IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

AN EXPERIMENTAL STUDY TO EVALUATE THE EFFECTIVENESS OF CHANGING POSITION AND EARLY AMBULATION ON PAIN, FATIGUE AND BLEEDING AMONG PATIENTS UNDERGONE CARDIAC CATHETERIZATION AT SELECTED HOSPITAL, PANIPAT.

Medhavi

NPCC practitioner

Pt.B.D.Sharma University of Health sciences

CHAPTER – I

INTRODUCTION

Background of the study:

After cardiac catheterization, prolonged bed rest is prescribed to minimize the vascular complications. This prolonged bed rest is often associated with pain and discomfort for patients. Changing patients' position and early ambulation after cardiac catheterization may decrease the level of back pain. Changing patients' position and early ambulation after cardiac catheterization increase the levels of comfort and satisfaction and decrease the level of fatigue. Changing patients' position and removing the sand bag from the puncture site early at the post catheterization period does not increase the risk of vascular complications.[1]

Cardiac catheterization [CC] is widely used for diagnostic evaluations in patients with cardiac diseases (Woods et al., 2005).[2]Despite progressive improvements innon-invasive techniques, CC remains a key clinical tool for the assessment of anatomy and physiology of the heart and its associated vasculature (Kasper et al., 2005). Currently, CC has become a routine diagnostic procedure performed in many hospitals in India. Although it can be performed through brachial, radial or femoral arteries (Woods et al., 2005),[3] most (>95%)

CCs are performed through the percutaneous femoral technique (Kasper et al.,2005; Chair et al., 2007). However, CC is not entirely freeform the risk of complications (West et al., 2006).[4]

Vascular complications such as bleeding, hematoma, distal embolization and arterial thrombosis are major complications after CC that could be resulted from a trauma to the femoral artery (Chair et al., 2003; Steffenino et al., 2006).[5]Due to the potential vascular complications, all patients are restricted to bed rest in supine position with the affected leg immobilized for 6–24 h after the procedure to prevent bleeding from the groin site, which usually occurs in 0.43–4% of patients (Chair et al., 2003, 2007; Benson,2004). Bearing such a prolonged bed rest in supine position, however, is difficult for many patients, and it is often associated with discomfort for them (Fowlow et al.,1995; Lunde´n et al., 2006).[7]

Studies show that this type of positioning is based on tradition rather than on research (McCabe et al., 2001).[8] The most uncomfortable part of hospital admission for these patients is the time required to lie in flat position after procedure that often results in back pain (Vlasic, 2004). Pain can increase the fatigue level and dissatisfaction of patients (Louville et al., 2003;Morton and Fontaine, 2005).[9]Early ambulation, changing position in bed, and reducing the length of bed rest, may decrease patients' pain (Chair et al., 2003, 2007; Benson,2004) and significantly decrease the nursing staff work-load, reduce in-hospital stay and also enable the patients to meet self care needs such as eating, drinking, and voiding (Roebuck et al., 2000; Tengiz et al., 2003; Rosenstein et al 2004).[10]

Many patients find it difficult to use bedpan or urinal in the supine position during the bed rest (Chairet al., 2007) and due to special religious and cultural beliefs, this is a highly conflicting and unpleasant problem for the Indian patients. In spite of these facts, many hospitals are requiring their patients to remain in prolonged bed rest from 18 to 24 h after procedure usually until next morning to prevent complications. The possibility and safety of changing patients' position and early ambulation after cardiac catheterization in our country have not yet been investigated. Furthermore, the effect of changing position and early ambulation on comfort, satisfaction and fatigue has not been investigated yet.[11]

Cardiovascular diseases (CVDs), especially coronary heart disease (CHD), have assumed epidemic proportions worldwide. Globally, CVD led to 17.5 million deaths in 2018.[1]More than 75% of these deaths occurred in developing countries. In contrast to developed countries, where mortality from CHD is rapidly declining, it is increasing in developing countries.[2]This increase is driven by industrialization, urbanization, and related lifestyle changes and is called epidemiological transition.[12]

With the turn of the century, cardiovascular diseases (CVDs) have become the leading cause of mortality in India.[13] In comparison with the people of European ancestry, CVD affects Indians at least a decade earlier and in their most productive midlife years.For example, in Western populations only 23% of CVD deaths occur before the age of 70 years; in India, this number is 52%.[14] In addition, case fatality attributable to CVD in low-income countries, including India, appears to be much higher than in middle- and high-income countries. The World Health Organization (WHO) has estimated that, with the current burden of

CVD, India would lose $237 billion from the loss of productivity and spending on health care over a 10-year period (2005–2015).[15]

Cardiac catheterization is the gold standard diagnostic test for coronary heart diseases. In order to minimize the post-procedure complications, patients are restricted to prolonged bed rest that is always accompanied by fatigue and discomfort.[9]After cardiac catheterization, prolonged bed rest is prescribed to minimize the vascular complications. This prolonged bed rest is often associated with pain and discomfort for patients. Changing patients' position and early ambulation after cardiac catheterization may decrease the level of back pain.[16]

Studies show that this type of positioning is based on tradition rather than on research (McCabe et al., 2001). The most uncomfortable part of hospital admission for these patients is the time required to lie in flat position after procedure that often results in back pain (Vlasic, 2004). Pain can increase the fatigue level and dissatisfaction of patients (Louville et al., 2003; Morton and Fontaine, 2005).[17] Early ambulation, changing position in bed, and reducing the length of bed rest, may decrease patients' pain (Chair et al., 2003, 2007; Benson, 2004) and significantly decrease the nursing staff workload, reduce in-hospital stay and also enable the patients to meet self-care needs such as eating, drinking, and voiding (Roebuck et al., 2000; Tengiz et al., 2003; Rosenstein et al., 2004).[18] Many patients find it difficult to use bedpan or urinal in the supine position during the bed rest (Chair et al., 2007) and due to special religious and cultural beliefs, this is a highly conflicting and unpleasant problem for the Indian patients. In spite of these facts, many hospitals are requiring their patients to remain in prolonged bed rest from 18 to 24 hour after procedure usually until next morning to prevent complications. The possibility and safety of changing patients' position and early ambulation after cardiac catheterization in our country have not yet been investigated. Furthermore, the effect of changing position and early ambulation on comfort, satisfaction and fatigue has not been investigated yet in India.[19]

Back pain following CC accounts for 35.8% of patients' complaints of pain. Gulanick et al. studied patient's responses to coronary angioplasty. In this qualitative study, back pain was listed as a negative theme. Patient complained of severe back pain, with perceived pain related to prolonged immobility.[20] Unrelieved pain is thought to interfere with one's well-being.[21] Therefore, promoting patient comfort measures after CC is a major goal of nursing. However, in order to enhance patient comfort, it is necessary to identify factors that are related to back pain following CC. After determining which factors contribute significantly to back pain after CC, appropriate nursing interventions can be identified to promote patient comfort without compromising patient safety, including the prevention of vascular complications.[22]

Need for the study:

Cardiac catheterization is one of the most widely performed cardiac procedures. In the United States, more than 1,000,000 cardiac catheterization procedures are performed annually. As expected, in any invasive procedure, there are some patient-related and procedure-related complications. With significant advances in the equipment used for cardiac catheterization, the improved skill of the operators, and newer techniques, the rates of these complications have been reduced significantly. The term cardiac catheterization can refer to either right heart catheterization or left heart catheterization, or both. The procedure can be either diagnostic or therapeutic, and interventional cardiologists can perform a variety of interventions depending on the clinical need.[23]

Across the globe, cardiovascular disease is responsible for high morbidity and mortality. By 2020, coronary heart disease will become the most common cause of death in India and worldwide.[24] The gold standard for the most accurate diagnosis of cardiac disease is cardiac catheterization, which is quite a safe procedure but it has some risk for morbidity and even death.[25]

The prevalence of CAD has increased in India as shown in many studies conducted in rural and urban India over the last 30 years.[26] The National Statistical Survey Organisation (NSSO) survey is the largest recent study on the prevalence of CAD in India. In its 60th NSSO survey (2004–2005), a total of 390 913 subjects were evaluated. The prevalence of CAD was found to be 7% in urban and 3% in the rural population.[27]

The increase in CAD prevalence in India is attributed to social and economic change and its consequences including change in dietary habits, physical inactivity and increased incidence of diabetes and hypertension. Increase in prevalence may also be due to, although small, better survival on account of early detection and treatment. Although many studies from India have reported a trend towards increase in prevalence of CAD, most of these studies only report the prevalence of CAD and risk factors at one-time point.[28] One study from urban India that looked at trend in changes in the prevalence of risk factors found that over a 20-year period, body mass index (BMI) and overweight increased, smoking and systolic blood pressure (BP) decreased, while truncal obesity, hypercholesterolaemia and diabetes remained unchanged.[29]

Previous studies suggested safety of early ambulation after diagnostic heart catheterization. A meta-analysis of early ambulation trials after diagnostic catheterization, by Logeman et al, showed that 6 hours' bed rest after cardiac catheterization offered no advantage over 2 hours of bed rest with respect to combined bleeding, hematoma, and pseudoaneurysm (4.8% in the 2-hour vs 6.2% in the 6-hour group). Adding their 201-patient study to previous studies, they studied a total of 635 patients undergoing cardiac catheterization with 6-Fr catheters and demonstrated that early ambulation is not associated with increased bleeding complications. They stated that the occasional bleeding observed occurred within 10 minutes after ambulation rather than after discharge.[29]

Transradial and transfemoral are the two main approaches to angiography which are used for diagnostic and therapeutic purposes in catheterization. Transfemoral coronary angiography (TFA) is often preferred over transradial3due to the unlimited repetition of puncturing, easy access, less radiation, and less contrast.[20] However, TFA is associated with acute and chronic complications. For example, back pain is a common complication following TFA and is associated with immobility and restricted positioning following the procedure.[31] It is recommended that following TFA, patients complete bed rest in supine for 6–12 h to prevent possible complications.[32] This extended bed rest may lead to further patient discomfort, groin and back pain, increased treatment costs, and a longer hospital stay.[33]Other complications after TFA are hematoma, haemorrhage, and urinary retention. To reduce complications from TFA, strategies such as therapeutic positioning of the patient, increase the head of bed elevation, early ambulation, and use of a weight applied to the catheter insertion site are recommended, but the effectiveness of these methods are controversial.

Changing the patient's position, increasing the head of bed elevation, and early mobilization after the angiography can reduce back pain, groin pain, urinary retention, and overall increase patient comfort without an increase in the vascular complications such as hematoma, haemorrhage, thrombosis, or bruising and decrease the healthcare providers' workload, reduce the duration of hospitalization and also enable the patients to meet their needs such as eating, drinking, and voiding. However, there is varying information in the literature on the effect of adjusting the bed angle. For example, evidence showed that slightly raising the head of bed (15°) after angiography did not reduce the pain/discomfort of patients. Besides, an incline of 30° did not affect pain intensity, urinary retention, and other vascular complications after angiography compared to the supine position but, an incline of 45° was found can help to decrease overall pain. To now, many hospitals are requiring their patients to remain in long-time bed rest after FFA to prevent complications. Based on the evidence mentioned, there is no consensus regarding the optimal position and length of bed rest after TFA.[34]

The rate of postangiography side effects has been reported between 0.5% and 13.6% in different researches.[35] In order to prevention of probable side effects, patients must be limited to bed rest and neurovascular of suffering organs area is observed for bleeding and hematoma.[36] The back pain is an inconvenient extra effect for the patients in addition to bleeding and hematoma. The back pain is due to immobility in position change.

In recent years, the methods of angiography nursing care have changed this change leads to increase of patients' comfort and relief and decrease in its post angiography side effects.[37] Furthermore, change in patient's bed angles has been studied on pain after coronary angiography by using vital signals. Results showed that patients were placed in bed by angle 45° group have had significantly less back pain than the other groups ($P = 0.001$).

In another study, the effect of early mobilization was studied in patient undergoing coronary angiography on vascular complications and back pain. The results showed that there was a significantly lower rate of perceived back pain in the short immobilization group, compared to the controls, at the time of mobilization, which remained significant also after 2 hrs of mobilization.[38]

Position and mobilization post angiography study was carried out to assess the comparison of 4.5 h and 2.5 h bed rest on side effects and the rate of patient's comfort. Results showed that no significant difference between two groups considering side effects, but group 2.5 hrs more comfortable than group 4.5 h ($P = 0.001$).[39]

A lot of studies have been conducted in India that can be mentioned to study of changing position on low back pain after angiography, that results showed intervention group have had significantly less back pain than the control groups ($P = 0.001$).[40] Furthermore, in another study, effect of 4 h bed rest was studied on side effects in a patient undergoing coronary angiography on vascular complications and back pain. The results showed no significant difference between two groups considering side effects. There was a significantly lower rate of back pain in intervention group, compared to the controls, which remained 6 h bed rest.[41]

Considering the increasing growth of cardiovascular diseases and the importance of diagnostic methods to reduce the mortality, caring for patients after angiography offers a special responsibility for nurses while the aim of nursing care is increasing comfort and relief of pain without increasing vascular side effects after coronary angiography. Furthermore, while millions of patients are under angiography a year, there is limited research on the change of bed resting position in vascular complications after angiography. Hence, the researcher decided to determine the effect of changing position and early mobilization on back pain, fatigue and bleeding in patients after cardiac catheterization.

Statement of the problem:

An experimental study to evaluate the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization at selected hospital, Panipat.

Objectives:

1. To assess the pre-test and post-test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.
2. To compare the pre – test and post – test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.
3. To determine association of pre-test pain, fatigue and bleeding with selected socio-demographic variables of the patients in experimental and control group

Hypotheses:

All the hypotheses were tested at the 'P' value < than 0.05.

H_1 – There will be a significant reduction in post-test pain in experimental group as compared to control group after administration of changing position and early ambulation.

H_2 - There will be a significant reduction in post-test fatigue in experimental group as compared to control group after administration of changing position and early ambulation.

H_3 - There will be a significant reduction in post-test bleeding in experimental group as compared to control group after administration of changing position and early ambulation.

Assumptions:

1. Patient's undergone cardiac catheterization will have pain, fatigue and bleeding.
2. Early ambulation along with positioning the patients who underwent cardiac catheterization will have less pain, less fatigue and less bleeding.

Operational Definitions:

- **Evaluate –** It is defined as the process of determining the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization
- **Effectiveness – in** this study it is defined as the capability of changing position and early ambulation in reducing the pain, fatigue and bleeding among patients undergone cardiac catheterization.
- **Changing position –** in this study, patients in the experimental group who had cardiac catheterization will be given the following positions as mentioned below:

Table – I: Positioning protocols and assessment methods in the groups.

Hour	Position of Patient in Experimental Group	Position of Patient in Control Group
After CC	Supine HOB 15 Elevated, Pillows R/L	Routine positioning, including 10–24 h bed rest in supine position with the affected leg immobilized
1 Hour	Supine HOB 15 Elevated, Pillows R/L	
2 Hour	Supine HOB 30 Elevated, Pillows R/L	
3 Hour	Supine HOB 45 Elevated, Pillows R/L	
4 Hour	Right Side HOB 15 Elevated	
5 Hour	Left Side HOB 15 Elevated	
6 Hour	Fowlers	
7 Hour	OOB	
8 Hour	OOB	
Next Morning	Routine	

CC – Cardiac Catheterization, HOB – Head of Bed, OOB – Out of Bed

- **Early ambulation –** in this study it is defined as a technique of postoperative care in which a patient wo underwent cardiac catheterization gets out of bed and engages in light activity (such as sitting, standing, or walking) as soon as possible after the cardiac catheterization procedure
- **Pain –** Pain is an unpleasant sensory and emotional experience associated with cardiac catheterization procedure and will be assessed in this study using visual analogue scale.
- **Fatigue –** It is defined as the extreme tiredness resulting from mental or physical exertion due to cardiac catheterization procedures and will be assessed in this study using fatigue severity scale.
- **Bleeding –** in this study it refers to the abnormal loss of blood in patients who had underwent cardiac catheterization and will be assessed in this study using Modified WHO Bleeding Assessment Score

Delimitations:

1. The current study findings will be delimited to 60 patients only
2. Study duration will be limited for 30 days only.

Conceptual Framework:

The conceptual frame work and the model for the present study was based on Wiedenbach's helping art of clinical nursing theory [1964]. It describes a desired situation and a way to attain it. It directs action towards the implicit goal. This theory had three factors central purpose, prescription, and realities. A nurse develops a prescription based on central purpose and implements it according to the realities of the situation.

1. Central purpose was the model refers to what to accomplish. It was the overall goal towards which a nurse strives. It transcends the immediate intent of the assignment or basic by specifically directing towards the patient wellness.
2. Prescription refers to the plan of care for a patient. It specifies the nature of action that will fulfil the nurse's central purpose and the rationale of the action.
3. A reality refers to the physical, psychological, emotional, spiritual factors that come into play in a situation involving nursing action. The five realities are Agent, Recipient, Goal, Means, Frame work.

   The conceptualization of nursing practice according to this theory consists of three steps which are as follows.

   The conceptualization of nursing practice according to this theory consists of three steps which are as follows.

   I. **Identifying the need for help.**
   II. **Ministering the need for help.**
   III. **Validating the need for help.**

   The model adopted for this study was a modified form of **Wiedenbach's helping art of clinical nursing theory**. The investigator adopted this model and perceived apt in enabling to assist the outcome of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization. This model views the level of pain among osteoarthritis patients.

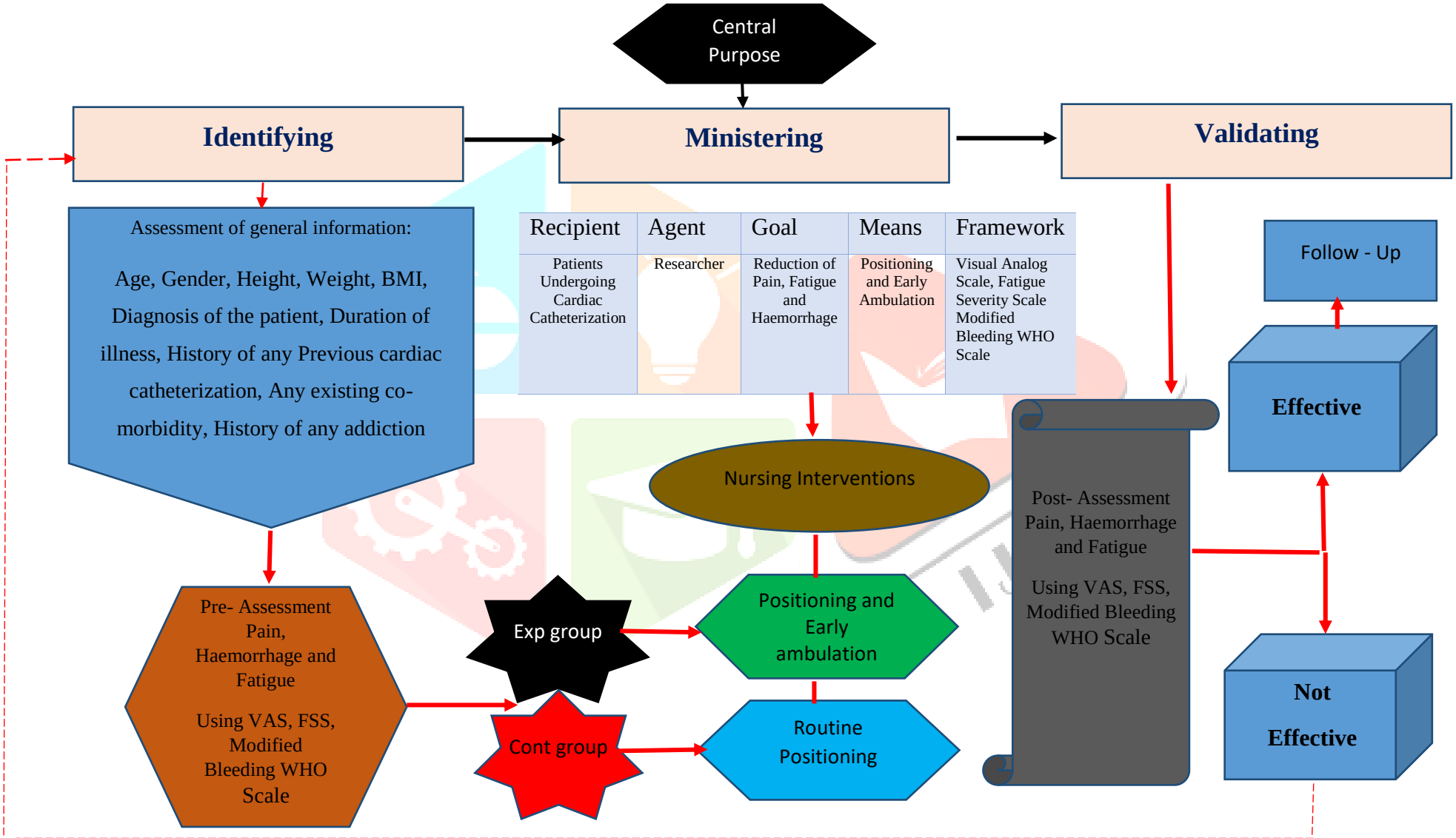
   The central purpose of the study was to compare the outcome of changing position versus early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization.

Thus the investigator selected two groups where changing position was provided for one group and routine positioning was done for the other group.

The realities identified were:

Agent	Investigator
Recipient	Patients undergone cardiac catheterization
Goal	Reduction of pain, fatigue and haemorrhage
Means	Changing position and Routine position
Framework	Visual Analog Scale, Fatigue Severity Scale and Modified WHO Bleeding Assessment Score

Figure – 1: Conceptual Framework Based on Modified Wiedenbach's Helping Art of Clinical Nursing Theory



CHAPTER – II

REVIEW OF LITERATURE

This chapter deals with the information collected in relation to the present study through published and unpublished materials for foundation to carry out the research work. Highly extensive review was made to strengthen the present study, and to lay down the foundation, which helps to reveal the prevailing situation of the similar studies in different areas.

The related literature for this study categorized under the following sections.

Section A: Literature related to cardiac catheterization

Section B: Literature related to effect of changing position on patients who underwent cardiac catheterization

Section C: Literature related to effect of early ambulation on patients who underwent cardiac catheterization

Section A: Literature related to cardiac catheterization

NiknamSarabi, H., Farsi, Z., Butler, S. et al. (2021) This study aimed to evaluate the effectiveness of a change in position to decrease pain and vascular complications for patients after TFA.This randomized clinical trial was conducted in 2020. Purposive sampling of 72 eligible patients undergoing TFA were selected and randomly assigned to either an experimental or control group. Patients in the experimental group (EG) were placed in a supine position for 2 h after angiography, followed by a semi-seated position with the bed angle gradually increased to 45° over 4 h. Patients in the control group (CG) remained in the supine position for 6 h. Vital signs, groin, back and leg pain, hematoma, hemorrhage, and urinary retention were assessed in both groups before, immediately after, and over 6 h after angiography. Results shows There was no significant difference between EG and CG on score of groin (2.69 ± 1.00 vs. 2.61 ± 1.00, $P = 0.74$), back (2.19 ± 0.98 vs. 2.47 ± 0.87, $P = 0.21$), and leg pain (2.14 ± 0.71 vs. 2.50 ± 1.08, $P = 0.27$) before the TFA.[42]

Aljanabi, Mohammed. (2020) done a study with the aim to valuate the early complications through utilization of observation check list form to check (hematoma, bleeding, back pain, urinary retention, and vasovagal stimulation post coronary angiography. randomized clinical

trial (RCT) was conducted for patients' undergoing coronary catheterization at Al Najaf Center for Cardiac Surgery The study results indicated that significant difference between the period of measurements of hematoma, and vasovagal reflex in the patients of experimental group (i.e. the patients return to normal though out the period of measurements).[43]

Mall A et al (2020) Researchers conducted a retrospective, exploratory analysis of adult cardiac catheterization outpatients (n = 375) receiving physician ordered, nurse administered procedural sedation (benzodiazepine and/or opioids) between April and June, 2017. Data were abstracted from the procedural database, Electronic Health Record, and Press Ganey© surveys. Results shows The mean age was 63 (SD 12.2), a majority were male (n = 226; 60%), white (n = 271; 73%), and overweight (mean body mass index = 29, SD 6.8). Patient-reported satisfaction with pain control and perceived staff concern for comfort were >75th percentile (Press Ganey© survey), with no difference in preprocedure and postprocedure pain scores (p = .596). Intraprocedural medication dose range and mean frequency were highly variable: midazolam (0.25-5.5 mg; 1.48); fentanyl (12.5-200 mcg; 1.63); and hydromorphone (0.5-2.5 mg; 1.33). Median time interval between administration of initial sedation and local anesthetic was 6 min. Patients with longer intervals had less frequent dosing (p < .001) and less total procedural sedation (p < .001). Sensitivity analysis revealed that trainee/fellow involvement (p = .001), younger age (p = .002), and shorter time intervals (p < .001) were associated with increased frequency and larger total dose.[44]

CarrollL.D, KetchellM.A and Astin F (2017) Done a review, the objective of this rapid review is to assess the efficacy of non-pharmacologic interventions (procedural education, relaxation techniques, psychological preparation) on psychological distress experienced by patients as they undergo a cardiac catheterization. Methodology shows Published, peer-reviewed, English-language intervention studies from 1981 to 2014 were identified in a search of CINAHL, Medline, and Cochrane Library. Eligible studies included adults undergoing cardiac catheterization. Studies included in this review used experimental and quasi-experimental designs and assessed at least one primary outcome: anxiety, depression, and pain to test non-pharmacologic interventions pre and post-cardiac catheterization. Researchers independently extracted data from included studies and completed a quality assessment using a published tool. Data were synthesized as a narrative. Results revealed There were 29 eligible experimental and quasi-experimental studies that tested the three interventions (n=2504). Findings suggest that non-pharmacologic interventions were able to

effectively reduce psychological distress in some patients undergoing cardiac catheterization.[45]

Hilário, Thamires& Santos, Simone & Kruger, Juliana & Goes, Marta & Casco, Márcia&Rabelo-Silva, Eneida. (2017) aim of the study was to describe how pain is assessed (characteristic, location, and intensity) and managed in clinical practice in patients undergoing endovascular procedures in the catheterization laboratory setting. Overall, 345 patients were included; 116 (34%) experienced post-procedural pain; in 107 (92%), pain characteristics were not recorded; the location of pain was reported in 100% of patients, and its intensity in 111 (96%); management was largely pharmacologic; of the patients who received some type of management (n=71), 42 (59%) underwent reassessment of pain.[46]

Section B: Literature related to effect of changing position on patients who underwent cardiac catheterization.

Ibdah RK, Ta'an WF, Shatnawi RM, Suliman MM, Rababah JA, Rawashdeh SI. (2020) conducted the study which aims to evaluate the effectiveness of early position change postcardiac catheterization on reducing patients' pain and discomfort. The study was conducted at two cardiac units in a university hospital in Jordan. A total of 120 patients were used in the study, 60 patients in each of the two groups-control and intervention. The randomized controlled trial design was used. Early position change 1 hour after sheath removal after cardiac catheterization was found to be effective in reducing back pain as compared with the control group ($P < .001$).[47]

Atiye K, Esra A A, Reyhan Y and Timur M (2022) This study aims to examine the effectiveness of music during pediatric cardiac catheterization procedure on children's pain, fear, anxiety and vital signs. This randomized, blind controlled study was conducted with the guidelines of Consolidated Standards of Reporting Trials (CONSORT). The sample of children was allocated to the Control Group, the Classic Music Group, and the Self-Selected Group. Pain, fear, and anxiety levels were measured before and after the pediatric cardiac catheterization procedure. Vital signs were measured before, during, and after the pediatric cardiac catheterization procedure. There was no significant difference between the groups in terms of demographic status, pain, fear, or anxiety levels and vital signs before the procedure. In post pediatric cardiac catheterization measurement in the recovery phase, pain, fear levels,

anxiety levels, heart rate, systolic and diastolic blood pressure of children in the musical intervention groups were lower than the control group.[48]

TheresiaFebriana Christi TyasUtami, DiyahFatmasari, MardiyonoMardiyono and ShobirunShobirun (2018) aim of the study was to examine the effect of positioning on bleeding complication and low back pain after diagnostic coronary angiography in patients with coronary heart disease patient in the Integrated Heart Care Center in Indonesia. This study was a true-experimental study with randomized posttest-only control group design. Thirty respondents were randomly selected using simple random sampling, which 15 respondents were randomly assigned in the experiment group and control group. The experiment group was given a positioning with 150, 300, 450 head-of-bed elevation in left and right lateral position. Findings showed that positioning had no effect on arterial hemorrhage (ρ=1.000) and subcutaneous bleeding (hematoma) (ρ=0.999). Repeated ANOVA test results revealed that positioning had a significant effect on low back pain (ρ=0.017).[50]

Vati J, Mathew K.T and Sharma P.Y (2017) done a study with the aim to investigate the effect of low fowler's position (30) on the severity of back pain and local vascular complications following transfemoral cardiac catheterization. A Randomized Controlled Trial (RCT) is the design principle used here. The study was conducted in the Advanced Cardiac Centre of Post Graduate Institute of Medical Education and Research, Chandigarh, India. A total 60 patients scheduled for elective transfemoral diagnostic cardiac catheterization were included in the study. Patients were randomly assigned to the control group (n=30) and the experimental group (n=30). Data were collected through the self-developed 'Interview schedule, 'Numerical pain intensity scale', and 'Vascular complications assessment' tools after checking its validity and reliability. Low fowler's position protocol and the protocol for assessing vascular complications were also developed. Both groups were restricted to bed rest for first 2 hours following the procedure in supine position with the affected leg straight and immobilized. After 2 hours, patients in the control group (n=30) were receiving conventional care in supine position and patients of the experimental group (n=30) were restricted to bed rest in low fowler's position with the head of the bed elevated to 30 degree. Severity of back pain was assessed at regular time intervals of 2, 4, 6 hours of post cardiac catheterization. Local vascular complications (hematoma, ecchymosis, and bleeding) were assessed at the time of removal of dressing at 12 hours after catheterization. The experimental group patients significantly had less back pain than the control group ($p<0.01$) at 4 hours and 6 hours after

cardiac catheterization. The control group patients (on supine position) significantly developed ecchymosis as compared to the experimental group (on low fowler position) ($p<0.02$) at the time of removal of dressing from the puncture site. None of the patient developed hematoma in both groups. There was no major bleeding in any of the groups. Nursing patients in low fowler's position at 30. [51]

Jogindra V, Tintu K. Mathew, Yash P S (2016) A Randomized Controlled Trial (RCT) is the design principle used here. The study was conducted in the Advanced Cardiac Centre of Post Graduate Institute of Medical Education and Research, Chandigarh, India. A total 60 patients scheduled for elective transfemoral diagnostic cardiac catheterization were included in the study. Patients were randomly assigned to the control group (n=30) and the experimental group (n=30). Data were collected through the self developed 'Interview schedule, 'Numerical pain intensity scale', and 'Vascular complications assessment' tools after checking its validity and reliability. Low fowler's position protocol and the protocol for assessing vascular complications were also developed. Both groups were restricted to bed rest for first 2 hours following the procedure in supine position with the affected leg straight and immobilized. After 2 hours, patients in the control group (n=30) were receiving conventional care in supine position and patients of the experimental group (n=30) were restricted to bed rest in low fowler's position with the head of the bed elevated to 30 degree. Severity of back pain was assessed at regular time intervals of 2, 4, 6 hours of post cardiac catheterization. Local vascular complications (hematoma, ecchymosis, and bleeding) were assessed at the time of removal of dressing at 12 hours after catheterization. The experimental group patients significantly had less back pain than the control group ($p<0.01$) at 4 hours and 6 hours after cardiac catheterization. The control group patients (on supine position) significantly developed ecchymosis as compared to the experimental group (on low fowler position) ($p<0.02$) at the time of removal of dressing from the puncture site.[52]

Adaryani R.M et al (2009) a study was done to investigate the effect of three positioning protocols on back pain, heart rate, blood pressure and vascular complications after cardiac catheterization. Methodology shows a three-group quasi-experimental design was used in this study, which was conducted in 2006. A convenience sample of 105 patients was randomly assigned to either the control or the two experimental groups (A and B). The control group received routine care. Group B was treated only with modified positioning and group A with modified positioning and a pillow under their body. Back pain, heart rate, arterial blood

pressure, haematoma formation and bleeding were measured at regular time intervals. Findings revealed The control group experienced higher levels of pain after 3, 6, 8 hours and the morning after catheterization. The level of pain in group B was also higher than in group A at 3 hours after the procedure. Mean heart rate and blood pressure were lower in the experimental groups compared with the control group at 6 and 8 hours after catheterization. No statistically significant difference between the three groups regarding the amounts of overall bleeding and overall haematoma formation was observed.[53]

Section C: Literature related to effect of early ambulation on patients who underwent cardiac catheterization

Ahmad Reza Dehghan, ZhilaFereidouni,and Majid NajafiKalyani (2019) Done a study which aimed at investigating the effect of peer group-based education on physical and psychological outcomes of patients undergoing coronary artery angiography through the radial artery. The present clinical study was conducted on 60 patients undergoing coronary angiography through the radial artery in Vali-e-Asr educational hospital of Fasa during 2018 to 2019. The participants were divided into peer training and control groups (in each group) using permutated block randomization. In the peer training group, the patients received the necessary precare training through peer training during and after angiography care. In the control group, the patients received the routine care by the nurse of the related ward. The peer group's stress, anxiety, and depression levels were evaluated before and after the training. Indeed, their comfort, tolerance, satisfaction, and pain levels were measured by a nurse after angiography at the time of entering the ward. *Findings*. The results indicated no significant difference between the two groups regarding the mean scores of stress, anxiety, and depression before the intervention ($P<0.05$). After the intervention, however, there was a significant difference between the two groups concerning the mean score of anxiety ($P< 0.05$). results of the study revealed that peer group-based training was effective in decreasing the mean score of anxiety in the patients undergoing coronary angiography.[54]

Salahshour N.V et al, (2017) done a study which aimed at investigating the impacts of changes in body position and earlier ambulation on comfort, bleeding, and ecchymosis after the diagnostic cardiac catheterization. Methodology of the study was clinical trial with quasi-experimental design included 90 patients undergoing diagnostic catheterization hospitalized in Shariati Hospital, Tehran, Iran. The purposive sampling method was used in the current study and subjects were allocated into 2 groups of intervention and control each of 45. The

control group received the routine practices, the supine and flat rest for 8 to 24 hours, and sandbag for 8 hours. The intervention group changed their position in bed; first hour in flat position and head of bed in 15° and second hour in flat position and head of bed in 30°; then, in the 3rd hour in 45° position as well as applying sandbag on catheter entrance site for the first 3 hours; then, the patient was allowed to rest in any position (15° to 30°). Levels of comfort as well as the amount of bleeding and ecchymosis were studied immediately after the admission, 6 hours, 24 hours, and 7 days after the catheterization. Then, the results were analysed using Chi-square and the Mann-Whitney tests with SPSS V. 11.5. result of the study showed there was no significant difference in the levels of comfort as well as the amount of bleeding and ecchymosis in early admission between the 2 groups, but the level of comfort was higher in the intervention group than the control group at the hours 6 and 24 after the catheterization ($P < 0.001$); in addition, there were no statically significant difference between the intervention and control groups in the amount of bleeding and ecchymosis at 6 hours, 24 hours, and 7 days after the catheterization ($P = 0.99$). study concluded that patients may be allowed to change their bed position, and they may be ambulated earlier (the sixth hour) after the diagnostic cardiac catheterization.[55]

PramoteThangkratok (2016) The aims of a pilot randomized controlled trial were to investigate the effect of reverse Trendelenburg position (RTP) on back pain after cardiovascular angiography and interventions and to compare incidence of vascular complications at the femoral access site between experimental and control groups. A pilot randomized controlled trial was conducted in 70 patients who underwent cardiovascular angiography and interventions via the femoral artery and received post procedural care at the intermediate cardiac care unit, Bangkok Heart Hospital from December 2015 to February 2016. The control group (35patients) received standard care, remaining in a supine and flat position for 6-12 hours, with the affected leg straight after the intervention, whereas the experimental group(35 patients) received a 30-45 degrees RTP. Pain score, blood pressure and vascular complications were recorded. Results shows The groups were not significantly different in terms of demographic characteristics; age, body weight and height. Back pain scores of the control group had significantly higher level than the experimental group ($p < 0.001$).[56]

Bakhshi F, Namjou Z, Andishmand A, Panabadi A, Bagherinasab M, Sarebanhassanabadi M (2014) The aim of study was to assess the effect of positioning on

patient outcomes after coronary angiography. This study used a single-blind randomized control trial approach. The sample consisted of 80 patients who had undergone a nonemergency coronary angiography via the femoral artery. Balanced block randomization was used to allocate participants into intervention and control groups. Routine care for the intervention group (n = 40) was adjusted to include the following: (1) intermittent changes to patient body and head position in bed during first 6 hours after catheterization, (2) reduction of sandbag compression time on the puncture site to 1 hour, and (3) regular examination for bleeding during the first 6 hours after catheterization. Intervention group participants were allowed to ambulate without restriction 6 hours after catheterization. Patients in the control group (n = 40) received routine care, consisting of (1) 6-24 hours of bed rest in the supine position with the affected leg fixed straight and immobilized and (2) sandbag compression on the puncture site for 6 hours. The main outcomes used in this study were level of back pain, discomfort, foot pain, bleeding, and hematoma. Intervention group patients had significantly less back pain and foot pain and higher comfort than the control group at the second, third, and sixth hour after catheterization (p = .00).[57]

Chair Y.S et al (2012) done a study with the purpose to investigate the effect of early ambulation after cardiac catheterization (CC) on patients' back pain, puncture site pain, vascular complications, urinary discomfort, general well-being perception and satisfaction level. Methodology of the study revealed This study was a randomized single-blinded controlled trial. Overall, 137 participants were randomly assigned to experimental (63 participants) or control (74 participants) group according to a computer generated random list. Early ambulation (ambulate at 4 hours post-CC) and routine post-procedure care of 12 to 24 hours were used in the experimental and control groups respectively. Independent t-test, Chi-square test, multiple logistic regression and generalized estimation equation model were applied to compare various outcomes between experimental and control groups. Result of the study showed Only one patient in the control group experienced puncture site bleeding after CC. Ambulation at 4 hours after CC significantly reduced patients' back pain 8 hours after they returned to the unit (OR=0.19, 95% CI: 0.08-0.45, p<0.001) and in the next morning (OR=0.36, 95% CI: 0.15-0.87, p=0.023), decrease urinary discomfort (OR=0.35, 95% CI: 0.14-0.90, p=0.03 for "very or unbearable urination discomfort" and OR=0.22, 95% CI: 0.06-0.74, p=0.015 for "much difficulty or unable to urinate at all"), and increase general well-being (p=0.005 for vitality subscale and p=0.014 for the total general well-being). However,

it made no significant differences on puncture site pain as well as the satisfaction level of patients.[58]

Boztosun B et al (2008) researchers had hypothesized that mobilization of selected patients at the second hour would not increase vascular complications. Coronary angiography was performed through the femoral route via 6-Fr catheters. Homeostasis was achieved by manual compression and maintained with a compressive bandage. A total of 1446 patients were ambulated at the second hour and 1226 of them were discharged without complication. A total of 220 patients required further follow-up due to blood oozing; 154 patients were conventionally ambulated due to difficult arterial access, longer (>15 minutes) compression time, hematoma formation within 2 hours, or hypertensive state (blood pressure >180/100 mm Hg). Twenty-five (16%) of those patients developed minor bleeding after ambulation. No major bleeding or large hematoma was observed during inhospital observation. Ecchymosis (10% [2-hour group] vs 21% [4–5 hour group]) and small hematomas (22% vs 9%) were the most frequent complications after discharge. Early mobilization of selected patients undergoing diagnostic heart catheterization through the femoral artery via 6-Fr catheters is safe and associated with acceptable bleeding complication rates.[59]

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

CHAPTER – III

RESEARCH METHODOLOGY

Methodology gives the blue print of the study. This chapter deals with research design, setting of the study, population, sample size, sampling technique, criteria for sample selection, development and description of tools, content validity, pilot study, Procedure for data collection and statistical analysis.

Research Approach:

The research approach used in the current study was quantitative research approach.
Quantitative research most often uses deductive logic, in which researchers start with hypotheses and then collect data which can be used to determine whether empirical evidence to support that hypothesis exists.

Research design:

The research design adopted for this study was true experimental - design (pre-test – post-test control group Design). Experimental designs are considered true experiments when they employ randomization in the selection of their samples and control for extraneous influences of variations on the dependent variable.

Group	Pre-Test	Intervention	Post-Test
Experimental Group	O_1	X_1	O_2
Control Group	O_1	X_2	O_3

Key:

O_1 – Pre-test assessment of pain, fatigue and bleeding

O_2 – Post-test assessment of pain, fatigue and bleeding

X_1 – Changing position and early ambulation among patients in experimental group

X_2 – Routine positioning of the patients in control group.

Setting of the study:

Research setting is the physical, social, or experimental context within which research is conducted. This study was conducted in Dr Prem Hospital. Panipat and Dr Ravindra Hospital. Panipat.

Population of the study:

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query.

Patients who are undergoing cardiac catheterization was selected as study population in the present study.

Accessible Population:

In the present study the accessible population will be the patients who will undergo cardiac catheterization in Dr Prem hospital and who will fulfil the inclusion criteria.

Variables: It refers to any characterstics that can take on different values.

Independent Variables- Charging position and early ambulation.

Dependent Variables – Pain, fatigue and bleeding.

Sample size:

Sample size selected for the study was 60. (30 each in Experimental group and Control Group)

Sampling technique:

The sampling technique adopted in this study was based on simple random sampling method.

Criteria for sample selection:

Inclusion Criteria:

- Patients who will undergo cardiac catheterization in Dr Prem hospital and Ravindra hospital – Panipat.
- Both male and female patients who had undergone cardiac catheterization
- Patients who were willing to take participation in this study.

Exclusion Criteria

- Patients who were not ready to participate in this study
- Patients who were with severe complications after cardiac catheterization.
- Patients who were drowsy and not mentally alert.

Development and description of the tool:

The investigator prepared the tool after going through the related literature and guidance of experts in the field of Nursing and Medicine

The tool for data collection was consist of three sections namely,

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

Section A: Demographic data

Section B: Visual Analog Scale

Section – C: Fatigue Severity Scale

Section – D: Modified WHO Bleeding Assessment Score.

Demographic Data – It will include age, gender, body mass index, systolic BP, diastolic BP, history of any cardiac catheterization.

Visual Analog Scale - The visual analogue scale (VAS) is a tool widely used to measure pain. A patient is asked to indicate his/her perceived pain intensity (most commonly) along a 100 mm horizontal line, and this rating is then measured from the left edge.

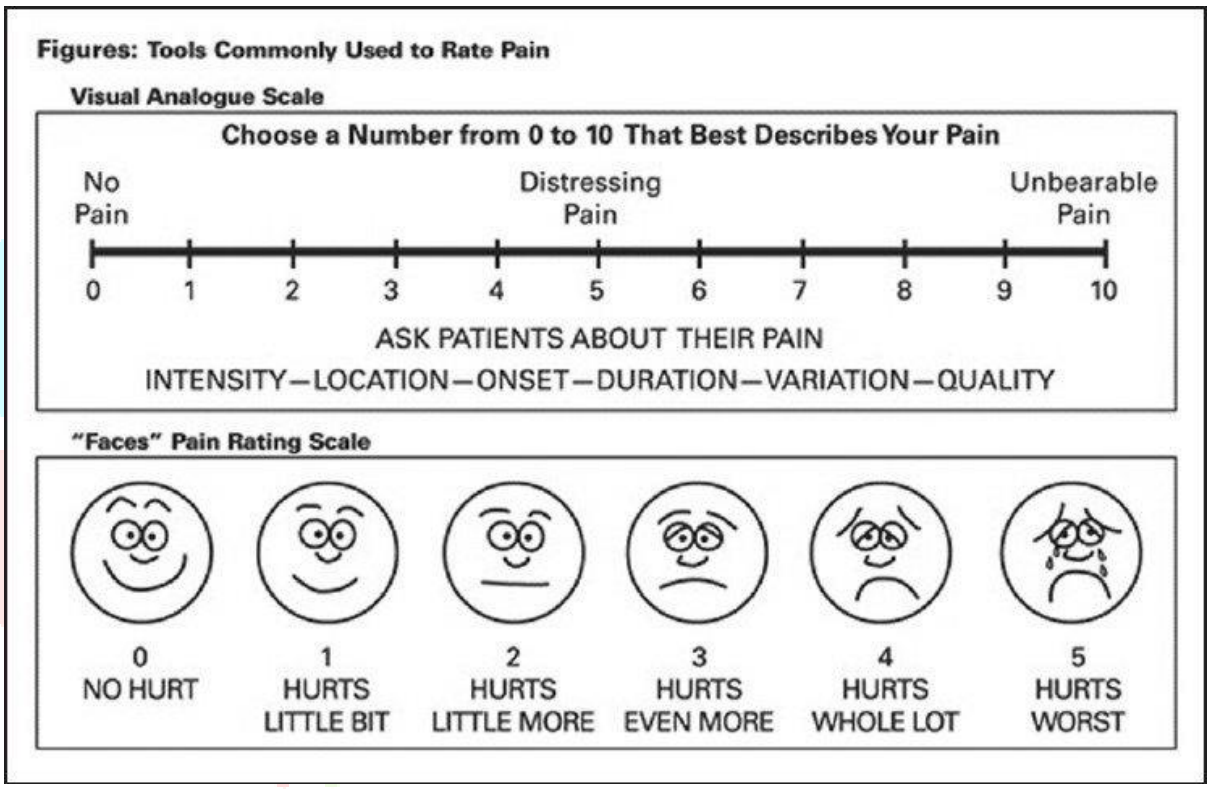


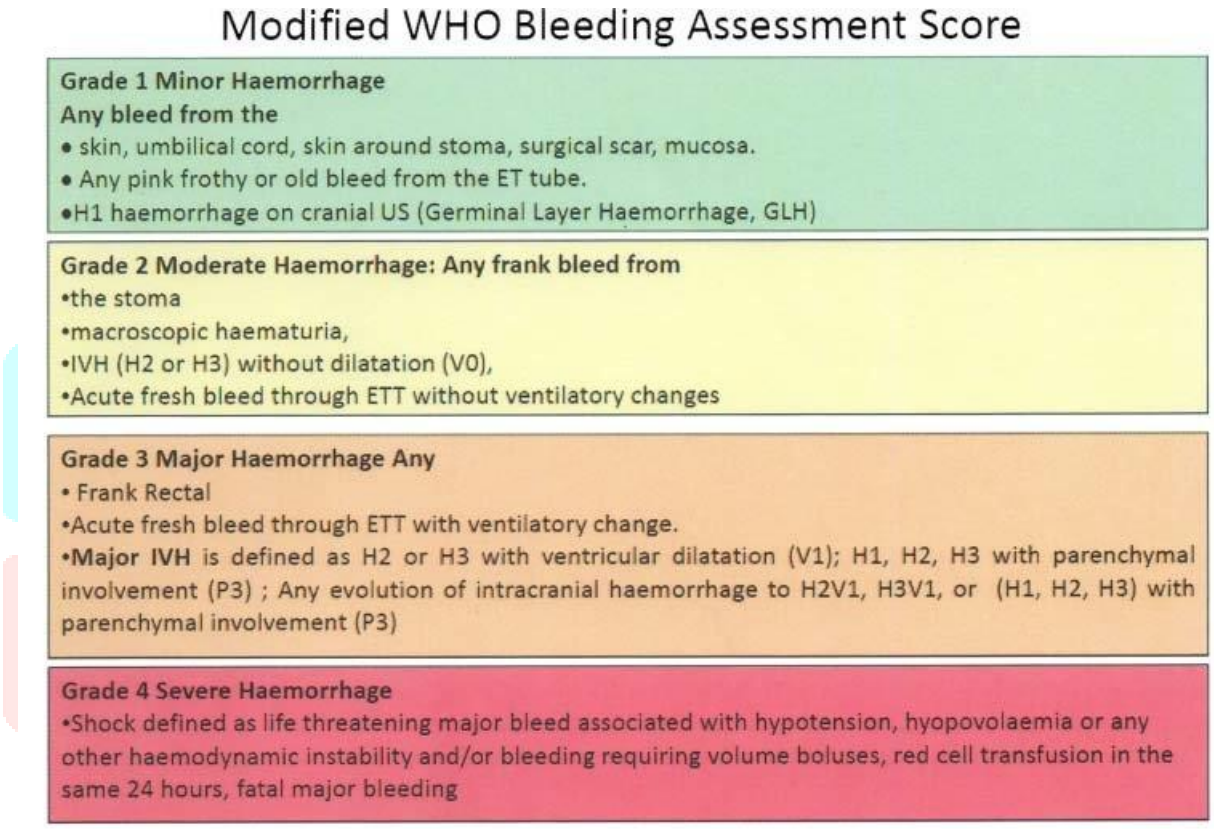
Figure – Visual Analogue Scale.

Fatigue Severity Scale - The Fatigue Severity Scale is a 9-item scale which measures the severity of fatigue and its effect on a person's activities and lifestyle in patients with a variety of disorders.

During the past week, I have found that:		Agreement Score						
1.	My motivation is lower when I am fatigued	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	Exercise brings on my fatigue.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	I am easily fatigued	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	Fatigue interferes with my physical functioning	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5.	Fatigue causes frequent problems for me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

6.	My fatigue prevents sustained physical functioning	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	Fatigue interferes with carrying out certain duties and responsibilities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	Fatigue is among my three most disabling symptoms	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	Fatigue interferes with my work, family, or social life	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Modified WHO Bleeding Assessment Score



H1= Germinal layer haemorrhage; H2- Intraventricular haemorrhage filling up less than 50% of the ventricle; H3 Intraventricular haemorrhage filling up more than 50% of the ventricle
V0= No ventricular dilatation;V1= Ventricular dilatation
P1= Parenchymal echodensity;P2=Porencephalic cyst;P3= periventricular leucomalacia

Content validity:

The investigator have formulated the tool based on the objectives after thorough literature review. The tool will be submitted to the experts in the field of Nursing and Medicine to establish the content validity. Based on expert's suggestions, the investigator will have finalized the tool for the original study.

Reliability:

By doing the pilot study, the reliability of the visual analogue scale (VAS) for pain was assessed by Intraclass correlation coefficients (ICCs) and it was found to be very high reliable

(0.91). The Fatigue Severity Scale (FSS) showed high internal consistency (Cronbach's alpha, 0.95).

Pilot study:

A pilot study can be defined as a 'small study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study.

The pilot study was conducted in Cygnus hospital, Panipat. With 6 subjects from 19/03/2022 to 24/03/2022 to determine the study feasibility. The results of the pilot study showed the current study was effective.

Procedure for data collection:

Prior to data collection, necessary permission was obtained from the hospital authorities. The main study was conducted after ethical clearance from the ethical committee of Ved Nursing College – Panipat.

Data were collected from the patients from 02/05/2022 to 02/06/2022, among the subjects who had undergone cardiac catheterization. Informed consent was taken from the subjects prior to the procedure and patients in Dr Prem hospital and Ravindra Hospital.

Pre-test assessment of pain, fatigue and bleeding was done among the subjects (experimental group) before positioning and ambulation. The protocol for positioning and early ambulation were shown below.

Hour	Position of Patient in Experimental Group	Position of Patient in Control Group
After CC	Supine HOB 15 Elevated, Pillows R/L	Routine positioning, including 10–24 h bed rest in supine position with the affected leg immobilized
1 Hour	Supine HOB 15 Elevated, Pillows R/L	
2 Hour	Supine HOB 30 Elevated, Pillows R/L	
3 Hour	Supine HOB 45 Elevated, Pillows R/L	
4 Hour	Right Side HOB 15 Elevated	
5 Hour	Left Side HOB 15 Elevated	
6 Hour	Fowlers	
7 Hour	OOB	
8 Hour	OOB	
Next Morning	Routine	

Post – test assessment of pain, fatigue and bleeding was done on day – 2.

Data analysis:

The obtained data were analysed by using both descriptive and inferential statistics. In the description statistics mean, standard deviation and percentage were used in this study. In the inferential statistics one sample 't' test used to find out the association between selected demographic variable with elicited problems.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

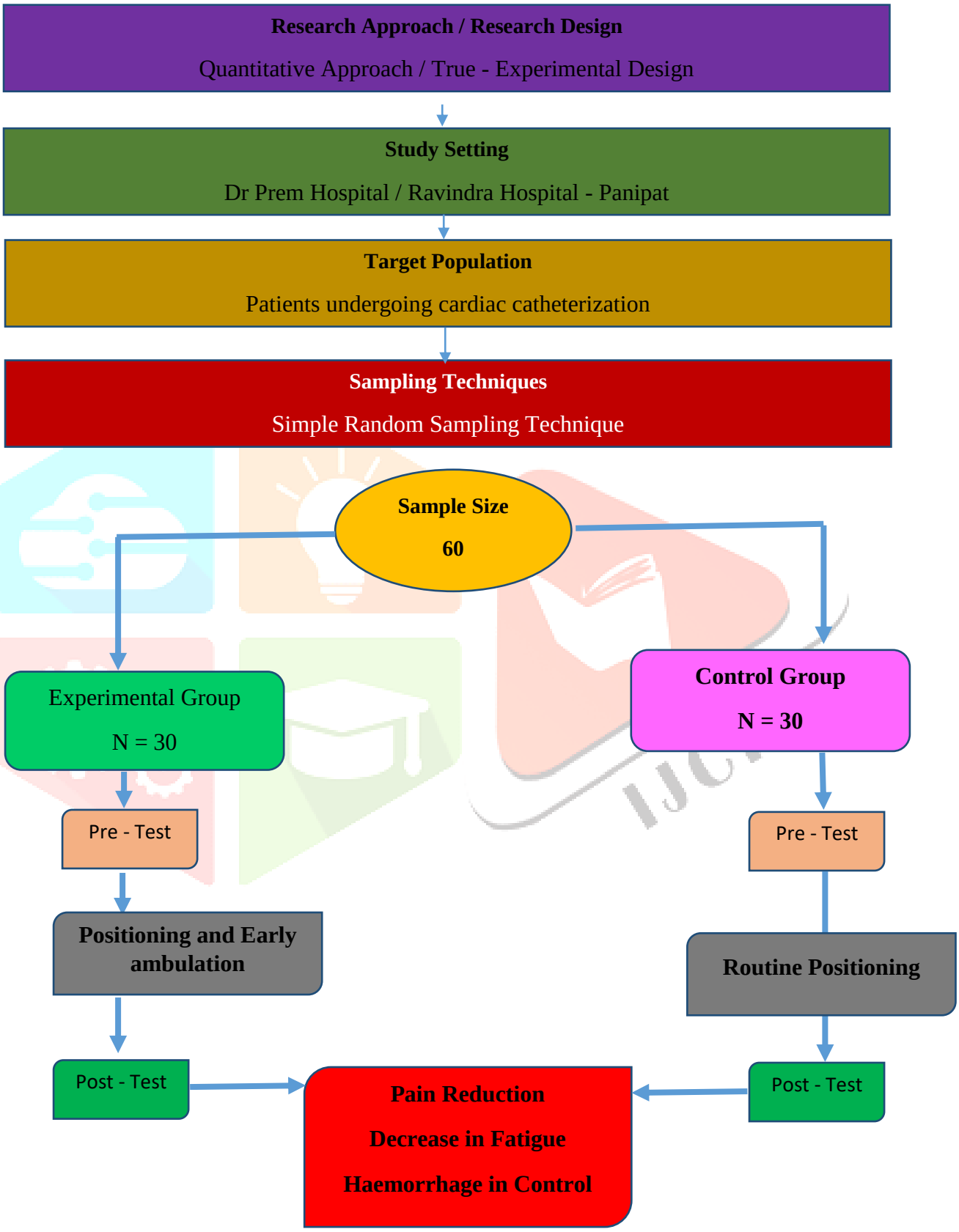


Figure – 2: Schematic Presentation of the Research Design

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

Data analysis is conducted to reduce, organize and give meaning to the data. The results obtained from data analyses require interpretation to be meaningful. Interpretation of data involves examination of the results from data analysis, formation of conclusions, consideration of the implications for nursing, exploration of the significance of the findings and suggestion of further studies **(Polit and Beck, 2016)**.

This chapter deals with analysis and interpretation of data including both descriptive and inferential statistics. The data were analysed according to the objectives and hypothesis of the study. Analysis of the data was compiled after all the data was transferred to the master coding sheet. The data were analysed, tabulated and interpreted using appropriate descriptive and inferential statistics.

Organization of Findings:

I. Frequency and Percentage Distribution of Subjects According to Demographic Variables in Experimental Group
II. Frequency and Percentage Distribution of Subjects According to Demographic Variables in Control Group
III. Mean, Standard Deviation and Variance Level of Height, Weight and Blood Pressure Among Subjects in Experimental and Control Group
IV. Frequency and Percentage Distribution of Subjects According to Level of Pain in Experimental and Control Group
V. Frequency and Percentage Distribution of Subjects According to Level of Fatigue in Experimental and Control Group
VI. Frequency and Percentage Distribution of Subjects According to Level of Haemorrhage in Experimental and Control Group
VII. Mean, mean difference, standard deviation and paired ‘t’- test value of Pain, Fatigue and Hemorrhage among subjects in experimental group

VIII. Mean, mean difference, standard deviation and paired ‘t’- test value of Pain, Fatigue and Hemorrhage among subjects in control group

IX. Mean, mean difference, standard deviation and independent ‘t’- test value of Pain, Fatigue and Hemorrhage among subjects in experimental and control group

X. Association of post-test pain with their sociodemographic variable of the subjects in experimental and control group

XI. Association of post-test fatigue with their sociodemographic variable of the subjects in experimental and control group

XII. Association of post-test hemorrhage with their sociodemographic variable of the subjects in experimental and control group

Table – I: Frequency and Percentage Distribution of Subjects According to Demographic Variables in Experimental Group

(n = 30)

S. No	Demographic Variables		Frequency	Percentage
1	**Age (Years)**	30 - 40	3	10.0
		41 - 50	18	60.0
		51 - 60	5	16.7
		61 - 70	4	13.3
2	Gender	Male	21	70.0
		Female	9	30.0
3	Body Mass Index	18.5 – 24.9	3	10.0
		25.0 – 29.9	5	16.7
		30.0 – 34.9	1	3.3
		35.0 – 39.9	12	40.0
		Above 40	9	30.0
4	Diagnosis of patient	Coronary Artery Disease	6	20.0
		Myocardial Infraction	17	56.7
		Valvular Heart Disease	3	10.0
		Cardiomyopathy	4	13.3
5	Duration of Disease	Acute	9	30.0
		Chronic	21	70.0
6	History of any previous cardiac catheterization	Yes	5	16.7
		No	25	83.3
7	Any Existing Co-Morbidity	Hypertension	10	33.3
		Diabetes Mellitus	17	56.7
		Others	3	10.0
8	Pharmacological treatments being taken	Anti-Hypertensive	14	46.7
		Anti-Coagulant	15	50.0
		Analgesics	1	3.3
9	History of any previous surgical intervention	Yes	0	0.0
		No	30	100.0
10	History of any addiction	Smoking	7	23.3
		Alcohol	3	10.0
		Tobacco	1	3.3
		Nil	19	63.3

Table – I reveal the frequency and percentage distribution of subjects according to demographic variables in experimental group.

With regard to age of the subjects in experimental group, majority 18 (60.0 %) were in age between 41 – 50 years. Those who were in the age between 51 – 60 years was 5 (16.7 %).

Gender distribution among the subjects in experimental group depict that majority 21 (70.0 %) were males and females are 9 (30.0 %).

Body mass index of the subjects in experimental group show that majority 12 (40.0 %) have 35.0 – 39.9. subjects with the body mass index above 40 were 9 (30.0 %).

With regard to the diagnosis of patient among the experimental group subject show that majority 17 (56.7 %) were diagnosed as myocardial infraction. Coronary Artery Disease was diagnosed among 6 (20.0 %) of the subjects.

Duration of disease among the subjects in experimental group were distributed as follows, majority 21 (70.0 %) were chronic and those wo were acute were 9 (30.0 %).

History of any previous cardiac catheterization in subjects in experimental group shows that an overwhelming majority 25 (83.3 %) had no history and others 5 (16.7 %) had previous cardiac catheterization.

Subjects distribution in experimental group according to any existing co-morbidities show that majority 17 (56.7 %) were having diabetes mellitus, hypertension was seen among 10 (33.3 %) subjects.

In experimental group, with regard to pharmacological treatments being taken shows that, one half of the total subjects 15 (50 %) were taking anti – coagulants. Anti-hypertensive was taken by 14 (46.7 %) of the subjects.

All the subjects 30 (100.0 %) in experimental group had no history of any previous surgical interventions.

With regard to the history of any previous addiction, in experimental group, majority 19 (61.3 %) had no addiction to any substances. Smoking was addicted by 7 (23.3 %) of the subjects. Those who got addicted to alcohol was 3 (10.0 %).

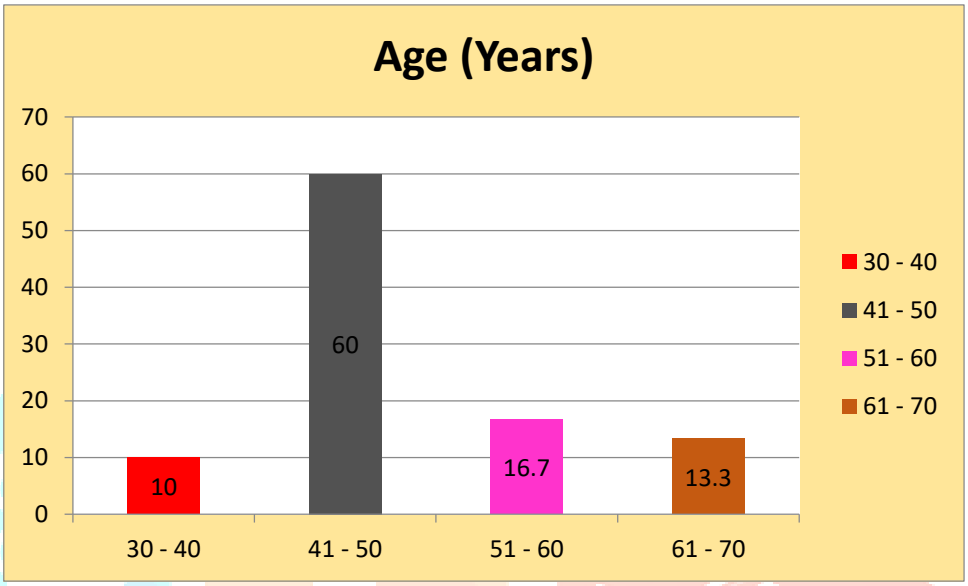


Figure – 4.1: Percentage Distribution of Subjects According to Age in Experimental Group.

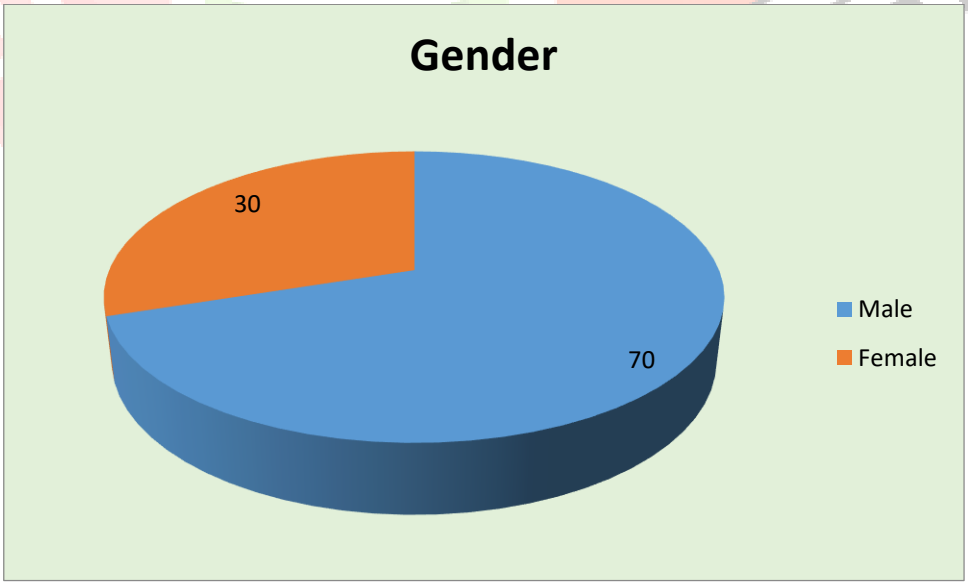


Figure – 4.2: Percentage Distribution of Subjects According to Gender in Experimental Group.

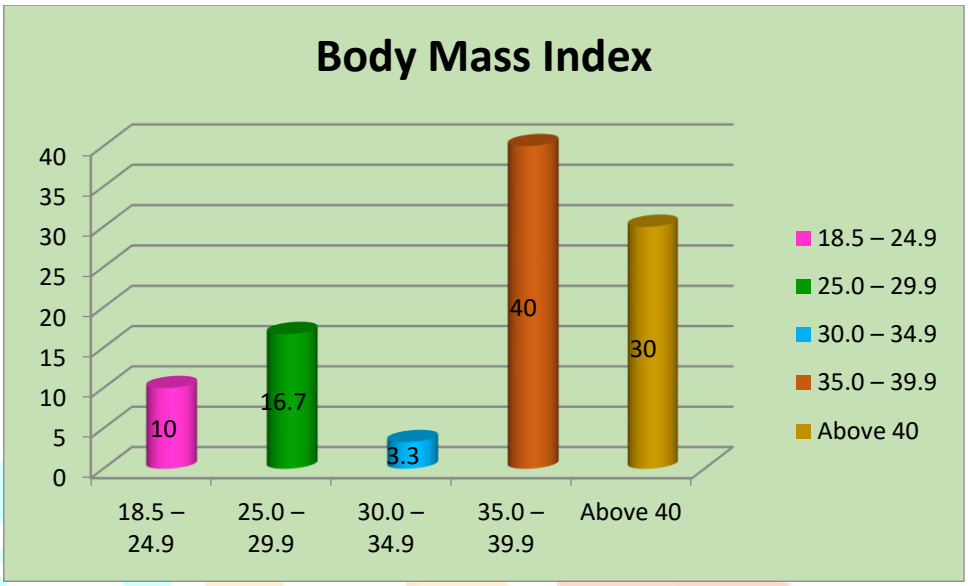


Figure – 4.3: Percentage Distribution of Subjects According to Body Mass Index in Experimental Group.

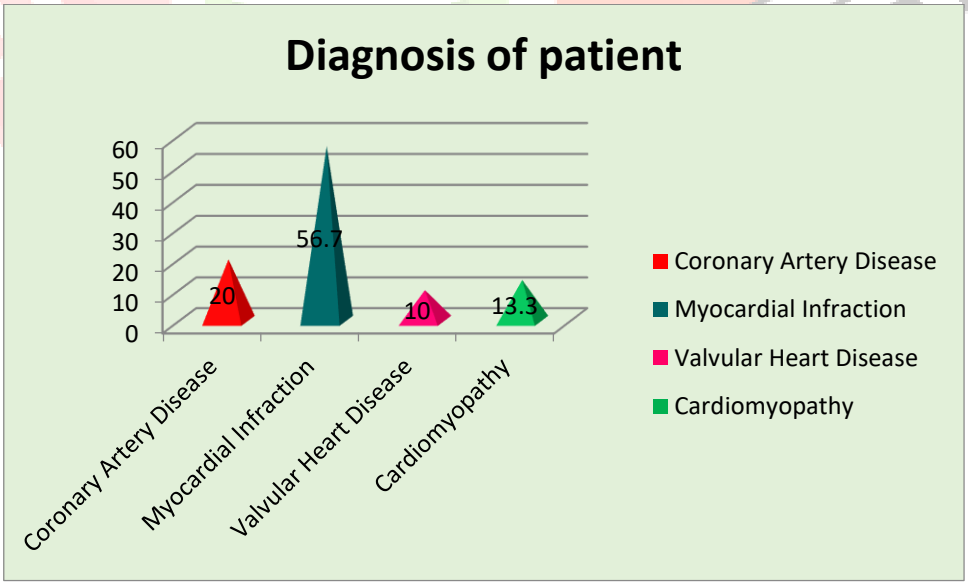


Figure – 4.4: Percentage Distribution of Subjects According to Diagnosis of patient in Experimental Group.

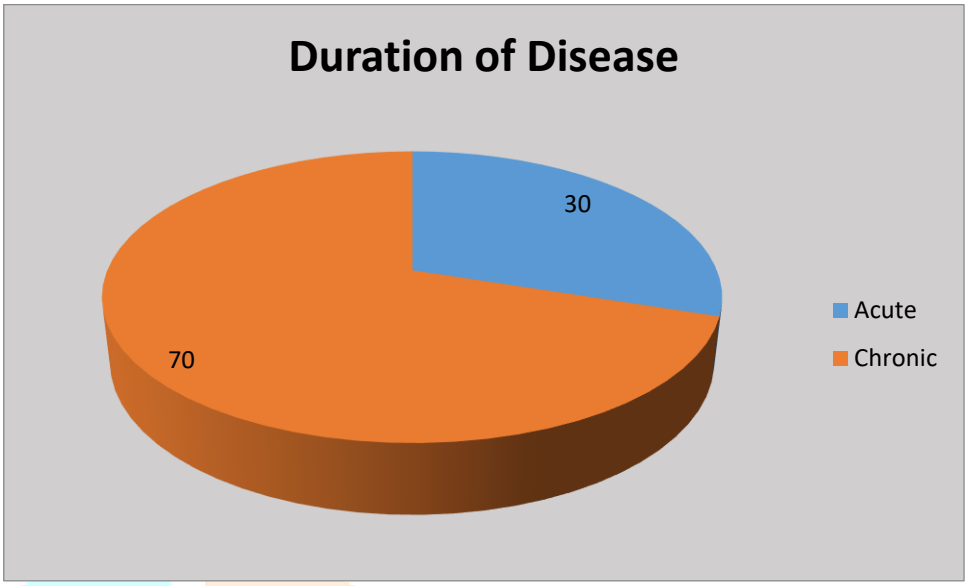


Figure – 4.5: Percentage Distribution of Subjects According to Duration of Disease in Experimental Group.

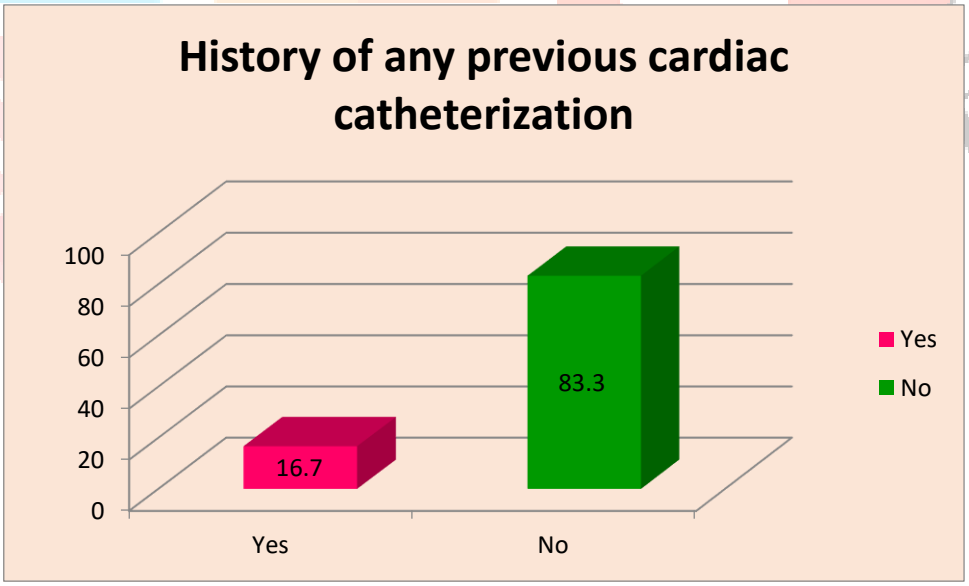


Figure – 4.6: Percentage Distribution of Subjects According to History of any previous cardiac catheterization in Experimental Group.

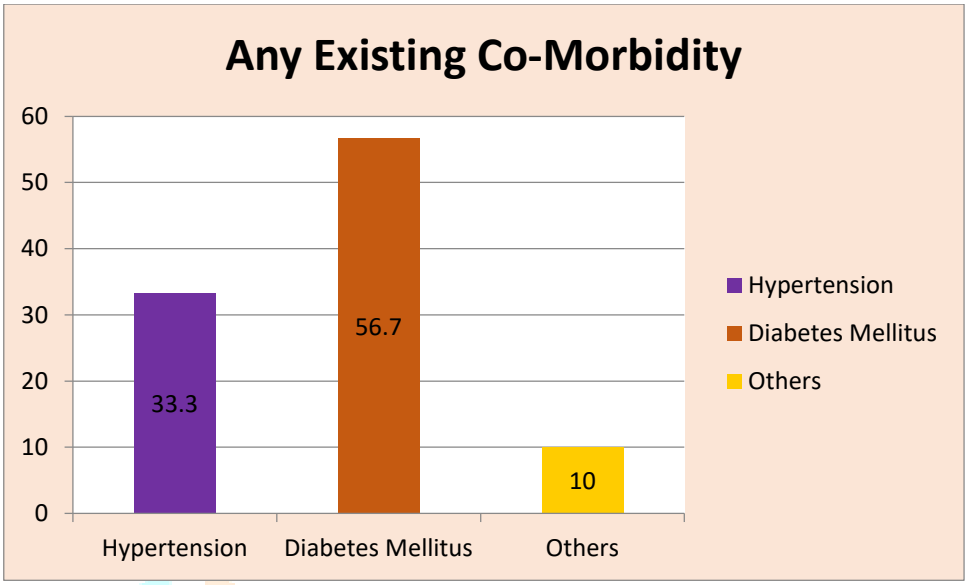


Figure – 4.7: Percentage Distribution of Subjects According to Any Existing Co-Morbidity in Experimental Group.

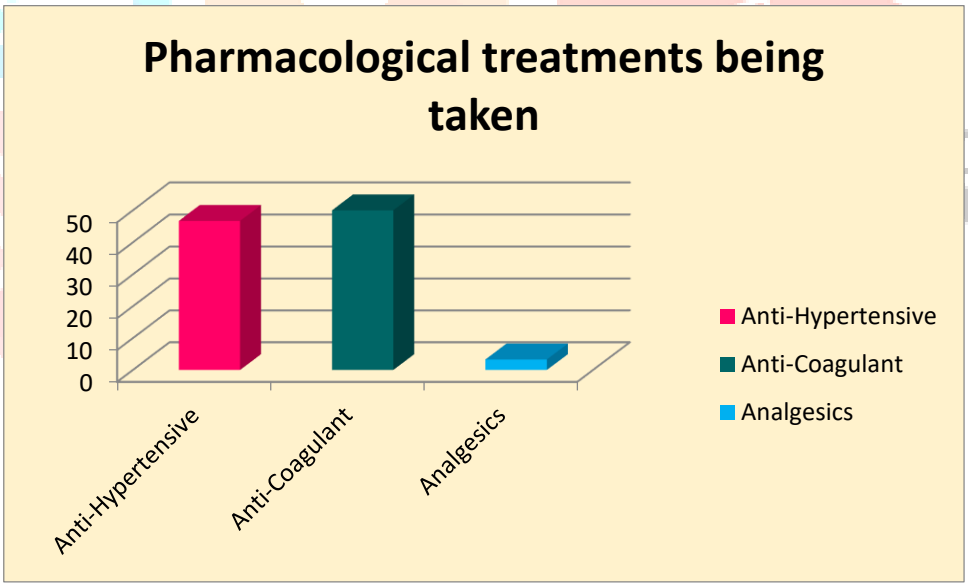


Figure – 4.8: Percentage Distribution of Subjects According to Pharmacological treatments being taken in Experimental Group.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

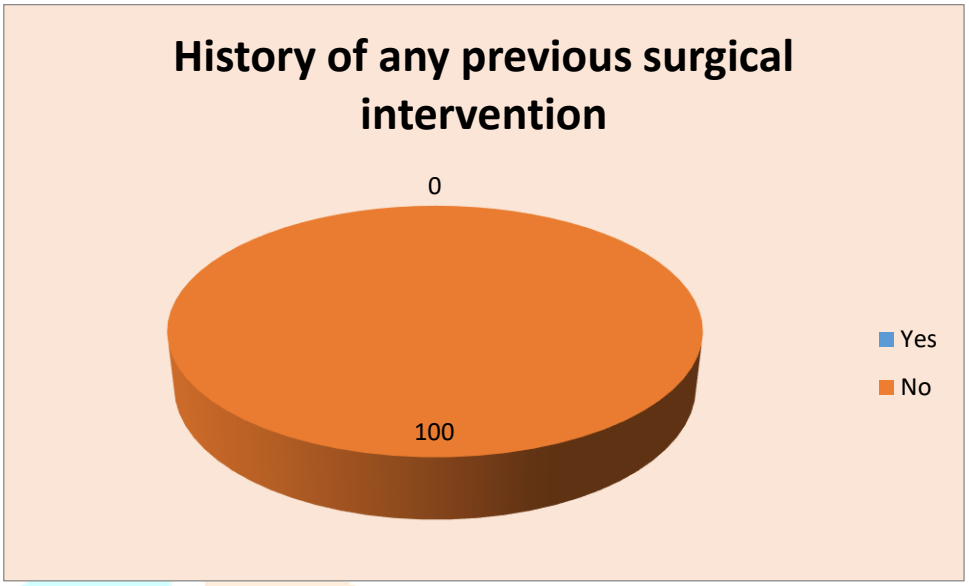


Figure – 4.9: Percentage Distribution of Subjects According to History of any previous Surgical Intervention in Experimental Group.

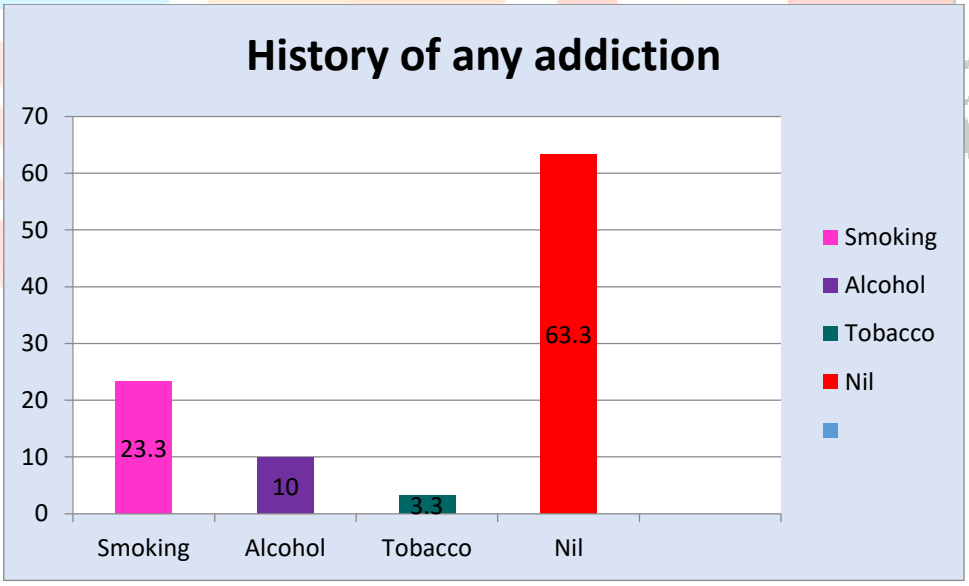


Figure – 4.10: Percentage Distribution of Subjects According to History being taken in Experimental Group.

Table – II: Frequency and Percentage Distribution of Subjects According to Demographic Variables in Control Group

(n = 30)

S. No	Demographic Variable		Frequency	Percentage
1	Age (Years)	30 - 40 years	4	13.3
		41 - 50 years	11	36.7
		51 - 60 years	9	30.0
		61 - 70 years	6	20.0
2	Gender	Male	15	50.0
		Female	15	50.0
3	Body Mass Index	18.5 – 24.9	3	10.0
		25.0 – 29.9	4	13.3
		30.0 – 34.9	1	3.3
		35.0 – 39.9	8	26.7
		Above 40	14	46.7
4	Diagnosis of patient	Coronary Artery Disease	3	10.0
		Myocardial Infraction	15	50.0
		Valvular Heart Disease	5	16.7
		Cardiomyopathy	7	23.3
5	Duration of Disease	Acute	17	56.7
		Chronic	13	43.3
6	History of any previous cardiac catheterization	Yes	10	33.3
		No	20	66.7
7	Any Existing Co-Morbidity	Hypertension	10	33.3
		Diabetes Mellitus	15	50.0
		COPD	1	3.3
		Others	4	13.3
8	Pharmacological treatments being taken	Anti-Hypertensive	12	40.0
		Anti-Coagulant	14	46.7
		Analgesics	4	13.3
9	History of any previous surgical intervention	Yes	0	0.0
		No	30	100.0
10	History of any addiction	Smoking	7	23.3
		Alcohol	3	10.0
		Tobacco	1	3.3
		Nil	19	63.3

Table – II reveal the frequency and percentage distribution of subjects according to demographic variables in control group.

With regard to age of the subjects in control group, majority 11 (36.7 %) were in age between 41 – 50 years. Those who were in the age between 51 – 60 years was 9 (30.0 %).

Gender distribution among the subjects in control group depict that equal number of subjects 15 (50.0 %) were males and females.

Body mass index of the subjects in control group show that majority 14 (46.7 %) have above 40. subjects with the body mass index 35.0 – 39.9 were 9 (30.0 %).

With regard to the diagnosis of patient among the control group subject show that majority 15 (50.0 %) were diagnosed as myocardial infraction. cardiomyopathy was diagnosed among 7 (26.7 %) of the subjects.

Duration of disease among the subjects in control group were distributed as follows, majority 17 (56.7 %) were acute and those who were chronic were 13 (43.3 %).

History of any previous cardiac catheterization in subjects in control group shows that majority 20 (66.7 %) had previous cardiac catheterization and others 10 (33.3 %) had no previous cardiac catheterization.

Subjects distribution in control group according to any existing co-morbidities show that majority 15 (50.0 %) were having diabetes mellitus, hypertension was seen among 10 (33.3 %) subjects.

In control group, with regard to pharmacological treatments being taken shows that, one half of the total subjects 14 (46.7 %) were taking anti – coagulants. Anti-hypertensive was taken by 12 (40.0 %) of the subjects.

All the subjects 30 (100.0 %) in control group had no history of any previous surgical interventions.

With regard to the history of any previous addiction, in control group, majority 19 (61.3 %) had no addiction to any substances. Smoking was addicted by 7 (23.3 %) of the subjects. Those who got addicted to alcohol was 3 (10.0 %).

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

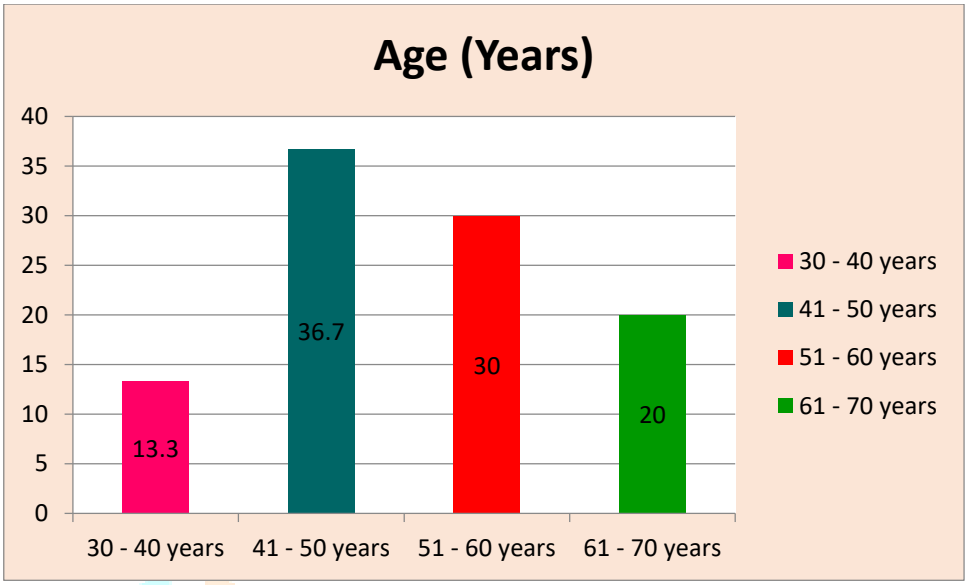


Figure – 4.11: Percentage Distribution of Subjects According to Pharmacological treatments being taken in Control Group.

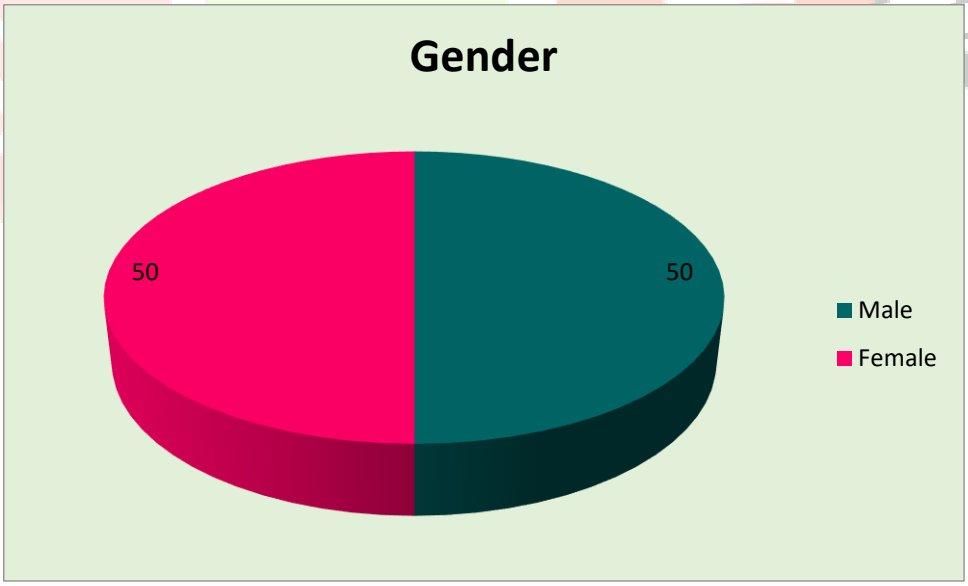


Figure – 4.12: Percentage Distribution of Subjects According to Gender in Control Group.

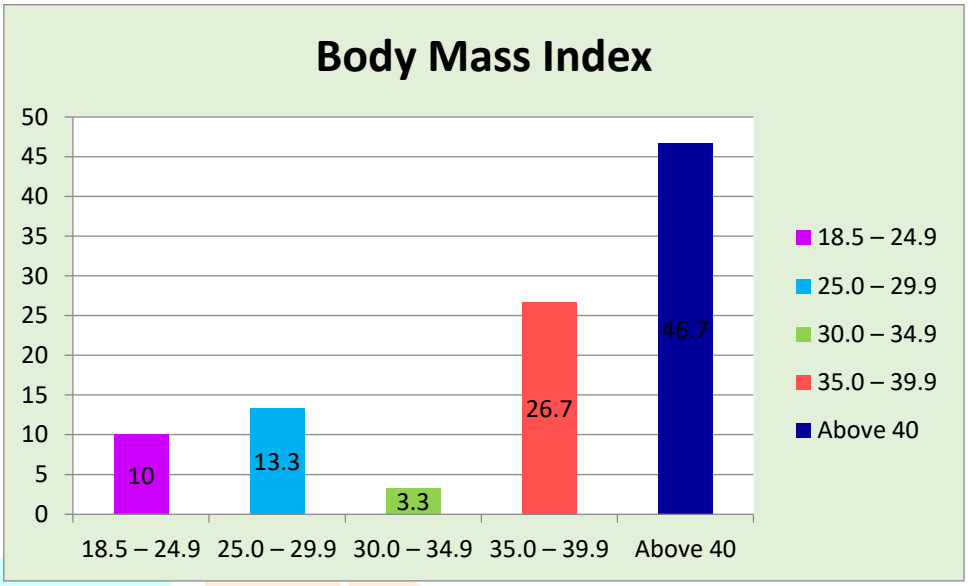


Figure – 4.13: Percentage Distribution of Subjects According to Body Mass Index in Control Group.

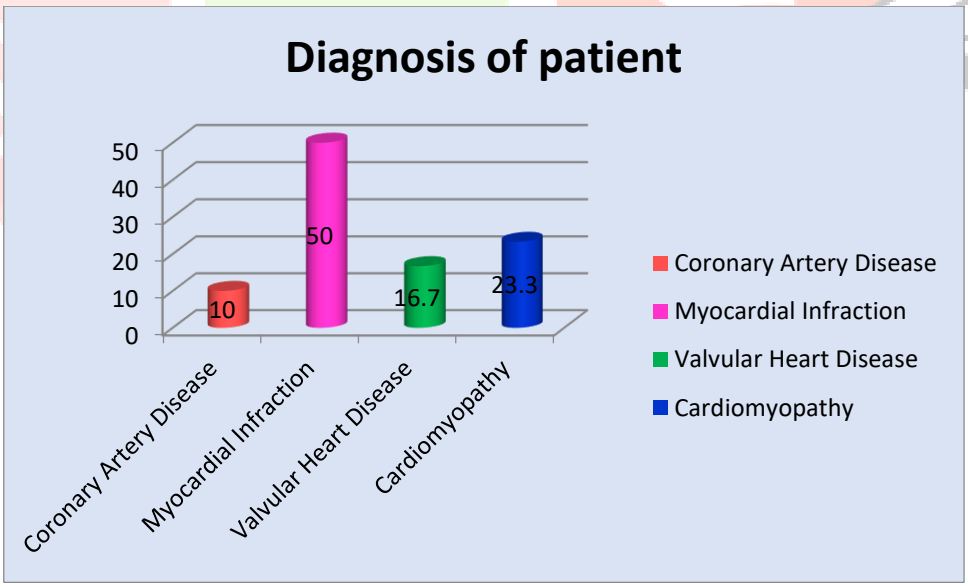


Figure – 4.14: Percentage Distribution of Subjects According to Body Mass Index in Control Group.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

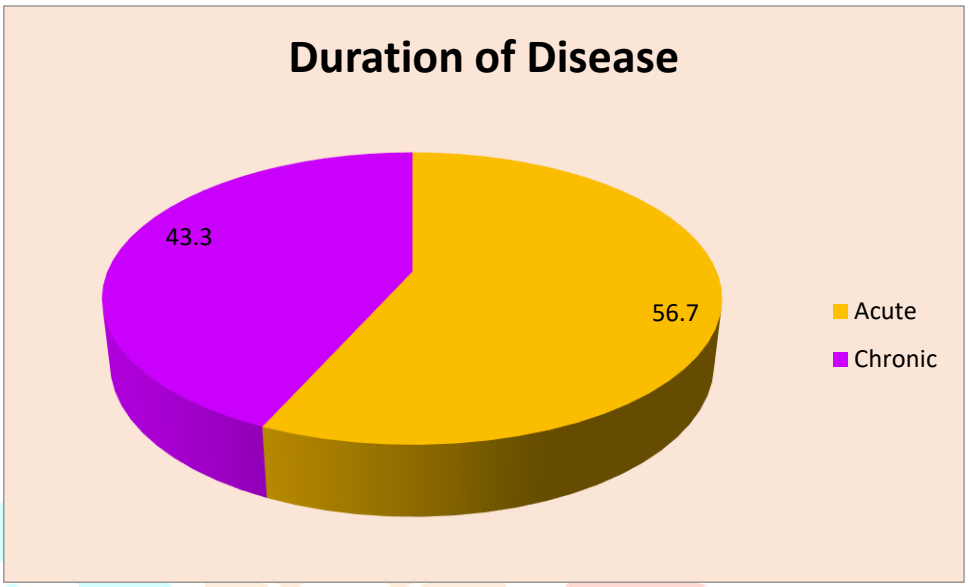


Figure – 4.15: Percentage Distribution of Subjects According to Duration of Disease in Control Group.

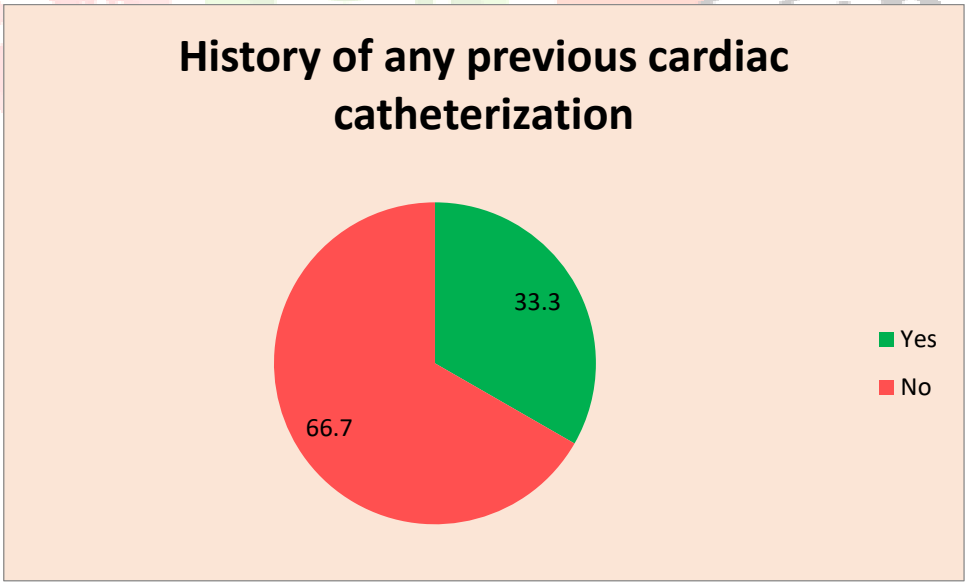


Figure – 4.16: Percentage Distribution of Subjects According to History of any previous cardiac catheterization in Control Group.

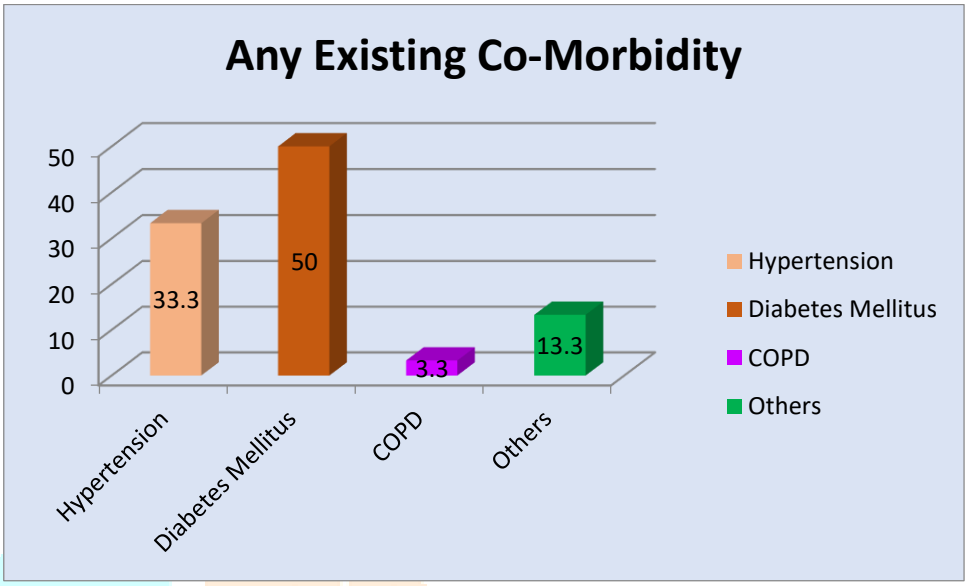


Figure – 4.17: Percentage Distribution of Subjects According to Any Existing Co-Morbidity in Control Group.

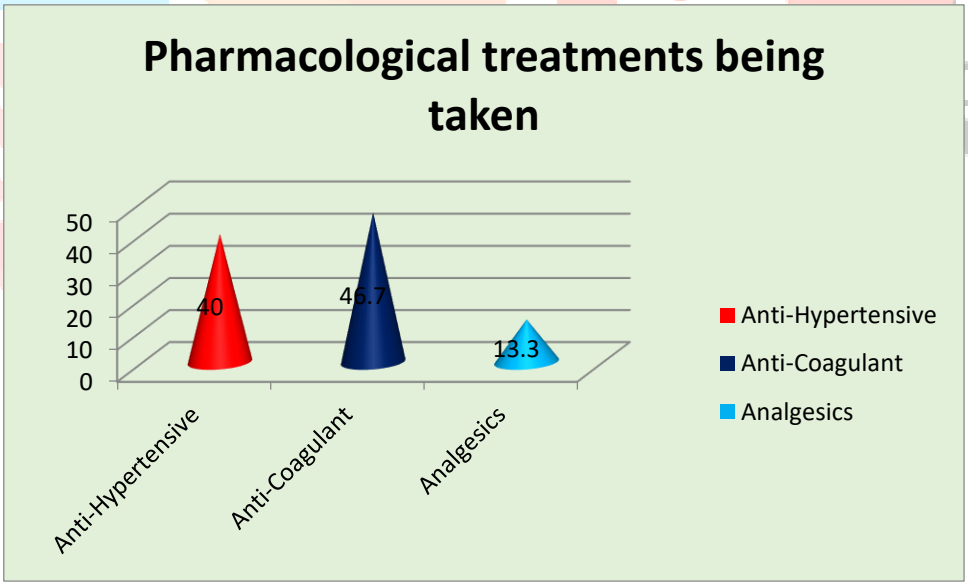


Figure – 4.18: Percentage Distribution of Subjects According to Pharmacological Treatments being taken in Control Group.

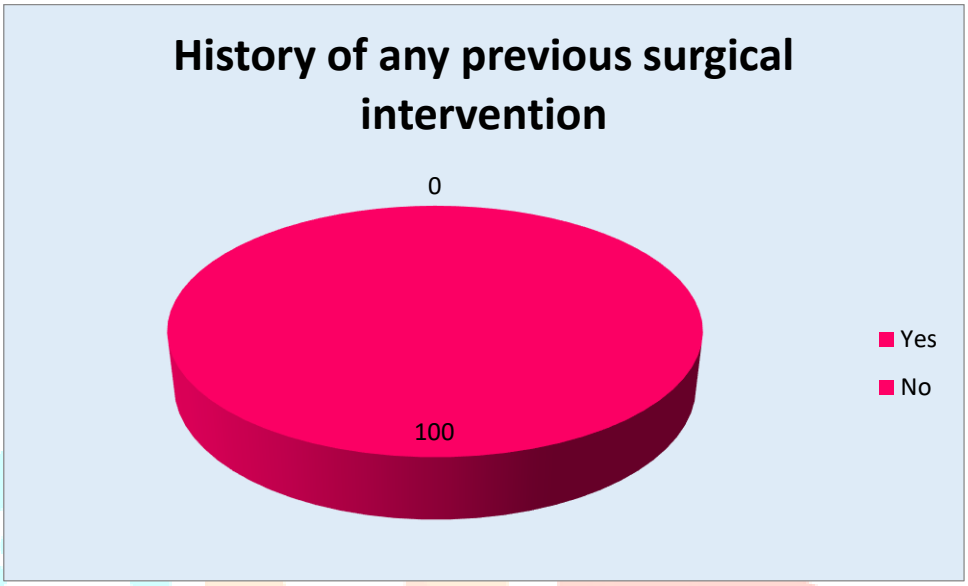


Figure – 4.19: Percentage Distribution of Subjects According to History of any previous surgical intervention in Control Group.

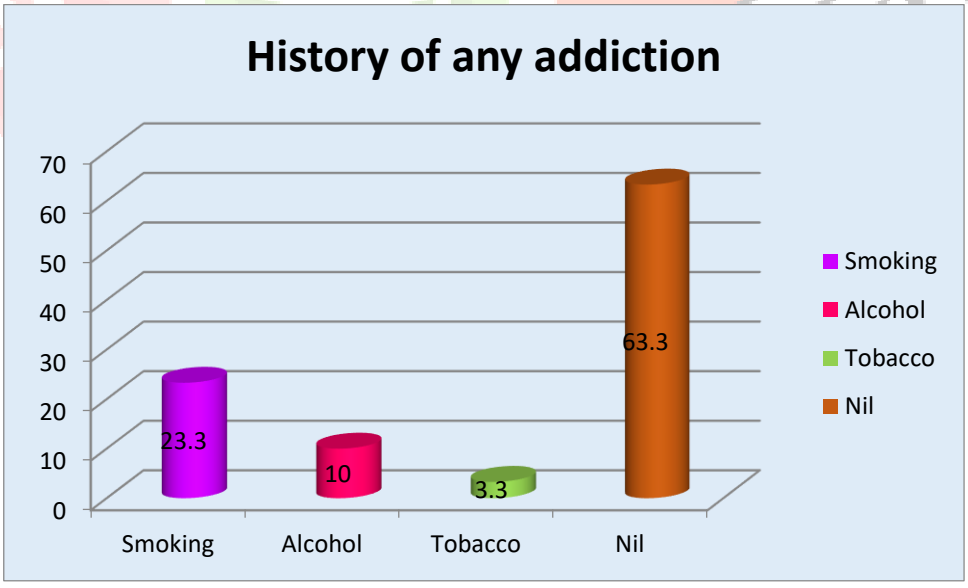


Figure – 4.20: Percentage Distribution of Subjects According to History of any addiction in Control Group.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

Table – III: Mean, Standard Deviation and Variance Level of Height, Weight and Blood Pressure Among Subjects in Experimental and Control Group

(N = 60)

	Experimental Group			Control Group		
	Mean	**Standard Deviation**	**Variance**	**Mean**	**Standard Deviation**	**Variance**
Height	147.73	9.822	96.478	148.13	11.346	128.740
Weight	77.37	12.609	158.999	81.47	10.631	113.016
Systolic BP	137.00	7.926	62.828	135.53	9.468	89.637
Diastolic BP	87.57	3.892	15.151	87.30	5.114	26.148

Table – III show the Mean, Standard Deviation and Variance Level of Height, Weight and Blood Pressure Among Subjects in Experimental and Control Group

In experimental group, with regard to the height of the subjects, the mean height score was 147.73 cm with standard deviation was 9.822 and the variance level was 96.478. similarly, among the subjects in control group, the mean height of the subjects was 148.13 cm and the standard deviation score was 11.346 with the variance score as 128.740.

In experimental group, with regard to the weight of the subjects, the mean weight score was 77.37 kg with standard deviation was 12.609 and the variance level was 158.99. similarly, among the subjects in control group, the mean weight of the subjects was 81.47 and the standard deviation score was 10.631 with the variance score as 113.016,

In experimental group, with regard to the systolic BP of the subjects, the mean systolic BP score was 137 with standard deviation was 7.926 and the variance level was 62.828. similarly, among the subjects in control group, the mean systolic BP of the subjects was 135.53 and the standard deviation score was 9.468 with the variance score as 89.637.

In experimental group, with regard to the diastolic BP of the subjects, the mean diastolic BP score was 87.57 with standard deviation was 3.892 and the variance level was 15.151 similarly, among the subjects in control group, the mean diastolic BP of the subjects was 87.30 and the standard deviation score was 5.114 with the variance score as 26.148.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

Table – IV: Frequency and Percentage Distribution of Subjects According to Level of Pain in Experimental and Control Group

(N = 60)

Group		Mild Pain		Moderate Pain		Severe Pain	
		F	%	F	%	F	%
Experimental	**Pre-Test**	0	0.0	0	0.0	30	100.0
	Post-Test	8	20.0	22	80.0	0	0.0
Control	**Pre-Test**	0	0.0	0	0.0	30	100.0
	Post-Test	0	0.0	2	6.7	28	93.3

Table above depict the Frequency and Percentage Distribution of Subjects According to Level of Pain in Experimental and Control Group.

Among the subjects in experimental group, during pre – test all the subjects 30 (100.00 %) had severe pain. And at the time of post – test majority of the subjects 22 (80.0 %) were with moderate pain and mild pain was present among 8 (20.0 %) of the subjects.

Among the subjects in control group, during pre – test all the subjects 30 (100.00 %) had severe pain. And at the time of post – test majority of the subjects 28 (93.3 %) were with severe pain and moderate pain was seen among 2 (6.7 %) of the subjects. None of the subjects were with mild pain.

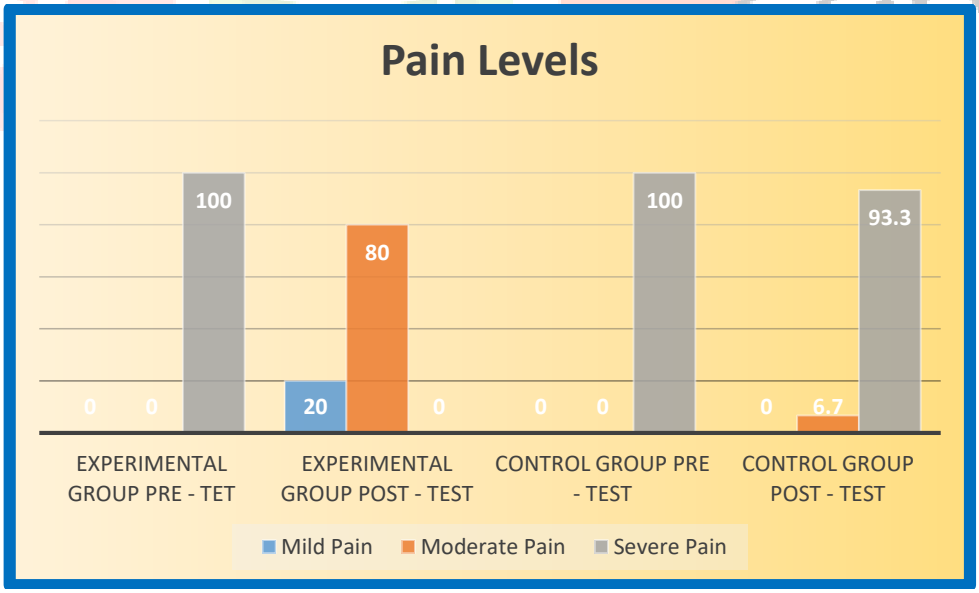


Figure – 4.21: Percentage Distribution of Subjects According to Pain Levels in Experimental and Control Group

Table – V: Frequency and Percentage Distribution of Subjects According to Level of Fatigue in Experimental and Control Group

(N = 60)

Group		Low Fatigue		Medium Fatigue		High Fatigue	
		F	%	F	%	F	%
Experimental	Pre-Test	0	0.0	8	20.0	22	80.0
	Post-Test	27	90.0	3	10.0	0	0.0
Control	Pre-Test	0	0.0	2	6.7	28	97.3
	Post-Test	0	0.0	8	20.0	22	80.0

Table above depict the Frequency and Percentage Distribution of Subjects According to Level of Fatigue in Experimental and Control Group.

Among the subjects in experimental group, during pre – test majority of the subjects 22 (80.0 %) had high fatigue and medium fatigue was present in 8 (20.0 %) of the subjects. None of the subjects had low fatigue. During post-test, an overwhelming majority of the subjects 27 (90.0 %) were with low fatigue. Those who were with medium fatigue was 3 (10.0 %), none of the subjects had high fatigue.

Among the subjects in control group, during pre – test majority of the subjects 28 (97.3 %) had high fatigue and medium fatigue was present in 2 (6.7 %) of the subjects. None of the subjects had low fatigue. During post-test, an overwhelming majority of the subjects 22 (80.0 %) were with high fatigue. Those who were with medium fatigue was8(20.0 %), none of the subjects were with low fatigue.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

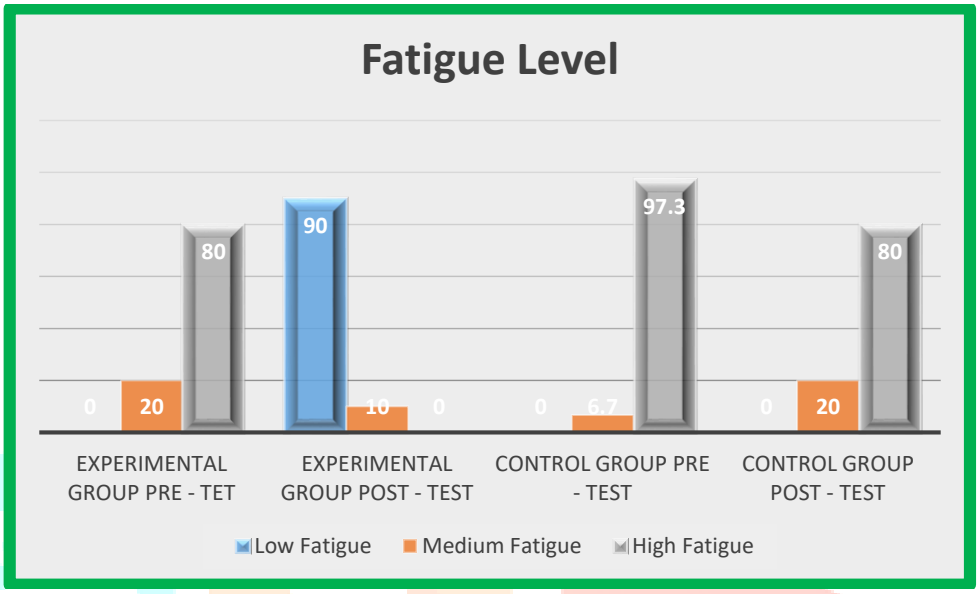


Figure – 4.22: Percentage Distribution of Subjects According to Fatigue Levels in Experimental and Control Group

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

Table – VI: Frequency and Percentage Distribution of Subjects According to Level of Haemorrhage in Experimental and Control Group

(N = 60)

Group		Minor		Moderate		Major		Severe	
		F	%	F	%	F	%	F	%
Experimental	Pre-Test	0	0.0	0	0.0	17	56.7	13	43.3
	Post-Test	13	43.3	17	56.7	0	0.0	0	0.0
Control	Pre-Test	0	0.0	0	0.0	20	66.6	10	33.7
	Post-Test	0	0.00	4	13.33	15	50.0	11	36.67

Table above depict the Frequency and Percentage Distribution of Subjects According to Level of Haemorrhage in Experimental and Control Group.

Among the subjects in experimental group, during pre – test majority of the subjects 17 (56.7 %) had major haemorrhage, severe haemorrhage was seen among 13 (43.3 %) of the subjects. None of the subjects had minor and moderate haemorrhage. At the time of post-test assessment, majority of the subjects 17 (56.7 %) were with moderate haemorrhage and minor haemorrhage was present in 13 (43.3 %) of the subjects.

Among the subjects in control group, during pre – test majority of the subjects 66.6 % had major haemorrhage, At the time of post-test assessment, majority of the subjects 50.0 % were with major haemorrhage. Moderate haemorrhage was present among 4 (13.33 %) of the subjects, none of the subjects was with minor haemorrhage.

\

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

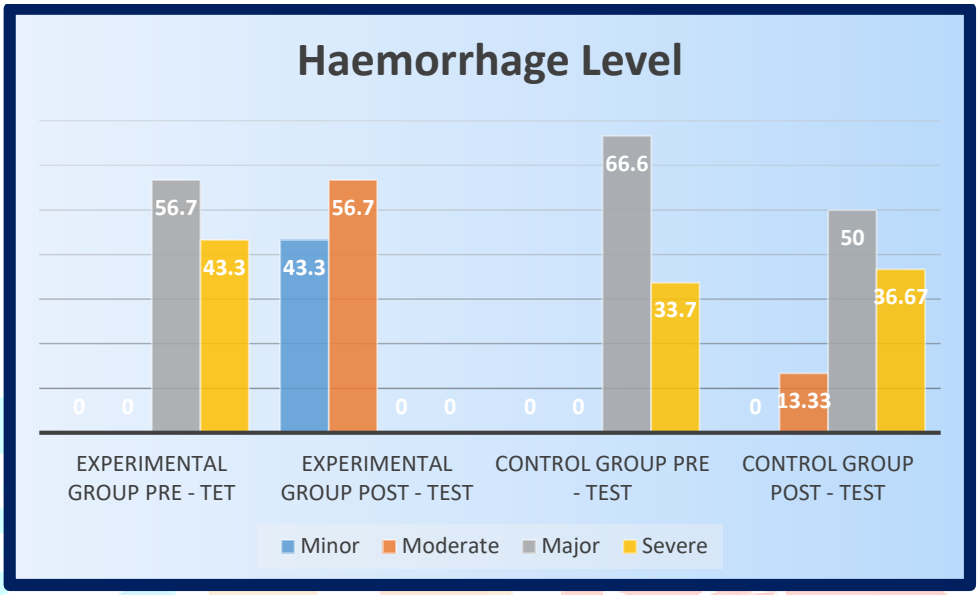


Figure – 4.23: Percentage Distribution of Subjects According to Fatigue Levels in Experimental and Control Group

Table – VII: Mean, mean difference, standard deviation and paired 't'- test value of Pain, Fatigue and Hemorrhage among subjects in experimental group

(n = 30)

Variable	Test	Mean	Mean Difference	S.D	Paired test	'p' Value
Pain	Pre - Test	8.50	4.53	0.86	19.012	0.001*
	Post - Test	3.97		1.21	(df = 29)	
Fatigue	Pre - Test	50.33	30.66	6.54	24.414	0.001*
	Post - Test	19.67		5.30	(df = 29)	
Hemorrhage	Pre - Test	3.43	1.86	0.50	17.895	0.001*
	Post - Test	1.57		0.50	(df = 29)	

Level of Significance at 'p' value < than 0.05, * - Significant

Table – VII depicts the Mean, mean difference, standard deviation and paired 't'- test value of Pain, Fatigue and Hemorrhage among subjects in experimental group.

Pain:

Among the subjects in experimental group, with regard to pain, the pre - test mean and standard deviation of pain score was 8.50 $\pm$ 0.36. the post – teat mean and standard deviation pain score was 3.97 $\pm$ 1.21. the mean difference pain score was 4.53. the paired 't' test score was 19.012 for the degree of freedom 29, which was statistically significant at the 'p' value < 0.001. this shows that, there was a significant difference in pain level between pre-test and post-test.

Fatigue:

Among the subjects in experimental group, with regard to fatigue, the pre - test mean and standard deviation of fatigue score was 50.33 $\pm$ 6.54. the post – teat mean and standard deviation fatigue score was 19.67 $\pm$ 5.30. the mean difference fatigue score was 30.66. the paired 't' test score was 24.414 for the degree of freedom 29, which was statistically significant at the 'p' value < 0.001. this shows that, there was a significant difference in fatigue level between pre-test and post-test.

Hemorrhage:

Among the subjects in experimental group, with regard to hemorrhage, the pre - test mean and standard deviation of hemorrhage score was 3.43 $\pm$ 0.50. the post – teat mean and standard deviation hemorrhage score was 1.57 $\pm$ 0.50. the mean difference hemorrhage score was 1.86. the paired 't' test score was 17.895 for the degree of freedom 29, which was statistically significant at the 'p' value < 0.001. this shows that, there was a significant difference in hemorrhage level between pre-test and post-test.

© 2023 IJCRT | Volume 11, Issue 8 August 2023 |

Table – VII: Mean, mean difference, standard deviation and paired 't'- test value of Pain, Fatigue and Hemorrhage among subjects in control group

(n = 30)

Variable	Test	Mean	Mean Difference	S.D	Paired test	'p' Value
Pain	Pre - Test	8.80	1.07	0.86	5.139	0.84^{NS}
	Post - Test	7.73		0.90	(df = 29)	
Fatigue	Pre - Test	50.33	1.96	6.54	1.716	0.97^{NS}
	Post - Test	48.37		8.10	(df = 29)	
Hemorrhage	Pre - Test	3.33	0.1	0.47	0.682	0.501^{NS}
	Post - Test	3.23		0.67	(df = 29)	

Level of Significance at 'p' value < than 0.05, NS – Not Significant

Table – VIII depicts the Mean, mean difference, standard deviation and paired 't'- test value of Pain, Fatigue and Hemorrhage among subjects in control group.

Pain:

Among the subjects in control group, with regard to pain, the pre - test mean and standard deviation of pain score was 8.80 $\pm$ 0.86. the post – teat mean and standard deviation pain score was 7.73 $\pm$ 0.90. the mean difference pain score was 1.07. the paired 't' test score was 5.139 for the degree of freedom 29, which was not statistically significant at the 'p' value 0.84. this shows that, there was no significant difference in pain level between pre-test and post-test.

Fatigue:

Among the subjects in control group, with regard to fatigue, the pre - test mean and standard deviation of fatigue score was 50.33 $\pm$ 6.54. the post – teat mean and standard deviation fatigue score was 48.37 $\pm$ 8.10. the mean difference fatigue score was 1.96. the paired 't' test score was 1.716 for the degree of freedom 29, which was not statistically significant at the 'p' value 0.97. this shows that, there was no significant difference in fatigue level between pre-test and post-test.

Hemorrhage:

Among the subjects in control group, with regard to hemorrhage, the pre - test mean and standard deviation of hemorrhage score was 3.33 $\pm$ 0.47. the post – teat mean and standard deviation hemorrhage score was 3.23 $\pm$ 0.67. the mean difference hemorrhage score was 0.1. the paired 't' test score was 0.682 for the degree of freedom 29, which was not statistically significant at the 'p' value 0.501. this shows that, there was no ignificant difference in fatigue level between pre-test and post-test.

Table – VII: Mean, mean difference, standard deviation and independent 't'- test value of Pain, Fatigue and Hemorrhage among subjects in experimental and control group

(n = 30)

Variable	Post - Test	Mean	Mean Difference	S.D	Independent 't' test	'p' Value
Pain	Experimental Group	3.97	3.76	0.86	13.59 (df = 58)	0.001*
	Control Group	7.73		0.90		
Fatigue	Experimental Group	19.67	28.7	5.30	1.716 (df = 29)	0.001*
	Control Group	48.37		8.10		
Hemorrhage	Experimental Group	1.57	1.66	0.47	10.79 (df = 29)	0.001*
	Control Group	3.23		0.67		

Level of Significance at 'p' value < than 0.05, * Significant

Table – VIII depicts the Mean, mean difference, standard deviation and independent 't'- test value of Pain, Fatigue and Hemorrhage among subjects in control group.

Pain:

Among subjects in experimental group, the post-test mean and standard deviation pain score was 3.97 $\pm$ 0.86. in the control group, the post – test mean and standard deviation pain score was 7.73 $\pm$ 0.90. the mean difference pain score was 3.76. the independent 't' test value was 13.59 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in pain level between the subjects in two groups.

Fatigue:

Among subjects in experimental group, the post-test mean and standard deviation fatigue score was 19.67 $\pm$ 5.30. in the control group, the post – test mean and standard deviation fatigue score was 48.37 $\pm$ 8.10. the mean difference fatigue score was 28.7. the independent 't' test value was 1.716 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in fatigue level between the subjects in two groups.

Hemorrhage:

Among subjects in experimental group, the post-test mean and standard deviation hemorrhage score was 1.57 $\pm$ 0.47. in the control group, the post – test mean and standard deviation hemorrhage score was 3.23 $\pm$ 0.67. the mean difference hemorrhage score was 1.66. the independent 't' test value was 10.79 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in hemorrhage level between the subjects in two groups.

Table IX: Association of post-test pain with their demographic variable of the subjects in experimental and control group

(N = 60)

S. No	Demographic Variables	Experimental Group			Control Group		
		χ^2 value	'p' value	Level of Significance	χ^2 value	'p' value	Level of Significance
1.	Age (Years)	2.756 (df = 3)	0.431	Not Significant	1.997 (df = 3)	0.573	Not Significant
2.	Gender	2.078 (df = 1)	0.161	Not Significant	0.005 (df = 1)	0.759	Not Significant
3.	Body Mass Index	5.540 (df = 4)	0.236	Not Significant	1.041 (df = 4)	0.908	Not Significant
4.	Diagnosis of patient	0.446 (df = 3)	0.931	Not Significant	2.413 (df = 3)	0.543	Not Significant
5.	Duration of disease	0.292 (df = 1)	0.453	Not Significant	2.802 (df = 1)	0.094	Not Significant
6.	History of any Previous cardiac catheterization	0.136 (df = 1)	0.595	Not Significant	0.268 (df = 1)	0.605	Not Significant
7.	Any existing co-morbidity	1.123 (df = 2)	0.545	Not Significant	15.008 (df = 2)	0.002*	Significant
8.	Pharmacological treatment being taken	0.390 (df = 2)	0.823	Not Significant	0.344 (df = 2)	0.842	Not Significant
9.	History of any addiction	3.009 (df = 3)	0.380	Not Significant	1.243 (df = 3)	0.743	Not Significant

Significant 'p' value < than 0.05

Table IX depict the Association of post-test pain with their demographic variable of the subjects in experimental and control group.

To test the association between post-test pain with their demographic variables of the subjects in experimental group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test pain and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in experimental group.

From Table IX, we could interpret that no demographic variables such as age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction were not significant with post-test pain among subjects in experimental group.

To test the association between post-test pain with their demographic variables of the subjects in control group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test pain and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in control group.

From Table IX, we could interpret that any existing co-morbidity (χ^2 = 15.008, df = 2, 'p' value < = 0.002) was having significant association with the post – test pain of the subjects in control group.

Other demographic variables like age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization and pharmacological treatment was not having association with the post – test pain of the subjects in control group.

Table X: Association of post-test fatigue with their sociodemographic variable of the subjects in experimental and control group

(N = 60)

S. No	Demographic Variables	Experimental Group			Control Group		
		χ^2 value	'p' value	Level of Significance	χ^2 value	'p' value	Level of Significance
1.	**Age (Years)**	2.284 (df = 3)	0.180	Not Significant	7.955 (df = 3)	0.241	Not Significant
2.	**Gender**	0.006 (df = 1)	0.936	Not Significant	1.453 (df = 1)	0.484	Not Significant
3.	**Body Mass Index**	6.900 (df = 8)	1.412	Not Significant	10.367 (df = 8)	0.240	Not Significant
4.	**Diagnosis of patient**	0.536 (df = 3)	0.911	Not Significant	3.371 (df = 3)	0.761	Not Significant
5.	**Duration of disease**	0.006 (df = 1)	0.623	Not Significant	0.957 (df = 1)	0.620	Not Significant

6.	**History of any Previous cardiac catheterization**	0.679 (df = 1)	0.367	Not Significant	0.655 (df = 1)	0.721	Not Significant
7.	**Any existing co-morbidity**	3.458 (df = 2)	0.178	Not Significant	4.145 (df = 2)	0.657	Not Significant
8.	**Pharmacological treatment being taken**	0.217 (df = 2)	0.338	Not Significant	0.986 (df = 2)	0.041*	Significant
9.	**History of any addiction**	2.177 (df = 3)	0.536	Not Significant	5.386 (df = 3)	0.496	Not Significant

Table X depict the Association of post-test fatigue with their demographic variable of the subjects in experimental and control group.

To test the association between post-test fatigue with their demographic variables of the subjects in experimental group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test fatigue and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in experimental group.

From Table X, we could interpret that no demographic variables such as age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction were not significant with post-test fatigue among subjects in experimental group.

To test the association between post-test fatigue with their demographic variables of the subjects in control group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test fatigue and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in control group.

From Table X, we could interpret that any pharmacological treatment being taken ($\chi^2 = 0.986$, df = 2, 'p' value < = 0.041) was having significant association with the post – test fatigue of the subjects in control group.

Other demographic variables like age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity and history of any addiction was not having association with the post – test fatigue of the subjects in control group.

Table XI: Association of post-test hemorrhage with their sociodemographic variable of the subjects in experimental and control group

(N = 60)

S. No	Demographic Variables	Experimental Group			Control Group		
		χ^2 value	'p' value	Level of Significance	χ^2 value	'p' value	Level of Significance
1.	Age (Years)	2.284 (df = 3)	0.516	Not Significant	6.345 (df = 3)	0.386	Not Significant
2.	Gender	2.134 (df = 1)	0.144	Not Significant	1.150 (df = 1)	0.581	Not Significant
3.	Body Mass Index	1.605 (df = 4)	0.808	Not Significant	5.406 (df = 4)	0.856	Not Significant
4.	Diagnosis of patient	2.985 (df = 3)	0.931	Not Significant	4.543 (df = 3)	0.605	Not Significant
5.	Duration of disease	2.134 (df = 1)	0.207	Not Significant	1.246 (df = 1)	0.536	Not Significant
6.	History of any Previous cardiac catheterization	0.667 (df = 1)	0.567	Not Significant	0.845 (df = 2)	0.655	Not Significant
7.	Any existing co-morbidity	4.015 (df = 2)	0.090	Not Significant	12.024 (df = 6)	0.061	Not Significant
8.	Pharmacological treatment being taken	0.423 (df = 2)	0.809	Not Significant	4.003 (df = 4)	0.406	Not Significant
9.	History of any addiction	1.930 (df = 3)	0.587	Not Significant	11.977 (df = 6)	0.062	Not Significant

Table XI depict the Association of post-test hemorrhage with their demographic variable of the subjects in experimental and control group.

To test the association between post-test he with their demographic variables of the subjects in experimental group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test hemorrhage and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in experimental group.

From Table XI, we could interpret that no demographic variables such as age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction were not significant with post-test hemorrhage among subjects in experimental group.

To test the association between post-test hemorrhage with their demographic variables of the subjects in control group, the null hypothesis can be stated as follows.

H0 – There will be no significant association between post-test hemorrhage and demographic variables (age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction) of the subjects in control group.

From Table XI, we could interpret that no demographic variables such as age, gender, body mass index, diagnosis of patient, duration of disease, history of any previous cardiac catheterization, any existing co-morbidity, pharmacological treatment being taken and history of any addiction were not significant with post-test hemorrhage among subjects in control group

CHAPTER – V

DISCUSSION

The main aim of the current research was toevaluate the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization at selected hospital, Panipat. Researcher had adopted true experimental design to assess the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization. Settings of the study was Dr. Prem Hospital and Ravindra Hospital – Panipat. Samples were selected through simple random sampling technique. Sample size was estimated as 60 among these 30 samples were selected in experimental group and other 30 samples were placed for control group. Tools for assessing the pain of the subjects were done through visual analogue scale (VAS), fatigue severity scale (FSS) and to assess bleeding, modified WHO bleeding assessment score were used. The pilot study was

conducted in Cygnus hospital, Panipat. With 6 subjects from 19/03/2022 to 24/03/2022 to determine the study feasibility.Main data were collected from the subjects in Dr Prem hospital and Ravindra hospital. Data were collected from 02/05/2022 to 02/06/2022, among the subjects who had undergone cardiac catheterization. Followed by the pre-test assessment of pain, fatigue and haemorrhage among the subjects in both group the researcher provided positioning and early ambulation according to the protocol which was mentioned earlier under research methodology data collection procedure. Post – test was done on the day – 2 from the cardiac catheterization procedure. The collected data were analysed through SPSS by using descriptive and inferential statistics. The results of the analysed data were discussed in this chapter according the supportive literatures

The subjects in the present study were distributed as follows with regard to demographic variables.

With regard to age of the subjects in experimental group, majority 60.0 % were in age between 41 – 50 years. In control group with regard to age of the subject's majority 36.7 % were in age between 41 – 50 years. Gender distribution among the subjects in experimental group depict that majority 70.0 %, but in control group equal number of subjects 15 (50.0 %) were males and females. Body mass index of the subjects in experimental group show that majority 40.0 % have 35.0 – 39.9. But in control group majority 46.7 % have above 40. With regard to the diagnosis of patient among the experimental group subject show that majority 56.7 % were diagnosed as myocardial infraction. Diagnosis of the patient among subjects in control group majority 50.0 % were diagnosed as myocardial infraction. 70.0 % of the subjects in experimental group were chronic according to the duration of disease. Among the subjects in control group majority 56.7 % were acute; History of any previous cardiac catheterization in subjects in experimental group shows that an overwhelming majority 83.3 % had no past history but in control group majority 66.7 % had previous cardiac catheterization. Subjects distribution in experimental group according to any existing co-morbidities show that majority 56.7 % were having diabetes mellitus, in experimental group, with regard to pharmacological treatments being taken shows that, one half of the total subjects 50 % were taking anti – coagulants. Whereas among the subjects in control group 46.7 % were taking anti – coagulants. All the subjects 100.0 % in both groups had no history of any previous surgical interventions. With regard to the history of any previous addiction, in experimental group, majority 61.3 % had no addiction to any substances, this was same among the subjects in ontrol group, majority 61.3 % had no addiction to any substances.

These finding were similar to the the findings of the study done by **Chair SY, Yu M, Choi KC, Wong EM, Sit JW, Ip WY. (2012)**The study was a single-blinded randomized controlled trial. Participants were randomly assigned to the experimental or control group using a computer generated random list. Early ambulation, defined as 4 hours post-cardiac catheterization, was the intervention used in the experimental group, and routine post-procedure care of 12 to 24 hours bed rest was used in the control group. Subjects in this study were distributed as follows Among all the 137 participants, the proportions of male to female was similar (50.4% versus 49.6%), 52% were elderly (aged 65 or above), 17% were single, divorced or widowed, 37% had secondary or above education, 19% had a job. Fifty-five percentage of the participants had monthly household income less than HK$8.000 (1US$ ~= 7.8 HK$), 30% had middle income between HK$ 8.000 and 18.000, the

remaining 15% had high income greater than HK$ 18.000. About 20% of the participants had history of back pain before cardiac catheterization.[60]

First objective of the present study was to assess the pre-test and post-test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.

In this study, table – iv shows the pre-test and post-test pain level of subjects in experimental and control group, Among the subjects in experimental group, during pre – test all the subjects 100.00 % had severe pain.And at the time of post – test majority of the subjects 80.0 % were with moderate pain. Among the subjects in control group, during pre – test all the subjects 30 100.00 % had severe pain. And at the time of post – test majority of the subjects 93.3 % were with severe pain.

Table –v in the present study reveals the Frequency and Percentage Distribution of Subjects According to Level of Fatigue in Experimental and Control Group. Among the subjects in experimental group, during pre – test majority of the subjects 80.0 % had high fatigue. During post-test, an overwhelming majority of the subjects 90.0 % were with low fatigue. Among the subjects in control group, during pre – test majority of the subjects 97.3 % had high fatigue. During post-test, an overwhelming majority of the subjects 80.0 % were with high fatigue.

Table –iv Frequency and Percentage Distribution of Subjects According to Level of Haemorrhage in Experimental and Control Group. Among the subjects in experimental group, during pre – test majority of the subjects 56.7 % had major haemorrhage, At the time of post-test assessment, majority of the subjects 56.7 % were with moderate haemorrhage. Among the subjects in control group, during pre – test majority of the subjects 66.6 % had major haemorrhage, At the time of post-test assessment, majority of the subjects 50.0 % were with major haemorrhage.

Rezaei-Adaryani M, Ahmadi F, Asghari-Jafarabadi M. (2009) The aim of this study was to assess the effect of changing position and early ambulation on the level of comfort, satisfaction, and fatigue and on the amount of bleeding and hematoma after cardiac catheterization. In a single-blind randomized controlled trial, each patient was randomly assigned to either the control or experimental group. The patients' position in the experimental group was intermittently changed during the first 6h after catheterization. Seven hours after the procedure, they were allowed to be ambulated and to undertake their self care activities. A pillow was placed under the patients' bodies. Patients in the control group were managed as routine; they were restricted to a 10-24h bed rest bed rest in supine position with the affected leg straight and immobilized and a sand bag on the puncture site for at least 8h. results shows The patients in the experimental group had significantly higher comfort and satisfaction and lower fatigue levels than the control group at 3, 6, 8h and the next morning after catheterization ($P<0.01$). Changing patients' position according to the current protocol in the experimental group produced no significant increase in the amount of bleeding and hematoma when compared with the control group ($P>0.05$).[61]

After cardiac catheterization, bed rest is prescribed in order to minimize vascular complications, but this often leads to back pain and other complications, such as hemodynamic instability. In a study conducted by **Rezaei-Adaryani M, Ahmadi F, Mohamadi E, Asghari-Jafarabadi M. (2009) which aimed** to investigate the effect of three positioning protocols on back pain, heart rate, blood pressure and vascular

complications after cardiac catheterization. A three-group quasi-experimental design was used in this study, which was conducted in 2006. A convenience sample of 105 patients was randomly assigned to either the control or the two experimental groups (A and B). The control group received routine care. Group B was treated only with modified positioning and group A with modified positioning and a pillow under their body. Back pain, heart rate, arterial blood pressure, haematoma formation and bleeding were measured at regular time intervals. Findings revealed The control group experienced higher levels of pain after 3, 6, 8 hours and the morning after catheterization. The level of pain in group B was also higher than in group A at 3 hours after the procedure. Mean heart rate and blood pressure were lower in the experimental groups compared with the control group at 6 and 8 hours after catheterization.[62]

Second Objective of the study was to compare the pre – test and post – test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.

In this study, table – viii compares the pain, fatigue and haemorrhage levels of the subjects in experimental and control group. With regard to pain among subjects in experimental group, the post-test mean and standard deviation pain score was 3.97 $\pm$ 0.86. in the control group, the post – test mean and standard deviation pain score was 7.73 $\pm$ 0.90. the independent 't' test value was 13.59 for the degree of freedom 58. Which was significant at the 'p' value < 0.001.

With regard to fatigue among subjects in experimental group, the post-test mean and standard deviation fatigue score was 19.67 $\pm$ 5.30. in the control group, the post – test mean and standard deviation fatigue score was 48.37 $\pm$ 8.10. the independent 't' test value was 1.716 for the degree of freedom 58. Which was significant at the 'p' value < 0.001.

With regard to haemorrhage among subjects in experimental group, the post-test mean and standard deviation hemorrhage score was 1.57 $\pm$ 0.47. in the control group, the post – test mean and standard deviation hemorrhage score was 3.23 $\pm$ 0.67. the independent 't' test value was 10.79 for the degree of freedom 58. Which was significant at the 'p' value < 0.001.

All the mentioned above findings were similar to the findings of the following research data.

Abdollahi, Ali &Mehranfard, Shahzad&Behnampour, Nasser &Kordnejad, Abdol. (2015). Conducted a study which was designed to assess the effect of changing position and early ambulation on low back pain, urinary retention, bleeding and hematoma after cardiac catheterization. In this clinical trial, 140 patients by using a convenience sampling randomly divided into four 35-individual groups. The patients in the control group were in the supine position for 6 hours without a movement. Change position was applied to the second group (based on a specific protocol), early ambulation was applied to the third group and both early ambulation and change position were applied to the fourth group. Then, severity of bleeding, hematoma, back pain and urinary retention were measured at zero, 1, 2, 4, 6, and 24 hours after angiography. The data was collected through an individual data questionnaire, Numerical Rating Scale (NRS) of pain and Kristin Swain's check list was applied to evaluate the severity of bleeding and hematoma. None of patients developed vascular complications. Incidence of urinary retention was higher in the control group, although this difference was not significant. The mean of pain intensity in the fourth and

sixth hours showed a significant difference. Based on the findings of this study, changing patients' position can be safe and they can be ambulated early after angiography.[63]

In a study,*which aimed* to evaluate the effectiveness of a change in position to decrease pain and vascular complications for patients after TFA.**NiknamSarabi, H., Farsi, Z., Butler, S. *et al (2021)***This randomized clinical trial was conducted in 2020. Purposive sampling of 72 eligible patients undergoing TFA were selected and randomly assigned to either an experimental or control group. Patients in the experimental group (EG) were placed in a supine position for 2 h after angiography, followed by a semi-seated position with the bed angle gradually increased to 45° over 4 h. Patients in the control group (CG) remained in the supine position for 6 h. Vital signs, groin, back and leg pain, hematoma, hemorrhage, and urinary retention were assessed in both groups before, immediately after, and over 6 h after angiography.[64]

Third objective of the study was to determine association of pre-test pain, fatigue and bleeding with selected socio-demographic variables of the patients in experimental and control group

In the present study demographic variable like any existing co-morbidity (χ^2 = 15.008, df = 2, 'p' value < = 0.002) was having significant association with the post – test pain of the subjects in control group and pharmacological treatment being taken (χ^2 = 0.986, df = 2, 'p' value < = 0.041) was having significant association with the post – test fatigue of the subjects in control group.

The above findings were not supported by the studies of the past.

RehamAbdElhamedAbdElmawlaElsaid, Hanan Mohamed MohamedSoliman, Houda Mohamad Sobh, and Abdul Razek Abdul Lateef Maaty (2015) The aim of this study was to investigate the effect of early ambulation; three versus five hours after transfemoral diagnostic cardiac catheterization on vascular complications and level of pain. The study was conducted at cardiac catheterization unit in cardiology department of the Specialized Medical Hospital at Mansoura University Hospital. The intensity of pain, the level of bleeding and hematoma were evaluated at ambulation time and after the seventh day of catheterization. In this study, the demographic variables like occupation (χ2 = 9.341, 'P' < 0.009) were statistically significant with level of pain and diagnosis of the patient was statistically associated with ((χ2 = 9.745, 'P' < 0.021).[65]

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter presents the summary of the study and conclusion drawn from the study findings. It classifies limitation of the study, implications, recommendations in different areas like nursing practice, nursing education, nursing administration, nursing research and recommendation for the further study.

Statement of the problem:

An experimental study to evaluate the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization at selected hospital, Panipat.

Objectives of the study:

1. To assess the pre-test and post-test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.
2. To compare the pre – test and post – test pain, fatigue and bleeding among patients undergone cardiac catheterization in experimental and control group.
3. To determine association of pre-test pain, fatigue and bleeding with selected socio-demographic variables of the patients in experimental and control group

Hypotheses:

H1 – There will be a significant reduction in post-test pain in experimental group as compared to control group after administration of changing position and early ambulation.

H2 - There will be a significant reduction in post-test fatigue in experimental group as compared to control group after administration of changing position and early ambulation.

H3 - There will be a significant reduction in post-test bleeding in experimental group as compared to control group after administration of changing position and early ambulation.

The conceptual model adopted for this study was a modified form of **Wiedenbach's helping art of clinical nursing theory**. Researcher had adopted true experimental design to assess the effectiveness of changing position and early ambulation on pain, fatigue and bleeding among patients undergone cardiac catheterization. Settings of the study was Dr. Prem Hospital and Ravindra Hospital – Panipat. Samples were selected through simple random sampling technique. Sample size was estimated as 60 among these 30 samples were selected in experimental group and other 30 samples were placed for control group. Tools for assessing the pain of the subjects were done through visual analogue scale (VAS), fatigue severity scale (FSS) and to assess bleeding, modified WHO bleeding assessment score were used. The pilot study was conducted in Cygnus hospital, Panipat. With 6 subjects from 19/03/2022 to 24/03/2022 to determine the study feasibility.Main data were collected from the subjects in Dr Prem hospital and Ravindra hospital. Data were collected from 02/05/2022 to 02/06/2022, among the subjects who had undergone cardiac catheterization. Followed by the pre-test assessment of pain, fatigue and haemorrhage among the subjects in both group the researcher provided positioning and early ambulation according to the protocol which was mentioned earlier under research methodology data collection procedure. Post – test was done on the day – 2 from the cardiac catheterization procedure. The collected data were analysed through SPSS by using descriptive and inferential statistics.

Major Findings of the Study:

- With regard to age of the subjects in experimental group, majority 18 (60.0 %) were in age between 41 – 50 years.
- Gender distribution among the subjects in experimental group depict that majority 21 (70.0 %) were males.
- Body mass index of the subjects in experimental group show that majority 12 (40.0 %) have 35.0 – 39.9.
- With regard to the diagnosis of patient among the experimental group subject show that majority 17 (56.7 %) were diagnosed as myocardial infraction.
- Duration of disease among the subjects in experimental group were distributed as follows, majority 21 (70.0 %).
- History of any previous cardiac catheterization in subjects in experimental group shows that an overwhelming majority 25 (83.3 %) had no history.
- Subjects distribution in experimental group according to any existing co-morbidities show that majority 17 (56.7 %) were having diabetes mellitus.

- In experimental group, with regard to pharmacological treatments being taken shows that, one half of the total subjects 15 (50 %) were taking anti – coagulants.
- All the subjects 30 (100.0 %) in experimental group had no history of any previous surgical interventions.
- With regard to the history of any previous addiction, in experimental group, majority 19 (61.3 %) had no addiction to any substances.
- With regard to age of the subjects in control group, majority 11 (36.7 %) were in age between 41 – 50 years.
- Gender distribution among the subjects in control group depict that equal number of subjects 15 (50.0 %) were males and females.
- Body mass index of the subjects in control group show that majority 14 (46.7 %) have above 40.
- With regard to the diagnosis of patient among the control group subject show that majority 15 (50.0 %) were diagnosed as myocardial infraction.
- Duration of disease among the subjects in control group were distributed as follows, majority 17 (56.7 %) were acute.
- History of any previous cardiac catheterization in subjects in control group shows that majority 20 (66.7 %) had previous cardiac catheterization.
- Subjects distribution in control group according to any existing co-morbidities show that majority 15 (50.0 %) were having diabetes mellitus.
- In control group, with regard to pharmacological treatments being taken shows that, one half of the total subjects 14 (46.7 %) were taking anti – coagulants.
- All the subjects 30 (100.0 %) in control group had no history of any previous surgical interventions.
- With regard to the history of any previous addiction, in control group, majority 19 (61.3 %) had no addiction to any substances.
- In experimental group, with regard to the height of the subjects, the mean height score was 147.73 cm with standard deviation was 9.822. among the subjects in control group, the mean height of the subjects was 148.13 cm and the standard deviation score was 11.346
- In experimental group, with regard to the weight of the subjects, the mean weight score was 77.37 kg with standard deviation was 12.609 similarly, among the subjects in control group, the mean weight of the subjects was 81.47 and the standard deviation score was 10.631.
- In experimental group, with regard to the systolic BP of the subjects, the mean systolic BP score was 137 with standard deviation was 7.926 similarly, among the subjects in control group, the mean systolic BP of the subjects was 135.53 and the standard deviation score was 9.468.
- In experimental group, with regard to the diastolic BP of the subjects, the mean diastolic BP score was 87.57 with standard deviation was 3.892, among the subjects in control group, the mean diastolic BP of the subjects was 87.30 and the standard deviation score was 5.114.

- Among the subjects in experimental group, during pre – test all the subjects 30 (100.00 %) had severe pain. And at the time of post – test majority of the subjects 22 (80.0 %) were with moderate pain and mild pain was present among 8 (20.0 %) of the subjects.
- Among the subjects in control group, during pre – test all the subjects 30 (100.00 %) had severe pain. And at the time of post – test majority of the subjects 28 (93.3 %) were with severe pain.
- Among the subjects in experimental group, during pre – test majority of the subjects 22 (80.0 %) had high fatigue During post-test, an overwhelming majority of the subjects 27 (90.0 %) were with low fatigue.
- Among the subjects in control group, during pre – test majority of the subjects 28 (97.3 %) had high fatigue and medium fatigue was present in 2 (6.7 %) of the subjects During post-test, an overwhelming majority of the subjects 22 (80.0 %) were with high fatigue.
- Among the subjects in experimental group, during pre – test majority of the subjects 17 (56.7 %) had major haemorrhage.
- At the time of post-test assessment, majority of the subjects 17 (56.7 %) were with moderate haemorrhage and Among the subjects in control group, during pre – test majority of the subjects 66.6 % had major haemorrhage, At the time of post-test assessment, majority of the subjects 50.0 % were with major haemorrhage.
- Among subjects in experimental group, the post-test mean and standard deviation pain score was 3.97 $\pm$ 0.86. in the control group, the post – test mean and standard deviation pain score was 7.73 $\pm$ 0.90. the independent 't' test value was 13.59 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in pain level between the subjects in two groups.
- Among subjects in experimental group, the post-test mean and standard deviation fatigue score was 19.67 $\pm$ 5.30. in the control group, the post – test mean and standard deviation fatigue score was 48.37 $\pm$ 8.10. the independent 't' test value was 1.716 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in fatigue level between the subjects in two groups.
- Among subjects in experimental group, the post-test mean and standard deviation hemorrhage score was 1.57 $\pm$ 0.47. in the control group, the post – test mean and standard deviation hemorrhage score was 3.23 $\pm$ 0.67. the independent 't' test value was 10.79 for the degree of freedom 58. Which was significant at the 'p' value < 0.001. this shows that, there was a significant difference in hemorrhage level between the subjects in two groups.
- In this study, any existing co-morbidity (χ^2 = 15.008, df = 2, 'p' value < = 0.002) was having significant association with the post – test pain of the subjects in control group.
- In this study, any pharmacological treatment being taken (χ^2 = 0.986, df = 2, 'p' value < = 0.041) was having significant association with the post – test fatigue of the subjects in control group.

Conclusion:

The results of this study showed that the levels of pain, fatigue and haemorrhage after positioning and early ambulation have been reduced among the subjects in experimental group, when compared with those who were in control group. Changing patients' position accompanied by early ambulation after cardiac catheterization are associated with increasing comfort and satisfaction levels and decreasing the level of pain and fatigue without increasing the amount of bleeding and hematoma.

Implications of The Study

The findings of the study have the following implication in nursing.

Implications for Nursing practice:

1. Positioning and early ambulation are cost effective measure to reduce the pain, decrease haemorrhage and prevents haemorrhage.
2. Nurses working in critical care unit should practice positioning and early ambulation for all patients who were undergoing cardiac catheterization.

Implication for Nursing administration:

- ❖ Nurse administrator should have a policy decision to implement the positioning and early ambulation protocols for all patients who undergone cardiac catheterization.
- ❖ Administration must provide adequate facilities to all patients and nurse practioner to implement the protocols regarding early ambulation and positioning.

Implications for Nursing Research.

The study will be a valuable reference material for future researcher.

- ❖ The findings of the study would help to expand the scientific body of professional knowledge upon which further researchers can be conducted.
- ❖ Effects of positioning and early ambulation may be studied more scientifically and used as a specific nursing intervention.

Recommendations:

- ❖ Similar study can replicate on a larger scale.
- ❖ A similar study can be conducted in another patient with different surgical conditions.
- ❖ A similar study can be conducted among patients undergoing cardiac catheterization to assess hematoma, satisfaction level and early recovery.

References:

1. WHO. Global Status Report on Noncommunicable Diseases. 2014 http://www. who. int/ nmh/ publications/ ncd- status- report- 2014/ en/ (accessed 6 Jun 2016).
2. Yusuf S, Rangarajan S, Teo K, et al. Cardiovascular risk and events in 17 low-, middle-, and high-income countries. N Engl J Med 2014; 371:818–27.
3. Xavier D, Pais P, Devereaux PJ, et al. Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data. Lancet 2008; 371:1435–42.
4. Mohanan PP, Mathew R, Harikrishnan S, et al. Presentation, management, and outcomes of 25 748 acute coronary syndrome admissions in Kerala, India: results from the Kerala ACS Registry. Eur Heart J 2013; 34:121–9.
5. Kutty VR, Balakrishnan KG, Jayasree AK, et al. Prevalence of coronary heart disease in the rural population of Thiruvananthapuram district, Kerala, India. Int J Cardiol 1993; 39:59–70.
6. Woods SL, Froelicher ESS, Motzer, SU, Bridges EJ. Cardiac Nursing.6th ed. Philadelphia: Lippincott; 2010.
7. Chair SY, Thompson DR, Li SK. The effect of ambulation after cardiac catheterization on patient outcomes. J ClinNurs 2007; 16: 212-4. [CrossRef]
8. Boztosun B, Güneş Y, Yıldız A, Bulut M, Sağlam M, Kargın R, et al. Early ambulation after diagnostic heart catheterization. Angiology 2007; 58: 743-6. [CrossRef]
9. Hamel WJ. Femoral artery closure after cardiac catheterization. Crit Care Nurse 2009; 29: 39-46. [CrossRef]

10. Steffenino G, Dutto S, Conte L, Dutto M, Lice G, Tomatis M, et al. Vascular access complications after cardiac catheterization: a nurseled quality assurance program. Eur J CardiovascNurs 2006; 5: 31-6. [CrossRef]
11. Dewan BD, Malhotra KC, Gupta SP. Epidemiological study of coronary heart disease in rural community in Haryana. Indian Heart J 1974;26:68–78.
12. Wander GS, Khurana SB, Gulati R, et al. Epidemiology of coronary heart disease in a rural Punjab population--prevalence and correlation with various risk factors. Indian Heart J 1994;46:319–23.
13. Gupta R, Gupta VP, Ahluwalia NS. Educational status, coronary heart disease, and coronary risk factor prevalence in a rural population of India. BMJ 1994;309:1332–6.
14. Joshi R, Chow CK, Raju PK, et al. Fatal and nonfatal cardiovascular disease and the use of therapies for secondary prevention in a rural region of India. Circulation 2009;119:1950–5.
15. Rao KD, Bhatnagar A, Murphy A. Socio-economic inequalities in the financing of cardiovascular & diabetes inpatient treatment in India. Indian J Med Res 2011;133:57–63.
16. Kinra S, Bowen LJ, Lyngdoh T, et al. Sociodemographic patterning of no communicable disease risk factors in rural India: a cross sectional study. BMJ 2010;341:c4974.
17. Gupta R, Islam S, Mony P, et al. Socioeconomic factors and use of secondary preventive therapies for cardiovascular diseases in South Asia: the PURE study. Eur J PrevCardiol2015;22:1261–71.
18. Gupta R, Guptha S, Gupta VP, et al. Twenty-year trends in cardiovascular risk factors in India and influence of educational status. Eur J PrevCardiol2012;19:1258–71.
19. Dewan BD, Malhotra KC, Gupta SP. Epidemiological study of coronary heart disease in rural community in Haryana. Indian Heart J 1974;26:68–78.
20. Misra A, Chowbey P, Makkar BM, et al. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. J Assoc Physicians India 2009;57:163–70.
21. World Health Organization. Arterial hypertension; 1978, Report No: 628. http:// apps. who. int/ iris/ bitstream/ 10665/ 41632/ 1/ WHO_ TRS_ 628. pdf (accessed 2 Jul 2016).
22. Association of Physicians of India. Indian guidelines on hypertension (IGH)-III – 2013. J Assoc Physicians India 2013;61:1–33
23. Mundermann, A., Nigg, B.M., Stefanyshyn, D.R., Humble, R.N., 2002. Development of a reliable method to assess footwear comfort during running. Gait and Posture 16, 38–45.
24. Pollard, S.D., Munks, K., Wales, C., Crossman, D.C., Cumberland, D.C., Oakley, G.D.G., Gunn, J., 2003. Position and Mobilization Post-Angiography Study (PAMPAS): a comparison of 4.5 h and 2.5 h bed rest Heart 89, 447–448.
25. Pooler-Lunse, C., Barkman, A., Bock, B.F., 1996. Effects of modified positioning and mobilization on back pain and delayed bleeding in patients who had received heparin and undergone angiography: a pilot study. Heart Lung 25 (2), 117–123.

26. Rezaei-Adaryani, M., Ahmadi, F., Mohammadi, E., Jafar-Abadi, M., 2009. The effect of three positioning methods on patient outcomes after cardiac catheterization. Journal of Advanced Nursing 65 (2), 417–424.
27. Mall A, Girton TA, Yardley K, Rossman P, Ohman EM, Jones WS, Granger BB. Understanding the patient experience of pain and discomfort during cardiac catheterization. Catheter CardiovascInterv. 2020 Jun 1;95(7):E196-E200. doi: 10.1002/ccd.28403. Epub 2019 Jul 16. PMID: 31313448.
28. Carroll DL, Malecki-Ketchell A, Astin F. Non-pharmacological interventions to reduce psychological distress in patients undergoing diagnostic cardiac catheterization: a rapid review. Eur J CardiovascNurs. 2017 Feb;16(2):92-103. doi: 10.1177/1474515116670596. Epub 2016 Sep 23. PMID: 27638314.
29. Ibdah RK, Ta'an WF, Shatnawi RM, Suliman MM, Rababah JA, Rawashdeh SI. The effectiveness of early position change postcardiac catheterization on patient's outcomes: A randomized controlled trial. Nurs Forum. 2020 Jul;55(3):380-388. doi: 10.1111/nuf.12438. Epub 2020 Feb 5. PMID: 32020631.
30. Vati J. Effect of Low Fowler's Position on Back Pain and Vascular Complicationsfollowing Trans-Femoral Cardiac Catheterization: A Randomized Controlled Trial. [cited 2021 Jul 24]; Available from: http://www.imanagerpublications.com
31. Rezaei-Adaryani M, Ahmadi F, Mohamadi E, Asghari-Jafarabadi M. The effect of three positioning methods on patient outcomes after cardiac catheterization. J AdvNurs. 2009 Feb;65(2):417-24. doi: 10.1111/j.1365-2648.2008.04889.x. Erratum in: J AdvNurs. 2009 Apr;65(4):919. PMID: 19191940.
32. The Effect of Body Position and Early Ambulation on Comfort Bleeding and Ecchymosis After Diagnostic Cardiac Catheterization - Journal of Client-Centered Nursing Care [Internet]. [cited 2021 Jul 24].
33. Chair SY, Yu M, Choi KC, Wong EM, Sit JW, Ip WY. Effect of early ambulation after transfemoral cardiac catheterization in Hong Kong: a single-blinded randomized controlled trial. AnadoluKardiyolDerg. 2012 May;12(3):222-30. doi: 10.5152/akd.2012.065. Epub 2012 Feb 24. PMID: 22366106.
34. Boztosun B, Günes Y, Yildiz A, Bulut M, Saglam M, Kargin R, Kirma C. Early ambulation after diagnostic heart catheterization. Angiology. 2007 Dec-2008 Jan;58(6):743-6. doi: 10.1177/0003319707308890. Epub 2007 Nov 7. PMID: 17989423)
35. Larry Jameson J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J. Harrison's Principles of Internal Medicine. 20th ed. New York: McGraw-Hill Education; 2018. Back to cited text no. 1
36. Brunner LS. Brunner &Suddarth's Textbook of Medical-Surgical Nursing. 14th ed. New York: Lippincott Williams & Wilkins; 2018.
37. Writing Group Members, Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, et al. Heart disease and stroke statistics-2016 update: A report from the American Heart Association. Circulation 2016;133:e38-360.
38. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med 2006;3:e442.

39. Sadeghi M, Haghdoost AA, Bahrampour A, Dehghani M. Modeling the burden of cardiovascular diseases in Iran from 2005 to 2025: The impact of demographic changes. Iran J Public Health 2017;46:506-16.
40. Tadaionfar M, Foji S, Mohesnpour M, Rakhshani M. The effects of guided imagery on pationts anxiety unrergoing cardiac catheterization. JSUMS 2014;20:689-95.
41. Höglund J, Stenestrand U, Tödt T, Johansson I. The effect of early mobilisation for patient undergoing coronary angiography; a pilot study with focus on vascular complications and back pain. Eur J CardiovascNurs 2011;10:130-6.
42. NiknamSarabi H, Farsi Z, Butler S, Pishgooie AH. Comparison of the effectiveness of position change for patients with pain and vascular complications after transfemoral coronary angiography: a randomized clinical trial. BMC CardiovascDisord. 2021 Feb 25;21(1):114. doi: 10.1186/s12872-021-01922-w. PMID: 33632127; PMCID: PMC7908805.
43. Aljanabi, Mohammed. (2020). Effectiveness of Nursing Intervention on Early Complications for Patients undergoing Coronary Catheterization.
44. Mall A, Girton TA, Yardley K, Rossman P, Ohman EM, Jones WS, Granger BB. Understanding the patient experience of pain and discomfort during cardiac catheterization. Catheter CardiovascInterv. 2020 Jun 1;95(7):E196-E200. doi: 10.1002/ccd.28403. Epub 2019 Jul 16. PMID: 31313448.
45. Carroll DL, Malecki-Ketchell A, Astin F. Non-pharmacological interventions to reduce psychological distress in patients undergoing diagnostic cardiac catheterization: a rapid review. Eur J CardiovascNurs. 2017 Feb;16(2):92-103. doi: 10.1177/1474515116670596. Epub 2016 Sep 23. PMID: 27638314.
46. Hilário, Thamires& Santos, Simone & Kruger, Juliana & Goes, Marta & Casco, Márcia&Rabelo-Silva, Eneida. (2017). Pain assessment and management in patients undergoing endovascular procedures in the catheterization laboratory. Revista da Escola de Enfermagem da USP. 51. 10.1590/s1980-220x2016018003229.
47. Ibdah RK, Ta'an WF, Shatnawi RM, Suliman MM, Rababah JA, Rawashdeh SI. The effectiveness of early position change postcardiac catheterization on patient's outcomes: A randomized controlled trial. Nurs Forum. 2020 Jul;55(3):380-388. doi: 10.1111/nuf.12438. Epub 2020 Feb 5. PMID: 32020631.
48. Karakul A, Akgül EA, Yalınız R, Meşe T. Effectiveness of music during cardiac catheterization on children's pain, fear, anxiety and vital signs: A randomized, blind controlled trial. J PediatrNurs. 2022 Mar 9:S0882-5963(22)00042-2. doi: 10.1016/j.pedn.2022.02.009. Epub ahead of print. PMID: 35279331.
49. Utami, Theresia&Fatmasari, Diyah&Mardiyono, Mardiyono&Shobirun, Shobirun. (2018). EFFECT OF POSITIONING ON BLEEDING COMPLICATION AND LOW BACK PAIN AFTER DIAGNOSTIC CORONARY ANGIOGRAPHY IN PATIENTS WITH CORONARY HEART DISEASE IN AN INTEGRATED HEART CARE CENTER IN INDONESIA. Belitung Nursing Journal. 4. 145-153. 10.33546/bnj.356.

50. Vati, J., Mathew, T.K., and Sharma, Y.P. (2016). Effect of Low Fowler's Position on Back Pain and Vascular Complications following Trans-Femoral Cardiac Catheterization: A Randomized Controlled Trial. *i-manager's Journal on Nursing*, 6(1), 24-31. https://doi.org/10.26634/jnur.6.1.5916
51. Spieth, P. M., Kubasch, A. S., Penzlin, A. I., Illigens, B. M., Barlinn, K., &Siepmann, T. (2016). Randomized controlled trials - a matter of design. *Neuropsychiatric disease and treatment*, *12*, 1341–1349. https://doi.org/10.2147/NDT.S101938
52. Ashktorab, Tahereh&Neyshabori, M. &Piranfar, M. &Alavimajd, H.. (2009). Effect of bed rest reduction after coronary angiography on local vascular complications and back pain. Journal of Nursing and Midwifery. 18. 31-38.
53. Rezaei-Adaryani M, Ahmadi F, Mohamadi E, Asghari-Jafarabadi M. The effect of three positioning methods on patient outcomes after cardiac catheterization. J AdvNurs. 2009 Feb;65(2):417-24. doi: 10.1111/j.1365-2648.2008.04889.x. Erratum in: J AdvNurs. 2009 Apr;65(4):919. PMID: 19191940.
54. Dehghan AR, Fereidouni Z, NajafiKalyani M. The Effectiveness of Peer Group-Based Training on the Outcomes of Patients Undergoing Transradial Coronary Angiography. Biomed Res Int. 2020 Apr 26;2020:3629782. doi: 10.1155/2020/3629782. PMID: 32420337; PMCID: PMC7201826.
55. Naseri, Vahid&Gol, Masoume&Basaampour, Shiva &Varaei, Shokoh&Sajadi, Mahboube& Mehran, Abbas. (2017). The Effect of Body Position and Early Ambulation on Comfort, Bleeding, and Ecchymosis After Diagnostic Cardiac Catheterization. Journal of Client-centered Nursing Care. 3. 19-26. 10.32598/jccnc.3.1.19.
56. Thangkratok, Pramote. (2016). The Effect of Reverse Trendelenburg Position on Back Pain after Cardiovascular Angiography and Interventions. The Bangkok Medical Journal. 12. 28-32. 10.31524/bkkmedj.2016.09.005.
57. Bakhshi F, Namjou Z, Andishmand A, Panabadi A, Bagherinasab M, Sarebanhassanabadi M. Effect of positioning on patient outcomes after coronary angiography: a single-blind randomized controlled trial. J Nurs Res. 2014 Mar;22(1):45-50. doi: 10.1097/jnr.0000000000000020. PMID: 24517899.
58. Chair SY, Yu M, Choi KC, Wong EM, Sit JW, Ip WY. Effect of early ambulation after transfemoral cardiac catheterization in Hong Kong: a single-blinded randomized controlled trial. AnadoluKardiyolDerg. 2012 May;12(3):222-30. doi: 10.5152/akd.2012.065. Epub 2012 Feb 24. PMID: 22366106.
59. Boztosun B, Günes Y, Yildiz A, Bulut M, Saglam M, Kargin R, Kirma C. Early ambulation after diagnostic heart catheterization. Angiology. 2007 Dec-2008 Jan;58(6):743-6. doi: 10.1177/0003319707308890. Epub 2007 Nov 7. PMID: 17989423.
60. Chair SY, Yu M, Choi KC, Wong EM, Sit JW, Ip WY. Effect of early ambulation after transfemoral cardiac catheterization in Hong Kong: a single-blinded randomized controlled trial. AnadoluKardiyolDerg. 2012 May;12(3):222-30. doi: 10.5152/akd.2012.065. Epub 2012 Feb 24. PMID: 22366106.
61. Rezaei-Adaryani M, Ahmadi F, Asghari-Jafarabadi M. The effect of changing position and early ambulation after cardiac catheterization on patients' outcomes: a single-blind randomized controlled

trial. Int J Nurs Stud. 2009 Aug;46(8):1047-53. doi: 10.1016/j.ijnurstu.2009.02.004. Epub 2009 Mar 17. PMID: 19296949.

62. Abdollahi AA, Mehranfard S, Behnampour N, Kordnejad AM. Effect of Positioning and Early Ambulation on Coronary Angiography Complications: a Randomized Clinical Trial. J Caring Sci. 2015 Jun 1;4(2):125-34. doi: 10.15171/jcs.2015.013. PMID: 26171374; PMCID: PMC4484987.
63. NiknamSarabi H, Farsi Z, Butler S, Pishgooie AH. Comparison of the effectiveness of position change for patients with pain and vascular complications after transfemoral coronary angiography: a randomized clinical trial. BMC CardiovascDisord. 2021 Feb 25;21(1):114. doi: 10.1186/s12872-021-01922-w. PMID: 33632127; PMCID: PMC7908805.
64. Elsaid RAA, Mohamed H, Soliman, Sobh HM, Maaty AA. Effect of Early Ambulation ; Three versus Five hours after Transfemoral diagnostic Cardiac Catheterization : A randomized clinical One-arm Study [Internet]. 2015 [cited 2022 Jun 24]. Available from: https://www.semanticscholar.org/paper/Effect-of-Early-Ambulation-%3B-Three-versus-Five-%3A-A-Elsaid-Mohamed/2f04b98d77b4ec298dddcd4b20e623fa0589ce1c