The impact of nurse led educational intervention on anxiety in patients undergoing cardiac surgery

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Declaration of originality

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Candidate Declaration

Declaration

This is to certify that:

i. The dissertation comprises only my original work

ii. Due acknowledgement had been made in the text to all other materials used.

iii. No portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institution of learning

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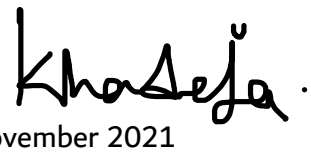
Signature: 

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List of abbreviation

Abbreviation	Full meaning
ACE	Angiotensin-converting enzyme
ACS	Acute coronary syndrome
BP	blood pressure
CABG	coronary artery bypass graft
CAD	Coronary artery disease
CASP	Critical Appraisals Skills Program
CHD	Coronary heart disease
CVD	Cardiovascular disease
HADS	hospital anxiety and depression scale
ICD	implantable cardioverter-defibrillator
ICU	Intensive Care Unit
PCI	percutaneous coronary intervention
PTCA	percutaneous transluminal coronary angioplasty
RCT	randomization Control trial
SSAI	Spielberg's state anxiety inventory
STAI	StateTrait Anxiety Inventory
STOA	state-trait operation anxiety
WHO	World Health Organisation

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Abstract

Title: The impact of nurse led educational intervention on anxiety in patients undergoing cardiac surgery.

Background: Anxiety is the most common complication for patients who are undergoing cardiac surgery. It has been shown that preoperative anxiety has a negative impact on patient health and healing process. However, nursing education has a positive effect on reduce patient anxiety.

Aim: To examine the impact of nurse leads educational interventions in the pre and post operative stage for patients attending cardiac surgery in reducing patient level of anxiety.

Methodology: A systematic search was performed by using three databases from Mohammed Bin Rashid University of Medicine and Health Sciences Library. The resources that have been used for the literature review are CINAHAL complete, PubMed, and Medline complete. A total of six studies were included in this systematic literature review. A combination of qualitative and quasi-experimental study.

Results: The literature review highlighted that patient's anxiety can be reduced by several education interventions such as verbal education, booklet, leaflet, dialogue, audiotape, and having individual education session according to the patient source of anxiety. However, it has been showed that participants in the intervention group that received nursing led educational intervention had significant reduction in their anxiety level compare to the

control group with the P value of ($P < 0.001$). However, the literature review also showed participant that receive audiotape education program, had no significant reducing in their level of anxiety with a P-value of ($P > 0.05$).

conclusion: The literature review result shown that nursing education has a positive effect on reducing patients' level of anxiety and post-operative complications. Preoperative education should be incorporated into nurses' routine practice while preparing cardiac patients to reduce level of anxiety.

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Chapter one - Introduction

The purpose of this dissertation is to discuss what influence nurses led educational interventions has on preoperative and the postoperative level of anxiety in patients undergoing cardiovascular surgery. Chapter one will provide a brief introduction to coronary artery diseases, as well as the incidence and prevalence of coronary artery diseases, and then it will discuss the level of anxiety among cardiac patients. Chapter two will identify cardiovascular disease, the mortality rate of coronary artery diseases globally, and the mortality rate of coronary artery diseases United Stated. Also, it will discuss the mortality rate of coronary artery diseases in the United Kingdom, and lastly, it will examine the mortality rate of coronary artery diseases in the United Arab Emirates. Then it will outline the modifiable as well as the non-modifiable risk factory of developing cardiovascular disease. Afterwards, it will discuss cardiac conditions such as acute myocardial infarction, angina pectoris, acute coronary syndrome, heart failure. In addition, it will highlight the lifestyle management of coronary heart disease and the medication management of coronary heart disease. Furthermore, then it will highlight revascularization. After that, it will discuss the patient's issues in the preoperative stage and the complication after the surgery. And lastly, it will discuss preoperative preparation, nursing education and the impact of nursing education on the surgical procedure. Chapter Three will outline the use of systematic review, study aim as well as the literature review objective with the review question, then it will discuss the research strategy, data-based that have been chosen, research strategy, Prisma flow chart, and lastly it will disuse the data extraction table.

Chapter four will discuss critical appraisal skills. It will be focused on if the study addressed the clear focused issue. Was the study randomized, where all the participants in the research accounted intel the conclusion and were similar in intel the end of the trial. Also, it will discuss if the study's used a blind technique. And was the treatment effective, and can the study be replicated. Chapter five will discuss the finding of the literature review, and it will discuss six subthemes. The first theme is verbal nursing education, and the second theme Will be about nursing intervention using a booklet with information regarding cardiac surgery. The third theme will discuss providing individual education regarding the patient source of anxiety, in addition, the fourth theme will discuss using leaflet education to reduce patient level of anxiety, And the fifth theme will discuss providing the patient with dialogue with individual information regarding the patient Concerns as well as providing emotional support. The last theme will discuss providing the patient audiotape intervention before and after six weeks of the surgical procedure.

Chapter six will be the discussion part, which will discuss the impact of nursing education in the preoperative period. Patients undergoing cardiac surgery will highlight the effect of preoperative education on patient outcomes and use different teaching styles for the patient, and then it will discuss each subtheme. And chapter seven will discuss the strength and delimitation of the little review as well as the recommendation for future studies. Also, chapter eight will discuss the aim of the literature review and will explain preoperative anxiety. On the other hand, it will discase patient complications for not receiving preoperative education. In addition, it will highlight the importance of identifying the source of anxiety for the patient and identifying patient learning styles to provide

preoperative education. And it will highlight the most significant learning style that reduced patient level of anxiety from the literature review. As well as it will highlight that intervention nursing education should be incorporated into nurses' routine practice during the preoperative period

1.1 Introduction

Coronary Artery Disease (CAD) is caused by plaque buildup in the wall of the arteries that supply blood to the heart (Centers of Disease Control and prevention, 2021). According to the World Health Organization (WHO) (2015), CAD is the first cause of death worldwide. CAD affects around 126 million individuals (1,655 per 100,000), and that is approximately about 1.72% of the world's population (Khan *et al.,*2020). However, Patients that are waiting for cardiac surgery during the preoperative period experience severe level of anxiety and that due to fear of the surgery, lack of knowledge, risk of death, experience severe postoperative pain, difficulty managing their pain, losing control over their body and being afraid of death (Chivukula *et al.,* 2013) (Douki *et al.,* 2011). Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure (Ashrafi-Rizi *et al.,* 2014).

Furthermore, patients develop anxiety once there hospitalized. The reason for this occurrence is that the patient experiences their first time being away from their family, being uncomfortable with the hospital environment, and the nature of the cardiac disease and the threats (Celano *et al.,* 2016). Research showed that a high level of anxiety is associated with an increase in the risk of mortality and complication for a patient

undergoing cardiac surgery (Meier *et al.,* 2016). Also, another research showed that patients with a high level of anxiety during their preoperative period would increase their chance of prolonged hospitalization and recovery time (Prado-Olivares & Chover-Sierra, 2019). In addition, research has shown that a high level of anxiety decreases the quality of life and health of the patient undergoing cardiac surgery (Malek *et al.,* 2018). Preoperative education that is nurses led has shown to reduce the patient level of anxiety, as well as improve patient recovery time, and the reason for this occurrences is that nurses provide health care relevant information, coping skills, and they also provide psychosocial support before the surgery and is also shown that preoperative education has a positive effect on the patient such as improve patient anxiety level and patient knowledge by providing health care relevant information and coping skill after the surgical procedure (Guo & East, 2012). This study examines the impact of nurses led educational intervention in the preoperative preparation for a patient undergoing cardiac surgery.

1.2 Chapter summery

This chapter outline the definition of coronary artery disease as well as the incidence and prevalence of coronary artery disease. Furthermore, it discusses why patients develop high levels of anxiety while waiting for their cardiac surgery. The chapter also, Identified anxiety. Moreover, it highlighted that a high level of anxiety is associated with a high mortality rate in a patient undergoing cardiac surgery and increased hospitalization. Then it highlighted the importance of having preoperative nursing educational interventions to improve the patient level of anxiety and increase patient knowledge.

Chapter Two - Background

2.1 Introduction:

The Background and literature review context will be provided to set the scene of the dissertation, and this chapter well focuses on the issue that influences the researchers when deciding on the topic.

This chapter will cover the definition of cardiovascular disease, and it will discuss the cardiovascular statistic Globally, in the United States, the United Kingdom and the Middle East. Then it will cover the non-modifiable and modifiable risk factors of developing cardiovascular disease. Also, it will discuss the definition of coronary heart disease and the statistic of patient mortality and living condition with coronary heart disease in the United Kingdom. Then it will highlight the condition that is caused due to coronary heart diseases, such as acute myocardial infarction, angina pectoris, acute coronary syndrome and heart failure. It will discuss coronary heart disease lifestyle management and pharmacological management. Then it will define and discuss revascularization, the issue that patients face in the preoperative stage, and the complication after the surgery. Lastly, it will discuss the preoperative preparation, nursing education and the nursing education impact on the surgery

2.2 Cardiovascular disease

Cardiovascular disease (CVD) is a condition that affects the heart muscle and blood vessels. It is usually associated with a build-up of fatty deposits inside the arteries, known as

atherosclerosis (Shaima *et al.,* 2016). Furthermore, arteriosclerosis occurs when the arteries that carry oxygen and nutrient from the heart to the rest of the body become hardened (Bergheanu *et al.,* 2017). Cardiovascular disease is associated with damage to arteries in organs such as the brain, heart, kidneys and eyes (Jankowski *et al.,* 2021). *Cardiovascular disease* is an umbrella term that incorporates a range of conditions, including coronary heart disease, deep vein thrombosis, peripheral arterial disease, pulmonary embolism, rheumatic heart disease, cerebrovascular disease, and congenital heart disease (Celermajer *et al.,* 2012). Coronary heart disease (CHD) is known as ischaemic heart disease (Sanchis-Gomar *et al.,* 2016). Coronary heart disease is caused by the buildup of plaque, a waxy substance, inside the lining of larger coronary arteries, known as atherosclerosis (Sanchis-Gomar *et al.,* 2016). Atherosclerosis can build up until the arteries become narrow and cannot get enough oxygen-rich blood to the heart (Sanchis-Gomar *et al.,* 2016). Coronary heart disease develops slowly over time, and the symptoms can be different from one patient to another. However, the most common symptoms are severe chest pain is known as angina, shortness of breath, pain travelling through the body, feeling faint, and nausea (Ford & Berry, 2020).

2.3 The worldwide incidents and prevalence of cardiovascular disease:

The global prevalence stated that about 101.5 million people suffered from a stroke in 2019 (Glidewell *et al.,* 2019). Furthermore, it has been shown that cardiovascular disease was more prevalent in males than females. Research conducted by Loney *et al.* (2013) estate that globally cardiovascular mortality rate is about 308.9 per 100,000 for males and 203.9 per 100,000 for females globally. On the other hand, it has also been shown that several races had the highest prevalence rate in cardiovascular diseases, such as northern African,

Middle Eastern, Central Asia, and Eastern Europe (Virani *et al.,* 2021). The World Health Organisation (WHO) estimates that chronic diseases increase worldwide, with the most significant increase in cardiovascular disease occurring in the Eastern Mediterranean Region such as Pakistan and Afghanistan (Global Burden of Disease, 2018). The following paragraph will cover the American statistic of cardiovascular disease.

2.4 The American incidents and prevalence of cardiovascular disease:

The American Heart Association (AHA) estimated that in 2019 about 179.2 million people were living with ischemic heart disease (Virani *et al.,* 2021). On the other hand, The (AHA) estimated that in 2019 approximately about 18.6 million deaths were attributed to cardiovascular disease (Weiss *et al.,* 2017). The following paragraph will cover the United Kingdom statistic of cardiovascular disease.

2.5 The United Kingdom incidents and prevalence of cardiovascular disease:

Wilkins *et al.* (2017) stated that cardiovascular disease is the leading cause of mortality in Europe, it causes over 3.9 million deaths a year, around 1.8 million deaths in men while 2.1 million deaths in women. However, cardiovascular disease is also the leading cause of mortality in the European Union that leading to over 1.8 million deaths each year, around 800,000 deaths in men and 1 million deaths in women (Wilkins *et al.,* 2017). In addition, the British heart foundation stated that coronary heart disease is the most common cause of premature death, and It was the leading cause of death worldwide in 2019 (BHF, 2021). Coronary heart disease is responsible for 64,000 deaths in the UK each year and an average of 175 people each day (BHF, 2021). Moreover, Around 24,000 people under

the age of 75 in the UK die from Coronary heart disease each year (BHF, 2021) 2.3 million people in the UK live with coronary heart disease (Quality Assurance and Improvement Framework, 2019). Also, the British Heart Foundation (BHF) stated that around 4 million males and 3.6 million females are diagnosed with the cardiovascular disorder in the United Kingdom (UK), resulting in more than 160,000 deaths each year. However, it was estimated that the health care cost for cardiovascular disease is £9 billion each year (BHF, 2021). The following paragraph will cover the United Arab Emirates statistic of cardiovascular disease.

2.6 The United Arab Emirates incidents and prevalence of cardiovascular disease:

The word health organization reported in 2016 that cardiovascular diseases were the number one cause of mortality in the United Arab Emirates (UAE), with a percentage that is less than forty-five per cent (40%) (WHO, 2018). In addition, further study was conducted in Abu Dhabi the capital of the UAE shows that less than thirty per cent (29%) of the mortality rate is due to cardiovascular disease (Loney *et al.,* 2013). The following paragraph will cover the non-modifiable risk factor to develop cardiovascular disease.

2.7 Non-modifiable risk factor to develop cardiovascular disease:

Several contributing factors cause cardiovascular disease, and they can be classified as modifiable and non-modifiable. A relation to non-modifiable Risk factors is age, gender, ethnicity and family history. For example, cardiovascular disease increases after 35 years of age in both men and women. Although, men have a higher chance of developing cardiovascular disease than women. Furthermore, the risk of developing cardiovascular

disease in men after 40 years is about 49 percentage, but for women is about 32% (Sanchis-Gomar *et al.,* 2016). However, researchers showed that patients with Blacks, Hispanics, Latinos, and Southeast Asian Ethnicity are at higher risk of cardiovascular disease (Carnethon *et al.,* 2017) (Rodriguez *et al.,* 2014). In addition, family history is also a significant risk factor. As long as patients have a family history of cardiovascular disease and are younger than 50 years old have an increased risk of developing cardiovascular disease (Bachmann *et al.,* 2012). The following paragraph will cover the modifiable risk factor to develop cardiovascular disease.

2.8 Modifiable risk factor to develop cardiovascular disease:

Modifiable risk factors for developing cardiovascular disease are hypertension, hyperlipidemia, diabetes mellitus, obesity, smoking and poor diet (Pencina et al., 2019). High blood pressure is known as (hypertension) the normal range of blood pressure is between 90/60mmHg diastolic and 120/80mmHg systolic (Hajar, 2017). Hajar (2017) estate that hyperdistention is the leading cause of cardiovascular diseases. Moreover, it has been shown that approximately 54% of strokes and 47% of coronary heart diseases are attributed to high blood pressure. (Malakar et al., 2019). However, if the patient has a blood pressure higher than the normal range, it will cause damage and narrowing arteries (Hajar, 2017). Also, exposure to high systolic blood pressure (BP) accounted for 10.7 million deaths globally (Camm et al., 2018).

High levels of lipids in the blood are known as (Hyperlipidemia), the second most common risk factor for cardiovascular disease (Mozaffarian et al., 2015). According to the

world health organization , an increase in cholesterol caused an estimated 2.6 million deaths and The world health organization stated that a third of ischemic heart diseases are attributed to high cholesterol (WHO, 2014). Akyea et al.(2019) stated that 39.65% of people in the UK have high blood cholesterol.

Diabetes has been shown as the leading cause of cardiovascular disease because excess blood sugar decreases the elasticity of blood vessels and causes them to narrow and impede blood flow (Virani et al., 2021). This will lead to a reduced supply of blood and oxygen to the body, increasing the risk of high blood pressure and damaging large and small blood vessels. Based on 2019 data, overall, 237.9 million males and 222.0 million females worldwide had diabetes (Virani et al., 2021). However, handling harmful substances such as smoking tobacco's, chewing tobacco, or being exposed to secondhand smoke can cause cardiovascular disease (Virani et al., 2021). However, a study done in The US showed that nonsmokers regularly exposed to secondhand smoke also have a 25 per cent to 30 per cent rise in their chance of developing cardiovascular disease (Japuntich et al., 2015).

Furthermore, tobacco is the lead cause of damage and narrow to the blood vessels (Virani et al., 2021). However, the age-standardized global prevalence of daily smoking in 2017 was 8.7 per cent in males and 1.76 per cent in females (Virani et al., 2021). Tobacco is estimated to cause 8.7 million deaths globally in 2019, with about 6.6 million men and 2.1 million women (Virani et al., 2021). On the other hand, a 2015 meta-analysis research revealed that smoking resulted in a 51 per cent increased risk of coronary heart disease in patients with diabetes (Pan et al., 2015).

In addition, inactive elderly patients are more likely to have high blood pressure and high cholesterol levels for being overweight (Roberto et al., 2015). Robert et al., 2015 stated

that is about 107.7 million young adults, and 603.7 million elderly had obesity, with an overall obesity prevalence of 5.0 per cent among young adults and 12.0 per cent among the elderly. Lastly, research shows that patients with a poor diet have shown that trans-fat increases the risk of cardiovascular disease through adverse effects on lipids, endothelial function, insulin resistance, and inflammation (Anand et al., 2015). Every 2 per cent of calories consumed from trans fat was associated with a 23 per cent higher CAD risk (Mozaffarian et al., 2015). A 2016 systemic review revealed that soft drinks and sweetened beverages were associated with a 22 per cent higher risk of myocardial infarction (Narain et l., 2016). The following paragraph will cover acute myocardial infarction.

2.9 Acute myocardial infarction:

The conditions that are caused due to coronary heart disease are acute myocardial infarction, angina pectoris, acute coronary syndrome and heart failure (Boateng and Sanborn, 2013). Furthermore, acute myocardial infarction is also known as a heart attack (Boateng and Sanborn, 2013). Acute myocardial infarction is a life-threatening condition, especially when a part of the coronary arteries becomes blocked, resulting in the heart muscle becoming deprived of blood and becoming damaged (Boateng & Sanborn, 2013). In addition, if the heart muscle is damaged, it may affect the heart's ability to pump blood to the rest of the body, which leads the heart to failure (Barberi & Van den Hondel, 2018). However, the sudden loss of blood in the heart muscle will cause the patient to experience severe pain and an irregular heartbeat (Boateng & Sanborn, 2013). Research conducted by Nascimento *et al.* (2019) estimated that acute myocardial infarctions are the leading cause

of death worldwide, with a prevalence approaching about three million people worldwide. The following paragraph will cover angina pectoris.

2.10 Angina pectoris:

Angina pectoris is when a patient experiences severe chest pain or discomfort, which is caused due to the heart having a lack of blood and oxygen (Ford & Berry, 2020). According to Qintar *et al.* (2016), It was estimated that between 30,000 to 40,000 per million patients experience anginas in the western country. In addition, it was estimated that 43% of angina patients remain under-recognized (Qintar *et al.,* 2016). The following paragraph will cover acute coronary syndrome.

2.11 Acute coronary syndrome:

Acute coronary syndrome (ACS) includes patients with ischemic cardiac chest pain of recent origin in acute myocardial infarction, unstable angina, patients who experience abrupt closure of a coronary artery during the percutaneous coronary intervention (Kotecha & Rakhit, 2016). Research conducted by Bueno (2018) stated that the mortality rate due to ACS is about 1.8 million deaths yearly. However, the incidence of Ischemic heart disease in general and acute coronary syndrome increases with age on average, which occurs 7–10 years earlier in men than women (Bueno, 2018). Furthermore, the acute coronary syndrome occurs far more often in men than in women below 60 years, but women represent most patients over 75 years of age (Bueno, 2018). The following paragraph will cover heart failure.

2.12 Heart failure:

Heart failure is when the heart can not maintain blood circulation is impaired due to a functional impairment of ventricular filling or ejection (Inamdar and Inamdar, 2016). Research conducted by Virani *et al.* (2020) in the US showed that about 6.2 million adults have heart failure, and in the year of 2018, heart failure was mentioned on 379,800 death certificates (Virani *et al.,* 2020). On the other hand, treating heart failure patient costs in the US was estimated at about $30.7 billion in 2012 (Virani *et al.,* 2020). According to Conrad *et al.* (2018), about 920000 people live with Heart failure in the UK. The following paragraph will cover the lifestyle management of coronary heart disease.

2.13 The lifestyle management of coronary heart disease:

Coronary heart disease can be managed effectively with a combination of lifestyle changes, medicine and, surgery (Rippe, 2019) (Ittaman *et al.,* 2014) (Kandaswamy & Zuo, 2018). The lifestyle changes that reduce the chance of developing coronary heart disease include eating healthily, being physically active, giving up smoking, reducing alcohol consumption, Keeping blood pressure under control, and keeping diabetes under control (Rippe, 2019). For example, researchers have shown that People that have fruits and vegetables, whole grains, nuts, fish, poultry, and vegetable oils diets had a 31 per cent lower risk of heart disease, a 33 per cent lower risk of diabetes, and a 20 per cent lower risk of stroke (Chiuve *et al.,* 2012). Furthermore, research has shown That a healthy lifestyle may prevent over 80 per cent of cases of coronary artery disease, 50 per cent of ischemic strokes, 80 per cent of sudden cardiac deaths, and 72 per cent of premature deaths related to heart disease

(Chiuve *et al.,* 2011). The following paragraph will cover the medication management of coronary heart disease.

2.14 The medication management of coronary heart disease:

There are many different medicines to treat coronary heart disease. Like anticoagulation medicines, statins, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, diuretics (Ittaman *et al.,* 2014). Anticoagulation medication is known as (blood thinners), which prevent blood clots from forming, preventing any blood clots from travelling to the brain and causing a stroke to the patient (Ittaman *et al.,* 2014). There are different types of anticoagulation medication, such as antiplatelet and warfarin (Ittaman *et al.,* 2014). Aspirin reduces the mortality rate and reduces the chances of developing stroke (Ittaman *et al.,* 2014). On the other hand, warfarin has an even more impressive record of reducing mortality by 25 to 35 per cent and recurrent infarctions by 50 per cent, with an acceptable risk for cerebral haemorrhage of 2 per cent per year (Ittaman *et al.,* 2014). In addition, Research has shown that statin lowers the chance of heart attack by about 54 per cent, reducing the chance of stroke by about 48 per cent, reducing the need for angioplasty or coronary artery bypass surgery by 46 per cent, and reducing the chance of sudden death by 20 per cent. In addition, among patients taking a statin, their low-density lipoprotein cholesterol levels were reduced by 50 per cent (Garcia *et al.,* 2016).

Beta-blockers is known as beta-adrenergic blocking agents which is an agent that reduces blood pressure (Xu *et al.,* 2019). According to Oh, *et al.* (2016) ACE medications relax the veins and arteries to lower the patient blood pressure.

Lastly, a diuretic is known as (water pill) which this medication help the body to get rid of sodium and the water into the urine (Ellison & Felfker, 2017). Furthermore, many patients face difficulties to treat their narrow blood vessels with medication. In this case, surgical procedures will be needed, such as Coronary angioplasty, Coronary artery bypass graft, and Heart transplant (Kandaswamy & Zuo, 2018). The following paragraph will cover revascularization

2.15 Revascularization

There are two types of prevention mechanisms to prevent and reduce the impacts of coronary heart disease. Primary prevention refers to the action taken by the patient to prevent coronary heart disease, which is achieved by maintaining a healthy lifestyle such as having a healthy diet and daily exercise. However, secondary prevention focuses on reducing the impact of the disease by early diagnosis before any critical and permanent damage to the arteries by revascularization. Revascularization is restoring blood flow to the heart after the arteries have become clogged with cholesterol plaque (Ennker *et al.,* 2013). This procedure can be accomplished through many interventions such as the following: coronary artery bypass graft (CABG), angioplasty, or stenting (Bennett & Dubois., 2013). Bennett and Dubois (2013) stated that angioplasty and stenting are minimally invasive catheter procedures that together are known as percutaneous coronary intervention (PCI).

Percutaneous transluminal coronary angioplasty (PTCA) or balloon angioplasty are known as other common interventions used to treat patients with cardiovascular issues (Bennett & Dubois, 2013). Furthermore, an angioplasty procedure is done for a patient with angina, and it is an urgent treatment if the patient symptoms have become unstable

(Bennett & Dubois, 2013). A coronary angiogram is the most common test performed to identify the possibility of presenting any narrowing or blockage in the arteries. This test is performed by using a special X-ray, and it requires a dye that will be injected through the blood vessel and at the same time, the X-ray will be taken to examine any coronary artery problems (Tavakol *et al.,* 2012).

According to Tavakol *et al.* (2012), coronary angioplasty is also accomplished as an emergency treatment, especially during a heart attack. A small balloon is inserted during the procedure to push the fatty tissue in the narrowed artery outwards. Furthermore, this procedure will allow the blood flow to move more quickly in the vessels, by a metal stent known as a wire mesh tube is usually placed in the artery to hold it open. Drug-eluting stents can also be used, those types of stents release medicines to stop the artery from narrowing again by preventing any form of a blood clot (Tavakol *et al.,* 2012).

Melly *et al.* (2017) reported that coronary artery bypass grafting is also known as bypass surgery. It has been carried out in people whose arteries are narrowed or blocked. Regarding off-pump coronary artery bypass, Calafiore *et al.* (2017) stated that it is a type of coronary artery bypass surgery performed while the heart continues to pump blood by itself without needing a heart-lung machine. Instead, a blood vessel is grafted between the main artery leaving the heart, the aorta, and a part of the coronary artery, the blocked area. Sometimes, an artery that supplies blood to the chest wall is used and diverted to one of the heart arteries. Furthermore, that will allow the blood to bypass (get around) the narrowed sections of coronary arteries (Tala et al., 2015).

In addition, Jennings *et al.* (2014) stated that since the percutaneous coronary intervention was first performed in 1977, it has rapidly evolved into one of the most

performed medical procedures, currently over 3 million annually worldwide. In addition, as the American heart association stated in 2012, the number of coronary artery bypass graft surgeries performed worldwide is more than 800,000 every year (Pan Vascular medicine, 2014). Furthermore, according to the national audit for percutaneous coronary intervention report, there was 102,258 PCI performed in the UK between 2017 and 2018 (Percutaneous Coronary Intervention,2019). However, the annual number of coronary artery bypass surgeries performed in the United Kingdom from 2018 to 2019 is about 14.2 thousand surgeries (Stewart, 2021). In comparison, the postoperative mortality rate of PCI procedure is 2.4 per cent, while the mortality rate for CABG procedure is about 2.6 per cent (Mejia *et al.*, 2021) (Noman *et al.,* 2017). It is essential to highlight that percutaneous coronary intervention is not for everyone. Depending on the patient's condition, the doctor may determine that percutaneous coronary intervention surgery is a better option if the pulmonary veins are narrow, the heart muscle is weak, and the patient has diabetes and multiple severe blockages in the arteries. (Pursnani *et al.,* 2012). According to Diodato and Chedrawy (2014), coronary artery bypass graft (CABG) surgery is performed when there is a blockage or partial blockage or impairment in the coronary arteries, which affects the blood flow in heart malfunction. For this type of surgery, the surgeon is going to take a blood vessel from another part of the body and graft in the heart to improve the blood flow by this new blood flow route, and this is going to enhance heart function. Finally, it is important to highlight that if the patient has an artery blockage, that cannot be treated with angioplasty.

Heart valve repair, for this procedure, the surgeons either repair the damaged valve or replace it with an artificial valve or replace it with a biological valve made from human

heart tissue, pig or cow tissue. Furthermore, there is an option to repair the patient valve by installing a catheter through a large blood vessel and directing it to the heart, then inflating and deflating a small balloon at the end of the catheter to extend a narrow valve (Fok *et al.*, 2014).

According to Kotsakou *et al.* (2015), there are two main ways to maintain tachycardia, bradycardia and irregular heartbeat, which is an insertion of a pacemaker or an implantable cardioverter-defibrillator (ICD). In some cases, the medication fails to treat or control the heartbeat, therefore, the surgeon may implant a pacemaker below the skin of the chest, with wires that attach to the heart chambers. The device uses electrical pulses to control the heart rhythm when a sensor detects that it is abnormal. In addition, Kotsakou *et al.* (2015) An ICD works similarly. However, it sends an electric shock to restore a normal rhythm when it detects a dangerous arrhythmia such as ventricular tachycardia (VT) or ventricular fibrillation (VF).

In addition, Maze surgery is another type of cardiac intervention. In this surgery, the surgeon will make a pattern of scar tissue within the heart's upper chambers to redirect electrical signals along a steady path to the lower heart chambers. The surgery blocks the stray electrical signals that cause atrial fibrillation, the most common type of severe arrhythmia. (Kotsakou *et al.,* 2015). Invasive heart surgery is performed by making minor incisions in the right side of the chest to reach the heart between the ribs without cutting the ribs like open-heart surgery (Doenst *et al.,* 2017). However, many heart procedures are performed with minimally invasive heart surgery, such as valve repair or replacement, Atrioventricular septal defect surgery, Atrial septal defect, and the Maze procedure atrial fibrillation (Antoniou *et al.,* 2015). Most heart surgeries are major surgeries. Although often

successful, they do entail risks. The National Heart, Lung, and Blood Institute identifies some of these risks, such as bleeding, chest wound infection, to highlight, those complications are more common in patients with obesity or diabetes or those who have had a CABG before. However, other side effects are reactions to anaesthesia, heart attack, damage to tissues in the heart, kidneys, liver and lungs. In addition, stroke, breathing difficulty, pneumonia, Death. (Hartog *et al.,* 2019). The following paragraph will cover issues face the patient in the pre-operative stage, and the complication after the surgery

2.16 Issues face the patient in pre-operative stage, and the complication after the surgery

Cardiovascular complications in the perioperative period are the most common events leading to increased morbidity and mortality, making it essential for physicians to understand the importance of perioperative cardiovascular risk assessment and evaluation. Preoperative preparation involves detailed history taking, the patient's medical profile, medications being used, functional status, and knowledge about the surgical procedure and its risks (Rafiq *et al.,* 2017). However, patients in the preoperative stage face mixed feeling such as fear, worry, anxiety, suspicion, and hopefulness (Mulugeta *et al.,* 2018). Preoperative anxiety is an uncomfortable, tense, unpleasant mood before surgery, an emotional response to a potential challenge or threat to reality(Liu and Xuzhou, 2017). However, preoperative anxiety has been shown to have adverse postoperative outcomes such as increased postoperative pain, delay of healing, and prolonged hospital stay (Mulugeta *et al.,* 2018). The most common complication of cardiovascular surgery is chest wound infection, pneumonia, chest pain, heart attack, irregular heartbeat, blood loss, blood clot, and breathing difficulty.

(Alston *et al.,* 2015). Research conducted by Abate *et al.* (2020) stated that globally about 48 per cent of patients suffer from preoperative anxiety. In addition, approximately 20 per cent up to 50 per cent of patients experienced anxiety while waiting for Bypass surgery (Heilmann *et al.,* 2016). However, a study conducted in Germany by Sachs et al. (2014) showed that 44 per cent of patients would need psychological support on the day of admission for cardiovascular surgery to reduce their level of anxiety (Sachs *et al.,* 2014). The following paragraph will cover pre-operative preparation, nursing education and the of it on the surgery.

2.17 pre-operative preparation, nursing education and the impact of it on the surgery

When the patient has been scheduled for surgery, the following tests are needed to form a clinical baseline assessment before surgery (Engelman *et al.,* 2019). That will help the doctors decide the best treatment for the patient during and after the operation (Engelman *et al.,* 2019). Firstly, the preoperative preparation will include Cardiac Anesthesiologist, Electrocardiogram, Chest X-ray, Blood work and urine analysis (Engelman *et al.,* 2019). Then the patient will receive nursing education before the surgery, which will enhance the speed of the patient recovery period (Herbert *et al.,* 2017). However, suppose the patient is identified as a smoker, in that case, inform the patient to stop smoking three weeks before the surgery (Myers *et al.,* 2011). The reason for this occurrence is that smoking can cause the developing of pneumonia and pulmonary complications after surgery, making the heart pump blood harder (Myers *et al.,* 2011).

On the other hand, it is advised to discontinue anticoagulants medications four days before the surgery, such as aspirin, Plavix, and Motrin. Also, Medications for diabetes such as

glyburide, metformin, and insulin should not be taken on the day of surgery. (Plümer *et al.*, 2017). Preoperative preparation allows patients to Gain a better understanding of their surgery, feel more in control, decrease their anxiety level and decrease the length of their hospital stay (Tollefson *et al.,* 2012). In addition, research conducted by Klaiber *et al.* (2018) highlighted that patient education in the preoperative period help with decreasing the recovery period and decreasing postoperative complications. In addition, appropriate timing of preoperative education is helpful for the patient's information retention, because cardiovascular surgery is anxiety-provoking to most patients, the nurse must assess the patient for individual learning needs and provide the information on time to minimize as much anxiety as possible (King *et al.*, 2014). In addition, During preoperative teaching, the nurse should provide postoperative expectations such as pain and inform the patient that pain will be managed during the postoperative period (Garimella & Cellini, 2013).

2.18 Chapter summary

This chapter outlines the definition of cardiovascular disease and the different conditions that are incorporated with cardiovascular disease. Also, it identified coronary heart disease and highlighted the symptoms that are associated with CHD. Then it discussed the incidents and prevalence of the cardiovascular disease worldwide, United States, the United Kingdom, and the United Arab Emirates. After that, it highlighted the non-modifiable and modifiable risk factors to develop cardiovascular disease. Furthermore, it identified acute myocardial infarction and its prevalence worldwide. Also, it identified angina pectoris and the prevalence in western countries. As well as identified acute coronary syndrome

pectoris and the prevalence in both genders. Then it identified heart failure and the prevalence of it in the United States and the United Kingdom.

On the other hand, it also highlighted the lifestyle and medication management of coronary heart disease. After that, the chapter identified revascularization and the type of procedure. Then it will highlight the patient's issues in the pre-operative stage and the complication after the surgery. And lastly, it discusses pre-operative preparation, nursing education and the impact it on the surgery.

Chapter three - Methodology

3.1 Introduction

This chapter will discuss the methods that are used in this systematic review, also it will discuss the aim, objective and the review question will be outlined. the keywords will be present that have been used to inform the search strategies for their databases Including inclusion and exclusion criteria for the retrieved studies the purpose of this chapter is to ensure transparency and replicability of the search and That resulted in selection of the relevant result articles.

3.2 Systematic review

A systematic review of the literature was chosen to compile evidence on the impact of nurse lead educational intervention on reducing the level of anxiety in patients undergoing cardiac surgery, and examine significant relevant research, extract and examine records from the studies covered, including the review (Akker *et al.,* 2020). A systematic review is based on a comprehensive literature search of all available researchers for the target research question. It provides information about the consequences of specific phenomena under various empirical conditions and methods (Sinclair *et al.,* 2013). When the research produces consistent results, the systematic review will prove that the phenomenon is reliable and applicable. If the research produces conflicting results, the source of the variation can be checked (Sinclair *et al.,* 2013).

3.3 The study Aim, objective as well as the review question

The literature review aim is to examine the impact of nurse leads educational interventions in the pre-postoperative of patients attending cardiac surgery. In addition, the literature review objective is to Identify whether nursing educational interventions can reduce patient level of anxiety, and to determines the effectiveness of nursing education programs on patient anxiety. Furthermore, the literature review question is “The impact of nurse leads educational intervention on anxiety in patients undergoing cardiac surgery”

3.4 Research Strategy

A Research Strategy is a step by step course of action that offers a path to individual, mind and efforts, enabling people to conduct research systematically and on the agenda to provide quality outcomes and unique reporting. This allows the researcher to stay focused, enhance quality and most importantly, save time and resources (Dinnen, 2014). For this research stratagem PEO question format was used. And the question based on this format identify three concepts (1) population, (2) exposure, and (3) outcomes. (VCU Libraries Research Guides., 2021). (Table 1)

Table 1 – The research strategy

Population	Patient undergoing a cardiac surgery
Exposure	the effect of nursing-led educational programmers on patients undergoing cardiac surgery
Outcomes	the impact of patient education to reduce anxiety

3.5 The Data Base:

CINAHL complete Database contains more than 2.3 million records since 1981. (Wright *et al.*, 2016) The CINAHL complete database provides an index with more than 3,000 English-language nursing and health journals and publications (Wright *et al.,* 2016). CINAHL complete database has coverage of nursing journals and publications by the National Nursing Federation (NNF) and the American Nursing Association (ANA) (Wright *et al.,* 2016). Also, CINAHL complete database covers nursing, medicine, biomedicine, alternative medicine and 17 health-related disciplines (Wright *et al.,* 2016). Moreover, it

provides access to health care books, nursing dissertations, audiovisual materials, and book chapters (Wright *et al.,* 2016).

In addition, the PubMed database was invented by the National Library of Medicine (NLM), and it includes journal articles in medicine, dentistry, nursing, veterinary medicine, and healthcare systems (Williamson & Minter, 2019). PubMed database contains information about journal articles currently more than 24 million published in 5,600 journals in 30 languages since 1946 (Williamson & Minter, 2019). Moreover, the NLM indexer adds words called medical subject headings (MeSH) to the information about each article. Thus, meSH word search helps to find more relevant articles (Williamson & Minter, 2019).

Furthermore, Medline complete Database is a document index of biomedical journals published by the national medical library. approximately 5,000 journals are read, and their articles are indexed and added to the Medline database, which contains more than 12 million journal articles. (GWU health science students., N.D). Medline complete Database is an essential resource for medical research because it is peer-reviewed, comprehensive and authoritative. Medline is authoritative because it can strictly show the research was conducted, who wrote the results, and even where the research was conducted. Therefore, journals on Medline must target health professionals and researchers (GWU health science students., N.D). However, many Medline research is peer-reviewed because peer reviewers try to ensure that the research plan is thorough, the statistics are presented correctly, and the research is worth sharing (GWU health science students., N.D).

3.6 Search Strategy:

A search strategy is an organized form of key phrases used to search a database. The search strategy contains fundamental concepts of the search question to retrieve accurate results (Webb, 2021). Search strategy that was used to conduct the research was key words, the Boolean operator, inclusion and exclusion. The keywords used in the database to find the article are education, cardiac surgery, nurse education, anxiety, patient education and preoperative education. The Boolean operator that was used to find articles is (and) Because this requires the presence of these two terms in each item returned, if one term exists in the document and the other does not, the item will not be included in the final list, which will narrow the search (Alliant Libraries, N.D.) However, the research was taking on 20 January 2021 until 8 November 2021. the study has exclusion and inclusion criteria, as shown in the (Table 2).

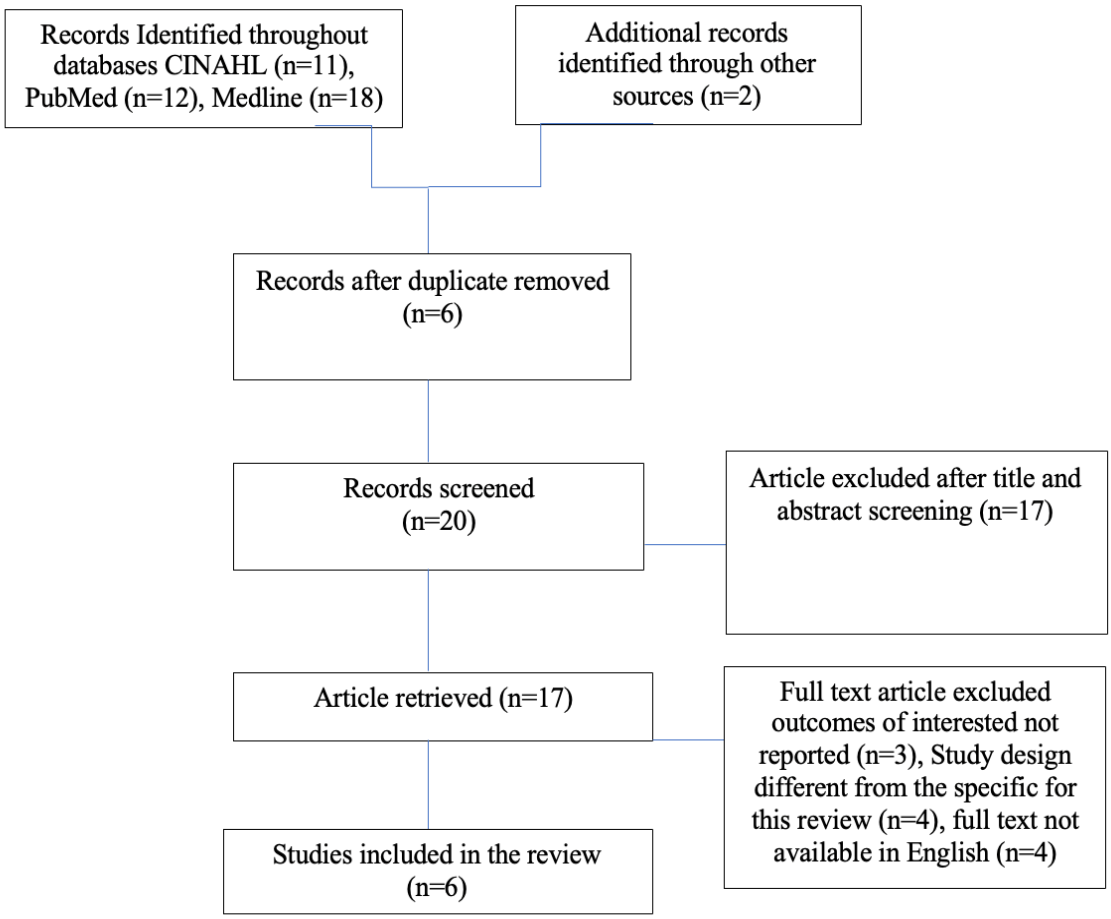
The inclusion criteria for this research	The exclusion criterion of this study
• Peer Review article from 2011 to 2021. Because it will show better significance of research contribution • English language only • Focused on patient anxiety in the pre – post operative period • Focused on nursing education to reduce patient anxiety	• Articles should not be written in languages other than English • Articles should not be less than ten years old, and they should not be secondary research • The article should not focus on pain management or primary research

• Focused Primary research papers on cardiovascular surgeries only (Patino and Ferreira., 2018)	• Research focus that does not answer research questions (Patino and Ferreira., 2018)

3.7 The PRISMA Flowchart

The flow diagram represents the flow of information through the specific levels of a systematic review. It maps out the range of statistics identified, included and excluded. Also, it shows the Different templates available depending on the type of review, new or updated, and sources used to discover studies (PRISMA, 2021). The recorded result from the CINAHL complete database was (n=11), Pub Med database was (n=12), Medline complete database was (n=18), and other sources (n=2). After entering all the result to endnote soft wear, it removed (n=6) articles that were duplicate. After the title and abstract screening (n=20) articles were excluded, leading to (n=17) article. However, after full article reading, the article was excluded because it was focused on pain management to reduce patient anxiety (n=3). The study design form of the article, like scoping review, was excluded (n=4). Furthermore, about (n=4) were excluded because it was not available in English. And that leave (n=6) studies included in the review (See Appendix 1,2,3) (See Figure 1).

(Figure 1 – PRISMA flow chart)



3.8 Data extraction

The articles were chosen for the research question. We're focused on the effect of preoperative education on patient anxiety in the preoperative period for cardiac surgery. The research took place in different areas and different years, like the Turkey was conducted in 2018. Greek was conducted in 2015, and china was conducted in 2011, Germany was conducted in 2015 and Iran was conducted in 2013 and 2018. In addition, the research types were qualitative and quantitative, and the study design was mixed between quasi-experimental and randomized controlled trials. However, all the research results showed that

preoperative education had reduced patient anxiety before the surgery, except one research conducted in Iran showed no significant relation that preoperative education affects patient anxiety (**See Appendix 4**) the next chapter will discuss the critical appraisal skills of research articles.

3.9 Chapter summery

This chapter outlines the methodology that was implemented in the systematic review, and it discusses the literature review aim and objective, as well as the review question was outlined. Then, the keywords were presented that have been used to inform the search strategies. Also, it discussed the databases inclusion and exclusion criteria for the retrieved studies. After that, it discussed how the PRISMA flow was used for information through the specific levels of a systematic review. Lastly, it highlighted the use of data extraction in differentiating all of the selected articles.

Chapter Four - Critical Appraisal of Research Articles

4.1 Introduction

This chapter will include a critical appraisal of the chosen article of the study using critical appraisal skills programs (CASP) by checking the article validity, results, and usefulness (CASP, 2021). In addition, this chapter will discuss the purpose of using critical appraisal skills program, and this chapter will highlight if the s study design is valid for a randomized controlled trial, if the study is methodological sound, what the results of the articles, and if the results will help locally (CASP, 2021). The critical appraisal skills programs enables to systematically assess the trustworthiness, relevance and results of published papers. The critical appraisal skills programs tool has over 25 years of significant and unrivalled expertise in delivering training to healthcare professionals. (CASP, 2021).

4.2 Critical Appraisal Skills of Research Article

The critical appraisal skills programs tool provides a validated framework to guide critical appraisal in a systematic fashion allowing consistency in the appraisal of research studies (CASP, 2021). The program consists of seven critical appraisal tools to assess Systematic review, randomized control trials, qualitative research, economic evaluation studies, cohort studies, case-control studies, and diagnostic studies (Long *et al.,* 2020). The articles that will be critiqued are a total of six articles. Five of the articles were randomized control trial studies (Malek *et al.* 2018) (Kalogianni *et al.,* 2015) (Guo *et al.,* 2011) (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013). However, one article by (Erturk & Unlu, 2018)

is a quasi-experimental study. Moreover, the CASP tool randomized controlled trial is chosen to critique the article. It contained 11 questions (CASP, 2021) (See Appendix 5).

4.3 Did the studies address a clearly focused issue:

All chosen articles for this literature review had addressed the targeted issue in their study, which is reducing the patient level of anxiety by the nursing educational intervention (Hoseini *et al.,* 2012) (Guo *et al.,* 2011) (Malek *et al.,* 2018) (Heilmann *et al.,* 2016) (Kalogianni *et al.,*2015) (Erturk & Unlu, 2018). In addition, all of the chosen articles had the same targeted population for their study, which was patients undergoing cardiac surgery. However, the participant in each study had different nursing educational interventions. For example, participants in the Hoseini *et al.* (2012) study received an audiotape educational program before and after six weeks of the surgery. Moreover, other study provided their participant with an information leaflet and verbal advice (Guo *et al.,* 2011). On the other hand, Malek *et al.* (2018) provided her participant's verbal education to increase patient knowledge and address their concern. However, other studies provided the patient with educational dialogue with individualized information (Heilmann *et al.,* 2016). The study performed by Kalogianni *et al.* (2015) provided the patient with a booklet that contained information regarding the surgery and the postoperative care. Furthermore, the study performed by Erturk & Unlu (2018) provided the participant's individualized education regarding their source of anxiety. The outcomes from all the studies were measured.

4.4 Was patients' treatments randomised:

The researchers assigned their study's participants randomly to the treatment, which is appropriate in a randomized controlled trial study to minimize bias and not affect the results' significance. However, only one study performed by Erturk & Unlu (2018) used a quasi-experimental study instead of randomizing. Nevertheless, all of the studies used a different way of randomization. The study was performed by Hoseini *et al.* (2012) used power SSC software to divide the participants into equal groups 35 participants were in the control group, and the other 35 were in the intervention group. In the study that was conducted by Guo *et al.* (2011), the randomization was implemented by the PG using a series of consecutively numbered, opaque and sealed envelopes. The sealed envelopes are appropriate to reduce bias and show significance highly on the finding because the participants cannot know which group there belong to in the study (Clark *et al.,* 2021).In addition, the study that was performed by Malek *et al.* (2018) used random block sampling, and the first ten blooks were considered the experimental group and the other ten were considered in the control group, and this process will be continued intel recaching the sample size, however, the random block sampling is commonly used to reduce bias achieve balance in the allocation of participants to treatment especially when the sample size of the studies are small (Efird, 2011).

Furthermore, in the study conducted byKalogianni *et al.* (2015), the participants have divided into two groups. The intervention group had an odd admission number, and the control group had an even admission number. The study that was performed by Heilmann *et al.* (2016) had the participants computerized randomized to the study.

4.5 Were all of the patients who entered the trial properly accounted for at its conclusion:

During all the chosen studies, all the participants completed their trial without any complication, and all the participant data was analyzed in the trial (Malek *et al.* 2018) (Kalogianni *et al.,* 2015) (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013) (Erturk & Unlu, 2018). According to (Holmberg *et al.,* 2014), completing Clinical trials are essential for discovering new treatments for diseases and new ways to detect, diagnose, and reduce the disease's chance of developing. In addition, if the participant completed their trial, it shows the significance of the study and the findings (Holmberg *et al.,* 2014). However, the study of Guo *et al.* (2011) not all of the participants completed the trial and that due to loss of contact with a patient that was discharged without surgery, also In China, it is not unusual for patients to discharge themselves before surgery due to the financial cost.

4.6 was the studies personnel 'blind' to treatment:

Not all articles selected for this study used the blind Technique in their treatment (Malek *et al.* 2018) (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013) (Erturk & Unlu, 2018). According to Karanicolas *et al.* (2011), If participants are not blinded to the study, it may affect their behaviors in the trial and their responses to subjective outcome measures. Moreover, it has been shown that the blinding technique aims to reduce the risk of bias caused by an awareness of the participants in the study (Forbes, 2013). However, in the study performed by Kalogianni *et al.* (2015), the researcher had the two groups blindly to the treatment. The researcher put patients with odd admission numbers to an intervention

group and put an even admission number to the control group. Blinding is an important methodologic feature of randomized control trials to minimize bias and maximize the validity of the results (Karanicolas *et al.,* 2011).

4.7 Were the groups similar at the start of the trial:

The studies had their intervention group and control group similar in demographics such as gender, family status, having kids, nationality, education level, residence, BMI, and smoker status (Hoseini *et al.,* 2012) (Guo *et al.,* 2011) (Malek *et al.,* 2018) (Heilmann *et al.,* 2016) (Kalogianni *et al.,* 2015) (Erturk & Unlu, 2018). Moreover, the demographic information provides data regarding research participants (Stam, 2010). Therefore, it is necessary to determine whether the individuals in a particular study are a representative sample of the target population for generalization purposes (Stam, 2010). The recognition of inherent individual-level heterogeneity has significant consequences for research practices. For example, because units of analysis in a population are all different, scientific or random sampling is essential to ensure the representativeness of a well-defined population (Xie, 2013). In addition, homogeneity considers whether a significant level of variability is more excellent than expected in a sample with variability resulting from random sampling error (Allen, 2017).

However, in the study done by Erturk & Unlu. (2018), the study participants were not similar in the demographic such as gender, marital status, employment status, operation type, and the patient's previous surgery and source of anxiety by the significant difference of p-value of ($p < 0.05$). Some of the studies had power calculation sampling was done for the sample size in their study (Malek *et al.,* 2018) (Kalogianni *et al.,* 2015) (Guo *et al.,* 2011).

Moreover, the benefit of having power calculation sampling allows us to know how many patients are required to avoid a type I or a type II error (Schmidt *et al.,* 2018). On the other hand, problems with recruitment can disrupt the timetable for a research project, preoccupy the researcher, reduce the ability of a therapeutic study to detect treatment differences and, ultimately, result in a trial being abandoned (Patel *et al.,* 2018). However, the benefit of using recruitment is that it assures that participants reflect the main characteristics and behaviours of the target participants (Newington & Metcalfe, 2014). Unfortunately, (Erturk & Unlu, 2018) (Hoseini *et al.,* 2012) (Heilmann *et al.,* 2016) study did not perform power calculations for their sampling, which indicate that the number of patients required to avoid a Type I or a type II error in the study were not provided (Schmidt *et al.,* 2018).

4.8 were the groups treated equally:

The study showed that most of the studies did not treat the two groups equally, and they all had different intervention techniques. Kalogianni *et al.* (2015) The validity of the research is also understood from the fact that the intervention group received preoperative education by the specially trained nurse as they provided the patient with a booklet that had all information about the surgery, and they emphasized the patient to perform breathing exercises, leg exercises, pain management and control arm movement.

In addition, Guo *et al.* (2011) The validity of the research is also understood from the fact that the control group received usual care, had separate visits from the surgeon and anaesthetist one day before surgery, these visits allow patients and family members to gain information about their surgery and anaesthesia's general process and risks, additional

information was available from the ward-based cardiac nurses. However, the intervention group had an information leaflet and verbal advice.

The research was conducted by Heilmann. *et al.* (2016) The validity of the research is also understood because the participants in the control group were routinely informed as usual. The patients of the intervention group received a dialogue with individualised information and emotional support one day before surgery and standard care.

In addition, the study of Hoseini *et al.* (2012) The validity of the research is also understood from the fact that the intervention group received routine training. An audiotape educational programme was given to the intervention group after surgery and followed up for six weeks. However, patients in the control group received only routine training.

However, Malek *et al.* (2018) had the two groups receive the same treatment and intervention, the treatment group and randomized group Received routine care including medication and controlled hemodynamic status; also, a participant in both groups had to Fill Spielberg's state anxiety inventory (SSAI) the day of admission and the night before the surgery. Moreover, the primary outcome was to measure the patient's anxiety level in the admission and before the surgery.

On the other hand, in Erturk & Unlu. (2018) study, the participant, was not divided into two groups. They all had the same treatment and intervention; all Patients underwent the state-trait anxiety inventory (STAI) one day before the operation to identify their sources of anxiety and educational needs after that, individualized education was given accordingly to the patient needs. Then one day after the operation.

4.9 was the treatment effect:

The result from the study showed that the intervention group had a more significant reduction in anxiety level during the preoperative period than the control group and the significance of the intervention effect was (p=0.001), and that indicates that nursing educational intervention can reduce anxiety for a patient undergoing cardiac surgery (Malek *et al.* 2018) (Kalogianni *et al.,* 2015) (Guo *et al.,* 2011) (Heilmann *et al.,* 2015) (Hoseini *et al.*, 2013). However, the study that was done by Erturk & Unlu (2018) showed that there was no significant difference was the level of anxiety in the control and the intervention group with the P value of (P > 0.05). The confidence interval on the studies was mentioned in only two studies the first was in Malek *et al.* (2018) and the confidence interval of 95 per cent, and the second was performed by Guo *et al.* (2011), and the confidence interval of the study was (P < 0.001). In a study by Kalogianni *et al.* (2015), The confidence interval was mentioned to be measured, but it was not mentioned clearly in the study. Furthermore, another study did not mention the confidence interval (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013) (Erturk & Unlu, 2018). However, the result of all studies was clear and focused on nursing intervention to reduce the patient level of anxiety.

4.10 can the result be replicated in another population and were all outcomes considered in the studies, were all benefits with the harm and cost:

The result of the study can be replicated in another population if they follow the original methods of studies (Malek *et al.* 2018) (Kalogianni *et al.,* 2015) (Guo *et al.,* 2011) (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013) (Erturk & Unlu, 2018). The studies can be

replicated, and they will achieve the same or similar results as the original study, which will provide a greater validity to the findings and more likely that those results can be generalized to the larger sample size (Cherry, 2021). All the outcomes from the studies were considered to improve the patient level of anxiety before the surgery. In addition, the studies did not have a cost on the hospital (Malek *et al.* 2018) (Kalogianni *et al.,* 2015) (Guo *et al.,* 2011) (Heilmann *et al.,* 2015) (Hoseini *et al.,* 2013) (Erturk & Unlu, 2018). However, four studies did not cause any emotional and psychological harm to the patient. However, one study caused the patient to experience psychological harm, which caused the participant to have a high level of anxiety due to the nursing educational intervention (Erturk & Unlu, 2018). The next chapter will discuss the finding of the literature review.

4.11 Chapter Summary:

This chapter discussed the reason for choosing the critical appraisal skills programs, and it discussed the purpose of the programmes. In addition, the chapter identified critical appraisal skills programs. However, then the program critiquing totally of fix article. Afterwards, it discussed if the studies had a clear focused issue, was the treatment randomized, did the participant completed their trial without any complication, did the study use blind treatment, was the participant similar at the start of the trial and were they treated equally, as well as if the treatment effective, lastly, It discussed if the study can be replicated in other population. Lastly, it discussed if the study causes any emotional or psychological harm.

Chapter Five - The Finding

5.1 Introduction:

This chapter will discuss the research question, themes, and the findings from the comprehensive literature review. The primary purpose of this study was to examine the impact of nurse lead intervention in the preoperative period for patients undergoing cardiac surgery to reduce their level of anxiety. The research question is (The impact of nurse-led educational intervention on anxiety in patients undergoing cardiac surgery). The extended literature review was based on six articles, five of them were randomized, and one was quasi-experimental. All these articles were in different countries such as turkey, Greek, China, Germany and two were performed in Iran. This article aimed to measure a nursing intervention in the preoperative period in reducing patient anxiety for cardiac surgery. The following paragraphs will outline nurses leads educational interventions themes.

The first theme will discuss verbal education to reduce the patient level of anxiety. The second theme will be focused on using a booklet with information about cardiac surgery and the preoperative process. Patients receiving individual education according to their source of anxiety will be highlighted in the third theme. The fourth theme will be focused on using leaflets. However, the fifth them will discuss the use of dialogue and individual information on a patient undergoing cardiac surgery. Finally, patients receiving audiotape before and after six weeks of the surgical procedure to reduce their level of anxiety will be discussed in the last theme.

5.2 Theme 1. The highly significant importance of having nursing intervention such as verbal education for the patient undergoing cardiac surgery to reduce their anxiety, the participant in the research Malek, et al. 2018 showed that there is a significant difference between the anxiety level in the control group and the experimental group after the intervention with the P-value of ($P < .001$)

The participant in the research Malek et al. 2018 had to full Spielberger state anxiety inventory (SSAI) on the day of the admission and the day before the surgery. A patient selected to be in the intervention group received verbal education from the nurse, and the education included a detailed explanation of the surgical procedure and surgical complications. In addition, in this time period, the nurse allows the patient to ask questions regarding their concerns. The verbal education encourages the patient to speak about the cause of their anxiety and allows the nurse to develop verbal education and advice in reducing the anxiety. The mean score of anxiety before the intervention in the control group was (51.82), but in the experimental group, their anxiety was (58.22). These findings showed that the mean score of anxiety was significantly higher in the experimental group ($P < .001$). However, after the intervention, the mean score for the control group was (61.9), however the mean score of anxiety reduced to (48.39) in the experimental group ($P < .001$). this result showed the significant of having nursing verbal education and developing communication with the patient to reduce their anxiety (See Table 4).

The verbal nursing education had positive outcomes such as reducing patient anxiety and improving patients' sleep before the procedure, which showed that verbal education should be on top of the nursing task because the benefit of having nursing education will be

improved quality of care for the patient, having patients participate in their care, preparing the patient to care for themselves at home, improves patient treatment and length of stay at the hospital (Paterick et al. 2017).

Table 3 – The finding of Malek, et al. (2018) study

Control Group				Experimental Group		
Time	Scale	Mean	SD	Mean	SD	Independent t Test
Before the intervention	Anxiety	51.82	4.11	58.22	2.63	$P < .001$
After the intervention	Anxiety	61.09	3.36	48.39	7.05	$P < .001$

5.3 Theme 2. The significance of having nursing intervention education such as booklet with information about the cardiac surgery and the preoperative process. And there was a significant difference between the control group and the experimental group after the intervention, with the P-value of ($P < .001$)

The participant in the research Kalogianni et al., 2015, the educational intervention was carried out by three specialist nurses. On the admission day, all participants in the intervention group had received a booklet with information about the cardiac surgery and the preoperative process. The booklet was titled “All I should know before cardiac surgery”.

It included information about the anatomy, function, and surgery disease of the heart, the preoperative period, and the process. Furthermore, it emphasized self-care for the patient during this period. On the other hand, the control group received ordinary information, which was unstructured, verbal, and limited. Also, the surgeon and the anesthetists delivered some information about the preoperative preparation and the procedure.

The mean score was measured on admission for the control and intervention groups and did not differ between the two study groups. Specifically, the control group had a mean of (51.0), and the intervention group had a mean of (50.7), and the P-value was (P=0.116). The day before surgery, the mean score decreased dramatically for the intervention group to (34.0), and it decreased little beat in the control group to (36.9), and the P-value was (P=0.002). However, before discharge, both study groups had lower state levels than the corresponding levels on hospital admission and the day before surgery. The mean scores were lower for the intervention group before discharge (29.1) and for the control group it was about (34.6).and the P-value was (P=0.001), the mean decrease in the mean score during the follow-up period was more significant in the intervention group as compared with the control group. (See Table 5). And that improve that booklet education Improve nurse and Patient Communication Leading to Greater Compliance. Which Patient that received education booklet can break down complicated procedures, diseases, and therapies into relevant, which is easy to read the material, enabling patients to remember important information. The booklet also saves valuable office time for the patient and nurses and allowing to have more effective communication, professionally written patient brochures can be a huge time-saving tool. Patients do not always understand what their doctor is telling

them, and Having colorful, accurate images and text to review with your patient while going over their condition can lead to better understanding and fewer questions down the line (Bester, et al. 2016)

Table 4- The finding of Kalogianni et al. (2015) study

Group	On admission Mean (SD)	Day before the surgery Mean (SD)	Before discharge Mean (SD)
Control Group	37.7(10.6)	36.9(10.7)	34.6(10.2)
Intervention Group	36.1(9.6)	34.0(8.4)	29.1(6.5)
P value	0.116	0.002	<0.001

5.4 Theme 3. there is no significant difference detected between the participant that were participant, which they had to full in the state-trait anxiety inventory (STAI) to identify their source of anxiety and received individualize education according to their anxiety. the mean of preoperative and postoperative state of anxiety displays statistically significant differences with P value of ($P > 0.05$).

The participant in the research Erturk & Unlu, 2018. Each participant in the control group and the intervention group had different Sources of anxiety, which was identified before the operation. The participant's data was collected by spiel Berger state-trait anxiety inventory (STAI) and it included 20 items that identified how the participant feel in specific moment and under specific condition. Furthermore, the participants were given

individualized education during preoperative care according to their needs it included physical and psychological preparation before the operation, and it took between 30-90 minuets. And the most common source of anxiety was lack of knowledge, being away from family, risk of death, having pain, discomfort, loss of privacy, Impairment of body image, Complication development, inability to wake up from anesthesia, Loss of control over body, Loss of working ability and becoming permanently disable (See Table 6). According to Vahdat, et al., 2014, educating all patients the same allows them to feel more heard and respected, but providing care for each patient regarding there need help the patient to feel less anxiety and have less fear.

The participants mean score of anxiety in the preoperative was (34.34), but after the individual education the mean score of postoperative anxiety score was (35.94) for the participant. And that showed that there is no significant difference was identified between mean in preoperative and postoperative state anxiety scores ($P > 0.05$).

Table 5 - The finding of Erturk & Unlu. (2018) study

source of anxiety	**n (%)**
Lack of knowledge	77(70.6)
Being away from family	23(21.1)
Risk of death	18(16.5)
Having s pain,	17(15.6)
Discomfort	11(10.1)

Loss of privacy	11(10.1)
Impairment of body image	10(9.2)
Complication developmen	10(9.2)
Inability to wake up from anesthesia,	10(9.2)
Loss of control over body,	9(8.3)
Loss of working ability	8(7.3)
Becoming permanently disable	3(2.8)

5.5 Theme 4. The significant of having nursing intervention education such as leaflet reduce patient anxiety in the preoperative period with P value of ($P < 0.001$)

The participant in the research Guo, et al. 2011. The participant in the intervention group received usual care, such as having two separate visits from the surgeon and anaesthetist one day before surgery. These visits allow patients and families to gain information about their surgery and anaesthesia's general process and risks. Moreover, the intervention group will have an additional leaflet titled “your heart surgery”, and the contents of the leaflet were divided into several short sections under the headings: preoperative tests and preparation, the stay in the Intensive Care Unit (ICU) after surgery, returning to the cardiac surgical ward, and recovery at home. The leaflet also provided a contact number to call for further help after discharge from the hospital if required.

The participants in both groups had reduced anxiety scores at follow-up. But those in the preoperative intervention group had a mean decrease in anxiety score of 3.5 points (SD

4.50) while those in the control group had a reduction of 0.7 points (SD 4.95), and the P-value is (P < 0.001). (See Table 7)

Table 6 - The finding of Guo, et al. (2011) study

Variables	Control Group	Intervention Group
Anxiety scale (SD)	7.3(4.33)	6.0(3.59)

5.6 Theme 5. The significant of having nursing intervention education such as received dialog with individualized information, emotional support and having a supportive psychotherapy by train nurse with a P value of (P < 0.001).

The participant in the research of Hellmann, et al., 2016. The control group participant received routinely informed in the preoperative period such as the surgery, postoperative transfer to the ICU, on the hospital stay in general, and on the discharge management.

In addition, the participant in the intervention group received a dialogue with individualised information and emotional support one day before surgery in addition to standard care. Also, this intervention of 30 minutes was based on a supportive psychotherapy model and was delivered by trained nurses. Also, the anxiety level was measured by state-trait operation anxiety (STOA). *Emotional support* is the sensitive, understanding approach that helps individuals accept and deal with their difficulties or illness. And emotional support can increase longevity, improve psychological function and

cause improvement to immune system function, allow the patient to be calm and relax, and having lowering anxiety (Yoo, et al, 2015).

The significantly of reducton of anxiety level was found in the intervention group compared to the control group before coronary artery bypass grafting by the P value of ($p < 0.001$), and five days after surgery with P value of ($p < 0.001$).

5.7 Theme 6. The significant of having nursing intervention education before and after 6 week of the procedure such as audiotape, which reduce patient anxiety, with P value of ($P < 0.001$).

The participant in the research Hoseini et al. 2012. The participant in the intervention group received an audiotape educational programme after the surgery in addition to routine training, and this audiotape contained all the training and information needed for postoperative care at home. However, patients in the control group only received routine training. Levels of anxiety were measured by the hospital anxiety and depression scale (HADS) questionnaire. The Data were collected before and six weeks after the intervention. The audiotape reduces the teaching time with the patient and allows more time to be spent in helping the patient apply the information.

the participant in the intervention group had a mean anxiety score of 4.17 showed a significant decrease in ($p < 00001$). However, the anxiety score in the control group not only had any reduction but also increased to 10.08 after six weeks. (See Table 8)

Table 7 - The finding of Hoseini et al. (2012) study

Out comes	Group	Mean score before intervention (SD)	Mean score after intervention (SD)	P value
Anxiety	Intervention	10.14 (1.86)	5.97(2.28)	0.0000
	Control	9.88(3.96)	10.08(1.68)	0.79

5.8 Chapter summary

This chapter discuss the subthemes that were used in the extended literature review. Also, this chapter highlighted the first theme discuss nurses using verbal education to reduce patient level of anxiety and it was highly significant in reducing patient anxiety with the P value of ($P < .001$). The second theme the nurses were focused on using booklet with information about the cardiac surgery and the preoperative process to reduce patient level of anxiety and it was highly significant in reducing patient anxiety with the P value of ($P < .001$). In the third theme the nurses provided the patient with individual education according to their source of anxiety, however it was not significant in reducing patient anxiety with the P value of ($P > 0.05$). The fourth theme nurses were focused on using leaflet to reduce patient level of anxiety and it was highly significant in reducing patient anxiety with the P value of ($P < .001$). In addition, the fifth them will discuss the nurses were focused on using of dialog and individual information on patient undergoing cardiac surgery to reduce the level of anxiety and it was highly significant in reducing patient anxiety with the P value of ($P < .001$). last theme the patient receiving audiotape from the nurses before and after 6 weeks of the surgical procedure to reduce their level of anxiety and it was highly significant in reducing patient anxiety with the P value of ($P < .001$).

Chapter Fix- Discussion

6.1 Introduction:

This chapter will discuss the barriers that faced finding research that discussed the effectiveness of nursing intervention in reducing patient anxiety for cardiac surgery, and then it will highlight the impact of nursing education for the patient undergoing cardiac surgery and the impact of preoperative education. Also, this chapter will discuss the comparison of the findings from the umbilical studies retrieved in the systematic review with the published literature and understand the impact of nurse lead intervention in the preoperative period for patients undergoing cardiac surgery to reduce their level of anxiety. Furthermore, the purpose of the study was to evaluate the effectiveness of nursing intervention in reducing patient anxiety for cardiac surgery. It was challenging to find the research that highlighted the importance of nursing education in the preoperative stage in cardiac surgery. However, there was little research that has been done about this topic. Nevertheless, the articles selected for this research did discuss the effectiveness of nursing intervention and the education Strategy that has been done and their effect on patient anxiety.

6.2 The impact of nursing education in the preoperative period for patient undergoing cardiac surgery

Nursing education in the preoperative period for cardiac surgery is important because it aims to improve patient knowledge about their surgery and improve their

behaviors and health outcomes (McDonald *et al.,* 2014). Also, the education that patients receive before surgery has significant positive effects on surgery outcomes. The results of preoperative education in this study showed increased overall patient satisfaction of the education and improved quality of life (Yu, 2015). Furthermore, many articles selected for this research showed that the significance of nursing education in the preoperative period to reduce patient anxiety was ($P < 0.001$).

6.3 The impact of preoperative education

As a result of the literature review, it has been shown indicate we need more research that discusses the impact of preoperative education. Because as it has shown, it has a positive footprint such as allowing the patient to gain a better understanding of their surgery, making the patient feel more in control of their condition, decreasing the length of stay of the patient in the hospital. It allows the patient to experience decreased postoperative pain and anxiety (Moyle, 2020). Preoperative education is essential to reduce the risk of postoperative complications and allows the patient to participate actively in their recovery and help them reclaim control (Koutoukidis, Stainton & Hughson 2017). preoperative teaching should be prolonged to allow the patient to ask questions and ensure the patient absorbs information. Therefore, ideally, teaching showed not be performed on the day of surgery. It should be an ongoing process that begins during the preadmission visit (Farrell & Dempsey 2013). We need to have more researchers to show the effectiveness of preoperative education, inpatient behaviour, and recovery journeys. Because surgery can be physically and psychologically stressful for patients, it is hypothesized that education before

surgery reduces anxiety and enhances postoperative outcomes (Farrell & Dempsey 2013). Therefore, it is important to develop preoperative programs for a patient undergoing cardiac surgery. It mentions that preoperative education allows the patient to have a better understanding of their surgery. Also, it showed that nursing education in the preoperative period reduces patient anxiety and decreases postoperative complications. A preoperative education program should be incorporated into routine preparation for a patient undergoing cardiac surgery. Because patient education programs will provide education that will include expectations of the surgical procedure, ant medication that needs to be also stopped food restrictions before the procedure and providing instructions for aftercare once a patient is discharged home, and during this period, it will allow the patient to ask a question and highlight their concerns.

6.4 Teaching the patient

Teaching patients is an important aspect of the nursing role; however, when teaching patients, we need to consider these five strategies, which are taking advantage of educational technology, determining the patient's learning style, stimulating the patient's interest, considering the patient's limitations and strengths, and include family members in health care management. In taking advantage of the technology strategies, it allows the patient to have learning materials more accessible in many different languages, making sure that individualized patient need is addressed not only giving the patient booklets to read about their procedure as a nurse making sure that picture understands the instruction and answer every question that comes in their mind. The second strategy is to determine that

particular learning style. In this stage, as a nurse, we should ask the patient their learning style, whether by watching a video or by reading or they love interaction face to face with giving instruction and having their questions, and that will allow the patient to have their best information about that procedure and understanding. The third strategy has focused on patient interest, which some patients like to have detailed information about every aspect of their health conditions. Finally, the first strategy is considering patient limitation and strength during learning in the preoperative In this stage, we need to know that patient is physically and mentally or emotionally impaired that affect the ability of their learning; for example, if the patient is having vision problems, we can print large materials for the patient to see appropriately All of the patients is having hearing problems we can use like visual materials and hand-on method instead of simply providing verbal information And always making sure to let the patient repeat what they learn to make sure that they understand everything correctly.

Furthermore, the last strategy includes family members in their care management because involving family members in patient teaching improve their chances of following the instruction. After all, family plays a critical role in health care management (Marcus, 2014). Educational programs in the preoperative area for a patient undergoing cardiac surgery should be nurses led. According to Cui *et al.,* 2019 patients will develop self-management skills during their admission for the surgery by nurse education. Also, it has been found that a structured educational program was associated with significant medication adherence, reducing patient anxiety, and reeducation of hospital readmission. As it has been mentioned previously, educational program for patients should be according to the patient a special learning style such as watching a video of the procedure, a booklet explaining the patient

condition and the Purpose of the surgery, or face to face interaction with allowing the patient to take their time of learning their condition and ask a question as many as they need to feel more comfortable (Inott & Kennedy, 2011). The study highlighted the need for nurses led educational programs in the preoperative period for cardiac surgery in the United Arab Emirate (UAE) to reduce patient anxiety and give the patient realistic expectations of the surgery and low their length of stay in the hospital and patient having control over their pain (Chandarbabu *et al.,* 2017). The following paragraph will illustrate the impact of different nursing education on reducing the patient level of anxiety.

6.5 The impact of having nursing verbal education

Having good communication with the patient will provide a high quality of health care services, leads to patient satisfaction (Norouzinia et al., 2016). In addition, a study showed the significant of having verbal nursing education during the post-operative period allowed the patient to understand the importance of subsequent home care and the new lifestyle after discharge to decrease patient anxiety level (Yildiz et al., 2014). Post-operative education should be implemented for the patient before discharge as part of the surgical and pharmacological treatment of patients to decrease the level of anxiety in the patient (Yildiz et al., 2014). However, the study showed that patient anxiety level was high before receiving nursing education with the P-value of (P= 0.583) but, after the verbal nursing education the patient experienced decrease in their level of anxiety with the P-value of ($P < 0.001$) (Yildiz et al., 2014).

6.6 The impact of using nursing booklet education

A study showed the significant of having a well-designed nursing educational booklet to reduce patient anxiety (Amini et al., 2018). In addition, the study highlighted that if the nurses are under time pressure, the booklet allows the patient to get accurate information regarding the surgical procedure and the healing process, reducing preoperative patient anxiety (Amini et al., 2018).

6.7 The impact of having individualised education according to the patient source of anxiety

A study showed the significance of individualized education according to patients' particular needs (Yildiz et al., 2014). Moreover, that will allow individualized education to decrease the anxiety levels of patients undergoing cardiac surgery (Yildiz et al., 2014). And provide more effective use of educational resources in decreasing patient level of anxiety after receiving individualized education with the P-value of ($P < 0.001$) (Yildiz et al., 2014).

6.8 The impact of having information leaflets

Information leaflets are strongly recommended in emergency care settings to improve patient satisfaction and reduce patient anxiety (Guo, 2012). Also, it has been shown that leaflet covered valuable and relevant information that patients would want to be informed about, such as pertinent procedural, sensory temporal and instructional information throughout the patients' journey from the preoperative phase until discharge

(Guo, 2012). Moreover, it has been shown that leaflet information in the preoperative reduces patient anxiety and enhances the patient's healing process (Guo, 2012).

6.9 The impact of having dialog with individualized information according to the patient concerns and receiving emotional support

A study shows the importance of preoperative nurses to have understood the source of the patient anxiety and being competent in delivering evidence-based health education relevant to their patient's specific needs (Alanazi, 2014). In addition, another study has shown that patients receiving psychosocial support in the preoperative period will impact reducing their anxiety level, and patients undergoing cardiac surgery should be scheduled to be screened routinely for preoperative anxiety (Salzmann et al., 2021).

6.10 The impact of having audiotape program

A study showed that nurses could use an audiotape to reduce patient anxiety (Qasim & Kathim, 2017). Because the audiotape will be containing preparatory information to improve patient outcomes after cardiac surgery (Qasim & Kathim, 2017). However, a study performed by Utriyaprasit et al. (2010) showed that there is no statistically significant difference in the patient level of anxiety after receiving the audiotape program. Although this may be true, another study shows that providing patient audiotape in the waiting period has a positive impact on reducing the patient level of anxiety and improving patient knowledge (Qasim & Kathim, 2017).

6.11 Chapter summery

This chapter discusses the impact of nursing education in the preoperative period for patients undergoing cardiac surgery, such as improving patient knowledge regarding their cardiac surgery to improve their behaviours and health outcomes. The chapter discussed the impact that preoperative education has on the patient as it leaves a positive footprint, such as allowing the patient to gain a better understanding of their surgery, making the patient feel more in control of their condition. Preoperative teaching should be prolonged to allow the patient to ask questions and ensure the patient absorbs information. In addition, it highlighted the need to conduct more researchers to show the effectiveness of preoperative education because cardiac surgery can be physically and psychologically stressful for patients. Moreover, a preoperative education program should be incorporated into routine preparation for a patient undergoing cardiac surgery. The chapter discussed that teaching patient is an important aspect of the nursing role, when teaching the patient those five strategies should be considered such as the advantage of using technology for education, determining the patient's learning style, stimulating the patient's interest, considering the patient's limitations and strengths, and include family members in health care management.

Furthermore, the chapter discussed the impact of having verbal education for a patient undergoing cardiac surgery. It highlighted the significance of having verbal nursing education during the post-operative period. It allowed the patient to understand the importance of subsequent home care. Also, the chapter discussed The impact of using a nursing booklet in nursing education which showed that is booklet allow the patient to get accurate information regarding the surgical procedure, especially when the nurses are under

pressure. The chapter discussed the impact of having individualized education according to the patient source of anxiety, which will provide more effective use of educational resources in decreasing patient level of anxiety. In addition, the chapter highlighted the impact of using leaflets to educate patients during the preoperative period because the leaflet covered valuable and relevant information that patients would want to be informed about, such as pertinent procedural. Also, the chapter discussed the impact of having a dialogue with individualized information, as well as emotional support, because it will allow the nurse to understand the source of the patient anxiety and deliver evidence-based health education and emotional support according to the patient needs. Lastly, the chapter highlighted the impact of having an audiotape program because the audiotape will be containing preparatory information to improve patient outcomes after cardiac surgery. On the other hand, a study showed no statistically significant difference in the patient level of anxiety after receiving the audiotape program. However, another study shows that providing patient audiotape in the waiting period has a positive impact on reducing the patient level of anxiety and improving patient knowledge.

Chapter seven- The Strength and the limitation of the literature review, as well as the recommendation.

7.1 Strength:

The literature review reflected on the updated studies within the last ten years to highlight the significance of having nursing education. In addition, the literature review shows a high significate of having nursing education for patients undergoing cardiac surgery to reduce the level of anxiety.

7.2 Limitation:

At the beginning of this dissertation, many specific writing skills and researching in skills databases were noted. There was some limitation to the literature review, such as the lack of study in the middle east that supports nursing education for cardiac surgery patients. Furthermore, some primary research requested payment in order to get access to the research paper.

7.3 Recommendation:

Further research should include an investigation on the type of educational intervention that reduces the patient level of anxiety. Also, future researchers should test the intervention's effectiveness for the patient for an extended period of time to know the most effective educational program. However, further research should consider highlighting the coping strategies the patient used to relieve their anxiety to focus on another type of nursing education such as digital patient education. It has been shown that digital education

increases the quality of life and lowers patient feelings of depression and anxiety. Alternatively, it can be focused on other educational interventions such as websites, imagery, and multimedia.

Chapter 8 - Conclusion

To summarize, the literature review aimed to show the effectiveness of preoperative nursing education for patients undergoing cardiac surgery and reducing their level of anxiety. As it been estate by Liu & Xuzhou (2017), preoperative anxiety is combined of feelings such as being uncomfortable, tense, and unpleasant mood swings before surgery. In addition to this, the patient will feel an emotional response to a potential challenge and threat to their reality (Liu & Xuzhou, 2017). Furthermore, preoperative anxiety has been shown to have adverse postoperative outcomes such as delay of the healing process, prolonged hospital stays, and increased postoperative pain (Mulugeta et al., 2018). The literature review highlighted the importance of known patient sources of anxiety, such as having a lack of knowledge regarding their cardiac surgery, risk of dying, and suffering of severe pain after the procedure. Knowing the source of anxiety during admission allows them to plan and implement preoperative education to reduce patient anxiety by identifying the patient learning style.

The literature review showed that there are many types of nursing education style such as providing the patient with verbal education, booklet information, leaflet information, dialogue information, and audiotape educational programs, to teach the patient about their condition, their surgical procedure, as well as the postoperative care for reducing the patient level of anxiety. However, the literature review highlighted that the result from the study showed that patients that received verbal education, booklet information, leaflet information, dialogue information, and audiotape educational programs had a significant reduction in their level of anxiety with the P value of ($p=0.001$). On the other hand, a patient

that received individualized information according to their source of anxiety had an increase in their level of anxiety, with the P-value of ($P > 0.05$).

Further, it has been shown that preoperative nursing education reduces postoperative complications to the patient undergoing cardiac surgery, such as bleeding, irregular heart arrhythmia, and reducing infection on the insertion site (Matos et al., 2021). Based on the existing evidence from the literature review, nursing education intervention reduces the patient level of anxiety among cardiac surgery patients.

The literature review concluded that nursing educational intervention should be incorporated into nurses' routine practice during the preoperative period to reduce the patient level of anxiety to reduce further complications. Nursing education to reduce patient anxiety is an important topic that needs further research to reduce postoperative complications. In addition, educating the patient about their surgical procedure will support the patient with their secession making regarding their treatment to reduce their hospitalization and the cost to the health care system.

Reference:

Abate, S.M., Chekol, Y.A. and Basu, B. (2020) 'Global prevalence and determinants of preoperative anxiety among surgical patients: A systematic review and meta-analysis'. *International Journal of Surgery Open*, *25*, pp.6-16 [Online]. Available at: *10.1016/j.ijso.2020.05.010* (Accessed: 19 August 2021).

Akker, O.R., Peters, G.J., Bakker, C., Carlsson, R., Coles, N., Corker, K.S., Feldman, G., Mellor, D., Moreau, D., Nordström, T., Pfeiffer, N., Pickering, J.S., Riegelman, A., Topor, M., Veggel, N.V. and Yeung, S.K. (2020) 'Inclusive Systematic Review Registration Form'. pp.1-13 [Online]. Available at: *10.31222/osf.io/3nbea*(Accessed: 2 July 2021).

Akyea, R.K., Kai, J., Qureshi, N., Iyen, B. and Weng, S.F (2019). Sub-optimal cholesterol response to initiation of statins and future risk of cardiovascular disease. *Heart*. 105(13), PP. 975 [Online]. Available at: 10.1136/heartjnl-2018-314253 (Accessed: 5 November 2021).

Allen, M. (2017). *The sage encyclopedia of communication research methods*, [Online]. Available at: 10.4135/9781483381411(Accessed: 30 September 2021)
Allen, M. ed., 2017. *The SAGE encyclopedia of communication research methods*. Sage Publications. (Accessed: 16 September 2021).

Alliant Libraries (N.D) *"What is a Boolean Operator?",* Available at: *http://library.alliant.edu* (Accessed: 13 June 2021).

Alston, P., Myles, P.S. and Ranucci, M. (2015) *Oxford Textbook of Cardiothoracic Anaesthesia. Oxford University Press* [Online]. Available at: *10.1093/med/9780199653478.001.0001* (Accessed: 15 July 2021).

Amini, K., Alihossaini, Z., Ghahremani, Z. (2018). Randomized Clinical Trial Comparison of the Effect of Verbal Education and Education Booklet on Preoperative Anxiety. Journal of peri anesthesia nursing, 34(2), pp.289-296 [Online]. Available at: 10.1016/j.jopan.2018.06.101(Accessed: 5 November 2021).

Anand, S.S., Hawkes, C., Souza, R.J., Mente, A., Dehghan, M., Nugent, R., Zulyniak, M.A., Weis, T., Bernstein, A.M., Krauss, R., Kromhout, D., Jenkins, D.J., Malik, V., Gonzalez, M.A., Mozafarrian, D., Yusuf, S., Willett, W.C., and Popkin, B.M. (2016) 'Food Consumption and its impact on Cardiovascular Disease: Importance of Solutions focused on the globalized food system', *Journal of the American College of Cardiology,* 66(14), pp. 1590–1614 [Online]. Available at: *10.1016/j.jacc.2015.07.050.* (Accessed: 10 July 2021).

Antoniou, S.A., Antoniou, G.A., Antoniou, A.I. and Granderath, F.A. (2015) 'Past, present, and future of minimally invasive abdominal surgery'. *JSLS: Journal of the Society of Laparoendoscopic Surgeons*. *19*(3) [Online]. Available at: *10.4293/JSLS.2015.00052* (Accessed: 19 August 2021).

Ashrafi-Rizi, H., Zarmehr, F., Bahrami, S., Ghazavi-Khorasgani, Z., Kazempour, Z. and Shahrzadi, L., (2014). 'Study on research anxiety among faculty members of Isfahan University of Medical Sciences'. *Materia socio-medica*, *26*(6), p.356 [Online] Available at: 10.5455/msm.2014.26.356-359 (Accessed: October 16, 2021)

Ayyadhah Alanazi, A. (2014) "Reducing anxiety in preoperative patients: a systematic review," *British journal of nursing,* 23(7), pp. 387–393 [Online]. Available at:10.12968/bjon.2014.23.7.387(Accessed: 5 November 2021).

Bachmann, J.M., Willis, B.L., Ayers, C.R., Khera, A. and Berry, J.D. (2012) 'Association between family history and coronary heart disease death across long-term follow-up in men: the Cooper Center Longitudinal Study', *Circulation,* 125(25), pp. 3092–3098 [Online]. Available at: *10.1161/CIRCULATIONAHA.111.065490* (Accessed: 14 August 2021).

Barberi, C. and van den Hondel, K.E. (2018) 'The use of cardiac troponin T (cTnT) in the postmortem diagnosis of acute myocardial infarction and sudden cardiac death: A systematic review', *Forensic science international,* (292), pp. 27-38 [Online]. Available at: *10.1016/j.forsciint.2018.09.002* (Accessed: 15 August 2021).

Benjamin Janse, B., Huijsman, R. and Fabbricotti, N. (2014). A quasi-experimental study of the effects of an integrated care intervention for the frail elderly on informal caregivers'

satisfaction with care and support, . *BMC Health Services Research* , 14(140). Pp.1-13. [Online]. Available at: 10.1186/1472-6963-14-140 (Accessed: 20 September 2021).

Bergheanu, S.C., Bodde, M.C. and Jukema, J.W. (2017) 'Pathophysiology and treatment of atherosclerosis', *Netherlands Heart Journal,* 25(4), pp. 231–242 [Online]. Available at: *10.1007/s12471-017-0959-2* (Accessed: 15 August 2021).

Bester, N., Vito smith, M., Mcgarry, T., Riffikin, M., Kaehler, S., Pilot, R., Bwire, R. (2016). 'The Effectiveness of an Educational Brochure as a Risk Minimization Activity to Communicate Important Rare Adverse Events to Health-Care Professionals'. *Advances in therapy.*33(2). Pp. 167-177. [Online]. Available at: 10.1007/s12325-016-0284-y (Accessed: 25 September 2021).

Boateng, S. and Sanborn, T., (2013) 'Acute myocardial infarction'. *Disease-a-Month*. 59 (3), pp.83-96 [Online]. Available at: *10.1016/j.disamonth.2012.12.004* (Accessed: 16 August 2021).

British Heart Foundation (2021) *UK Factsheet ,* Available at: *https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwidnti-q67yAhVzQkEAHU6kAMIQFnoECAMQAQ&url=https%3A%2F%2Fwww.bhf.org.uk%2F-%2Fmedia%2Ffiles%2Fresearch%2Fheart-statistics%2Fbhf-cvd-statistics-uk-factsheet.pdf&usg=AOvVaw3cL0StMVuLglemlJ7AwHTV* (Accessed: 14 August 2021).

Bueno, H. (2018) *Epidemiology of acute coronary syndromes.* [Online]. Available at: *10.1093/med/9780198784906.003.0305* (Accessed: 15 August 2021).

Byrd-Bredbenner, C., Wu, F., Spaccarotella, K., Quick, V., Martin-Biggers, J. and Zhang, Y., (2017). 'Systematic review of control groups in nutrition education intervention research'. *International Journal of Behavioral Nutrition and Physical Activity*, *14* (1), pp.1-26. [Online]. Available at: 0.1186/s12966-017-0546-3 (Accessed: 16 September 2021).

Calafiore, A.M., Prapas, S., Osman, A.and Mauro, M.D. (2017) 'Coronary artery bypass grafting off-pump or on-pump: another brick in the wall', *Annals of Translational Medicine*

Journal , 5(7), pp. 1-3 [Online]. Available at: *10.21037/atm.2017.03.52*(Accessed: 10 July 2021).

Camm, J., Lüscher, T.F., Maurer, G. and Serruys, P.W. (2018) *ESC CardioMed . Oxford* [Online]. Available at: *10.1093/med/9780198784906.003.0061* (Accessed: 10 July 2021).

Carnethon, M.R., Pu, J., Howard, G., Albert, M.A., Anderson, C.A., Bertoni, A.G., Mujahid, M.S., Palaniappan, L., Taylor Jr, H.A., Willis, M. and Yancy, C.W. (2017) 'Cardiovascular health in African Americans: a scientific statement from the American Heart Association', *Circulation,* 136(21), pp. 393-423 [Online]. Available at: *10.1161/CIR.0000000000000534* (Accessed: 14 August 2021).

Celano, C.M., Daunis, D.J., Lokko, H.N., Campbell, K.A. and Huffman, J.C., 2016. Anxiety disorders and cardiovascular disease. *Current psychiatry reports*, *18*(11), pp.1-11[Online] Available at: 10.1007/s11920-016-0739-5(Accessed: October 16, 2021).

Celermajer, D.S., Chow, C.K., Marijon, E., Anstey, N.M. and Woo, K.S. (2012) 'Cardiovascular disease in the developing world: prevalences, patterns, and the potential of early disease detection', *Journal of the American College of Cardiology,* 60(14), pp. 1207-1216 [Online]. Available at: *10.1016/j.jacc.2012.03.074* (Accessed: 10 July 2021).

Centers Of Disease Control and prevention (2021) *Coronary artery disease*, *Cdc.gov*. Available at: https://www.cdc.gov/heartdisease/coronary_ad.htm (Accessed: November 1, 2021).

Chandrababu, R., Nayak, B., Pai, V.B. and Patil, N. (2017). Effect of Preoperative Education on Postoperative Outcomes Among Patients Undergoing Cardiac Surgery: A Systematic Review and Meta-Analysis. Journals od peri anesthesia nursing. 32(6). Pp. 518-529. [Online] Available at: 10.1016/j.jopan.2016.11.011(Accessed: October 16, 2021).

Cherry, K. (2021) *Replication in psychology research*, [Online] Available at: www.verywellmind.com/what-is-replication-2795802 (Accessed: November 7, 2021).

Chiuve, S.E., Fung, T.T., Rexrode, K.M., Spiegelman, D., Manson, J.E., Stampfer, M.J. and Albert, C.M. (2011) 'Adherence to a low-risk, healthy lifestyle and risk of sudden cardiac

death among women', *Jama,* 306(1), pp. 1-16 [Online]. Available at: *10.1001/jama.2011.907* (Accessed: 16 August 2021).

Chiuve, S.E., Fung, T.T., Rimm, E.B., Hu, F.B., McCullough, M.L., Wang, M., Stampfer, M.J. and Willett, W.C. (2012) Alternative dietary indices both strongly predict risk of chronic disease , *The Journal of nutrition,* 142(6), pp. 1009-1018 [Online]. Available at: *10.3945/jn.111.157222* (Accessed: 16 August 2021).

Chivukula, U., Swain, S., Rana, S. and Hariharan, M. (2013). Perceived social support and type of cardiac procedures as modifiers of hospital anxiety and depression. *Psychol Stud.* 58(3), pp.242–247 [Online] Available at: 10.1007/s12646-013-0199-5(Accessed: October 16, 2021).

Clark, L., Dean, A., Mitchell, A. and Torgerson, D.J (2021). Envelope use and reporting in randomised controlled trials: A guide for researchers. *Research Methods in Medicine & Health Sciences*, *2*(1), pp.2-11[Online]. Available at: 10.1177/2632084320957204 (Accessed: 5 November 2021)

Creswell JW, Plano Clark VL. Designing and conducting mixed methods research. 2nd ed. ThousandOaks, CA: Sage; 2011.

Critical Appraisal Skills Programme (2021) *CASP Checklist: 11 questions to help you make sense of a Randomised Controlled Trial,* Available at: *www.casp-uk.net* (Accessed: 27 August 2021).
Critical Appraisal Skills Programme (2021) *WHY CASP,* Available at: *https://casp-uk.net* (Accessed: 16 June 2021).

Cui, X., Zhou, X., Ma, L.L., Sun, T.W., Bishop, L., Gardiner, F.W., Wang, L. (2019). A nurse-led structured education program improves self-management skills and reduces hospital readmissions in patients with chronic heart failure: a randomized and controlled trial in China. *Rural Remote Health* 19(2) pp. 5270. [Online] Available at: 10.22605/RRH5270 (Accessed: October 16, 2021).

Dinnen, J. (2014) *Phase #2: Clearly Define Your Research Strategy,* Available at: *https://www.mackenziecorp.com/phase-2-clearly-define-research-strategy/* (Accessed: 20 June 2021).

Diodato, M. and Chedrawy, E.G. (2014) 'Coronary Artery Bypass Graft Surgery: The Past, Present, and Future of Myocardial Revascularisation', *Surgery Research and Practice,* pp. 1-6 [Online]. Available at: *10.1155/2014/726158* (Accessed: 19 August 2021).

Doenst, T., Diab, M., Sponholz, C., Bauer, M. and Färber, G., (2017) 'The opportunities and limitations of minimally invasive cardiac surgery'. *Deutsches Ärzteblatt International*, *114*(46), pp.777 [Online]. Available at: *10.3238/arztebl.2017.0777* (Accessed: 19 August 2021).

Doody, O., Bailey, M.E.(2016). Setting a research question, aim and objective. *Nurse Res*. 23(4), pp.19-23. [Online]. Available at: 10.7748/nr.23.4.19.s5 (Accessed: 30 September 2021)

Douki, Z.E., Vaezzadeh, N., Shahmohammadi, S., Shahhosseini, Z., Tabary, S.Z., Mohammadpour, R.A. and Esmaeeli, M. (2011) 'Anxiety before and after coronary artery bypass grafting surgery: Relationship to QOL'. *Middle East J Sci Res*. 7 (1), Pp. 103-108 [Online]. Available at: https://www.idosi.org/mejsr/mejsr7(1)11/17.pdf (Accessed: 18 October 2021).

Efird J. (2011). Blocked randomization with randomly selected block sizes. *International journal of environmental research and public health*, *8*(1), pp.15–20 [Online]. Available at: 10.3390/ijerph8010015 (Accessed: 5 November 2021)

Ellison, D. H., & Felker, G. M. (2017). Diuretic Treatment in Heart Failure. *The New England journal of medicine*, *377*(20), 1964–1975 [Online]. Available at:10.1056/NEJMra1703100 (Accessed: 5 November 2021).

Engelman, D.T., Ali, W.B. and Williams, J.B. (2019) 'Guidelines for Perioperative Care in Cardiac Surgery' ,154(8), pp. 755-766 [Online]. Available at: *10.1001/jamasurg.2019.1153* (Accessed: 15 July 2021).

Ennker, J., Bauer, S. and Ennker, I.C. (2013) 'Revascularization surgery as a treatment concept for heart failure', *Intensive Care Cardiovascular Journal ,* 5(2), pp. 89-97 [Online]. Available at: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3722340/pdf/hsrp-05-089.pdf*(Accessed: 11 July 2021).

Ertürk, E.B. and Ünlü, H. (2018) 'Effects of pre-operative individualized education on anxiety and pain severity in patients following open-heart surgery', *International Journal of Health Sciences,* 12(4), pp. 27-34 [Online]. Available at: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6040857/pdf/IJHS-12-26.pdf* (Accessed: 27 August 2021).

Farrell, M & Dempsey, J 2013, Smeltzer and Bare's Textbook of Medical-Surgical Nursing, 3rd edn, Lippincott Williams & Wilkins, Broadway Fok, M., Shaw, M., Sancho, E., Abello, D. and Bashir, M. (2014) 'Aortic Valve Repair: A Systematic Review and Meta-analysis of Published Literature', *Aorta Journal,* 2(1), pp. 10-21 [Online]. Available at: *10.12945/j.aorta.2014.14-003* (Accessed: 10 July 2021).

Forbes, D. (2013). Blinding: an essential component in decreasing risk of bias in experimental designs. *Evid Based Nurs.* 16(3) pp.70-71. [Online]. Available at: 10.1136/eb-2013-101382 (Accessed: 30 September 2021)

Ford, T.J. and Berry, C. (2020) 'Angina: contemporary diagnosis and management', *BMJ,* 106(5), pp. 387–398. [Online]. Available at: *10.1136/heartjnl-2018-314661*(Accessed: 15 August 2021).

Ford, T.J. and Berry, C. (2020) 'Angina: contemporary diagnosis and management.', *Heart,* 106(5), pp. 387-398 [Online]. Available at: *10.1136/heartjnl-2018-314661*(Accessed: 15 August 2021).

Garcia, M., Mulvagh, S.L., Bairey Merz, C.N., Buring, J.E. and Manson, J.E., (2016) 'Cardiovascular disease in women: clinical perspectives'. *Circulation research*, *118*(8), pp.1273-1293 [Online]. Available at: *10.1161/CIRCRESAHA.116.307547* (Accessed: 16 August 2021).

Garimella, V. and Cellini, C. (2013) 'Postoperative pain control'. *Clinics in colon and rectal surgery*, *26*(03), pp.191-196 [Online]. Available at: *10.1055/s-0033-1351138* (Accessed: 20 August 2021).

Glidewell, J., Grosse, S.D., Colarusso, T.R., Pinto, N., Hudson, J., Daskalov, R., Gaviglio, A., Darby, E., Singh, S. and Sontag, M. (2019) 'Actions in Support of Newborn Screening for

Critical Congenital Heart Disease - United States, 2011-2018', *Morbidity and Mortality Weekly Report,* 68(5), pp. 107-111 [Online]. Available at: *10.15585/mmwr.mm6805a3* (Accessed: 10 July 2021).

Global Burden of Disease (2018), 'Burden of cardiovascular diseases in the Eastern Mediterranean Region, 1990-2015: findings from the Global Burden of Disease 2015 study'. *International journal of public health*, *63*(1), pp.137–149 [Online]. Available at: https://doi.org/10.1007/s00038-017-1012-3 (Accessed: 8 August 2021).

Guo, P. (2012). *A PREOPERATIVE EDUCATION INTERVENTION TO REDUCE ANXIETY AND IMPROVE RECOVERY AMONG CHINESE CARDIAC PATIENTS: A RANDOMISED CONTROLLED TRIAL*, [Online]. Available at: http://eprints.nottingham.ac.uk/12906/1/A_preoperative_education_intervention_to_reduce_anxiety_and_improve_recovery_among_Chinese_cardiac_patients-a_randomised_controlled_trial.pdf (Accessed: 5 November 2021).

Guo, P., East, L. and Arthur, A. (2012) 'A preoperative education intervention to reduce anxiety and improve recovery among Chinese cardiac patients: a randomized controlled trial', *Int J Nurs Stud ,* 49(2), pp. 129-137 [Online]. Available at: 10.1016/j.ijnurstu.2011.08.008 (Accessed: 27 August 2021).

GWU Health Science students (N.D) *Finding resources: MEDLINE,* Available at: *https://himmelfarb.gwu.edu/tutorials/excellent_tutorial/medline.html* (Accessed: 13 June 2021).

Hajar, R. (2017) 'Risk factors for coronary artery disease: historical perspectives.', *Heart views: the official journal of the Gulf Heart Association,* 18(3), pp. 109-114 [Online]. Available at: *10.4103/HEARTVIEWS.HEARTVIEWS_106_17* (Accessed: 15 August 2021).

Hajar, R. (2017) 'Risk Factors for Coronary Artery Disease: Historical Perspectives', *The Official Journal of the Gulf Heart Association,* 18(3), pp. 109-114 [Online]. Available at: *10.4103/HEARTVIEWS.HEARTVIEWS_106_17 PMCID: PMC5686931*(Accessed: 10 July 2021).

Hartog, J., Blokzijl, F., Dijkstra, S., DeJongste, M.J., Reneman, M.F., Dieperink, W., Horst, I.C., Fleer, J., Woude, L.H., Harst, P.V. and Mariani, M.A. (2019) 'Heart Rehabilitation in patients

awaiting Open heart surgery targeting to prevent Complications and to improve Quality of life (Heart-ROCQ): study protocol for a prospective, randomised, open, blinded endpoint (PROBE) trial', *MBJ open Journal ,* 9(9), pp. 1-11 [Online]. Available at: *10.1136/bmjopen-2019-031738* (Accessed: 11 July 2021).

Heilmann, C., Stotz, U., Burbaum, C., Feuchtinger, J., Leonhart, R., Siepe, M., Beyersdorf, F. and Fritzsche, K. (2016) 'Short-term intervention to reduce anxiety before coronary artery bypass surgery--a randomised controlled trial', *J Clin Nurs ,* 25(3-4), pp. 351-361 [Online]. Available at: 10.1111/jocn.13055 (Accessed: 27 August 2021).

Herbert, G., Sutton, E., Burden, S., Lewis, S., Thomas, S., Ness, A. and Atkinson, C. (2017). 'Healthcare professionals' views of the enhanced recovery after surgery programme: a qualitative investigation'. *BMC health services research*, *17*(1), pp.1-14 [Online]. Available at:110.1186/s12913-017-2547-y(Accessed: 8 August 2021).

Holmberg, C., Karner, J., Rappenecker, J. and Witt, C.M (2014) Clinical trial participants' experiences of completing questionnaires: a qualitative study*, BMJ Open*, 4(3). PP-1-8. [Online]. Available at: 10.1136/bmjopen-2013-004363 (Accessed: 20 September 2021).

Hoseini, S., Soltani, F., Babaee Beygi, M. and Zarifsanaee, N., 2013. The effect of educational audiotape programme on anxiety and depression in patients undergoing coronary artery bypass graft. *Journal of clinical nursing*, *22*(11-12), pp.1613-1619 [Online]. Available at: **10.1111/jocn.12125** (Accessed: 27 August 2021).

Hughes, A. (2019) *database,* Available at: *https://searchdatamanagement.techtarget.com/definition/database* (Accessed: 20 June 2021).

Inamdar, A.A. and Inamdar, A.C. (2016) 'Heart Failure: Diagnosis, Management and Utilization', *Journal of clinical medicine,,* 5(7), pp. 1-28 [Online]. Available at: *10.3390/jcm5070062* (Accessed: 15 August 2021).

Inott, T., Kennedy, B. (2011). Assessing Learning Styles: Practical Tips for Patient Education, Nursing Clinics of North America. 46(3). Pp. 313-320. [Online] Available at: 10.1016/j.cnur.2011.05.006 (Accessed: October 16, 2021).

Ittaman, S.V., VanWormer, J.J. and Rezkalla, S.H. (2014) 'The Role of Aspirin in the Prevention of Cardiovascular Disease'. *Clinical medicine & research,* 12(3-4), pp. 147–154 [Online]. Available at: *10.3121/cmr.2013.1197* (Accessed: 16 August 2021).

Jankowski, J., Floege, J., Fliser, D. and Marx , M.B. (2021) 'Cardiovascular Disease in Chronic Kidney Disease', *American Heart Accusation Journal ,* (143), pp. 1157–1172 [Online]. Available at: *10.1161/CIRCULATIONAHA.120.050686* (Accessed: 10 July 2021).

Japuntich, S.J., Eilers, M.A., Shenhav, S., Park, E.R., Winickoff, J.P., Benowitz, N.L. and Rigotti, N.A. (2015) 'Secondhand tobacco smoke exposure among hospitalized nonsmokers with coronary heart disease', *JAMA internal medicine,,* 175(1), pp. 133-136 [Online]. Available at: *10.1001/jamainternmed.2014.5476* (Accessed: 14 August 2021).

Jennings, S., Bennett, K., Shelley, E., Kearney, P., Daly, K. and Fennell, W.,(2014) 'Trends in percutaneous coronary intervention and angiography in Ireland, 2004–2011: implications for Ireland and Europe'. *IJC Heart & Vessels*. 4. pp.35-39 [Online]. Available at: *10.1016/j.ijchv.2014.08.001*

Kalogianni, A., Almpani, P., Vastardis, L., Baltopoulos, G., Charitos, C. and Brokalaki, H. (2016) 'Can nurse-led preoperative education reduce anxiety and postoperative complications of patients undergoing cardiac surgery?', *Eur J Cardiovasc Nurs ,* 15(6), pp. 447–458 [Online]. Available at: 10.1177/1474515115602678 (Accessed: 27 August 2021).

Kandaswamy, E. and Zuo, L., (2018)'Recent advances in treatment of coronary artery disease: role of science and technology'. *International journal of molecular sciences*, *19*(2), p.424 [Online]. Available at: *10.3390/ijms19020424* (Accessed: 16 August 2021).

Karanicolas, P.J., Farrokhyar, F. and Bhandari, M (2011). Blinding: Who, what, when, why, how?, *Canadian Medical Association* , 53(5). Pp-345-348. [Online]. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2947122/ (Accessed: 20 September 2021).

Khan, M.A., Hashim, M.J., Mustafa, H., Baniyas, M.Y., Al Suwaidi, S.K.B.M., AlKatheeri, R., Alblooshi, F.M.K., Almatrooshi, M.E.A.H., Alzaabi, M.E.H., Al Darmaki, R.S. and Lootah, S.N.A.H. (2020) 'Global epidemiology of ischemic heart disease: Results from the global

burden of disease study'. *Cureus*, *12*(7), Pp- 1-12 [Online]. Available at: 10.7759/cureus.9349 (Accessed: 18 October 2021).

Khorsandi, M., Shaikhrezai, K. and Zamvar, V. (2014) *PanVascular medicine. Peter Lanzer* [Online]. Available at: *10.1007/978-3-642-37078-6_233* (Accessed: 17 August 2021).

King, J., Chamberland, P., Rawji, A., Ager, A., Léger, R., Michaels, R., Poitras, R., Skelton, D. and Warren, M., (2014) 'Patient educational needs of patients undergoing surgery for lung cancer'. *Journal of Cancer Education*, 29(4), pp.802-807 [Online]. Available at: *10.1007/s13187-014-0658-2* (Accessed: 20 August 2021).

Klaiber, U., Stephan-Paulsen, L.M., Bruckner,T., Müller, G., Auer, S., Farrenkopf, I., Fink, C., Dörr-Harim,C., Diener, M.K., Büchler, M.W. and Knebel, P. (2018) 'Impact of preoperative patient education on the prevention of postoperative complications after major visceral surgery: the cluster randomized controlled PEDUCAT trial'. 19(288), pp. 1-12 [Online]. Available at: *10.1186/s13063-018-2676-6* (Accessed: 20 August 2021).

Kotsakou, M., Kioumis, L., Lazaridis, G., Pitsiou, G., Lampaki, S., Papaiwannou,A., Karavergou, A., Tsakiridis, K., Katsikogiannis, N., Karapantzos, L., Karapantzou, C., Baka, S., Mpoukovinas, L., Karavasilis, V., Rapti, A., Trakada, G., Zissimopoulos, A., Zarogoulidis, K. and Zarogoulidis, P. (2015) 'Pacemaker insertion', *Annals of Translational Medicine Journal ,* 3(3), pp. 1-8 [Online]. Available at: *10.3978/j.issn.2305-5839.2015.02.06* (Accessed: 10 July 2021).

Koutoukidis, G, Stainton, K & Hughson, J (eds) 2017, Tabbner's Nursing Care: Theory and Practice, 7th edn, Elsevier, Chatswood

Liu, J.D. and Xuzhou (2017) *Preoperative Anxiety's Incidence and Related Factors in Surgical Patients,* Available at: *https://www.clinicaltrials.gov/ct2/show/study/NCT03162692* (Accessed: 15 July 2021).

Loney, T., Aw, T.C., Handysides, D.G., Ali, R., Blair, I., Grivna, M., Shah, S.M., Hussein, M.S., Sadig, M., Sharif, A.A. and Obaid, Y. (2013) 'An analysis of the health status of the United

Arab Emirates: the 'Big 4' public health issues', *Glob Health Action Journal ,* (6), pp. 1-8 [Online]. Available at: *10.3402/gha.v6i0.20100* (Accessed: 14 August 2021).

Long, H. A., French, D. P. and Brooks, J. M. (2020) 'Optimising the value of the Critical Appraisal Skills Programme (CASP) tool for quality appraisal in qualitative evidence synthesis'. *Research Methods in Medicine & Health Sciences*, 1(1), Pp. 31–42 [Online]. Available at: https://doi.org/10.1177/2632084320947559(Accessed: 16 June 2021).

Long, H. A., French, D. P., & Brooks, J. M. (2020). Optimising the value of the Critical Appraisal Skills Programme (CASP) tool for quality appraisal in qualitative evidence synthesis. Research Methods in Medicine & Health Sciences, 1(1), 31–42 [Online]. Available at: https://doi.org/10.1177/2632084320947559(Accessed: 16 June 2021).

Malakar, A.K., Choudhury, D., Halder, B., Paul, P., Uddin, A. and Chakraborty, S. (2019) 'A review on coronary artery disease, its risk factors, and therapeutics', *Journal of cellular physiology,* 234(10), pp. 16812-16823 [Online]. Available at: *10.1002/jcp.28350* (Accessed: 14 August 2021).

Malek, N.M., Zakerimoghadam, M., Esmaeili, M. and Kazemnejad, A., 2018. Effects of nurse-led intervention on patients' anxiety and sleep before coronary artery bypass grafting. *Critical care nursing quarterly*, *41*(2), pp.161-169 [Online]. Available at: 10.1097/CNQ.0000000000000195 (Accessed: 27 August 2021).

Marcus, C., (2014). Strategies for improving the quality of verbal patient and family education: a review of the literature and creation of the EDUCATE model. *Health Psychology & Behavioural Medicine.* 2(1). Pp. 482-495. [Online] Available at: 10.1080/21642850.2014.900450 (Accessed: October 16, 2021).

Matos, A.A., Silva, D.B., Guimaraes, A.R. and Cordeiro, A.L.L (2020) Incidence of complications after cardiac surgery, *International Physical Medicine & Rehabilitation Journal*, 5(1), pp.25-28 [Online]. Available at: 10.15406/ipmrj.2020.05.00224 (Accessed: 5 November 2021)

McDonald, S., Page, M.J., Beringer, K., Wasiak, J. and Sprowson, A. (2014). Preoperative education for hip or knee replacement. *Cochrane Database of systematic. (4). Pp. 1-4.* [Online]. Available at: 10.1002/14651858.CD003526.pub3 (Accessed: 17 October 2021).

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Meena Harihara
Meier, S. M., Mattheisen, M., Mors, O., Mortensen, P. B., Laursen, T. M., & Penninx, B. W. (2016). Increased mortality among people with anxiety disorders: total population study. *The British journal of psychiatry : the journal of mental science*, *209*(3), 216–221 [Online] Available at: 10.1192/bjp.bp.115.171975 (Accessed: October 16, 2021).

Mejia, O.A., Borgomoni, G.B., Lima, E.G., Guerreiro, G.P., Dallan, L.R., Silva, P.D., Nakazone, M.A., Junior, O.P., Gomes, W.J., Oliveira, M.A., Sousa, A., Campagnucci, V.P., Tiveron, M.G., Rodrigues, A.J., Tineli, R.A., Silva, R.R., Lisboa, L.A. and Jatene, F.B. (2021) 'Most deaths in low-risk cardiac surgery could be avoidable'. *Scientific Reports*,, pp. 1-8 [Online]. Available at: *10.1038/s41598-020-80175-7* (Accessed: 19 August 2021).

Melly, L., Torregrossa, G., Lee, T., Jansens, J.L. and Puskas, J.D. (2017) 'Fifty years of coronary artery bypass grafting', *Journal of Thoracic Disease,* 10(3), pp. 1960-1967 [Online]. Available at: *10.21037/jtd.2018.02.43* (Accessed: 10 July 2021).

Moyle, S. (2020) *Preoperative Education*, *Ausmed.com*. Ausmed Education Pty Ltd. [Online]. Available at: https://www.ausmed.com/cpd/articles/preoperative-education (Accessed: October 16, 2021).

Mozaffarian, D., Benjamin, E.J., Go, A.S., Arnett, D.K., Blaha, M.J., Cushman, M., De Ferranti, S., Després, J.P., Fullerton, H.J., Howard, V.J. and Huffman, M.D. (2015) 'Heart disease and stroke statistics—2015 update: a report from the American Heart Association', *circulation,* 131(4), pp. 29-322 [Online]. Available at: *10.1161/CIR.0000000000000152* (Accessed: 14 August 2021).

Mulugeta, H., Ayana, M., Sintayehu, M., Dessie, G. and Zewdu, T. (2018) 'Preoperative anxiety and associated factors among adult surgical patients in Debre Markos and Felege

Hiwot referral hospitals, Northwest Ethiopia', *BMC Anaesthesiology Journal,* 18(155), pp. 1-9 [Online]. Available at: *10.1186/s12871-018-0619-0* (Accessed: 14 July 2021).
Myers, K., Hajek, P., Hinds, C. and McRobbie, H. (2011) 'Stopping Smoking Shortly Before Surgery and Postoperative Complications', *international med Journal ,* 171(11), pp. 983-989 [Online]. Available at: *10.1001/archinternmed.2011.97* (Accessed: 15 July 2021).

Narain, A., Kwok, C.S. and Mamas, M.A. (2016) 'Soft drinks and sweetened beverages and the risk of cardiovascular disease and mortality: a systematic review and meta-analysis', *nternational journal of clinical practice,* 70(10), pp. 791-805 [Online]. Available at: *10.1111/ijcp.12841* (Accessed: 14 August 2021).

Nascimento, B.R., Brant, L.C.C., Marino, B.C., Passaglia, L.G. and Ribeiro, A.L.P. (2019) 'Implementing myocardial infarction systems of care in low/middle-income countries', *Heart,* 105(1), pp. 20-26 [Online]. Available at: *10.1136/heartjnl-2018-313398* (Accessed: 15 August 2021).

Newington, L. and Metcalfe, A. (2014). Factors influencing recruitment to research: qualitative study of the experiences and perceptions of research teams. *BMC medical research methodology*, *14*(1), pp.1-11. [Online]. Available at: 10.1186/1471-2288-14-10 (Accessed: 30 September 2021)

Noman, A., Balasubramaniam, K., Alhous, M.H.A., Lee, K., Jesudason, P., Rashid, M., Mamas, M.A. and Zaman, A.G., (2017) 'Mortality after percutaneous coronary revascularization: prior cardiovascular risk factor control and improved outcomes in patients with diabetes mellitus'. *Catheterization and Cardiovascular Interventions*, *89*(7), pp.1195-1204 [Online]. Available at: *10.1002/ccd.26882* (Accessed: 19 August 2021).

Norouzinia, R., Aghabarari, M., Shiri, M., Karimi, M., & Samami, E. (2015). Communication Barriers Perceived by Nurses and Patients. *Global journal of health science*, *8*(6), 65–74 [Online]. Available at: 10.5539/gjhs.v8n6p65 (Accessed: 5 November 2021).

Oh, P. C., Sakuma, I., Hayashi, T. and Koh, K. K. (2016). Angiotensin converting enzyme inhibitors remain the first treatment of choice. *The Korean journal of internal medicine*, *31*(2), pp.237–241 [Online]. Available at:https://doi.org/10.3904/kjim.2016.026 (Accessed: 5 November 2021).

Pan, A., Wang, Y., Talaei, M. and Hu, F.B. (2015) 'Relation of smoking with total mortality and cardiovascular events among patients with diabetes mellitus: a meta-analysis and systematic review', *Circulation,* 132(19), pp. 1795-1804 [Online]. Available at: *10.1161/CIRCULATIONAHA.115.017926* (Accessed: 14 August 2021).

Patel, M.X., Doku, V. and Tennakoon, L. (2018). Challenges in recruitment of research participants. *Advances in Psychiatric Treatment*, *9*(3), pp.229-238. [Online]. Available at: 10.1192/apt.9.3.229 (Accessed: 30 September 2021)

Paterick, T.E., Patel, N., Tajik, A.J. and Chandrasekaran, K., (2017,) January. Improving health outcomes through patient education and partnerships with patients. In *Baylor University Medical Center Proceedings*, 30 (1). pp. 112-113. [Online]. Available at: 10.1080/08998280.2017.11929552 (Accessed: 25 September 2021).

Patino, C.M. and Ferreira, J.C. (2018) 'Inclusion and exclusion criteria in research studies: definitions and why they matter". *SCIENTIFIC METHODOLOGY,* 44(2), pp. 84-84 [Online]. Available at: *http://dx.doi.org/10.1590/S1806-37562018000000088*(Accessed: 13 June 2021).

Pencina, M.J., Navar, A.M., Wojdyla, D., Sanchez, R.J., Khan, I., Elassal, J., D'Agostino Sr, R.B., Peterson, E.D. and Sniderman, A.D. (2019) 'Quantifying importance of major risk factors for coronary heart disease', *Circulation,* 139(13), pp. 1603-1611 [Online]. Available at: *10.1161/CIRCULATIONAHA.117.031855* (Accessed: 14 August 2021).

Percutaneous Coronary Intervention (PCI) (2019) *The National Audit of Percutaneous Coronary Intervention (PCI) ,* Available at: *https://www.nicor.org.uk/wp-content/uploads/2019/09/NAPCI-2019-Summary-Report-final.pdf* (Accessed: 19 August 2021).

Plümer, L., Seiffert, M., Punke, M.A., Kersten, J.F., Blankenberg, S., Zöllner, C. and Petzoldt, M. (2017) 'Aspirin Before Elective Surgery—Stop or Continue?',114, pp. 27-28 [Online]. Available at: *10.3238/arztebl.2017.0473* (Accessed: 15 July 2021).

Prado-Olivares, J. and Chover-Sierra, E.(2019). Preoperatory anxiety in patients undergoing cardiac surgery. *Diseases*, *7*(2), p.46 [Online] Available at: 10.3390/diseases7020046 (Accessed: October 16, 2021).

PRISMA (2021) *PRISMA Flow Diagram,* Available at: *http://prisma-statement.org/prismastatement/flowdiagram.aspx* (Accessed: 20 June 2021).

Pursnani, S., Korley, F., Gopaul, R., Kanade, P., Chandra, N., Shaw, R.E. and Bangalore, S., (2012) 'Percutaneous coronary intervention versus optimal medical therapy in stable coronary artery disease: a systematic review and meta-analysis of randomized clinical trials'. *Circulation: Cardiovascular Interventions*, *5*(4), pp.476-490 [Online]. Available at: *10.1161/CIRCINTERVENTIONS.112.970954* (Accessed: 19 August 2021).

Qasim, A.A. and Kathim, H.Y. (2017). Effectiveness of an Educational Video Intervention on Anxiety Level of Patients prior to Diagnostic Coronary Catheterization in Al-Nasiriya's Cardiac Center. Journal of nursing and health science. 6(4). Pp. 57-64 [Online]. Available at: 10.9790/1959-0604045764(Accessed: 5 November 2021).

Qintar, M., Spertus, J.A., Gosch, K.L., Beltrame, J., Kureshi, F., Shafiq, A., Breeding, T., Alexander, K.P. and Arnold, S.V. (2016) ' Effect of angina under-recognition on treatment in outpatients with stable ischaemic heart disease.', *European Heart Journal–Quality of Care and Clinical Outcomes,,* 2(3), pp. 208-214 [Online]. Available at: *10.1093/ehjqcco/qcw016* (Accessed: 15 August 2021).

Quality Assurance and Improvement Framework (2019) *Guidance for the GMS Contract Wales,* Available at: *http://www.wales.nhs.uk/sites3/Documents/480/Guidance%20for%20GMS%20Contract%20Wales%20-%20Quality%20and%20Improvement%20Framework%202019-20.pdf* (Accessed: 15 August 2021).

Rafiq, A., Sklyar, E. and Bella, J.N. (2017) 'Cardiac evaluation and monitoring of patients undergoing noncardiac surgery', *Health services insights,* 10, pp. 1-17 [Online]. Available at: *10.1177/1178632916686074* (Accessed: 11 July 2021).

Rebers, S., Aaronson, N.K., Leeuwen, F.E. and Schmidt, M.K. (2016). Exceptions to the rule of informed consent for research with an intervention. *BMC Medical Ethics*. 17(9). Pp. 1-11. [Online]. Available at: 10.1186/s12910-016-0092-6 (Accessed: 30 September 2021)

Rippe, J.M. (2019) Lifestyle strategies for risk factor reduction, prevention, and treatment of cardiovascular disease, *American Journal of Lifestyle Medicine,* 13(2), pp. 204-212 [Online]. Available at: *10.1177/1559827618812395* (Accessed: 16 August 2021).

Roberto, C.A., Swinburn, B., Hawkes, C., Huang, T., Costa, S.A., Ashe, M., Zwicker, L., Cawley, J.H. and Brownell, K.D. (2015) 'Patchy progress on obesity prevention: emerging examples, entrenched barriers, and new thinking', *The Lancet Journal,* 385(9985), pp. 2400-2409 [Online]. Available at: *10.1016/S0140-6736(14)61744-X*(Accessed: 10 July 2021).

Rodriguez, C.J., Allison, M., Daviglus, M.L., Isasi, C.R., Keller, C., Leira, E.C., Palaniappan, L., Piña, I.L., Ramirez, S.M., Rodriguez, B. and Sims, M. (2014) 'Status of cardiovascular disease and stroke in Hispanics/Latinos in the United States: a science advisory from the American Heart Association', *Circulation,* 130(7), pp. 593-625 [Online]. Available at: *10.1161/CIR.0000000000000071* (Accessed: 14 August 2021).

Sachs, M.K., Kahr, P.C., Scheld, H.H. and Drees, G. (2014). 'Need for psychosocial assistance in patients undergoing cardiothoracic surgery evaluated by a seven-item questionnaire'. *Thorac Cardiovasc Surg ,* 62(8), pp. 662-669 [Online]. Available at: *10.1055/s-0034-1371532* (Accessed: 20 August 2021).

Salzmann, S., Rienmuller, S., Kampmann, S., Euteneuer, F. and Rusch, D. (2021). Preoperative anxiety and its association with patients' desire for support - an observational study in adult, BMC Anesthesiology. 21(149). Pp.1-9 [Online]. Available at:*10.1186/s12871-021-01361-2*(Accessed: 5 November 2021).

Sanchis-Gomar, F., Perez-Quilis, C., Leischik, R. and Lucia, A. (2016) 'Epidemiology of coronary heart disease and acute coronary syndrome', *Annals of translational medicine,* 4(13), pp. 1-12 [Online]. Available at: *10.21037/atm.2016.06.33* (Accessed: 15 August 2021).

Sanchis-Gomar, F., Perez-Quilis, C., Leischik, R. and Lucia, A. (2016) ' Epidemiology of coronary heart disease and acute coronary syndrome.', *Annals of translational medicine,* 4(13), pp. 1-12 [Online]. Available at: *10.21037/atm.2016.06.33* (Accessed: 14 August 2021).

Schmidt, S.A., Lo. S. and Hollestein, L.M. (2018) Research Techniques Made Simple: Sample Size Estimation and Power Calculation, Journal of investigative dermatology. 138(8). Pp.1678-1682. [Online]. Available at:10.1016/j.jid.2018.06.165(Accessed: 20 September 2021).

Shaima, C., Moorthi, P.V. and Shaheen, N.K. (2016) 'Cardiovascular diseases: Traditional and non-traditional risk factors', *Journal of Medical & Allied Science s,* 6(2), pp. 46 -51 [Online]. Available at: *10.5455/jmas.228597* (Accessed: 10 July 2021).

Sinclair, D., Isba, R., Kredo, T., Zani, B., Smith, H. and Garner, P. (2013) 'World Health Organization Guideline Development: An Evaluation'. *Evaluation of WHO Guidelines,* 8(5), pp. 1-5 [Online]. Available at: 10.1371/journal.pone.0063715 (Accessed: 12 June 2021).

Stam, H., 2010. Encyclopedia of research design. [Online]. Available at:

Stewart, C. (2021) *Number of coronary artery bypass surgeries in the United Kingdom (UK) 2000-2019,* Available at: *https://www.statista.com/statistics/940785/number-of-coronary-artery-bypass-surgeries-in-united-kingdom-uk/* (Accessed: 19 August 2021).

Tala, S.P., MacNeil, S. and Claeyssens, F. (2015) 'The Tissue-Engineered Vascular Graft—Past, Present, and Future', *Tissue Engineering Journal ,* 22(1), pp. 68–100 [Online]. Available at: *10.1089/ten.teb.2015.0100* (Accessed: 10 July 2021).

Tavakol, M., Ashraf, S. and Brener, S.J. (2012) 'Risks and Complications of Coronary Angiography: A Comprehensive Review', *Global Journal of Health Science,* 4(1), pp. 65–93 [Online]. Available at: *10.5539/gjhs.v4n1p65* (Accessed: 10 July 2021).

The World Health Organization (N.D) *Raised cholesterol*, Available at: https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3236 (Accessed: 7 November 2021).

Tollefson, J., Bishop, T., Jelly, E., Watson, G. and Tambree, K. (eds). (2012) Essential Clinical Skills, 2nd edn. Cengage Learning: South Melbourne
Usha Chivukula & Sunayana Swain & Suvashisa Rana &
Usha Chivukula & Sunayana Swain & Suvashisa Rana &
Utriyaprasit, K., Moore, S.M. and Chaiseri, P. (2010). Recovery after coronary artery bypass surgery: effect of an audiotape information programme, *J Adv Nurs.* 66(8). Pp.1747-1759 [Online]. Available at:10.1111/j.1365-2648.2010.05334.x(Accessed: 5 November 2021).

Vahdat, S., Hamzehgardeshi, L., Hessam, S. and Hamzehgardeshi, Z., 2014. Patient involvement in health care decision making: a review. *Iranian Red Crescent Medical Journal*, *16*(1). Pp. 1-7 [Online]. Available at : 10.5812/ircmj.12454 (Accessed: 25 September 2021).

VCU Libraries Research Guides (2021) *How to Conduct a Literature Review (Health Sciences),* Available at: *https://guides.library.vcu.edu/health-sciences-lit-review* (Accessed: 20 June 2021).

Virani, S.S., Alonso, A., Aparicio, H.J., Benjamin, E.J., Bittencourt, M.S., Callaway, C.W., Carson, A.P., Chamberlain, A.M., Cheng, S., Delling, F.N., Elkind, M.S., Evenson, K.R., Ferguson, J.F., Gupta, D.K., Khan, S.S., Kissela, B.M., Knutson, K.L., Lee, C.D., Lewis, T.T., Liu, J., Loop, M.S., Lutsey, P.L., Ma, J., Mackey, J., Martin, S.S., Matchar, D.B., Mussolino, M.E., Navaneethan, S.D., Perak, A.M., Roth, G.A., Samad, Z., Satou, G.M., Schroeder, E.B., Shah, S.H., Shay, C.M., Stokes, A., VanWagner, L.B., Wang, N.Y. and Tsao, C.W. (2021) 'Heart Disease and Stroke Statistics— 2021 Update', *American Heart Association Journals ,* (143), pp. 254–743 [Online]. Available at: *10.1161/CIR.0000000000000950* (Accessed: 10 July 2021).

Virani, S.S., Alonso, A., Benjamin, E.J., Bittencourt, M.S., Callaway, C.W., Carson, A.P., Chamberlain, A.M., Chang, A.R., Cheng, S., Delling, F.N. and Djousse, L. (2020) 'Heart disease and stroke statistics—2020 update: a report from the American Heart Association', *Circulation,* 141(9), pp. 139-596 [Online]. Available at: *10.1161/CIR.0000000000000757* (Accessed: 15 August 2021).

Webb, K.K. (2021) *Literature Review: Developing a search strategy,* Available at: *https://libguides.csu.edu.au/ld.php?content_id=36285749* (Accessed: 17 June 2021).

Weiss, J., Freeman, M., Low, A., Fu, R., Kerfoot, A., Paynter, R., Motu'apuaka, M., Kondo, K. and Kansagara, D. (2017) 'Benefits and Harms of Intensive Blood Pressure Treatment in Adults Aged 60 Years or Older: A Systematic Review and Meta-analysis', *Annals of Internal Medicine Journal ,* 166(6), pp. 419-429 [Online]. Available at: *10.7326/M16-1754* (Accessed: 10 July 2021).

Wilkins, E., Wilson, L., Wickramasinghe, K., Bhatnagar, P., Leal, J., Luengo-Fernandez, R., Burns, R., Rayner, M. and Townsend, N., 2017. European cardiovascular disease statistics 2017. (Accessed: 14 August 2021).

Williamson, P.O. and Minter, C.J. (2019) 'Exploring PubMed as a reliable resource for scholarly communications services', *Journal of the Medical Library Association,* 107(1), pp. 16-29 [Online]. Available at: *dx.doi.org/10.5195/jmla.2019.433* (Accessed: 12 June 2021).

Wisdom, J. and Creswell, J.W. (2013). Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models. Pp. 1-5 [Online]. Available at: https://pcmh.ahrq.gov/sites/default/files/attachments/MixedMethods_032513comp.pdf (Accessed: 30 September 2021)

World Health Organization (2018) *United Arab Emirates,* Available at: *www.who.int/nmh/countries/are_en.pdf* (Accessed: 14 August 2021).

World Health Organization Cardiovascular disease fact sheets, 2015. Updated January; 2015. Available at: http://www.who.int/ mediacentre/factsheets/fs317/en (Accessed: 30 September 2021)

Wright, k., Golder, S. and Light, K.K. (2015) 'What value is the CINAHL database when searching for systematic reviews of qualitative studies?'. *Systematic Reviews,* 4(104), pp. 1-8 [Online]. Available at: *10.1186/s13643-015-0069-4* (Accessed: 12 June 2021).

Xie, Y. (2013). Population heterogeneity and causal inference. 110(16). Pp. 6262-6268 [Online]. Available at: 10.1073/pnas.1303102110(Accessed: 30 September 2021)

Xu, T., Huang, Y., Zhou, H., Bai, Y., Huang, X., Hu, Y., Xu, D., Zhang, Y. and Zhang, J. (2019). β-blockers and risk of all-cause mortality in patients with chronic heart failure and atrial fibrillation-a meta-analysis. *BMC cardiovascular disorders*, *19*(1), pp. 1.10 [Online]. Available at: 10.1186/s12872-019-1079-2 (Accessed: 5 November 2021).

Yildiz, T., Gürkan, S., Gür, Ö., Ünsal, C., Göktaş, S. B., and Özen, Y. (2014). Effect of standard versus patient-targeted in-patient education on patients' anxiety about self-care after discharge from cardiovascular surgery clinics. *Cardiovascular journal of Africa*, *25*(6),pp. 259–264 [Online]. Available at: 10.5830/CVJA-2014-048(Accessed: 5 November 2021).

Yoo, W., Namkoong, K., Choi, M., Shah, D.V., Tsang, S. Hong, Y., Aguilar, M. and Gustafson, D.H. (2015). Giving and Receiving Emotional Support Online: Communication Competence as a Moderator of Psychosocial Benefits for Women with Breast Cancer. Comput human behave. Pp.1-25 [Online]. Available at: 10.1016/j.chb.2013.07.024 (Accessed: 25 September 2021).

Yu, M. E. A. (2015) *The benefits of pre-surgery education*, *Gallup*. [Online]. Available at: 10.4135/9781412961288.n108 (Accessed: 20 September 2021).

Appendix

Appendix 1 - Cinahl Database

Databases: Cinahl Database

web address: Advanced Search: EBSCOhost

accessed: 20th January 2021

period: 20 January 202 1inte l6 June 2021

Limitation: English language, the article should be less than 10 years, primary articles.

Search ID	Cinahl Database	Result
#1	Topic= (nursing education) (title)	2020
#2	Topic= (cardiac surgery) (title)	1591
#3	**#1 And #2**	0
#4	Topic= (pre-operative education) (title)	9
#5	Topic= (anxiety) (title)	5938
#6	**#3 And #4**	2

Appendix 2 - PubMed Database

Databases: PubMed Database

Web address: https://pubmed.ncbi.nlm.nih.gov

Accessed: 20th January 2021

Period: 20 January 202 1inte l6 June 2021

Limitation: English language, the article should be less than 10 years, primary articles.

Search ID	PubMed Database	Result
#1	Topic= (nursing education) (title)	2928
#2	Topic= (cardiac surgery) (title)	131
#3	**#1 And #2**	0
#4	Topic= (pre-operative education) (title)	23
#5	Topic= (anxiety) (title)	**786**
#6	**#2 And #3 And #4**	2

Appendix 3 - Medline Database

Databases: Medline Database

Web address: https://www.nlm.nih.gov/medline/medline_overview.html

Accessed: 20th January 2021

Period: 20 January 202 1inte 16 June 2021

Limitation: English language, the article should be less than 10 years, primary articles.

Search ID	Medline Database	Result
#1	Topic= (nursing education) (title)	5034
#2	Topic= (cardiac surgery) (title)	30764
#3	**#1 And #2**	57
#4	Topic= (pre-operative education) (title)	70453
#5	Topic= (anxiety) (title)	949688
#6	**#2 And #3 And #4**	2

Appendix 4 - Data extraction table

Title, Authors, year, country	Study design	sample size	Study aims	Strength & limitation	Findings
Effects of pre-operative individualized education on anxiety and pain severity in patients following open-heart surgery (Ertürk, E,B. and Ünlü, H. 2018) in turkey	quasi-experimental study design	109 patients	investigated the effects of pre-operative individualized education for open-heart surgery patients on post-operative anxiety and pain severity.	The limitation: 1-there was no control group to compare against the pre- and post-operative state anxiety scores of the patients who were provided with individualized education and routine care.	The individualized education is given to patients before surgery was found to have potential effects on their post-operative pain levels.

Can nurse-led preoperative education reduce anxiety and postoperative complications of patients undergoing cardiac surgery? (Kalogianni, A., et al., 2015) in Greek	randomised controlled study designed.	395 patients (intervention group: 205, control group: 190).	estimate the effectiveness of a nurse-led preoperative education on anxiety and postoperative outcomes.	The strength: 1- this study was the first one to be conducted in Greece 2- 2-the study population underwent cover the whole spectrum of cardiac surgery and not just CABG The limitations: 1- the small sample size and the data were collected by one cardiac surgery centre only. 2- The interrater reliability between the three nurses delivering the education and the	Preoperative education delivered by nurses reduced anxiety and postoperative complications of patients undergoing cardiac surgery, but it was not effective in reducing readmissions or length of stay.

				treatment fidelity was not measured. 3- Anxiety was assessed with a single tool in the preoperative stage and before discharge. 4- The researchers measured those complications that could be influenced by preoperative education and anxiety. Anxiety-related complications such as restlessness, insomnia/nightmares, need for bolus sedation, pain scores was not measured.	

A preoperative education intervention to reduce anxiety and improve recovery among Chinese cardiac patients: A randomized controlled trial (Guo, P., et al., 2011). In china	randomized controlled trial study designed.	153 patient (77 control group and 76 preoperative education group)	determine whether a preoperative education intervention designed for Chinese cardiac patients can reduce anxiety and improve recovery.	The strength: 1-the first randomized controlled trial to assess the effect of preoperative education among Chinese patients undergoing cardiac surgery 2-The sample size of 153 is larger than most other trials 3-the study used randomized in design to look at the effect of preoperative information for cardiac surgical patients the limitation: 1-The reason for loss to follow-up was being discharged without surgery with the remaining attrition	This form of preoperative education is effective in reducing anxiety and depression among Chinese cardiac surgery patients. Based upon existing evidence and international practice, preoperative education should be incorporated into routine practice to prepare Chinese cardiac patients for surgery.

				due to reasons of death, and care transfer to another hospital. 2-In China, it is not unusual for patients to discharge themselves prior to surgery. due to the financial cost	
Short-term intervention to reduce anxiety before coronary artery bypass surgery (Heilmann, C., et al., 2015). In Germany	randomised controlled trial study designed.	253Patient (intervention group 139, and a control group 114)	evaluate an intervention with individualised information and emotional support before coronary artery bypass grafting in a controlled randomised trial	The limitations: 1- patients who refused to participate in the study could have been in particular need of emotional support. 2-Assuming that the preoperative discussion with the surgeon and anaesthetist influences the anxiety of the patient. However, regular information of the control	Our short-term psychosocial intervention in patients undergoing coronary artery bypass grafting had a beneficial effect on reducing pre- and post- operative anxiety that was better than routine information alone.

				patients and interventions were delivered by the trained study nurses. 3-The Data on the clinical outcome of our intervention was restricted to in-hospital mortality and length of stay in the ICU. 4-The proportion of the randomisation for intervention and control group was not 1, but it was less than 15, and that do not consider this to have influenced the study outcomes. 5-The attending medical team was not intentionally blinded to the assignment to the intervention or control	

				group. However, no conversation with health care professionals was scheduled between the intervention or regular information for the control group and the assessment of the primary endpoint to avoid interference.	
The effect of educational audiotape programme on anxiety and depression in patients undergoing coronary	randomised clinical trial study designed.	70 patient	investigate use of educational audiotape programme on anxiety and depression in patients undergo- ing coronary artery bypass graft (CABG).	None was mention	Audiotape educational programme used by patients undergoing CABG decreases the level of their anxiety and depression after cardiac surgery.

artery bypass graft (Hoseini, S., et al., 2013) in Iran					
Effects of Nurse-Led Intervention on Patients' Anxiety and Sleep Before Coronary Artery Bypass Grafting (Malek, N.M., et al., 2018) in Iran	randomised controlled trial study designed.	patients 160 (experimental group 80 and 80 control groups)	examine the effects of supportive-educational nurse-led intervention on the patients' anxiety and sleep before the coronary artery bypass grafting.	None was mention	Results showed that non-pharmacological and supportive interventions can reduce patients' anxiety and sleep disturbance before the coronary artery bypass grafting. According to the results, nonpharmacological thera- pies should be placed at the top of nurses' tasks

Appendix 5 – Critical Appraisal Skills Programme Tool

CASP Tool Question	Malek., et al., 2018	Kalogianni, et al., 2015	Erturk & Unlu., 2018	Guo, et al. 2011	Heilmann., et al., 2016	Hoseini, et al., 2012
Q1-Did the trial address a clearly focused issue?	yes	Yes	No	Yes	Yes	Yes
Q2-Was the assignment of patients to treatments randomised?	yes	yes	No, it was quasi experimental	Yes	Yes	Yes
Q3-Were all of the patients who entered the trial	Yes	Yes	Yes	No, -The reason for loss to follow-up was being discharged without surgery with the	Yes	Yes

properly accounted for at its conclusion?				remaining attrition due to reasons of death, and care transfer to another hospital. 2-In China, it is not unusual for patients to discharge themselves prior to surgery. due to the financial cost		
Q4-Were patients, health workers and study personnel	No, it was random block sampling	Yes, it was blinding	No	No it was random block sampling	No	No

'blind' to treatment?						
Q5-Were the groups similar at the start of the trial	Yes	Yes	Yes	Yes	Yes	yes
Q6-Aside from the experimental intervention, were the groups treated equally?	Yes, both group had medication, controlling hemodynamic statues, and both group had to fill SSAI form	No, the intervention group received preoperative education by specially trained nurses, but the The control group received the standard information by the ward personnel.	There was no control group	No, in usual care group All participants in the trial received usual care, consisting of two separate visits from the surgeon and anesthetist one day before surgery. These visits constituted the main opportu- nity whereby patients and family members could	No, the patients of the control group were routinely informed as usual. The patients of the intervention group received a dialogue with individualised information and emotional support one day before surgery in addition to standard care.	No, An audiotape educational programme was given to the intervention group after surgery in addition to the routine training. But patients in the control group received only routine training.

				gain information related to the general process and risks of their surgery and anesthesia, the use of analgesia and/or pain management. In preoperative education group they recived leaflet 'Your Heart Surgery' together with approximately 15–20 min of verbal advice by PG.		
Q7-How large was the	The mean score of anxiety was 51.82 in the control group	the mean decrease in state score during the follow-up period	No significant difference was identified between	When adjustments were made for baseline anxiety	Significantly, reduced anxiety was found in the intervention	According to the results of independent T-test, mean scores of anxiety

treatment effect?	before the intervention, indicating high anxiety, while the mean score of anxiety was severe (58.22) in the exper- imental group. the mean score of anxiety was 61.9 (severe) in the control group after the intervention, whereas the mean score of anxiety reduced to 48.39 (moderate) in the experimental group after the intervention.	was greater in the intervention group as compared with the control group.	mean pre- and post-operative state anxiety scores ($P > 0.05$)	score, age, gender, education level, and type of surgery, it appeared to widen the difference between the two groups, with the preoperative education group having a signifi- cantly lower anxiety score at follow-up (mean difference P < 0.001)	group compared to control group (p< 0.001)	between the two groups before and after the intervention are not statistically significant (p = 073)

	Therefore, there was a statistically significant difference between the control and experimental groups in terms of the mean anxiety after the intervention (*P* < .001, percentage change = −20.78)					
Q8-How precise was the estimate of the treatment effect?	The confidence interval of 95% and test power of 80% and using the following formula, but it increased to 80 peo- ple taking into account a	The confidence Scores range from 20 to 80, with higher scores correlating with greater anxiety.	The confidence interval was not mentioned	confidence interval (P < 0.001)	The confidence interval was not mentioned	The confidence interval was not mentioned

	possible sample loss of 10% in each group					
Q9-Can the results be applied to the local population, or in your context?	Yes	yes	Yes	Yes	Yes	Yes
Q10-Were all clinically important outcomes considered?	Yes	yes	Yes	Yes	Yes	Yes
Q11-Are the benefits worth the harms and costs?	the study showed Nonpharmacological and support the intervention can reduce patient	The study showed that preoperative education that has been delivered by nurses reduce	The study showed that preoperative individual education reduces patient anxiety,	The research showed that preoperative education has massive effect on	The study showed that beneficial effects own reducing pre and post-operative anxiety that was	Study showed that audio tape education program reduced patient anxiety, there was no cost on the hospital

	anxiety jeering the preoperative stage for CABG surgery, there was no cost on the hospital	anxiety and postoperative complications of patient and they're going for cardiac surgery, there was no cost on the hospital	there was no cost on the hospital	reducing anxiety For Chinese patients undergoing for cardiac surgery, there was no cost on the hospital	better than new routine information alone, there was no cost on the hospital	