



Patient Education:
A portfolio of research related to
the methods of providing education for
patients pending a cardiac intervention

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*This portfolio is dedicated
to my father
Norman Marnie*

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Certificate

I certify that the substance of this portfolio has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help received in preparing this portfolio, and all sources used, have been acknowledged in this portfolio.

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Introduction to Portfolio

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Portfolio Structure and Overview

This portfolio is a summation of the research-based component of the Doctor of Nursing degree. The uniqueness of the Doctor of Nursing allows the student to gain knowledge through scholarly debate and research into contemporary issues in nursing. There are opportunities to actively participate in field work and through the core subjects predict, critique and consider the vision for nursing with a working knowledge of historical practice, political influences, economic rationalisation and the benefits of the evidence based movement. Coupled with this is the research framework, which provides opportunities for gaining insight into theoretical influences in the research movement and their related methodologies. The research component of the course then allows the student to gain some skills and knowledge about methodologies and methods and undertake research, which has a strong clinical focus, with the ultimate aim to contribute knowledge to the body of nursing and influence change that can have an impact on outcomes for patients.

The research completed in this portfolio aimed to identify effective education methods for patients prior to a cardiac investigation and determine the preferred time to receive the education as well as method of education delivery.

The portfolio is divided into 4 sections:

Section one — The introduction and background section contextualise the area of research interest, namely educational methods for the patient pending a cardiac investigation. This portfolio begins with an outline of the historical development of cardiac interventions, the burden of heart disease on the health care system, and the role nurses have in providing patient education in the area of cardiac interventional diagnostic techniques and/or surgery.

Section two — This section of the portfolio is a report of the first study: A systematic review of the effectiveness of different approaches to pre-cardiac intervention education. The objective of this review was to summarise the best available evidence related to the effectiveness of pre-intervention educational methods for patients undergoing a cardiac investigation. The review focused on educational methods provided prior to cardiac intervention (either pre or post admission) which was aimed at reducing pre and/or post cardiac intervention anxiety, post intervention pain, improving knowledge retention and reducing length of stay. Although the systematic review has highlighted a lack of quality research in this area, it has also indicated how consideration should be given to the timing and method of educational delivery. This information can assist nurses in cardiac surgical units to guide their education delivery methods and timing of delivery when developing and evaluating current practice.

Section three — Is a descriptive study of the preferred method of pre-operative education for patients having cardiac surgery. This descriptive study adopted both qualitative and quantitative methods of data collection and analysis through the use of a patient questionnaire. A descriptive study design was chosen for this research to describe the most commonly provided method of educational delivery and the patients preferred time to receive the education as well as the preferred method. The findings highlight not only the individual nature of patient's requirements prior to cardiac surgery, but also emphasise the diverse educational requirements of participants and the importance of providing concise, accurate information. The knowledge generated from this study provides an insight into patients' preferred time to receive education and the preferred education method. This study provides nurses with a consumer perspective and can guide practice when developing innovative educational programs that are tailored specifically for the patient having cardiac surgery.

Section four — This section of the portfolio presents a summary of the two pieces of research and provides future directions for nursing research in this area.

Historical Development

The treatment of coronary artery disease and surgical intervention has advanced significantly over the past 100 years. The last 50 years in particular have seen technological developments facilitate a reduction in invasive surgery and streamlined recovery periods. Coronary artery bypass is now one of the most frequently performed surgical procedures in Australia. The most recent statistics available indicate an estimated 22,253 cardiac surgery procedures were performed in Australia in 1998, with an average caseload of 445 patients per cardiac surgery unit.¹

Adam Hammer conceptualised the initial idea of managing angina pain in 1876.² He recognised that angina pain could be attributed to the interruption of coronary artery blood flow and that myocardial infarctions (heart attacks) occurred when at least one coronary artery was blocked.²

The first surgeon to attempt a direct 'hookup' to the coronary artery was an experimental vascular surgeon, Alexis Carrel.² Dr Carrel's suturing techniques were practiced on animals before being pioneered in humans, and the technique of suturing small vessel hookups is still used today. In 1910, Dr Carrel described to the American Surgical Association the technique of coronary artery bypass grafting. He demonstrated the principle of directly grafting into the coronary artery branches. His ideas went largely unnoticed for nearly 50 years until the 1950s when a Canadian surgeon, Gordon Murray, made two major advances.³ The first was the introduction of anticoagulation (heparin) into the field of vascular surgery, and the second was the initial success of directly suturing a graft to the coronary artery in dogs. However, widespread clinical adoption of his discoveries was delayed due to the lack of angiography techniques at the time.³

During the late 1940s, the emergence of valvular surgery by Dr Dwight Harken (an American Army surgeon) occurred in response to the management and treatment of soldiers who had shrapnel wounds that would have been fatal if left untreated. Many of the

early pioneering efforts were disastrous, with the majority of patients dying. Gradually, through the surgeons improving their techniques, the procedure became successful. Techniques that were developed during the late 1940s and early 1950s remain common surgical treatment methods for repairing or replacing the mitral, aortic, tricuspid or pulmonic valves today.⁴ In Australia currently, the procedure consists of replacing the damaged valve with a prosthesis — either a porcine bioprosthesis or human graft. Reconstruction of the damaged valve by suturing techniques is less common at this time.¹

During the early development of cardiac catheterisation, access to the vascular system was predominantly attempted through direct exposure or vessel cut-down. This method had associated risks such as arterial thrombosis and bleeding.⁵ In 1953, the percutaneous technique of arterial catheterisation which is routinely used today was developed by Seldinger.⁵ This method involves passing a catheter into either the arterial or venous circulation via access created using a percutaneous needle with a sharp inner obturator.

The developments of modern surgical techniques were hampered due to the lack of x-ray diagnostics. Dr Sones at the Cleveland Clinic accidentally injected angiographic dye into the coronary arteries of a living patient in 1962 — the incidental finding was that he could visualise coronary artery blood flow. Aware of the significance of this observation, he went on to develop catheters and techniques to routinely x-ray the various coronary arteries in human patients.⁶ The procedure of manipulating a catheter into a coronary ostia and injecting contrast solution while watching the image intensifier and recording the image on a movie film gained immediate popularity throughout the world.⁶

Charles Dotter developed the technique of transluminal angioplasty in the 1960s. As a consequence of this technique Melvin Judkins, a radiologist working with Dotter, developed diagnostic imaging further and recommended diagnostic imaging that involved specialised catheters via a groin puncture rather than the surgical opening of the brachial artery that had been conceptualised by Sones. Judkins believed this technique using a

specifically designed J-shaped catheter, would make it easier to gain access to the coronary arteries during the procedure.⁷ The technique gained widespread acceptance and remains a popular method today.

The first attempt to directly suture a saphenous vein bypass graft into the coronary circulation in humans is credited to Dr David Sabiston Jr. in 1962. His first vein bypass patient died from a stroke, and Dr Sabiston did not officially report his technique until 1974. In 1966, the Russian surgeon Dr V. Kolessov in Leningrad, USSR, reported the use of the internal mammary artery (from the inside of the chest wall) to create a bypass to the coronary artery.⁶ In 1967, Dr Rene Favalaro, an Argentinean working at the Cleveland Clinic reported initial results in a small series of patients where coronary bypass was undertaken in human patients using the saphenous vein from the leg.³

During the early 1970s Andreas Gruentzig, a German physician, developed the concept of adding a balloon to the end of Dotter's catheters. Although colleagues at the American Heart Association meeting received this idea with scepticism, in 1976 Richard Myler could conceptualise the idea and the two worked together to develop the first coronary angioplasty during cardiac surgery in May 1977.⁸ Gruentzig went on to perform the first percutaneous transluminal coronary angioplasty (PTCA) in 1977 in Switzerland on a patient who was conscious at the time.⁸

Following these important milestones, many investigators have expanded the concept of reconstructing blood supply to the heart. As technologies advance further in the area of x-ray, imaging techniques, contrast media and cardiac catheters, so too will the surgical interventions, becoming less invasive and more time efficient. The past few years have seen a rapid growth in new strategies to manage patients with acute and chronic heart disease.

The role of coronary artery vein graft (CAVG) surgery is changing. There are now many other treatment options for patients with cardiac disease, but surgery remains the mainstay for a large group of people for whom other options are not as effective. This group consists of patients such as those with diffuse disease, left main coronary disease, and many patients with multi-vessel disease and left ventricular dysfunction, among whom chronic total occlusions are common and in whom the completeness of revascularisation is a major objective when considering long term prognosis.

Burden of Heart Disease

Continuous technological developments, improvements in myocardial protection, better understanding of the pathophysiology sequelae of cardiac circulation, as well as the increasing experience and technical abilities of cardiac surgeons, have all contributed to decreased morbidity and mortality associated with the procedures and improved long term results.⁴ However, heart disease remains a major cause of morbidity and mortality, causing 29% of all deaths in Australia in 1998 and claiming almost 30,000 lives in Australia every year.⁹ The most common forms of heart disease affecting Australians are coronary artery disease, acquired valve disease, conduction defects, congestive heart failure and congenital heart defects. There are a wide range of treatments for heart disease, among which are cardiac surgery and various other non-invasive surgical procedures such as percutaneous transluminal coronary angioplasty and electrophysiological treatments.¹

The burden on the health care system and community is substantial and remains a major public health problem. Cardiovascular disease is also the leading cause of disability for Australians. In 1996-1997, there were 421,516 hospitalisations for cardiovascular conditions (8% of all hospitalisations). This economic toll does not take into account the impact this problem has on Australian families directly affected by cardiovascular disease.¹⁰

Existing expenditure on a disease, no matter how large or small, does not, in itself, give an indication of the loss of health due to that disease, the priority for intervention or the need for additional health services expenditure. Resource allocation decisions should be made with appropriate consideration for not only the information sourced from average costs and outcomes, but also to the marginal costs and marginal outcomes associated with the specific intervention under scrutiny. Care should be taken in interpreting direct costs associated with disease treatment. If expenditures can be linked to output and outcome measures such as the number of hospital admissions, length of stay and changes in health status, then the expenditure information may be beneficial. In essence, disease costing is not able to provide a comprehensive assessment of the impact of coronary artery disease on society.

What is understood is that this health issue has an extensive impact on the community and health care system. There is potential to reduce the burden on the health care system through applying knowledge and improving understanding. Investing time and effort into providing suitable information in a readily understood format is sound economics and, it is hoped, will ultimately improve patients' immediate and long-term outcomes.

The Nurse's Role in the Cardiovascular Unit

Nurses are integral members of the health care team in the Cardiovascular Unit. They play a significant role in the patients' management before, during and after a cardiac intervention, be it either coronary angiography, angioplasty or CAVG. The pre-intervention period of a patient's admission can be an extremely stressful event for them with the advent of the pending procedure and fear of the recovery outcome potentially leading to intense emotion, stress and anxiety.¹¹ The literature supports the provision of information to help alleviate this stress and lead to better post intervention outcomes.^{12,13} Often it is the nurse who provides educational information to the patient in various formats

to ensure they have an understanding of the pending intervention. The education formats generally provided include information pamphlets, lectures, and videos explaining what to expect whilst an inpatient, the relevant cardiac intervention and the post intervention care.

The nurse aims to provide the patient with education prior to their cardiac intervention and in doing so to establish a rapport with the patient and support person if present. When the nurse provides educational information it may be carried out whilst performing other roles such as recording an electrocardiogram, venepuncture and/or taking baseline vital signs. It is also at this time that the nurse identifies how much information the patient requires. Cues and indicators regarding the patient's willingness to receive information and desire to gain an insight into the hospital admission process are often detected and acted upon by the nurse in the unit.

The nurses' role is extensive within the Cardiovascular Unit as they are involved in orientating the patient to their surroundings and informing them of the standard hospital admission process. It is the nurse who educates the patient regarding time frames and procedural details such as how the patient may feel when having an angiogram. For example, the nurse may explain how when the contrast dye is injected it is not unusual to experience a warm sensation and have the urge to pass urine, that there maybe some chest pain during a percutaneous transluminal coronary angioplasty when the balloon is inflated, or perhaps the importance of coughing when asked to during the procedure because of an irregular heart rhythm. Providing a rationale to some of these necessary actions is extremely important and required prior to the procedure.

It is not just the pre-intervention management and intervention awareness that is important, but also educating the patient regarding movement through the unit and care post intervention. It is the nurse who informs the patient and support person where they will be located post intervention, length of bed rest and how long they may remain in an area such as recovery. Not only does the nurse provide information, but they also work in a team

environment caring for the patient in theatre. Specialised-trained nurses care for patients in the recovery unit providing primary care. It is during this time that the nurse maintains the patient's haemodynamic status, ventilation status, wound care, cardiac rhythm, psychological state and comfort levels. The nurse's role throughout the Cardiovascular Unit is diverse, including direct and indirect patient care as well as consulting with a team of health care providers, family support members and initiating emergency procedures if required.

Clinical assessment skills and sound clinical judgement are an integral component of the nurse's role working in the Cardiovascular Unit. Increasingly the nurse's role is expanding — examples of this being femoral sheath removal post angiogram or percutaneous transluminal coronary angioplasty, and ventilation extubation post cardio-thoracic surgery — with each activity requiring individual accreditation. There are many roles that the nurse performs in the unit that are clinical in their nature and are aimed at improving recovery times and ultimately patient outcomes. However, these actions cannot be performed without informing the patient and providing necessary education.

The importance of providing patients with psychological support can never be underestimated. Without adequate preparation and guidance many roles the nurse performs for the patient in the Cardiovascular Unit could have untoward outcomes through lack of understanding and information provision.

Many procedures performed in the Cardiovascular Unit involve short lengths of stay such as one to two days. However, cardio-thoracic surgery length of stay is longer — six to seven days. Every effort should be made to provide comprehensive, meaningful education to the patient during this time. If this is not possible, flexible education initiatives should be considered such as before admission. Although there is limited time, the patient should be adequately educated otherwise they may be considered inadequately treated. Effective

patient education therefore is a nursing objective in the Cardiovascular Unit and one that the nurse must remain committed to.

Conclusion

The aim of this first section of the portfolio was to establish the context and area of research focus — patient education prior to a cardiac intervention. An overview of the structure and content of the portfolio has been outlined. A review of the historical developments of cardiac surgery was provided in order to highlight the rapid developments that have occurred in relation to cardiac interventions in recent years.

The management of heart disease has a significant impact on the health care system and burden on the health care budget. The economics of managing illness within the community is a significant factor affecting the hospital system. Not only does heart disease place an enormous burden on the health care budget but also on patients, families and the support services accessed.

Finally, a discussion on the role of the nurse in the cardiovascular unit was presented. Nurses play an integral role in the successful management of patients whilst in the cardiovascular unit. A significant proportion of this role is education — without it, technological advancements and economic rationalisation would not be possible as understanding and compliance could not be achieved.

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Study one

A systematic review of the effectiveness of different approaches to pre-cardiac intervention education

N.B. This systematic review was conducted from September 2000 to November 2001. Therefore only research reports that were identified prior to November 2001 have been included in this systematic review.

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Abstract

Background: Pre-intervention education is widely accepted as part of the orientation routine for most patients prior to their cardiac intervention. To date, minimal rigorous research has been undertaken to identify the most beneficial educational method for patients undergoing a cardiac intervention.

Objective: The aim of the systematic review was to summarise the best available research evidence related to the effectiveness of pre-intervention educational methods for patients undergoing cardiac interventions. The review focused on education methods aimed at reducing anxiety (pre- or post-intervention), post intervention pain, length of stay and improving knowledge retention.

Method: The search strategy sought to identify both published and unpublished research reports that evaluated education methods offered to patients prior to a cardiac intervention. Methodological quality was assessed using pre-designed criteria. Due to the lack of homogeneity between study outcomes, no meta-analysis could be completed. However, graphical representation was used to display results from each study using the Review Manager 4.0.4 software package. Evidence was synthesised using narrative summaries.

Results: Five articles met the inclusion criteria. Although there were four randomised-controlled trials identified, only two met the inclusion criteria for this review and the other three included studies were of randomised quasi-experimental design. The results indicated that there was a lack of substantive research to isolate or identify one particular educational method that effectively deals with improving knowledge, reducing post-intervention pain, anxiety or length of stay for patients post cardiac intervention. One study demonstrated statistically significant improved knowledge scores and reduced anxiety levels for patients who received an information pamphlet pre-admission. However,

these results must be viewed with caution due to the variance in actual time of testing prior to the cardiac intervention.

Conclusion: Further research is required on the most effective method of education to provide to patients prior to a cardiac intervention. Rigorous, methodologically sound research should be undertaken to identify the optimal time to provide education and the ideal education method which, when measured, consistently demonstrates a significant improvement in patient outcomes.

Background

The purpose of pre-cardiac intervention education is to provide knowledge and assist in the development of skills, which facilitate each patient's understanding of the indications for surgery and what to expect in the post cardiac intervention period. Providing educational information to the patient prior to a surgical intervention may help them to feel more in control and better prepared for their procedure as well as assist in achieving positive post-intervention outcomes.

The pre-intervention period for the patient awaiting a cardiac procedure is undoubtedly one of the most traumatic stages of their hospital admission.¹ Prior to the intervention many patients feel frightened and experience a great deal of stress and anxiety.^{2,3} Death has occurred during cardiac catheterisation due to extreme distress alone.⁴ It has been suggested that with the provision of educational information to patients in the pre-intervention period there is a reduction in anxiety levels.⁵ One author suggests that patients who suffered extreme anxiety in the pre-operative period experienced increased pain levels in the post-operative period.¹ This adds support to the notion that pre-intervention education can ease anxiety and by doing so decrease post-intervention pain to some extent. Another author supported these beliefs, suggesting that with the provision of pre-

intervention education, the patient was better prepared for surgery and furthermore, this aided their recovery phase.⁶

Education delivery is becoming more interactive, collaborative and patient focused.⁷ One of the driving factors affecting change in the teaching/learning process for patients undergoing a cardiac intervention in large institutions is reduced length of stay. The time from the cardiac diagnostic procedure to that of an intervention (such as percutaneous transluminal coronary angioplasty or coronary artery vein graft) is often less than 24 hours thus limiting the time available for comprehensive and informative patient education. Providing the patient with the most effective education by the most effective method is of paramount importance in the learning process and can potentially assist the recovery phase.⁸

Education for patients prior to invasive cardiac intervention can encompass a number of different approaches such as designated nurse educators, telephone intervention, education groups, audio-visual (video), information pamphlets, nurse initiated information delivered in an unstructured manner, or a combination of these methods. The timing of the delivery of pre-intervention education for the patient has also been subject to comparisons, such as pre-admission education versus post admission.⁹

The use of a variety of educational methods has appeared to gain widespread acceptance in assisting the patient both pre and post cardiac intervention during their hospital admission. However, the most effective educational method provided prior to a cardiac intervention for the reduction of pre-intervention and/or post-intervention anxiety, post-intervention pain, length of stay and knowledge retention remains largely undefined. There is no consensus in the literature as to the most appropriate and beneficial educational delivery method with few randomised-controlled trials on the various methods and their comparative benefits. Owing to the variation in educational delivery methods and timing of delivery, it is appropriate that a systematic review of the literature be undertaken to

critically examine and assess the effectiveness of the varying educational methods and the optimal timing of the delivery for the patient undergoing a cardiac intervention.

Note on Terminology

To clarify common terminology throughout this systematic review the following definitions are provided:

Although there are many different terms to describe people who use the health care system such as *consumer, client, customer and patient*, *patient* has been chosen as the preferred term for this systematic review.

Cardiac Interventions — Common cardiac interventions consist of percutaneous transluminal coronary angioplasty (PTCA), coronary angiogram, cardiac pacemaker insertion/replacement, cardiac catheterisation, electrophysiology study, trans-oesophageal echocardiogram, coronary artery vein graft (CAVG), aortic or mitral valve replacement (AVR or MVR). Intervention has been chosen as the preferred term for this systematic review. Alternatives could be procedure, operation or surgery.

Cardiac — Pre-intervention — Throughout this systematic review this term pertains to the time preceding a cardiac interventional procedure. The pre-intervention period is the time leading up to the procedure from the moment the patient is notified of the pending procedure to the moment the cardiac intervention is performed.

Cardiac — Post intervention — Throughout this systematic review this term pertains to the time post a cardiac interventional procedure. More specifically the moment the cardiac intervention has ceased and the patient has been removed from the surgical area.

Objective

The objective of this review was to summarise the best available research evidence related to the effectiveness of pre-intervention educational methods for patients undergoing cardiac interventions. The review focuses on educational methods aimed at reducing anxiety (pre or post cardiac intervention), post-intervention pain, length of stay and improving knowledge retention.

Review Questions

The specific review questions to be addressed were:

- Is pre-intervention education effective in reducing pain, anxiety (pre- or post-intervention), length of stay, and improving knowledge retention for the cardiac patient?
- What type of pre-intervention educational method(s) is most effective for cardiac patients for reducing pain, length of stay, and anxiety (pre- or post-intervention), and improving knowledge retention post-intervention?

In addition to this, the review also attempted to determine:

- Does the timing of education delivery influence the effectiveness of a pre-intervention education?

Criteria for Considering Studies Reviewed

Inclusion criteria

An inclusion criterion was developed as part of the review protocol to assist in the selection of studies. The established criteria aided in determining the suitability and relevance of

studies for inclusion in the systematic review. For studies to be included in the review the following criteria had to be met.

Types of participants

This review considered all studies that included adults who were patients in a hospital or same day surgical setting who had undergone a cardiac intervention and who received pre-intervention education.

Types of interventions

Interventions of interest were the educational methods used to facilitate pre-cardiac intervention patient education. Consideration was also given to studies that reported the timing of the intervention as a variant.

Educational methods

The different educational methods identified that were offered to the patient prior to their cardiac intervention were:

- Audio-visual (video)
- Information pamphlet
- Telephone intervention consultation
- Pre-admission teaching session
- Verbal education by a nurse post admission
- Combination of methods

Timing of delivery

- Pre-admission and/or post-admission

Types of outcome measures and measurement tools considered

The aim was to assess which pre-cardiac intervention educational method(s) was most effective in reducing the patient's anxiety (pre &/or post intervention), pain and length of stay and/or improving knowledge retention post intervention. The primary outcomes were those directly related to understanding the information and the effect it had on the following:

- Severity of pain (visual analogue scale, VAS)
- Amount of analgesia used
- Rating of anxiety (State Trait Anxiety Inventory, STAI & VAS)
- Vital signs
- Length of stay
- Knowledge retention

Types of studies

This review considered randomised-controlled trials (RCTs) that evaluated pre-intervention education methods for cardiac patients and the timing of the educational delivery. Where RCTs of sufficient quality could not be identified, uncontrolled clinical trials and descriptive studies were considered.

A checklist that outlines the inclusion criteria for this review was attached to each reference (refer Appendix 1).

Exclusion criteria

Exclusion criteria were also developed as part of the review protocol to assist in determining which studies would not be included in the review.

Studies were excluded from the systematic review if:

- Critical appraisal indicated that it was of poor methodological quality.
- There was inadequate description in the study report to determine specific information about the participants, cardiac intervention, outcome measures or research method.
- The study did not provide sufficient description from the educational methods for pre-intervention education.
- It should also be noted that it was beyond the scope of this review to consider non-English language studies, due to the lack of resources available to translate information.

Search Strategy

The search for studies involving pre-intervention educational methods for patients undergoing a cardiac intervention was based on the search strategy outlined by Dickersin, Scherer and Lefebvre.¹⁰ The initial search sought to identify ideal search terms from electronic databases relevant to the topic. The aim was to identify key words contained in the title or abstract and index terms used to describe relevant articles.

The final search terms were:

- Pre-procedural education
- Cardiac patient education
- Educational tools

- Information needs

Once the initial key words and search terms were identified from the initial search a thorough search of a number of databases was performed. The databases searched and the search period included (refer Appendix 2):

- CINAHL — 1982-2001
- MEDLINE — 1966-2001
- Current Contents — 1998-2001
- Database of Abstracts of Reviews of Effectiveness (DARE) — 2001
- The Cochrane Collaboration Library — 2001
- Centre for Reviews and Dissemination (CRD) — 2001
- Health Star — 1975-2001
- EMBASE — 1980-2001

The search for unpublished studies included:

- Dissertation Abstracts International Database — 1992-2001
- Proceedings First Database — 1992-2001
- Manual search of cardiac conference proceedings

This extensive search of the databases was performed using all identifiable key words and indexed terms.

To increase the possibility of identifying all relevant studies, bibliographies and reference lists of all retrieved articles were then hand searched for further studies where the titles appeared to meet the inclusion criteria.

All studies highlighted from the database searches were assessed for relevance to the review based on the information gathered from the title, abstract and medical/nursing subheadings descriptor/ MeSH terms, and a full report was retrieved for all studies that met the inclusion criteria. Reference lists at the end of chapters within cardiac related books were searched to check if there were any articles that met the review inclusion criteria. The approach aimed to identify all relevant articles related to pre-intervention cardiac patient education and the effects on post intervention pain, anxiety, length of stay and/or knowledge retention regardless of the study methodology. The search strategy was maintained until the reviewer was satisfied that no new citations were emerging from individual databases that had not been identified previously.

Manual searching was also undertaken of relevant journals. However, due to time constraints, this was limited to those journals and books accessible to the reviewer (refer Appendix 3). No articles were found using this search method.

It was anticipated that many relevant articles would be identified and retrieved following the search process. The software program 'EndNote Version 4' was used to manage the extensive list of references.

Assessment of methodological quality

A critical appraisal was performed to determine whether the selected studies met the methodological criteria prior to inclusion in this systematic review (refer Appendix 4). Methodological quality was assessed using a checklist (Critical Appraisal Checklist) which was based on the work of The Cochrane Collaboration and the Centre for Reviews and Dissemination at The University of York and further refined by The Joanna Briggs Institute (JBI).^{11,12} The reviewer and an experienced systematic reviewer piloted the critical appraisal checklist prior to use of the review.

In the absence of RCTs the reviewer considered other studies, such as experimental studies or descriptive studies. These studies were then included in a narrative summary that described the outcomes of the particular educational method used. Non-RCTs were assessed for inclusion using a checklist (refer Appendix 5); its design being guided by those developed at JBI and based on the work of The Cochrane Collaboration and the Centre for Reviews and Dissemination at the University of York.^{11,12}

Each study included in the review was coded with a reference number. To aid identification of the selected articles, these numbers were correlated with the reference number stored in the EndNote Version 4 citation. Once the critical appraisal process was completed the checklist was left attached to each article. Studies scoring 'yes' to questions 1 to 5 on the checklist were considered suitable for inclusion.

Studies were eliminated if:

- They failed to have an adequately defined randomisation technique (selection bias).
- Despite the study intervention they displayed a variance in management within the study groups (performance bias).
- There was a high incidence of withdrawal or dropout by the participants (attrition bias).
- They displayed different outcome assessment measures (detection bias) or poor follow-up.

The studies included in the review were categorised according to the strength of the evidence reported using the scale published by the National Health and Medical Research Council (refer Appendices 6 and 7).¹³ Two reviewers also independently assessed all studies included in the review.

Data Extraction

To minimise the risk of error, data was extracted from the results of each study using a 'data extraction form', which had been pilot tested prior to use. Double data extraction was used to check for accuracy and prevent errors during transcription of study results.

The data extraction form developed and tested for validity by The Joanna Briggs Institute was time efficient because all of the data was recorded on one occasion, which avoids having to repeatedly return to the article for additional information (refer Appendix 8). The data extraction form also allowed others to check the review for accuracy. This maintained a replicable process that could be assessed. The data extraction form was attached to each reviewed article.

The data extracted from each study included:

- General demographic details of study participants.
- Description of the study location (institutions).
- Data related to the specific cardiac intervention and the treatment group(s).
- The specific education method being compared and its relevance to administration (timing).
- The impacts of specific outcomes relevant to this review — post intervention pain, anxiety, length of stay and knowledge retention.

Data Synthesis

The aim of the data synthesis phase of the review was to both summarise and synthesise the findings of all studies addressing the most effective education method for pre-intervention cardiac patients on post-intervention pain, anxiety, length of stay and/or knowledge retention.

The Review Manager software program (RevMan 4.0.4) developed by The Cochrane Collaboration was used to graphically display data where possible. For continuous data the weighted mean difference (WMD) was used as the summary measure of effect. Where possible, the 95% confidence interval (CI) was calculated and displayed in a meta-view graph format. No studies had comparable outcome measures to perform meta-analysis, therefore due to the lack of statistical pooling of results they are summarised in narrative form. While the value of this information is limited because of threats to bias, this information was considered significant in order to present a complete summary.

Results

This systematic review aimed to present the best available research evidence related to the effectiveness of educational methods for pre-intervention cardiac patients in relation to post-intervention pain, anxiety (pre or post intervention), length of stay and/or knowledge retention. This review identified 29 papers that appeared to meet the inclusion criteria, based on a preliminary review of the article abstract or title. Of these there were:

Randomised controlled trials	4
Randomised quasi-experimental studies	3
Clinical trials	9
Integrative reviews	4
Meta-analysis - cardiac education general	1
Discussion papers	4
Literature review	1
Descriptive studies	3

All studies were evaluated for their relevance to the question and their methodological rigour. Studies were included in this systematic review if they satisfied the inclusion criteria for the review (refer Appendix 1). A critical appraisal checklist was also used to

confirm the study design as a randomised-controlled trial or non-randomised controlled trial (refer Appendices 4 and 5).

Of the 29 articles that met the initial inclusion criteria addressing cardiac patient education methods, 5 were considered to be of an acceptable methodological quality for inclusion in the systematic review. A detailed summary of the papers utilised in this systematic review which incorporate: study design, author, sample, content of education, outcome measures and level of evidence is recorded in Appendix 7.

Due to the lack of homogeneity between the study outcomes no meta-analysis could be completed. However, it was possible to extract sufficient data from the individual studies to include the findings in narrative summary and display results in graph format using the RevMan 4.0.4 software package. The narrative summaries provide a methodological appraisal of the study findings and a descriptive summary of the demographic information, educational method and outcomes. Where possible the reporting of the results has been presented in graph format displaying weighted mean difference.

The 5 included studies compared various pre-intervention teaching methods and/or the timing of these methods.

In the identified studies, a variety of outcome measures were used. The primary outcomes of interest were those related to pain and anxiety plus objective measurements of hospital admission duration and knowledge, which included:

- anxiety levels (pre or post intervention)
- post intervention pain (analgesia usage)
- knowledge score
- length of hospital stay

Excluded studies

Articles were excluded from the review if they did not satisfy the inclusion criteria for the review (refer Appendix 1) and the requirements of the critical appraisal checklist (refer Appendices 4 and 5).

Of the 29 papers retrieved two were RCTs that did not meet the inclusion criteria. One failed to provide complete results data, and only the author's summary of the findings could be used.¹⁴ The other RCT, by Finesilver, could not attribute the results of the study to the educational intervention alone because, post cardiac intervention, some patients were left for several hours unattended and isolated in a recovery room and the researcher believes the results of the study reflected this influence.¹⁵ Many participants expressed feelings of helplessness due to their isolation post intervention and as a consequence the researcher believes the results of the Mood Adjective Check List (MACL) may be indicative of this.¹⁵ A search undertaken on the Internet for contact details of the researchers was unsuccessful. Nine clinical trials, which predominantly included convenience samples, did not meet the inclusion criteria. These nine were excluded due to a lack of blinding of participants and data collectors, the education was not provided until post cardiac intervention, and/or the research focused on post discharge outcomes not appropriate for this review. Four articles were integrative reviews providing a summation of the research available. One was a meta-analysis, which considered chronic heart disease as well as coronary artery bypass patients, however the analysis focused on outcomes that weren't relevant to this review such as lifestyle changes post discharge, smoking, diet and mortality. Four discussion papers focused on cardiac education in general with no specific outcomes measured. One paper was a literature review and only provided a summary of the literature. Three papers were descriptive studies, which did not contain relevant information for data to be extracted from the primary research studies. The citations and specific rationale for exclusion is detailed in Appendix 7.

Education methods for patients pre-cardiac intervention

Studies have been summarised through narrative discussion. The aim of this section of the review was to identify the approaches used, provide a methodological appraisal of studies and provide a descriptive summary of demographic information of existing studies and the outcomes. Particular issues of interest included:

- The populations that have been investigated,
- The types of pre-intervention education methods that have been subject to evaluation,
- Issues related to study quality,
- Contradictions in results,
- Study outcomes.

Educational delivery

Patients may be informed that they require a cardiac intervention several weeks before it can be performed. During this critical waiting period, patients may have time to minimize or exaggerate their fears about the impending cardiac intervention. Patients may seek information from family members, friends and/or other patients who are living proof of the success of the cardiac intervention.¹⁶ However, many patients may have limited access to appropriate, accurate information about their specific cardiac intervention and subsequent hospitalisation. Therefore it is vital that patients have access to the most appropriate information. It is also mentioned in the literature that the life-threatening nature of the cardiac intervention can inhibit learning and undermine the effectiveness of immediate pre-intervention education.⁹ Consequently, it is imperative that the most suitable information is provided at the most appropriate time.

It is difficult to ascertain the most suitable time to provide pre-admission education to help alleviate any potential uncertainties the patient may be experiencing. It was evident from the research that providing education to patients at different times prior to their cardiac

intervention was possible. The following studies have in essence made comparisons between various pre-intervention teaching methods and/or the timing of these methods. This will be highlighted when describing the study results.

Study one - study description

The study by Mott was a randomised, quasi-experimental study design.¹⁷ Mott compared the impact of verbal (non-scripted) education (treatment group 1) to audio-visual (video) education (treatment group 2) and also made comparisons to a combination of these treatments (treatment group 3) on anxiety scores.¹⁷

Subjects

Adult patients scheduled to undergo cardiac catheterisation served as potential subjects in this study. There were 20 men and 10 women, with a mean age of 58 years (SD±11.6 years).¹⁷

Interventions

All participants in the study were provided with education prior to their cardiac catheterisation. The content of the pre-cardiac intervention information was identical for all subjects in each of the three treatment groups however the manner in which it was delivered, illustrated or reinforced varied according to the patient group. Participants in all three treatment groups received a pamphlet entitled “Understanding Cardiac Catheterisation and Coronary Angiogram” by Krames Communications.¹⁸ The pamphlet consisted of 8 pages with graphic reference explaining the diagnostic procedure, its purpose, basic anatomy and physiology of the heart and uses of cardiac catheterisation. The possible risks were also included in the pamphlet. The clinic nurse provided detailed information to treatment groups 1 and 3 about visual, auditory and tactile sensations the patient would experience during the cardiac intervention. Also, stimuli the patient would

be exposed to such as the cardiac catheterisation laboratory and post intervention management was described. The video, which treatment groups 2 and 3 received, was provided by Squibb Diagnostics and was approximately 14 minutes in duration and consisted of a patient outlining the intent and ramifications of the cardiac catheterisation.

Treatment group 1 - verbal education

Subjects in treatment group 1 (n=8) received explicit verbal (non-scripted) explicit preparatory information and psychological support by the clinic nurse. Familiarizing the patient and family with visual, auditory and tactile sensations generally experienced during the procedure was also provided. The nurse described stimuli the patient would be exposed to (e.g the cardiac catheterisation laboratory) as well as the post cardiac catheterisation care that would be provided.

Treatment group 2 - video

Subjects in treatment group 2 (n=8) were shown the commercially produced videotape, which was approximately 14 minutes in duration detailing information regarding admission to hospital, the procedure and discharge plans. The patients received similar information as treatment group 1 however the information was supplied in video format and they did not receive any psychological support from the clinic nurse.

Treatment group 3 - combination of verbal and video

Subjects in treatment group 3 (n=14) received a combination of the previous two treatments.

Subjects in all three-treatment groups received an educational pamphlet, outlining basic anatomy and physiology of the heart, benefits of cardiac catheterisation and possible complications.

Outcome measures

Assessment of anxiety was measured in all treatment groups and varied from one day to three weeks prior the cardiac catheterisation dependent on when the participant visited the surgeon. Once the patients consented to participate in the study, anxiety was assessed before the various education methods were provided and then anxiety was tested again one to two hours prior to the cardiac catheterisation, using the State Trait Anxiety Scale (STAI) developed by Spielberger, Gorsuch and Lushene.¹⁹ This scale is a self reporting instrument where patients rate their transitory perceived anxiety on a four point scale of increasing intensity. Scores range from 20 to 80, with high score representing high state anxiety.

Results and conclusions

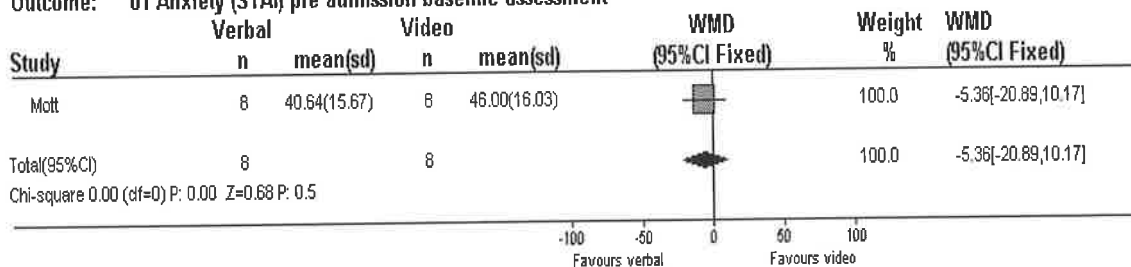
Anxiety

Mott's study established that there was no statistically significant difference in the mean pre-education anxiety score recorded as a baseline between the verbal education, video preparatory education groups and the group who received a combination of both (refer Figures 1, 2 & 3).¹⁷ The STAI scale was measured in all three treatment groups prior to the administration of the educational intervention. Following testing the education was provided dependent on the treatment group.

Figure 1

Comparison: 10 Verbal vs Video

Outcome: 01 Anxiety (STAI) pre admission baseline assessment

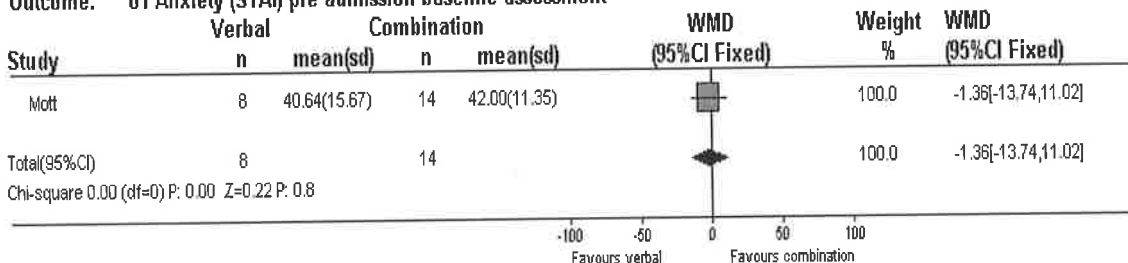


In terms of mean anxiety scores at baseline prior to education, the results demonstrated that there was no statistically significant difference between the verbal education (treatment group 1) and the video education group (treatment group 2) (WMD -5.36: 95% CI -20.89, 10.17).

Figure 2

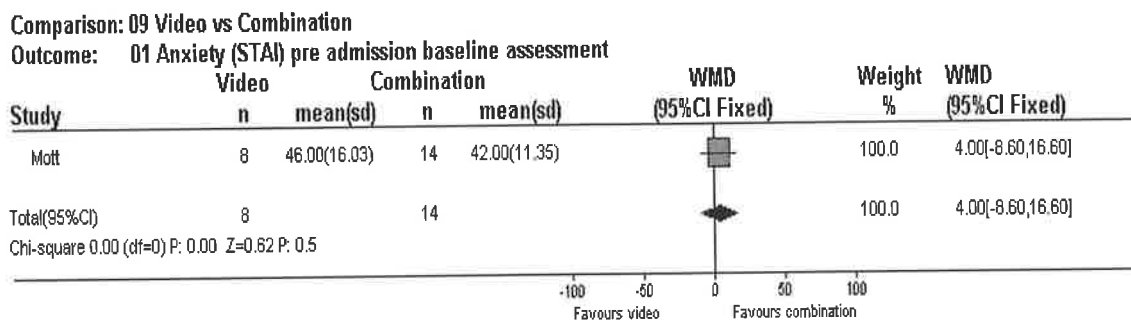
Comparison: 08 Verbal vs Combination

Outcome: 01 Anxiety (STAI) pre admission baseline assessment



The findings show no statistically significant difference in mean anxiety scores between verbal (non-scripted) education treatment group one when compared to treatment group three (combination of both the verbal and video education) at baseline (WMD 1.36: 95% CI -13.74, 11.02).

Figure 3

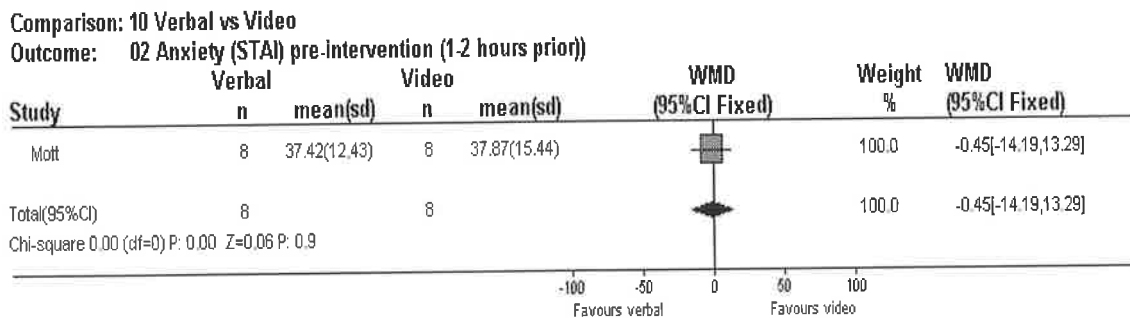


Once again there was no statistically significant difference in mean anxiety scores between the video group (treatment group 2) when compared to the group receiving a combination of both verbal (non-scripted) and video education at the pre-admission assessment (WMD 4.00: 95% CI -8.60, 16.60).

In summary all groups were established to be at the same baseline anxiety level prior to receiving education.

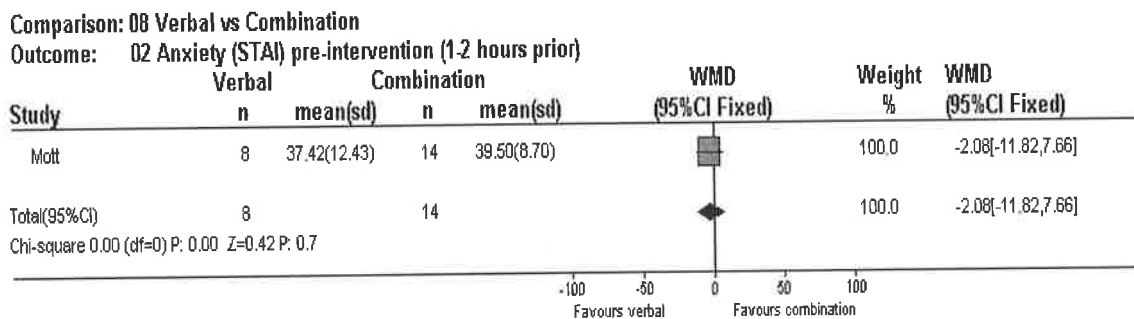
The STAI scale was measured again on the morning of the cardiac catheterisation, one to two hours before the cardiac intervention. The impact on anxiety at that time in all three-treatment groups is demonstrated in the following figures (refer Figures 4, 5 & 6).

Figure 4



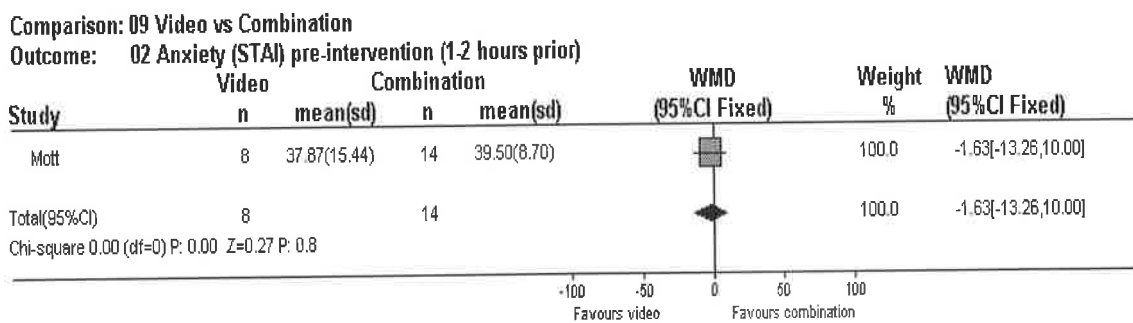
These findings indicate that there was no statistically significant difference in the mean post education anxiety score recorded one to two hours prior to the cardiac intervention between the verbal education (treatment group 1) when compared to the videotape education method (treatment group 2) (WMD -0.45: 95% CI -14.19, 13.29).

Figure 5



These results indicate that there was no statistically significant difference in mean anxiety scores with the provision of verbal (non-scripted) education alone when compared to a combination (verbal and video) of education methods one to two hours prior to the cardiac intervention (WMD 2.08: 95% CI -11.82, 7.66).

Figure 6



Once again the findings show no statistically significant difference in mean anxiety scores between the two groups (video vs combined) when recorded one to two hours prior to the cardiac intervention (WMD 1.63: 95% CI -13.26, 10.00).

Post-intervention pain

Post-intervention pain was not used as an outcome measure by the randomised, quasi-experimental study evaluating the effectiveness of verbal, video and a combination of both methods.

Length of stay

Length of stay was not used as an outcome measure by the randomised, quasi-experimental study evaluating the effectiveness of verbal, video and a combination of both methods.

Knowledge retention

Knowledge retention was not used as an outcome measure by the randomised, quasi-experimental study evaluating the effectiveness of verbal, video and a combination of both methods.

In summary, based on very limited evidence, when examining pre-cardiac intervention education such as a verbal, video or a combination of both, no method was deemed to be more effective in reducing mean anxiety scores when measured one to two hours prior to a cardiac catheterisation. There was no attempt to compare these additional methods with receiving only the information pamphlet. The additional impact of these methods was therefore not determined. Additionally, the impact of pre-cardiac intervention verbal versus video education and a combination of both on post-intervention pain, length of stay and/or knowledge retention has not been subject to any rigorous evaluations identified by this review.

Study two - study description

The second study by Lamarche, Taddeo and Pepler was a randomised pre and posttest quasi-experimental design used to explore the effect of the telephone intervention education method following a pre-admission teaching session.²⁰ The telephone intervention for the experimental group was carried out in the week following attendance at a pre-admission teaching session. Both study groups participated in the pre-admission teaching program prior to CAVG. The experimental group participated in the additional education method, which was a telephone call, whereas the control group had no further education until admission.

Subjects

Patients scheduled for elective CAVG for the first time from a large metropolitan tertiary care teaching hospital served as potential participants. Fifty-four patients were randomly assigned to the experimental or control group. There were 45 men and nine women recruited for the study. The mean age of the control group was 63.7 years and the experimental group was 63.5 years.²⁰

Interventions

Both groups participated in the pre-admission teaching program however the telephone call was only provided to the experimental group. The pre-admission teaching program provided information regarding hospitalisation, along with additional information about coronary artery disease and lifestyle adjustment. One of the investigators telephoned the patients in the experimental group. Patients in the experimental group received the telephone call in the week following the initial teaching session. The telephone intervention consisted of five open-ended questions. The first question allowed the patient to raise any concerns they may have regarding hospitalisation and CAVG. The second question allowed the investigator to clarify or add information to what was inaccurate or

incomplete. Further questions related to patient comfort and self-disclosure about the cardiac intervention. Finally, a direct question about feelings was utilised to allow the patient to express fears and expectations.

Control group

Subjects in the control group (n=26) participated in the pre-admission teaching program, which consisted of cognitive and affective information about hospitalisation, information about coronary artery disease, and lifestyle adjustments.

Experimental group

Subjects in the experimental group (n=28) participated in the pre-admission teaching program and received a telephone call by a study investigator a week following the pre-admission teaching session. The telephone call consisted of five open-ended questions giving individuals the opportunity to raise any concerns and fears they may have regarding the surgery.

Outcome measures

Lamarche, Taddeo and Pepler tested anxiety levels in all treatment groups at the time of initial teaching session (which was prior to the telephone intervention), on admission, and prior to discharge using the visual analogue scale developed by Vogelsang.^{20,21} The VAS consisted of a 10 cm horizontal line with defined ends representing extreme limits of not at all anxious and extremely anxious, scores were recorded out of 100, the higher the score the more anxious the patient was believed to be.

The level of actual knowledge was measured with the Coronary Artery Bypass Graft Questionnaire, developed by Cupples.⁹ The questionnaire is a 20 item multiple-choice test designed to measure patients' knowledge of CAVG and routine. The content areas

examined are anatomy and physiology of the heart; pre-, intra- and post-cardiac intervention routines and possible complications. Actual knowledge was tested after the initial teaching session and on admission (scores were recorded out of 100).²⁰

Perceived knowledge was measured out of 20 after the initial teaching session, on admission and also prior to discharge using a five-item perceived knowledge index developed by Anderson.¹⁹ The patients were asked about their perceptions of the extent of their knowledge regarding their current condition, possible complications, possible change of activities, care for themselves after returning home and prevention of future health problems.

Results and conclusions

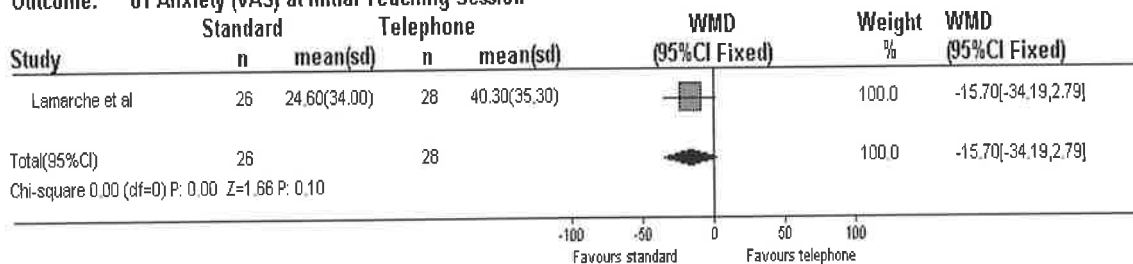
Anxiety

The findings of the study comparing the anxiety levels measured in both groups post the initial teaching session are provided in the following figure (refer Figure 7). Figure 8 outlines the anxiety levels between groups on admission.

Figure 7

Comparison: 01 Telephone Intervention Vs Standard Teaching Session

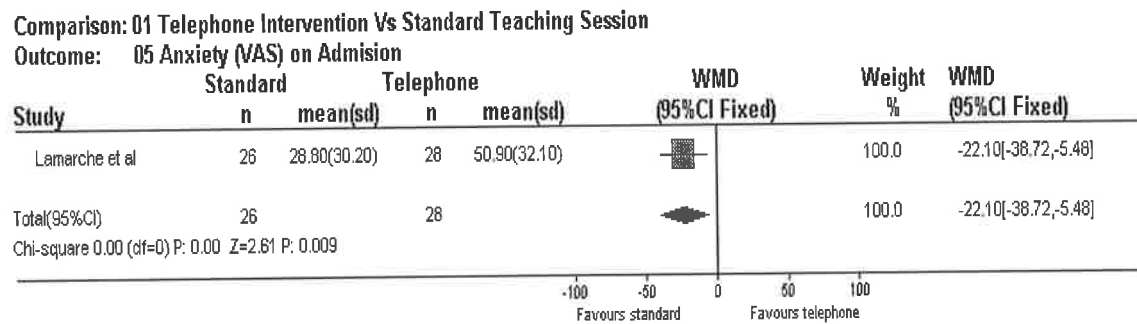
Outcome: 01 Anxiety (VAS) at Initial Teaching Session



These anxiety levels were measured at the time of the initial teaching session, which was prior to the telephone intervention. The initial anxiety scores measured out of 100 indicate

that there was no statistically significant difference between groups (WMD -15.70: 95% CI -34.19, 2.79).

Figure 8



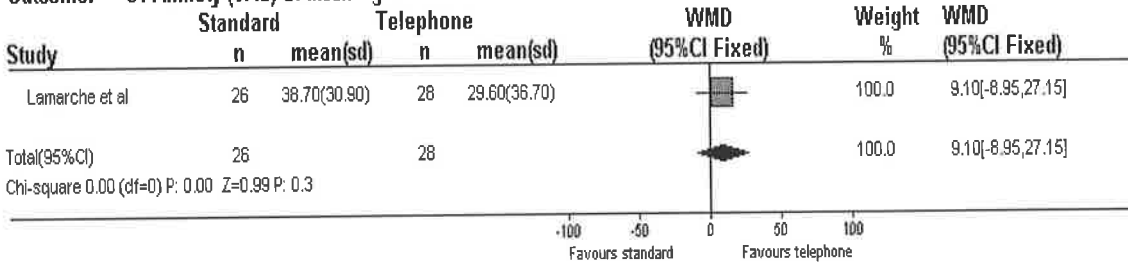
On admission the experimental group was statistically significantly more anxious than the control group ($p = 0.02$). However when anxiety level at teaching time and length of waiting time prior to CAVG were entered as covariates in multiple analysis of variance (MANOVA), the authors concluded that the difference between the groups anxiety levels on admission became non-significant ($p = 0.14$) (WMD -22.10: 95% CI -38.72, -5.48). MANOVA can be defined as an expansion of an analysis of variance for use when you have more than one dependent variable.²² There should be a conceptual reason or relationship when collating the dependent variables together. Through the combination of dependent variables MANOVA compares the groups, defines the analysis and outlines whether the mean differences between groups is likely to have occurred by chance or not. Going on to complete an analysis of variance using the new combined dependent variables will outline if there is any statistical significance between the groups.²²

The following figure outlines the mean discharge anxiety scores between the two groups (refer Figure 9).

Figure 9

Comparison: 01 Telephone Intervention Vs Standard Teaching Session

Outcome: 04 Anxiety (VAS) at discharge



At discharge the results indicate that there was no statistically significant difference between groups. The provision of telephone intervention post initial teaching session and prior to admission for CAVG did not provide any statistically significant difference in anxiety scores at discharge when compared to no telephone intervention post initial teaching session (WMD 9.10: 95% CI -8.95, 27.15).

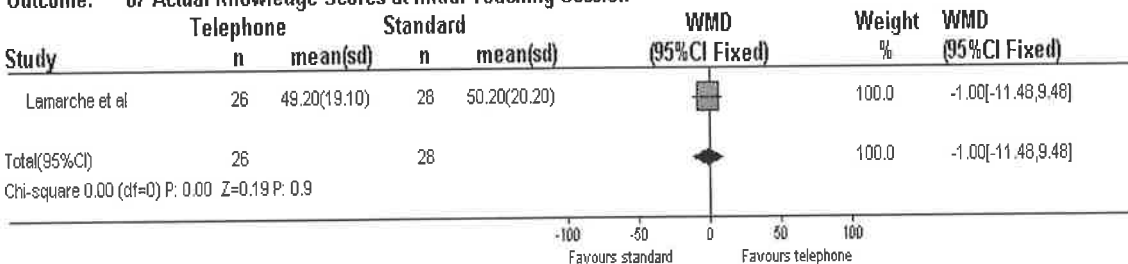
Knowledge retention

The findings of the study comparing the additional telephone intervention to the standard pre-admission teaching session on actual knowledge which was measured post the initial teaching session and again on admission. The results are presented in the following figures (refer Figures 10 & 11).

Figure 10

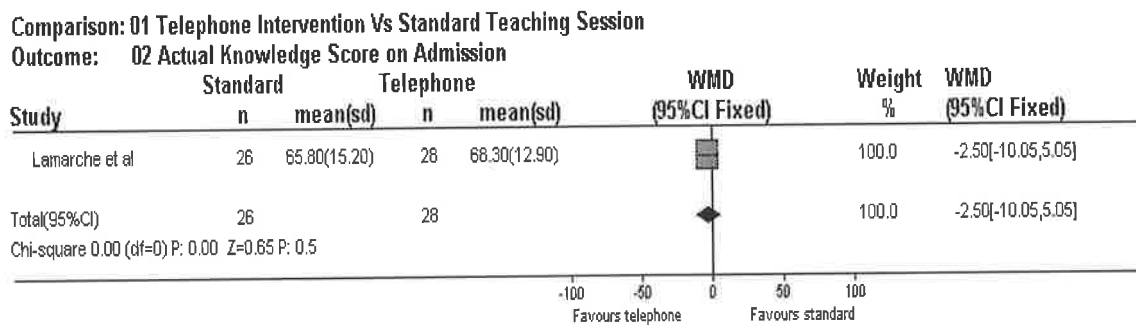
Comparison: 01 Telephone Intervention Vs Standard Teaching Session

Outcome: 07 Actual Knowledge Scores at Initial Teaching Session



The knowledge questionnaire completed by participants post the initial teaching session indicated that there was no statistically significant difference of actual knowledge between groups (WMD -1.00: 95% CI -11.48, 9.48).

Figure 11

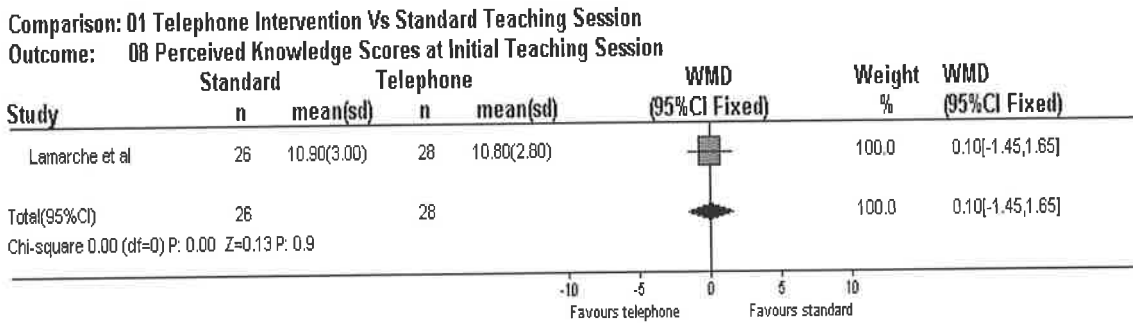


These findings suggest that there was no statistically significant difference in actual knowledge on admission for patients who received the telephone intervention prior to admission, post the initial teaching session in comparison to those patients who did not. The provision of the telephone intervention did not alter actual knowledge scores on admission (WMD -2.50: 95% CI -10.05, 5.05).

Although there was no statistically significant difference between groups at the time of the initial teaching session and when tested again on admission the actual knowledge scores did improve in both groups. However, the study did not discuss this outcome.

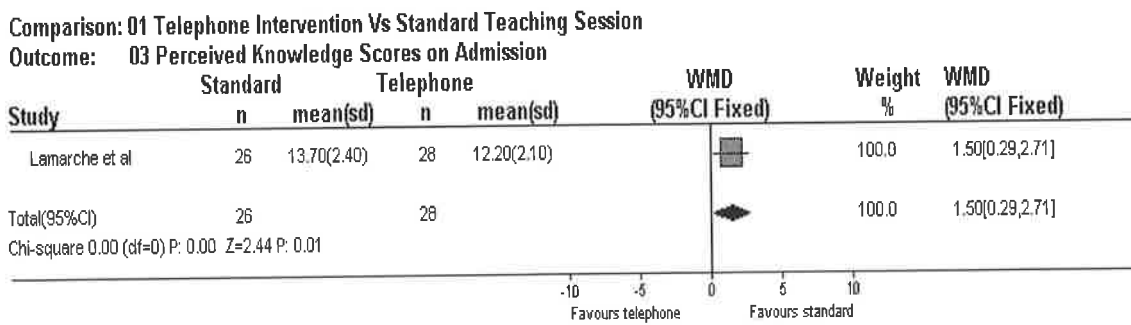
The following figures present the perceived knowledge scores of patients at the initial teaching session, on admission and at discharge (refer Figure 12, 13 & 14).

Figure 12



Perceived knowledge scores at the initial teaching session indicate that there was no statistically significant difference between groups (WMD 0.10: 95% CI -1.45, 1.65).

Figure 13



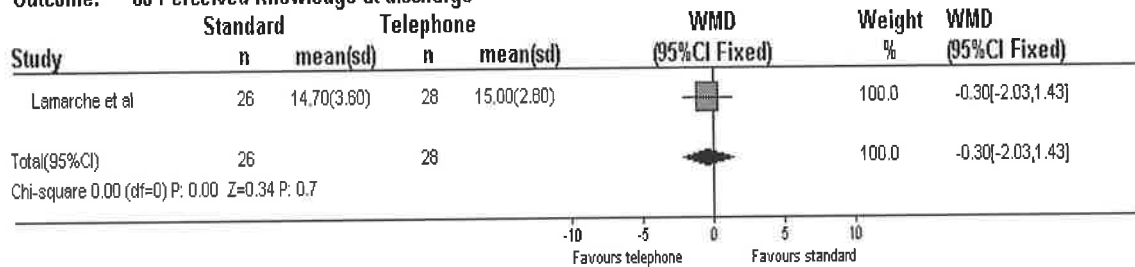
The findings demonstrate that the experimental group rated their perceived knowledge level to be lower than that of the control group. There was a statistically significant difference in perceived knowledge on admission ($p = 0.002$) for those patients who had not received the telephone intervention when compared to those who had, despite the fact that both groups had similar scores in actual knowledge (WMD 1.50: 95% CI 0.29, 2.71).

Only perceived knowledge was assessed on discharge. The results are outlined in the following figure (refer Figure 14).

Figure 14

Comparison: 01 Telephone Intervention Vs Standard Teaching Session

Outcome: 06 Perceived Knowledge at discharge



This figure demonstrates that there was no statistically significant difference in perceived knowledge between the control and experimental group at discharge (WMD -0.30 ; 95% CI $-2.03, 1.43$). Actual knowledge scores were not recorded at discharge.

Post-intervention pain

Post-intervention pain was not used as an outcome measure by the randomised pre-post test quasi-experimental study.

Length of stay

Length of stay was not used as an outcome measure by the randomised pre-post test quasi-experimental study.

In summary, based on the limited evidence, the findings suggest that telephone intervention post initial teaching session and prior to admission had little effect on anxiety and actual knowledge retention when compared to the routine teaching session alone. A statistically significant higher level of anxiety was noted in the experimental group on admission, but this difference became non-significant when the anxiety level at initial teaching session and length of waiting time were entered in as dependent variables and analysed using MANOVA. Those patients who had not received a telephone call prior to admission had

statistically higher perceived knowledge scores than those who had received the telephone intervention on admission. There were no relevant findings on post-intervention pain and length of stay from the identified study.

Study three - study description

The study by Christopherson and Pfeiffer was a randomised-controlled trial.¹⁶ Patients requiring coronary artery bypass grafting served as potential participants. Participants, once consented to the study, were assigned randomly to the different groups using a random numbers table. At that time a tentative date was scheduled for readmission for the CAVG. The information pamphlet was provided to Experimental A group one to two days (mean 1.2 days) prior to CAVG compared to the subjects who received the information pamphlet three to 35 days pre-intervention (mean = 14 days) (Experimental B group). Anxiety and knowledge retention were assessed to compare the impact of the timing of the information pamphlets on those outcomes.

Subjects

Patients scheduled to undergo CAVG who were hospitalised on a medical unit and had undergone cardiac catheterisation were considered for inclusion into the study. Patients were asked to participate in the study immediately after being informed by a cardiac surgeon of their need for CAVG surgery. The study involved adult male patients who were not classified as emergency cases (requiring surgical repair within one to two days) and who had not undergone CAVG before. The final study group constituted 29 men with a mean age of 55 years (SD± 8.5).¹⁶

Interventions

All participants were provided with the information pamphlet prior to their CAVG. The pamphlet provided was approximately 16 pages in length and contained several pictures of

patients in intensive care units pre - and post - cardiac intervention, a general overview of expectations post CAVG such as coughing and breathing exercises, a brief description of sensations experienced, and facts about the heart and heart disease. The instrument used to measure anxiety in this study was the STAI and knowledge was measured using a knowledge questionnaire.

Experimental A

During the initial pre-admission meeting all participants completed the knowledge questionnaire. Subjects in the Experimental A group (n=11) completed the STAI scale two days prior to CAVG and then they received the information pamphlet (mean = 1.2 days). Seven to ten days post CAVG, participants again completed the STAI and the knowledge questionnaire.

Experimental B

Subjects in the Experimental B group (n=18) completed the knowledge questionnaire anywhere from three to 35 days prior to CAVG (mean = 14 days) as with Experimental A group, however this group then received the information pamphlet at the initial pre-admission meeting. Experimental B group completed the STAI at the same time as Experimental A group, which was 2 days prior to CAVG (mean = 1.2 days). Seven to ten days post CAVG, participants again completed the STAI and the knowledge questionnaire.

Outcome measures

The instrument used to measure anxiety in all treatment groups was the STAI state anxiety scale developed by Spielberger et al.¹⁹ As stated earlier, assessment of STAI was measured in all study participants two days prior to CAVG (mean = 1.2 days). The Experimental A group was yet to receive the information pamphlet at the time of initial STAI and the Experimental B group had received the information pamphlet prior to the STAI. All study

participants completed the STAI scale again seven to ten days post CAVG and comparisons were made between the groups.

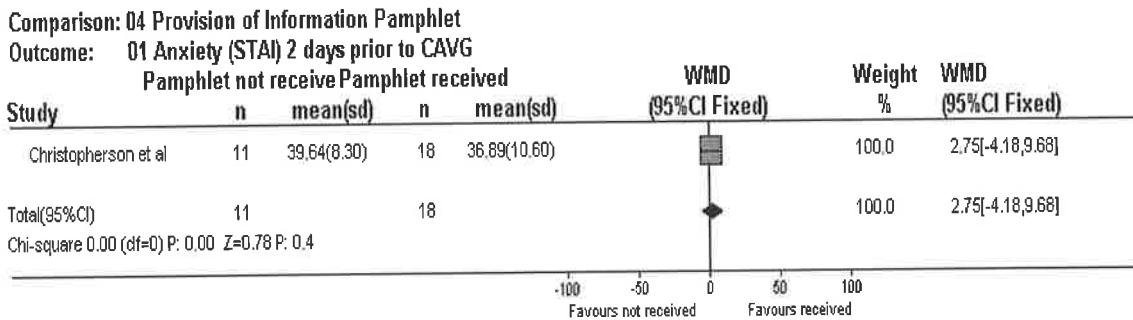
The knowledge questionnaire (KQ) was investigator constructed and consisted of 20 multiple-choice questions that were taken from information in the pamphlet. Five of the questions dealt with anatomy and physiology of the heart, eight with nature of coronary artery disease and angina, and seven with the patients' physical care whilst in hospital. Once consented for the study at the initial meeting with the researchers, all participants completed the KQ approximately three to 35 days prior to CAVG. All study participants completed the initial knowledge questionnaire prior to receiving the information pamphlet. Experimental B group were provided with the pamphlet once they completed the KQ (mean = 14 days prior to CAVG). Experimental A group received the pamphlet approximately two days prior to CAVG. All participants completed the KQ again seven to ten days post CAVG. The number of correct responses on the KQ was used as the measure of the level of knowledge.

Results and conclusions

Anxiety

When anxiety was assessed two days prior to CAVG there was no statistically significant difference between the group who had received the pamphlet (Experimental B) and those that had not (Experimental A) (refer Figure 15).

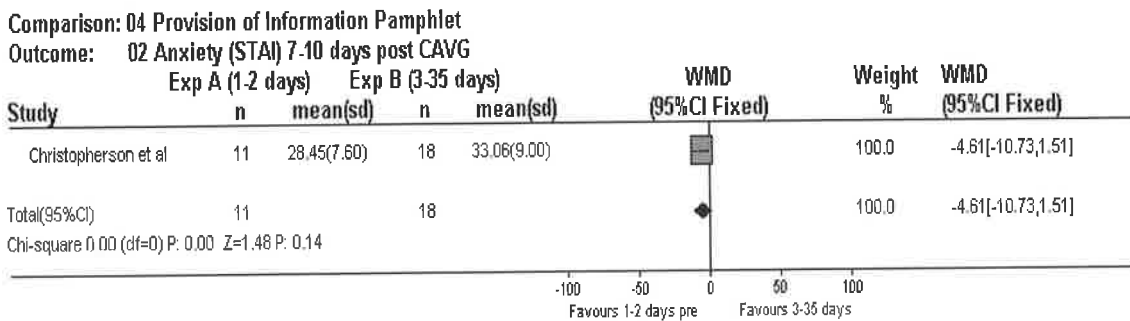
Figure 15



These findings demonstrate that there was no statistically significant difference between anxiety scores when the information pamphlet was provided prior to admission (mean = 14 days) compared to Experimental A group who were yet to receive the information pamphlet when tested two days prior to CAVG (mean = 1.2 days) (WMD 2.75; 95% CI - 4.18, 9.68).

The following figure outlines the mean anxiety scores for both groups when tested seven to ten days post CAVG (refer Figure 16).

Figure 16

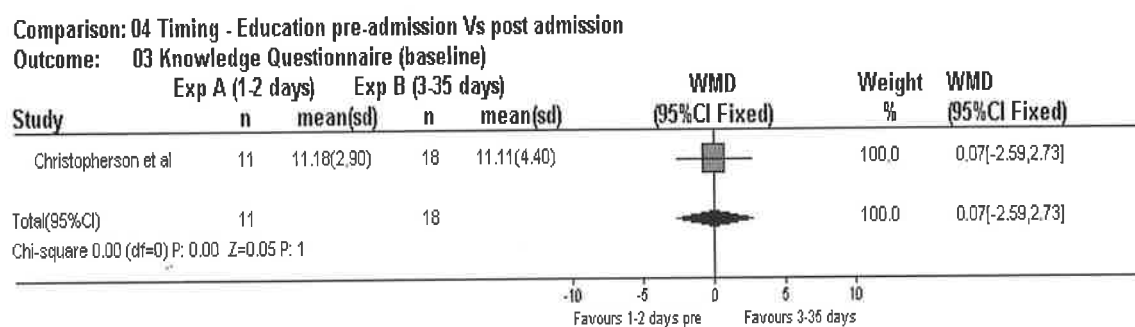


The results indicate that there was no statistically significant difference between the provision of the information pamphlet prior to admission when compared to two days prior to CAVG on post-intervention mean anxiety scores when measured at seven to ten days post CAVG (WMD -4.61; 95% CI -10.73, 1.51).

Knowledge retention

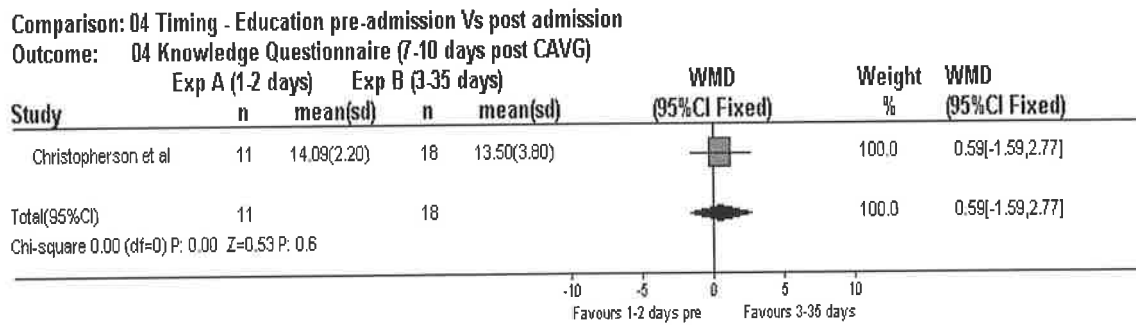
The results of a ‘Knowledge Questionnaire’ (KQ) that was initially provided prior to the provision of the information pamphlet (when participants had agreed to be involved in the study) are presented in Figure 17. The knowledge questionnaire was utilised again seven to ten days post CAVG to evaluate the impact of providing the information pamphlet one to two days prior (Experimental A group) to CAVG compared to prior to admission (Experimental B group) on participants knowledge (refer Figure 17).¹⁶

Figure 17



Once participants had been informed of their required CAVG surgery, they completed the knowledge questionnaire — this was prior to any study participants receiving the information pamphlet. The results, which were out of 20, demonstrated no statistically significant difference in the baseline results between groups. This result demonstrates the knowledge homogeneity between the two groups at baseline (WMD 0.07: 95% CI –2.59, 2.73).

Figure 18



Seven to ten days post CAVG, all participants again completed the knowledge questionnaire. The results indicate that there was no statistically significant difference between groups (WMD 0.59: 95% CI -1.59, 2.77).

Post-intervention pain

Post-intervention pain was not used as an outcome measure by the study evaluating the effectiveness of providing an information pamphlet two days prior to CAVG and compared to pre-admission.

Length of stay

This study did not evaluate the impact of providing an information pamphlet two days prior to CAVG when compared to three to 35 days prior to CAVG on length of stay.

In summary, these findings indicate that there was no statistically significant difference between the group who had received an information pamphlet prior to admission when compared to the group who were yet to receive an information pamphlet when anxiety was measured two days prior to CAVG (once anxiety was measured then the Experimental A group was provided with the information pamphlet). The groups were tested again seven to ten days post cardiac intervention and again there was no statistically significant

difference in mean anxiety scores. The results of the knowledge questionnaire also demonstrated that there was no statistically significant difference between the comparative groups seven to ten days post CAVG. The RCT identified did not provide evidence in relation to the outcomes of post-intervention pain or length of stay.

Study four - study description

The study by Cupples was a randomised, experimental, post test design.⁹ Cupples hypothesized that pre-admission pre-intervention education, provided at a time when patient's cognitive systems were less threatened by anxiety, would be more effective than routine post-admission education.⁹ The author believed this pre-admission education, coupled with post-admission reinforcement, would increase patient's understanding and retention of information thus concluding that the patient would have higher pre-cardiac intervention knowledge levels and lower post-cardiac intervention anxiety.

Subjects

Patients scheduled to have CAVG at a large community hospital served as potential participants. The study involved adult patients aged between 30 and 70 years, who were able to understand English, had no other concomitant cardiac disease and had no other serious medical conditions. There were 38 men and two women, with a mean age of 59.4 years (SD±6.8 years).

Interventions

There were two groups assigned, the experimental group and the control group. The teaching protocol with regard to content and duration remained the same for both groups however the timing and method of the delivery altered. A comparison was made between the provision of a teaching session conducted by the nurse researcher five to 14 days prior

to admission followed by a telephone call four days prior to admission, compared to nurse provided education post admission. Once admitted to hospital all participants in the study received the same pre-intervention education provided by hospital nursing staff.

Control group

Subjects in the control group (n=20) received routine post-admission education provided by the hospital staff (level of staff not stated). With regard to content the teaching protocol for the control group was the same as the experimental group. The educational content included anatomy and physiology of the heart, pre-, intra- and post-intervention routines, and possible complications. Immediately after the teaching session conducted by the hospital staff, each subject completed the STAI state anxiety scale and a 20 item knowledge questionnaire designed by the author.¹⁹ STAI was tested again day four post CAVG.

Experimental group

Subjects in the experimental group (n=20) were required to meet at the surgeon's office five to 14 days prior to admission. The nurse researcher then conducted an educational teaching session with each subject. Immediately following this teaching session participants completed the pre-intervention STAI scale and the knowledge questionnaire. In addition to the educational teaching session a follow-up telephone call was made to each subject four days before admission for questions and answers. Once these participants were admitted to hospital they also participated in the routine pre-operative education provided by hospital staff. STAI was tested again day four post-CAVG

Outcome measures

Assessment of anxiety was recorded at five to 14 days pre-intervention in the experimental group immediately after the initial teaching session and was compared to anxiety levels

measured the day before CAVG in the control group using the STAI scale developed by Spielberger et al.¹⁹ STAI was tested again in all participants four days post CAVG. As stated earlier in this chapter, the STAI scale is a self-report scale assessing the transitory condition of perceived anxiety. Scores range from 20 – 80, with high scores representing high state anxiety.¹⁹

Another outcome measured in this study was knowledge using a knowledge questionnaire (KQ) developed by the author based on established educational objectives for pre-intervention teaching for patients undergoing CAVG. The 20 item multiple-choice test was designed to measure patients' knowledge of CAVG and hospitalisation. The content areas examined were anatomy and physiology of the heart, pre-, intra-and post CAVG routines, and possible complications. Among the items included in the KQ were those identified in the literature as most important by patients who had had CAVG: pain, chest tubes, intensive care unit experiences, coughing and breathing exercises, and visits by family members. The experimental group completed the knowledge questionnaire pre-admission (after initial education, five to 14 days prior to CAVG). Both groups then did the knowledge questionnaire post admission following education provided by staff. This was additional for the experimental group and the initial session for the control group. No post CAVG knowledge questionnaire was undertaken.

Results and conclusions

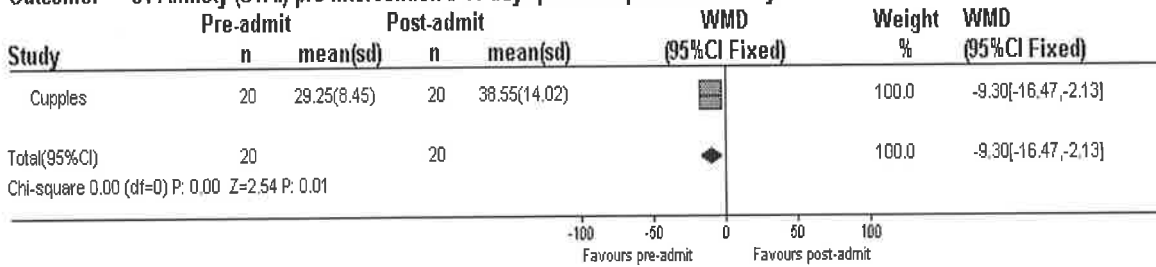
Anxiety

The findings of Cupples' study comparing the mean anxiety in the experimental group (five to 14 days pre-admission) compared to scores in the control group (recorded post-admission) are displayed in Figure 19.⁹ Both groups had received the education and then undertaken the STAI. The day four post CAVG mean anxiety scores are presented in Figure 20.⁹

Figure 19

Comparison: 02 Timing - Education pre-admission Vs post admission

Outcome: 04 Anxiety (STAI) pre-intervention 5-14 days prior compared to the day before

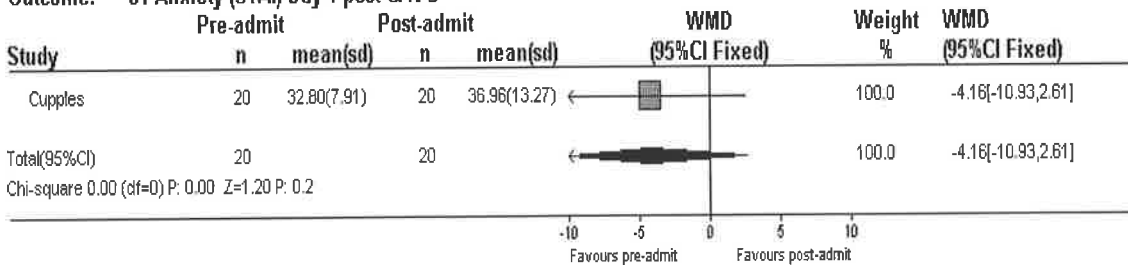


This result indicates that patients in the experimental group who received the education 5 to 14 days prior to admission for CAVG had statistically significantly ($p = 0.02$) lower anxiety scores at that time than those in the control group who received their education post admission (WMD -9.30; 95% CI -16.47, -2.13).

Figure 20

Comparison: 02 Timing - Education pre-admission Vs post admission

Outcome: 01 Anxiety (STAI) Day 4 post CAVG



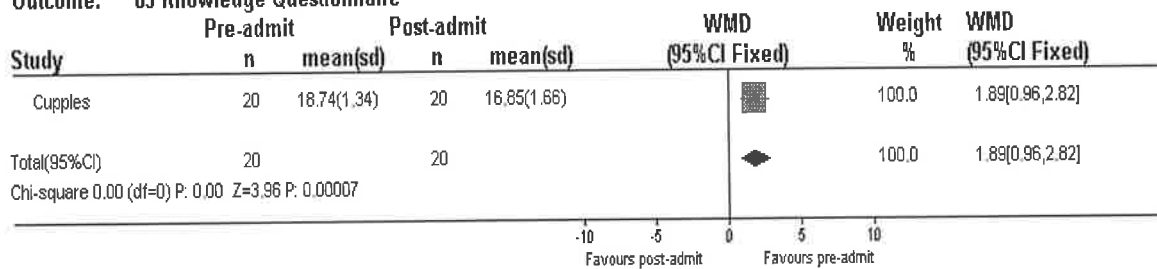
These results indicate that there was no statistically significant difference in mean anxiety scores between groups day four post CAVG (WMD -4.16; 95% CI -10.93, 2.61).

Knowledge retention

Immediately after the education sessions each participant completed the knowledge questionnaire.⁹ The findings of Cupples' study are outlined in the following figure (refer Figure 21).

Figure 21

Comparison: 02 Timing - Education pre-admission Vs post admission
 Outcome: 03 Knowledge Questionnaire



These statistically significant results indicate that the education provided pre-admission (five to 14 days prior) by the researcher were beneficial in improving knowledge scores at that time when compared to receiving the education post-admission for CAVG (WMD 1.89: 95% CI 0.96, 2.82).

Post-intervention pain

The identified study did not evaluate the impact of timing of the educational delivery method on post-intervention pain for patients’ post cardiac intervention.

Length of stay

The identified study did not evaluate the impact of timing of the educational delivery method on length of stay for patients’ post cardiac intervention.

In summary, based on the evidence examined, the findings indicated that the participants who received education five to 14 days prior to CAVG had statistically significant lower mean anxiety scores at that time when compared to the provision of education post-admission. However, at day four post CAVG there was no statistically significant difference in mean anxiety scores between groups.

The study by Cupples also identified that those patients who received the educational instruction five to 14 days before CAVG demonstrated statistically significant higher knowledge questionnaire scores at that time when compared to the group who were tested post instruction once admitted.⁹ These results may be reflective of the timing of the anxiety and knowledge tests just prior to a life threatening intervention.

Study five - study description

A randomised controlled trial undertaken by Rice, Mullin and Jarosz compared two approaches to teaching post-intervention therapeutic exercises (pre-admission self-instruction versus post-admission instruction by a nurse) on post CAVG recovery patients.²³ The research aimed to identify if patients would take ownership of their own recovery path and by doing so would require less analgesia post CAVG and have a reduced length of stay.

Subjects

Patients scheduled for CAVG without cardiac catheterisation, who had not had other major surgery within the past year, and were not health professionals met the inclusion criteria. The study involved 50 adults, who were randomly assigned to the experimental or control group with a mean age of 60.4 years (SD±8.3 years) in the pre-admission teaching experimental group, compared to 60.0 years (SD±7.4 years) in the post-admission teaching control group.

Interventions

All study participants received the same information pamphlet, however the timing of that delivery varied. The information pamphlet entitled “Exercises for a Speedy Recovery,” initially developed by Rice and Johnson, outlined step-by-step instructions for performing

coughing and breathing exercises followed by feedback cues to help patients evaluate if they were performing the exercises correctly.²⁴

Control group — post-admission instruction

Subjects in the control group (n=25) received post admission instruction of therapeutic exercises by a nurse and received the same information pamphlet the experimental group received. They were taught coughing, deep breathing, leg movement and ambulation exercises by the nurse.

Experimental group — pre-admission instruction

Subjects in the experimental group (n=25) were sent the self-instructional information pamphlet six to ten days prior to their scheduled admission for CAVG.

Following hospital admission, a nurse who was blinded to the different group assignments visited all patients. Patients were asked by the nurse to demonstrate how they would cough, deep breathe, do leg exercises, get out of bed and walk after surgery. The nurse used an exercise checklist to assess the patient's ability to perform these activities.

Outcomes measures

Analgesic use was assessed in both groups by averaging patient's daily doses of pain medications for each of the first three days post CAVG. Medications were grouped into those given by injection and those taken by mouth. Another outcome measured was length of stay, which was determined by the number of days that the patient was in the hospital for CAVG.

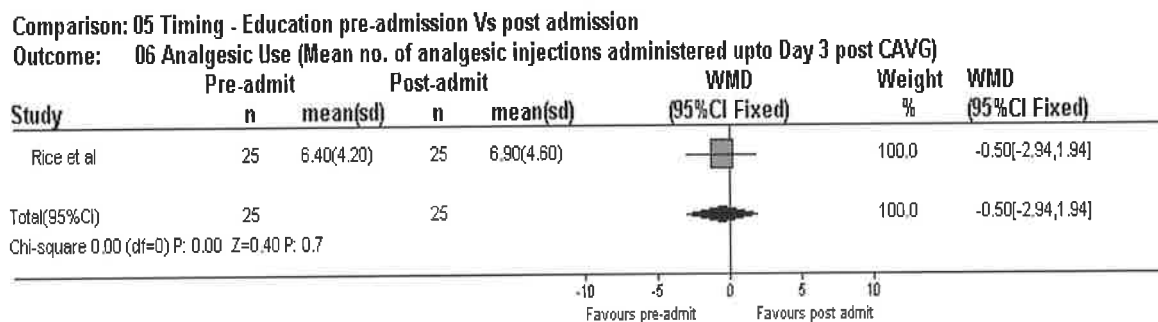
Results and conclusions

Post-intervention pain

The provision of the self-instruction information pamphlet six to ten days pre-admission when compared to receiving the pamphlet post-admission on post CAVG pain were objectively measured by examining the daily doses of pain medication each patient received for the first three days post CAVG.

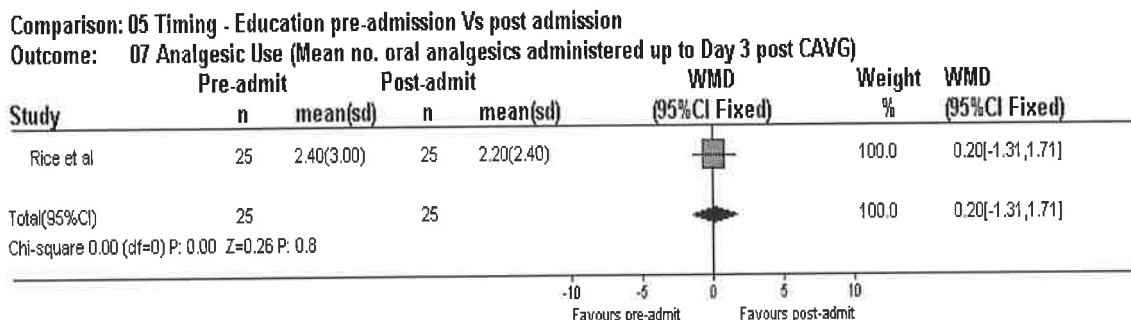
The following figures compare the two groups mean number of analgesic injections and oral analgesic medication given to patients up to day three post CAVG (refer Figure 22 & 23).

Figure 22



The results indicate that there was no statistically significant difference between groups in their use of intravenous analgesia post CAVG to day three (WMD -0.50: 95% CI -2.94, 1.94).

Figure 23



The results indicate that there was no statistically significant difference in the use of oral analgesics between groups (WMD 0.20: 95% CI -1.31, 1.71)

Although these objective measures demonstrated no statistical significant difference in analgesic use between groups, the very nature of pain management and individuals subjective opinion still leaves post-intervention pain difficult to assess. Many variables need to be considered before conclusive results can be made such as cultural beliefs and personal pain tolerance to name a few.

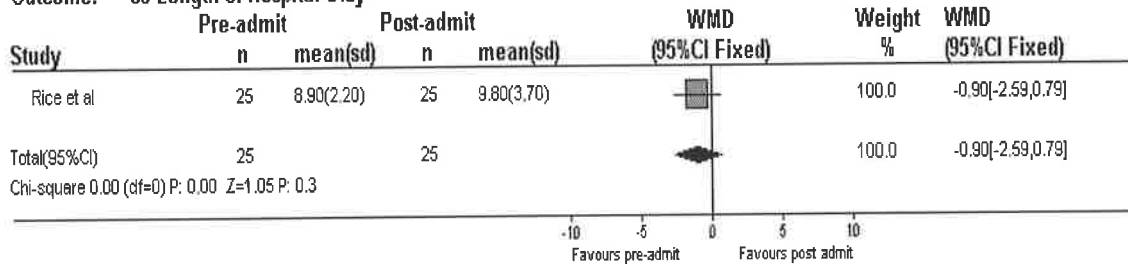
Length of stay

The comparisons of the length of stay between the two groups are demonstrated in the following graph (refer Figure 24).

Figure 24

Comparison: 05 Timing - Education pre-admission Vs post admission

Outcome: 05 Length of Hospital Stay



Although the experimental group had a reduced length of stay these findings indicated that the difference was not statistically significant between the experimental and control groups (WMD -0.90; 95% CI -2.59, 0.79).

Anxiety

Anxiety was not used as an outcome measure by the RCT evaluating the pre-admission self-instruction booklet when compared to the post admission instruction.

Knowledge retention

Knowledge retention was not used as an outcome measure by the RCT evaluating the effectiveness of pre-admission self-instruction booklet when compared to the post admission instruction.

In summary, based on limited evidence, the provision of pre-admission self-instruction information pamphlets made no statistically significant difference in analgesia use up to day three post CAVG between groups.

There was no statistically significant reduction in length of stay when patient were provided with pre-admission exercise self-instruction pamphlets six to ten days prior to admission when compared to the provision of the information post admission.²³

Discussion

The objective of this systematic review was to identify and present the best available evidence relating to the effectiveness of different educational methods for the patient pending a cardiac intervention. The specific review questions were:

- Is pre-intervention education effective in reducing pain post intervention, anxiety (pre or post intervention), length of stay, and/or improving knowledge retention for the cardiac patient?
- What type of pre-intervention education method is most effective for cardiac patients for reducing their post intervention pain, anxiety (pre or post intervention) length of stay, and/or improving knowledge retention post-intervention?

In addition to this, the review attempted to determine:

- Did the timing of its delivery influence the effectiveness of pre-intervention instruction?

Although on preliminary review 29 papers were identified that appeared to meet the inclusion criteria, only five studies actually met the review inclusion criteria.

Meta-analysis was not possible in this review due to the intervention and outcome measurements lacking homogeneity. However, where possible, meta-view graph format was used to display weighted mean differences (continuous outcome data). Where the results are not displayed in a graph format the report is in a narrative form.

The first study (study one) by Mott made comparisons between the provision of verbal (non-scripted) education, video, and a combination of both.¹⁷ Anxiety was measured in all three treatment groups prior to the provision of the educational intervention(s) and again once participants had received the educational intervention one to two hours prior to cardiac catheterisation. The findings highlighted that there was no statistically significant difference between groups when initially tested and also when anxiety was measured again one to two hours prior to the cardiac catheterisation. It must be noted that this was a small study and although the results were not significant, this may be the result of a type two error.

The study by Lamarche et al assessed the effect of an additional telephone call following the regular pre-admission teaching session.²⁰ Anxiety was measured at the time of the teaching session, on admission and prior to discharge, indicating no statistically significant differences between groups. Actual knowledge was measured at the time of the initial teaching session and on admission demonstrating no statistically significant difference between groups. Although there was no difference between groups, actual knowledge scores for both groups had improved when tested again on admission. These results may reflect a familiarity with the repeat test questions however the researchers did not investigate this outcome. Perceived knowledge was tested at the time of the initial teaching session, on admission and prior to discharge. There was no statistically significant difference between groups at the time of the initial teaching session however there was on admission. The control group who did not receive the additional telephone call perceived their knowledge to be higher. This may be associated with their lower anxiety level on admission however the study does not identify the exact significance of measuring perceived knowledge and the overall benefits to patient outcomes. At discharge there was no statistically significant difference between groups. This study had relatively small participant numbers and therefore the results should be viewed cautiously.

The study by Christopherson and Pfeiffer measured anxiety and knowledge retention. The research made comparisons between the provision on an information pamphlet three to 35 days prior to admission compared to the pamphlet being provided two days prior to CAVG.¹⁶ The initial STAI was measured two days prior to CAVG when only the experimental group had received the information pamphlet. The information pamphlet was then provided to the control group. The comparison between the groups was not statistically significantly different. When all participants were tested again seven to ten days post CAVG there was no statistically significant difference in mean anxiety scores. All participants completed a knowledge questionnaire prior to receiving an information pamphlet with the results providing no statistically significant difference between groups indicating their knowledge levels were homogeneous at baseline. When tested again seven to ten days post CAVG there was no statistically significant difference. It appears from this study that the relationship between anxiety and knowledge remains undefined and this may reflect the small participant numbers or perhaps the uncertainty of participants who actually read and understood the information provided. These results indicate that the optimal time to provide education requires further exploration and consideration.

Cupples identified a statistically significant lower mean anxiety and improved knowledge score of participants who were tested post a teaching session five to 14 days prior to admission when compared to the group who were tested immediately after receiving an information session post admission by hospital nursing staff.⁹

The participants who had received education five to 14 days prior to admission also received a follow-up telephone call by the researcher for any questions or answers the participants may have had. STAI was measured again four days post CAVG and there was no statistically significant difference between the two groups.⁹ Although these results did demonstrate a statistically significant improvement in the group who were tested five to 14 days prior to admission, they are to be viewed with caution given the small participant numbers and the nature of the pending life-threatening cardiac intervention. It may be

reasonable to consider that the patients demonstrated elevated anxiety scores because testing was undertaken the day before CAVG and therefore the outcomes may be associated with other significant factors such as the nature of the surgery and the time of the cardiac intervention. The actual testing of anxiety was not undertaken at the same time for both groups and therefore it is difficult to know if the experimental groups' anxiety levels were comparable to the control one to two days prior to CAVG.

The study by Rice et al evaluated the impact of pre-admission education compared to post-admission education on length of stay and post intervention analgesia use.²³ Patients in the treatment group were provided with a pre-admission exercise self-instruction booklet 6 to ten days prior to the cardiac intervention compared to the control group who received the information post admission. All participants were provided education on admission and the booklet was also used to teach patients in the post-admission instruction group. The results indicated that there was no statistically significant difference between the groups length of stay or analgesia use. The education provided by staff to both groups on admission may have nullified any impact of providing the booklet pre-admission. This is the difficulty with studies where more than one method or intervention is combined. Objectively measuring pain post CAVG may also be questionable given the subjective nature of individuals' pain management and tolerance. Many considerations need to be made before parallels could be made regarding post CAVG pain tolerance and analgesia requirements such as individuals' pain tolerance, cultural beliefs, age, pharmacodynamics and dose to name a few.

Implications for Research

The objective of this systematic review was to identify and present the best available evidence related to the effectiveness of different education methods provided to patients prior to their cardiac intervention. This systematic review has highlighted the limited quantity of research in this area. Many of the findings from this review have been based on single studies using a very defined, small population and therefore further research is

required to explore some of these findings further. Due to the scarcity of research literature numerous areas for further study have been identified by this review.

Currently there is no identifiable evidence on the benefits of a designated nurse educator for patients undergoing cardiac interventions on anxiety, post-intervention pain, length of stay and/or knowledge retention. Given that many large health care institutions may provide this facility, their individual contribution to patient outcomes requires further research.

Audio-visual (video) education techniques are becoming everyday practice as an adjunct to pre-cardiac intervention education, however the impact of this requires further investigation and the suitability of a video in conjunction with other methods should be reviewed in more detail. Further research is required to investigate this method more extensively, as well as the timing of its delivery, as it may be deemed more convenient in the clinical setting to provide a video rather than verbal education given time constraints and staffing levels. Research into preferred learning styles should be considered and reviewed in more detail.

Further research is required in determining the benefits of information pamphlets and the specific content of the pamphlets, exploring the reading and comprehension capabilities of patients further. Although information pamphlets are convenient, assumptions may be made by health care professionals when providing pamphlets that recipients will understand the content. Given the limited results on the benefits of information pamphlets further research with larger sample sizes is required, as it's a common method of providing cardiac education to patients. The timing of these pamphlets should also be reviewed as these studies have recognised that individuals might be more receptive to information at different times prior to a cardiac intervention. If further research is to be considered in this area, study groups should be tested at the same time to gain a comprehensive insight into the most suitable time.

The potential benefit of the use of a telephone call prior to admission could be explored further with the aim to establish the most suitable time to telephone patients prior to their cardiac intervention which will assist them, to improve pre- and post-intervention outcomes.

There is limited quality research on the benefits of a designated nurse educator, interactive CD-Rom, and video on patient outcomes and yet these methods are becoming standard practice in the clinical setting. The lack of research highlights the need for further studies with large sample sizes, culturally diverse populations, rigorous randomisation processes, inclusion criteria and succinct outcome measures to establish the most effective method. A cost analysis of the various methods and evaluation on patient outcomes could also be undertaken to measure the benefits and cost comparisons of these interventions.

It could be hypothesized that a combination of education methods would be more beneficial to the patient than one method alone, however, given current results and the limited research in this area, further methodologically sound research would have to be undertaken to confirm this hypothesis.

Identifying the most appropriate time to provide information should also be given careful consideration in future research. Individuals learn at different rates and in various circumstances therefore tailoring the learning requirements of individuals to meet these needs should be a priority. There is an urgent need to investigate potential benefits further with larger populations and perhaps with the inclusion of patients who do not have English as a first language, subsequently meeting the needs of the culturally diverse community more appropriately.

Implications for Practice

Preparing patients for emotionally stressful interventions is a part of nursing care delivery in the interventional cardiac ward. However, the research literature provides no succinct

guidelines to structure cardiac pre-intervention education. This systematic review identified various methods of cardiac pre-intervention education such as the use of various education methods and modification to the timing of the educational delivery. The review identified some relevant implications for practice that could be considered and explored further in the clinical setting such as the provision of pre-admission education pamphlets to improve patient's pre-intervention knowledge retention and reduce anxiety. It was shown to be a statistically effective strategy for patients having CAVG in one study.⁹ It was suggested from the research that providing an information pamphlet prior to admission at a time when patients were less anxious may be a more opportune time for patients to learn. Although it should be noted these results were extracted from one small study, nurses providing education to patients post admission for CAVG should be aware that patient's anxiety levels could be extremely elevated and therefore detrimental to their knowledge retention capacity. Recognising the most opportune time to provide education to patients is of vital consequence and may assist in post intervention outcomes.

It is evident from the review that providing information five to 14 days prior to admission may be a more suitable time for patients to ingest the information when they are less anxious and may be able to retain some knowledge from the education literature. However, this conclusion could only be drawn from one study and therefore the findings are limited. There is not one education method, which has been shown to provide better outcomes for patients post cardiac intervention in the area of post-intervention pain or length of stay. Subsequently it is not possible to make clear recommendations that any particular method of education is significantly more beneficial than another given the limited research evidence available. This systematic review has however, highlighted particular education methods that could assist health care providers make informed decisions when providing education for patients prior to their cardiac intervention.

Conclusion

In this systematic review a rigorous pre-planned process was used to identify primary research related to various education methods provided to patients prior to a cardiac intervention and the effect it had on pre or post intervention anxiety, knowledge retention, post intervention pain and length of stay. The results highlighted a lack of quality research on the topic. However, results do indicate that providing information prior to admission may be a more appropriate time. Patients were less anxious and could retain knowledge better prior to admission rather than post admission. This information may help nurses working in the cardiac unit to make informed decisions about particular education methods and guide the timing of the delivery.

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Appendix 1

Inclusion Criteria: Pre-intervention education and outcomes

Author _____ Year _____ Record Number _____

Types of Participants

Pre-intervention cardiac patients e.g. coronary angioplasty.

Types of Education offered to patient pre-procedure

Educational group

Audio-visual program

Information pamphlets(learning package)

Nursing Clinician during the shift

Combination of Formats

Timing of Education Delivery

Types of Outcomes Measured

Pain Score post intervention – e.g Magil Scale

Visual Analogue

Anxiety

Reduced lengths of hospital stay post procedure

Knowledge retention

Types of Study

Randomised control trial

Other _____

Appendix 2

MEDLINE (Silver platter) 1966-2001/02

The following search history was used to search the Medline database.

No.	Result	Search History
#1	289349	education
#2	235035	cardiac
#3	93738	pre*operat*
#4	105	#1 and #2 and #3
#5	64	#1 and #2 and (#3 in mesh)
#6	309255	education*
#7	2227	#2 and (#6 in mesh)
#8	2	information-needs
#9	0	#8 in mesh
#10	0	Education-tools
#11	0	Education-tools in mesh
#12	222118	information
#13	6071	information and #2
#14	222118	information
#15	15	information and #4
#1	289349	education
#2	235035	cardiac
#3	93738	pre*operat*
#4	105	#1 and #2 and #3
#5	64	#1 and #2 and (#3 in mesh)
#1	1025620	Effect
#2	76666	preoperative

#3	12267	instruction
#4	284189	postoperative
#5	43167	outcomes
#6	1	Effect of preoperative instruction on postoperative outcomes in ti

CINAHL ® 1982-2001/02

A similar search history was used to search the CINAHL electronic database.

No.	Result	Search History
#1	4547	pre?operative
#2	111070	education
#3	569	pre?operative education
#4	18598	communication
#5	12115	variables
#6	0	communication variables and #3
#7	12355	cardiac
#8	302	#4 and cardiac and #2
#9	4810	pre*operat*
#10	56	pre*operat* and #8
#1	117012	education*
#2	22798	literature
#3	58	education* literature in ab
#4	12355	cardiac
#5	0	cardiac and #3
#6	48	pre*proced*
#7	7	pre*proced* and #1 and #4
#8	4808	pre?operat*
#9	338	pre?operat* and #1 and #4
#10	98532	patient

#11	49564	information
#12	768	patient information
#13	2	patient-information
#14	30735	card*
#15	100	#14 and #12
#16	120198	educat*
#17	3022	video
#18	17	educat* video and #14
#1	117012	education*
#2	22798	literature
#3	58	education* literature in ab
#4	12355	cardiac
#5	0	cardiac and #3
#6	48	pre*proced*
#7	7	pre*proced* and #1 and #4
#8	4808	pre?operat*
#9	338	pre?operat* and #1 and #4
#1	4547	pre?operative
#2	111070	education
#3	569	pre?operative education
#4	18598	communication
#5	12115	variables
#6	0	communication variables and #3
#7	12355	cardiac
#8	302	#4 and cardiac and #2
#9	4810	pre*operat*
#10	56	pre*operat* and #8
#11	63897	Effects
#12	356681	of

#13	2155	timing
#14	903	reinforcement
#15	356681	of
#16	4349	preoperative
#17	111070	education
#18	162533	on
#19	24488	knowledge
#20	8730	recovery
#21	3	Effects of timing and reinforcement of preoperative education on knowledge and (recovery in ti)
#1	4810	pre*operat*
#2	111070	education
#3	6910	materials
#4	1	pre*operat* education materials
#5	117012	education*
#6	22798	literature
#7	320	education* literature
#8	4810	pre*operat*
#9	12355	cardiac
#10	48	pre*proced*
#11	1	#10 and #5 and (#9 in de)
#12	27	pre*procedure
#13	111070	education
#14	1	pre*procedure education
#15	120198	educat*
#16	12355	cardiac
#17	101349	patients
#18	40	educat* cardiac patients
#19	5813	pre*op*
#20	1771	information-needs
#21	0	pre*op* information-needs

#22	10539	approaches
#23	247795	to
#24	4810	pre*operat*
#25	111070	education
#26	0	approaches to pre*operat* education
#27	5	#7 and #24
#28	16720	Caring
#29	10384	open
#30	24727	heart
#31	98532	patient
#32	2	Caring for the open heart patient
#33	4763	Getting
#34	2030	ready
#35	3322	bypass
#36	33618	surgery
#37	1	Getting ready for bypass surgery
#38	52307	Review
#39	356681	of
#40	20709	teaching
#41	2377	helps
#42	101349	patients
#43	3479	remain
#44	352	compliant
#45	1	Review of teaching helps patients remain compliant
#46	12355	cardiac
#47	111070	education
#48	6	cardiac education in ti
#1	27	pre*procedure
#2	4810	pre*operat*
#3	4824	pre*procedure or pre*operat*
#4	145	tuition

#5	0	tuition in de
#6	145	tuition
#7	12355	cardiac
#8	111070	education
#9	0	#3 and #6 and #7 and (education in de)
#10	206	#3 and #7 and (#8 in de)
#1	4547	pre?operative
#2	111070	education
#3	569	pre?operative education
#4	18598	communication
#5	12115	variables
#6	0	communication variables and #3
#7	12355	cardiac
#8	302	#4 and cardiac and #2
#9	4810	pre*operat*
#10	56	pre*operat* and #8
#11	63897	Effects
#12	356681	of
#13	2155	timing
#14	903	reinforcement
#15	356681	of
#16	4349	preoperative
#17	111070	education
#18	162533	on
#19	24488	knowledge
#20	8730	recovery
#21	3	Effects of timing and reinforcement of preoperative education on knowledge and (recovery in ti)
#22	2155	timing
#23	356681	of
#24	461	pre-operative

#25	282	preparatory
#26	49564	information
#27	0	the timing of pre-operative preparatory information in ti
#28	63897	Effects
#29	356681	of
#30	524	psychoeducational
#31	183302	care
#32	73200	adult
#33	19722	surgical
#34	101349	patients
#35	2	Effects of psychoeducational care for adult surgical patients in ti
#36	32302	effect
#37	356681	of
#38	4349	preoperative
#39	5270	instruction
#40	162533	on
#41	15712	post
#42	5170	operative
#43	33331	outcomes
#44	0	effect of preoperative instruction on post operative outcomes in ti
#45	245	preadmission
#46	35351	self
#47	5270	instruction
#48	220	booklets
#49	1	preadmission self instruction booklets in ti
#50	32302	Effect
#51	356681	of
#52	245	preadmission
#53	0	brouchures
#54	162533	on
#55	19722	surgical
#56	101349	patients

#57	0	Effect of preadmission brochures on surgical patients in ti
#58	245	preadmission
#59	98	self-instruction
#60	63897	effects
#61	162533	on
#62	34	postadmission
#63	10102	postoperative
#64	5364	indicators
#65	2	preadmission self-instruction effects on postadmission and (postoperative indicators in ti)
#1	4547	pre?operative
#2	111070	education
#3	569	pre?operative education
#4	18598	communication
#5	12115	variables
#6	0	communication variables and #3
#7	12355	cardiac
#8	302	#4 and cardiac and #2
#9	4810	pre*operat*
#10	56	pre*operat* and #8
#11	63897	Effects
#12	356681	of
#13	2155	timing
#14	903	reinforcement
#15	356681	of
#16	4349	preoperative
#17	111070	education
#18	162533	on
#19	24488	knowledge
#20	8730	recovery

#21	3	Effects of timing and reinforcement of preoperative education on knowledge and (recovery in ti)
#22	2155	timing
#23	356681	of
#24	461	pre-operative
#25	282	preparatory
#26	49564	information
#27	0	the timing of pre-operative preparatory information in ti
#28	63897	Effects
#29	356681	of
#30	524	psychoeducational
#31	183302	care
#32	73200	adult
#33	19722	surgical
#34	101349	patients
#35	2	Effects of psycho-educational care for adult surgical patients in ti

Current Contents (1998-2001)

The following search history was used for the Current Contents electronic database.

No.	Search History	Result
#1	pre-procedure.mp. [mp=abstract,title,author,keywords,keywords plus]	28
#2	cardiac pre-procedure.mp. [mp=abstract,title,author,keywords,keywords plus]	0
#3	pre?operative.mp. [mp=abstract,title,author,keywords,keywords plus]	11911
#4	cardiac.mp. and 3 [mp=abstract,title,author,keywords,keywords plus]	947
#5	3 and 4 and outcomes.mp. [mp=abstract,title,author,keywords,keywords plus]	113
#6	3 and 4 and 5 and education.mp. [mp=abstract,title,author,keywords, keywords plus]	5
#7	education tools.mp. and 4 [mp= abstract,title,author,keywords,keywords plus]	0
#8	education instruments.mp. [mp=abstract,title,author,keywords,keywords plus]	0

#9	(timing and preparatory information.mp. [mp=abstract,title,author,keywords, keywords plus]	0
#10	preparatory information.mp. [mp=abstract,title,author,keywords,keywords plus]	4
#11	cardiac.mp. and 10 [mp=abstract,title,author,keywords,keywords plus]	2
#12	knowledge.mp. and 11 [mp=abstract,title,author,keywords,keywords plus]	1
#13	surgical cardiac .mp.and 10 [mp=abstract,title, author keywords,keywords, keywords plus]	0
#14	preoperative cardiac education.mp. [mp=abstract,title,author,keywords, keywords plus]	0
#15	cardiac recovery.mp. [mp=abstract,title,author,keywords,keywords plus]	33

Database of Abstracts of Reviews of Effectiveness (DARE)

The following search terms were used to search the DARE electronic database

No.	Search History	Result
#1	preprocedure and education	0
#2	cardiac and education	13
#3	preoperative and education	3
#4	postoperative and outcomes	135
#5	cardiac and (post-operative and outcomes)	6
#6	cardiac and (information and literature)	66

Health STAR (1975-2001)

The following search terms were used to search the HealthSTAR electronic database. The search excluded MEDLINE references.

No.	Search History	Result
------------	-----------------------	---------------

#1	Cardiac and Education	11
#2	Preprocedure and Education	7
#3	Pre-procedure and cardiac and education	0
#4	preoperative and cardiac and education	0
#5	preoperative	39
#6	cardiac and education	8
#7	information and cardiac	24
#8	education and tools	217
#9	education and tools and cardiac	0

EMBASE (1980-2001)

The following search terms were used to search the EMBASE electronic database.

#	Search History	Results
#1	pre-procedure education.mp.	0 -
#2	preprocedure.mp.	181
#3	cardiac.mp.	167808
#4	2 and 3	2
#5	Patient Education/ or cardiac patient education.mp.	12276
#6	preoperative.mp. and 5 [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name, device trade name]	88
#7	educational tools.mp. or Education/	47609
#8	cardiac.mp. and 7 [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name, device trade name]	0
#9	information needs.mp. or Patient Information/	6700
#10	9 and cardiac.mp. [mp=title, abstract, subject headings, drug trade name, original title, device	

manufacturer, drug manufacturer name,
device trade name]

13

Identified studies from reference lists

A Master Thesis completed in 1976 by RW Beadle, "The value of pre-operative teaching / counseling on the post operative welfare of open-heart surgery patients," was located in an appendix of an article by Devine and Cook an attempt to retrieve the abstract of the thesis was made through the University of North Carolina at Chapel Hill, Chapel Hill via email communication.²⁵ Unfortunately due to the extensive length of time since the thesis was completed it was unable to be located by the university. Databases were searched to check if the author had published the thesis.

Another Master 's Thesis completed in 1973 at the University of Kansas, Lawrence was identified in a reference list in an article by Hathaway.²⁶ The thesis was titled, "The effects of preoperative teaching on postoperative pain," by Barbara Voshall. An attempt to recover the abstract from this thesis was also made through the University of Kansas library (email address: libweb@ku.edu) without success, due to the duration of time since the thesis was completed. A search of the databases was made to check if the author had published this work, but failed to identify the thesis.

A doctoral dissertation completed in 1978 at the University of Toronto, Canada was identified in a reference list in an article by Hathaway.²⁶ The dissertation was titled "The effects of pre-operative counseling on post-operative recovery-open heart surgery patients," by Larry Hunt. An attempt to retrieve the abstract was made through the University of Toronto's library (email address: utweb@library.utoronto.ca) without success, due to the duration of time since the doctoral dissertation was completed. A search of the databases failed to identify a published article by this author on the topic.

Appendix 3

Table 1: Manually searched reference books

Author	Year	Title	Publisher
Underhill et al	1989	Cardiac Nursing (2 nd Edition)	Lippincott
Woods et al	1995	Cardiac Nursing (3 rd Edition)	Lippincott

Table 2: Manually searched journals

American Heart Journal — Jan. 2000 — Feb. 2001
American Journal of Cardiology — Jan. 2000 — June 2001
Australian Journal of Advanced Nursing — Sept. 2000 — July 2001
Australian Nurses Journal — Dec. 1998 — Jan. 2001
Circulation — July. 2000 — April 2001
Critical Care Nurse — Feb. 1999 — July 2001
Evidence Based Nursing — Jan. 1998 — Feb. 2001
Heart and Lung — Jan. 1999 — June 2001
Journal of Advanced Nursing — Jan. 2001 — May 2001
Journal of Continuing Education in Nursing — Jan. 1999 — Feb. 2001

Table 3: Manually searched conference proceedings

Conference	Year
The Spark of Life — An International Conference on Cardiopulmonary Resuscitation and Emergency Life Support — Melbourne, Australia	1993
44 th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand — Brisbane, Australia	1996
45 th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand — Hobart, Australia	1997
46 th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand — Perth, Australia	1998
47 th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand — Wellington, New Zealand	1999
Fifth Nursing Practice Conference, Royal Adelaide Hospital — Adelaide, Australia	1999
48 th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand — Melbourne, Australia	2000
Monash Interventional Cardiology 4 th International Symposium — Millennium intervention conference	2000
Sixth Nursing Practice Conference, Royal Adelaide Hospital — Adelaide, Australia	2000

Appendix 4

RCT Critical Appraisal Form:

Pre-Intervention Cardiac Patients Information-Systematic Review

Author _____ Year _____ Record Number _____

Questions 1 to 4 must be answered "yes" for study to be included in the systematic review.

- 1) Were the participants' randomised to study groups?
yes no not clear
- 2) Other than research intervention, were participants in each group treated the same.
yes no not clear
- 3) Were the outcomes measured in the same manner for all participants?
yes no not clear
- 4) Were groups comparable at entry
yes no not clear

Studies that answer no to questions 5, 6 or 7 will only be included in the systematic review if no other higher quality studies are identified available, however this must be noted in the report.

- 5) Was randomisation of participants blinded?
yes no not clear
- 6) Were those assessing outcome blinded to treatment allocation (if outcome not objective such as survival or length of hospitalisation)
yes no not clear
- 7) Was there adequate follow-up of participants?
yes no not clear
(less than 80% followed up)

Summary

Decision

Use in meta-analysis
Include in narrative summary
Reject from systematic review

Appendix 5

Checklist for Assessing the Validity of Non-RCT Studies

Pre-Intervention Cardiac Patients Information-Systematic Review

Is the method of allocating patients to the treatment groups clearly defined?

Yes **No** **Unsure** **N/A**

Are the criteria for inclusion of participant in the treatment groups clearly defined?

Yes **No** **Unsure** **N/A**

Were outcome measures assessed using objective criteria?

Yes **No** **Unsure** **N/A**

If comparisons were made, was there a sufficient description of the treatment groups?

Yes **No** **Unsure** **N/A**

Was an appropriate method used to analyse the data collected?

Yes **No** **Unsure** **N/A**

Summary

Total

Yes **No** **Unsure** **N/A**

Decision

Include in narrative summary
Reject from the systematic review
Further information needed

Comments

Appendix 6

Levels of Evidence

All included studies were categorised according to the strength of the evidence based on the following revised classification system.¹³

Level I

Evidence obtained from a systematic review of all-relevant randomised controlled trials

Level II

Evidence obtained from at least one properly designed randomised controlled trial

Level III.1

Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).

Level III.2

Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case control studies or interrupted time series with a control group

Level III.3

Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel

Level IV

Evidence obtained from case series, either post-test or re-test and post-test.

Appendix 7

Included Studies

Study Design	Author	Sample	Content of Education	Outcome Measures	Level of Evidence
Randomised quasi-experimental design	Mott 1999 ¹⁷	Cardiac Catheterisation 20 Men, 10 women Treatment group 1: n= 8 Treatment group 2: n = 8 TG 3: n = 14	Treatment group 1: Verbal (non-scripted), Treatment group 2: Video Treatment group 3: Combination of both, procedure information and the stimuli exposed to and ramifications of procedure.	STAI -anxiety	Level III.1
Randomised pre-post test quasi-experimental design	Lamarche et al 1998 ²⁰	CAVG Men 45, 9 women Control: n= 26 Experimental: n= 28	Control: Received standard education at initial teaching session (Did not receive telephone education prior to admission). Experimental: Received telephone education prior to admission post initial teaching session. Telephone: patient concerns, information, communication, operative information.	VAS - anxiety, Perceived knowledge index and actual knowledge	Level III.1
RCT	Christopher et al 1980 ¹⁶	CAVG Men 29 Experimental A: n = 11 Experimental B: n = 18	Experimental A: Read booklet 1-2 days prior to intervention Experimental B: Read booklet 3-35 days prior to intervention. Information included—tests and procedures, behaviours expected post-op, sensations post-op, information about the heart and heart disease.	STAI-anxiety, Knowledge questionnaire-knowledge, well-being(mood), hypertension.	Level II
Randomised experimental, post-test design	Cupples 1991 ⁹	CAVG Men 38, 2 woman Control: n=20 Experimental: n=20	Control: Pre-admission education the day before surgery Experimental: Education 5 to 14 days before CAVG Information included— anatomy and Physiology, operative routines, possible complications	STAI - anxiety, mood, knowledge questionnaire	Level III.1
RCT	Rice et al 1992 ²³	CAVG 41 Men, 9 women Control: n= 25 Experimental: n= 25	Control: Booklet provided post admission Experimental: Booklet provided: 6-10 days prior to admission detailing post-operative physiotherapy, (coughing, deep breathing, walking)	MACL -mood. Post operative questionnaire readiness for discharge, post-operative analgesia use and length of stay	Level II

Excluded Studies

Study Design	Author	Outcome Measures	Reasons for Exclusion
RCT	Anderson 1987 ¹⁴	Anxiety, Knowledge, Pain, Wellbeing (mood), hypertension	This study failed to provide complete results data. Only the author's summary of the findings could be used.
RCT	Finesilver 1978 ¹⁵	Mood, Anxiety and distress rating	Failed to identify randomisation method and the differences in the results could not be attributed to the educational intervention.
Non RCT	Barbarowicz 1980 ²⁷	Knowledge, anxiety and health related behaviours ie. Diet physical activity, smoking cessation and stress management	Provided education post CAVG only. Measured knowledge and anxiety 6 weeks post discharge
Non RCT	Miller 1978 ²⁸	Anxiety, Knowledge, Chest Drain Removal, Satisfaction	The participants were not blinded or randomised, and assessment of outcomes was not blinded.
Non RCT	Brambilla 1969 ²⁹	Most pervasive questions asked by patients	The specific review outcomes were not measured. This paper outlines what is the most commonly asked question patients having cardiac surgery ask. Outcome measures were not stated. Not randomised.
Non RCT	Kim et al 1999 ³⁰	Anxiety related to ventilation, mood, use of sedatives and analgesics and improved communication	Convenience sample of participants, focus of study on outcomes post ventilation.
Non RCT	Linde et al 1979 ³¹	Knowledge score	The focus of this report was on post-operative education.
Non RCT	Beckie 1989 ³²	Knowledge and anxiety	This study focused on the first 6 weeks after hospital discharge.
Non RCT	Marshall et al 1986 ³³	Knowledge, compliance with risk factors	This study focused on outcomes at 6 weeks post surgery.
Non RCT	Davis et al 1995 ³⁴	No specific outcomes were measured	This paper described a qualitative evaluation of a cardiac education follow-up program for patients and the families
Descriptive Study	Recker 1994 ³⁵	Satisfaction with the teaching	This study did not measure outcomes related to this review
Non RCT	Lepczyk et al 1990 ³⁶	Anxiety, mood and knowledge	Controlled trial only. No post procedure outcome measures were included in study.
Descriptive Study	Young et al 1994 ³⁷	Exercise Performance, reduced length of stay, anxiety, patient satisfaction	Not cardiac specific.
Descriptive Study	Martin 1996 ³⁸	Anxiety, pain, mobility	Not cardiac specific

Integrative Review	Devine 1992 ³⁹	Psycho-educational and post-operative pain	This was a review of surgical patients in general and not cardiac specific.
Integrative Review	Devine et al 1986 ²⁵	Psycho-educational and length of stay	This was a review of surgical patients in general and not cardiac specific
Integrative Review	Hathaway 1986 ²⁶	Anxiety, length of stay, psycho-educational interventions.	This was a review of the literature and not specific to this review.
Integrative Review	Moore 1997 ⁴⁰	Mood, knowledge, anxiety, haemodynamics, risk factors, activity performance, self-care and physical function.	This was a review of the literature not specific to the outcomes in this review.
Meta-Analysis	Mullen et al 1992 ⁴¹	Predominantly lifestyle modification.	Not specific to cardiac surgery or the outcomes in this review. Included study topics were coronary artery disease, myocardial infarction, coronary artery bypass graft surgery and angina were considered relevant.
Discussion Paper	LeNoble 1993 ⁴²	Patients evaluated the teaching sessions.	This report outlined the benefits of pre-admission clinics for patients having elective cardiac surgery.
Discussion Paper	Stewart et al 1991 ⁴³	Assessment of patients education needs	This paper focuses on tailoring an education regime suitable for patients having permanent pacemakers.
Discussion Paper	Bryant 1977 ⁴⁴	Identify hospital services available to the patient	This paper provides information regarding hospital services and does not identify specific outcomes related to this review
Discussion Paper	Billard 1990 ⁸	No specific outcomes measured	This paper reported the benefits of using film as an educational method. The outcomes were not specified.
Literature review	Shuldram 2001 ⁴⁵		This paper is a review to identify pre-operative education benefits and to identify outcomes.

Appendix 8
Data Extraction Form

Author Record Number

Journal

Year

Reviewer

Method _____

Setting _____

Participants _____

Number of Participants

Group A Group B Group C

Interventions

Intervention A _____

Intervention B _____

Intervention C _____

Outcome Measures

Reduced pain post procedure and reduced length of stay

Outcome Description	Scale / Measure

Results

Dichotomous Data

Outcome	Treatment Group number / total number	Control Group number / total number

Continuous Data

Outcome	Treatment Group mean & SD (number)	Control Group mean & SD (number)

Authors Conclusions

Other Study Findings

Comments

Study two
A descriptive study
of the preferred method of pre-
operative education for patients having
cardiac surgery

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Glossary of Terms and Abbreviations

Aortic Valve: Valve between the left ventricle and the aorta.

Cardio-Thoracic Surgical Unit (CTSU): The specific hospital unit dedicated to cardio-thoracic surgery and recovery.

Chi-square: A statistical test often used with categorical data. It is based on a comparison of frequencies observed and the frequencies expected in various categories.

Clinical Nurse Consultant (CNC): The nurse in charge of a ward.

Clinical Significance: The clinical significance of a research finding is the extent to which that finding is clinically meaningful.

Coronary Artery Disease (CAD): Any disease of the coronary arteries, particularly atherosclerosis, that reduces the blood flow and hence blood supply to the heart.

Coronary Artery Vein Graft Surgery (CAVG): Coronary artery vein graft surgery is used to bypass areas in the coronary arteries that have occluded due to atherosclerotic plaque, providing alternative route(s) which supply the myocardium with blood.

Heart Valve Surgery: Valve surgery involves the repair or replacement of a heart valve that has either become tight (stenosed) or leaks (regurgitates). Generally these procedures are carried out using a median sternotomy and frequently use cardio-pulmonary bypass. Types of heart valve surgery are aortic valve replacement (AVR) and mitral valve replacement (MVR).

Histogram: A method of graphing frequency distribution.

Intensive Care Unit (ICU): The unit that manages high acuity patients inclusive of post surgery and trauma patients.

Mean: The average score of a group of scores.

Median: The middle score of a group of scores.

Mode: The most frequently occurring score in a group of scores.

Mitral Valve: Valve between the left atrium and the left ventricle.

Nominal Scale: A measurement scale in which the values are distinct categories e.g male or female.

Non-parametric test: Statistical tests are selected on the type of scales that are being analysed. Statistical tests that are suitable for the analysis of ordinal and nominal data are termed non-parametric e.g. Chi-square or Mann Whitney U.

Ordinal Scale: A measurement scale that has the following properties: distinguishable values, they are ordered but the intervals between the points are not of equal distance nor is there a meaningful zero point.

Percutaneous Transluminal Coronary Angioplasty (PTCA): A surgical method of treating localised coronary artery narrowing using a special catheter with a balloon that can be inflated to dilate the narrowed vessel.

Questionnaire: A method of collecting data from people where they provide written responses to a set of questions, either in their own words or using pre-defined answers.

Randomised Control Trial (RCT): An experiment in which investigators randomly allocate eligible people into intervention groups to receive or not to receive one or more interventions that are being compared. The results are assessed by comparing outcomes in the treatment and control groups.

Standard Deviation (SD): A measure of the dispersion or variability of a group of scores.

Statistical Significance: Statistical significance can be achieved through the application of a statistical test, demonstrating that the attained result was not due to chance. Statistical significance is reached when the probability value is equal to or less than 0.05.

Abstract

Background: Cardiac investigations are potentially a life saving or life threatening event. The thoughts and emotions individuals' experience may be full of optimism and hope and/or engulfed in the anxiety and fear of the unknown. Research has demonstrated that pre-cardiac intervention education can be helpful in reducing anxiety and provide an increased sense of control for patients.^{1,2,3} Although research had identified that pre-cardiac intervention education was beneficial to the patient, there was a gap in the literature regarding patients' preferred time to receive the education and method of education favoured.

Objective: The objectives of this study was to determine what education patients receive pre- and post-admission for coronary artery bypass grafting or valvular surgery and determine if they considered the information they received to be of benefit to their hospitalisation and recovery path.

Method: This was a descriptive study that adopted both qualitative and quantitative methods of data collection and analysis through the use of a patient questionnaire. A descriptive study design was chosen for this research to describe and detail the patients preferred education method. During a period of five months, 51 patients completed the questionnaire during an inpatient episode in a large inner-city metropolitan hospital. It was anticipated that the information would provide an insight into patients' preferred time to receive education and their preferred method of delivery prior to cardiac surgery.

A statistical software package was used to assist in the analysis of the quantitative data obtained once it had been coded for entry into the program. Thematic analysis was also used to analyse the text generated from the qualitative data.

Findings: The descriptive data indicated that many participants received more than one method of education prior to admission, the most common being the information pamphlet, and post admission the most common was the video. Although many received more than one method of education the number of methods provided did not have any statistically significant impact on length of stay. Of the 40 participants who received some form of education prior to the cardiac intervention, 80% were content to receive the information prior to admission. The mean number of days people received information prior to admission was 48.86 (SD 69.79) days with the median 21 days.

From the thematic analysis six major themes emerged from the participants' questionnaires — *knew what to expect, family focus, personal attitude, was it enough, education methods and timing.*

Conclusion: The findings of this research highlight the individual nature of peoples' desire to receive education. Tailoring education to individual requirements is the challenge for health care providers. What can be learnt from this research is the influential nature education can have on patients and the need to ensure patients receive accurate, relevant details regarding their hospitalisation.

Introduction

In this section of the research portfolio a descriptive study of the preferred education method and the timing of its delivery to patients having cardiac surgery is discussed. The rationale behind this study is presented and the research method, analysis and results outlined.

The need for the study was determined as a result of a systematic review of research relating to the preferred education method for patients prior to their cardiac surgery completed by Eckert in 2002.³ Research to date has not provided evidence that is necessarily meaningful for clinicians in assisting with or developing pre intervention education packages. Patient education is accepted practice and considered a vital component in preparing patients prior to cardiac surgery.^{4,1} However, what the patient prefers in relation to pre-operative education methods requires further exploration.

Pre-operative teaching is one way of providing knowledge and skills to help patients understand the surgical procedure they are about to undergo. Patients are entitled to receive a clear explanation of any proposed treatment and therefore it is vital that the method of delivery of such information is appropriate, beneficial and well accepted by the patient. There are various education methods that can be offered prior to surgery, for example, nurse led education, information pamphlets, audiovisual methods such as video and telephoning patients prior to admission.

Appropriate patient information is one of the precursors to patients having a better understanding about their plan of care and therefore has the potential to impact on patient outcomes.⁵ However, it cannot be assumed that all patients are receptive to the various education methods offered. Assessing the requirements of defined groups and tailoring educational methods to the varying needs of patients should assist with short and long-term outcomes.

The benefits that providing education prior to an intervention has on patient outcomes have been explored in the literature.^{4,6-8} Research findings indicate there is a positive effect of pre-intervention education on post-intervention outcomes for patients underpinning various surgical interventions.^{1,5,9}

Background

Although education is viewed as an important aspect of a patient's admission, there are many aspects of the patient's hospital stay that could also be considered when tailoring education to individual needs. Although this is the case, the ensuing research has emerged as a consequence of results from the systematic review and therefore concentrated on the individual's educational needs prior to cardiac intervention.

Cardiac intervention

In this research the term cardiac intervention refers to the various cardiac surgical procedures that are available in cardiac surgical units and provided to patients for the exploration, identification and treatment of cardiac disorders.

Interventions such as cardiac catheterisation, coronary angiogram, pacemaker insertion, percutaneous transluminal coronary angioplasty (PTCA), coronary artery vein graft (CAVG) and valvular replacement encompass some of the performed interventions in cardiac units and for the purpose of this report are termed cardiac interventions. Although the provision of education prior to these various cardiac interventions has been reviewed in the literature, the descriptive study reported here focuses on education methods for patients undergoing coronary artery vein graft surgery and cardiac valve surgery only. These two cardiac interventions were chosen because the institution in which the study took place provides the same education to these two groups of patients who are located in one ward

during their admission. The admission process and the nursing care provided are similar for each patient.

Search Strategy

Published and unpublished articles relating to the review topic were examined. A search was undertaken to identify published studies on electronic databases such as MEDLINE, CINAHL, Current Contents, Database of Abstracts of Reviews of Effectiveness (DARE), The Cochrane Collaboration, The Centre for Reviews and Dissemination, and Expanded Academic Index. A search for unpublished studies included Dissertation Abstracts International Database and Proceedings First Database. To increase the possibility of identifying all relevant studies, bibliographies and reference lists of all retrieved articles were then searched for further studies when the titles appeared to relate to the research topic. Keywords contained in the title or the abstract were used to assist with the search. Search terms used were 'pre-procedural education', 'cardiac patient education', 'education tools' and 'information needs'.

The review of the literature outlines some of the experiences and emotions patients encounter prior to their cardiac intervention. The significance and value of pre-intervention education is highlighted and the benefits that pre-intervention education can have on post-intervention outcome measures are also discussed.

A Review of the Literature

The time prior to a cardiac intervention can be traumatic for many patients as they are exposed to unfamiliar surroundings, people and conditions.¹⁰ Research indicates that providing information to patients prior to their cardiac intervention may reduce anxiety and the fear of the unknown.^{1,11,12} It also suggests that information will provide knowledge and

understanding of the hospital admission process and therefore reduce the stress of the unknown.¹³ Pre-intervention education may intend to assist in the development of coping strategies and reduce anxiety, providing an insight into the surgical procedure, hospital routine and discharge expectations. Extreme anxiety in the pre-intervention period has been linked to increased pain levels in the post-intervention period.¹⁴ The research suggests that pre-intervention education can ease such anxiety and by doing so decrease post-intervention pain. These findings have been identified in other research where it was found that, with the provision of pre-intervention education, the patient was better prepared for their surgery and this knowledge had a positive impact on their recovery phase.¹⁵ This is of particular importance for the patient undergoing CAVG or valvular surgery as they will require mechanical ventilation in an intensive care unit (ICU) post intervention and may have to undergo a number of invasive procedures which they may find stressful.

Previous studies of patients receiving pre-intervention education and support indicate that those receiving the education had fewer complications and appeared to deal better with their surgery.^{9,16} Research conducted as early as the 1960's highlights how educating patients pre-intervention reduces post-intervention complications and is beneficial to patients in their recovery.^{5,17}

Research findings suggest that there are many benefits to patients who receive pre-intervention education with outcomes such as reduced patient stress levels, reduced patient recovery time, decreased need for post-intervention analgesics, decreased anxiety, reduced fear, and early discharge — all highlighting the importance of education prior to invasive procedures.^{6,18,19}

The literature review focused on aspects of patient education, the delivery method and the timing of the interventions. The literature supports the provision of some form of education rather than providing nothing, however clarity of the most suitable method of delivery requires exploration.^{6,20} It has been suggested that providing pre-intervention

education on admission may not be the best time as patients are distracted by other events and less likely to receive or retain information.^{1,21,22} Patients may be too anxious about their admission and the other things that are happening to them to take everything in and therefore the timing of the education requires further review.²³ The educational delivery methods critiqued when examining the literature were designated nurse led education groups, audiovisual programs, information pamphlets, telephone education, and a combination of methods. Pre-admission education as opposed to post-admission education was also examined in the literature to identify whether patients were more receptive to information, were less anxious and retained more detail in the time leading up to the intervention rather than receiving all of the information once admitted.

From an initial search of the literature several studies appeared to examine the effectiveness of different methods used to deliver the pre-intervention education and the effect the method of delivery had on a variety of outcomes.²⁴⁻²⁹ These studies concluded that pre-intervention education was beneficial to the patient in general, and demonstrated a reduced incidence of complications in the post-intervention period. However, conflicting recommendations exist within these studies as to the most beneficial educational method(s) and the timing of that educational delivery.

Several studies and meta-analyses have been undertaken to evaluate the effectiveness of pre-operative education in general.³⁰⁻³⁵ A meta-analysis which focused on education in general, found that patients who received pre-investigation information had a reduced length of hospital stay of up to 1.5 days.³² This is a clinically significant outcome for the patient in this era of reduced health care budgets and resources. Another meta-analysis demonstrated the positive effect of pre-intervention instruction on post-intervention outcomes such as fear and anxiety.³⁴ However this meta-analysis did not focus on education prior to cardiac interventions specifically and discussed pre-intervention education in general only.

A systematic review highlighted the many different methods of general pre-intervention education and the benefits that pre-procedural education can have.³⁶ The review identified that pre-admission information pamphlets are more effective than providing no information, commenting that pre-admission pamphlets were as effective as providing a post-admission information pamphlet used in combination with instruction that explains the content of the information pamphlet. The review did identify a statistically significant reduction in anxiety and improved knowledge levels when individuals were provided with information 5–14 days pre cardiac intervention when compared to post-admission.²⁰ Although there was a study that demonstrated statistically significant benefits in this review, it had a small, very specific sample group of 40 and the mean day of the provision of the information pamphlet was not provided. Therefore the exact time to provide the education remains unclear. The study participants also had anxiety and knowledge measured at different times and therefore it is difficult to ascertain if it was the actual education that made an impact or the time difference preceding the intervention.

A literature review questioned the benefit of pre-intervention education for patients prior to a cardiac investigation.⁸ The review attempted to establish whether pre-intervention education was beneficial to patients following coronary artery bypass surgery and revealed that there appeared to be limited evidence to suggest that pre-intervention education benefits patient recovery. However, the findings of this literature review highlighted that some of the research designs were weak, lacking clarity about randomisation techniques or participants being blinded to the randomisation method, and some only reported limited outcome data to support their findings. The authors of the literature review concluded that although there is an emotional reaction to educating patients, which suggests it is a ‘good thing,’ the review did not find demonstrable benefit from pre-intervention teaching for the patient pending a cardiac investigation.

Combination of methods

A study completed by Lamarche, Taddeo and Pepler examined the impact of pre-admission telephone education on anxiety at admission, actual knowledge and perceived knowledge.³⁷ Anxiety was measured using a visual analogue scale (VAS). Anxiety levels were tested at the time of the teaching session, on admission and prior to discharge. The aim of the telephone education intervention was to provide additional support for the patient, however the authors concluded that the intervention did not reduce anxiety in the experimental group. The randomised pre-test post-test quasi-experimental study did demonstrate a statistically significant reduction in anxiety favouring the control group (those patients who did not receive the telephone call) on admission. However, when anxiety level at initial teaching time and length of waiting time before the cardiac intervention were entered as covariates in multiple analysis of variance (MANOVA), the difference between the groups' anxiety levels on admission was not statistically significant. What did transpire as being statistically significant was that the control group perceived their knowledge to be higher than the experimental group on admission. The control group also had lower anxiety scores but these were not statistically significant. Perhaps it could be deduced from this research that patients with higher anxiety levels initially think that they lack knowledge. The use of telephone intervention was not statistically significant in improving patient outcomes. The study did not specify how the groups were randomised and there was no explanation made as to why actual knowledge was not tested at discharge but perceived knowledge was — this limits the opportunity to consider the overall findings of the telephone call on actual knowledge.

A research article was reviewed which evaluated pre-intervention education delivery either by a nurse, using video, or a combination of both prior to CAVG.³⁸ It was hypothesised that giving a combination of verbal, non-scripted communication and video education to patients prior to their cardiac investigation would result in patients exhibiting less anxiety than those who received only one form of education provided.³⁸ The study found no difference in anxiety levels whether one education method alone or a combination of

educational methods were delivered.³⁸ Although the patients viewing the video felt better about their cardiac intervention there were no statistically significant results between the three study groups, however these results may have been limited because the total sample size in the study was 30. The study had limitations due to ethical considerations such as no patients had information withheld, therefore no comparison could be made to patients who received no education. If patients asked for further information it was supplied and the amount of additional information patients received was not objectively measured or documented in any way. The author rejected their hypothesis, concluding that the use of verbal, video or a combination of both should be tailored to patient's coping style and personality disposition to minimise anxiety associated with cardiac catheterisation. Conversely, another study undertaken revealed that patients who received a variety of preoperative information for cardiac surgery gave the patients a feeling of control over their recovery and reduced their anxiety.¹² Although the research reported these findings it is difficult to clarify the statistical significance of the results due to the lack of information provided in the published article.

A three year prospective study was undertaken in a response to the lack of information regarding the efficacy of in-hospital education in changing knowledge or health-related behaviours of patients undergoing CAVG.³⁹ The aim of the study was to develop a standardised learning system of slide-sound modules and information pamphlets and determine their benefits on knowledge, relieving anxiety and inducing health-enhancing behaviours by comparing it to the usual hospital teaching methods provided post CAVG. Patients were randomised to either the slide-sound teaching program or the hospital's usual teaching methods. It was concluded from the results that slide sound program teaching was superior to usual teaching methods in increasing knowledge about coronary artery disease and associated treatment. The results showed a statistically significant improvement in knowledge retention. Fewer patients from the slide-sound program teaching group reported a need for additional information compared to the regular teaching group. Slide-

sound program teaching demonstrated from these results that it might be the path of choice for improving post-intervention knowledge in CAVG patients.

Timing

Results from one study found that providing patients with an information pamphlet ten days before admission were useful and enabled patients to take an active role in their own care.⁴⁰ Christopherson and Pfeiffer reported that a group of CAVG patients receiving formal instruction through information pamphlets demonstrated an increase in their pre-cardiac intervention learning and had a reduced length of hospitalisation when compared to a group receiving informal instruction.⁴¹ Although the authors reported positive results in the two groups who read the information pamphlet in relation to increased learning, the results were not statistically significant. It did not matter whether the patient received the education booklet one-two days prior to the cardiac intervention or 3-35 days. On reviewing the results further it was evident that the group who demonstrated a reduced stay in intensive care were the youngest in age, required the least amount of time for cardiopulmonary bypass and had the least number of coronary arteries bypassed. This research recruited only 29 patients from an eligible group of 146 and the reasons for non-participation were not discussed. The research design also had limitations given that the questionnaire used to test knowledge and the State Trait Anxiety Inventory (STAI) was the same at both comparative tests and after the first attempt. This indicates that patients were perhaps cued into learning the necessary information to answer the next testing. Although this was a limitation of the research, the results did not indicate any statistically significant improvement.

An integrative review of the literature examined 19 publications on the effects of interventions to promote recovery in CAVG patients.⁴² The review summarised and critiqued the research on the selected topic and identified limitations and gaps to be considered for future research. Most of the interventions examined were educational in nature and dealt with pre-intervention methods affecting in-hospital recovery including

preparatory information about cognitive dysfunction following surgery, preparatory information, counselling about physical and psychological recovery, and psychiatric counselling.

Two studies compared the effectiveness of pre-admission versus post-admission preparatory instructions. The first demonstrated that the ideal time to provide education is between five to 14 days before admission when compared to the provision of the information post-admission, confirming a statistically significant reduction in mean anxiety levels on admission and improvement in knowledge retention post cardiac intervention.¹ Although the results were statistically significant it could be assumed that testing anxiety scores the day before CAVG surgery would naturally be elevated given the very nature of the immediately pending life-threatening surgery. The impedance to learning and therefore knowledge at this time may also undermine the effectiveness of pre-intervention education in the immediate pre-intervention period when compared to five to 14 days prior. The sample group of 40 consisted of 38 men and two women. There was limited detail regarding a telephone call that was also provided to the experimental group prior to admission. No information was provided with regard to who made the telephone call (i.e. researcher or nurse) and the details of the call were not specified. Although length of stay was not an original variable in this study it was noted that a trend existed for subjects in the experimental group to have a shorter length of stay, but these results were not statistically significant. Another unanticipated finding was the lack of significant difference between the experimental and control groups with regard to post-intervention anxiety. Although it is valuable, this research requires further exploration and perhaps the interventions repeated with a larger sample size and additional STAI and knowledge questionnaire testing times.

The second study that compared the effectiveness of pre- and post-admission preparation instruction undertook a RCT examining alternative educational methods and the timing of that educational delivery.²² Pre-admission self-instruction from an information pamphlet compared to post-hospital admission instruction by a nurse in relation to therapeutic

exercise was examined. It was concluded from the research that self-instructed participants reported higher positive mood scores, correctly performed more exercise behaviours and required less teaching time following hospital admission. However, post-operatively, no statistically significant group differences were found on mood states, physical activity, analgesia use, or length of hospital stay. The results from this RCT demonstrated the value of pre-admission teaching of therapeutic exercises. These results could be associated with reduced length of pre-intervention admission time, which is associated with cost-containment, particularly if nurses do not have the time or opportunity to teach all patients following hospital admission. If pre-cardiac intervention patients can learn the exercises at home on their own, it could be hypothesised that this should reduce the amount of time that is needed by nursing staff to teach the patient following hospital admission. This research did not specify the exact contents of the information pamphlet provided nor is there any mention of the number of pages in the pamphlet, which limits the reader's understanding of the pamphlet. However, the findings from the study support the position that direct action such as self-directed learning is one means by which individuals cope with new or threatening events and that effective coping results in more positive emotions.⁴³ This self-directed educational method provides the individual with an opportunity to learn, practice and master new behaviours in a familiar environment at their own pace.⁴⁴

Finesilver believed that structured information was more effective than unstructured in increasing knowledge and information in general and that effectively increased knowledge would enhance resumption of activities during recovery.¹⁰ However, the most effective timing of this educational delivery was unclear. It was hypothesised in the uncontrolled clinical study that patients receiving preparatory information prior to their cardiac intervention would be more cooperative during the procedure, be less distressed and report higher levels of positive moods before and after the cardiac intervention.¹⁰ The results did not support the hypothesis and it was rejected. The findings from the study concluded that there is limited information available for clinicians to use to base their teaching strategies on. This led them to suggest that nursing clinicians develop their own educational

strategies and deliver that education when time permits, basing it on their own clinical experience.

Education delivery has evolved significantly in recent years. It is no longer made up of generalised information and has become interactive, collaborative and patient focused.⁴⁵ One of the driving factors effecting education for patients scheduled to have a cardiac intervention in large institutions is reduced length of stay. The time that evolves from a cardiac diagnostic procedure to an intervention such as PTCA or CAVG may be less than 24 hours, which limits the time available for appropriate, informative patient education. Providing patients with the most effective educational method, which is suited to their educational needs, is of paramount importance for the learning process to occur and potentially assist the recovery phase.⁴⁶

Summary

The literature examined indicates that there are a variety of conclusions related to the most beneficial educational method for the patient and the most appropriate time to deliver the education prior to a cardiac intervention. The main objective of this review was to identify from the available literature, which method(s) of education are considered most beneficial for the patient prior to their cardiac investigation, the exact purpose of the instruction, and the outcomes. The review also sought to examine if improved outcomes were influenced by a particular pre-intervention education method or influenced by the timing of its delivery. Pre-cardiac intervention education has been adopted with the expectation that there will be beneficial pre-intervention and post-intervention outcomes.

It appears that the use of a variety of educational methods have gained widespread acceptance in assisting the patient both pre-intervention and post-intervention during hospital admission. However, there does not appear to be consensus in the literature as to the most appropriate and beneficial educational delivery method.

From the literature there is limited evidence to suggest that pre-cardiac intervention education benefits patient recovery. However, this finding should be viewed with caution given the lack of rigorous research available and the limitations of the research identified such as small participant numbers and weak design.

Study Method

The purpose of the study

The need for this study was identified in a systematic review completed by Eckert in 2002.³ The systematic review highlighted the need to pursue further research in the field of patient education prior to a cardiac intervention on specific outcomes such as anxiety, knowledge retention, post intervention pain and length of stay. On completion of the systematic review, and as a consequence of the researcher's background of working for many years in a large institution's cardiac unit, many unanswered questions in this particular field of patient care delivery became apparent. The cardiac unit where the researcher worked provides a variety of education methods to patients prior to their cardiac intervention such as: a designated cardiac nurse educator who coordinates many and varied education sessions using different education methods; information pamphlets which are provided routinely; a relevant video is offered to patients and when possible the nurse at the bedside provides information to the patient to the best of their knowledge. However, whilst reflecting on current practice and through the consideration of the findings of the systematic review, it became apparent that there was no evaluation of the benefits of current practice in relevant clinical settings and there was a lack of rigorous research in the area to support a complete change in current practice. Therefore it was appropriate to investigate the area further. Previous research appeared to measure and compare various education methods. However, there did not appear to be a patient voice in this research.

Due to this discrepancy a questionnaire was designed to identify what the patient considered to be of benefit and the most appropriate time to receive education.

The purpose of the study is to identify the type of education methods provided prior to coronary artery bypass surgery or mitral/aortic valve replacement in a large cardio-thoracic surgical unit in metropolitan South Australia and the timing of the educational delivery. The descriptive study used a questionnaire format to gain an understanding of patients' education methods provided prior to CAVG surgery and the preferred timing of the educational delivery.

The Research Questions

The specific research questions in this study were:

- When does the patient waiting for their cardiac surgery prefer their education to be provided?
- What method of education is most commonly provided?
- Is there a relationship between number of education methods received and length of stay?

Objective

The objective of this study was:

- To gain an insight into the most common education method(s) provided prior to cardiac surgery and the patients' perceived benefits of this education.

Aims

The aims of this study were to:

- Gather patients' demographic and descriptive data i.e. age, gender, level of education and length of stay. Further information from the form regarding education method provided, timing of education delivery and descriptive explanation by patient of the benefits, (if any), of this educational method.
- Develop recommendations for patients' preferred education methods in the Cardio-Thoracic Surgical Unit (CTSU) based on the findings of the study.
- Make recommendations to evaluate the methods outlined by the patients through a formal process, such as a RCT.

Descriptive study

This study is a descriptive study that adopts both qualitative and quantitative methods of data collection and analysis through the use of a patient questionnaire. A descriptive study design was chosen for this research to describe rather than explain patients' preferred education method. It has been discussed in the research literature that a combination of methods adds enhanced meaning and provides scope for more extensive analysis of the subject under review.^{47,48} The justification for a descriptive design lies in the fact that this is a starting point for a program of research. Therefore it is necessary to understand the current situation, before considering whether or not change is required. The study took place in a large metropolitan teaching hospital that provides acute cardio-thoracic surgical care to patients from both the metropolitan and rural sector. Data was collected using a patient questionnaire given to participants whilst in the Cardio-Thoracic Surgical Unit (CTSU).

Study setting and participants

The setting for the study was a 17 bed Cardio-Thoracic Surgical Unit within a large inner-city teaching hospital. The bed occupancy averages 85-90% during the year with a constant turnover of patients through the ward. The specialised cardiac unit is kept busy throughout the year with 500 patients having cardiac surgery in 2002. Of those 500 patients, 350 (70%) of them had CAVG or valvular surgery.⁴⁹

The Cardio-Thoracic Surgical Unit specialises in coronary artery vein graft surgery, heart valve surgery, chest trauma and thoracic surgery. It provides 24 hour cardiac monitoring for patients post cardiac intervention, with the ability and skills to maintain a high level of nursing care delivery throughout the patients' admission. This is achieved by qualified staff in the unit.

Patients arrive at the CTSU either the day prior to surgery or on the day of surgery having attended a pre-admission clinic. This is dependent on the patient's medical condition and/or their accessibility to the pre-admission clinic prior to the cardiac intervention. During the pre-admission clinic patients have a chest x-ray taken, electrocardiogram recorded, essential biochemistry is taken such as electrolytes and complete blood picture and they are provided with an information pamphlet and perhaps a video, dependent on time constraints. Time may be lost due to lengthy waits for elective chest x-rays and size of the pre-admission group.

The unit may appear daunting to patients because of the array of cardiac monitoring equipment and other technical devices that assist in maintaining a patient's stability post cardiac intervention. Nursing staff assist patients to deal with the anxieties they may have by offering their professional support and education regarding their hospitalisation. When admitted the ideal is to take the patient on a tour of the ward and orientate the patient to their surroundings. It is anticipated that this tour will assist the patient and their family to

become familiar with the ward environment and in doing so, the surrounding noises and equipment may become less daunting.

Subject-recruitment

Between September 2002 and February 2003 a convenience sample of 51 patients scheduled to have elective coronary artery vein graft surgery or heart valve surgery from the large metropolitan tertiary referral hospital were recruited to participate in the study. Those patients who chose to complete and return the questionnaire became the sample population. The voluntary nature of this procedure necessitated that the sample be a convenience sample. The number of participants was limited due to the lengthy time involved in recruiting a large amount of individuals who fitted the inclusion criteria and the need to complete this research as part of a submission for a doctorate portfolio. The research will continue in this area and further research will emanate from the results of this study.

Convenience sample

Convenience sampling is a desirable process often adopted when using questionnaires to obtain data.⁵⁰ Patients admitted to the CTSU who met the inclusion criteria were the potential convenience sample. It was envisaged that the questionnaire would not take patients long to complete, minimising any inconvenience and requiring minimal participation by other staff members.

Advantages of convenience sample

Using a convenience sample can be time efficient as there is no randomisation process and all patients who fit the inclusion criteria can be considered eligible to participate in the study. This method can also reduce selection bias because it is not necessary to have a

defined randomisation technique. The population participating in the research are obtainable or convenient to reach.⁵¹

Disadvantages of convenience sample

A disadvantage of using a convenience sample is that it may not be a true representation of the total population and therefore the findings cannot be generalised to the population as a whole.

Inclusion criteria

Patients with the following criteria were eligible for inclusion in the study:

- Admitted to the cardio-thoracic surgical unit for CAVG or heart valve surgery.
- Patients who could understand and speak English as the study needed to be explained as well as issues of informed consent addressed, and also to allow the researcher to discuss with the patient any other issues about the study.

Exclusion criteria

Patients with the following criteria were not considered suitable to be included into the study:

- Did not speak and understand English and therefore the study could not be explained and consent could not be obtained. It was beyond the scope of the study to acquire the services of professional translators.
- Post intervention complications which had left the patient with extensive physical and/or mental impairment. Such complications post cardiac intervention had rendered the patient unable to complete a questionnaire. The ward Clinical Nurse Consultant decided this based on their clinical judgement.

- If the surgery was not CAVG or heart valve surgery. Patients not having these interventions were not included because the education required and method of delivery differed. For example, thoracic surgery patients did not receive the variety of education methods the CAVG or heart valve surgery patient received.

Ethical considerations

The research proposal was submitted for approval to the Research Higher Degrees Sub Committee of the Department of Clinical Nursing at the University of Adelaide and the Hospital Research and Ethics Committee. Approval was also sought from the Nursing Director of the Cardiovascular Service area at the study institution prior to commencement. Each supervisory body required a guarantee that the study was legitimate and evidence that the research study was methodologically sound. Approval was given to commence the research in December 2001.

The ethical considerations of importance in this study come from a moral and ethical perspective. The participants have at least four basic rights: the right not to be harmed; the right to full disclosure; the right to self-discrimination; and the right to privacy, anonymity and confidentiality.

Participation in the study was voluntary, confidential and anonymous. A guarantee of confidentiality and anonymity, to be maintained throughout the course of the study, was provided in the research information sheet. Participants were assured that any identifying information collected during the study that related to the person or institution would be either deleted from the report or changed to ensure anonymity. Informed written consent (refer Appendix 1) was obtained prior to completing the questionnaire and a plain language statement detailing the purpose of the study was provided. The participants were also advised that they could withdraw from the study at any time and that they could do so without prejudice.

The plain language introductory statement (refer Appendix 2) detailing the study purpose and aims of the research was provided to patients inviting them to participate in the research. Once participants indicated an interest in becoming involved in the research, and they had read the plain language statement about the research, an opportunity to ask questions relevant to the study was provided. The patient then completed the questionnaire at their convenience prior to discharge.

It was envisaged that any emotional trauma the participants may experience while participating in the study could be dealt with effectively by drawing on the researchers' background in nursing. All participants were provided with details of how to contact the researcher should they experience any difficulties during or after the interview period and appropriate counselling would be made available.

During the study, only the chief investigator and supervisor had access to the data. The researcher guaranteed that all questionnaires would be kept secure in a locked cabinet for a period of five years.

Questionnaire development

The researcher developed the questions for inclusion in the questionnaire based on the available literature and lengthy clinical experience in cardiac nursing. In order to coincide with the specific research questions and distinct objective of this study it was decided to develop a questionnaire specific to the population involved. Demographic data such as admission and discharge date, age, gender and level of education were collected to provide an overview of the study sample.

The inclusion of the open-ended questions was to allow the individuals to voice their own opinion in an unstructured manner. These results were not anticipated and therefore the researcher believed it was the most appropriate method to assist in identifying what the

patient considered to be the most beneficial time to receive education and the advantages of that education prior to their cardiac intervention.

Before the questionnaire was distributed to subjects it was piloted. The aim of the pilot was to survey a small group of patients similar to those who would be asked to participate in the study. The sample group used for this process met the same specified inclusion and exclusion criteria for this study. The questionnaire was piloted over a two-week period. All patients who were admitted to the unit during the nominated two-week period were invited to complete the questionnaire. Seven patients met the inclusion / exclusion criteria and of those, five participated in the pilot study.

The unit Clinical Nurse Consultant and the Cardiac Rehabilitation Nurse also reviewed the questionnaire. This was considered appropriate given their relevance to the unit and knowledge in cardio-thoracic care in order to acquire constructive feedback from them regarding the content of the questionnaire.

Advantages of pilot testing

The purpose of piloting the questionnaire before commencing data collection was to ensure the form was legible and easy for the patient to understand. It was also used as a time gauge to identify how long the process took a patient to complete. This can be beneficial because if the process proves to be confusing and time consuming, the questionnaire can be modified before the study commences reducing the potential for participant drop out. The pilot testing assisted the researcher to identify any questions that the patients may have felt were not relevant to their admission or the education methods provided to them. The aim of the pilot test was to also have real data to enter into the database to determine any issues with coding and or analysis and also assist the researcher to determine the validity and reliability of the data collection tool.

Disadvantages of pilot testing

Although there are several benefits to pilot testing a questionnaire before commencing the official data collection phase, there are also disadvantages such as the additional time that is required to pilot test appropriately and review the outcomes of the testing. Due to the limited numbers used during the pilot testing phase the results may not be a true reflection of the proposed population. It is seldom possible to obtain a representative sample without using a large number of patients.

Questionnaire structure

Validity

The validity of a questionnaire refers to the ability of the questionnaire to collect and measure the data that it is designed to measure.⁵² Therefore, validity demonstrates the degree to which the questionnaire is able to measure the intended phenomenon. The pilot study was undertaken in the cardiovascular unit at the large metropolitan teaching hospital to determine the validity of the questionnaire and provide an insight into the process of analysing the results.

Reliability

Reliability refers to whether or not the questionnaire drew out comparable responses from subjects.⁵¹ The reliability of the questionnaire was tested during the piloting of the questionnaire. Through pilot testing the questionnaire on a small sample of people clarification of the questions could be achieved as well as confirmation of whether or not the questions were understandable. It also ensured that the respondents shared the researcher's interpretation of the terms in each question and what its overall meaning was. There were no amendments made to the questionnaire following analysis of the pilot questionnaire.

In general, most participants completed the questionnaire themselves and in their own time, however for some the researcher assisted. For those who required assistance the researcher would ask the participants the question and write down verbatim the responses provided by participants. This guaranteed the questionnaires were completed according to the instructions. However, there was a potential for bias here with the researcher assisting participants to provide responses which may necessitate the researcher to ask questions in a manner that would lead respondents to provide an answer favoured by the researcher. The researcher asking the question was mindful to make the questions objective in their presentation in order to not 'skew' any potential response the participant may make.⁵¹

Fixed-choice questions

The fixed choice questions required the respondent to confine their answers to terms chosen by the researcher. This is necessary for fact-gathering cases, i.e. obtaining demographic information such as age and gender and provides a quantifiable, consistent basis on which to analyse the data.⁵³

Open-ended questions

Open-ended questions are not the same as the questions asked in an unstructured interview. In the open-ended questionnaire, the questions are always the same; it is the answers that vary.⁵³ The open-ended question allows the participant to compose their own answer instead of being forced to choose between a fixed set of answers written on the questionnaire.

The advantage of this method is that it allows participants to express their opinion in their own words. This was considered the most feasible approach for this research because the researcher could not anticipate the full range of possible answers. Because the responses will be the individual participants' opinions it will help to define the reality of the situation.

Data Collection

A questionnaire was given to patients during their admission in the cardio-thoracic surgical unit of the large metropolitan institution (refer Appendix 3). The design of the questionnaire enabled the researcher to obtain general demographics on the group being researched and also information regarding what the patient considered to be the most beneficial time to deliver the education and the advantages of that education prior to their cardiac intervention. Of particular interest was the education method the patient received and which one(s) they preferred.

The cardiac surgery procedure list located in the nurses' station on the Cardio-Thoracic Surgical Unit was accessed at the beginning of each day to determine those patients scheduled for a cardiac intervention who may be eligible for inclusion in the study. From the procedural list it could be determined which day the patient was scheduled for their cardiac intervention and therefore what day the researcher could visit them post-intervention. This was an important consideration given the nature of the surgery and required recovery time that would allow the patient to be receptive and capable of completing a questionnaire. Patients were approached if they were more than two days post-cardiac intervention, as it was considered that generally this was a reasonable time for them to be adequately recovered to complete the questionnaire. This also provided the patient with some days to reflect on the education methods they had received before completing the questionnaire prior to discharge.

Following a review of the patient procedural list and discussion with the Cardio-Thoracic Surgical Unit Clinical Nurse Consultant (CNC), the decision was made with regard to potential participants the researcher could approach. The benefit of discussing potential participants with the CNC was that this individual had local knowledge of the patient's recovery status. Many patients in the unit have ongoing procedures and daily tests and therefore it was also thought to be appropriate to always check with the CNC before entering a patient's room.

Based on the inclusion/exclusion criteria, patients in the Cardio-Thoracic Surgical Unit were considered for participation in the study. Those patients identified as potential inclusions for the study were approached and asked if they would be involved in the study. After meeting the patient, explaining the purpose of the study and ascertaining if the patient was willing to participate in the study, consent was obtained. Furthermore, a detailed explanation was provided of the research as well as instructions regarding where to leave the questionnaire once completed. The patient was also given the opportunity to clarify anything that might be unclear. They were then informed of the designated, labeled, sealed box by the door of the nurses' station to leave the form once completed. If the patient required assistance completing the questionnaire or was not actively ambulatory, the researcher would collect it once completed. If the patient requested assistance completing the form, the researcher would ask the patient any questions that were not completed and write down the response verbatim. The convenience sample consisted of 51 participants. The sample size of 51 captured approximately 15% of the average total number of patients to have cardiac interventions on that unit per year.

Limitations to the data collection

The data collection took five months, due to the duration of time it took to identify 51 people who met the inclusion criteria, thus resulting in the limited number of participants. Throughout this time sufficient numbers of people were admitted to the unit, however many did not meet the inclusion criteria. Due to this research contributing to a collaborative research portfolio for the completion of the Doctorate of Nursing the time frame to collect the questionnaires also dictated the final number. This research is a preliminary study to identify patient's preferred education methods and to try and determine any relationships between education methods received and length of stay.

Data Analysis

Following the collection of the questionnaires each participant's questionnaire was assigned a code number in order to preserve anonymity and confidentiality of the participants. This process also allows the number to be recorded in the data file, together with the data, so reference can be made to a particular completed questionnaire at any time to make correlations in the data file if necessary.⁵¹ The analysis of the questionnaire was carried out in two stages. The initial stage (Stage 1) used descriptive statistics to analyse the demographic and quantifiable data collected. Stage 2 used thematic analysis to identify and develop recurrent themes and ideas from the open-ended questions in the questionnaire that provided qualitative data.

Stage 1

Quantitative data analysis

The quantifiable data from the questionnaire were coded. Coding the responses consisted of assigning code values to all responses. The coding corresponded to the question number and the response was also numbered, these codes were used to reference the data prior to entering it into the statistical software package. The objective of the coding process was to provide a unique code for each answer that can be analysed once entered into the statistical computer software package.⁵¹ The responses to questions 5, part of 6, 7 and 8 could not be anticipated and therefore they had no pre-coded values associated — analysis of this data is discussed in the next section of this report.

Once all codeable questions had been coded, the data was transferred into a computer software file. A spreadsheet to enter the initial coded data was used before transferring that data into a statistical package. A Statistical Package for Social Sciences (SPSS) software version 10.0 for Macintosh was used for the analysis of the data. Descriptive statistics such

as frequency distribution (percentages), measure of central tendency (mean, median and mode), measures of dispersion (range, variance, standard deviation) and where appropriate non-parametric testing was undertaken.

Statistical tests used in the analysis of data were determined by the characteristics of the data collected. For example, parametric tests require certain assumptions not to be violated such as:

- normality or equal variance. The range of data must be similar between each of the groups or subjects,
- the data must have numeric values and the values must be equal in distance from one another. These scales refer to interval scale data, which is sometimes called 'equal interval' scales because the interval between each value on the scale is the same. For example, the measurement of temperature. Interval scales need not include the value of zero and,
- ratio data which is similar to interval scale data, however zero is absolute on the ratio scale. For example, distance in kilometres or age in years would refer to ratio scale data. If an object remains in the same place it would have traveled zero distance.^{51,54}

Non-parametric tests require few, if any, assumptions about the underlying population distribution.⁵⁴ Non-parametric tests such as Chi-square and Mann-Whitney *U* are used on nominal and ordinal scale data respectively. Chi-square was used in this study.

- Nominal scale data refers to a numeric code value, which may not represent a quantifiable value. For example, when respondents have to indicate 'male' or 'female' on a questionnaire to identify their sex. When coding this data, male may represent the code value of 1 and the female 2. In this case the numbers don't indicate a quantity.

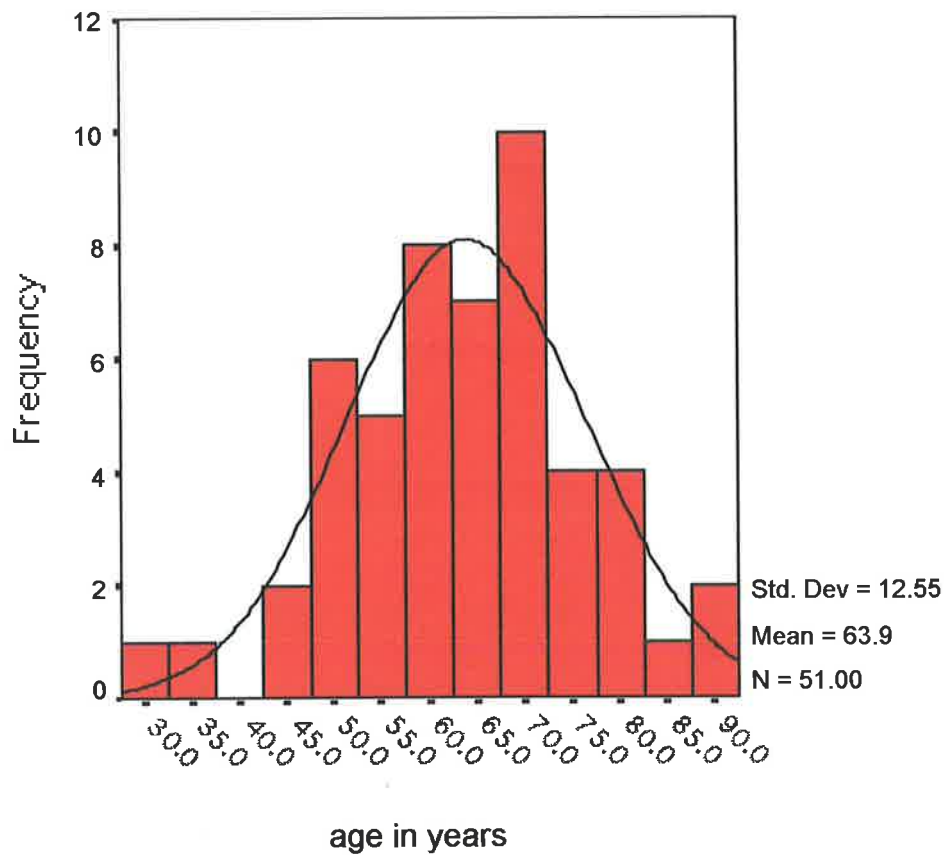
- Ordinal scale data may represent a ranking system, for example indicating the order in which a series of tasks were carried out would produce ordinal data.⁵¹
- Chi-square is appropriate for statistical analysis when variables have been measured on a nominal scale and measurements were of individual subjects. Chi-square is used to identify if there is a relationship between two individual variables.

Chi-square was used in this study to examine a number of possible associations. It was used to identify any relationship between level of schooling, education methods received both pre and post admission, and length of stay.⁵⁴ When completing the statistical analysis, the results were checked to identify if one of the assumptions concerning the chi-square value was violated concerning the 'minimum expected cell frequency' which should be 5 or greater (or at least 80 % of cells with expected frequencies of 5 or more). For example, if none of the cells have an expected count of less than 5 the assumption has not been violated.⁵⁵

Once the process of data analysis has occurred and the values calculated appropriately the results would be interpreted for statistical significance. This measurement clarifies if the results obtained have occurred by chance, at some specified level of probability.⁵¹ Statistical significance was considered when the probability value was equal to or less than 0.05.⁵⁴

Although the sample in this study was a convenience sample, a histogram of the distribution of the age of subjects suggested that for at least one variable the sample was normally distributed. The participant's age and gender comparisons were also made to The Australian Institute of Health and Welfare (AIHW) and National Heart Foundation of Australia's (NHFA) most relevant report on cardiac surgery and it appears that at least for age the sample is representative of the population (refer Figure 1).⁵⁶

Figure 1: Histogram age in years



The scores in this histogram appear normally distributed, with most scores occurring in the centre, tapering out towards the extremes. This distribution is comparable to the AIHW and NHFA statistical values in relation to age and cardiac surgery.⁵⁶ A test of normality (Kolmogorov-Smirnov statistic) was made to assess the normality of the distribution. A non-significant result (significance value of greater than 0.05) indicates normality.⁵⁵ In this case the significance value was 0.200 suggesting no violation of the assumption of normality.

Results

The following information provides the results of the categorisation of the data into units of measurement (such as nominal and ordinal). The text, tables and figures below provide an explanation of the data collected from the questionnaires.

Unless indicated, any differences between groups are not statistically significant (chi-square).

Demographic data

Demographic data was collected such as age, gender (refer Table 1) and level of education (completed high school, completed tertiary education). There were more male participants enrolled in this study than females ($n = 41$ and 10 respectively) and the mean age was 63.9 (± 12.55) years for all participants. There was no statistically significant difference between male and female ages in the study, with the mean age for males being 62.93 and females 67.90 years.

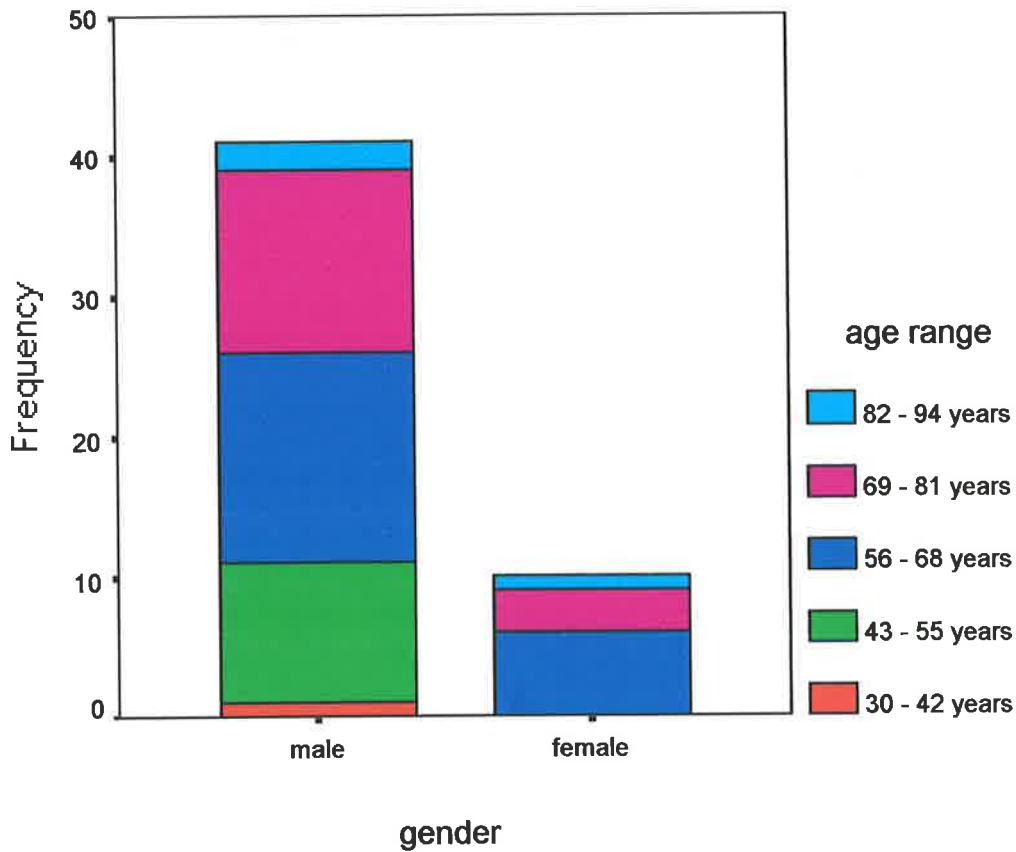
Table 1: Age and gender demographics

Gender	Mean (age in years)	Number
Male	62.93 (31-91) ± 13.18	41
Female	67.90 (57-84) ± 9.04	10
Total	63.90 ± 12.55	51

mean \pm standard deviation

The age of participants ranged from 31 to 91 years, with the largest group of participants aged between 56 to 68 years (41.2%, $n = 21$). The median age was 64 years, the mode was 72 years and the mean for the sample was 63.9 years. Distribution of age groups of subjects in this study is outlined in Figure 2.

Figure 2: Frequency of males and female participants' age ranges in study



N = 51
 Mean = 63.9 years
 SD ±12.55 years

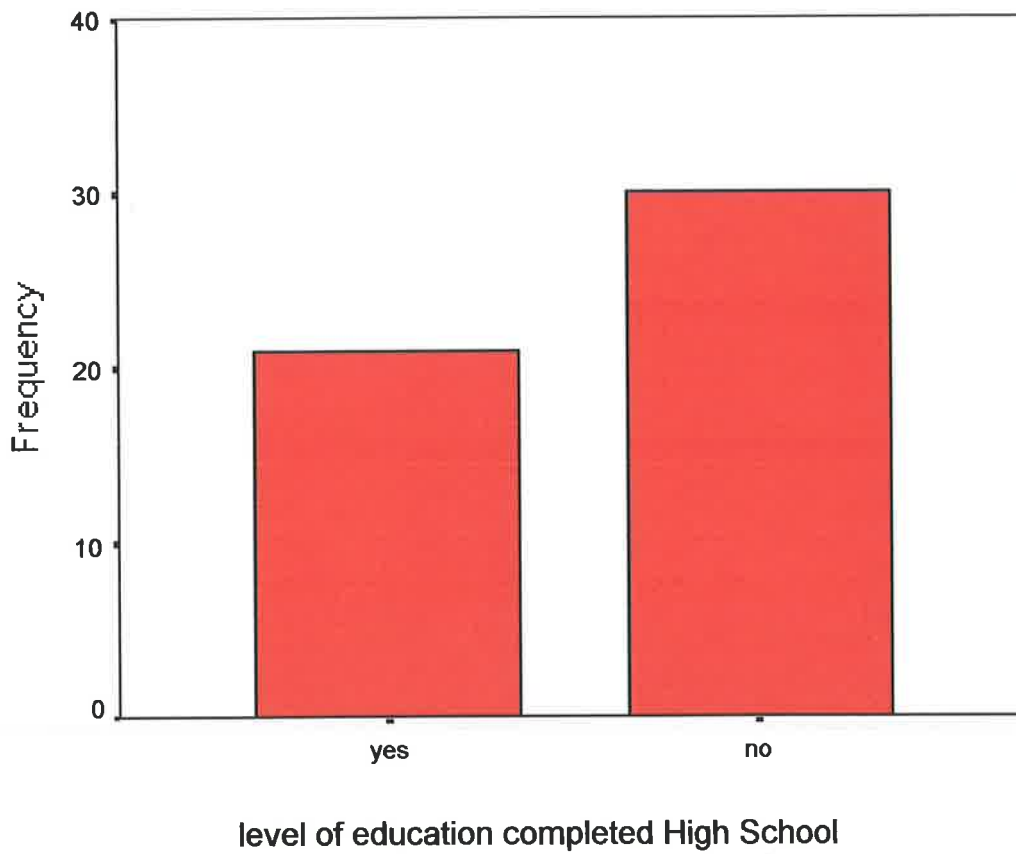
Comparisons were made to the AIHW and NHFA with regards to the age and gender of participants. It was evident that more males were admitted for cardiac surgery than females in the national statistics from 1998 at a ratio of 3:1 (males/females) with the ratio in this study providing similar at 4:1.⁵⁶ The procedure rates for men and women is most marked in the age range of 56 to 68 years which is slightly younger than the AIHW and NHF statistic from 1998. Procedure rates peak in the AIHW and NHFA at ages 70 to 74 years between both male and females.⁵⁶

Level of Education

High school

Level of education was included in the questionnaire to identify what the educational baseline was for all participants and establish if there was an association between preferred method and level of education. Of the 51 participants in the study, 21 (41.2%) completed High School and 30 (58.8%) had not (refer Figure 3).

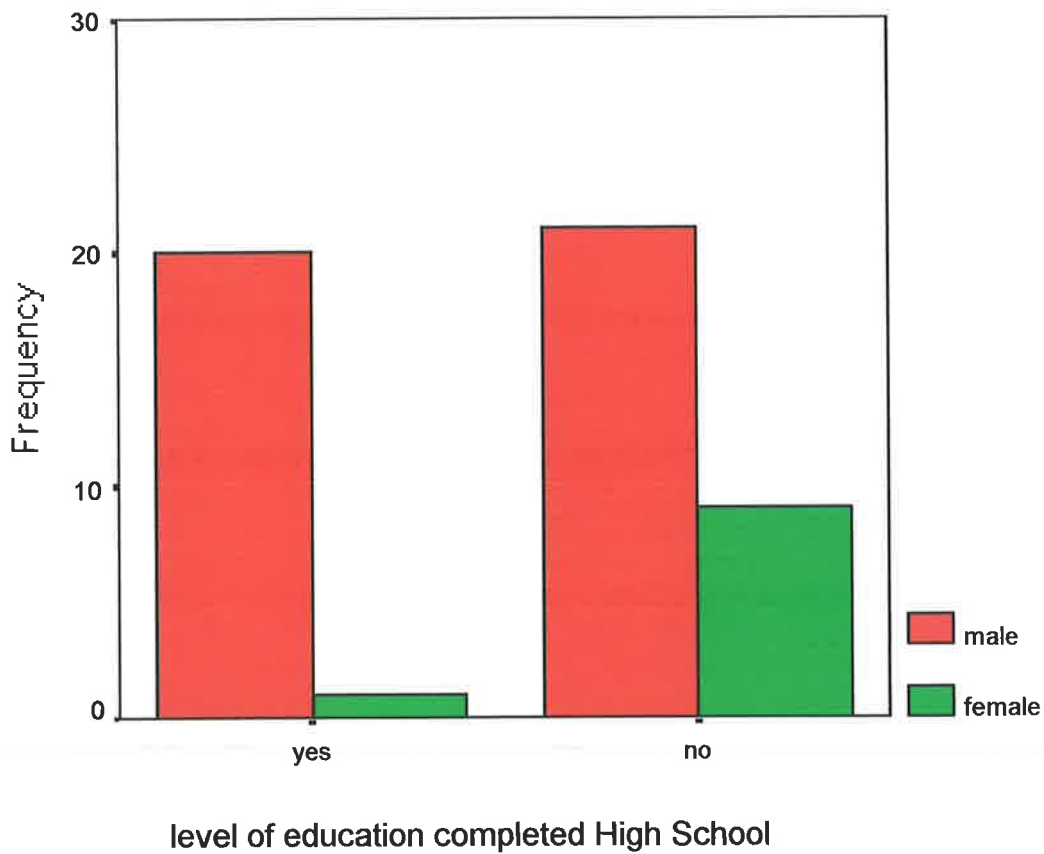
Figure 3: Frequency of patients who had completed high school



N = 21

Figure 4 provides an overview of the number of males and females in this study who had completed high school. Of the 51 participants in the study 20/41 (48.8%) males and 1/10 (10.0%) females completed high school. A total of 21 (41.2%) participants completed high school and 30/51 (58.8%) of the total study population did not. Twenty one (51.2%) of the males and 9/10 (90.0%) of the females in the study did not complete high school. The chi-square analysis of this categorical data indicated that the proportion of males and females who completed high school was not statistically different to the proportion that did not.

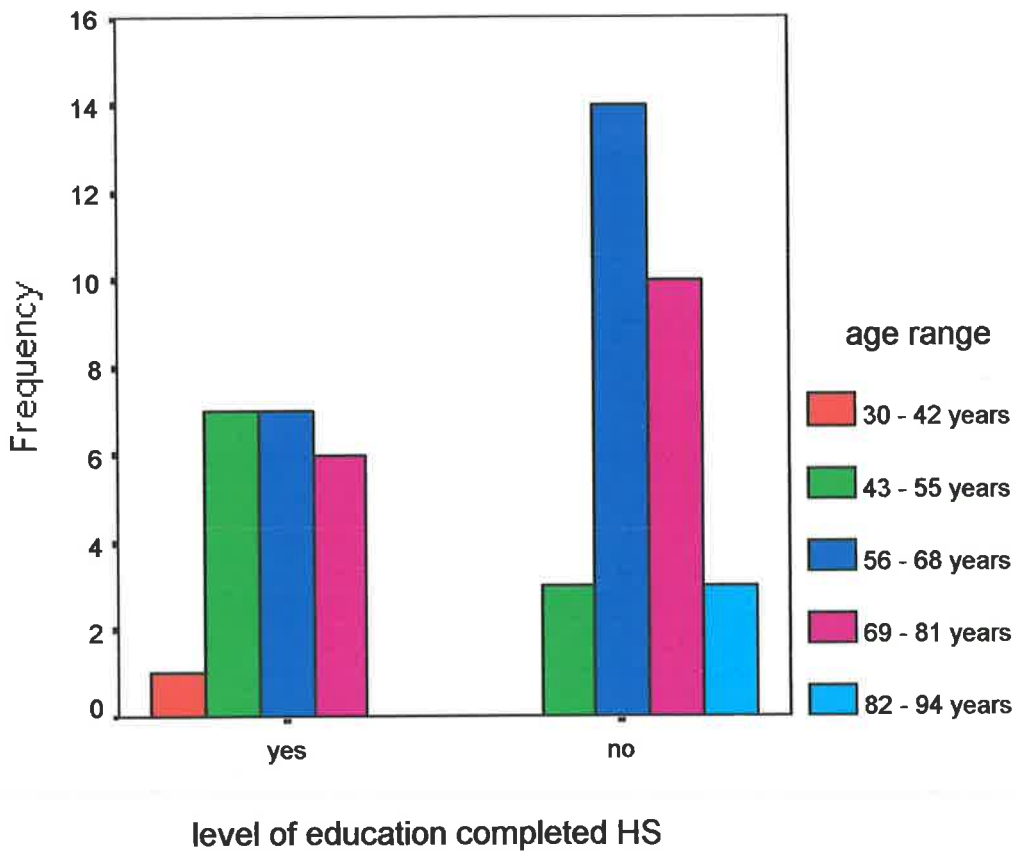
Figure 4: Frequency of males and females who completed high school



N = 21

There were 21 participants who had completed high school and of those 1/21 (4.7%) was aged between 30-42 years and was male. Seven were aged between 43-55 years (33.3%) and all male, there were seven males aged between 56-68 years (33.3%) and five males and one female aged between 69-81 years (28.6%). The mean age of the total group of participants who had completed high school was 60.57 (± 11.38) years and the mean age for those who did not complete high school were 66.23 (± 12.99) years (refer Figure 5).

Figure 5: Frequency of age ranges of those who did and did not complete high school

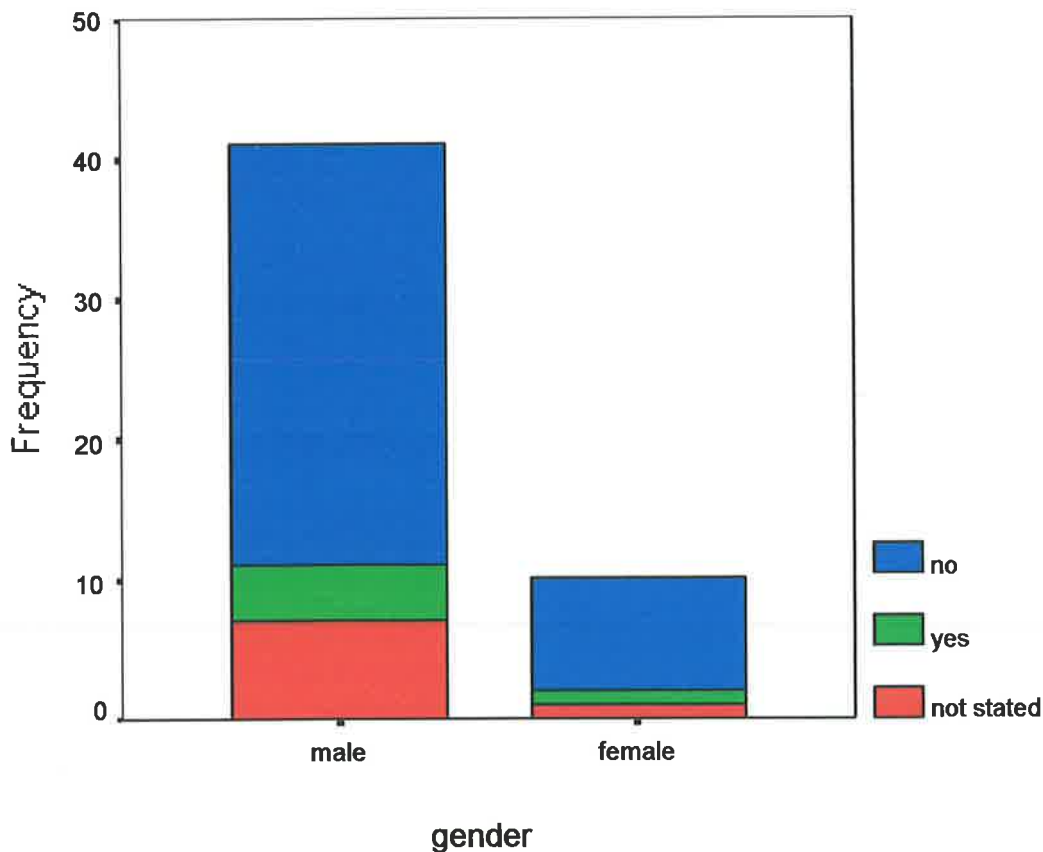


N = 21
 Mean = 60.57 years
 SD = ± 11.38 years

Tertiary education

Of the 51 participants in the study four out of a possible 34 (11.7%) males who answered the question completed tertiary education and one out of a possible nine (11.1%) females who responded to the question completed tertiary education (refer Figure 6). A total of 5/43 (11.6%) of the study population completed tertiary education and 38/43 (88.4%) who answered the question did not. There were a total of 8/51 (15.6%) participants (seven males and one female) who did not answer the question. The chi-square analysis of this data indicated that the proportion of participants who had completed tertiary education was not statistically significantly different when compared to the proportion that had not.

Figure 6: Frequency of males and females who completed tertiary education

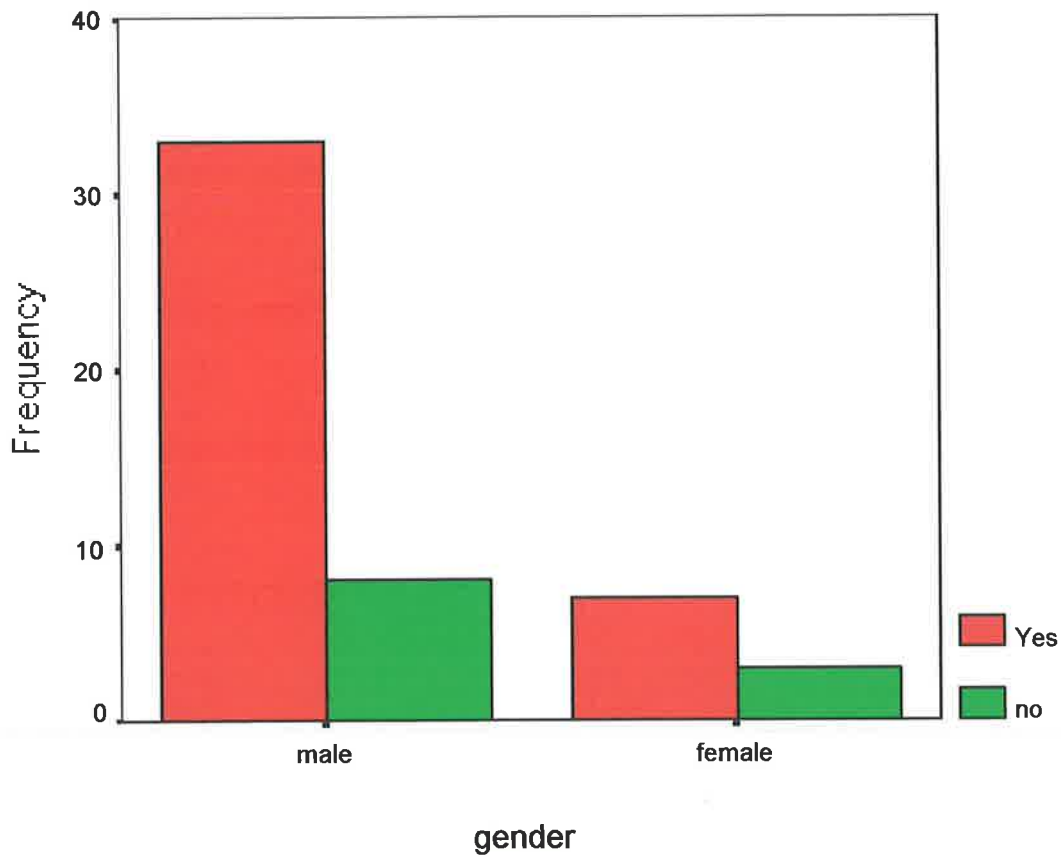


N= 5

Cardiac education provided

Of the subjects who participated in the study, 40/51 (78.4%) received education prior to admission and 11/51 (21.6%) did not. Of the 40 participants who received education prior to admission 33/40 (82.5%) were males and 7/40 (17.5%) were females (refer Figure 7). There was no statistically significant difference between participants who received education when compared to the participants who did not receive education prior to admission.

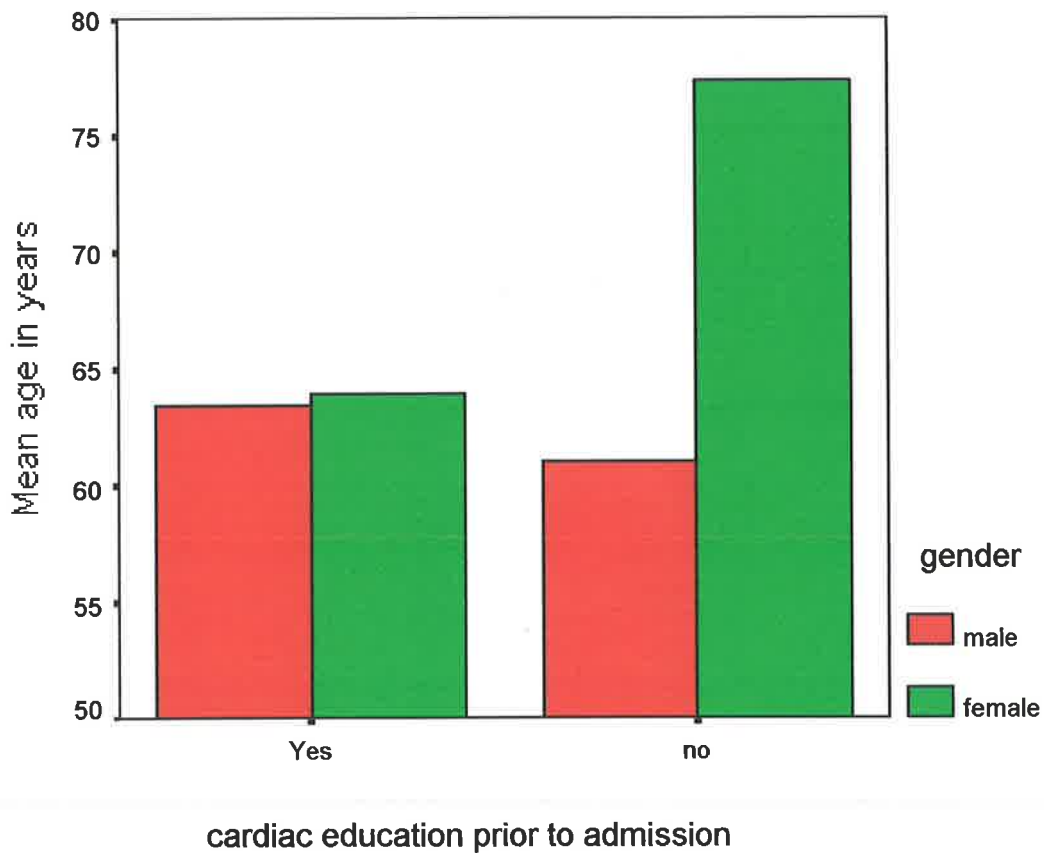
Figure 7: Frequency of males and females who received education prior to admission



N = 40

There were 33 males who received education prior to admission with a mean age of 63 years and the males who didn't receive education had a mean age of 61 years. The mean age of the seven females who received education prior to admission was 64 years with a mean of 77 years for the three who did not (refer Figure 8). No females under the age range of 57 or over the 74 years received education prior to admission.

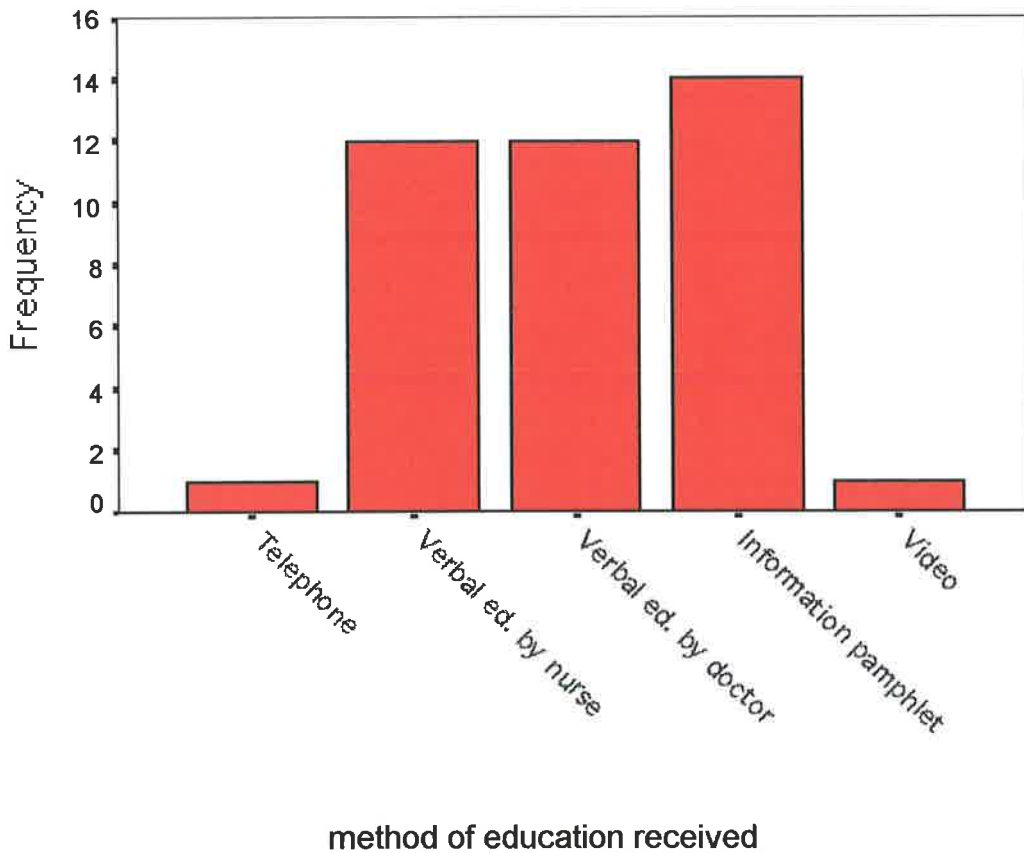
Figure 8: Frequency of the males and females who did and did not receive cardiac education prior to admission mean ages



The questionnaire aimed to capture the educational methods provided to patients prior to their cardiac surgery, identifying the most frequently offered method. Figure 9 represents the education methods patients were provided with prior to admission.

One patient received education via the telephone reflecting 2.5% of the total group of 40 participants who received education prior to admission, 12/40 (30%) received education from a nurse, 12/40 (30%) received education from a doctor, 14/40 (35%) acquired information from a pamphlet and 1/40 (2.5%) it was provided by video.

Figure 9: Method of education received by participants prior to admission



N = 40

The total number of education methods received represented by gender and age range is outlined in Table 2. The table identifies the age ranges of male and female participants who received education prior to admission and the number of education methods these participants received, with further examination made to identify the gender and number of

methods received. There was no statistically significant difference between the proportion of males and females who received one, two or three different methods of education prior to admission.

Table 2: Number of education methods according to age range and gender

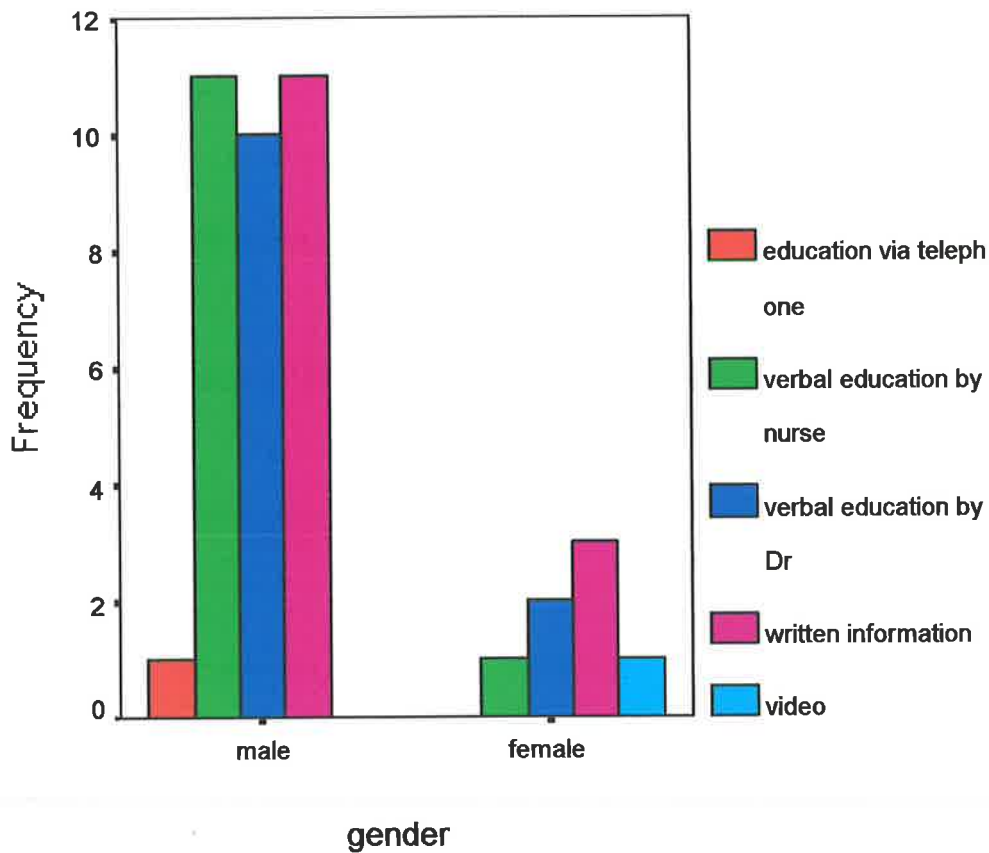
Gender	Education- al Method	Age 30-42 yrs	Age 43-55 yrs	Age 56-68 yrs	Age 69-81 yrs	Age 82-94 yrs	Total
Male	One method		3 (33.3%)	2 (16.6%)	4 (44.4%)	1 (50%)	10 (30.3%)
	Two methods		4 (44.4%)	5 (41.7%)	1 (11.1%)		10 (30.3%)
	Three methods	1 (100%)	2 (22.2%)	5 (41.7%)	4 (44.4%)	1 (50%)	13 (39.4%)
	Total	1	9	12	9	2	33
Female	One method			4 (57.1%)			4 (57.1%)
	Two methods			2 (28.6%)			2 (28.6%)
	Three methods				1 (100%)		1 (14.3%)
	Total			6	1		7

N = 40

A comparison of the education method received prior to admission and the gender of the participants was considered. Of the 40 participants who received some form of education prior to admission 33/40 (82.5%) were male and 7/40 (17.5%) were female. The variations in education that the male participants received is as follows: one (3%) male received education via the telephone, 11 (33.3%) were provided with verbal education by a nurse, ten (30.3%) males received verbal education by a Doctor and 11 (33.3%) were given an

information pamphlet. Of the seven females, one (14.3%) received verbal education by a nurse, two (28.6%) had education from a doctor, three (42.9%) received the information pamphlet and one (14.3%) received a video (refer Figure 10). There was no statistically significant difference in types of education methods received prior to admission when genders were compared.

Figure 10: Frequency of males and females and the education received prior to admission



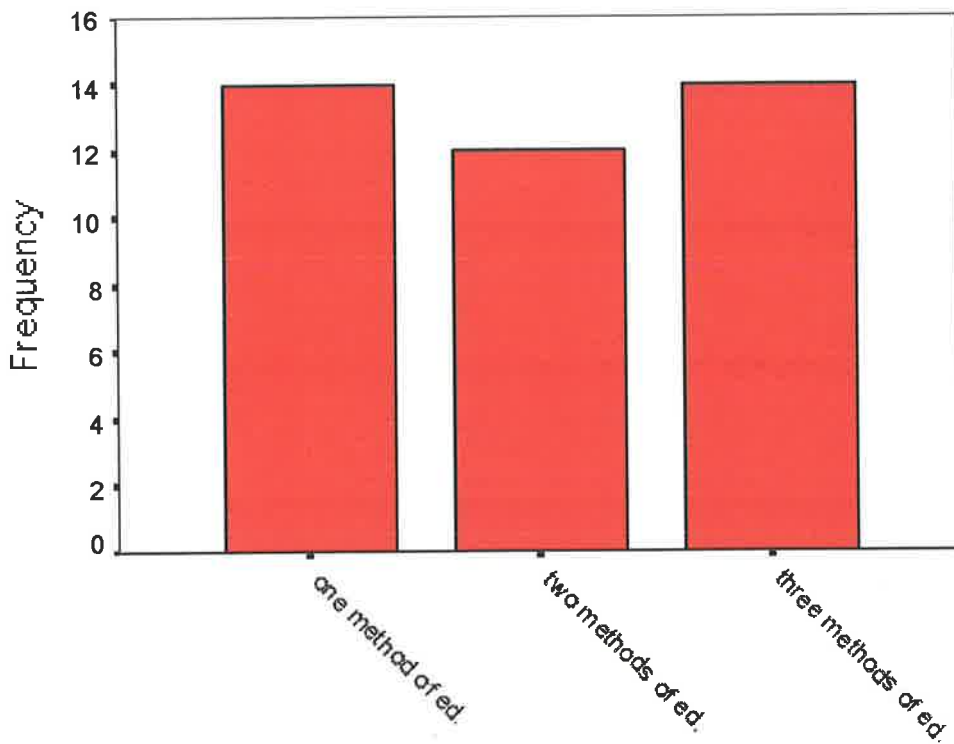
N = 40

Some patients in the study had received more than one method of education prior to their admission. Of the 40 participants who received education 14/40 (35%) received just one

method. There were 12/40 (30%) who were provided with two methods of education and 14/40 (35%) of the participants received three methods of education prior to admission (refer Figure 11).

The following figures outlining the number of methods of education have been termed: 'methods of ed.'

Figure 11: Frequency of total types of education methods provided



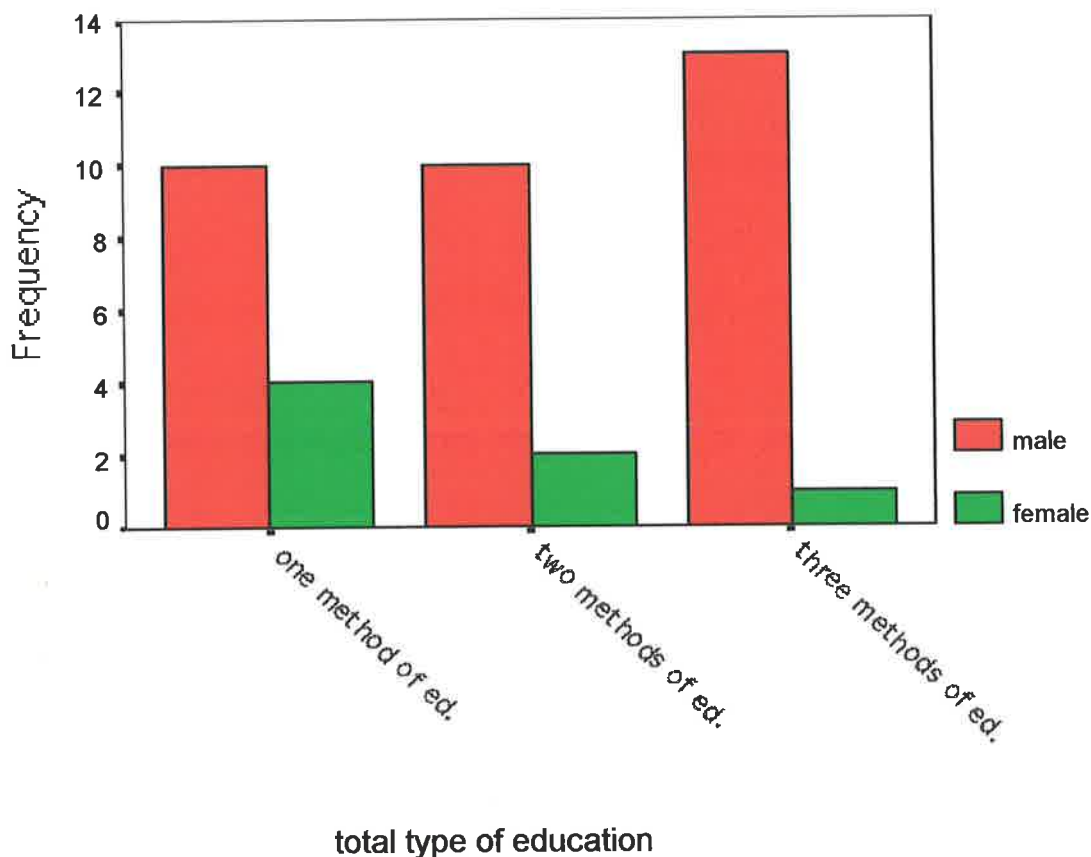
methods of education received

N= 40

Ten (71.4%) males and four (28.4%) females received one method of education. Ten (83%) males and two (16.7%) females were provided with two methods of education and

thirteen (92.9%) males and one (7.1%) female received three methods of education prior to admission (refer Figure 12). The comparison of the number of education methods provided by gender was not statistically significant.

Figure 12: Frequency of males and females total type of education methods provided



N = 40

The 14 participants who received one method of education prior to admission received it in three different formats. One (7.1%) received verbal education by a nurse, two (14%) received verbal education by a doctor and 11 (78.5%) received an information pamphlet. There were 12 participants who received two different methods of education. Of that, two (16.7%) received verbal education by a nurse, six (50.0%) by a Doctor, three (25.0%) were

provided with an information pamphlet and one (8.3%) received a video. Of the 14 participants who received three different education methods, one (7.1%) received education via telephone, nine (64.3%) received verbal education by a nurse and four (28.6%) received verbal education from a doctor prior to admission. Table 3 outlines the various education methods and number of methods male participants received prior to admission.

Table 3. Various education methods male participants received

Gender	Education Method	1 st Method	2nd Method	3rd Method	Total
Male	Education via telephone			1 (7.7%)	1 (3.0%)
Male	Verbal education by a nurse	1 (10.0%)	2 (20.0%)	8 (61.5%)	11 (33.3%)
Male	Verbal education by a Doctor	1 (10.0%)	5 (50.0%)	4 (30.8%)	10 (30.3%)
Male	Information pamphlet	8 (80.0%)	3 (30.0%)		11 (33.3%)
Total		10 (30.3%) (100.0%)	10 (30.3%) 100.0%	13 (39.4%) (100.0%)	33 (100.0%)

N= 33

Table 4 outlines the various education methods and number of methods female participants received prior to admission.

Table 4 Various education methods female participants received

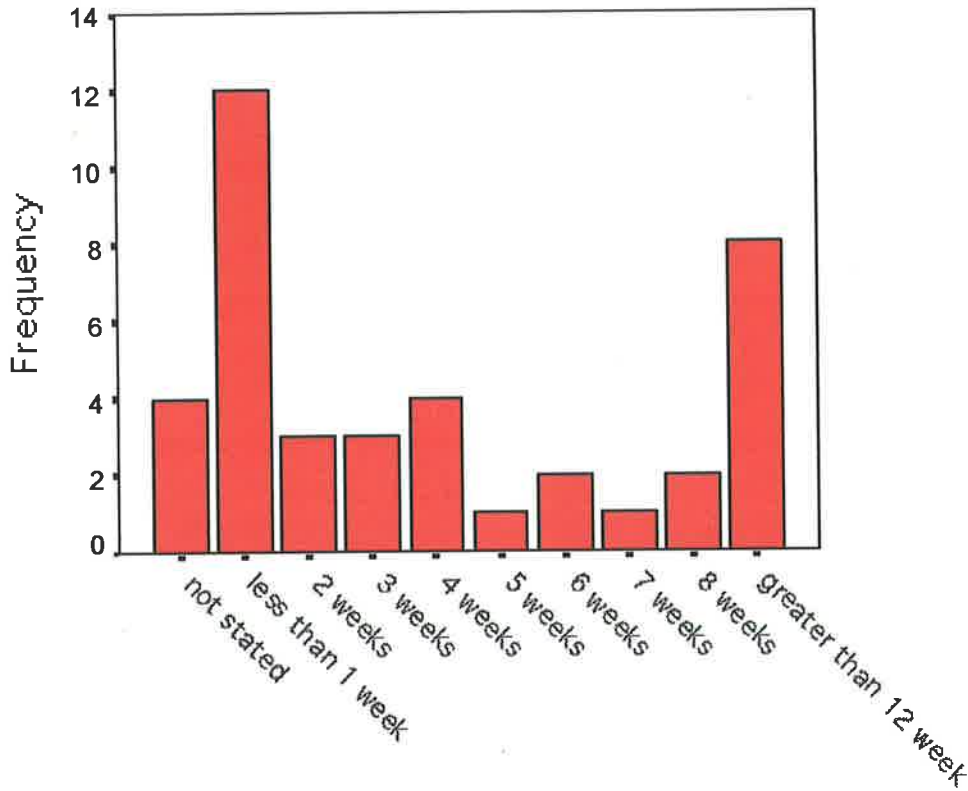
Gender	Education Method	1 st Method	2nd Method	3rd Method	Total
Female	Education via telephone				
Female	Verbal education by a nurse			1 (100.0%)	1 (14.3%)
Female	Verbal education by a Doctor	1 (25.0%)	1 (50.0%)		2 (28.6%)
Female	Information pamphlet	3 (75.0%)			3 (42.9%)
Female	Video		1 (50.0%)		1 (14.3%)
Total		4 (57.1%) (100.0%)	2 (28.6%) (100.0%)	1 (14.3%) (100.0%)	7 (100.0%)

N = 7

Time prior to admission

The participants who received some form of education method did so anywhere from less than a week to greater than 12 weeks prior to admission. 12 (30.0%) of the 40 participants indicated they received the education method(s) less than a week prior to admission; three (7.5%) participants received the education method two weeks prior; three (7.5%) at three weeks; four (10%) at four weeks; one (2.5%) at five weeks; two (5.0%) at six weeks; one (2.5%) at seven weeks; two (5.0%) at eight weeks, and eight (20.0%) at greater than 12 weeks (refer Figure 13). The mean number of days that patients received the education method(s) prior to admission was 48.86 days (SD 69.79) and the median 21 days. There were four (10.0%) participants who received education prior to admission but did not state how long.

Figure 13: Frequency of time education method(s) were received prior to admission



How long prior to admission did you receive information?

N = 36

Mean = 48.86 days

SD = 69.79 days

Median = 21 days

Education received once admitted

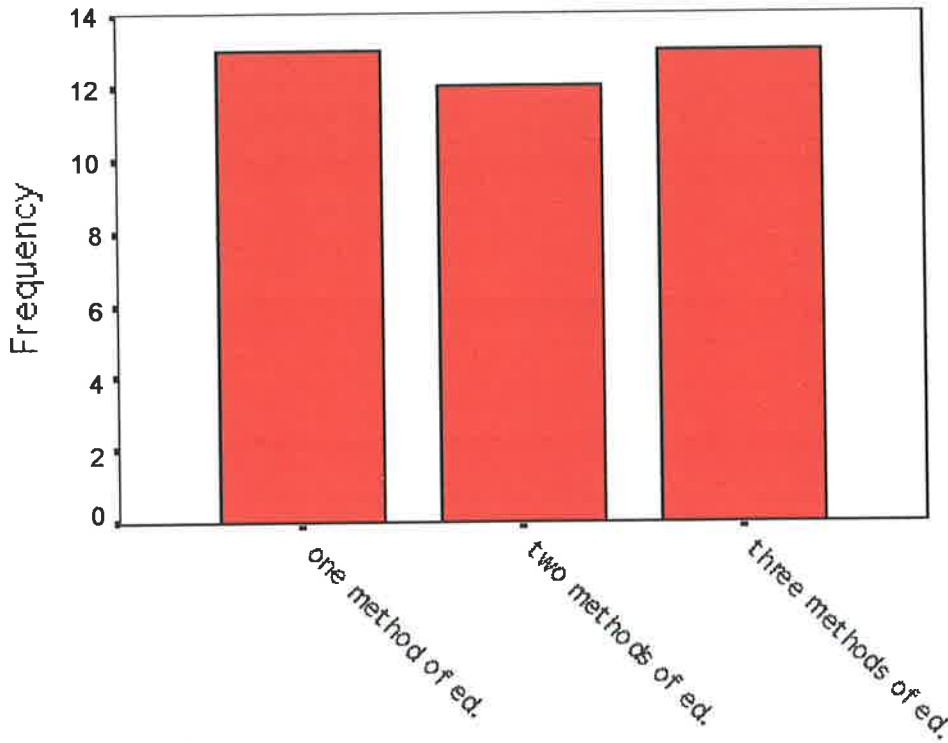
Participants were asked if they received education on admission to the ward prior to their cardiac surgery. Of the 51 participants in the study, 38 (74.5%) received some form of

education on the ward prior to their cardiac surgery and 13 (25.4%) did not. One participant did not receive any education prior to admission or post admission.

There were 28 (73.7%) males and ten (26.3%) females who received some form of education on admission. The 13 participants who did not receive any education once admitted were all males. There was no statistically significant difference between the number of males and females who did or did not receive education once admitted.

Some of the participants received more than one method of education post admission. Of the 38 who received some form of education, 13 (34.2%) received one method of education, 12 (31.6%) received two methods of education and 13 (34.2%) received three methods of education (refer Figure 14). There was no statistically significant difference between the number of participants who received education and the number of methods received on admission.

Figure 14: Frequency of total education methods provided

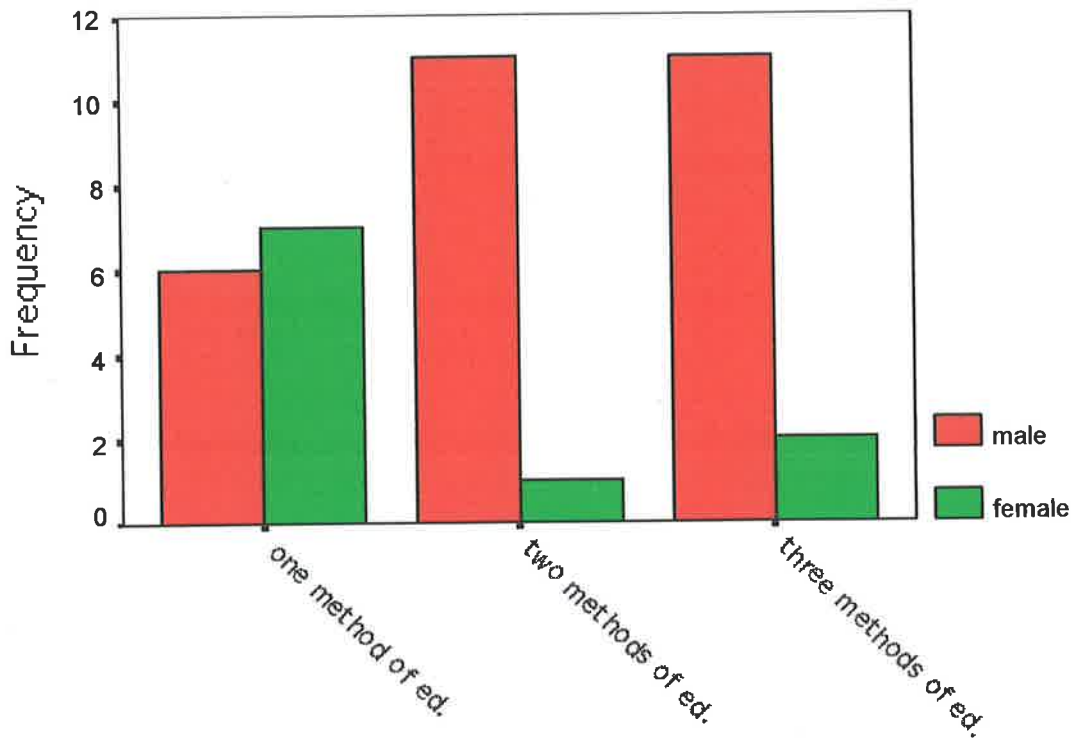


total methods of education received post admission

N= 38

There were six (46.2%) males and seven (53.8%) females who received one method of education once admitted to the ward, 11 (91.7%) males and one (8.3%) female received two methods of education, and 11 (84.6%) males and two (15.4%) females received three various methods of education (refer Figure 15).

Figure 15: Frequency of males and females who received different methods of education



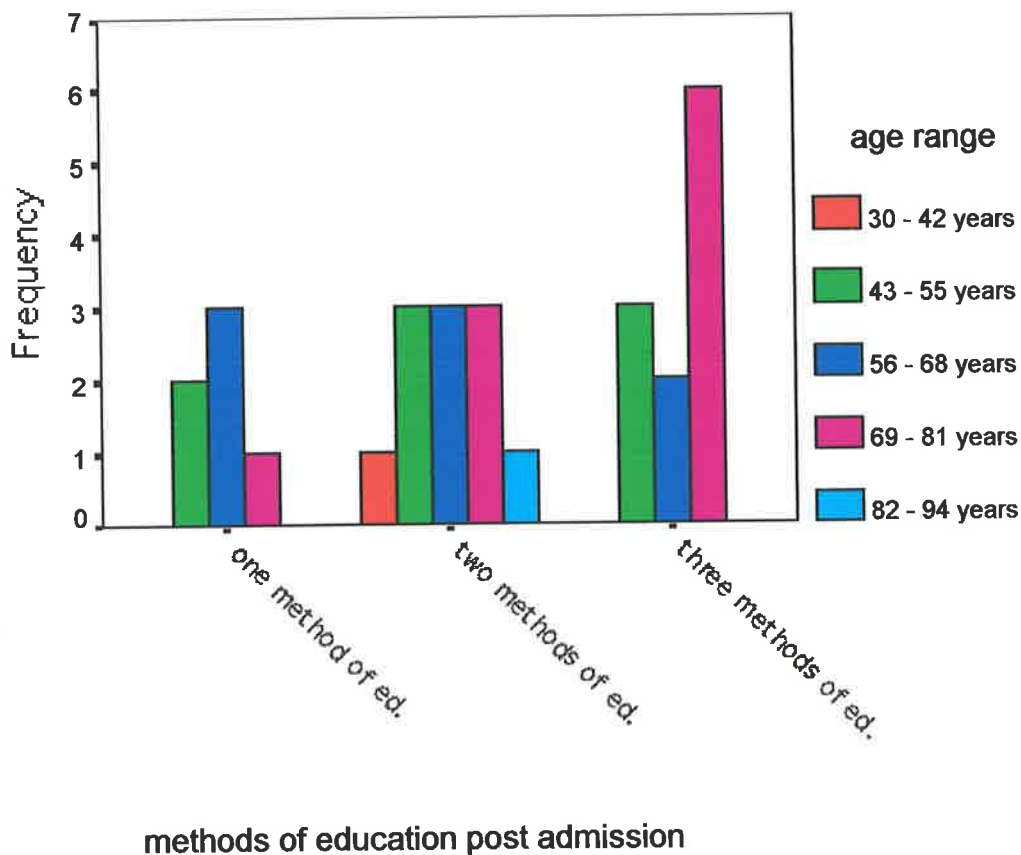
total number of education methods post admission

N = 38

There were two males (33.3%) aged 43-55 years, three males (50%) aged between 56-68 years and one male (16.6%) aged between 69-81 years who received one method of education only (mean 60.17 years $SD \pm 11.02$), totaling six males who received one method of education. Of the 11 males who received two methods of education, one (9.1%) was aged 30-42 years, three (27.3%) were between 43-55 years, three (27.3%) were between 56-68 years, three (27.3%) were between 69-81 years and one (9.1%) was aged between 82-94 years (mean 63.18 years $SD \pm 15.87$). There was a total of 11 males who received three various education methods once admitted of those, three (27.3%) were aged between

43-55 years, two (18.2%) aged between 56-68 years and six (54.5%) were aged between 69-81 years (mean 60.91 years $SD\pm 14.27$). There was no statistically significant difference between groups (refer Figure 16).

Figure 16: Frequency of various methods of education males received and their age ranges

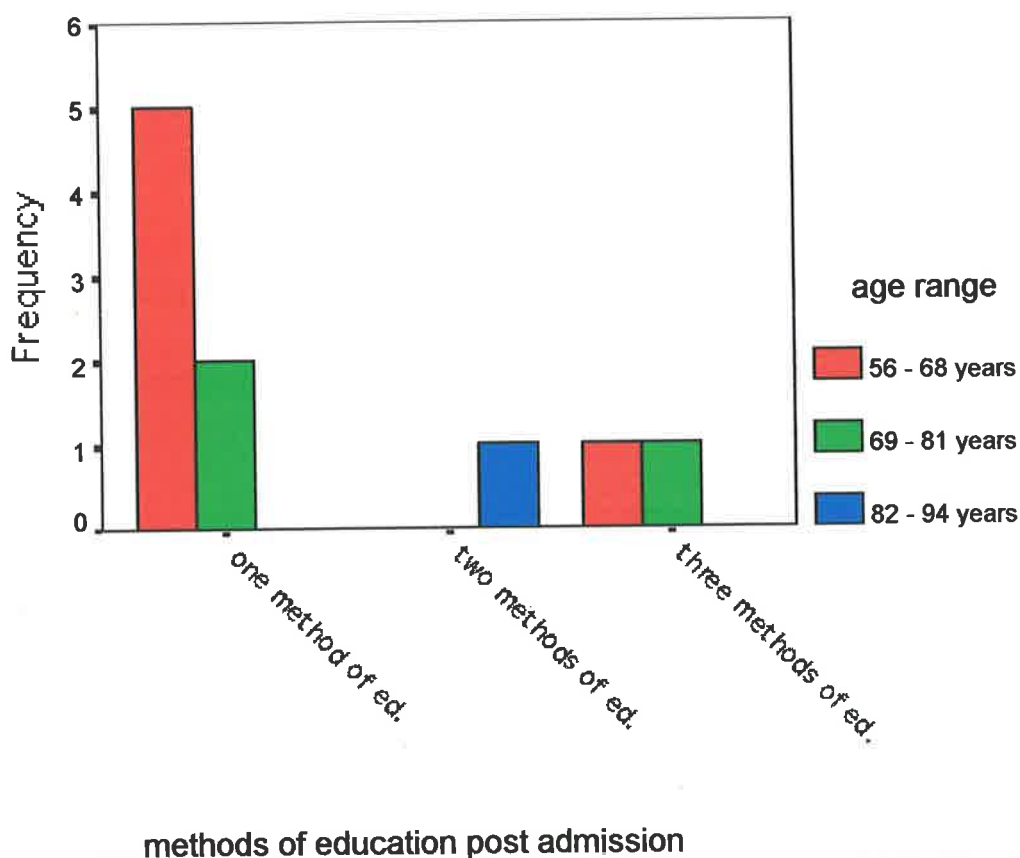


N = 28

Figure 17 outlines the frequency of females who received different education methods in comparison to age. The seven females who received one method of education once admitted were in the following age ranges: five (71.4%) were 56-68 years and two (28.6%) were 69-81 years (mean 66.71 years $SD\pm 8.20$). One female aged 84 years received two

methods of education once admitted and there were two females who received three methods of education, one was aged between 56-68 years and other between 69-81 (mean 64 years $SD\pm 5.66$). There was no statistically significant difference between number of methods provided and age ranges.

Figure 17: Frequency of various methods of education females received and their age ranges



N = 10

A total number of 13 participants who received one method of education had it delivered in four different formats: four (28.6%) received verbal education by a nurse; three (21.4%) received verbal education by a Doctor; four (28.6%) were provided with an information

pamphlet and two (14.3%) received a video once admitted. There were 12 participants who received two methods of education in three different formats. Six (50.0%) received verbal education by a Doctor, one (8.3%) was supplied with an information pamphlet and five (41.6%) were provided with a video. Of the 38 participants who received education on admission, 13 received three different methods which included four (30.8%) being provided with an information pamphlet and nine (69.2%) provided with a video once admitted. Tables 5 and 6 outline the various education methods provided. There was no statistically significant difference between methods provided between males and females. Table 5 outlines the methods of education the male participants received and Table 6 the methods the female participants received.

Table 5. Various education methods male participants received post admission

Gender	Education Method	1 st Method	2nd Method	3rd Method	Total
Male	Verbal education by a nurse	2 (33.3%)			2 (7.1%)
Male	Verbal education by a Doctor	3 (50.0%)	5 (45.5%)		8 (28.6%)
Male	Information pamphlet	1 (16.6%)	1 (9.0%)	3 (27.3%)	5 (17.8%)
Male	Video		5 (45.5%)	8 (72.7%)	13 (46.4%)
Total		6 (21.4%) (100.0%)	11 (39.0%) (100.0%)	11 (39.0%) (100.0%)	28 (100.0%)

N= 28

Table 6. Highlights the various education methods the female participants received post admission.

Table 6 Various education methods female participants received post admission

Gender	Education Method	1 st Method	2nd Method	3rd Method	Total
Female	Verbal education by a nurse	2 (28.6%)			2 (20.0%)
Female	Verbal education by a Doctor		1 (100%)		1 (10.0%)
Female	Information pamphlet	3 (42.9%)		1 (50.0%)	4 (40.0%)
Female	Video	2 (28.6%)		1 (50.0%)	3 (30.0%)
Total		7 (70.0%) (100.0%)	1 (10.0%) (100.0%)	2 (20.0%) (100.0%)	10 (100.0%)

N = 10

Time of education delivery

The participants were asked if they would have preferred to receive the education at another time. The literature on the timing of education delivery is limited with few studies showing improved outcomes with the provision of education to patients prior to admission for their cardiac intervention.³ Of the 40 participants who received education prior to admission, 32 (80%) stated 'no', seven (17.5%) replied 'yes' and one (2.5%) did not complete the question.

Of the 38 participants who received education post admission five (13.2%) would have preferred the education at another time. There were 33 (86.8%) who answered 'no' they would not have preferred the education at any other time and were satisfied with receiving it post admission.

Has the education received assisted recovery?

The participants were asked if they thought the education they received had assisted their recovery. It is relevant to health care providers supplying education to patients prior to their cardiac surgery to have an understanding and knowledge about whether the patient feels the information provided is of some benefit. There were 31 (77.5%) of the 40 participants who received education prior to admission who believed the education they received assisted their recovery. Nine (22.5%) however, answered 'no', they did not think the education they received assisted their recovery (the responses will be discussed further in Stage 2 of the report).

There was a similar outcome with the 38 participants who received education once admitted. Of those, 29 (76.3%) believed the education they received assisted their recovery and there were nine (23.7%) who answered 'no' they did not think the education they received assisted their recovery (the responses will be discussed further in Stage 2 of the report).

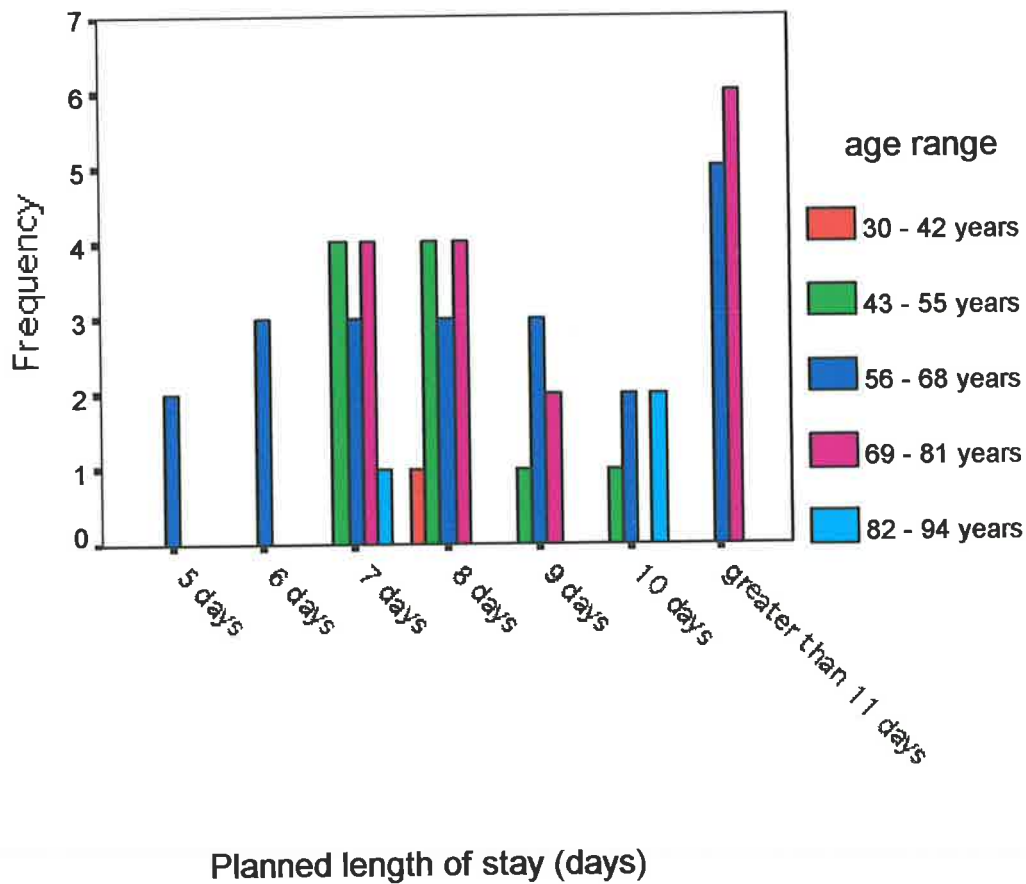
There was a total of 28 participants who received a combination of education prior to admission and post admission, of those 22 (78.6%) answered 'yes' and six (21.4%) answered 'no' they did not think the education they received assisted their recovery. These responses will be explored further in the thematic analysis (Stage 2) of the report.

Length of stay (days)

Planned length of stay and actual length of stay were recorded in an attempt to identify any relationships between the education provided and length of stay. Figure 20 outlines the planned length of stay the participants had anticipated and compared this to their age range. Although the emphasis post cardiac surgery is to achieve a high standard of quality outcomes with a reduced length of stay, many participants had planned to stay greater than

seven days as indicated in Figure 18. It was also evident that the more senior age range had planned to stay longer. This may have resulted from medical advice or their postoperative recovery pathway. The mean numbers of days participants planned to stay was 9.63 days (SD 5.23). There was no statistically significant relationship between planned length of stay and age range.

Figure 18: Frequency of participants planned length of stay by age range



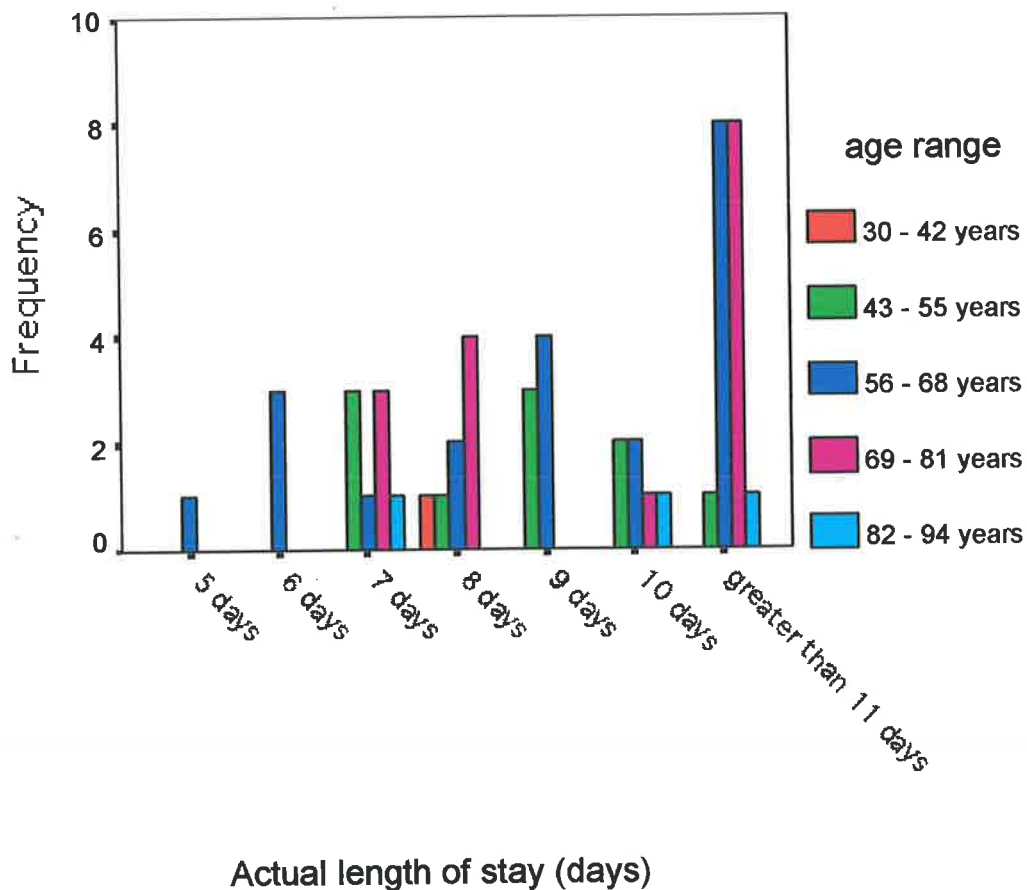
Mean = 9.63 days

SD = 5.25 days

The actual length of stay outlined in Figure 21 shows that few of the participants stayed less than seven days and greater than 90% stayed more than seven days, the mean length of

stay was 12.98 days (SD 17.63) with participants in the 56-81 age group staying the longest. The unit promotes discharge post cardiac surgery within five to six days however many patients from this study stayed longer. Only four participants stayed six or less days (refer Figure 19). This increased length of stay may be reflective of the age of the participants, the extent of the individual's surgical requirements, any postoperative complications and the growing trend of increased co-morbidity rates that cardiac surgery patients now have.^{57,58}

Figure 19: Frequency of actual length of stay

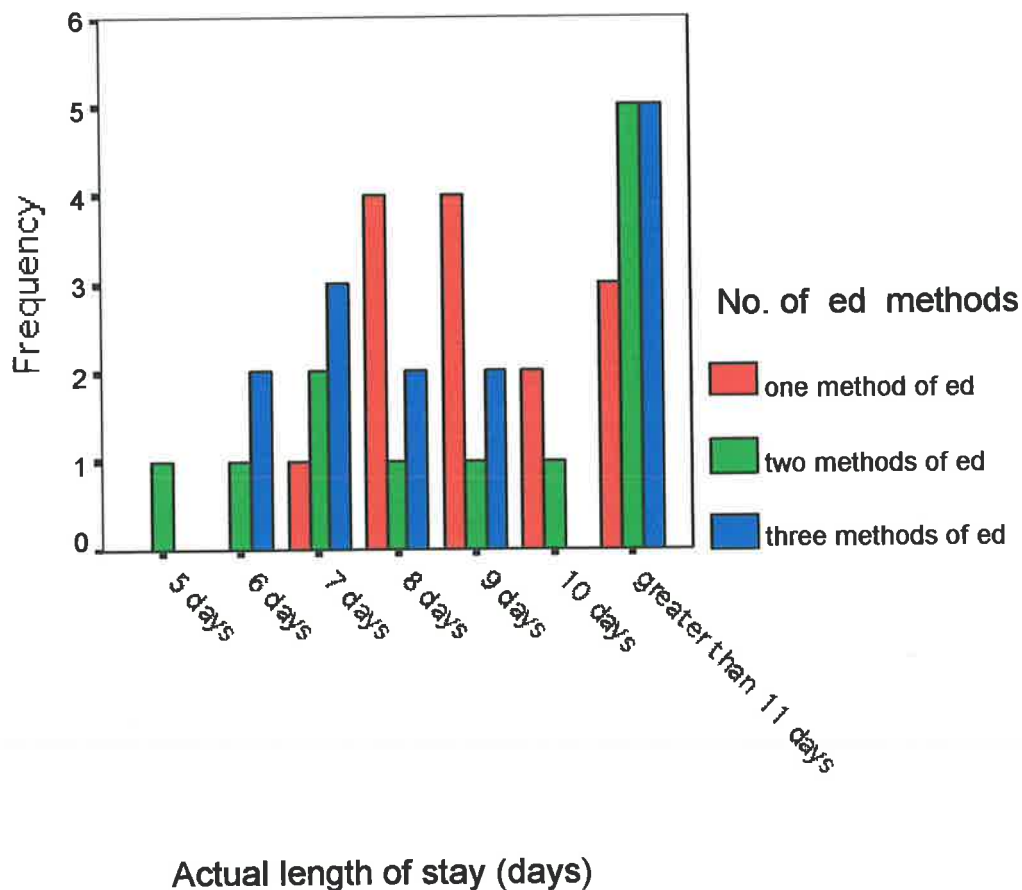


Mean = 12.98 days

SD = 17.63 days

A further inquiry in this research considered whether there was an association between the number of education methods received and participants' length of stay. Figure 20 shows the number of education methods participants received prior to admission and the actual length of stay. There was no statistical significance suggesting that for these subjects the number of education methods provided prior to admission was not associated with actual length of stay.

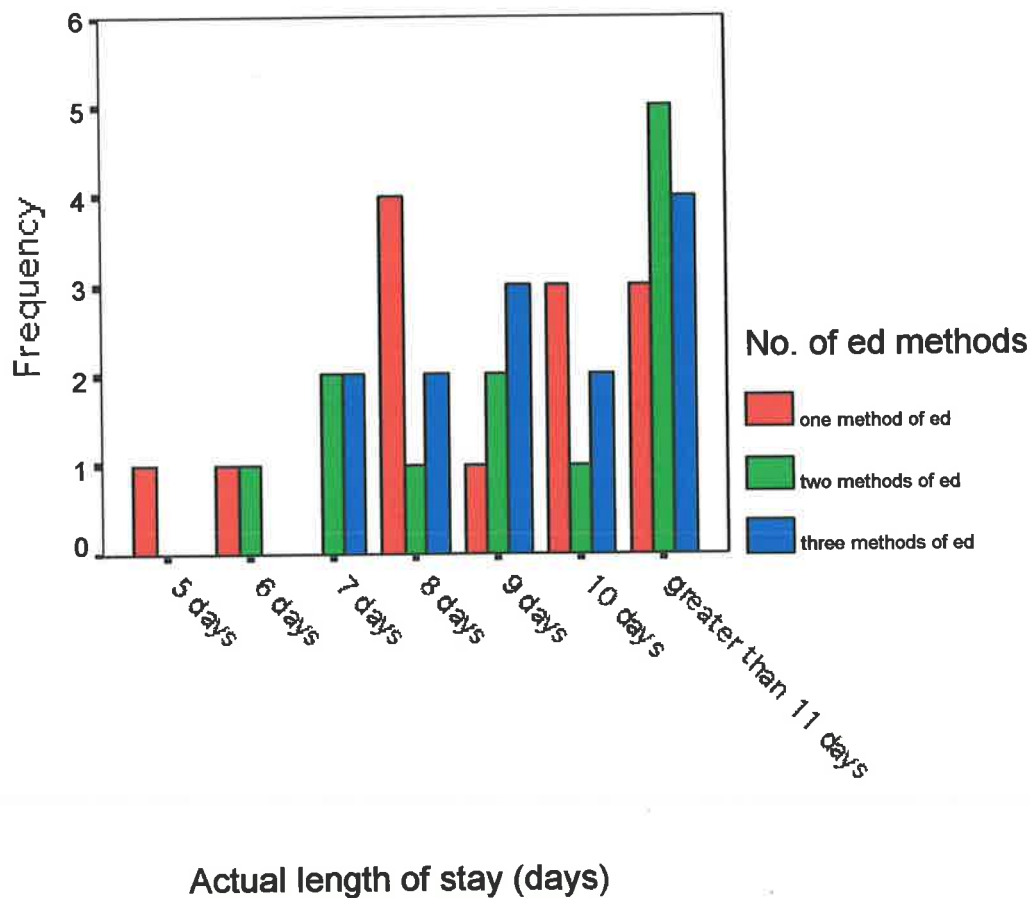
Figure 20: Frequency of education methods provided prior to admission in comparison to actual length of stay.



N = 40

There were 38 people who received some form of education post admission (prior to cardiac surgery). Figure 21 shows the actual length of stay compared to the number of methods received post admission. There was no statistically significant association between the number of education methods received post admission and prior to cardiac surgery and actual length of stay.

Figure 21: Frequency of education methods provided post admission in comparison to actual length of stay.



N = 38

Summary of the Findings

This section of the study analysis examined the quantitative data from the questionnaire that related to demographic details provided, level of education, time of educational delivery, type of education methods provided, preferred timing of education delivery and if the participants believed the education provided had assisted their recovery.

The quantitative data indicated that the patient population, which was sourced as a convenience sample, was comparable for many characteristics to the Australian Institute of Health and Welfare and National Heart Foundation of Australia's most recent report on cardiac surgery.⁵⁶ The mean age of the participants in the study was 63.9 years (SD 12.55) and the ratio of males to females was 4:1 respectively.

There were 21 participants who had completed high school and five had tertiary education. There was no statistically significant difference in the number who had completed high school and tertiary education to those who had not. The level of education was not associated with anticipated or actual length of stay.

There were 40/51 (78.4%) participants who received education prior to admission (mean 48.86 (SD 69.79) days and the median was 21 days prior to admission). The most frequently provided education method participants received prior to admission was the information pamphlet. Other popular methods provided were education by a nurse and the doctor. Once admitted, the most frequent education method the 38/51 (74.5%) participants who received education were provided with was the video and then an equal provision of the information pamphlet and education from the doctor. Education provided by a nurse occurs more frequently prior to admission than post admission but this was not a statistically significant difference. There was also no statistically significant difference in the age groups and gender of the participants who received the various education methods. It was noted that the more senior in age the participants were, the less information they

received. The group aged between 56-68 years received the most education prior to their cardiac surgery.

The quantitative data showed that 80% of participants who received education prior to admission were satisfied with the timing of the education delivery and 17.5% would have preferred the education to be delivered at another time. There was 2.5% of patients who did not respond to the question which is representative of the one patient who did not receive any education prior to or post admission.

When the patients were asked to consider if they thought that the education they had received had assisted their recovery, approximately 77% of the total number of participants who received education prior to admission and/or post admission believed the education they received did assist their recovery. These results will be discussed further in the thematic analysis.

The quantitative data acquired provides an outline of participants demographics, the degree and type of education provided, the most commonly provided method of education, the timing of that education delivery, patients' views on the timing of the education delivery, and if they thought the education assisted their recovery. These results provide the foundation for the next stage of data analysis in which a thematic analysis of the qualitative data is presented. It was anticipated that the thematic analysis would provide further meaning and highlight patients' preferred method(s) and times to receive education.

Stage 2

Thematic analysis of the data

This stage of the study is situated in the interpretive paradigm. The interpretive paradigm has an emphasis on the relationship between socially provoked concept formation and language. It is characterised by a belief in a socially constructed, subjectively based reality, one that is influenced by culture and history.⁵⁹ It also retains the ideals of researcher objectivity, and researcher as passive collector and interpreter of data. It is not within the scope of this portfolio to discuss the theoretical underpinning of the interpretive paradigm in detail, however the technique of thematic analysis is discussed.

The narrative data from each questionnaire was transcribed verbatim. Each document then represented the information from one question. The transcripts were read and re-read in order for the researcher to become familiar with the responses from the participants. Each response from the participant was numbered so that reference could be made, when required during the writing of this report.

Thematic analysis was used to analyse the individual text responses from questions eliciting emergent ideas and concepts. By bringing the raw data together components or fragments of ideas or experiences can emerge which are often meaningless if viewed alone, and from this process patterns and themes develop.⁶⁰ The process of data analysis was guided by the work of Leininger, Ekman and Segesten and this involved four distinct phases:^{60,61}

1. The entire material gathered was studied to give a sense of the whole picture.
2. Themes within the data were identified.
3. Recurrent patterns were identified.
4. Themes that summarised the research findings were identified.

During this process it was necessary to review the questionnaire responses many times to develop an insight and confirm developing ideas. Recurrent responses emerged and formed the basis of the themes that comprised participant perceptions of the education method provided and time of delivery. In the following pages the technique of thematic analysis is shown and the themes that developed from the data are discussed. Narratives from the raw data illustrate the themes. When quoting from the questionnaire responses, italics are used and an identifying code is utilised throughout the report. The surveys were numbered to maintain anonymity (the same code value used in Stage 1 of the report was utilised) and then the number of each question was used. The objective of the coding process was to provide a unique code for each survey. This code was used to refer to the actual questionnaire when required. The corresponding number of the survey question was used to itemise the precise response from the numbered questionnaire. This process meant that the survey had a coded number and each response was given the relevant number from the question. For example, participant three's response to question five would be numbered 5:3.

Once all of the responses were coded, thematic analysis could begin and themes developed.

Major themes from the interview data

During the thematic analysis key concepts emerged from the data, leading to the development of sub-themes which provided varying avenues of exploration and when considered together, fitted within a theme. The six major themes that emerged were — *knew what to expect, family focus, personal attitude, was it enough, education methods, and timing*. Each theme will be discussed and the development of the themes outlined.

Theme 1: Knew what to expect

From key concepts, sub-themes and eventually the theme 'knew what to expect' developed which highlighted how patients felt that education assisted in clarification of the admission, surgical and recovery process. As we know, fear of the unknown can conjure up many issues for people and can exaggerate misconceptions.⁵⁸ Because some patients are aware of their pending surgery several weeks before it can be performed, they have time to dwell on their fears and the unknown. Through the provision of education prior to surgery the fear of the unknown could be minimised and knowledge of the procedure gained. From the data, key concepts and then sub-themes emerged which were *knowledge*, *reassurance* and *the fear of the unknown*, and from these sub-themes the theme *knew what to expect* evolved. The table below demonstrates how key phrases developed into key concepts, then into sub-themes and the major theme — *knew what to expect* (refer Table 7).

Table 7: Theme 1 — Knew what to expect

Key Phrases	Key concept	Sub-theme	Theme
<i>Helped with basic understanding (5.29) It let me know what to expect and when (7.11). Made me more aware of ways to reduce pain and gave me a realistic expectation of the recovery process (7.18).</i>	Having the education provided mapped out the hospitalization process and provided an insight into the routine	Knowledge	Knew what to expect
<i>Knowing there was a blue day helped, because I had some blue days and it was O.K. (7.12).</i>	The information was affirming and provided the participants reassurance about the hospitalisation and surgery.	Reassurance	
<i>It helps to know what will go on (7.33). Helped to overcome the worry of the unknown (7.20). Gave me peace of mind, knew what was going to happen (7.25).</i>	It was comforting to some patients to know what was going to happen and helped to overcome any doubts	Reduce the fear of the unknown	

Knowledge

The sub-theme *knowledge* signified that the provision of some form of education prior to cardiac surgery allowed participants to become empowered. It could be assumed that the adequacy of a participant’s understanding depends on the knowledge that is made available to them. The data extracted reiterated the value of the provision of education prior to cardiac surgery for many participants to assist them in gaining knowledge.

When the participants were asked if they thought ‘the education they had received had assisted their recovery?’, many reiterated that knowing what to expect next was reassuring and helped to overcome any concern because it provided them with a level of knowledge and understanding.

The notion of improving knowledge related to pending cardiac surgery and hospitalisation through the provision of education prior to surgery (and in particular prior to admission) has been previously identified in the literature.^{1,32} In order for patients to make choices and participate in their own management it is vital that they are provided with the relevant information at a time when they can adequately learn and absorb the details.

Reassurance

The provision of education to participants prior to cardiac surgery was considered reassuring because it could affirm in their minds some of the challenges they may face post surgery. Patients also felt reassured in knowing that certain aspects were all part of the recovery process.

This sense of reassurance may have alleviated any conflicting information participants had been exposed to in this era of multi-media. Perhaps the education process provided them with an opportunity which allowed them to work through the areas of most concern to them, such as the hospitalisation routine, the actual procedure or the requirements of them post surgery. It could be concluded that patients should be availed to educational information prior to surgery in order to allow them a chance to work through any concerns, issues or myths they may have about the process. It is of interest that others who did not receive education worked through their concerns and sought reassurance from other avenues, which were not identified in this study.

Fear of the unknown

The provision of education seemed to reduce the fear of the unknown for many. This sub theme contributed to the overall theme of *knew what to expect*. By reducing the fear of the unknown patients knew what to expect and in some part that provided many with a sense of orientation and direction.

It is a fundamental belief that people are apprehensive and perhaps resistant to embrace changes when there is limited insight into what that involves or how they will benefit. Therefore it is important that health care providers facilitate understanding and knowledge acquisition of the unknown.

Reducing the worry of the unknown gave participants an opportunity to prepare themselves for the pending surgery. The provision of an education method either pre or post admission appeared to outline a pathway of the hospital admission, the surgical intervention and routine for the participants, providing patients with an insight and sense of understanding.

The aim of each education method was to ease patients' anxieties and decrease their fears regarding the anticipated cardiac surgery and its postoperative sequelae. Some of the comments made appeared to reiterate this concept and restate the sub- theme.

When the participants were asked, 'in what way do you think this information was beneficial?' some of the participants responded with the following comments:

Helped in various ways but mainly what to expect (5.14).

Reduced fears re:op (5.18).

Allowed me to see how others have coped with pain and stress (5.18).

Many participants simply responded to this question by stating, 'knew what to expect' (5.10,5.16,5.2 & 5.34). Through the provision of the education some patients could clarify areas of less certainty and ask questions, which helped them to know what was going to happen next. For others, knowing what to expect put them in the picture and reduced that fear of the unknown.

To know what was going to happen next (5.22).

Explain what happened put you in the picture (5.23).

Laid out the basics (5.25).

For some the education appeared to help them prepare for the pending surgery because they knew what to expect and therefore they knew what was planned next for them.

Prepared me and I knew what to expect. In the book it was straightforward (5.26).

Informing patients prior to their cardiac surgery can be an opportunity to provide accurate informative education about the surgical intervention and planned progress of the individual's admission. From the data it would appear that these participants responded positively to receiving some form of education and benefited by highlighting that they *knew what to expect*. As nurses we should never lose touch with the notion that the environment, routine and everyday rituals that we are accustomed to are very foreign to others who may have to be exposed to this, and in doing so become very vulnerable because of their surgical requirements. Therefore efforts should always be made to meet this knowledge gap, to reassure people and reduce the fear of the unknown.

Theme 2: Family focus

It became evident from key concepts that for many participants the involvement of family in the admission and recovery process was an essential component of their journey and they indicated appreciation of that level of involvement. The involvement of family in the learning process appeared to bring support and comfort to many of the participants. Having the knowledge that a family member or partner was receiving the same education was beneficial for some participants because they indicated that they felt reassured that their family or partner also knew what to expect and would have an understanding of what the patient was going to experience. There is documented evidence supporting spousal involvement throughout hospitalisation with beneficial outcomes for cardiac surgical patients' recovery and therefore it should be considered when providing education.⁶² This study also identified the importance of the family network. The sub-themes that were identified from the key concepts were *comforting to the patient* and *orientation for the*

family was important to both the patient and family member. From these sub-themes the theme family focus became apparent.

Table 8 demonstrates how key phrases developed into key concepts, sub-themes and the major theme — *family focus*.

Table 8: Theme 2 —Family focus

Key phrases	Key concepts	Sub-themes	Theme
<i>Had wife there, helpful for her to know about the mood swings, helped to understand also to know what to expect. Knowing about being emotional over nothing (5.9). Very relaxing and easy to understand and the family mattered (5.30).</i>	Involving the family helped them to understand the process and it was reassuring to the patient that the family was an integral component whilst on the ward.	Comforting to the patient	Family focus
<i>For the family – helped wife to understand could keep looking at the booklet (5.7). Reassuring, knowledgeable. Helped partner a lot (5.46). The video the day before was good and helpful to wife also (6.a.4)</i>	For some patients ensuring the family had knowledge of the surgery meant they didn't have to explain any mood swings, because they were aware of the emotional changes that may occur.	Orientation for the family was important to both the patient and family member	

Comforting to the patient

The one aspect that is familiar to a patient when admitted to hospital is their support person. For many, having someone there that they could share their fears and frustrations with seemed to be a comforting consideration. Previous research has shown that including family members in the patient's pre-operative education is important.⁶³ Therefore involving that person in the education process became a positive aspect for some participants in this study who made reference to family support. Some participants identified the value of a family member knowing what they were going to go through. They saw this as helpful because the family member would perhaps be able to identify and deal with more readily any mood swings and possibly the emotions the participant would experience.

The patients felt reassured by the fact that staff members recognised family as being an important part of the process. To an extent, it was also comforting to know that family would also be informed of the admission process. The knowledge of the family involvement and their acceptance in the hospitalisation process by all health care professionals may have helped alleviate any concerns patients may have had about the role of their family.

Orientation for the family was important to both the patient and family member

Participants felt that a collaborative learning approach helped to facilitate better knowledge retention by sharing the experience with a spouse/partner.

For the family – helped wife to understand could keep looking at the booklet (5.7).

The sharing of information with the family and the participant may be more beneficial pre-operatively and even perhaps pre-admission, because they can discuss the future surgery

and recovery. Studies have identified and reinforced this notion as a positive time to involve the family because patients are more open/frank in their discussion with their family members about the surgery before admission.^{29,64} Efforts should always be made when possible to involve the family and/or support network.

The theme *family focus* should not be undervalued when developing education programs and strategies in the cardio-thoracic unit. However, it should also be considered that although this study identified the value patients place on family involvement, those that do not have a supportive network should not be overlooked. For some participants in this study the involvement of the family and support networks were not as important as the individual's own attitude toward maintaining positive outcomes.

Theme 3: Personal attitude

The knowledge of the approaching surgery affected each participant differently. Some participants indicated that their personal attitude assisted them to deal with the experience. This extensive, personally invasive surgical procedure brings expectations, and each individual has ideals and life experiences they bring with them which impact on their emotions and ability to deal with the pending surgery and post-operative recovery. Although many of these participants had received some form of education they put forward the notion that it came down to the power of the mind and personal spirit. Perhaps these individuals had taken further ownership of their level of knowledge and learning requirements, relying on their life experiences and optimism to challenge any hurdles they faced. The theme 'personal attitude' incorporated the following sub-themes: *the power of the mind* to contribute to a positive experience and the belief that *recovery is individual*.

Table 9 demonstrates how key phrases developed into key concepts, sub-themes and the major theme — *personal attitude*.

Table 9: Theme 3 — Personal attitude

Key Phrases	Key concepts	Sub-themes	Theme
<i>Personally motivated (7.4)</i> <i>It was the power of the mind (7.28)</i> <i>Mental status helps your recovery (7.37)</i> <i>Don't think reading about it helps as much as the positive attitude (7.36).</i>	Having a positive attitude and strong personal belief contributed to a good recovery.	The power of the mind	Personal attitude
<i>I think it comes down to your own strength (7.35)</i> <i>Recovery is individual; everyone is different (7.31)</i>	Everyone recovers differently and the process is very individual	Recovery is individual	

The power of the mind

The power of the mind emerged as a sub-theme from the key concepts illustrating the optimism of some participants and the personal responsibility some individuals had for their own future. Some participants believed that it wasn't so much the education they had received but rather the individual's positive mental status that helped their recovery. Some believed that a good recovery was based on a strong personal belief. For some they believed the power of the mind played an integral part in determining positive outcomes.

Recovery is individual

For some participants who were motivated by their own personal attitude, which may also be their usual coping mechanism in life, there was a preference to remain focused on the goal rather than receiving additional education. Feeling positive and believing in oneself may have given these individuals a sense of control — an idea which is supported in a study completed by Goodman.⁶⁵ Because some participants believed that recovery was an individual journey, they may have thought that the education would not be suited to them personally and therefore it was not as essential.

The power of the mind helped to direct the recovery path for some. Believing in themselves was enough and the education provided was not considered the major contributor to their recovery, they were.

Theme 4: Was it enough?

People gain and retain knowledge through many different sources such as visual transmission of information and information pamphlets. Therefore, providing the most suitable medium to transfer information to suit the individual should be constructed whenever possible. The participants in this study highlighted this concept through their preference for receiving particular methods of education and their noted appeal to certain types of educational mediums.

It became apparent that, due to differences in individual learning requirements, patients might not be receiving education, which utilizes methods appropriate to their specific needs. From key concepts the following sub-themes emerged: the education method provided *was adequate* whereas for others who wanted more, *it wasn't adequate*. The theme *was it enough* emanated from the sub-themes.

Table 10 demonstrates how key phrases developed into key concepts, sub-themes and the major theme — *was it enough?*

Table 10: Theme 4 — Was it enough?

Key phrases	Key concepts	Sub-themes	Theme
<i>Most of it was good (8.36)</i> <i>Seemed O.K. (8.39)</i> <i>Perhaps (8.33)</i> <i>Happy with what I received, perhaps the medical staff could have explained a bit more! (8.7)</i>	Where is that balance between too little education and too much? For some patients what they received was enough	It was adequate	Was it enough?
<i>Medical interns could have explained a bit more (8.38)</i>	For others they wanted more	It wasn't adequate	

It was adequate

The participants were asked if they thought ‘the education they received could have been improved in anyway?’ Although many participants responded favourably to the question, some participants were non-committal in their response; which left the researcher with the sub-theme of ‘*it was adequate*’.

Although many participants received some form of education prior to admission and post admission, perhaps the information and how it influenced their recovery was difficult to recall.

While participants did receive education pending surgery, the way in which the surgery was going to directly affect them may have distracted their thoughts. The provision of single education sessions, written material and/or video as a once off education method may not have been sufficient for some people to retain details. Research has indicated that repeated education sessions may be more effective in assisting patients to remember information about their condition.⁶⁶ Some responses from participants when asked if they thought the education had assisted their recovery were:

I remembered to do the exercises and coughing (7.2).
Yes, fair indication during video explained procedures and discharge planning (7.1).
Any assistance in overcoming anxiety associated with surgery has to be beneficial (7.6).
The more you know the more helpful it has been (7.15).

Other responses identified particular education delivery methods highlighting this theme further such as:

Happy with what I received, perhaps the medical staff could have explained a bit more! (8.7).
The booklet was good because we had time to read through the information at own pace (7.9).

There were favourable responses that highlighted that it was enough such as:

Happy with what was received (8.26).
It was enough (8.22).
Think it was adequate (8.16).
Thought it was enough (8.49).

Although some participants stated the education provided was adequate it was not unanimous. Therefore, health care providers and clinicians directly responsible for delivering care should be mindful of this and strive to meet the needs of patients by offering various education mediums through consultation with the patient.

It wasn't adequate

The responses highlight the personal nature and interpretation individuals had with regard to the education provided. Although some participants mentioned it was adequate, for others it wasn't and they stated they would have preferred more information. Research has demonstrated that people learn more and are more motivated to learn if taught in the way they prefer.^{62,67} Perhaps for some the method of education delivery was not appropriate

and hindered their learning experience. Some participants' responses linked to this concept were:

The video would have been good to think about (6.a.19).

Would have been better to watch a video with a qualified person to explain through (8.20).

Different techniques could have been explained more (8.37).

All health care providers should consider the importance of patient learning preferences when planning teaching activities. For some people the information they did receive wasn't enough and stated the following:

Medical interns could have explained a bit more (8.38).

It did not prepare me for immediate recovery (7.49).

Many patients received information from the intern or registrar whilst an in-patient on the ward and perhaps the experience and time permitted by these individuals to discuss details regarding the surgery and hospital admission was inadequate. This is not to say that the relevant medical practitioner did not have the knowledge required to inform the patient but rather lacked the insight of the educational needs of the individual. For some patients they had expressed a desire to obtain more information from the surgeon and again this outcome reiterates the importance of good communication and the recognition of individuals needs from all levels. This theme has highlighted that health care professionals should be aware of individuals preferred learning styles rather than just the quantity or quality of educational methods provided. Recognising that individuals learn and acquire knowledge at their own pace should underpin patient education programs.

Theme 5: Education methods

The significance of the particular '*education methods*' emerged as a theme from the sub-themes which were: *education by nurse* which related to the education provided by a nurse on the ward and the designated cardiac nurse educator; the *education by a doctor* which

also related to the education provided by a doctor on the ward; *information pamphlets* associated with the literature that was provided and *video* which was also provided as an education method. Because some participants described the education method so specifically it seemed appropriate to group them individually under the one theme.

The table below demonstrates how key phrases developed into key concepts, sub-themes and the major theme — *education methods* (refer Table 11).

Table 11: Theme 5 — Education methods

Key phrases	Key concepts	Sub-themes	Theme
<i>The nurse was exceptional (5.51). The nurses were first class (5.26). Didn't understand the surgeon's explanation. The nurse clarified what I was going into (5.47).</i>	Individual education by the nurse was appreciated	Education by a Nurse	Education methods
<i>Doctors were brief (5.19) Doctors could have explained more information about the procedure (5.38) Doctors, perhaps the technique of the operation (8.23)</i>	Doctors were brief	Education by a Doctor	
<i>Read coloured pamphlet and combination of the video and pamphlet was well rounded and it showed someone surviving the whole process (5.12). Pamphlet good because you can keep going back to it (5.38). Pamphlet in your own time (5.50). Booklet would have been better to have more diagrams less jargon. Thought it should have been phrased more for the lay-man (5.19)</i>	Pamphlet in your own time	Information pamphlet	
<i>Video – thought it explained what you needed to know without the gore (5.4). Video helped to understand (5.19). Video came into room – watched it twice, thorough (5.50)</i>	Video helped to understand procedure.	Video	

Education by a nurse

The sub-theme *education by a nurse* incorporated the responses people made with regard to the education provided by nurses prior to the cardiac surgery. Retrospectively there is no way of being able to detail the exact content of the education the nurses on the ward provided, only to make assumptions from key phrases. However, what did become apparent was that some participants found the provision of education by a nurse to be beneficial for them.

Research has indicated that patients taught by postgraduate nurses, in particular master's prepared nurses, have higher knowledge scores at the time of discharge compared to those taught by nurses with less qualifications.⁶⁸ This is not to say that the results of that research are transferable to every clinical scenario. However, the level of knowledge the clinician has in this specialty area and personal confidence to relay important information affects the details the patient receives from that clinician. In this particular cardio-thoracic unit there is also a cardiac rehabilitation nurse who may or may not have visited the patient prior to surgery. Cupples indicates that the time between admission and surgery would also play an important role in the success of the pre-operative teaching by the nurse.¹

The participants were asked to outline 'in what way they thought the information they received was beneficial?' For one participant the education that the nurse provided was useful and assisted in their understanding of the cardiac procedure:

Didn't understand the surgeon's explanation. The nurse clarified what I was going into (5.47).

For other participants the information provided by the cardiac nurse educator lacked specificity, not fulfilling their requirements. Not every participant was receptive to the group work provided by the cardiac unit's designated cardiac nurse educator and this may reflect the individual learning requirements of those participants.

One of the participants' responses related to the question: 'do you think the education you received could have been improved in any way?'

Pretty right. Communication with the nurses in the ward was good (8.12).

Due to workload demands and reduced pre-procedure lengths of stay it is vital that nurses streamline the education they provide by determining what is important to the patient in order to meet the patient's needs. Perhaps this can be achieved by early identification of patient's perceptions of their learning abilities. It would seem that for some participants in the study the nurses met their education requirements and dealt with issues at an individual level. However, providing patient specific education is a continuous challenge and one that nurses should strive for.

Education by a doctor

Many responses related to the education received specifically from doctors. It seemed appropriate to group these responses into the sub-theme 'education by a doctor' under the main theme of 'education method' to highlight the participants' responses to the education they received from the medical staff. The literature supports the concept that many patients require reassurance from medical staff, it also highlights that patients want not just reassurance but also explanations about the surgery.⁶⁵ This became evident from some of the participant's responses. When the participants were asked, 'in what way did you think this information was beneficial?' the following responses emerged in relation to medical staff:

He [doctor] explained everything to me about the procedure, which helped the recovery, knew what was coming next (5.14).

Traditionally participants may have been accustomed to gleaning detailed information from medical staff when they have had surgery. However, due to increased time constraints and work-load commitments of medical staff, they may not have been able to provide the level of attention patients require or expect prior to surgery. The following responses seem to reflect this issue.

Doctors were brief (5.19)

Doctors could have explained more information about the procedure (5.38)

Some participants wanted more details with regard to the cardiac intervention when asked if they thought that the education they received 'could have been improved in any way?' stating:

Happy with what I received perhaps the medical staff could have explained a bit more(8.7).

Doctors, perhaps the technique of the operation (8.23).

Medical Interns could have explained more (8.38).

Such outcomes reflect the unmet requirements of these individuals. Perhaps these responses are reflective of a lack of knowledge in the specialty by the more junior medical staff and/or reflect the time constraints healthcare professionals face. An answer cannot be concluded. However, it does indicate that patients desired more education and descriptive detail from medical staff.

Information pamphlets

Healthcare professionals tend to rely on written literature as a convenient and low cost method of providing education related to cardiac surgery. The amount of time available for nurses and other healthcare professionals to provide patients with education prior to their cardiac surgery is becoming increasingly limited due to reduced admission time prior to surgery. Therefore the convenience of providing an information pamphlet can be seen as time efficient, cost effective and a strategy to meet the demands of individuals' educational requirements particularly when literature supports the notion of providing something being

better than nothing.^{3,16,20} Information pamphlets were the most commonly provided education method prior to admission, which allowed participants to read in their own time and at their own pace (assuming they had a reasonable literacy level and adequate vision to read the text). Because many participants indicated having received a pamphlet or brochure prior to admission, many key phrases reflected this and therefore *information pamphlet* emerged as a sub-theme.

When asked 'in what way did you think this information was beneficial?' the following responses emerged:

Read coloured pamphlet and combination of the video and pamphlet was well rounded and it showed someone surviving the whole process (5.12).
Pamphlet good because you can keep going back to it (5.38).
Pamphlet in your own time (5.50).

One patient who received only the information pamphlet prior to admission was not quite as favourable towards the information provided:

Different techniques could have been explained more (8.37)

Another participant who received only the information pamphlet prior to admission made the following comment:

Barely beneficial (5.45).

Although it was identified in this study that the most frequently provided education method prior to admission was the information pamphlet, health professionals should not simply assume that a pamphlet will adequately meet the requirements of patients. In our multicultural society, literacy levels of individuals cannot be assumed and therefore it is imperative that reading materials be assessed and reviewed to meet the consumer's requirements. Research in the United States has shown that 50% of adult public hospital patients demonstrate difficulty reading or are unable to read materials written at the fifth

grade level (aged 10 years).^{63,69} Health care providers should also be mindful that reading ability may not necessarily ensure reading comprehension. The following response from a participant highlights this:

Booklet would have been better to have more diagrams less jargon. Thought it should have been phrased more for the lay-man (5.19)

Some participants indicated that their preference would not be information provided in the form of a pamphlet. Therefore, it could be concluded that this is representative of their learning style and/or literacy level. Research undertaken by Merritt reiterates that patients' preference for reading was significantly lower than that for structured information and listening to information, suggesting that experiential learning modes are desirable.⁶⁷ The research also found that some people are not interested in setting their own goals and learning independently.⁶⁷ This suggests that healthcare professionals should be mindful that some people have a low preference for reading.

It is important to provide information pamphlets that suit the majority of the population catering for literacy levels and cultural backgrounds to obtain optimal patient outcomes. Another response when asked could the education received 'have been improved in anyway?' was:

Yes, perhaps more specific. However the booklet was good at outlining enough information (8.25)

Tailoring written literature to individuals needs seems to be a difficult balance to achieve. It appeared that some participants wanted less 'jargon' and more pictures whilst others requested more specific detail. The skill then for healthcare professionals is to accurately evaluate learning skills and requirements prior to the provision of education to capitalise on the patient's learning abilities.

It is difficult to provide care identical to what the literature states due to the unpredictable nature of the health care environment when trying to meet the needs and requirements of all individuals. However, it is important that people realise the information provided is a guide to their hospitalisation and the pending surgery.

Video

The use of videotape was the most common education method provided to patients once admitted for cardiac surgery. Video is a relatively low cost method of education that is also convenient for healthcare professionals to provide.⁷⁰ Because individuals learn at different rates and through a variety of mediums, the use of video was provided as an alternate means to relay information. This may have been a reflection of convenience for staff and/or request by patients to meet individual learning needs. It is also a convenient way to share information to a group of people such as family and/or support group. The video could be watched in the convenience of the patient's room with the family and/or support group. It became apparent in this study that *video* was a sub-theme because of the various key concepts that emerged in response to key phrases.

When participants were asked in what way was the information beneficial, some of the responses were positive in relation to this education method:

Video – thought it explained what you needed to know without the gore (5.4).

Video helped to understand (5.19).

Video came into room – watched it twice, thorough (5.50).

Although some people appeared to find the video relating to the surgery beneficial, other responses were not so favourable, requiring some clarification whilst watching the video and perhaps seeking debriefing once viewed:

Video a bit 'chopped and changed' a little bit of information then changed, not thorough enough (8.48).

Would be better to watch a video with a qualified person to explain through (8.20).

The advantage of the video reaching a larger group of people to provide education has its merits.^{38,70} However health care professionals should consider it as an adjunct to education because of the varying educational requirements of individuals. Although it may be considered costly it may be timely to review current video content and research the benefits further with consumer involvement to optimise content validity.

Theme 6: Timing

The timing of the education delivery appeared to be linked to the type of education participants received. For example, more people received the information pamphlet prior to admission and post admission they watched the video. This variation in the education method and timing of delivery may be responsible for some participants' preference for the various methods provided. There appeared to be a link to peoples' preferred time to receive education, which lead to the emergence of the following sub-themes: *better before admission* because people had time to think about the pending surgery. However, others believed the provision of education was *better after admission* because it was fresh in their minds.

The table below demonstrates how key phrases developed into key concepts, sub-themes and the major theme — *timing* (refer Table 12).

Table 12: Theme 6 — Timing

Key phrases	Key concepts	Sub-themes	Theme
<i>Yes, maybe better before admission. Video would have been good to think about (6.a.19). Yes, couple of weeks prior, more time then to understand it all (6.a.20). Yes, prior to admission could read at home (6.a.28). Yes, first visit to specialist (6.a.43). Thought it was helpful having the information before admission to read (6.b.7). Time to absorb the information took a while to read through the booklet, but could at own pace (6.b.10).</i>	Could read at home, allowed time to absorb the information	Better before admission	Timing
<i>Pre-admission wasn't so significant. The video the day before was good and helpful to wife (6.a.4). On admission also (6.a.29). Would have liked when admitted (6.a.12).</i>	Pre-admission wasn't so significant, because weren't so interested then.	Better after admission	

Better before admission

Providing information to patients prior to admission has been identified in the literature as an appropriate practice because people can learn at their own pace and discuss the information with their support person. Patients have also been identified as having lower anxiety levels and therefore perhaps an increased capacity to learn at this time.^{1,58} These concepts were reiterated when the participants were asked if they would have preferred this information at any other time? — not all participants who responded to this question actually received education prior to admission but had a view on the preference to receive the information earlier.

Yes, maybe better before admission. Video would have been good to think about (6.a.19).

Yes, couple of weeks prior, more time then to understand it all (6.a.20).

Yes, prior to admission could read at home (6.a.28).

Yes, first visit to specialist (6.a.43).

Obtaining information prior to admission may prove less stressful or anxiety provoking for some individuals, helping them to gain an element of control over the situation through knowledge. Having more time to think about the hospitalisation seemed to help some people. There was a sense of approval from some of those who did receive some form of education prior to admission:

Thought it was helpful having the information before admission to read (6.b.7).

Time to absorb the information took a while to read through the booklet, but could at own pace (6.b.10).

The actual time-frame that patients received education prior to their procedure may also have impacted on the responses; the mean length of time information was received prior to admission was 48.86 days. A time frame that facilitates assimilation of information may be just as significant as the actual information provided. For some individuals it was important to have the time to absorb the information, supporting the theme that it was better before admission:

It suited me (6.b.11).

2 days prior to admission kept it fresh in my mind (6.b.14).

Thought the booklet was good to read before admission (6.b.15).

Some believed it was better before admission because it allowed time to go through at their own pace and absorb the information provided:

One month before gave you time to think about it (6.b.27)

Sooner the better, Thought the pamphlet before admission was helpful, helped to know what to expect (6.b.37).

Had time to read it and think about it (6.b.37).

It would seem that some participants preferred to receive the education prior to admission to allow time to think about the admission and surgical procedure. Research has supported that the time between learning of the need for surgery and the surgery itself plays a significant role in determining anxiety levels.^{1,71} However, the exact time to provide that information is not recognised in the literature. Therefore, it may be appropriate to provide information to consumers of the cardio-thoracic surgical unit at a time that has been identified as mutually agreeable.

Better after admission

Traditionally, preoperative information has been provided to patients on admission. This study has identified that such a method of education delivery remains a preference for many. It was recognised in this study that although they may have had feelings of lack of control, fear and anxiety, participants still preferred to receive the information only once admitted, and this may reflect that they were more willing to learn once admitted because they had had due time to prepare for the idea of being in hospital and were now ready to attempt to understand the surgery itself.

Thought seeing the video after admission was good just before surgery. Too early could make you think about it too much (6.b.9).

On admission was a good time. Too early may be scary (6.b.12).

If earlier I might not have been interested (6.b.26).

Some participants who did not receive education once admitted noted that they would have appreciated it then.

On admission also (6.a.29).

Would have liked when admitted (6.a.12).

Many participants were content to receive the education just before surgery and post admission because it would appear that they were ready to deal with it.

Timing was appropriate ready to know the details (6.b.1).
Good just before (6.b.38).

Receiving the information just before the surgery for some, kept it fresh in their minds.

Fresh in my mind (6.b.50)
Thought it was the right time (6.b.50).

According to Lazarus, anxiety and stress are caused by fear, lack of knowledge about a situation or not knowing how to deal with it —elements which contribute to making one feel unable to control events or anticipate scenarios.⁷² Knowledge of these issues are particularly relevant for the patient pending cardiac surgery and therefore it is vital that an admission education meets the needs of the individual. Otherwise anxiety, stress and fear may be perpetuated and impact on outcomes. Because the time frame between admission and surgery is reducing, healthcare professionals must be conscious of the individual's needs and meeting each individual's requirements.

Summary of the findings

Stage 2 of the research project was designed to identify individuals' preferences for the type of education received and the time to receive it prior to cardiac surgery. This stage was a continuation of Stage 1 of the research, which identified the most common education methods provided prior to admission and post admission for patients pending cardiac surgery.

It would appear from the themes that emerged from the qualitative data that provision of the various education methods and timing of delivery had different impacts on the study participants. The themes that emerged highlight the individual learning requirements of participants.

The qualitative data was collected to provide richness and further understanding of the quantitative data. During the thematic analysis six major themes emerged from the questionnaires —*knew what to expect, family focus, personal attitude, was it enough, education methods* and *timing*. Within all of these themes are a number of sub-themes, with some of the key words and concepts that emerged common to more than one sub-theme. However, when considered within a major theme, these words and concepts took on related but altered meaning for the participants. Additionally, although each major theme has been presented separately, many of the key concepts are linked in some way across the six major themes. For example, the key concept related to the sub-theme *knowledge* highlights that the provision of the education material gave participants an insight and they then *knew what to expect* whilst in hospital. The affirmation of having information provided control and for some comfort, which was also comforting to the family member or support person who received the information. The video helped participants to understand the procedure, providing a visual, audible method to absorb information and was another example of a key concept that could also be linked to other sub-themes because it provided people with knowledge and helped them to know what to expect.

The themes that have been developed from the narrative text provide a deeper comprehension of the relevance and benefits of cardiac education provided to patients prior to their cardiac surgery. Although the analysis of quantitative and qualitative data has been separated into two sections for structural reasons, the content is linked and neither analysis should be considered in isolation.

Discussion

This study identified that the traditional concept of providing education once admitted is changing. This change may be in response to increasing consumer demand and reduced length of hospitalisation. It could be considered that providing education prior to

admission allows the patient more time to review and assimilate information. However, identifying the most appropriate method of education to provide to patients seems to be an issue that requires consideration of the individual requirements of patients and an acknowledgement that a 'one-size-fits-all' approach may no longer be appropriate.

Although there are a large variety of educational methods available, this study identified that the most common methods provided in this cardiac unit were: the information pamphlet, education by a nurse, education by a doctor and the video. The type of education that was provided seemed to be based on convenience and timing. The most common education method provided prior to admission was the information pamphlet. This may reflect the convenience (portability) of providing a pamphlet and the flexibility for the patient to read the information in their own time. Many participants who received an information pamphlet found it beneficial because they could read it at their own pace and family members could also gain an insight into the surgery. Although it may seem practical to provide an information pamphlet to patients either prior to admission or even once admitted, this research demonstrated that it was not always appropriate. Assumptions were made with regard to patients' literacy levels and ability to understand the content of the information. This highlights the importance of tailoring education to meet the patients' needs and not just that of the health care provider, for convenience sake.

Once admitted, the most common method of education provided was the video. Many participants seemed receptive to viewing the video because of the ability to share this experience with their support person and/or perhaps it suited the individuals' learning preference. The video was portable and could be watched in the privacy of a participant's room. If requested, they could watch it again to seek further clarification which for some was beneficial in aiding understanding.

The value of communication cannot be overstated prior to cardiac surgery — translating important information regarding surgery and recovery is vital to patients' orientation to the

environment and an informal method of identifying patients' needs. This research recognised that many participants received education from either a nurse or a doctor prior to surgery but the level of which the information was communicated varied substantially. It was apparent from some of the responses that patients were satisfied with the information they received and the level of involvement the nurses undertook. The ward nurses play a pivotal role in provision of education to patients and tailoring that education to meet the individuals' needs, which is of vital importance, therefore it is essential they recognise their influence and meet the patients' needs. For many participants who received education from medical staff, they were not as satisfied. Patients would have preferred more information from medical staff, conferring that the education they received was brief. Identifying patient's exact requirements from medical staff is difficult to ascertain and no deeper analysis can be extracted from the available data. However, what this does emphasise is the need to individualise the education each patient receives. Nurses in particular are in a prime position to provide relevant information that adequately prepares patients for their cardiac surgery and informs them about their follow-up care and healthy life-style patterns, as they spend the greatest amount of time with patients whilst hospitalised.

A fundamental finding from this research was the importance of the support person(s). Many patients found it comforting to see that family could be involved in the education and take part in the learning process. It was important for some participants to see that their family mattered in the hospitalisation process. The family's involvement for some was a reassuring and positive experience.

An attempt to recognise the most suitable method and/or combination of education methods was not successful. What did emerge that was of little consequence which method of education participants did or did not receive, as it had no statistically significant impact on outcomes such as length of stay. Assumptions are made that a variety of methods can be more beneficial than one method alone, however this research does not

support such a concept. It does support the ideal of providing information to suit the individual, recognising the learning needs and adapting methods to meet those needs.

With a diverse array of education methods available it may be opportune for nurses to provide further interactive education that's relevant to individual's preferred method of learning such as interactive CD-Roms or consumer information from the hospital web site. It is timely in this age of computer technology and informatics that computer — assisted instruction and other multi-media teaching devices be considered to provide additional health information and relevant detail to the individual. Although this study identified that providing more than one method of education may not necessarily be any more beneficial to patients' length of stay, it may suit individual's learning preferences and inform them further and by doing so improve outcomes. The idea of having various education methods available provides patients with choices to gain knowledge from their preferred source.

Recommendations

The results of this study reinforce the value of preoperative preparation for the patient having cardiac surgery. However, it is recommended that future rigorous research be conducted with a larger, more diverse sample group to enable a broad and comprehensive exploration and subsequent understanding of optimal educational method(s) and timing of delivery. Increasing healthcare costs and reduced lengths of stay mean that nurses must be constantly reflecting on practice and educational delivery methods to enable optimal patient outcomes. Complacency with historical educational delivery methods may no longer be appropriate and potentially lack the flexibility to suit growing consumer demands.

Innovative education methods that can be continually evaluated and modified by providers and consumers should be considered. Further study could also be augmented on the effect

the support person and/or family has on hospitalisation and recovery outcomes of the patient who has undergone cardiac surgery.

Providing adequate pre-operative teaching is a challenge with today's diminishing resources. Although cost-containment is the reality, pre-operative education should not be given a lower priority. All healthcare institutions and professionals should consider tailoring education needs to meet the individual's requirements. Time should be taken to present the information carefully, clearly and concisely. Time should also be provided for patients to ask questions and seek answers. Nurses must become advocates for the promotion of effective, accurate and comprehensive education for patients prior to surgical intervention. Innovative education methods such as interactive CD-Rom and other such multi-media mediums may offer a time efficient alternative for patients to learn what they specifically want to know, providing a resource that has audio capabilities, graphics and appropriate visuals. However, there is limited research on this new age of information sharing in the hospital setting and therefore it requires further exploration.

The education delivered should be reviewed and updated regularly allowing consumers of the healthcare system to participate in the review process. This process may be considered costly by the organisation however, the growing consumer voice cannot be ignored. The value of comprehensive pre-operative education may translate to lower costs associated with shortened lengths of stay.

Study Limitations

There are some factors related to this research that may be perceived as potential limitations. The small sample size means it is not possible to extrapolate the findings of this study to the broader cardiac surgery population or to any other cardiac interventional group. Due to time restrictions, the researcher was limited by the number of participants included in the study.

The questionnaire was completed whilst the participants were inpatients — perhaps given more recovery time and post discharge their responses may have altered. It is possible that some participants were influenced by post-operative medication such as analgesia use when completing the questionnaire.

The nature of a convenience sample meant that any patients that could not speak English were excluded due to limited resources to translate the questionnaire to the relevant language. Although there were no participants in the study who could not speak English, there were participants in the study from a diverse range of cultural backgrounds however this information was not captured in the questionnaire.

This study is a preliminary one and sets the scene for further research into identifying patients' learning needs in the cardiac surgical unit and to guide health care professionals in meeting education requirements of the individual. Determining when the patient is most receptive to learning about the cardiac surgical procedure and what method(s) of education health care professionals can provide is important, if we are to optimise outcomes.

Conclusion

This study has provided an insight into patients' preferred education methods prior to cardiac surgery. Most participants were satisfied with receiving some form of education prior to admission. This pre-admission education provided patients with an insight into the surgery and the hospitalisation process giving them a sense of knowing and understanding. Although the information pamphlet was identified as the most common method for education provision, it should not be assumed that this method alone would adequately meet the needs of all patients in this setting. The video provided once a patient was admitted seemed popular and participants were receptive to the visual method of education. The actual number of education methods received prior to cardiac surgery did not appear to have any impact on participants' length of stay. It became apparent that it wasn't

necessarily the amount of education methods provided but rather the type of education that patients were most receptive to. These results highlight the individual nature of people's expectations and personal requirements prior to cardiac surgery. Although from these results there were trends to preferred methods of education delivery and types there were no statistically significant outcomes that highlighted a definitive type of education method or delivery time. Therefore the challenge for the future is for health care professionals to facilitate a learning culture that is tailored to the individuals needs and facilitates improved quality outcomes for the patient.

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Appendix 1

Patient Consent Form

Project Title: A descriptive study of the preferred method of pre-operative education for patients having cardiac surgery.

Researcher: Ms Marion Eckert

- 1/ The nature and purpose of the research project has been explained to me. I understand it, and agree to take part.
- 2/ I agree to participate as a volunteer in the above named research project.
- 3/ I understand that, while information gained during the study may be published, I will not be identified and my personal details will remain confidential.
- 4/ I understand that I can withdraw from the study at any stage or refuse to answer any question should I chose to do so without penalty.
- 5/ I have had the opportunity to ask whatever questions I desire, and all such questions have been answered to my satisfaction.
- 6/ I have had the opportunity to discuss taking part in this investigation with a family member or friend.

Name of Participant: _____

Signed: _____

Date: _____

I certify that I have explained the study to the patient undertaking the questionnaire and consider that he/she understands what is involved.

Signed: _____

(Investigator)

Appendix 2

Study Information Sheet

I am currently undertaking the Doctor of Nursing Science at the Adelaide University. As part of my degree I am interested in defining the specific educational requirements for patients having cardiac surgery and the benefits various educational methods have on post-operative outcomes such as pain, anxiety, length of stay and knowledge retention.

I would like to invite you to take part in a study, which aims to gain an insight into the most common education method(s) provided prior to cardiac surgery and the perceived benefits of this education. The data will be collected using a questionnaire.

Attached is a copy of the questionnaire, I would be grateful if you could take the time to read it and then complete it if you are interested in doing so. You do not have to answer all of the questions if you do not want to. Your answers will be anonymous and confidential. Your name is not to be written anywhere on the form and all completed forms are to be placed in a sealed box located in the nurse's station. I will empty the contents of the box each day. The data collected will be secured and only my supervisor and I will have access to the information.

The benefits of the study is to gain an insight into type of education provided and attempt to identify when the most suitable time is to provide that information. It is hoped that this study will assist health care providers to understand the diverse educational needs of patients and assist with improving post-operative outcomes even further.

Any information provided will be treated in the strictest confidence and no individuals will be identifiable in the resulting research dissertation. Participants are of course free to discontinue participation at any time or to decline to answer particular questions if you so desire with prejudice to their care or treatment.

Any inquiries about the study can be directed to me by telephoning the number listed below. If you would like to talk to someone not directly involved in this study you can contact the Chairperson of the Research and Ethics Committee of the Royal Adelaide Hospital by telephoning (08) 8222 4139.

Please accept in advance my thanks for your assistance.

Marion Eckert
Telephone: 0411 152 809

If no, please state why?

.....
.....
.....
.....

Q.7. Do you think the education you received has assisted your recovery?

Y / N

Please clarify your answer?

.....
.....
.....

Q.8. Do you think the education you received could have been improved in any way (please state)?

.....
.....
.....
.....

Q.9. Planned Discharge Date.....

Q.10. Actual Discharge Date.....

Thank you for your participation in this questionnaire.

Where to next?

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Where to next?

What became apparent whilst undertaking this research was the vital role nurses play in cardiac surgical unit regarding patient education about their pending intervention and recovery.

Nurses are in the ideal position to guide provision of effective education and have a direct responsibility to ensure patients receive optimal care with the ultimate goal of improving clinical outcomes. Striving for improved clinical outcomes has become particularly important and increasingly challenging as a result of reductions in length of stay and decreasing resources. Health care institutions need to contain costs and one way to achieve this is to reduce the average length of stay.¹ This containment comes at another cost and that is the reduced admission time prior to surgery. Therefore, the pre-surgical management is restricted because patients may be admitted the day of surgery or the evening prior, thus limiting time available to educate patients once admitted. Traditional methods of education must be adapted to meet this change and still fulfill the patients' needs.

Those involved in clinical practice need to be accountable for the efficiency and effectiveness of care delivery.² This demanding change in practice has resulted in a shift from traditional care rituals to providing care that is clinically astute and grounded in evidence based practice.³ Clinical evidence can be acquired through the conduct of systematic research. The research in this portfolio aimed to determine the effectiveness of different approaches to pre-cardiac intervention education for patients, ascertain patients' preferred type of education, and establish a time at which receiving education prior to cardiac intervention, was most beneficial.

This portfolio of research has investigated nursing practice in one major area — patient education pre and post admission prior to cardiac investigations. From the findings there

are several areas that warrant further examination and research. As a consequence of reduced lengths of stay, nurses and all healthcare professionals have to deliver appropriate, relevant education in a much shorter time frame prior to surgery. Therefore educating patients prior to admission is an economic necessity that requires urgent attention and yet careful planning. The advanced practice nurse committed to educating patients prior to admission should be utilised further and established as an essential component of patient preparation. This nurse must be adequately trained to meet individuals' learning requirements and welcome the participation of the support person/family member during provision of the education.

Pre-admission clinic

Research at the pre-admission clinic that considers individual patient's learning requirements, developing education pathways for those patients and then measuring their outcomes such as knowledge retention on admission, anxiety levels, post intervention pain and length of stay is appropriate. The pre-admission clinic could be the ideal environment to establish an education pathway at a time when the patient may be less stressed and can therefore better retain knowledge. Attendance at the pre-admission clinic allows time for the patient to discuss with the nurse their individual learning requirements.

Learning packages

Individual learning packages sourced from a library of education methods and materials could be tailored to patients' needs once they are admitted. The learning package should be consumer driven, offering patients various education methods. The results of this specifically tailored learning package could then be measured prior to discharge using an audit tool, which assesses patient outcomes and includes details such as length of stay.

Education methods

The currency, relevance and patient preference for actual education methods used in the clinical area should be examined. Video and information pamphlets for instance should be appropriate to the current management and nurses working in the clinical area should ensure that this information is based on the best available evidence.

Timing

Exploring the ideal time to provide education could also be examined more rigorously by involving various education mediums and times prior to admission. The aim would be to identify the most appropriate time to provide education, when the patient is most receptive to education and the most suitable education method. Providing education to patients prior to admission should not eliminate the need for post admission teaching, but could allow nurses to use this valuable time to discuss key issues the patient may have, effectively review/reinforce details and provide support.

Economic analysis

Identifying exactly how much time is spent providing education to patients prior to their cardiac surgery may provide an insight into time spent by nurses on this valuable process. An economic evaluation could be undertaken considering the amount of time nurses spend educating patients. Once identified, outcomes measures could be compared to see if there is any statistical significance in the duration of the timing that education was provided. If the timing of the education delivery is significant then perhaps strategies could be introduced in the relevant organization to dedicate time to education such as cardiac nurse educators trained specifically on the related surgical intervention or utilising the facility in patients homes prior to admission.

Family involvement

The role of the support person requires further research regarding the effect that person has on pre and post cardiac intervention outcomes for the patient. The current trend in health practice is toward involving patient support members in every phase of care. The benefit of this trend requires further review and research. Perhaps consideration could be made for future research to target this population.

Those without family support should also be considered with regard to researching the benefits of encouraging a support person or the need to provide additional information.

Nursing education

Reviewing the effectiveness of teaching should also be researched. Effective teaching strategies should enable patients to attain the intended outcomes, therefore pre-operative instruction and delivery by healthcare professionals should be scrutinised further. Nursing variables such as personal experiences, level of knowledge on the relevant subject, and time constraints may influence teaching delivery.

The effectiveness of teaching methods requires further research because what is assumed to be adequate may not necessarily be so. Perhaps further emphasis should be made in nursing undergraduate curriculums to highlight the importance of pre-operative instruction and outline the significance of education to the individual, their levels of compliance and clinical outcomes.

Research has identified that patients taught by postgraduate qualified nurses, in particular master's prepared nurses, has a positive effect on knowledge scores at the time of discharge. Therefore, nurses should be encouraged to develop their education to enhance not only their own education but also their ability to transfer their knowledge to patients.

Technology and education

As education moves into the new millennium there are exciting opportunities available not only for the nursing clinician but also the consumer. Technological advances, particularly in the form of multi-media and use of the internet, present enticing opportunities for the development of new education strategies. Although these methods of education remain in their infancy, what has become evident is that with the changing nature of nursing care delivery and allocation of resources, education has to be more flexible and attractive to meet consumers' needs. Increasingly, multi-media and computerised technologies are being utilised with interactive workshops becoming important aspects of education. Computer assisted learning programs can be tailored to suit the individuals' learning level, while many traditional methods lack this flexibility. However, as with any new technology, implementation can be complex and have many consequences. Costs in comparison with the potential benefits should be carefully considered prior to implementation. These concepts are the cutting edge methods of education and require further research and cost analysis to make judgements and informed proposals to trial this technology in the clinical setting.

Not one education method can be deemed as being more effective in all circumstances for improving outcomes post cardiac intervention. Circumstances such as resources, level of knowledge and available time may dictate education strategies used. However, research supports the notion of making education flexible, interactive and understandable to the consumer. The challenge is to ensure that as technology advances and more diverse methods of education delivery become available, that research continues to evaluate the benefits to patients.

The Clinician

As a clinician working in the Cardiovascular Unit in the large metropolitan hospital it is anticipated that with the information and new knowledge identified from this portfolio of

research, opportunities for change will be capitalised upon. The results from this portfolio have promoted an awareness of the desperate need for change to the historical education patterns that have shaped current education delivery methods and which require review or perhaps replacement.

Although the current education methods have satisfied the environment in terms of convenience and relevance to the cardiac intervention, it is timely to review these methods and extend the type of education delivery offered. This portfolio has set the scene and identified the need to review current practice.

The next step is to increase all health care professionals' awareness of the need to meet the education requirements of the individual. This will be promoted through the publication of this portfolio, in peer-reviewed journals, and presentation of results at national and international conferences.

Within the clinical setting where this research was conducted it is proposed that further research be undertaken measuring specific patient outcomes such as anxiety, knowledge retention and length of stay. It would be an extension of previous research with larger participant numbers. The findings of the research will assist in guiding the development and evaluation of education methods further and their impact, if any, on patient outcomes.

This portfolio also recognised a lack of research in the area of health information technology for the patient having a cardiac intervention. Further exploration into the viability and availability of this method of information-sharing will also be investigated. The benefits of dissemination of current and relevant information for specific cardiac interventions through the use of web-based technology need to be considered and evaluated. It would be an ideal starting point to emphasise the lack of research in this area to management, and consider strategies to trial new methods within the unit that are interactive and consumer-driven. The site would be user-friendly, hospital and procedure

specific, and would also discuss lifestyle modification issues such as diet and exercise post discharge. As well as being displayed on the site, this information could be downloaded as a kit to handout to patients and/or support people assuring that the information is always current and portable.

The provision of the most appropriate education method for the patient in the cardiac unit is an ongoing pursuit. Clinicians working in the area must be constantly evaluating education methods and developing educational strategies that improve patient outcomes.

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