisciplinary team may include a wide range of staff based in primary, secondary and community care.

'Type 2 diabetes in adults: management', NICE guideline NG28. Published December 2015, last updated April 2017.

Appendix II: Domain calculations for guideline appraisal

Appraiser 1- Amy

Appraiser 2- Gowsi

Country-specific (CHRC/PAHO) (73)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	7	1	6	14
Appraiser 2	7	1	5	13
Total	14	2	11	**27**

27-6/42-6* 100= 58.33%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	7	1	7	15
Appraiser 2	6	1	7	14
Total	13	2	14	**29**

29-6/42-6*100= 63.89%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	1	1	1	1	3	1	1	1	10
Appraiser 2	1	1	1	1	2	1	1	1	9
Total	2	2	2	2	5	2	2	2	**19**

19-16/112-16*100= 3.13%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total
Appraiser 1	6	7	1	14
Appraiser 2	6	6	1	13
Total	12	13	2	**27**

27-6/42-6*100= 58.33%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	1	3	2	7	13
Appraiser 2	1	4	2	6	13
Total	2	7	4	13	**26**

26-8/56-8*100= 37.5%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	1	7	8
Appraiser 2	1	7	8
Total	2	14	**16**

16-4/28-4*100= 50%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	3	No
Appraiser 2	3	No

International Diabetes Federation (IDF) (46)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	5	5	5	15
Appraiser 2	5	5	5	15
Total	10	10	10	**30**

30-6/42-6*100= 66.67%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	4	2	5	11
Appraiser 2	5	3	6	14
Total	9	5	11	**25**

25-6/42-6*100= 52.78%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	1	1	2	1	5	5	2	3	20
Appraiser 2	1	1	2	1	5	6	4	5	25
Total	2	2	4	2	10	11	6	8	**45**

45-16/112-16*100= 30.21%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	6	7	7	20
Appraiser 2	6	7	7	20
Total	12	14	14	**40**

40-6/42-6*100= 94.44%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	4	5	4	7	20
Appraiser 2	5	5	2	6	18
Total	9	10	6	13	**38**

38-8/56-8*100= 62.5%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	2	3	5
Appraiser 2	2	2	4
Total	4	5	**9**

9-4/28-4*100= 20.83%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	4	Yes, with modification
Appraiser 2	4	Yes, with modification

International Diabetes Federation (IDF) (13)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	5	2	7	14
Appraiser 2	4	3	7	14
Total	9	5	14	**28**

28-6/42-6*100= 61.11%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	2	3	3	3	1	6	1	1	20
Appraiser 2	2	3	2	2	1	6	1	1	18
Total	4	6	5	5	2	12	2	2	**38**

38-16/112-16*100= 22.92%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	6	7	7	20
Appraiser 2	6	7	7	20
Total	12	14	14	**40**

40-6/42-6*100= 94.44%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	2	3	1	7	13
Appraiser 2	2	2	1	7	12
Total	4	5	2	14	**25**

25-8/56-8*100= 35.42%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	1	2	3
Appraiser 2	1	1	2
Total	2	3	**5**

5-4/28-4*100= 4.17%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	5	Yes, with modifications
Appraiser 2	4	Yes, with modifications

American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD) (86)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	6	2	6	14
Appraiser 2	7	3	6	16
Total	13	5	12	**30**

30-6/42-6 * 100 = 66.67%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	5	5	2	12
Appraiser 2	5	4	3	12
Total	10	9	5	**24**

24-6/42-6*100= 50%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	7	1	1	2	7	5	1	1	25
Appraiser 2	7	1	1	2	6	4	1	1	23
Total	14	2	2	4	13	9	2	2	**48**

48-16/112-16*100= 33.33%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total
Appraiser 1	6	6	7	19
Appraiser 2	7	6	7	20
Total	13	12	14	**39**

39-6/42-6*100= 91.67%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	2	4	2	7	15
Appraiser 2	2	5	2	7	16
Total	4	9	4	14	**31**

31-8/56-8*100= 47.92%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	4	8
Appraiser 2	4	3	7
Total	8	7	**15**

15-4/28-4*100= 45.83%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	3	No
Appraiser 2	3	No

Country-specific (RACGP) (87)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	2	2	2	6
Appraiser 2	3	3	3	9
Total	5	5	5	**15**

15-6/42-6*100= 25%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	3	2	3	8
Appraiser 2	4	3	4	11
Total	7	5	7	**19**

19-6/42-6*100= 36.11%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	1	2	4	2	6	5	2	2	24
Appraiser 2	1	2	3	3	6	6	3	2	26
Total	2	4	7	5	12	11	5	4	**50**

50-16/112-16*100= 35.42%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	4	4	3	6	17
Appraiser 2	5	5	4	5	19
Total	9	9	7	11	**36**

36-8/56-8*100= 58.33%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	1	5
Appraiser 2	4	1	5
Total	8	2	**10**

10-4/28-4*100= 25%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	3	Yes, with modifications
Appraiser 2	4	Yes, with modifications

Country-specific (Diabetes Canada/CDA) (88)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	7	6	7	20
Appraiser 2	7	6	7	20
Total	14	12	14	**40**

40-6/42-6*100= 94.44%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	7	6	7	20
Appraiser 2	7	6	7	20
Total	14	12	14	**40**

40-6/42-6*100= 94.44%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	4	6	7	6	7	7	4	6	47
Appraiser 2	5	6	7	7	7	7	6	6	51
Total	9	12	14	13	14	14	10	12	**98**

98-16/112-16*100= 85.42%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	5	6	2	7	20
Appraiser 2	7	7	2	7	23
Total	12	13	4	14	**43**

43-8/56-8*100= 72.92%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	6	10
Appraiser 2	5	6	11
Total	9	12	21

21-4/28-4*100= 70.83%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	5	Yes
Appraiser 2	6	Yes

Country-specific (NZGD) (89)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	2	2	2	6
Appraiser 2	3	3	3	9
Total	5	5	5	**15**

15-6/42-6*100= 25%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	5	2	3	10
Appraiser 2	5	2	4	11
Total	10	4	7	**21**

21-6/42-6*100= 41.67%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	1	1	1	2	3	5	1	1	15
Appraiser 2	1	1	1	2	4	5	1	1	16
Total	2	2	2	4	7	10	2	2	**31**

31-16/112-16*100= 15.63%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	5	6	3	14
Appraiser 2	4	6	3	13
Total	9	12	6	**27**

27-6/42-6*100= 58.33%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	2	3	1	6	12
Appraiser 2	2	3	1	5	11
Total	4	6	2	11	**23**

23-8/56-8*100= 31.25%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	1	5
Appraiser 2	4	1	5
Total	8	2	**10**

10-4/28-4*100= 25%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	2	No
Appraiser 2	2	No

Country-specific (ADA) (90)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	6	3	7	16
Appraiser 2	5	3	7	15
Total	11	6	14	**31**

31-6/42-6*100= 69.44%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	4	3	7	14
Appraiser 2	5	3	7	15
Total	9	6	14	**29**

29-6/42-6*100= 63.89%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	4	1	3	3	7	7	2	4	31
Appraiser 2	5	1	4	3	7	7	3	4	34
Total	9	2	7	6	14	14	5	8	**65**

65-16/112-16*100= 51.04%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	4	3	5	6	18
Appraiser 2	5	5	6	5	21
Total	9	8	11	11	**39**

39-8/56-8*100= 64.58%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	3	7
Appraiser 2	4	4	8
Total	8	7	**15**

15-4/28-4*100= 45.83

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	5	Yes, with modification
Appraiser 2	5	Yes, with modification

Country-specific (NICE) (47)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	6	7	7	20
Appraiser 2	7	5	7	19
Total	13	12	14	**39**

39-6/42-6*100= 91.67%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	7	6	7	7	7	7	7	7	55
Appraiser 2	7	7	7	7	7	7	7	7	56
Total	14	13	14	14	14	14	14	14	**111**

111-16/112-16*100= 98.96%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	7	7	6	20
Appraiser 2	7	7	7	21
Total	14	14	13	**41**

41-6/42-6*100= 97.22%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	5	6	7	7	25
Appraiser 2	6	7	7	7	27
Total	11	13	14	14	**52**

52-8/56-8*100= 91.67%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	4	5	9
Appraiser 2	4	7	11
Total	8	12	**20**

20-4/28-4*100= 66.67%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	7	Yes
Appraiser 2	7	Yes

Country-specific (SIGN) (91,92)

Domain 1: Scope and Purpose

	Item 1	Item 2	Item 3	Total
Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 2: Stakeholder Involvement

	Item 4	Item 5	Item 6	Total
Appraiser 1	7	7	7	21
Appraiser 2	7	7	7	21
Total	14	14	14	**42**

42-6/42-6*100= 100%

Domain 3: Rigour of Development

	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Total
Appraiser 1	5	5	5	7	7	7	6	5	47
Appraiser 2	7	7	7	7	7	7	7	7	56
Total	12	12	12	14	14	14	13	12	**103**

103-16/112-16*100= 90.63%

Domain 4: Clarity of Presentation

	Item 15	Item 16	Item 17	Total

Appraiser 1	7	7	6	20
Appraiser 2	7	7	7	21
Total	14	14	13	**41**

41-6/42-6*100= 97.22%

Domain 5: Applicability

	Item 18	Item 19	Item 20	Item 21	Total
Appraiser 1	5	6	7	6	24
Appraiser 2	7	7	7	7	28
Total	12	13	14	13	**52**

52-8/56-8*100= 91.67%

Domain 6: Editorial Independence

	Item 22	Item 23	Total
Appraiser 1	6	6	12
Appraiser 2	7	7	14
Total	13	13	**26**

26-4/28-4*100= 91.67%

	Rate overall quality of this guideline	I would recommend this guideline for use
Appraiser 1	6	Yes
Appraiser 2	7	Yes

Appendix III: Search strategies for systematic review

Published studies

MEDLINE (1946- 11th March, 2020)

1. exp diabetes mellitus, type 2/
2. exp diabetes complications/
3. (MODY or NIDDM or T2DM).tw,ot.
4. ((typ? 2 or typ? II or typ?2 or typ?II) adj diabet$).tw,ot.
5. 1 or 2 or 3 or 4
6. (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*).mp.
7. exp qualitative research/
8. exp interview/
9. exp focus groups/
10. exp cross-sectional studies/
11. exp surveys and questionnaires/
12. (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*).mp.
13. 6 or 7 or 8 or 9 or 10 or 11 or 12
14. exp Caribbean Region/
15. (Trinidad and Tobago).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
16. exp Antigua and Barbuda/
17. exp Barbados/
18. exp Martinique/
19. exp Dominican Republic/
20. exp Haiti/
21. exp Jamaica/
22. exp Puerto Rico/
23. exp Cuba/
24. exp Bahamas/
25. exp Dominica/
26. exp Saint Lucia/
27. exp Grenada/

28. exp Guadeloupe/
29. exp Curacao/
30. exp Aruba/
31. exp Netherlands Antilles/
32. exp United States Virgin Islands/
33. exp British Virgin Islands/
34. exp Saint Kitts and Nevis/
35. exp Sint Maarten/
36. exp West Indies/
37. exp Saint Vincent and the Grenadines/
38. ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy)).mp.
39. 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38
40. 5 and 13 and 39

Embase (1947- 11th March, 2020)

1. type 2 diabetes.mp. or non insulin dependent diabetes mellitus/
2. diabetes complications.mp. or diabetic complications/
3. (MODY or NIDDM or T2DM).mp. [mp=title abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, key word, floating subheading word, candidate term word]
4. (MODY or NIDDM or T2DM).tw,ot.
5. ((typ? 2 or typ? II or typ?2 or typ?II) adj diabet$).tw,ot.
6. 1 or 2 or 3 or 4 or 5
7. (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*).mp.
8. qualitative research.mp. or qualitative research/
9. interview.mp. or interview/
10. focus groups.mp. or information processing/
11. cross-sectional studies.mp. or cross-sectional study/
12. (surveys and questionnaires).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
13. (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*).mp.
14. 7 or 8 or 9 or 10 or 11 or 12 or 13
15. Caribbean Region.mp. or Caribbean/
16. (Trinidad and Tobago).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacture, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
17. (Antigua and Barbuda).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacture, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
18. Barbados.mp. or Barbados/
19. Martinique.mp. or Martinique/
20. Dominican Republic.mp. or Dominican Republic/
21. Haiti.mp. or Haiti/
22. Jamaica.mp. or Jamaica/
23. Puerto Rico.mp. or Puerto Rico/
24. Cuba.mp. or Cuba/
25. Bahamas.mp. or Bahamas/
26. “Dominican (Dominica)”/ or Dominica.mp. or Dominica/
27. Saint Lucia.mp. or Saint Lucia/
28. Grenada.mp. or Grenada/
29. Guadeloupe.mp. or Guadeloupe/

30. Curacao.mp. or Curacao/
31. Aruba.mp. or Aruba/
32. Netherlands Antilles.mp. or Netherlands Antilles/
33. United States Virgin Islands.mp. or “Virgin Islands (U.S.)”/
34. British Virgin Islands.mp. or Virgin Islands (British)”/
35. (Saint Kitts and Nevis).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
36. Sint Maarten.mp. or Saint Martin (Dutch)”/
37. West Indies.mp. or Caribbean Islands/
38. (Saint Vincent and the Grenadines).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]
39. ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy)).mp.
40. 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39
41. 6 and 14 and 40

CINAHL (1961-11th March, 2020)

1. (MH “type 2 diabetes mellitus”) or (MH “type 2 diabetes”) or (MH “diabetes type 2”)
2. (MH “diabetes complications”)
3. MW (“MODY” or ‘NIDDM” or “T2DM”)
4. MW (typ? 2 or typ? II or typ?2 or typ?II (N diabet$))
5. 1 or 2 or 3 or 4 / S1
6. TX (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*)
7. (MH “qualitative research”)
8. (MH “interview”)
9. (MH “focus group”)
10. (MH “cross-sectional studies”)
11. (MH “surveys and questionnaires”)
12. TX (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*)
13. 6 or 7 or 8 or 9 or 10 or 11 or 12 / S2
14. TX ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy))
15. MH ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy))
16. 14 or 15 / S3
17. 5 and 13 and 16 / S1 and S2 and S3

PsycINFO (1806- 11th March, 2020)

1. Type 2 diabetes.mp. or Type 2 Diabetes/
2. exp Type 2 Diabetes/ or diabetes mellitus, type 2.mp.
3. (MODY or NIDDM or T2DM).tw,ot.
4. exp Type 2 Diabetes/ or diabetes complications.mp.
5. ((typ? 2 or typ? II or typ?2 or typ?II) adj diabet*).tw,ot.
6. 1 or 2 or 3 or 4 or 5
7. (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*).mp.
8. exp qualitative research/
9. exp interview/
10. exp Group Discussion/
11. exp Group Discussion/ or exp qualitative research/ or focus groups.mp.
12. cross-sectional studies.mp.
13. exp surveys/ and questionnaires/
14. (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*).mp.
15. 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
16. Caribbean Region.mp.
17. (Trinidad and Tobago).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
18. (Antigua and Barbuda).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
19. Barbados.mp.
20. Exp Countries/ or Martinique.mp.
21. Dominican Republic.mp.
22. Haiti.mp.
23. exp Countries/ or Jamaica.mp.
24. exp Countries/ or Puerto Rico.mp.
25. exp Countries/ or Cuba.mp.
26. Bahamas.mp.
27. Dominica.mp.
28. Saint Lucia.mp.
29. Grenada.mp.
30. Guadeloupe.mp.
31. Curacao.mp.
32. Aruba.mp.
33. Netherlands Antilles.mp.
34. United States Virgin Islands.mp.
35. British Virgin Islands.mp.

36. (Saint Kitts and Nevis).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
37. Sint Maarten.mp.
38. West Indies.mp.
39. (Saint Vincent and the Grenadines).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
40. ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy)).mp.
41. 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38or 39 or 40
42. 6 and 15 and 41

AMED (1985- 11th March, 2020)

1. exp diabetes mellitus, type 2/
2. exp diabetes complications/
3. ("MODY" or "NIDDM" or "T2DM").af.
4. ((typ? 2 or typ? II or typ?2 or typ?II) adj diabet*).mp.
5. 1 or 2 or 3 or 4
6. (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*).mp.
7. Research/ or qualitative research.mp.
8. exp interview/
9. focus groups.mp.
10. cross-sectional studies.mp.
11. (surveys and questionnaires).mp. [mp=abstract, heading words, title]
12. (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*).af.
13. 6 or 7 or 8 or 9 or 10 or 11 or 12
14. Caribbean Region.mp.
15. (Trinidad and Tobago).mp. [mp=abstract, heading words, title]
16. (Antigua and Barbuda).mp. [mp=abstract, heading words, title]
17. Barbados.mp.
18. Martinique.mp.
19. Dominican Republic.mp.
20. Haiti.mp.
21. Jamaica.mp.
22. Puerto Rico.mp.
23. Cuba/ or Cuba.mp.
24. Bahamas.mp.
25. Dominica.mp.
26. Saint Lucia.mp. or Saint Lucia/
27. Grenada.mp.
28. Guadeloupe.mp.
29. Curacao.mp.
30. Aruba.mp.
31. Netherlands Antilles.mp.
32. United States Virgin Islands.mp.
33. British Virgin Islands.mp.
34. (Saint Kitts and Nevis).mp. [mp=abstract, heading words, title]
35. Sint Maarten.mp.
36. West Indies.mp.
37. (Saint Vincent and the Grenadines).mp. [mp=abstract, heading words, title]

38. ((Caribbean) or (Trinidad) or (Tobago) or (Antigua) or (Barbuda) or (Barbados) or (Martinique) or (Dominican Republic) or (Haiti) or (Hispaniola) or (Jamaica) or (Puerto Rico) or (Cuba) or (Bahamas) or (Dominica) or (Saint Lucia) or (Grenada) or (Guadeloupe) or (Curacao) or (Bonaire) or (Aruba) or (Saba) or (Saint Eustatius) or (Virgin Islands) or (Tortola) or (Virgin Gorda) or (Jost Van Dyke) or (Anegada) or (Saint Croix) or (Saint Thomas) or (Saint John) or (Saint Kitts) or (Nevis) or (Saint Christopher) or (Sombrero) or (Saint Martin) or (Sint Maarten) or (West Indies) or (Saint Vincent) or (Grenadines) or (Eastern Caribbean) or (Greater Antilles) or (Lesser Antilles) or (Leeward Islands) or (Windward Islands) or (Caribbean Islands) or (Cayman Islands) or (Montserrat) or (Turks and Caicos Islands) or (Anguilla) or (Saint Barthelemy)).mp.
39. 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38
40. 5 and 13 and 39

Web of Science (1900- 11th March, 2020)

1.TS=(typ? 2 NEAR/1 diabet? Or diabetes complications or type 2 diabetes mellitus)

2.TS=(barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*)

3. TS=(qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*)

4. #2 or #3

5. TS=(Caribbean count* or Caribbean region or Caribbean islands or Caribbean*)

6. 1 AND 4 AND 5

Scopus (1960-111th March, 2020)

TITLE-ABS-KEY (typ? 2 W/1 diabet? Or diabetes complications or type 2 diabetes mellitus) and (TITLE-ABS-KEY (barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*) or TITLE-ABS-KEY (qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*)) and TITLE-ABS-KEY (Caribbean count* or Caribbean region or Caribbean islands or Caribbean*)

Unpublished studies

EthOS- 11th March, 2020

1. Diabetes
2. Type 2 diabetes
3. Caribbean

type 2 diabetes in the Caribbean

ProQuest Dissertations and Theses- 11th March, 2020

SU((typ? 2 W/1 diabet? Or diabetes complications or type 2 diabetes mellitus)) and SU((barrier* or impediment* or challenge* or hindrance* or obstacle* or hurdle* or obstruction* or deterrent* or facilitator*)) or SU((qualitative or interview* or focus group* or cross-sectional or cross sectional or survey*)) and SU((Caribbean count* or Caribbean region or Caribbean islands or Caribbean*))

Appendix IV: Systematic review study findings and illustrations

Physical activity in Puerto Rican adults with type 2 diabetes mellitus. Davila[121]	
Finding 1	Positive Benefits to Health Status (U)
illustration	“Improves my diabetes condition and blood circulation.”
Finding 2	Optimal physical status (U)
illustration	“Physically my body hurts less, I feel lighter and stronger.”
Finding 3	Optimal psychological status U)
illustration	“I feel good and it cheers me up. My self-esteem increases.”
Finding 4	Optimal social benefits (U)
Illustration	“When I exercised outside my house I met new friends and I joined a jogging club.”
Finding 5	Benefits in daily life activities (U)
Illustration	“I am less tired in my other activities.”
Finding 6	Physical impairments by medical history (U)
Illustration	“When my back condition or knee does not allow me to do it.”
Finding 7	Overwhelmed by multiple responsibilities from work and home (U)
Illustration	“My work demands many times do not allow me to get home early.”
Finding 8	Concerns regarding their own safety (U)

Illustration	“Safety in the area. My husband works and cannot go with me.”
Finding 9	Motivation and self-esteem (U)
Illustration	“Lack of motivation and interest.”

Contextualising Experiences of Diabetes-Related Stress in Rural Dominican Republic. Gonzalez Rodriguez et al.[125]	
Finding 1	Sources of stress- Food access and availability (U)
Illustration	‘‘There are people who can follow their diet, but many cannot. We often must eat things that we should not eat because [living with] hunger is hard. . . . [Diabetes] is harder for the poor . . . I would say it is much harder. I feel bad for those of us that suffer from this illness. Sometimes I go to sleep hungry, and more so when one lives in the countryside. Things in the countryside are very difficult.’’
Finding 2	Sources of stress-Medication stress (U).
Illustration	“If you have AIDS, HIV, you have treatment. [handclap] Done. If you are in treatment, you can live 100 years and die of something else—you will not die of that [HIV]. But with diabetes, a person without treatment can be sure that one day, he will lose his vision. Through diabetes comes the famous diabetic foot or kidney problems. It is a tragedy for them and their family because now you have lost everything.”
Finding 3	Sources of stress - Stress-induced stress. (C)
Illustration	‘‘[Living with diabetes] is worse . . . when you think about it. It is worse because you can even die of depression if you think about that, and [it can affect] your heart and all that.
Finding 4	Coping with stress- Diabetes program Diabetes education and self-management techniques provided by cooperadores and providers at the clinic alleviated participants’ stress by reducing their uncertainty about diabetes. (U)
Illustration	“Through them, many people have been able to, as they say, [have] a little joy in their life because they have totally controlled [their] diabetes . . . it is like a blessing from God having them here.”

Living with Diabetes: Experiences from Jamaican Diabetes Clinics in Kingston and Morant Bay. Morrissey-Ross et al.[123]	
Finding 1	Doctor appointments (U)
Illustration	Nathan also expressed the importance of seeing the doctor, saying, “Yes, sometimes, I miss my appointment, but I hardly miss my appointment. And in me, sometimes if I do, it eating on me…When I miss my appointment…I call and they get me in.”
Finding 2	Obtaining and taking medications (C)
Illustration	Robert, an 82 year old man living in a rural community had suffered with type 2 DM for 32 years. He attributed his success in managing his disease without the onset of kidney disease, heart disease or stroke to taking his medication and regular exercise.
Finding 3	Knowledge of Type 2 Diabetes (U)
Illustration	The motivation that came after increased knowledge was exemplified by Ophelia who said, “So me gets-- me finds out now. So me have diabetes. And from thence on, me started the change. Them give me a diet sheet. And them tell me what to eat, and what not to eat, and so-and-so forth. But you know sometime you may eat what you are not supposed to eat.”
Finding 4	Concerns, worries, and fears (U)
Illustration	“My concern about having diabetes is when you read up on it, you'll realise that if you don't take care of yourself, you can lose a limb and you can even go blind.”
Finding 5	Most difficult part of having Typ2 2 DM (U)

Illustration	“It’s not an easy thing. Having diabetes contributes to other sickness and it’s not nice, because it become like a part of you gone.”
Finding 6	Psychosocial support (U)
Illustration	For the majority, supports were multifaceted, ranging from encouraging phone calls from concerned sisters overseas to such things as young grandchildren assisting with the administration of insulin and a daughter-in-law who visited every day on her way to work to check the blood sugar. Gina said, “In Jamaica, if you have family somewhere, you’re rich, you know.
Finding 7	Physiological impact (U)
Illustration	“Ah, diabetes... Whatever I could do first, I cannot do it again…It burdens my body. It’s against the body. Walking — I cannot walk straight…The most difficult part is over the body... poor circulation too... It look like it caused that too. …me fall down, as me step, me fall down…Yes, the nerves gone right out… It burn me under the heel and stick me... It can come anywhere… affecting my foot bottom and my heel. It burning me, burning me, burning like pepper...and the eyes, man, I don’t know if it’s a glaucoma get in the eye and eat out the eye….I can’t tell you how long I am suffering, suffering...”
Finding 8	Relationship with God (U)
Illustration	“Mary, I know that it’s God keeping me. Because there is nothing I don’t talk to Him about. I talk to …and tell him Lord, I leave everything to you. So sometimes I feel like is Him keeping me. It’s not really like the medication, I think He’s holding me.”
Finding 9	Partnership with God (U)
Illustration	“You pray a lot about your condition. A way to get comfort.”
Finding 10	Optimism from faith in God (U)

Illustration	“He’s keeping me. Me just believe that the diabetes, what I have, the Lord can cut it down. I can get healing for it.”
Finding 11	Economic Impact (U)
Illustration	“You cannot keep a strict diet without money because that come with money. So I have to find the money to buy it, and sometimes the drugs are expensive — as for the insulin. So if drug store don’t have don’t have insulin, you have to buy the insulin because I have to keep on the medication. You’re looking at three thousand or to three five (about $24-$28 U.S.) for one vial of insulin.”
Finding 12	Beliefs about what would help (U)
Illustration	“…the medications are very expensive. No matter how small it is, whatever, I have to make sure I put that money aside to fill my prescription. I don't put nothing before it.”
Illustration	“…what I learn about cerasee tea is that diabetic cannot feel any. It will hide the blood sugar… you will do the test, and it show normal with it creeping up.” Iris mused, “I tell myself, you see if the bushes worked nobody would have diabetes. So if you find yourself with medical problem, go to medical care. I don't believe in staying home and doing it yourself.”
Finding 13	Motivation to seek care (U)
Illustration	“And feeling healthy, that is the best. My mother, when she was alive, she used to take care of us, and she take care of herself until she leave us. So that's why I said I would take good care of myself just like my mom, and also she take care of her mother.”
Finding 14	Action taken to mitigate the effects of Type 2 DM (U)
Illustration	“My doctor told me what to eat, so I just stick by that. It's not hard as I cut down on portion size. Good eating habit, I can tell you. And why I know as I talk about the

	medication, I was following people and see, you can't get up every day just taking tablet, taking tablet.”
Finding 15	Differences between Genders relative to Type 2 DM (U)
Illustration	“them don’t go for check-ups because them afraid from the doctor."

Rural Vincentians' (Caribbean) beliefs about the usage of non-prescribable medicines for treating Type 2 diabetes. Moss et al.[122]	
Finding 1	An irregular pattern of usage emerged as plant and prescribed medications were used concurrently and interchangeably (U)
Illustration	"The Doctor medicine is useful … I take it today, tomorrow I take the bush."
Finding 2	A contrast in beliefs regarding the efficacy of prescribed medicine for diabetes and the nature of the relationship with medical personnel (C)
Illustration	"Doctor say is better for me not to take any tablets. Ah say, "Yes Doctor! Give me the tablets." … You must have yuh tablets to show that you coming to Doctor."
Finding 3	Traditional foods as medicine (alternative medicine) (U)
Illustration	"… If you buy ah egg and you bust it a little and you throw it out in the pan, you know and you beat it with some of the milk and drink it … that is a medicine!"
Finding 4	The importance of bitterness in diabetes treatment also emerged from the findings and this was perceived as being good (U)
Illustration	"I could tell you when my sugar raise then. It does pain me head plenty and when ah see me head start to pain me ah does say "well is the sugar raise" and when ah go and get ah cucumber and ah use that cucumber dey! Betime evening ah feel much better. The ache the headache gone then. That feel like the sugar gone down."
Finding 5	God was seen to be the source of information on diabetes treatment (U)
Illustration	"If you say you prayers and you go to yuh bedside and you pray you does get yuh own little thing. Sometimes one leaf of bush they will tell you to boil and you know! You feel much better.'"
Finding 6	A lack of belief in the efficacy of prescribable medicines (C)

Illustration	Participant C did state that prescribed medicines put her blood glucose up, which she rectified by taking both cucumber and carila.
Finding 7	Use and belief of non-prescribable medicines (U)
Illustration	Herbal medicines were categorised according to their perceived efficacy. Corila was described as ‘the strongest one of all’, Shaddom Vinni as a ‘very good thing for the sugar’ and Elder Bush as ‘good’ and ‘very good’
Finding 8	Control of diabetes was ascribed to a balanced intake of starchy and bitter foods and different food types were utilised to give this balance (U)
Illustration	“… If I feel drowsy, sick and I take some food and throw it in me mouth, it carry the feelings down. But if you sugar some tea and drink it, throw you down clean, you see.”
Finding 9	Participants felt that their folk medicine had got the better of conventional medicine (C)
Illustration	This became evident in the face of their amusement that ‘doctor nah know yet’ when he was pleased with the improvement in their blood glucose levels that they attributed to their herbal medicines.

Self-management among Patients Living with Diabetes in the United States Virgin Islands. Nunez et al.[112]	
Finding 1	Cultural nuances shaped perspectives on self-management: Use of herbal, complementary, and alternative remedies (CAMP) (U)
Illustration	"(My neighbor) is a diabetic too…. Sometimes she buys bush and give me some. I don't know the name of it but it is supposed to help with sugar. So I use that."
Finding 2	Cultural nuances shaped perspectives on self-management: Importance of maintaining local diet. (U)
Illustration	"I take liberty every day. Right now I have … 3 plantains, 5 or 6 tanya, sweet potatoes, and I plan to take pig tail and cornmeal dumplings and make a big pot of peas soup…. You know the attitude I take. I live 70 years eating the same thing. What, now it's going to kill me?"
Finding 3	Culturally-specific challenges were barriers to effective self-management: Stigma (U)
Illustration	"I think this needs to be more out in the open. Because you can have diabetes and control it and do everything that everybody else does. But it's so secretive … everyone will treat you like you're dying. There's a stigma attached, yes. To being diabetic or having to take medicine for it."
Finding 4	Culturally-specific challenges were barriers to effective self-management: Limited access to healthy food options/ exercise (U)
Illustration	"Making the good food choices is hard. They're simply not available in stores. Well, sometimes. Now, they tell me blueberries is good. I can eat that. But when you find that, it's five dollars for a little bag so…"
Finding 5	Medical homes were rarely viewed as a primary source of diabetes education or support: Lack of educational resources (U)

Illustration	“I think there should be better resources for diabetics. Once you’re diagnosed there should be a place that you can go to for regular classes and monitoring. I can’t believe we don’t have that in this day and age. There isn’t even a dietician there (doctor’s office).”
Finding 6	Medical homes were rarely viewed as a primary source of diabetes education or support: Self-adjustment of medication dosing and regimen influenced by friends and family (U)
Illustration	“Well, the doctor told me to take the insulin two times but my mother tell me I want to know if this is right. He tell me to take twenty five units in the morning and twenty five in the night. But she said it’s too much, and just gives me fifteen at night. So that’s what I do.”
Finding 7	Fear of disease complications largely motivated or stalled self-management practices: Denial/Minimisation (U)
Illustration	“I don’t want to think about it (having diabetes). Like I say, I don’t say I’m a diabetic. I only say my sugar is a little elevated. I don’t even want to call the word.”
Finding 8	Fear of disease complications largely motivated or stalled self-management practices: Resilience (U)
Illustration	“I see the struggle when people lose limbs. I play the flute and don’t want to lose fingers so I changed everything … I stopped the alcohol. And I cut back on all the starchy, Caribbean foods. You have to make up your mind that you’re going to back out of all those foods you grew up with. I grow my own vegetables now. And that is another way I can get exercise.”

Coping with diabetes stress among adults in rural Dominican Republic: “I don’t think about it” Sadeghzadeh et al.[126]	
Finding 1	Why people don’t think about diabetes – Almost all participants considered diabetes a manageable lifelong condition, such that in achieving diabetic control, they did not have to exhaust mental energy to think about diabetes every day. (U)
Illustration	“I think that with diabetes, you can die from something else that isn’t diabetes. If you take your medicine and the necessary care, you aren’t necessarily going to die from diabetes.”
Finding 2	How to not think about diabetes- Reflecting the integration of not thinking about it as part of diabetes management (U).
Illustration	I would say to learn how to manage what you eat. Learn how to manage the situation of sugar [diabetes]. And don’t think about it. Always have your mind busy with work, and exercise. Diabetics shouldn’t just sit.
Finding 3	How to not think about diabetes - Staying physically and socially active to keep your mind busy entailed doing house- hold chores, working (paid employment), volunteering, or visiting friends and family (U).
Illustration	“If you are working, your mind will be busy and you won’t remember that you’re sick. You’ll live your normal life.”
Finding 4	How to not think about diabetes - the central role of faith in most rural Dominican communities, religion and religious-related practices, such as attending church events and reading religious text, kept participants socially engaged and helped them not think about diabetes. (C)
Illustration	“I always live with a clear mind because I like to read the word of God.”
Finding 5	Outcomes of no le doy mente - maintaining a sense of normalcy and protecting their health.(U)
Illustration	“. . .living your normal life. Taking your medication, managing your diet. . .doing the things that the doctor tells you to do. Sure, all of that. But not thinking, “Oh I am diabetic, I am diabetic,” because if I sit here thinking that I am diabetic all day, I will be stuck here.”

Finding 6	Outcomes of no le doy mente - The influence of seeing others living normal lives is notable here, as it reflects the social influence processes of observing others as they successfully manage diabetes and live a normal life. (U)
Illustration	“I know there are people who live many years with diabetes, and they have a normal life. But it’s because they take care of themselves. That has motivated me to take care of myself.”

Types and Sources of Social Support among Adults Living with Type 2 Diabetes in Rural Communities in the Dominican Republic. Wallace et al.[124]	
Finding 1	The path of direct support for diagnosis from friends and neighbours (U)
Illustration	"…She told me, 'you're sick, your clothes are loose and falling off of you.' I agreed. I had a t-shirt that I no longer fit in. Dry, I was getting drier, [...to the point that] a man told others 'be fearful of that man, he could have AIDS.' And I heard that, you see? I went to my partner and told her that I felt ill. After that a neighbour took me to the see a good doctor to see about my condition where the doctor then tells me, 'sir, you are a diabetic."
Finding 2	Informational and instrumental support from friends and neighbours to get to the clinic (U)
Illustration	"How did I first get here? The man sitting in the waiting room brought me. He found out about this program and invited a group of us to go with him. Every month a few of us go in his bus for our appointments."
Finding 3	Cooperadores played a key role in disseminating diabetes-related information and increasing awareness of the diabetes programme in their communities. (U)
Illustration	"I started here because I used to get checked out in a distant part of the province. Then, I went to a public clinic and heard about a diabetes centre from the staff. That is how I learned about the programme and that's how I came here."
Finding 4	Cohabitating partners were often the primary supporters mentioned by participants when asked 'who supports you with your diabetes?' (U)
Illustration	"Yes, my wife supports me with my treatment. She'll gives me what I can or should eat [for my diet]. If I can't eat something she does not prepare it."
Finding 5	Women had the primary responsibilities of the home such as domestic work and preparing family meals, even when those meals were not part of their recommended diet. Maintaining the same level of responsibilities they had before having diabetes

	coupled with reporting little support in the home led to narratives depicting stress and frustration. Below Rosa, a 52 year-old female living with diabetes for three years, described having limited support at home and how it affected her physically. (U)
Illustration	“No one supports me, no one. How do I say this, even if I feel bad no one pays attention. Not even my sisters come to visit and lend me a hand. But God gives me strength, because no one else helps me. What happens is that when my sugar levels go up, I cannot sleep well and sometimes I get scared. Sometimes my family does things I don’t like, which makes me feel ill, like I have high blood pressure. I don’t know. Listen, those who have diabetes have to be careful and so they need someone who will support them so that they feel better.”
Finding 6	The role of support from cooperadores, who are tasked with not only supporting diabetes care and medication, but also delivering health talks on the importance of diabetes self-management strategies to all participants and the community at large. These health talks were often referenced in the interviews as a form of informational support to learn how best to manage their condition. Cooperdores also provided emotional support by showing that they cared about their participants through actively listening to their successes and challenges. (U)
Illustration	“Before I came here I felt that everything was crashing around me. Some of us feel like we’re drowning in a cup of water because we do not find someone to talk to about our problems. But now I can talk to the cooperadores…to the doctor, and I feel better.”
Finding 7	Physicians served as sounding boards for issues related to their diabetes and their day-to-day stressors. (U)
Illustration	“For men, we can suffer from a problem with (sexual) relations. I spoke with the doctor when I had a problem [erectile dysfunction]. He told me what I need to do to control my sugar otherwise I won’t get better.”
Finding 8	Support from friends and neighbours was less salient in the long-term management stage than the support from partners and providers. (C)

Illustration	The long-term management stage was characterised by instrumental and emotional support from family, especially partners. Healthcare providers and cooperadores provided informational and instrumental support to help participants manage their diabetes. Friends and neighbours were less salient in this stage compared to the diagnosis and programme enrolment stages. Although participants reported a greater variety of social support sources in this stage, participants also described the negative effects of limited or no support to manage their diabetes.
Finding 9	Having a friend who ensured that he adhered to his diet was appreciated and helped him adhere to his self-management regimen. (U)
Illustration	Miguel: I have a good friend that when we go out to eat, he argues with me about what I can eat. He tells me, 'no you can't eat this and that, because it's harmful.' Interviewer: And when he says that, how does that make you feel? Miguel: Good, because he's looking out for me.

Knowledge, Motivation and Barriers to Diabetes Control in Adults in Jamaica. Wint et al.[113]	
Finding 1	To keep healthy (N)
Finding 2	Perceived risk of complications (N)
Finding 3	Fear of death, discomfort (N)
Finding 4	Desire to live (N)
Finding 5	Follow doctors' orders (N)
Finding 6	Feeling compelled (N)
Finding 7	Support from family and friends (N)
Finding 8	Experience of complications (N)
Finding 9	Lack of self-monitoring of blood glucose (N)
Finding 10	Lack of perceived risk of complications (N)
Finding 11	Overweight or obese state (N)
Finding 12	Inadequate knowledge (N)
Finding 13	Little motivation to maintain health (N)
Finding 14	Non-compliance with medication (N)
Finding 15	Little effort to control diet (N)
Finding 16	Use of "bush teas" (N)

Finding 17	Belief that diabetes can be cures (N)

Appendix V: Systematic review studies ineligible for full text review

Studies excluded on full-text examination	
References	**Reasons for exclusion**
Apparico N, Clerk N, Henry G, Seale J, Sealy R, Ward S, et al. How well controlled are our type 2 diabetic patients in 2002?. An observational study in North and Central Trinidad. Diabetes Res Clin Pract [Internet]. 2007;75(3):301–5. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed10&NEWS=N&AN=46091812	Quantitative studies / cross-sectional surveys that contain no free text
Foster T, Mowatt L, Mullings J. Knowledge, beliefs and practices of patients with diabetic retinopathy at the University Hospital of the West Indies, Jamaica. J Community Health [Internet]. 2016;41(3):584–92. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emexa&NEWS=N&AN=620155270	Quantitative studies / cross-sectional surveys that contain no free text
Ezenwaka C, Olukoga A, Onuoha P, Worrell R, Skinner T, Mayers H, et al. Perceptions of Caribbean type 2 diabetes patients on self-monitoring of blood glucose. Arch Physiol Biochem [Internet]. 2012;118(1):16–21. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med7&NEWS=N&AN=22103450	Quantitative studies / cross-sectional surveys that contain no free text
Rodriguez-Vigil E, Kianes-Perez Z. Quality of care provided to patients with diabetes mellitus in Puerto Rico; managed care versus fee-for-service experience. Endocr Pract [Internet]. 2005;11(6):376–81. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med5&NEWS=N&AN=16718949	Quantitative studies / cross-sectional surveys that contain no free text
Harnarayan P, Cawich S., Islam S, Ramsewak S. Self-directed treatment for lower limb wounds in persons with diabetes: A short report. Patient Prefer Adherence [Internet]. 2014;8:1173–7. Available from: http://www.dovepress.com/self-directed-treatment-for-lower-limb-wounds-innbsppersons-with-diabe-peer-reviewed-article-PPA	Quantitative studies / cross-sectional surveys that contain no free text

Gordon S. The effect of health literacy level on health outcomes in patients with diabetes at a type v health centre in Western Jamaica. Int J Nurs Sci [Internet]. 2017;4(3):266–70. Available from: http://www.journals.elsevier.com/international-journal-of-nursing-sciences/	Quantitative studies / cross-sectional surveys that contain no free text
Bobb A, Gale D, Manmohan S, Mohammed A, Seetahal F, Small P, et al. The impact of the chronic disease assistance plan (CDAP) on the control of type 2 diabetes in Trinidad. Diabetes Res Clin Pract [Internet]. 2008;80(3):360–4. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med6&NEWS=N&AN=18407368	Quantitative studies / cross-sectional surveys that contain no free text
Roopnarinesingh N, Brennan N, Khan C, Ladenson PW, Hill-Briggs F, Kalyani RR. Barriers to optimal diabetes care in Trinidad and Tobago: a health care Professionals' perspective. BMC Health Serv Res. 2015 Sep;15.	Quantitative studies / cross-sectional surveys that contain no free text
Bernal H. Self-management of diabetes in a Puerto Rican population. Public Health Nurs [Internet]. 1986 Mar;3(1):38–47. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107571744&site=ehost-live	Quantitative studies / cross-sectional surveys that contain no free text
Thomas N. Evaluating the "healthy diabetes" caribbean food plate and website portal for diabetes prevention and management: results of an online study and implications for reducing health disparities. Diss Abstr Int Sect A Humanit Soc Sci [Internet]. 2014;74(12-A(E)):No-Specified. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc11&NEWS=N&AN=2014-99110-490	Quantitative studies / cross-sectional surveys that contain no free text
Hall M, Gordon M. Knowledge of the benefits of exercise and exercise participation in persons living with diabetes in Kingston and St Andrew, Jamaica. 61(SUPPL. 6):42. Available from: http://ojs.mona.uwi.edu/index.php/wimj/article/view/3466/3129	Quantitative studies / cross-sectional surveys that contain no free text

Ezenwaka C, Nwankwo C, Onuoha P. Perceptions of practice nurses and dietitians on implementing diabetes self-management education (DSME) in two countries in Africa and the Caribbean. Diabetes [Internet]. 2015;64(SUPPL. 1):A199. Available from: http://diabetes.diabetesjournals.org/content/64/Supplement_1/A187.full.pdf+html	Quantitative studies / cross-sectional surveys that contain no free text
Hunt A, Eldemire-Shearer D. Establishing a system for health professional training and certification in diabetes self-management education in the Caribbean. Diabetes Spectr [Internet]. 2013;26(4):255–8. Available from: http://spectrum.diabetesjournals.org/content/26/4/255.full.pdf+html	Quantitative studies / cross-sectional surveys that contain no free text
Taylor Jr. C, Taylor G, Atherley A, Hambleton I, Unwin N, Adams O. Barbados Insulin Matters (BIM) study: Perceptions on insulin initiation by primary care doctors in the Caribbean island of Barbados. Prim Care Diabetes. 2017 Apr;11(2):140–7.	Quantitative studies / cross-sectional surveys that contain no free text
Taylor C, Taylor G, Atherley A, Hambleton I, Unwin N, Adams O. The Barbados Insulin Matters (BIM) study: Barriers to insulin therapy among a population-based sample of people with type 2 diabetes in the Caribbean island of Barbados. J Clin Transl Endocrinol [Internet]. 2017 Jun 1 [cited 2019 Jun 9];8(4):49–53. Available from: https://www.sciencedirect.com/science/article/pii/S2214623717300236	Quantitative studies / cross-sectional surveys that contain no free text
Webb M, Aguilal J. Nutritional Knowledge, Attitude and Practice among Patients with Type 2 Diabetes in North Central Health Authority in Trinidad and Tobago. West Indian Med J [Internet]. 2015;65(1):170–6. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=prem1&NEWS=N&AN=26684157	Quantitative studies / cross-sectional surveys that contain no free text
Bridgelal-Nagassar R, James K, Nagassar R, Maharaj S. Medication adherence and health insurance/health benefit in adult diabetics in Kingston, Jamaica. West Indian Med J [Internet]. 2016;65(2):320–2. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/wimj_iss2_2016_320-22.pdf	Quantitative studies / cross-sectional surveys that contain no free text

Gordon C, Nelson G. Physical activity correlates among persons with type 2 diabetes in Jamaica. Int J Diabetes Dev Ctries [Internet]. 2019;39(1):108–14. Available from: http://www.springerlink.com/content/0973-3930/	Quantitative studies / cross-sectional surveys that contain no free text
Osborn C, Amico K, Cruz N, O'Connell A, Perez-Escamilla R, Kalichman S, et al. A brief culturally tailored intervention for Puerto Ricans with type 2 diabetes. Heal Educ Behav [Internet]. 2010 Dec;37(6):849–62. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104957987&site=ehost-live	Inappropriate phenomena of interest
McDonald P, Nunez M, Yarandi HN. A church-based diabetes care survey in St. Thomas, U.S. Virgin Islands. J Natl Black Nurses Assoc [Internet]. 2017;28(1):9–13. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=medc&NEWS=N&AN=29932561	Inappropriate phenomena of interest
Alcubierre N, Rubinat E, Traveset A, Martinez-Alonso M, Hernandez M, Jurjo C, et al. A prospective cross-sectional study on quality of life and treatment satisfaction in type 2 diabetic patients with retinopathy without other major late diabetic complications. Heal Qual Life Outcomes [Internet]. 2014 Jan;12(1):131. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=103844111&site=ehost-live	Inappropriate phenomena of interest
Gucciardi E, Chan VWS, Manuel L. A systematic literature review of diabetes self-management education features to improve diabetes education in women of Black African/Caribbean and Hispanic/Latin American ethnicity. Patient Educ Couns [Internet]. 2013;92(2):235–45. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed14&NEWS=N&AN=52525216	Inappropriate phenomena of interest
Mei-Kuei T. Ambulatory blood pressure and physical activity in heart failure. South Online J Nurs Res [Internet]. 2008 Jul;8(4):13. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105496456&site=ehost-live	Inappropriate phenomena of interest

Bryan G, Johnson J, Dawes L. An assessment of the risk factors for type 2 diabetes among women in rural Jamaica. West Indian Med J [Internet]. 2012;61(8):808–12. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/dr_gc_bryan_wimj_november.qxd_.pdf	Inappropriate phenomena of interest
Clinical Rounds. Nursing (Lond) [Internet]. 2002 May;32(5):33–5. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106499845&site=ehost-live	Inappropriate phenomena of interest
Diaz-Perera G, Bacallao J, Diaz-Perera G, Bacallao J, Alemany E. Contextual and individual influences on diabetes and heart disease in Havana primary care catchment areas. MEDICC Rev [Internet]. 2013;15(2):10–5. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med7&NEWS=N&AN=23686249	Inappropriate phenomena of interest
Gulliford M. Controlling non-insulin-dependent diabetes mellitus in developing countries. Int J Epidemiol [Internet]. 1995;24 Suppl 1(SUPPL. 1):S53-9. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed5&NEWS=N&AN=25194268	Inappropriate phenomena of interest
Gulliford M, Alert C, Mahabir D, AriyanayagamBaksh S, Fraser H, Picou D. Diabetes care in middle-income countries: a Caribbean case study. Diabet Med. 1996 Jun;13(6):574–81.	Inappropriate phenomena of interest
Whincup P, Nightingale C, Owen C. Diabetes prevention strategies should target children. Prim Heal Care [Internet]. 2010 Sep;20(7):13. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105107907&site=ehost-live	Inappropriate phenomena of interest
Aponte J. General literacy and health literacy in Dominicans with diabetes. Hisp Health Care Int [Internet]. 2013;11(4):167–72. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed14&NEWS=N&AN=606790594	Inappropriate phenomena of interest

In brief. Pract Nurse [Internet]. 2013 Jul 19;43(7):8. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107961962&site=ehost-live	Inappropriate phenomena of interest
Wilks R, Sargeant L, Gulliford M, Reid M, Forrester T, Thomas S. Management of diabetes mellitus in three settings in Jamaica. Rev Panam Salud Pública/ Pan Am J Public Heal [Internet]. 2001 [cited 2019 Jun 9];9(2):65–72. Available from: https://www.scielosp.org/article/ssm/content/raw/?resource_ssm_path=/media/assets/rpsp/v9n2/4296.pdf	Inappropriate phenomena of interest
Bridgelal-Nagassar R, James K, Nagassar R. Medication adherence and health insurance/health benefit in adult diabetics in Kingston, Jamaica. West Indian Med J [Internet]. 2016;65(2):320–2. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/wimj_iss2_2016_320-22.pdf	Inappropriate phenomena of interest
Abbasi J. On CDC's 70th anniversary, director Tom Frieden, MD, looks ahead. JAMA - J Am Med Assoc [Internet]. 2016;316(18):1857–8. Available from: http://jamanetwork.com/journals/jama/data/Journals/JAMA/935852/jch160038	Inappropriate phenomena of interest
Hall G. PN plus. 14a: prevention and detection. Pract Nurse [Internet]. 2004 Jan 30;27(2):37–42. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106761905&site=ehost-live	Inappropriate phenomena of interest
Selby M. Prevention of complications of diabetes oral therapies for T2D. Pract Nurse [Internet]. 2012 Mar 23;42(5):14–8. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=108172405&site=ehost-live	Inappropriate phenomena of interest
Bostock-Cox B. Prevention of diabetes. Pract Nurse [Internet]. 2015 Jun 12;45(6):29–32. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=109804739&site=ehost-live	Inappropriate phenomena of interest
Recently published abstracts. Altern Med Rev [Internet]. 2010 Sep;15(3):283–92. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104948651&site=ehost-live	Inappropriate phenomena of interest

Less L, Ragoobirsingh D, Morrison EY, Boyne M. The Jamaican lay facilitators program: a positive impact on glycemic control. Diabetes Manag [Internet]. 2011;1(2):167–73. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=364469372	Inappropriate phenomena of interest
Babwah F, Baksh S, Blake L, Cupid-Thuesday J, Hosein I, Sookhai A, et al. The role of gender in compliance and attendance at an outpatient clinic for type 2 diabetes mellitus in Trinidad. Rev Panam Salud Publica/Pan Am J Public Heal [Internet]. 2006;19(2):79–84. Available from: http://www.scielosp.org/pdf/rpsp/v19n2/30301.pdf	Inappropriate phenomena of interest
Type 2 diabetes. Nurs Stand [Internet]. 2014 Jul 16;28(46):19. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=103975403&site=ehost-live	Inappropriate phenomena of interest
Degazon C, Parker V. Coping and psychosocial adaptation to Type 2 diabetes in older Blacks born in the Southern US and the Caribbean. Res Nurs Health [Internet]. 2007;30(2):151–63. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med5&NEWS=N&AN=17380516	Inappropriate phenomena of interest
Brathwaite A, Brathwaite A, Lemonde M. Exploring health beliefs and practices of Caribbean immigrants in Ontario to prevent Type 2 Diabetes. J Transcult Nurs Off J Transcult Nurs Soc [Internet]. 2017;28(1):15–23. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=medc&NEWS=N&AN=26243716	Inappropriate phenomena of interest
DeVille-Almond J. Tackling the diabetes epidemic -- helping patients take small steps to make achievable changes. Pract Nurse [Internet]. 2005 Dec 9;30(10):4p-4p. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106444526&site=ehost-live	Inappropriate phenomena of interest
Adams O, Carter A. Diabetes and hypertension guidelines and the primary health care practitioner in Barbados: knowledge, attitudes, practices and barriers-a focus group study. BMC Fam Pract [Internet]. 2010 Dec 3 [cited 2019 Feb 10];11(1):96. Available from: https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-11-96	Incorrect participants

Adams O, Carter A. Knowledge, attitudes, practices, and barriers reported by patients receiving diabetes and hypertension primary health care in Barbados: a focus group study. BMC Fam Pract [Internet]. 2011 Dec 2 [cited 2019 Feb 10];12(1):135. Available from: https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-12-135	Incorrect participants
Irving R, Mills J, Choo-Kang E, Morrison E, Wright-Pascoe R, McLaughlin W, et al. Depressive symptoms in children of women with newly diagnosed type 2 diabetes. Prim Care Companion J Clin Psychiatry [Internet]. 2007 Feb;9(1):21–4. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105929203&site=ehost-live	Incorrect participants
Bacon C. Supporting children and young people diagnosed with type 2 diabetes in school. Br J Sch Nurs [Internet]. 2013 Jun;8(5):222–6. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107952540&site=ehost-live	Incorrect participants
Edwards H, Speight J, Bridgman H, Skinner T. The pregnancy journey for women with type 1 diabetes: a qualitative model from contemplation to motherhood. Pract Diabetes [Internet]. 2016 Jul;33(6):194. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=117151547&site=ehost-live	Incorrect participants
Lewis Y. A qualitative investigation into the impact of type 2 diabetes on African Caribbean women Implications for self-management. University of Leeds; 2002.	Full-text not available
Aguero Esquivel M. Assessing barriers that prevent treatment compliance in Hispanic adults with type 2 diabetes mellitus using focus groups [Internet]. ProQuest Dissertations and Theses. [Ann Arbor]: D'Youville College; 2014. Available from: http://ezproxy.nottingham.ac.uk/login?url=https://search.proquest.com/docview/1539704176?accountid=8018	Full-text not available
McFarlane S, Bernard O, Less L, Castillo A, Mathurin C. Diabetes in Caribbean youth. Pediatr Diabetes [Internet]. 2013;14(SUPPL. 18):153. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed14&NEWS=N&AN=71557502	Full-text not available

Dyer-Regis B, James K, Mills D. School experiences of students in the Caribbean living with diabetes. Endocr Pract [Internet]. 2016;22(Supplement 6):15. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed17&NEWS=N&AN=615077789	Full-text not available
Londono Agudelo E, Rodriguez Salva A, Seuc Jo A, Diaz Pinera A, Maldonado Cantillo G, Balcindes Acosta S. Assessment of diabetes care in the municipalities of Cardenas and Santiago (Cuba). Trop Med Int Heal [Internet]. 2017;22(Supplement 1):78. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed18&NEWS=N&AN=618977966	Full-text not available (Abstract)
Salva A, Pinera A, Hernandez L, Roche R. Gaps in the management of type 2 diabetic patients in a metropolitan area of Havana. Trop Med Int Heal [Internet]. 2017;22(Supplement 1):285–6. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed18&NEWS=N&AN=618977917	Full-text not available (Abstract)
Greaves N, Pooransingh S, Samuels T. HIV and Type 2 diabetes: A qualitative exploration of the burden of care experienced and perceived by persons living with multiple co-morbidities in Barbados and Trinidad and Tobago. West Indian Med J [Internet]. 2018;67(Supplement 2):38. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/carpha_2018_-_session_6a.pdf	Full-text not available (Abstracts)
Strachan-Bowleg D, King-Strachan K, McLean-Morgan M, Conliffe C. Dedication to my medication: factors that affect medication compliance/adherence in the adult hypertensive and type 2 diabetic population: A Bahamian experience. West Indian Med J [Internet]. 2017;66(Supplement 3):22. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/4th_scientific_session_-_wimj_bahamas_research_day_supplement_2017_cme.pdf	Full-text not available (Abstract)

Ezenwaka C, Onuoha P, Extavour R. Perceptions of caribbean type 2 diabetes patients towards insulin prescription and therapy. Diabetes [Internet]. 2019;68(Supplement 1). Available from: https://diabetes.diabetesjournals.org/content/68/Supplement_1/702-P	Full-text not available (Poster presentation)
Bartholomew L, Bynoe K, Taylor C, Taylor R, Unwin N. Barriers and facilitators to reversing diabetes Type 2: Keeping on target during a low-calorie diet. West Indian Med J [Internet]. 2016;65(Supplement 3):67. Available from: https://www.mona.uwi.edu/fms/wimj/system/files/article_pdfs/poster_presentations.pdf	Full-text not available (Poster presentation)
Abubakari A-R, Jones M, Lauder W, Kirk A, Anderson J, Devendra D. Associations between knowledge, illness perceptions, self-management and metabolic control of type 2 diabetes among African and European-origin patients. J Nurs Healthc Chronic Illnesses [Internet]. 2011 Sep;3(3):245–56. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104626350&site=ehost-live	Inappropriate study context
Osborn C, Amico K, Cruz N, Perez-Escamilla R, Kalichman S, O'Connell A, et al. Development and implementation of a culturally tailored diabetes intervention in primary care. Transl Behav Med [Internet]. 2011;1(3):468–79. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=365107257	Inappropriate study context
Moise RK, Conserve DF, Elewonibi B, Francis LA, BeLue R, R.K. M, et al. Diabetes Knowledge, Management, and Prevention Among Haitian Immigrants in Philadelphia. Diabetes Educ [Internet]. 2017;43(4):341–7. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emexa&NEWS=N&AN=621970663	Inappropriate study context
Huffman F, Vaccaro J, Nath S, Zarini G. Diabetes self management: are Cuban Americans receiving quality health care? J Health Hum Serv Adm [Internet]. 2009 Dec;32(3):278–304. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105300376&site=ehost-live	Inappropriate study context
Long J, Sowell R, Bairan A, Holtz C, Curtis A, Fogarty K. Exploration of commonalities and variations in health related beliefs across four Latino subgroups using focus group methodology: implications in care for Latinos with type 2	Inappropriate study context

diabetes. J Cult Divers [Internet]. 2012;19(4):133–42. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed13&NEWS=N&AN=368420831	
Lipton R, Losey L, Giachello A, Corral M, Girotti M, Mendez J. Factors affecting diabetes treatment and patient education among Latinos: results of a preliminary study in Chicago. J Med Syst [Internet]. 1996;20(5):267–76. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med4&NEWS=N&AN=9001994	Inappropriate study context
Brown K, Avis M, Hubbard M. Health beliefs of African-Caribbean people with type 2 diabetes: a qualitative study. Br J Gen Pract [Internet]. 2007;57(539):461–9. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed10&NEWS=N&AN=46894985	Inappropriate study context
Aponte J, Boutin-Foster C. Knowledge, perceptions, and experiences of Dominicans with diabetes. J Immigr Minor Health [Internet]. 2012;14(6):1006–13. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed13&NEWS=N&AN=366420517	Inappropriate study context
Smith C. Living with sugar: influence of cultural beliefs on type 2 diabetes self-management of English-speaking Afro-Caribbean women. J Immigr Minor Health [Internet]. 2012;14(4):640–7. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed13&NEWS=N&AN=366005424	Inappropriate study context
Smith C. Living with sugar: Socioeconomic status and cultural beliefs about type 2 diabetes among Afro-Caribbean women. Diss Abstr Int Sect A Humanit Soc Sci [Internet]. 2011;71(9-A):3321. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc8&NEWS=N&AN=2011-99050-531	Inappropriate study context
Cuevas H, Brown S. Self-management decision making of Cuban Americans with type 2 diabetes. J Transcult Nurs [Internet]. 2018 May;29(3):222–8. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=129080272&site=ehost-live	Inappropriate study context

Von Goeler D, Rosal M, Ockene J, Scavron J, De Torrijos F. Self-management of type 2 diabetes: a survey of low-income urban Puerto Ricans. Diabetes Educ [Internet]. 2003 Jul;29(4):663–72. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106695857&site=ehost-live	Inappropriate study context
Gucciardi E, Fortugno M, Senchuk A, Beanlands H, McCay E, Peel E. Self-monitoring of blood glucose in Black Caribbean and South Asian Canadians with non-insulin treated type 2 diabetes mellitus: a qualitative study of patients' perspectives. BMC Endocr Disord [Internet]. 2013 Jan;13(1):46. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104116042&site=ehost-live	Inappropriate study context
Aponte J, Campos-Dominguez G, Jaramillo D. Understanding diabetes self-management behaviours among Hispanics in New York City. Hisp Health Care Int [Internet]. 2015;13(1):19–26. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med8&NEWS=N&AN=25741930	Inappropriate study context
Majeed-Ariss R, Jackson C, Knapp P, Cheater F. A systematic review of research into black and ethnic minority patients' views on self-management of type 2 diabetes. Heal Expect [Internet]. 2015 Oct;18(5):625–42. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=109969037&site=ehost-live	Inappropriate study context
Erickson D. Barriers to physical activity in people with type 2 diabetes mellitus enrolled in a worksite disease management program [Internet]. ProQuest Dissertations and Theses. [Ann Arbor]: Rush University; 2008. Available from: http://ezproxy.nottingham.ac.uk/login?url=https://search.proquest.com/docview/304340905?accountid=8018	Inappropriate study context
Greener M. Can we ever really tackle diabetes in ethnic minorities? Pract Diabetes [Internet]. 2015 Jun;32(5):165–6. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=109800144&site=ehost-live	Inappropriate study context
Davies K. Cultural competence. Addressing the needs of an ethnic minority diabetic population. Br J Nurs [Internet]. 2006 May 11;15(9):516–9. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106314226&site=ehost-live	Inappropriate study context

Casey R, Rouff M, Jauregui-Covarrubias L. Diabetes among Latinos in the Southwestern United States: border health and binational cooperation. Rev Panam Salud Publica [Internet]. 2014 Dec;36(6):391–5. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=103766192&site=ehost-live	Inappropriate study context
Goldie L. Diabetes management in primary care. Pract Nurse [Internet]. 2008 Jul 11;36(1):14–7. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105790870&site=ehost-live	Inappropriate study context
Gomersall T, Madill A, Summers L. Getting one's thoughts straight: a dialogical analysis of women's accounts of poorly controlled type 2 diabetes. Psychol Health [Internet]. 2012 Mar;27(3):378–93. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104530188&site=ehost-live	Inappropriate study context
Anguita M. Next generation of diabetes drugs arriving, but approach with caution. Nurse Prescr [Internet]. 2013 Feb;11(2):58–60. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104313243&site=ehost-live	Inappropriate study context
Dhippayom T, Fuangchan A, Tunpichart S, Chaiyakunapruk N. Opportunistic screening and health promotion for type 2 diabetes: an expanding public health role for the community pharmacist. J Public Health (Bangkok) [Internet]. 2013 Jun;35(2):262–9. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104175677&site=ehost-live	Inappropriate study context
Capaldi B. Optimising glycaemic control for patients starting insulin therapy. Nurs Stand [Internet]. 2007 Jul 11;21(44):49–60. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106143524&site=ehost-live	Inappropriate study context
Dean E. Physical therapy in the 21st century (part I): toward practice informed by epidemiology and the crisis of lifestyle conditions. Physiother Theory Pract [Internet]. 2009 Jul;25(5/6):330–53. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105397613&site=ehost-live	Inappropriate study context

Alvarez S. Type 2 diabetes program geared toward Latinos fosters more than Self-Management. Generations [Internet]. 2014 Dec;38(4):41–5. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=103786042&site=ehost-live	Inappropriate study context
Mulligan K, McBain H, Lamontagne - Godwin F, Chapman J, Haddad M, Jones J, et al. Barriers and enablers of type 2 diabetes self-management in people with severe mental illness. Heal Expect [Internet]. 2017 Oct;20(5):1020–30. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=125188968&site=ehost-live	Inappropriate study context
McBain H, Begum S, Rahman S, Mulligan K. Barriers to and enablers of insulin self-titration in adults with type 2 diabetes: a qualitative study. Diabet Med [Internet]. 2017;34(2):253–61. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=medc&NEWS=N&AN=27505306	Inappropriate study context
Moore A, Stanton-Fay S, Rivas C, Harding S. Co-design of a theoretically based diabetes self-management education and support programme for UK African and Caribbean patients with type 2 diabetes: Healthy Eating & Active Lifestyles for Diabetes (HEAL-D). Diabet Med [Internet]. 2018;35(Supplement 1):129. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emexa&NEWS=N&AN=621462433	Inappropriate study context
Moore A, Rivas C, Harding S. Designing the Healthy Eating and Active Lifestyles for Diabetes (HEAL-D) intervention: exploring barriers around adoption of lifestyle management advice in African and Caribbean patients with type 2 diabetes. Diabet Med [Internet]. 2017;34(Supplement 1):125. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed18&NEWS=N&AN=614844898	Inappropriate study context
Moore A, Rivas C, Harding S. Designing the Healthy Eating and Active Lifestyles for Diabetes (HEAL-D) intervention: exploring the barriers and facilitators to delivering culturally-tailored care for diabetes in African and Caribbean communities. Diabet Med [Internet]. 2017;34(Supplement 1):126. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed18&NEWS=N&AN=614844942	Inappropriate study context

Carbone E, Rosal M, Torres M, Goins K, Bermudez. Diabetes self-management: perspectives of Latino patients and their health care providers. Patient Educ Couns [Internet]. 2007 May;66(2):202–10. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=105982424&site=ehost-live	Inappropriate study context
Abubakari A-R, Jones M, Lauder W, Kirk A, Anderson J, Devendra D. Ethnic differences and socio-demographic predictors of illness perceptions, self-management, and metabolic control of type 2 diabetes. Int J Gen Med [Internet]. 2013;6:617–28. Available from: http://www.dovepress.com/getfile.php?fileID=16931	Inappropriate study context
Kollannoor-Samuel G, Vega-Lopez S, Chhabra J, Segura-Perez S, Damio G, Perez-Escamilla R. Food insecurity and low self-efficacy are associated with health care access barriers among Puerto-Ricans with type 2 diabetes. J Immigr Minor Heal [Internet]. 2012;14(4):552–62. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med7&NEWS=N&AN=22101725	Inappropriate study context
Scott P. Lay beliefs and the management of disease amongst West Indians with diabetes. Health Soc Care Community [Internet]. 1998 Nov;6(6):407–19. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107190323&site=ehost-live	Inappropriate study context
Adams C. Lessons learned from urban Latinas with type 2 diabetes mellitus. J Transcult Nurs [Internet]. 2003 Jul;14(3):255–65. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=106856467&site=ehost-live	Inappropriate study context
Noakes H. Perceptions of black African and African-Caribbean people regarding insulin. J Diabetes Nurs [Internet]. 2010 Apr;14(4):148–56. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=104965192&site=ehost-live	Inappropriate study context

Deitrick L, Paxton H, Rivera A, Gertner E, Biery N, Letcher A, et al. Understanding the role of the promotora in a Latino diabetes education program. Qual Health Res [Internet]. 2010;20(3):386–99. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med6&NEWS=N&AN=20133505	Inappropriate study context
Jager MJ, van der Sande R, Essink-Bot M-L, van den Muijsenbergh METC, M.J. J, R. van der S, et al. Views and experiences of ethnic minority diabetes patients on dietetic care in the Netherlands - a qualitative study. Eur J Public Health [Internet]. 2019;29(2):208–13. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emexa&NEWS=N&AN=626968982	Inappropriate study context