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Introduction

1.1) Introduction

As this study uses the terms Cardio Pulmonary Resuscitation (CPR) and Basic Life Support (BLS) a great deal, it is appropriate to define these terms from the outset.

Cardio Pulmonary Resuscitation (CPR) is defined as; “an emergency procedure for life support consisting of artificial respiration and manual external cardiac massage. It is used in cases of cardiac arrest or apparent sudden death resulting from electric shock, drowning, respiratory arrest or other causes to establish effective circulation and ventilation in order to prevent irreversible brain damage” (Oxford University Press 2008a).

Basic Life Support (BLS) is defined as: “the provision of treatment designed to maintain adequate circulation and ventilation to a patient in cardiac arrest without the use of drugs or specialist equipment” (Oxford University Press 2002)

Basic Life Support (BLS) provision is a vital part of the role of a ward nurse, as most BLS is initiated by nursing staff (Boyde and Wotton 2001). However, much of the literature which has been conducted into Nurses BLS abilities suggests that nurses do not possess the skills needed to perform BLS in an emergency situation (Kaye and Mancini 1986, Nyman and Sihvonen 2000, Wynne et al 1987, Hamilton 2005). Further to this there is little evidence of the levels of confidence that nurses have in their ability to perform BLS.

1.2) Success rates of CPR

Both healthcare professionals and members of the public have high expectations of success rates of CPR. In a study by Roberts et al (2000) health care professional respondents expected

resuscitation to be successful in 24% of adult cases and 41% for paediatric attempts. It is true that BLS, along with the other elements of the chain of survival (see section 2.2), can be a life saving procedure but it is often the case that survival to discharge from hospital is very low. In a study conducted by Kuisma and Jaara (1997) one ambulance service reported attempting 162 resuscitations in a two year period. Of these 162 patients only 59 (36.4%) regained spontaneous circulation, that is to say that their heart could pump blood around the body without assistance. However, only eight patients survived to be discharged from hospital and even this is classed as a high success rate.

Within a hospital setting, as one might expect return of spontaneous circulation was much higher: as high as 75% in some cases according to Pottle and Brant (2000). It is not clear from this study, however, how many people survived to be discharged from hospital or what their quality of life was like.

If success rates vary so much, it simply highlights the importance of early effective CPR as described in the Chain of Survival (King 2009), this is because the patient deserves the best care possible that will provide them with the highest possible chance of survival.

1.3) Rationale for study

The topic in question was selected as it has always been of interest to the author and the relevant literature clearly shows that nurses and student nurses' skills and knowledge of BLS deteriorates after training (Greig et al 1996, Badger and Rawstorne 1998, Nyman and Sihvonon 2000, Pottle and Brant 2000). Hamilton (2005) suggests CPR training is mandatory and important as nurses are often the first to discover the victims on an in-hospital arrest. Furthermore, Nyman and Sihvonon (2000 page 179) state that "Adequate resuscitation by nurses is an important factor in determining

survival from an episode of ventricular fibrillation". There is strong evidence in the literature that highlights the poor standard of BLS skills amongst qualified and student nurses (Cooper and Libby 1997, Badger and Rawstorne 1998, Nyman and Sihvonen 2000, Pottle and Brant 2000); most of which were conducted over a decade ago; before new standards and guidelines for BLS had been developed. Since then skills training has developed with the use of new improved, more accurate mannequins. Through informal discussions with other student nurses it has also become clear that they feel under-prepared despite having received annual BLS training. Therefore, it is important to evaluate student nurses the effect of the BLS training students on their confidence when they are in practice.

1.4) Aims and objectives of the study

The original research question for this article was; what effect does BLS training and personal experience of resuscitation (if applicable) have on student nurses confidence of their ability to perform basic life support. On the basis of this research question the following aims and objectives were formulated:

Aims and Objectives

The aim of this study was to investigate the effect of basic life support training and personal experience of resuscitation on student nurses' confidence in their ability to perform BLS.

Objectives:

- ◆ To conduct a critical review of the literature surrounding the training of BLS amongst student nurses.
- ◆ To investigate the effect of mandatory BLS on student nurses' confidence in their ability to

perform Basic Life Support.

- ◆ To investigate the effect of personal experience of BLS situations on student nurses' confidence in their ability to perform Basic Life Support.
- ◆ To investigate the effect of any external additional training on student nurses' confidence of their ability to perform Basic Life Support.
- ◆ To assess student nurses perceptions of the frequency, style and setting of their BLS training.

1.5) Summary

Each of the chapters in this study will focus on a different aspect of the research project at hand. Chapter Two considers the literature published about BLS competence in nurses and BLS training methods. Chapter Three discusses research methodology and the methods used in this study. Chapter Four covers the findings and analysis of this study. Chapter Five discusses how results relate to current published literature. Chapter Six concludes by highlighting the implication for nursing, recommendations for future research and nurse education.

Literature review

2.1) Introduction and Search Strategy

This chapter will consider the published literature that surrounds the topic of Basic Life Support (BLS). The aim is to outline the BLS skills of both student and qualified nurses. The Chain of Survival, which is considered by many to be very important in resuscitation care, will also be explored. The literary debate surrounding confidence and competence will also be discussed, and following this the variety of training methods used to teach BLS shall be examined. Below, is a table outlining the search strategy used in the literature review, which includes the number of search results for each search. Search terms which were combined with and were then manually searched to identify relevant articles.

Data Bases Searched	Search Terms Used	Number of Results
British Nursing Index (OvidSP)	Basic Life Support	63
	BLS	4
	Cardiopulmonary resuscitation	247
	Resuscitation	705
	CPR	103
	Student Nurses	1 872
	Nurses	33 775
	Basic life support and Student Nurses	3
	Basic Life support and Nurses	14
	Resuscitation and Student Nurses	4
	CPR and Nurses	16
	CPR and Student Nurses	2
	MEDLINE (OVID) 1996-Present	Basic Life Support
BLS		536
Cardiopulmonary resuscitation		6 120
Resuscitation		5 078
CPR		3 250
Student Nurses		790
Nurses		10 402
Basic life support and Student Nurses		2
Resuscitation and Student Nurses		0
CPR and Nurses		18
CPR and Student Nurses		2
PsycINFO (Ovid)	Confidence	26 485
	Competence	10 636
	Basic life support	9
	Competence and confidence	258
	Confidence and Basic life Support	3

Table 1: Search Strategy Used.

2.2) Chain of survival

As highlighted by King (2009 page 47) “Effective resuscitation is dependent on a number of interventions happening within as short a time period as possible.” The Chain of Survival represents the combination of the individual components required to effectively manage a cardiac emergency. The four links of the chain of survival are shown below:



Figure 1: The Chain of Survival.

The concept of the chain of survival has not changed significantly since it was first introduced. However individual components such as BLS (the term CPR is used in the diagram above) and the implementation of the defibrillation element in the 1980's has demonstrated the systems' ability to develop according to the most recent evidence based practice.

2.2.1) Early recognition and call for help

BLS can be initiated by any trained person in a variety of locations as the use of any advanced equipment is not required. The main concern of BLS is to provide the patient with a patent airway, administer ventilations and closed chest compressions. Its other concern is to ensure that advanced airway/breathing equipment, a defibrillator, emergency drugs and personnel who are trained in ALS (Advanced Life Support) are dispatched at the earliest opportunity. King (2009, page

48) also states that “Telephoning for assistance relies on the rescuer assessing the casualty, accurately recognising the situation and responding by summoning help. Early access will not be achieved if the rescuer:

- ◆ chooses not to approach the casualty – real or perceived risks
- ◆ fails to recognise the serious nature of the situation
- ◆ does not know how to access help – inadequate training”

(King 2009, page 48)

As this stage of the Chain of Survival can be carried out in a hospital environment and it is often nursing staff or nursing students who are the first to discover patients having a cardiac event (such as chest pain) it is important that they are adequately trained in how to recognise the serious nature of the situation and in how to access help.

2.2.2) Early CPR

Closed chest compressions only achieve 25-30% of normal cardiac output (Resuscitation Council 2005), therefore it would be accurate to say that CPR delivers considerably less oxygen than a person would normally receive if they were able to maintain their own normal output. Cardiac output is defined as the amount of blood pumped out by *each* ventricle in one minute. Cardiac output is calculated as a product of heart rate and stroke volume (stroke volume is the amount of blood pumped out by *one* ventricle with each heart beat.) A normal adult stroke volume is around 5.25 litres/min (calculated using normal resting heart rate of 70 beats per minute and a stroke volume of 70ml per beat). As the normal adult blood volume is around 5 litres, the entire blood supply passes through each side of the heart once in each minute (Marieb and Hoehn 2007). As the patient will be receiving significantly less oxygen than normal CPR alone cannot prevent the

effects of oxygen damage over an extended period of time. This therefore, emphasises the importance of summoning for advanced help as early as possible. The main purpose of CPR is to perfuse the body's vital organs (e.g. the brain and heart) during a period in which circulation is absent. It will rarely restore adequate circulation on its own which is why the next step in the chain, early defibrillation, is so important.

2.2.3) Early Defibrillation

CPR is used as a means to buy time, however if a defibrillator is immediately available then it should be used without delay (King 2009). Approximately 30% of cardiac arrests which occur inside a hospital have a 'shockable rhythm' when they enter cardiac arrest, and in these cases an automated or manual defibrillator can be used to restore the heart to normal sinus rhythm. As students, nurses are not trained or authorised to operate automated defibrillators however they play a vital role in summoning help who would be trained to use such equipment.

2.2.4) Post resuscitation care

Although more lives are saved by the effective and prompt implementation of the first three stages of the Chain of Survival (King 2009) the aim of early Post resuscitation care is to stabilise the patient as much as possible in the period after spontaneous circulation has been restored as the patient will be physiologically and physically vulnerable. It is also hoped that as great a quality of life as possible will be restored. The work of the cardiac arrest team (or paramedics if the arrest occurs outside of a hospital setting) may include some or all of the following actions:

- ◆ Intubation either endobronchial or endotracheal – to protect the airway.
- ◆ Securing IV (Intravenous) access – for the administration of IV cardiac drugs e.g. adrenaline.

- ◆ Obtaining as full a clinical history as is possible to ascertain and treat any reversible causes of the cardiac arrest as quickly as possible.
- ◆ Ensuring that CPR remains effective to allow the patient to have as much time as possible

In a hospital based setting the emphasis for the implementation of the Chain of Survival is the early assessment and recognition of patients who are at risk and responding quickly and effectively to prevent cardiac arrests from occurring.

2.3) Nurses skills in BLS

As nurses and nursing students are often the first to discover patients who have suffered a cardiac arrest (Boyde and Wotton 2001), it is vital that they are adequate and appropriately trained to perform BLS. It is also important that students feel confident in their ability to perform BLS should they need to. Many studies over the last two decades have identified BLS knowledge and skills decline over time. (Nyman and Sihvonen 2000, Hamilton 2005, Badger and Rawstrone 1998, Greig et al 1996, Boyde and Wotton 2001 Madden 2005).

BLS knowledge is difficult to retain and remember and the levels of retention vary significantly between individuals (Greig et al 1996, Badger and Rawstorne 1998, Nyman and Sihvonen 2000, Pottle and Brant 2000). It is also found that many student nurses' scored themselves highly for self rated knowledge and ability to perform CPR, this is despite the knowledge and skills gaps in most, if not all areas of CPR/BLS (Jospovic, Webb and McGrath 2009, Castle et al 2007, Nyman and Sihvonen 2000, Kruger and Dunning 1999) It is perhaps unsurprising that performance is poor as BLS is a very complex psychomotor task and nurses are expected to recall and perform up to 50 psychomotor skills at one time (Wollard et al 2004). In a literature review relating to BLS, (Hamilton 2006) has highlighted multidisciplinary research showing that resuscitation knowledge

and skills decline from 3 to 6 months following lecture style training. Madden (2005) has demonstrated that although training did improve CPR knowledge and skills against pre-test scores, at no point in the study did any participants pass a skills assessment. Current literature also highlights that methods of BLS training may also have an effect on confidence and retention of BLS skills (Hamilton 2005, Kakora-Shiner 2009, Boorse Fabius et al 1994).

2.4) Confidence .v. Competence

Although a great deal of the literature surrounding BLS focuses on the person's ability to perform the skills and knowledge of BLS little is reported in the literature surrounding the a person's confidence levels regarding BLS and what factors may influence these levels of confidence. Castle et al (2007) conducted a study which compared the confidence levels of doctors, registered nurses and health care assistants with their competence levels when assessed on specific skills. They state that the combination of training and clinical exposure improves both confidence and competence. However they do also point out that an individual's confidence does not always directly reflect competence. This is a statement reflected by other researchers such as Kruger and Dunning (1999 page 1121) who argue that "People tend to hold overly favourable views of their ability in many social and intellectual domains."

2.4.1) Confidence and competence: definition of terms

The dictionary defines the terms confidence and competence stand as follows:

Confidence (noun):

- 1** the belief that one can have faith in or rely on someone or something.
- 2** self-assurance arising from an appreciation of one's abilities (Oxford University Press 2008b).

Competence (noun) (also **competency**):

the ability to do something well (Cambridge University Press 2007).

Worryingly, in previous studies investigated by Stewart et al (2000) in which researches have measured and discussed their findings using the terms confidence and competence very little information was given about their meaning. Furthermore, none of the articles included an analysis of definition of the terms used, and they often appear to be used synonymously. As stated above there are of course dictionary definitions of both confidence and competence. However, it is important that meanings are clarified by researchers as a definition is particularly important when analysing the studies. Without clear definitions understanding the rationale for the methods are difficult to interpret. As highlighted by Stewart et al (2000) "measuring any aspect of one's self or personal performance is neither easy nor straightforward. As self evaluation is by its very nature a subjective measurement, individuals are likely to adopt different self-evaluation methods depending on what they are doing and who they are with. Stewart et al (2000) argue that this may account for any differences in self-reported confidence scores and this should be taken into account when researching such matters through adequate validity testing of these methods. This statement is mirrored by Strube (1990) and Regehr et al (1996) who argue that accurate self-appraisal is the exception, not the normal and self-appraisal must be recognised as a process and not an outcome and it is more important that an individual can identify areas in which he/she is relatively effective and areas in which he/she is relatively ineffective' (p 552). It is this ability to reflect that is to be considered as clinically significant as the ability to evaluate accurately what one is capable or is not capable of doing, that will make people into safer practitioners and potentially more secure learners. In turn the knowledge of self perceived confidence could be used as a framework to encourage a self-directed, needs-driven learning regime.

Stewart et al (2000) suggests that "Confidence was undoubtedly an important construct for the house officers and there was some indication that when present, it was the factor that dictated whether or not the house officer would undertake a task" (page 905). Stewart et al (2000) also go on to point out that "The house officer might not have carried out the task before and therefore could not assess their ability, that is, their perceived competence. Consequently they would assess how confident they felt about performing the task without causing significant detrimental effects. Thus, feelings of confidence involved assessing risk. Confidence also allowed the house officer to continue performing a task if initially unsuccessful" (page 905). Although it is accepted within the literature that levels of self perceived confidence do not marry up with performance in assessments (Stewart et al 2000, Morgan and Cleave-Hogg 2002) the above statement highlights the clinical significance of self perceived importance and its potential impact on the ability and willingness to perform clinical procedures in practice.

Stewart et al (2000) also highlight that levels of confidence should be tempered with knowledge of personal limitations and weaknesses. Otherwise individuals who are overconfident may perform tasks for which they are not trained to undertake or attempt tasks without first analysing risk. Whilst on the other hand those who are under confident may not be able to work independently of supervision or may suffer from high and uncontrollable levels of anxiety.

Morgan and Cleave-Hogg (2002) in their study comparing medical students' experience, confidence and competence, concluded that clinical experience and level of confidence had no predictive value in performance of standardised tests. However, they did discover that "There was a significant correlation between the number of times a task was performed and the perceived level of confidence for all tasks used in the analysis" (page 536). Therefore, implying that clinical experience improves student confidence. However, this judgment should be considered with

caution when applying such conclusions to clinical practice. It is important to remember that self perceived confidence does not always equate to competence. Morgan and Cleave-Hogg (2002) also discovered that “The students in our study exhibited a wide range of clinical experience in different skills and management problems...However; there were no correlation between experience and performance assessments. In addition, there was no correlation between students’ level of confidence and either clinical or written examination grades” (page 537). These findings were also supported by other studies conducted on the topic. For example Beck et al (2007) reported that performance on a multiple-choice examination is independent of the number of patients seen. There are many documented reasons for this lack of correlation between clinical experience and examination results. McManus et al (1998) suggested that such results may be reflective of a lack of validity of the examination itself. However, even when standardised examinations such as the Objective Structured Clinical Examination (OSCE) are used, little association is seen between clinical experience and OSCE scores (Jolly et al 1996).

Furthermore there are also other researchers who have highlighted the flaws in self assessment. Dunning et al (2004) highlights the many ways in which self assessments of both skills and character are substantially flawed. He argues that “In general, people’s self-views hold only a tenuous to modest relationship with their actual behavior and performance...indeed, at times, other people’s predictions of a person’s outcomes prove more accurate than that person’s self-predictions” (Dunning et al, page 69).

There is a general opinion within the literature that with the implementation in many countries of an ‘all graduate’ approach to nurse training has led to the situation that “...nurses, although better equipped with theory and research evidence, loose something of practical experience and may not

seem to be as 'competent' on first qualification" (Roberts 2009). However, it is important to note that these views are often not based on empirical evidence. Lauder et al (2008 pages 35-36) state that "The belief that students lack clinical skills remains widely held even though these evaluations [of nursing training courses] produced no objective evidence that...students are any less competent than students that undertook earlier curricula". Lauder et al (2008) also highlight that these interpretations relied on the opinions of managers and qualified nurses on the competence of such students before they had completed their course.

2.5) BLS training methods

A significant portion of the literature is devoted to the effect of different teaching approaches on retention of BLS knowledge and skills. There is a general consensus in the literature that Computer Aided Learning (CAL) as a method of teaching BLS helps to improve theoretical knowledge but not practical skills, and it would be important for nurses to make use of the practical equipment between updates (Hamilton 2005). However, there are also a number of positive aspects of CAL highlighted in the literature, including increased accessibility, the fact that it would allow training to take place over a longer time frame and the idea that a computer is an unbiased examiner that is able to always provide feedback and points for improvement (Tanner and Gitlow 1992, Wormuth 1992 taken from Hamilton). In contradiction to most research, Fabius et al (1994) found that most participants preferred the lecture style method of teaching in comparison to the CAL package as they considered CAL to be more time consuming. However, this study had limitations such as the use of multiple instructors, the unequal amount of time spent with the experimental group and the unequal size of the groups at the re-qualification stage of the study.

Arrest simulations are considered by some researches as the most effective way of teaching BLS as stated by Hamilton (2005 page 292), "a real cardiac arrest is not the time for learning CPR." With

the invention of more specialised mannequins, practical classroom based teaching is now the most appropriate method as now many mannequins are able to simulate medical emergency.

Hendriskse et al (2001) suggests that simulation training is positive as it helps to improve participant's knowledge in a relatively realistic area and enables them to familiarise themselves with emergency equipment and procedures. However, as highlighted by Hamilton (2005) most of the studies that looked at arrest simulations did not formally assess the CPR performance of the participants and the main focus of the approach is to improve team work and increase the practice of essential roles during an emergency situation. One of the few studies that assess competence and retention was a study by Granneman and Conn (1996) which compared two different types of arrest simulation training. The results showed that the two groups had similar knowledge retention rates at 6 months. It is not possible to comment on their practical skills as these were not formally assessed.

A further teaching method for BLS that has been identified in the literature is that of peer tuition. Perkins et al (2002) found that it provided the peer tutors with valuable teaching experience and that they were able to train the student to a higher standard than that achieved by lecturer lead teaching. A finding that is supported by Ward and Ward (1996), who reported that regardless of at the point in the training that the peer tutor was, introduced the performance of the subjects improved. However, two major limitations of this study were the small sample size (only 10 participants were tested), plus the fact that all students had to achieve certification as part of their course may have influenced the pass rate.

2.6) Summary

BLS as part of the Chain of Survival is a vitally important part of the care of nursing care. It is a vital part of the role of a ward nurse, as most BLS is initiated by nursing staff. The Chain of Survival has

not changed significantly since it was first introduced, however individual components such as BLS and the implementation of the defibrillation element in the 1980's has demonstrated the tools ability to develop according to the most recent evidence based practice. It has also been demonstrated that a significant portion of the literature is devoted to the effect of different teaching approaches on retention of BLS knowledge and skills. Each of the teaching methods which have been explored has their advantages and disadvantages such as with the Computer Aided Learning (CAL) which has been shown to increase accessibility, and therefore allow training to take place over a longer time frame, furthermore there is the idea that a computer is an unbiased examiner that is able to always provide feedback and points for improvement (Tanner and Gitlow 1992). Research also shows that BLS knowledge and skills decline over time (Nyman and Sihvonen 2000, Hamilton 2005, Badger and Rawstrone 1998, Greig et al 1996, Boyde and Wotton 2001) and that BLS knowledge is difficult to retain and that the levels of retention vary significantly between individuals (Greig et al 1996, Badger and Rawstorne 1998, Nyman and Sihvonen 2000, Pottle and Brant 2000).

Although a great deal of the literature surrounding BLS focuses on the person's ability to perform the skills and knowledge of BLS little is reported in the literature surrounding the a person's confidence levels regarding BLS and what factors may influence these levels of confidence. It is however, important to note that the articles which discuss the idea of competence and confidence often neglect to define the terms under which these words were used thus making it difficult when analysing and interpreting such studies.

The following chapter will discuss the chosen methodology for this study in terms of the research design, sampling method and data collection tool.

Methodology

3.1) Introduction

The previous chapter highlighted that there is a direct correlation between experience and confidence. However, it was also shown that a higher self-reported confidence score does not directly relate to an increase in competence. This chapter will outline and justify the reasons for the chosen methodology for this study in relation to the sample, research design and data collection method.

The chosen methodology hopes to reflect both the aims and objectives of this study (See section 1.4) and take into account the body of existing evidence as described in the literature section of this study.

3.2) Methodology

The methodology used as part of the research process should take into account the purpose of the study being performed. Therefore, it is important to first examine the two main research paradigms.

The two main principles research methods are the quantitative and qualitative approach. Quantitative research is used when the area to be researched can be reduced into discrete and definable variables which can be tested and measured. Often the aim is to show a causal relationship between two variables for example "Is social support related to patients and husbands psychosocial adjustment to breast cancer?" (Noll, Hoskins and Mariano 2004 page 7). The quantitative method is very popular respected and effectively used (Polit and Tatano-Beck 2006, Clark 1995). However, it has its limitations; nursing research often wants to examine

humans and human relationships which are both complex and diverse. Within quantitative methodology there is often little consideration of individual experience (Clark 1995). Critics of the quantitative methodology argue that this narrowness and inflexibility cannot fully capture the reality of human experience (Polit and Tatano-Beck 2006).

Such limitations of the quantitative approach have meant there is an increasing interest in the qualitative approaches to nursing research since the 1970's (Holloway and Wheeler 1996). Qualitative research tends to look at a small area to be researched in depth with very few presupposed views with regards to the outcome (Tarling and Crofts 1998). Researchers are able to explore the dynamic and individual aspects of any phenomenon they find (Polit and Tatano-Beck 2006, Couchman and Dawson 1990). The overall aim being to understand, analyse and add to current knowledge and research around a particular subject (Clark 1995). However, this methodology has many limitations; the main difficulty is the subjective nature of data interpretation and often very small sample sizes, both of which raise questions about the ability to generalise the findings.

The literature review highlighted that in general, studies that have examined knowledge, actions and effect in healthcare tend to use a quantitative approach.

The quantitative approach was chosen in this instance because it is thought that this approach would provide numerical data which can be subject to statistical analysis that could be able to confirm or disprove a hypothesis.

3.3) Hypothesis

The word hypothesis is defined by Polit and Tatano Beck (2004) as “a statement of the researcher’s expectations about relationships between the variables under investigation.

Hypotheses, in other words are predictions of expected outcomes...” The research hypothesis for this study is as follows:

- ◆ Student Nurses, who have experienced mandatory basic life support training as part of their nursing course, will show difference in their self-reported confidence score of their ability to perform BLS.

Along with a research hypothesis comes a null hypothesis which is a statement that there will be no relationship between the two variables being investigated. When statistical tests are being performed in order to analyse the data the null hypothesis for this study is assumed. In the case of this study the null hypothesis is:

- ◆ Student Nurses, who have experienced mandatory BLS training as part of their nursing course, will show no difference in their self-reported confidence score of their ability to perform basic life support.

The effect of personal CPR experience and extra BLS training on confidence levels will also be examined.

3.4) Research design

The research design was selected to address the aims and test the hypothesis of the study. It is also important to note that the research aim is not descriptive but plans to find a link. Currently the School of Nursing at the Higher Education Institute involved in this study provides mandatory

annual updates in BLS. The design chosen for this study was a within-subjects design, also sometimes known as a repeated measures design. This design was selected as it allows for comparisons between the same individual at two points in time. In this recordings of self confidence were taken before and after the administration of at least one session of mandatory BLS training. Ideally this study would have also been longitudinal in design, meaning that it would have taken place over more than one point in time, as is the case with most within-subject design studies. However, due to time constraints, it was not possible to make this study longitudinal and as such participants baseline confidence scores (the participants confidence score before they started their course) was obtained retrospectively. The disadvantages of this will be addressed in the discussion chapter (Section 5.4.3) of this study. One of the main advantages however, of a within type study is that it ensures the highest possible equivalence within subjects on factors such as age, gender and experimental treatments because they are the same person.

3.5) Research instrument

There are many ways in which to collect quantitative data, structural quantitative approaches to collecting data are the most appropriate when researchers have clear aims and objectives as with this study (Polit and Tatano Beck 2006). The need for a large sample size was highlighted by Noll Hoskins and Mariano (2004) and it was therefore decided that a large scale survey/questionnaire method would be the most appropriate as it would be cost effective and the least labour intensive way of obtaining information from such a large sample (Tarling and Crofts 1998, Cormack 2000). Questionnaires are the most common method of data collection in health and social care research (Parahoo 1997) as questionnaires are flexible and adaptable to a wide variety of subjects and settings. In addition to this they are also easy to collect anonymously which is helpful in maintaining confidentiality and this more likely to result in more honest answers on sensitive,

embarrassing or revealing topics such as confidence (Parahoo 1997). Furthermore, according to Parahoo (1997) and Polit et al (2001) when testing attitudes, ideas or self-beliefs questionnaires are particularly effective at reducing potential researcher bias and a subjective interpretation when closed questions are used. On the other hand there are also well documented limitations to this approach. For example LoBiondo-Wood and Haber (1998) along with Couchman and Dawson (1995) who recommend that questionnaires “should be as short as possible, otherwise the respondent may become tired and bored or not even bother at all” (Couchman and Dawson 1995 page 78). It is also important that the questions used in the questionnaire are clear, as lack of clarity may result in the participants not understanding the questions or what they are being asked for. This in itself emphasises the importance of getting the questionnaire right and thus the importance of piloting the questionnaire to ensure validity of the questions being asked. These factors will all act to increase the likely response rate.

The questionnaire used included a mixture of open and closed questions. Closed questions give the participants a list of pre-specified responses. The benefits of such questions include that it allows responses to be more easily compared and analysed statistically, also individuals are able to fill in more answers in a given time therefore leading to an increased response rate. However, there are also negative aspects of questionnaires. Closed questions are more difficult to construct as researcher may miss out an important response or the responses may be very superficial or respondents may not complete a question as they do not feel they agree with any of the options stated (Couchman and Dawson 1995). This once again highlights that any completion instructions should be very clear and ideally a pilot study should be completed to ensure clarity in the questionnaire.

On the other hand, a very small number of open ended response questions may also be of benefit as they have the advantage that they allow the responder to answer in their own words, allowing for depth in an answer if the respondent is a verbally expressive person. However, by its nature qualitative data is more difficult to process and many respondents may be unwilling to write lengthy answers (Polit and Tatano Beck 2006).

The questionnaire which was used in this study consisted of 17 questions (See Appendix 1). The first three of which explored the student nurses year of study, chosen branch and type of nursing course, for example, Diploma, Bachelors' degree or Masters' degree. These questions were included simply to map out the demographic of the sample used for the study. The fourth and seventeenth questions were of most importance as these questions formed the marker for the baseline and current confidence scores respectively. The other questions, which included a mixture of open and closed questions, were grouped to explore if the student nurses in the sample had either any personal experience of being involved in a resuscitation attempt or had received any BLS training in addition to that which they receive as part of their nursing course. There were also questions (numbers seven and eleven) included that explored if this extra training and/or experience had either a positive or negative effect on the students confidence.

Furthermore as the literature review conducted highlighted that different styles and frequency of training had an effect on student nurses competence when it comes to BLS knowledge and skills (See section 2) the author was also interested to see if the student nurses sampled wished to have the frequency of their training changed.

3.6) Reliability and validity

The quality of a quantitative study is dependent on its reliability and validity. It has been suggested by Polgar and Thomas (2000) that a poorly designed questionnaire may produce data which does not truly reflect the views of the respondents. One of the more effective ways to test reliability is through the use of a pilot study (Cormack 2000). There are many benefits to using this method, the most important is to test if any changes need to be made to the questionnaire and ensure that the questions are clear, easy to read and that the flow of the questionnaire was good. During the design of the research questionnaire the wording of certain questions was explored by the researcher with the pilot group to assess what they believed the questions meant, which resulted in changes. Changes were also made as a result of the ethical approval process. A copy of the questionnaire can be found in the appendix one. The piloting of the study and subsequent changes made was a time consuming process; however this is an important aspect of the research process in ensuring validity and reliability.

Other than the use of a pilot study the main measure of validity was face validity. This is defined as “the extent to which a measuring instrument looks as though it is measuring what it purports [claims] to measure” (Polit and Tatano Beck 2004). The approach of using only face validity is no longer considered acceptable evidence of true validity. However it is argued by Burns and Grove (2005 page 377) that face validity is “still an important aspect of the usefulness of the instrument” as they claim that willingness of the participants to complete the questionnaire is linked to their perception that the questionnaire measures the subject matter they believe it to.

3.7) Study sampling and questionnaire coding

The sampling method used is a key component of a good study. Errors or problems with sampling at any stage in the study can lead to compromised results, even more so in a quantitative study. Sampling can be defined as “the process of selecting a portion of the population to represent the entire population” (Polit and Tatano Beck 2004 page 731). The sampling method used in this study was a non-randomised convenience sample. Such a method is referred to a convenient sample as this method uses the most conveniently available participants. The advantages of such a method are clear; a convenience sample is both a convenient and economical method, both of which were important factors in the choice of method for this study (LoBiondo-Wood and Haber 2000). Sadly this method has flaws, the main flaw being that of sample selection bias sometimes known as sampling error, which means that the sample selected does not provide a representative picture of (Burns and Grove 2005). Such disadvantages, however, can be overcome if sample size is large enough, it is therefore very important to pay close attention to the sample size if the results are to be useful and applicable.

The sample used in this study consists of student nurses who are currently studying either a diploma, bachelors’ or master’s degree at the chosen higher educational institution. The inclusion criteria were;

- ◆ Student nurses (either male or female) who are currently enrolled and studying on either a pre-registration diploma, bachelors’ or master’s degree at the chosen higher educational institution.

Exclusion criteria:

- ◆ Anyone who is not studying a pre-registration diploma, bachelors' or master's degree at the chosen higher educational institution.

These criteria were chosen for two main reasons; the first being that pre registration nurses were an easily accessible demographic and thus the author felt that it would be easier to obtain a more representative sample. Secondly, it was a large population and therefore even if a low return rate was obtained then it might still be possible to identify statistically significant results.

The population of student nurses available for study was calculated to be 655 people. To ensure that the study has sufficient power, a power calculation was performed to identify the minimum sample size required would be around 242 questionnaires when generalising to such a large group. The sample size was calculated using an online sample size calculator (Psychnet 2009). The parameters were set at a confidence level of 95% and a confidence interval of 5. The data gained from the questionnaires was then analysed using a Paired-t-test. This statistical analysis can be seen in section 4.5.3.

The questionnaires used in the study were also coded by the use of individualised identification numbers. The addition of identification numbers to raw data post completion and collection, was very useful when processing as kept anonymity but made questionnaires very easy to identify once the data had been entered into data processing programme

3.8) Ethics and study procedures

The ethics process throws up challenges as ethical requirements can sometimes be in conflict with the desires and need to produce high quality evidence for practice.

3.8.1) Ensuring study is ethical

It has been argued that all research can be potentially harmful to participants and researchers. For example, controlled trials that employ the use of invasive procedures could unintentionally cause harm. Likewise, non-invasive enquiries that seek evidence from individuals about sensitive topics could cause inadvertent emotional stress and potential damage to individuals.

Davis (2008) highlights that there are two main paradigms of research ethics: the consequentialist approach, which assesses the ethical value of research by the benefit of its outcome to society, or the principle based approach which is concerned with the process involved in reaching an outcome and doing what is right. The most widely accepted set of ethical principles in biomedical ethics are those described by Beauchamp and Childress (2001) as the principles of:

- ◆ Beneficence: The principle of doing “good” i.e. something of benefit to others.
- ◆ Non-Maleficence: twinned with the above, the idea that we must avoid harming others.
- ◆ Respect for Autonomy: that researchers have a duty to allow people to make decisions for themselves
- ◆ Justice/Equality: The idea that we must treat others equally.

It is also important to remember other ethical considerations such as confidentiality. In addition to this the RCN (Royal Collage of Nursing 2004) have identified a number of key areas which must be addressed before a research project is initiated which include:

- ◆ informed consent
- ◆ confidentiality
- ◆ data protection
- ◆ right to withdraw

- ◆ potential benefits
- ◆ potential harms

The concept of autonomy considers each person to be capable of making their own decisions based on the information provided to them (Davis 2008). As such in order to respect a person's autonomy it is important that they are provided with all the information they require and that they are allowed to come to a decision independently. As part of the research process all participants were provided with an information sheet detailing all the information related to the study. In order to ensure that people did not feel pressured into participating, the sample was approached as a group. The participants also had the right to refuse to take part in the study without their reasons being questioned. Furthermore, once participants had completed the questionnaire there was no way of identifying any data that had been submitted, which further aided the maintenance of confidentiality.

In order that the questionnaires maintained participant confidentiality no personally identifiable data or information will be requested. In order to be ethically sound the study must demonstrate beneficence to society. As previously stated the aim of this study is to look at student nurses perceptions of their BLS training and their level of confidence in their own BLS ability. This study has been able to provide an insight into the levels of these skills and will be able to make recommendations with regards to improvements with training based on students own views and also will also be able to highlight areas of further research.

3.8.2) Ethical approval and raw data storage

Before any empirical study is conducted it is imperative that the study obtains ethical approval from the appropriate ethical committee. This process, although long and often complicated, not

only ensures that the study poses no harm to its intended participants, but also that the study is worthwhile and good quality research will be conducted, from which reasonably useful conclusions can be made. Ethical approval for the study in question was gained from the local Medical School Ethics Committee.

3.9) Dissemination of studies

It was decided that the easiest way to disseminate questionnaires was at the end of lectures attended by nursing students who fit the sample inclusion criteria. Before approaching the sample permission was sought from any lecturers who taught the sample group. This not only minimised disruption but ensured that lectures were fully informed as to the aim and objectives of the research paper. Following the receipt of permission, the researcher attended each relevant lecture at a mutually convenient time. A very short presentation was then given to the group to explain the purpose of the study. To accompany this oral presentation the group were given an information sheet and asked to collect a questionnaire which they could complete in their own time.

Potential participants were offered two ways of returning completed questionnaires they could either; complete the questionnaires at the time and place them in a sealed box at the front of the room or they could return the questionnaire to the researchers' pigeon hole.

3.10) Data Analysis

According to Polit and Tatano-Beck (2006) in order to give meaning to raw data it must be statistically analysed so that trends and significant results can be identified. Raw data from this study was processed using the statistical analysis software programme SPSS (Version 16.0) on a PC. There are two main approaches to analysing data known as; descriptive and inferential

statistics. Descriptive statistics, sometimes also referred to as simple statistics, are simply that, they are statistics such as means, percentages and averages which serve simply to describe the data that has been collected. On the other hand, inferential statistics are the type of statistics from which conclusions can be drawn. The paired-t-test was used as the statistical test of choice for this study to inferentially analyse the data for any trends. The paired t-test was used in this case because of the nature of the data which had been gathered. Both variables used in the analysis were provided from the same participants

3.11) Summary

The aim of this chapter has been to illustrate the methods used to carry out this study. The preferred methodology for this research has been discussed and the chosen method justified by highlighting the method which best suited the aims and objectives of the study. Ethical considerations and the ethics process were also explored. This chapter has set the scene for the 'Results' and 'Discussion' chapters which will now follow.

Results and Analysis

4.1) Introduction

The following chapter will now examine and analyse the raw data gathered as part of this study. All quantitative analysis was conducted using SPSS (Version 16.0 for Windows), a computerised data analysis programme. When analysing data it is important to do so in relation to the aims and objectives of the study (See section 1.4). Therefore results for each question or group of questions will then be addressed on the similarity of the areas they explore for example; the effect that being involved in a resuscitation attempt has had on student nurses' confidence. This chapter will also cover how results and missing data were coded for as part of the programme; the overall response rate will also be discussed along with the characteristics of the sample.

4.2) Coding of results

A coding system was created so that the results could be inputted into the statistical analysis programme SPSS (Version 16.0 for Windows) (Paliant 2005). This involved deciding how to define and label each of the questions and possible responses by assigning a number to each possible response for the questions used.

In a small number of cases questions were either not completed or were filled in incorrectly. This may have been due to poor question wording, badly composed instructions on how to complete the document or that the participants may not have taken sufficient time in order to understand what the questionnaire is asking them to do. When such cases arose any missing information, or missing values as they are sometimes referred to, was coded as "88".

4.3) Response rate to questionnaires

One of the strengths of this study was its high response rate; of the 300 questionnaires distributed 229 were returned: representing a return rate of 74 percent. It is important to note that there are a number of things which can affect response rates. The reason for the high return rate in this case is likely to have been the use of mainly closed questions in the questionnaire. As highlighted by (Couchman and Dawson 1995) individuals are able to fill in more answers in a given time therefore often meaning they are more willing to complete the questions asked of them also the questionnaire. Also, the questionnaire was short and thus participants were less likely to get bored when completing the survey.

4.4) Characteristics of sample

Of the students that responded it can be seen that the majority of respondents were students in their third year of training (53.3 %) and the majority of the respondents were adult branch students constituting 85.2% of the overall sample. Within the adult branch respondents the majority were studying for their nursing diploma (51.3%) rather than a degree or masters (25.6% and 23.1% respectively). However this difference may be accounted for by the higher proportion of diploma students present in the sample as a whole. Fewer respondents were gained from fourth year and masters courses, gain this can be justified by the fact that there were a small proportional number of masters students' in the population as a whole, because they only have one entry cohort per year rather than twice a year as in the case of diploma/degree students. It is unfortunate that the sample has a disproportionately small percentage of participants from child, mental health and learning disability branches. The effects of this will be addressed in the discussion chapter of this assignment.

		Branch				Total (%**)	
		Adult Branch	Child Branch	Mental Health Branch	Learning Disability Branch	n	%
Year of Training	Year 2	69	8	3	0	80	34.9
	Year 3	111	4	3	4	122	53.3
	Year 4	15	9	3	N/A [^]	27	11.8
	Total	n	195	21	9	4	229
	%*	(85.2)	(9.2)	(3.9)	1.7	100	
Nursing Course	Diploma	100	3	2	2	107	(46.7)
	BSc	50	1	1	2	54	(23.6)
	MNurSci	45	17	6	N/A [#]	68	(29.7)
	Total	n	195	21	9	4	229*
	%*	(85.2)	(9.2)	(3.9)	(1.7)	100	

*Total sample size

** Percentage of total sample size

[^]There are no fourth year learning disability branch students at this centre

[#] Learning disability nursing is not offered as a four year undergraduate option at this institution.

Table 1: A descriptive breakdown of the sample by nursing course, chosen branch and year of training.

4.5) A comparison of self-reported confidence at the beginning and the current point in nursing course

The following section examines the self-reported confidence of student nurses and the start of their nursing course with the self-reported confidence of those same nurses at the current point in their course. The tables supporting this graph can be found in Appendix 5: section A.

4.5.1) Student nurses' self-reported confidence at the start of their nursing course

The following graph examines the self-reported confidence of student nurses at the start of their nursing course. The tables supporting this graph can be found in Appendix 5: section A.

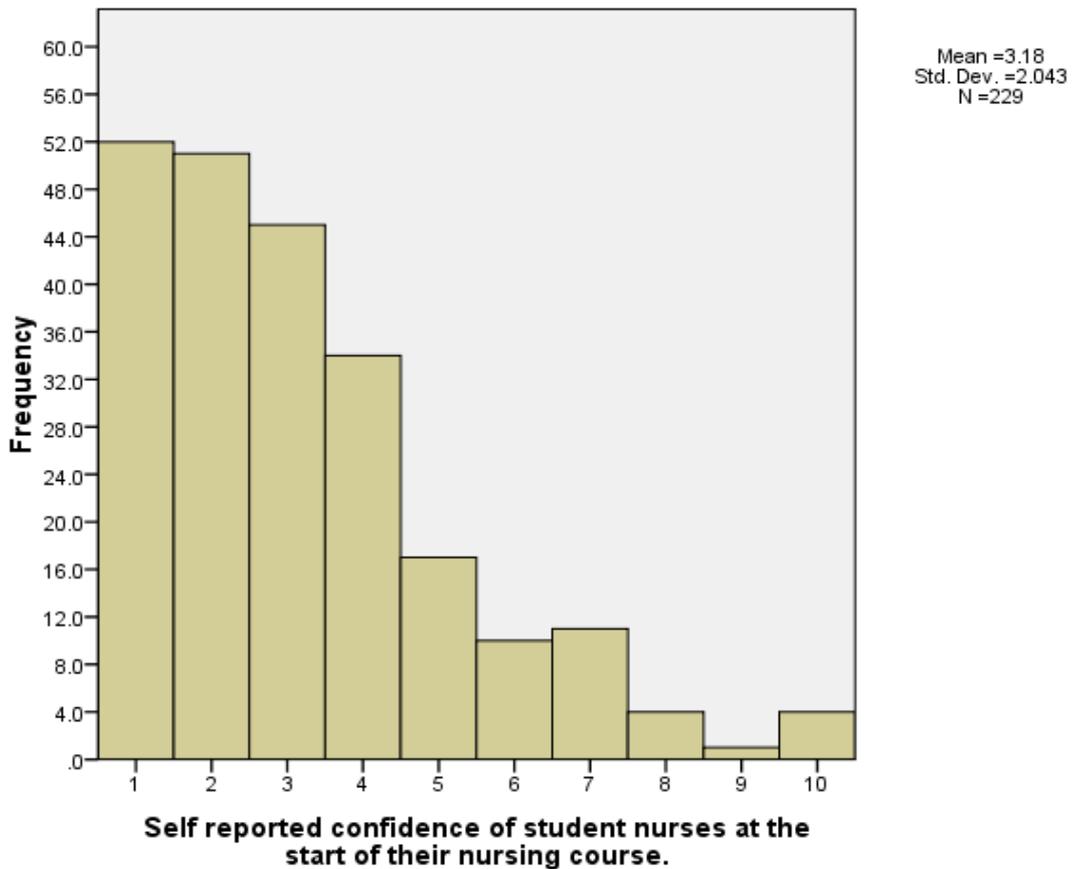


Figure 1: Self-reported confidence of student nurses at the start of their nursing course on a 10 point scale.

The above graph diagrammatically shows that at face value there appears to be a higher frequency of lower self-reported confidence scores. Descriptive analysis showed that the mean self-reported confidence score was 3.18 (with a standard deviation of 2.043).

4.5.2) Student nurses' self-reported confidence at the current point of their nursing course

The following section examines the self-reported confidence of student nurses at the current point of their nursing course. The tables supporting this graph can be found in Appendix 5: section B.

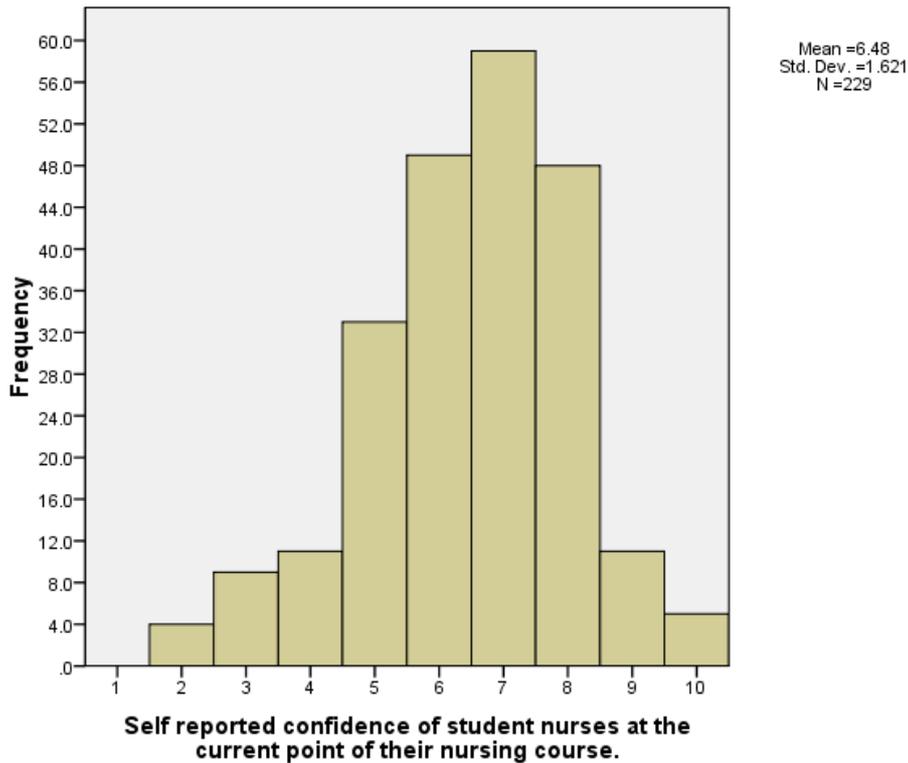


Figure 2: Self-reported confidence of student nurses at the current point of their nursing course on a 10 point scale.

The above graph diagrammatically shows that at face value there appears to be a higher frequency of higher self-reported confidence scores at the students' current point in their course. Descriptive analysis has shown that the mean self-reported confidence score was 6.48 (with a standard deviation of 1.621).

4.5.3) Statistical analysis - Paired t-test: Confidence score at current point of course .v. start of course confidence score.

The link between student nurses' self-reported confidence at the start of nursing course and at the current point in nursing course has already been shown in diagrammatic form above. It appears at first glance that there has been an increase in student nurses' self-reported confidence with regards to their ability to perform BLS. As previously stated in order to give meaning to raw data it must be statistically analysed so that trends and significant results can be identified (Polit and Tatano-Beck 2006). As such this section will now examine if this increase is statistically significant. The statistical test used to analyse if there has been a statistically significant increase in student nurses' self-reported confidence with regards to their ability to perform BLS.

The paired t-test was used in this case as it is a non-parametric test which is suitable when scores or measures are obtained from the same subjects. Therefore, meaning that the two scores are dependent as they have come from the same source.

Variables	Mean	Std. Dev.	95% Confidence Interval of the difference		Significance (2 tailed) P value
			Upper	Lower	
Confidence score at current point in course	6.48	1.621	-----	-----	-----
Confidence score at start of course	3.18	2.043	-----	-----	-----
Confidence score at current point of course .v. start of course confidence score	3.301	1.956	3.047	3.556	<0.001

Table 2: The paired sample t-test to show the statistical difference between two paired variables.

Overall the mean self-reported confidence before the start of the nursing course was 3.18 (2.043 Std. Dev.). The mean self-reported confidence at the current point in the nursing course was 6.48 (2.621 Std. Dev.) Therefore the mean change in confidence was 3.301. It was shown that this increase was statistically significant ($p = <0.001$ Paired sample t-test). This therefore highlights that over time, between the start of their nursing course and their current point, student nurses' self-reported confidence levels increased. During which time they will have received at least one mandatory BLS session.

4.6) Statistical analysis - Paired t-test: Differences between confidence scores of diploma/degree and masters nursing students.

A further result of interest is that the change in mean confidence varies between courses from 3.50 (1.98 Std. Dev.) on the diploma/degree course to 2.84 (1.83 Std. Dev.) on the Masters of Nursing course. Following statistical analysis it was shown that this difference was statistically significant ($p = 0.02$ non-paired-t-test), therefore highlighting that there as was greater overall increase in the diploma/degree course when compared to the Masters of Nursing group.

4.7) Basic Life Support and Cardiopulmonary Resuscitation training outside of their nursing course and the effect this has had on their confidence.

Results have shown that on average about half of the respondents asked had received some sort of BLS or CPR training in addition to that which they received as part of their nursing course. 48.9% of respondents are recorded as having had additional BLS training, with 117 (51.1%) of respondents stating they had received additional CPR training.

The majority of participants found that this extra training had either made them feel either more confident (45.8%) or a lot more confident (12.7%). Due to the nature of the closed question used it

is not possible to ascertain why this effect has occurred. However, if further research were to take place using more qualitative data collection methods, such as interviews or surveys using open ended questions, then the reasons behind these responses could be explored.

4.8) Student nurses experience of a resuscitation attempt and the effect this has had on their confidence.

Of the total sample, only a quarter (25.3%) had been involved in an actual resuscitation attempt. Further details about the participants' involvement such as the level of participant involvement were not investigated due to constraint of resources and the wish not to make the questionnaire too long as is recommended by Polit and Tatano Beck (2006).

Have you been involved in a resuscitation attempt?	Frequency (n)	Percentage (%)
Yes	58	25.3
No	171	74.7
Total	229	100

Table 3: Number of participants involved in resuscitation attempt.

The majority of participants found that their involvement in a resuscitation attempt had either made them feel either more confident (in 57.7% of cases) or a lot more confident (in 22.0% of cases). The raw descriptive statistics can be found in Appendix 5: section D. Due to the nature of quantitative data it is not possible to ascertain why this effect has occurred. However, if further research were to take place using more qualitative data collection methods, such as interviews or surveys using open ended questions, then the reasons behind these responses could be explored.

4.9) The preferred frequency and methods of mandatory Basic Life Support training given as part of a nursing course.

	Frequency (n)	Percentage (%)
Once a year	60	26.2
Every 6 months	125	56.6
Every 3 months	44	19.2

Table 4: Frequency table of the preferred number of times in a year for mandatory BLS training

It is clear from table four above that the majority of respondents (56.6% n=125) would prefer to have mandatory basic life support every 6 months rather than the annual mandatory BLS training currently provided at the institution involved in this study. Also the majority of respondents felt that an increase in the number of times per year that mandatory life support was provided would make them feel either more confident (55.5%) or a lot more confidence (32.3%) See bar chart below.

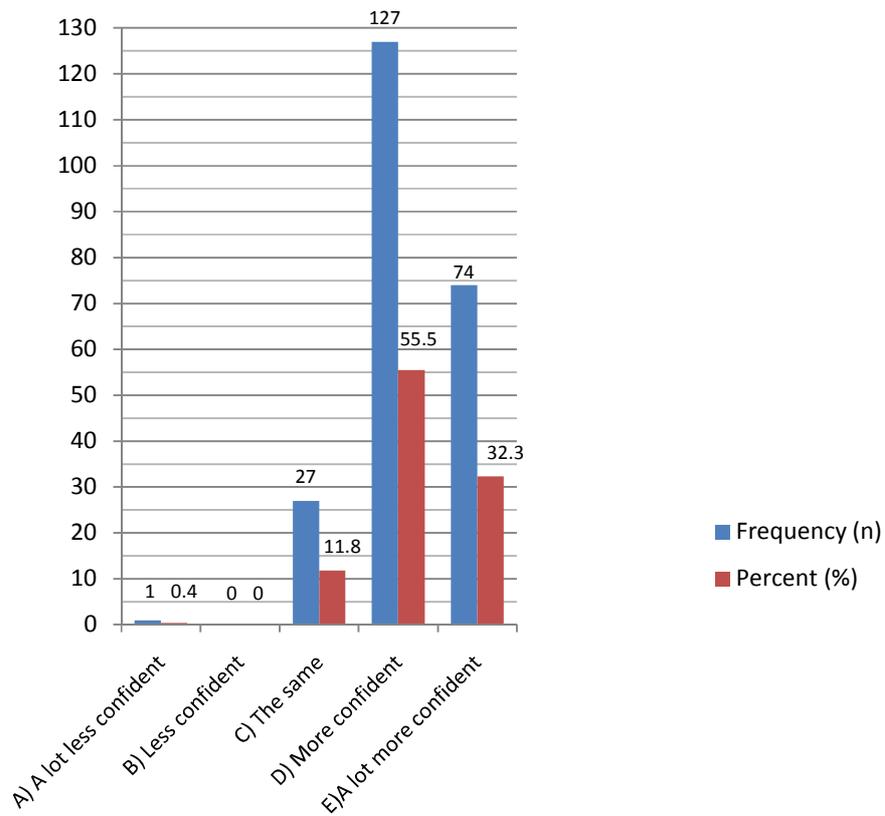


Figure 2: A bar chart to show the self reported change in confidence, as a result of a proposed increase in the annual frequency of basic life support training (%)

Training Method	Option selected	Frequency (n)	Percentage (%)
Lecture	Yes	21	9.2
	No	208	90.8
Practical session	Yes	220	96.1
	No	9	3.9
Peer tuition	Yes	21	9.2
	No	208	90.8
Computer Aided Learning	Yes	32	14.0
	No	197	86.0
Instructional DVD	Yes	10	4.4
	No	219	95.6
A mix of the above	Yes	61	26.6
	No	158	73.4

Table 5: Preferred methods of basic life support training selected by respondents

As demonstrated in table 3 above the most popular method of training delivery was; practical sessions as chosen by 96.1% (n= 220) of the sample. The impact of training methods on student nurse confidence is a topic which has been addressed as part of the literature review (See section 2.5) For example, arrest simulations are considered by some researchers as the most effective way of teaching basic life support, as stated by Hamilton (2005), “a real cardiac arrest is not the time for learning CPR.” Hendriskse et al (2001) also suggests that simulation training is positive as it helps to improve participant’s knowledge in a relatively realistic area and enables them to familiarise themselves with emergency equipment and procedures.

4.10) Qualitative data analysis

Qualitative data, it has been argued, is more difficult to objectively analyse (insert reference).

Therefore an editing analysis method was used which enabled the researcher to identify trends in the qualitative data. This method was used to develop a categorisation method and corresponding codes were used to sort the data (Polit and Tatano-Beck 2004).

The data collected consisted of three open ended questions. Polit, Tatano-Beck et al (2001) stress the need to create appropriate and unambiguous categories in order to make the responses more objective and less likely to be subject to bias on the part of the researcher who is analysing the data. In order to create the more suitable categories it is necessary to read through a selection of the raw questionnaire data and create various categories into which the data could be coded.

Although this process was time consuming it was invaluable as it meant that the coding process was more straightforward as all responses could be coded into their appropriate category. The questionnaire used as part of this research produced predominately quantitative data therefore a quantitative strategy (as described above) was used to analysis all data as opposed to a qualitative strategy as it was more appropriate for the majority of the data.

The responses to question twelve are outlined below in table 4. Theoretically, as annual BLS training is mandatory; all participants who completed the question correctly should have attended a BLS training session as part of their nursing course within the last year at least. However, 7 subjects (3.1% of the sample) stated that the last time they had attended was over a year ago.

There could be many reasons for this unexpected result, the most likely of which is that they have recollected the timing incorrectly. Both Aseltine et al (1995) and Litwin and McGuigan (1999) have shown that recall can be inaccurate and therefore cause problems with regard to the truth of the response given. For example Aseltine et al (1995) showed that patients' retrospective reports of

change in overall health were more favorable than actual before/after measurements indicated. Furthermore Litwin and McGuigan (1999) demonstrated in their study that overall, recall was poor as patients tended to remember their baseline scores as being better than it actually was. In this study, the problem of recall bias could have been overcome by conducting a longitudinal study in which students' self-reported confidence scores would have been taken at the true beginning of their course and then would have been followed up annually. However, due to lack of resources such as time and finance, it was not possible to conduct a longitudinal study in this case

The last time the participant attended mandatory BLS training	Frequency (n)	Percentage (%)
Within the last 3 months	80	34.9
Within the last 6 months	68	29.7
Within the last year	64	27.9
Over one year ago	7	3.1
Question not completed	10	4.4
Total	229	100.0

Table 4: Frequency table of the last time the participant attended mandatory BLS training

Results do shown, however, that the BLS or CPR training that participant had received as part of their nursing course made them feel either more confident or a lot more confident (61.6% and 25.3% of the total sample respectively). A frequency table showing responses to this question can be found in appendix 5 table 7.

4.11) Summary

This chapter has examined and analysed the data collected using a questionnaire data collection method. Trends have been identified and statistical analysis was performed on quantitative data using both Paired and Non-Paired t-test. These tests have shown that overall the mean self-reported confidence before the start of the nursing course was 3.18 (2.043 Std. Dev.). The mean

self-reported confidence at the current point in the nursing course was 6.48 (2.621 Std. Dev.)

Therefore the mean change in confidence was 3.301. It was shown that this increase was statistically significant ($p < 0.001$ Paired sample t-test). This therefore highlights that over time, between the start of their nursing course and their current point, student nurses' self-reported confidence levels increased. During which time they will have received at least one mandatory BLS session.

The following discussion chapter will be expanding further into some of the idea and trends identified following the analysis of the raw data.

Discussion

5.1) Introduction

The following discussion chapter will discuss further the results produced as part of this study. This discussion is written with the view in mind that basic life support plays a vital role in the care of the person who has suffered a cardiac arrest. The flow of the discussion will be shaped by the comparison of self-reported confidence at the beginning and at the current point in their nursing course. The impact of both external training and any personal resuscitation experience will be explored in relation to current literature.

5.2) Rationale for discussion

This discussion is written for the perspective that nurses have a significant role to play in the administration of BLS in order to give all patients who suffer cardiac arrests the best chance of survival (King 2009). As nurses and nursing students are often the first to discover patients who have suffered a cardiac arrest (Boyde and Wotton 2001), it is vital that they are adequately and appropriately trained to perform BLS. Castle et al (2007) conducted a study which compared the confidence levels of doctors, registered nurses and health care assistants with their competence levels when assessed on specific skills. They state that the combination of training and clinical exposure improves both confidence and competence. They also point out that an individual's confidence does not always directly reflect competence. This is a statement reflected by other researchers such as Kruger and Dunning (1999). However, it is also important that students feel confident in their ability to perform BLS should they need to because a lack of self confidence is likely to affect whether or not the person would get involved in a task (Stewart et al 2000).

5.3) Review of findings

Although there is a great deal of literature surrounding student nurses competence in their ability to perform BLS (See Chapter 2), there is little literature surrounding student nurses' confidence. Nurses and student nurses have the potential to make a vast difference to the lives of patients post cardiac arrest through the use of their BLS skills. As highlighted by the Chain of Survival one of the most important aspects in the care of a person who has suffered a cardiac arrest is early CPR, in order to buy time (King 2009). The following discussion will be directed by:

- ◆ The aims of the study as originally stated at the outset.
- ◆ The results of the study and the current literature surrounding the topic.

The discussion will begin with a concise review of the results followed by a discussion of their significance. The role that pre-registration nurse training has to play in this field will also be debated. The chapter will conclude by reviewing and addressing the strengths and limitations of this study.

5.3.1) Results of statistics tests

The paired t-test was used to identify that there was a statistically significant difference between the participants self-reported confidence scores at the start of their course and at the current point in their course. Overall the mean self-reported confidence before the start of the nursing course was 3.18 (2.043 Std. Dev). The mean self-reported confidence at the current point in the nursing course was 6.48 (2.621 Std. Dev) Therefore the mean change in confidence was 3.301. It was shown that this increase was statistically significant ($p < 0.001$ Paired sample t-test).

The non paired t-test was used to identify whether there was a statistically significant difference between the changes in mean confidence based on course. This varies between courses from 3.50 (1.98 Std. Dev.) on the diploma/degree course to 2.84 (1.83 Std. Dev.) on the Masters of Nursing course. Following statistical analysis it was shown that this difference was statistically significant ($p = 0.02$ non-paired t-test), therefore highlighting that there as was greater overall increase in the diploma/degree course, than when compared to the Masters of Nursing group.

Despite the statistically significant result shown with regard to differences between courses, as this was not an originally stated aim of the study (See section 1.4 for study aims). However, this result will also be discussed as a point of interest.

5.3.2) A comparison of self-reported confidence at the beginning and the current point in nursing course

The link between student nurses' self-reported confidence at the start of nursing course and at the current point in nursing course has already been shown in diagrammatic form (Section 4.5). It appeared at first glance that there has been an increase in student nurses' self-reported confidence with regards to their ability to perform BLS Overall the mean self-reported confidence before the start of the nursing course was 3.18 (2.043 Std. Dev). The mean self-reported confidence at the current point in the nursing course was 6.48 (2.621 Std. Dev). Therefore, the mean increase in confidence was 3.301. It was shown that this increase was statistically significant ($p = <0.001$ Paired sample t-test). This result highlights that over time, between the start of their nursing course and their current point, student nurses' self-reported confidence levels increased. During this time they will have received at least one mandatory BLS session. This result is supported by current literature, it is expected that experience will result in an increase in confidence. Morgan and Cleave-Hogg (2002) in their study comparing medical students'

experience, confidence and competence, concluded that clinical experience and level of confidence had no predictive value in performance of standardised tests. However, they did discover that “There was a significant correlation between the number of times a task was performed and the perceived level of confidence for all tasks...” (Morgan and Cleave-Hogg 2002 page 536). This therefore demonstrates that clinical experience improves student confidence.

In relation to the research question the objective related to this result was to investigate the effect of mandatory BLS on student nurses’ confidence of their ability to perform Basic Life Support, which has been shown to increase. With regards to the hypothesis of the study although it proposed that an effect would occur, the direction of such effect was not pre-supposed. This result highlights the importance of the link between clinical practice and confidence.

5.3.3) The impact of additional Basic Life Support training on confidence

The results showed that participants who had received basic life support or CPR training in addition to their nursing course felt that this extra training had either made them feel either more confident (45.8%) or a lot more confident (12.7%). Due to the nature of the closed question used, it is not possible to ascertain why this effect has occurred. However, if further research were to take place using more qualitative data collection methods, such as interviews or surveys using open ended questions, then the reasons behind these responses could be explored.

As previously stated, current literature has shown that there is a correlation between the number of times a task is performed and self perceived level of confidence (Morgan and Cleave-Hogg 2002). Therefore this particular questionnaire response appears to support current literature.

In relation to the research question posed by this study, the objective to discover the effect of any external additional training on student nurses’ confidence of their ability to perform Basic Life

Support has been addressed. In light of the belief that extra training improved self-confidence, the recommendation from this study would be that student nurses have the opportunity and the encouragement to take part in additional basic life support or CPR training. It is, however, important to note that this recommendation is given tentatively under the proviso that further research be conducted in this particular area. This study did not include the addition of a control group; therefore it is not possible to state that this increase in confidence is a causal effect. Hence further research would be required.

5.3.4) The impact of personal experience of a resuscitation attempt on confidence

The results of the study showed that of the total sample, only a quarter (25.3%) had been involved in an actual resuscitation attempt. Further details about the participants' involvement such as the level of participant involvement were not investigated. This was due to constraint of resources and the wish not to make the questionnaire too long as is recommended by Polit and Tatano Beck (2006). The majority of participants found that their involvement in a resuscitation attempt had either made them feel either more confident (in 57.7% of cases) or a lot more confident (in 22.0% of cases). The raw descriptive statistics can be found in Appendix 5: section D. Due to the nature of quantitative data, it is not possible to ascertain why this effect has occurred. However, as with section 5.3.3, the reasons behind these responses could be explored if further research were to take place using more qualitative data collection methods.

In relation to current literature, little has been researched in the traditional sense with regard to the effect of real life BLS situations. Indeed Hamilton (2005 page 292), states that "a real cardiac arrest is not the time for learning CPR." Castle et al (2007) have demonstrated that "exposure to a patient in cardiac arrest in the previous 12 months increased participants' confidence as well as their competence" (Castle et al 2007 page 665) when compared against those who had no

experience on the last 12 months. In the case of certain skills assessed as part of the study, such as calling for help and using the correct rate for chest compressions, this difference was statistically significant (Castle et al 2007 page 665 table 2). However, the article appears not to have performed any statistical analysis with regard to the mean difference in confidence between those who had personal experience of a patient in cardiac arrest within the last 12 months, and those who had not. It is not, therefore possible to establish if there is a statistically significant difference in confidence between these two groups.

It would not be true to say that the results of this study contradict current literature, more that the effect on impact of personal experience of resuscitation attempt on confidence requires further investigation. If personal experience is shown to improve confidence and competence on a wider scale, the recommendation for practice might be that student nurses should be placed in areas that expose them to an increased likelihood of experiencing involvement in basic life support delivery such as the accident and emergency department.

5.3.5) The impact of nurse training received

The results showed that the BLS or CPR training that participant had received as part of their nursing course made them feel either more confident or a lot more confident (61.6% and 25.3% of the total sample respectively). A frequency table showing responses to this question can be found in appendix 5 table 7.

Current literature over the last two decades has shown that BLS knowledge and skills decline over time. (Nyman and Sihvonen 2000, Hamilton 2005, Badger and Rawstrone 1998, Greig et al 1996, Boyde and Wotton 2001). BLS knowledge is difficult to retain and remember and the levels of retention vary significantly between individuals (Greig et al 1996, Badger and Rawstone 1998,

Nyman and Sihvonen 2000, Pottle and Brant 2000). It is also found that many student nurses scored themselves highly for self rated knowledge and ability to perform CPR, this is despite the knowledge and skills gaps in most, if not all areas of CPR/BLS (Jospovic, Webb and McGrath 2009, Castle et al 2007, Nyman and Sihvonen 2000, Kruger and Dunning 1999). Theoretically, as annual BLS training is mandatory, all participants who completed the questionnaire correctly should have attended a BLS training session as part of their nursing course within the last year at least.

As previously stated, it is well documented that both knowledge and skills related to basic life support dwindle over time. The results of this study add to current literature in showing the mostly positive impact that their basic life support training has had on their confidence.

5.3.6) The style of training wanted

The results show the most popular method of training delivery was; practical sessions as chosen by 96.1% (n= 220) of the sample See table 3. The impact of training methods on student nurse confidence is a topic which has been addressed as part of the literature review (See section 2.5). the result of this study in general supports the current literature, for example Hendriskse et al (2001) suggests that simulation training is positive as it helps to improve participant's knowledge in a relatively realistic area and enables them to familiarise themselves with emergency equipment and procedures. The results of this study are also supported by Hamilton (2005 page 288) who states that overall "staff should be formally assessed using a manikin with a feedback mechanism or an expert instructor..."

Despite the documented benefits of Computer Aided Learning (CAL) which has been shown to increase accessibility, and therefore allow training to take place over a longer time frame, along with the idea that a computer is an unbiased examiner that is able to always provide feedback and

points for improvement (Tanner and Gitlow 1992). The option was not a popular one with the respondents of this study; only 14% (n=32) of the sample expressed a preference for this method.

This highlights that although teaching methods should remain based on best evidenced based practice and be innovative in order to retain students attention (Bowen 1999), students' preferences and personal learning styles should be taken into account when providing any type of training. Therefore a variety of teaching methods should be offered so the student may choose which method or methods are most suited to them.

5.3.7) The frequency of training wanted

It is clear from table four (section 4.9 that the majority of respondents (56.6% n=125) would prefer to have mandatory BLS training every 6 months rather than the annual training currently required at the institution involved in this study.

This result supports the argument in current literature that BLS training should be provided at 3-6 months intervals (Hamilton 2005, Kaye et al 1995). However, the recommendation from literature is often based on competence and states that confidence and confidence are not related (Castle et al 2007, Kruger and Dunning 1999). Alternatively, an increased self-reported confidence may mean that people are more likely to perform a task (Morgan Cleave-Hogg 2002), which is highly important as "Effective resuscitation is dependent on each stage of the Chain of Survival (the second of which being early basic life support) happening within as short a time period as possible" (King 2009 page 48).

Furthermore, an important discovery of this study is that an increase in frequency would lead to increase in confidence (See section 4.9), which, as already stated could lead to an increase in willingness to perform BLS in the first place.

5.4) Strengths and limitations of study.

Section will highlight the main strengths and weaknesses of the study. This will serve as an important part of evaluation of the research findings and their usefulness.

5.4.1) Sample size and selection bias

One of the strengths of this study is that it had a large sample size. The power of a study is defined as: a research designs ability to detect relationships between variables (Polit and Tatano Beck 2004 page 728).

Power analysis is a test performed to calculate the sample size need for a study to ensure that it is able to accurately detect relationships between variables it wishes to test. If a study is underpowered (that is to say that the sample size is too small) are overly prone to making false-negative conclusions, or committing what are called type II errors. A type II error is defined as “an error caused by accepting the null hypothesis when it is false (i.e. the researcher concludes that no relationship exists when in fact it does)” (Polit and Tatano Beck 2004 page 734).

The population of student nurses available for study was calculated to be 655 people. To make sure that the study has sufficient power, a power calculation was performed to identify the minimum sample size required. This was calculated to be around 242 questionnaires when generalising to such a large group (parameters were set at a confidence level of 95% and a confidence interval of 5). The sample size was calculated using an online sample size calculator (Psychnet 2009).

In most cases a power calculation is performed before the study is conducted to dictate sample size, however it is possible to perform a power calculation after a study has been conducted,

which is known as a *post-hoc* power calculation. According to some researchers the concept of *post-hoc* power makes little sense from a statistical point of view, but it is argued that it is sometimes useful for researchers who are trying to find an explanation for their inability to find significant results (Madsen 2002, Yuan and Maxwell 2005). After careful consideration it was concluded that a *post-hoc* power calculation should not be carried out on this study, as the result of the main statistical test was statistically significant and the sample size used was very close to the recommended number.

5.4.2) Non-response

The response rate of this study was 74%, which was much higher than expected. This can be considered as strength of the study and may be due to many reasons. One of the most likely reasons is because the questionnaire was short and contained mostly closed questions. Short questionnaires are likely to have a high response rate according to Couchman and Dawson (1995), as individuals are able to fill in more answers in a given time, often meaning they are more willing to complete the questions asked of them. In addition, participants were less likely to get bored when completing the survey.

5.4.3) Strengths and weaknesses of questionnaire design

The quality and generalisability of any study is based on its reliability and validity. In this case the validity of the questionnaire was tested using the face validity method and through the use of a pilot questionnaire. The piloting of the question is discussed in section 3.6.

A weakness of this study is that the questionnaire may not be truly valid, as the main test of validity used was face validity questionnaire may be weak. On reflection other, more advanced methods of measuring validity should have been implemented such as measuring content validity

against a formal content validity index or using a questionnaire which has already been well tested for validity.

However, the use of a power calculation has ensured that the samples size used is large enough to be able to accurately detect relationships between variables it wishes to test. This study very nearly reached the recommended sample size, it could therefore be argued that the sample is representative of the population being investigated.

It is also important to note that the self-reported confidence scores of the participants at the start of their course was gained retrospectively, as due to time constraints the study was completed with a cross-section design. The disadvantage of retrospective data collection is that the participants are subject to recall bias. This is a weakness because a long time span between the questionnaire and the event causes people to have greater difficulty remembering how they were before the experience, or they are more likely to exaggerate or underestimate their scores (Mann 2003). If time and resources had been available, the recall bias problem could have been managed similarly to that used by Middel et al (2006), who used two questionnaires. To assess recall bias, the follow-up questionnaire contained two items which related to the original questionnaire. The score given in answer to the second questionnaire was then subtracted from their original answer. The extent of deviation ranged from -5 to 5: a zero score indicated no recall bias and a score of absolute value 5 (i.e., either negative or positive) indicates the maximum amount of recall bias. A score of 5 would indicate that the estimates made by the patient retrospectively, and the estimate actually given at baseline, were completely the opposite of each other. In the case of this study it would have been tantamount to sampling each participant at the beginning of their course and then at the current point, and at the current point ask them what they felt their confidence levels were at the start of their course. However, due to time constraints and confidentiality difficulties

this was not possible. If the study were to be repeated, future researchers may have this opportunity.

5.5) Summary

This chapter has provided insight into what the findings of this study have shown in comparison with other studies. It has also highlighted that the majority of the results support current literature surrounding student nurses and BLS. The main strengths and weaknesses of the chosen research design have been discussed, and suggestions have been made as to how such weaknesses might have been overcome. The following chapter will draw together conclusions for the study as a whole. Implications for nursing education and future research will then be recommended.

Conclusion

6.1) Introduction

This chapter will now briefly summarise the results of the study and in relation to current research will make recommendation for nursing education, future research and nursing practice.

6.2) Summary of important findings

The results of this study strongly suggest that Student Nurses, who have experienced mandatory basic life support training as part of their nursing course, will show difference in their self-reported confidence score of their ability to perform BLS. Statistical tests have shown that the increase in mean self-reported confidence scores from 3.18 (2.043 Std. Dev.), before the start of the nursing course to 6.48 (2.621 Std. Dev.) at the current point in the nursing course. It was shown that this increase was statistically significant ($p < 0.001$ Paired sample t-test). Therefore, this highlights that over time, between the start of their nursing course and their current point, student nurses' self-reported confidence levels increased. During this time they will have received at least one mandatory BLS session.

Interestingly, an unexpected result was that the change in mean confidence varies between diploma/degree courses and masters courses was different. The overall increase in mean for the diploma/degree course was 3.50 (1.98 Std. Dev.) but only 2.84 (1.83 Std. Dev.) on the Masters of Nursing course. Following statistical analysis it was shown that this difference was statistically significant ($p = 0.02$ non-paired t-test). This unexpected result highlights that there as was greater overall increase in the diploma/degree course when compared to the Masters of Nursing group. As this result was not expected the implications for nursing are not clear and warren further investigation in future research.

In desire of the subjects to have an increase in the number of times a year that they receive basic life support training is supported by the view in the literature that basic life support training should be provided more often (Hamilton 2005). Although this recommendation is based on knowledge and skill attrition rather than confidence and confidence and confidence and competence are not always related (Castle et al 2007, Kruger and Dunning 1999). It is important to remember that an increased self-reported confidence may mean that people are more likely to perform a task (Morgan Cleave-Hogg 2002). This is highly important with relation to BLS as “Effective resuscitation is dependent on each stage of the Chain of survival (the second of which being early basic life support) happening within as short a time period as possible” (King 2009 page 48).

6.3) Implications for nursing

Although the results of this study only add a small amount of new information to the current literature surrounding the confidence of student nurses of their basic life support skills, it has shown that over time the self-reported confidence does increase. The main implication for nursing is therefore based around nurse education. If, as suggested in the literature review, low levels of self confidence result in a reduced likelihood to participate in BLS when required then patient care could suffer.

On the other hand if participants are over estimating their confidence levels and are over confident and under competent then they risk providing ineffective BLS, as they feel confident in their abilities when in fact their knowledge and skills are lacking.

6.4) Recommendations for future research and nurse education

This section will highlight specific recommendations for future research and nursing education.

Any recommendations made are done so on the basis of current research along with any additional knowledge that has been generated as part of this study.

6.4.1) Future research

There are many ways in which future research could be conducted. One of the most fundamental things that must be done following any study is to repeat to test the reliability of the results found and the reproducibility of the method used. In the case of this study, as previously mentioned, one of the main methods used to test the validity of the questionnaire used was through face validity. This is acknowledged by researchers to be an undesirable method of reliability testing and should only be used in conjunction with other methods of validity testing (Polit and Tatano Beck 2004).

If this research were to be repeated, more advanced methods of measuring validity should be used. These would include measuring content validity against a formal content validity index and using a questionnaire which has been thoroughly tested for validity. Use of these stronger methods of validity would make any findings of future research more credible.

In addition to strengthening the methodology used in future research, the results of this study have highlighted points of interest that lead to further investigation in their own right. For example, the results of this study have shown that different cohorts have a statistically significant difference in their level of self-reported confidence. It was found that there was a greater difference in the self-reported confidence scores of students on the diploma/degree course in comparison with students of the masters of nursing science programme. It is the researcher's

belief that qualitative research into this variance should be conducted to explore the reasons for this statistically significant difference.

As stated in the literature review (see section 2.3) the deterioration of knowledge and skills related to BLS can be detected as early as ten weeks after training (Madden 2005). However, there appears to be little research conducted into the potential decline of confidence levels following BLS training. Despite the fact that it has been shown that confidence and competence are not always positively correlated, a low self confidence level may prevent willingness to participate in BLS situations. This should also be investigated further.

6.4.2) Nursing education

As has already been shown, confidence can be somewhat of a double edged sword. The validity of self assessment measures of confidence have already been highlighted (Dunning et al 2004).

Teachers and trainers should use such method with caution as there is a tendency to overestimate their self confidence. Such methods should, however, be employed alongside records of competency to ensure that students feel confident enough to engage in training to improve both their skills and their self confidence.

Teaching methods should remain based on best evidence based practice and be innovative in order to retain students' attention (Bowen 1999). Students' preferences and personal learning styles should be taken into account when providing any type of training. For example, Computer Aided Learning (CAL) has been shown to increase accessibility, therefore allowing training to take place over a longer time frame, along with the idea that a computer is an unbiased examiner that is able to always provide feedback and points for improvement (Tanner and Gitlow 1992). Despite these facts, CAL was not a popular method of training with the respondents of this study; only 14%

(n=32) of the sample expressed a preference for this method. This added further weight to the recommendation that a variety of teaching methods should be on offer so that the student may choose which method or methods are most suited to them.

A further recommendation is that basic life support training should be provided on a more frequent basis. Current literature recommends that this should be as often as every three to six months (Hamilton 2005), a suggestion that is supported further by the results of this study in which 56,6% of participants would prefer to have BLS training every 6 months. Although this recommendation is based mainly on the fact that knowledge and skills (i.e. competence) declines after this point results from this study show that respondents would feel either more confident (55.5%) or a lot more confident (32.3%) if they received BLS training on a more frequent basis.

Another recommendation to come out of this study is that where possible nursing schools should have a visit day to a clinical area where there is an increased chance of students being able to perform BLS in a more realistic environment. As it has been shown that clinical experience is one of the most important factors in improving confidence (Morgan and Cleave-Hogg 2002). Even though there was no correlation between clinical experiences and results in examinations, this may prove to be an effective tool to increase the confidence of students who have little 'real life experience' of cardiac arrest scenarios.