

A Study to Evaluate Nurse-Led Intervention on Knowledge and Practice Regarding Rehabilitation Program for Postoperative CABG Patients in CTVS Department at Pt. B.D. Sharma PGIMS, Rohtak

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Abstract

Background: Coronary Artery Bypass Graft (CABG) is a commonly performed surgery for treating cardiovascular disease and is recognized as a life-saving intervention. However, the initial recovery phase presents several challenges for patients, caregivers, and healthcare providers. This recovery period is often seen as a particularly stressful and critical time, with patients facing a range of both physical and emotional difficulties. **Objectives:** The main objective of the study to evaluate nurse led intervention on knowledge and practice regarding rehabilitation program for postoperative CABG patients in CTVS department at Pt. B.D. Sharma PGIMS, Rohtak. **Methods:** A pre-experimental study recruited 60 patients of postoperative CABG by using non-probability convenient sampling techniques. The Sociodemographic profile, Self-structured knowledge questionnaire, and structured interview schedule knowledge on practice regarding cardiac rehabilitation (checklist) were used as tool for data collection. Variables under study dependent variables, such as knowledge and practice regarding rehabilitation program for postoperative CABG patient, Independent variables, such as nurse-led interventions and demographic variables, such as age, sex, occupation, weight, POST op day, nutritional status. **Results:** CABG was more common in males 66.7%, prior knowledge Score with an average score of 7.717. The scores are moderately dispersed around the mean with a standard deviation of 2.3728. Post-Knowledge Score with an average score of 14.017. The scores are less dispersed compared to pretest scores with a standard deviation of 2.1901. Pre-Practice Level and Skill Level with an average score of 4.183. The scores are moderately dispersed around the mean with a standard deviation of 1.6312. Post-Practice Level and Skill Level with an average score of 7.400. The scores are less dispersed compared to pre-practice scores with a standard deviation of

1.5093. The paired samples test results indicate a statistically significant difference between post-knowledge scores and prior knowledge scores (mean difference = 6.3, $t(59) = 19.064$, $p < .001$, 95% CI [5.6387, 6.9613]). The paired samples test results indicate a statistically significant difference between post-practice level and skill level scores and pre-practice level and skill level scores (mean difference = 3.2167, $t(59) = 28.162$, $p < .001$, 95% CI [2.9881, 3.4452]). **Conclusion:** However, there is a statistically significant difference between post-knowledge scores and prior knowledge scores, and in between post-practice level and skill level scores and pre-practice level and skill level scores, as well.

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INTRODUCTION

Background of the Study

Cardiovascular diseases (CVDs) are an emerging epidemic and the primary cause of premature death, disability, hospitalization, and healthcare expenditure throughout the world. CVDs include vascular diseases of the brain and diseases of the blood vessels and heart. CVDs, mainly heart attacks and strokes, are the leading cause of death worldwide. In 2019, approximately 17.9 million people lost their lives to CVDs, accounting for 32% of all deaths globally. Of these fatalities, 85% were attributed to heart attacks and strokes [1].

Coronary Artery Disease (CAD) is one of the non-communicable diseases. Coronary artery disease (CAD) has emerged as a major public health concern in developing countries, with prevalence rates ranging from 14.5 to 65.4 per 1,000 people. This rise is largely due to the increasing rates of hypertension, diabetes, smoking, and physical inactivity, which are primarily linked to poor dietary habits and lifestyle changes, including high-stress living and diets rich in cholesterol (Kamal et al., 2018). According to the World Health Organization (WHO), CAD is projected to cause 15.3 million deaths, or 30% of all deaths, by 2020. The Global and Regional Projections of Mortality and Burden of Disease suggest that CAD will remain the leading cause of death over the next two decades [2].

The safety and efficiency of cardiac operations and surgical procedures has improved over the last three decades. In recent years, percutaneous coronary intervention (PCI), a nonsurgical procedure, has become the treatment of choice for patients who may not survive CABG surgery. However, while PCI may be universally applicable, findings from meta-analysis have consistently shown increased rates of repeat procedures. Over the last decade, despite patients presenting with co-morbidities including hypertension and obesity, CABG remains superior to PCI as an excellent revascularization procedure for complex CHD, such as left ventricular dysfunction and diabetes mellitus. CABG enhances blood flow to the heart and offers long term survival, freedom from re-intervention due to failure of the initial procedure and adverse cardiac events, notably heart failure or stroke, as well as being a more cost-effective procedure [3].

Nurses play an important role for patients undergoing cardiothoracic surgery by serving to coordinate care, providing emotional support at the time of diagnosis, providing information and assistance in decision-making, treatment, continuous assessment and care during and after treatment (Soltis., 2015). Fixed factors like age and sex have a limited impact on quality of life (QOL), whereas other factors are more manageable. The QOL of individuals who have undergone cardiothoracic surgery can be enhanced through various interventions, such as reducing psychological distress, offering crisis management educational programs, providing psychosocial support, facilitating coping through support groups, using cognitive behavioral therapy, and administering specific medications. When feasible, moderate physical activity is recommended to alleviate symptoms like chest pain, anxiety, insomnia, and fatigue [4].

Nurse-led CR programs can be distinguished by certain structures or features related to their purpose. These include emphasis on life management rather than intervention and diagnosis and a focus on health rather than illness. In addition to providing autonomy, nurse-led CR programs increase the opportunity for professional development among nurse practitioners. Nurse-led CR programs are staffed and managed solely by nurses with the ability to treat and consult, evaluate and refer patients to other health professionals as needed. Nurse-led services can optimize quality of care in managing patients with established CHD by diverting health consumers from busy general practice and hospital settings. This supports the view expressed by Johnson et al. that CR endorsement from nurses should be included in strategies to increase participation [5].

NEED OF THE STUDY

Over the past two decades, there has been a dramatic decline in CVD mortality rates in developed countries through individual healthcare approaches including screening of people in different care

settings for early detection. In addition, population-wide primary prevention strategies, such as public awareness promotion about the risk factors for CVD (e.g., smoking, alcohol use and unhealthy eating), provide foundational knowledge for policy makers to deliver or support prevention and treatment programs. Current guidelines highlight the importance of patients participating in cardiac rehabilitation (CR) as is also recommended by cardiovascular experts for the management of CVD. CR has been defined as measures designed to help patients minimize recovery time following a cardiac event and maximize physical, social and psychological functioning by encouraging positive behaviors. Intervention consists of medical evaluation, cardiac risk factor modification, education, behavioral change and supervised exercise training for 2–3 days a week over several weeks, months, or years to produce optimum improvements in patients' health-related quality of life (HRQoL) [6].

Low referral rates and limited patient motivation, largely stemming from a lack of awareness about the potential health benefits, were identified as major obstacles to cardiac rehabilitation. However, simple interventions, like making two follow-up phone calls after CABG, along with more extensive cardiac rehabilitation programs, have shown to have a positive impact [7].

Coronary Artery Bypass Graft (CABG) is a commonly performed surgical procedure for treating CVD and is recognized as a life-saving treatment. However, the initial recovery phase poses numerous challenges for patients, caregivers, and healthcare professionals. This period is often regarded as one of the most stressful and crisis-laden times, as it is associated with both physical and emotional issues. The first few weeks after surgery can be particularly overwhelming, with patients facing uncertainty about their prognosis, unexplained symptoms, or concerns regarding the treatment plan [8].

As per the latest WHO data from 2017, the rate of cardiothoracic surgeries in Egypt was 2.91% in males and 2.31% in females per 100, 000 people. About 39% of patients undergoing these surgeries experience disease progression, while 19% are diagnosed with late complication. Preoperative health education for patients undergoing CABG is crucial for nurses, as it provides an opportunity to share valuable knowledge and offer psychological and emotional support during the challenging postoperative phase. Nurses must have accurate information about cardiothoracic surgeries to effectively assist patients. Therefore, it is essential to assess the impact of discharge planning on the recovery of patients after cardiothoracic surgery [9].

The mortality rate for patients awaiting CABG has been shown to be remarkably stable approximately 0.5%–0.6% per year over the past 10 years [2]. However, research indicates that patients' physical and psychological well-being can worsen while waiting for surgery. Through its effects on the autonomic nervous system, emotional stress also influences catecholamines, myocardial oxygen demand, and platelet aggregation; this may affect morbidity during the waiting period. Such factors as preoperative anxiety and little social support have adverse psychological effects during extended preoperative waiting periods and, in addition, have been found to predict poor physical recovery from heart surgery. As a result, psychological factors and physical deconditioning that develop during the waiting period can adversely impact patients' hospital experience, potentially extending their length of stay. Because waiting for health services will probably continue to be a reality in publicly funded health care systems that value universal access, careful study of simple, affordable methods to improve patient outcomes during the waiting period is warranted [10].

OBJECTIVES OF THE STUDY

1. To assess the pre-test knowledge and practice regarding rehabilitation program among post operative CABG patients in CTVS department.
2. To evaluate the nurse led program on knowledge and practice regarding rehabilitation program among post operative CABG patients in CTVS department.
3. To examine the relationship between post-test knowledge and practices and selected demographic variables of CABG patients in the CTVS department.

HYPOTHESIS

All hypotheses will be test at 0.05 level of significance (p)

- *H1*: There will be a significant difference in pre-test and post-test knowledge and practices related to the rehabilitation program for post-operative CABG patients following a nurse-led intervention.
- *H2*: There will be a significant association between the pre-test knowledge score and practices regarding post-operative CABG patients.
- *H3*: There will be a significant relationship between pre-test knowledge and practice scores and selected demographic variables of post-operative CABG patients in the CTVS department.
- *H01*: There will be no significant difference in pre-test and post-test knowledge and practices regarding the care of post-operative CABG patients after a nurse-led intervention.
- *H02*: There will be no significant association between the pre-test knowledge score and practices regarding the care of CABG patients in the CTVS department.
- *H03*: There will be no significant relationship between pre-test knowledge and practice scores and selected demographic variables related to the care of CABG patients in the CTVS department.

ASSUMPTIONS

1. Post operative CABG patients may have some knowledge and practices regarding the care of themselves.
2. Knowledge and practices may vary from individual to individual.
3. Improvement in knowledge may improve patient outcome.

OPERATIONAL DEFINITIONS

1. *Evaluate*: In this study, evaluation means to identify & determine the level of gain in knowledge and practice of post operative CABG Patient in CTVS Department
2. *Nurse led intervention*: Nurse involved educational intervention to improve knowledge and practice of post operative CABG Patient in CTVS Department.
3. *Knowledge*: knowledge is a mix of different experiences, values, contextual information and expert insights.
4. *Practice*: Engaging in an activity or training regularly to enhance and refine one's skills.
5. *Rehabilitation*: Rehabilitation refers to the integrated use of medical, social, educational, and vocational approaches aimed at training an individual to achieve the highest possible level of functional capacity.
6. *Programme*: A programme is typically created to accomplish a specific goal or task.
7. *Department*: A department is a distinct functional unit within an organization, with its own structure and responsibilities.

DELIMITATIONS

- a. The study is delimited to patients admitted in PGIMS, Rohtak.
- b. The study is limited to sample size of 60.
- c. The data collection process will span a period of 7 weeks.

THEORETICAL & CONCEPTUAL FRAMEWORK

A conceptual framework is a network or structure of interconnected concepts that together provide a comprehensive understanding of a particular phenomenon. The concepts within a framework support and relate to one another, defining their respective phenomena and establishing a unique philosophical perspective for the framework.

Unlike theories, which are more formal and developed, a conceptual framework is less structured and focuses on abstract concepts assembled based on their relevance to a common theme. These frameworks use concepts as foundational elements and can guide research that contributes to theory

development. Conceptual models aim to represent reality while using minimalistic terms. A conceptual framework consists of a set of concepts and propositions that clarify the relationships between them. It plays a key role in advancing scientific understanding, making research findings meaningful and applicable. Additionally, a conceptual framework aids in communication and provides a systematic approach to nursing research, education, administration, and practice.

For this study, the conceptual framework is grounded in Ludwig Von Bertalanffy's General System Theory (1968) (Figure 1).

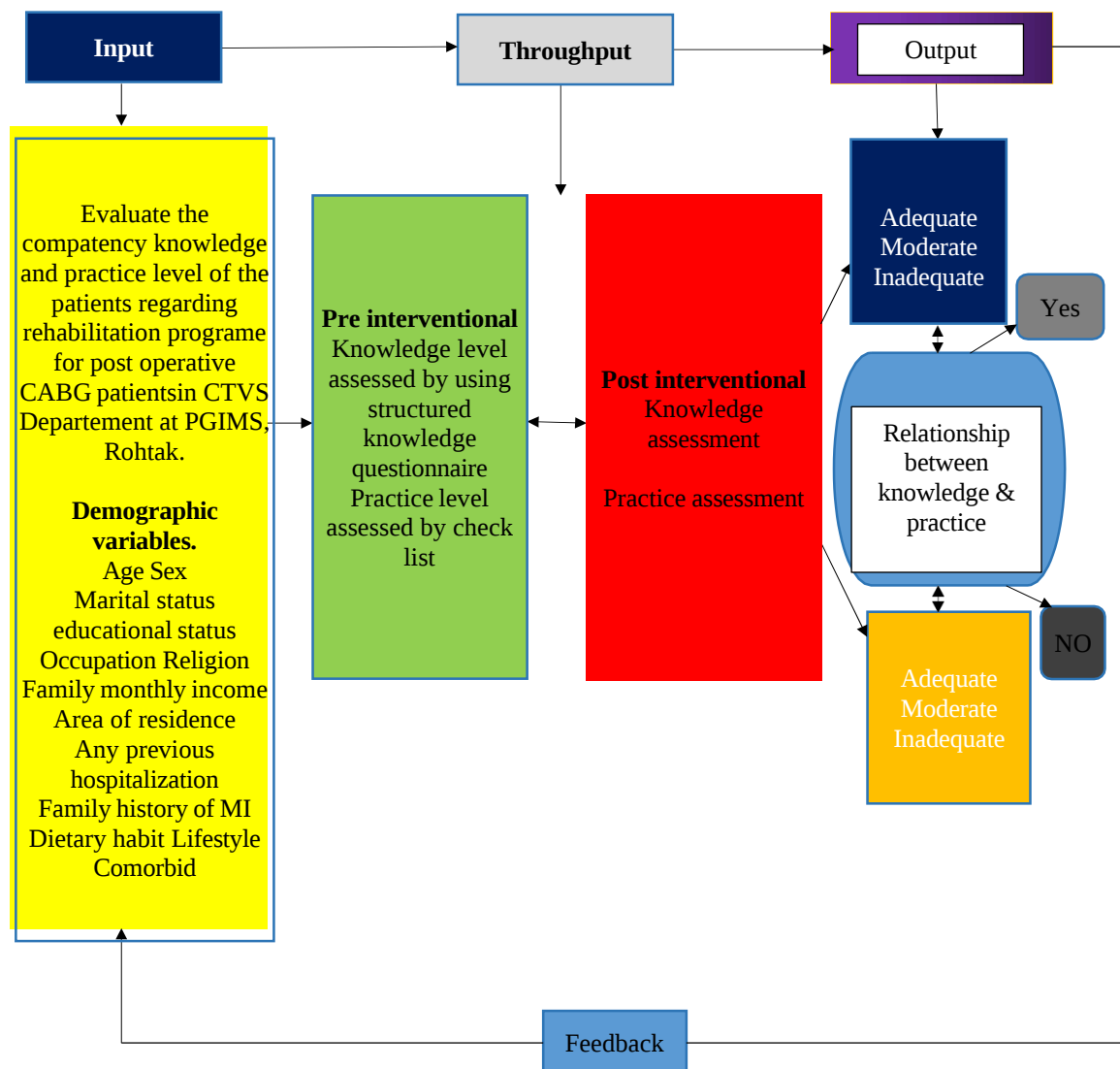


Figure 1. Conceptual Framework Based on General System Theory by Ludwig von Bertalanffy, 1968.

1. **Input:** Input is any form of energy of information, material or human that enters a system through its boundary. In the present study input refers to assessment knowledge and practice regarding rehabilitation program for post operative CABG patients in CTVs department of PGIMS Rohtak and assesses the effectiveness of planned teaching program.
2. **Throughput:** Throughput is the process that takes place between the input and output stages, facilitating the transformation of input into output in a manner that allows it to be effectively utilized by the system. In this study, throughput refers to the implementation of the planned teaching program.

3. *Output*: Output refers to energy, materials, or information that is released into the environment. Change is the feature of the process that is observable and measurable as output which should be different from that which is entered into the system, i.e., input. In the present study output refers to as the evaluation of target group for change in knowledge and practice regarding rehabilitation program for postoperative CABG patients in CTVs department of PGIMS, Rohtak after administration of planned teaching program.

In the present study self-structured questionnaire and observational checklist adopted to determine the knowledge and practice regarding rehabilitation program for postoperative CABG patients in CTVs department of PGIMS, Rohtak. The information thus acquired could be feedback on the system, which could help in the maintenance and improvement of the system.

4. *Feedback*: Feedback is the process through which information is collected at each stage of the system and used as input to guide and direct the evaluation process.

LITERATURE REVIEW

A literature review plays several key roles in the research process. Polit and Hungler (1999) define the process of reviewing research literature as involving the identification, selection, critical analysis, and written presentation of existing information related to the topic of interest. Conducting a literature review is a crucial part of research, offering a thorough analysis of recent findings in a specific area of focus. It contributes to the existing body of knowledge on a particular issue or may highlight a lack of information on the subject being studied.

According to Houser Janet (2008), review of literature guides in making decision about the research he or she is planning to undertake. The appropriate literature research provides a rich basis for establishing the importance of the study, verifying that the study has not already been performed by other researcher; clarifies the issues that are directly related to research questions reveals an appropriate theoretical framework.

The reviewed literature for the present study is organized as follows:

Elsayed ER, et al. conducted a quasi-experimental study to assess the impact of an educational intervention on the knowledge, compliance, and self-efficacy of post-CABG surgery patients at the Cardio-Thoracic Surgery outpatient clinic in Suez Canal University Hospitals. A total of 64 patients participated in the study, with purposive sampling used to select participants. Data was collected using two tools: a structured interview questionnaire and an assessment of self-efficacy for post-CABG patients. The study found that prior to the educational intervention, all participants had insufficient knowledge about their condition and their treatment. However, after the intervention, there was a noticeable improvement in patients' knowledge, and self-efficacy levels were significantly higher. Overall, the study concluded that both patients' knowledge and self-efficacy improved following the educational intervention [5].

Saboula NE, et al. conducted a quasi-experimental study to evaluate the impact of a self-management educational program on the clinical outcomes of post-CABG surgery patients at Tanta Main University Hospital in Gharbia Governorate. The study took place in the cardiothoracic surgery department and included follow-up visits at the hospital's outpatient clinics. A total of 40 patients participated, and five tools were used to collect data:

- Tool I (Bio-socio-demographic and physical assessment),
- Tool II (CABG surgery knowledge assessment),
- Tool III (Visual Numeric Pain Scale),
- Tool IV (Nutritional assessment), and
- Tool V (Functional assessment).

The study found significant differences between the study and control groups after the CABG self-management program, particularly in the areas of knowledge, nutrition, and functional abilities. The results concluded that participation in the self-management program and early post-surgery exercises significantly improved patients' clinical outcomes, including pain intensity, nutritional status, and functional abilities [7].

Rathi M conducted a quasi-experimental study to evaluate the effectiveness of a home-based nursing intervention on the knowledge, daily living activities, and pain levels of patients following CABG surgery at the outpatient clinics of Mahalla Cardiac Center in Mahalla City, Al-Gharbia Governorate, Egypt. The study included 140 patients, with purposive sampling used for participant selection. Data was collected using a structured interview questionnaire, which included socio-demographic details, medical history, knowledge assessment, and the Barthel Index Scale (BIS) for measuring daily living activities. After the implementation of the home-based nursing intervention, the study found a significant improvement in the total knowledge of the study group compared to the control group. Pain levels and daily living activities also showed substantial improvement in the study group. The results suggest that home-based nursing interventions were effective in enhancing patients' knowledge, reducing pain, and improving their daily living activities following CABG surgery [8].

Mohamed F, et al. (2019) conducted a quasi-experimental study to assess the impact of implementing a discharge plan on patient outcomes following CABG surgery in the Cardiothoracic Surgery department, with follow-up at the Outpatient Cardiothoracic Surgical Clinics at Zagazig University Hospital. A purposive sample of 60 patients was included in the study. Data were collected using four tools: a knowledge assessment questionnaire, a cardiac symptoms survey, the Exercise of Self-Care Agency Scale, and laboratory tests for lipid profiles. The study found that the mean scores for knowledge, severity of post-operative symptoms, and self-care ability at one month and three months post-surgery were significantly higher in the study group compared to the control group ($p < 0.001$). Additionally, there was a statistically significant difference in the lipid profile variables between the two groups. The results indicated that implementing a discharge plan effectively improved patients' clinical outcomes, including knowledge, post-operative symptom severity, self-care ability, and lipid profile [2].

Olsson LE, et al. conducted a randomized controlled trial to evaluate patients' experiences while participating in the trial and to gather staff perspectives on both the patients' experiences and the intervention. A purposive sample of 19 patients was interviewed, and the transcripts were shared with the staff during focus group discussions. These discussions centered around what the staff learned from the patients' stories and their own experiences with the program. The patients expressed appreciation for the support from nurses but felt that communication and physical assessments could be improved. There was variation in how well the patients understood the program and, in their motivation, to enhance their health. Similarly, the staff showed differences in their approach to preparing patients for surgery. External factors, such as the length of time on the waiting list and the increasing role of local rehabilitation services were found to influence the effectiveness of the intervention [9].

Ahmed AA, et al. conducted a quasi-experimental study to evaluate the impact of a cardiac rehabilitation exercise protocol on reducing post-operative cardiopulmonary complications in patients undergoing open heart surgery. A purposive sample of 60 male and female patients participated in the study, which was conducted at a hospital in New Minia City. Three tools were used to collect data:

- *Tool I:* Patient Assessment Sheet,
- *Tool II:* Cardiac Rehabilitation Exercise Checklist, and
- *Tool III:* Cardiopulmonary Complications Assessment Sheet.

The results revealed that the study group experienced a lower incidence of cardiac and respiratory complications (30% and 3.3%, respectively) compared to the control group (46.7% and 26.7%). Statistically significant differences were observed between the two groups. The study concluded that the cardiac rehabilitation exercise protocol, which included deep breathing exercises, the use of an incentive spirometer, coughing techniques, and early ambulation, significantly helped reduce the risk of post-operative cardiopulmonary complications [10].

Bhutiani E, et al. conducted the randomized control trial study to examine the utilization of specific inpatient cardiac rehabilitation and early mobilization protocols following CABG surgery, compare protocol designs, and assess the effect of protocol implementation on post-CABG outcomes. The initial literature search yielded 821 articles. Eighteen articles remained after application of the exclusionary criteria as cited previously. Twelve publications were identified that assessed mobilization protocols in patients during the immediate post-operative period following extubating after undergoing cardiac surgery requiring median sternotomy. Study designs and outcomes among the twelve selected studies were evaluated and compared [11].

Ngaage D, et al. conducted a randomized controlled trial to assess the feasibility of initiating outpatient reviews and starting cardiac rehabilitation (CR) earlier at Hull University Teaching Hospitals NHS Trust and South Tees Hospitals NHS Foundation Trust in the UK. A total of 70 patients participated in the study. This multicenter, randomized controlled, open feasibility trial compared two approaches: a control arm with postoperative outpatient reviews occurring 6 weeks after hospital discharge, followed by CR starting at 8 weeks, and an intervention arm with outpatient reviews 3 weeks after discharge, followed by CR starting at 4 weeks. The study aimed to recruit 100 eligible patients, aged 18–80, who had undergone either elective or urgent cardiac surgery involving a full median sternotomy, over a 7-month period at two centers. Feasibility was measured by consent, recruitment, retention rates, and attendance at appointments and CR sessions. Qualitative interviews with trial participants and staff were conducted to explore study processes and the acceptability of the intervention. These findings will be combined with the feasibility trial outcomes to guide the design of a future full-scale randomized controlled trial [12].

Colella TJ, et al. conducted the randomized controlled trial obtained from each Hospital Research Ethics Board as well as the Conjoint Health Research Ethics Board at the University of Calgary. There were 185 patients who were taken in the study. A randomized controlled trial was conducted with 185 men who had undergone CABG surgery. The participants were randomly assigned before hospital discharge. The intervention group received telephone-based peer support, consisting of weekly calls from a peer volunteer for 6 weeks, starting within 3–4 days after discharge. While a significant difference was found in depression scores at discharge, there were no notable changes in depression scores between the groups at 6 weeks ($p = 0.08$), 12 weeks ($p = 0.49$), or overtime ($p = 0.51$). Additionally, there were no significant differences in perceived social support scores over time ($p = 0.94$). However, in 12 weeks, the intervention group showed a significantly lower rate of health services utilization, including visits to family physicians ($p = 0.02$) and emergency rooms ($p = 0.04$). The findings suggest that healthcare providers should continue exploring new interventions to improve social support and reduce depression in cardiac patients [13].

Fredericks SM, et al. conducted a randomized pre-test-post-test clinical trial to determine the optimal timing (1–2 days before discharge versus 1–2 days after discharge) for delivering individualized education to patients who had undergone CABG surgery. The results showed no statistically significant differences between the experimental and control groups regarding their knowledge of self-care behaviors, their actual performance of these behaviors, or their symptom experiences. The study suggested that the nature and method of delivering the individualized intervention likely contributed to improvements in knowledge, self-care, and symptom management over time within both groups. Significant correlations were found between anxiety and all outcomes of interest, as well as between knowledge and self-care, and self-care and symptom experiences [14].

Nasrawi D, et al. conducted a review to explore the delivery, barriers, and facilitators of patient participation in inpatient cardiac rehabilitation (ICR) programs after cardiac surgery. This integrative review followed Whittemore and Knafl's methodology, which involved database searches, data evaluation, integration, and presentation of results. The databases searched included Medline, CINAHL Complete, PsycINFO, Cochrane Library, and Web of Science, with publications ranging from 2000 to 2021. The studies selected focused on Phase 1 cardiac rehabilitation following cardiac surgery. The quality of the included studies was assessed using the Mixed Method Appraisal Tool (2018), and textual data were analyzed using inductive content analysis [15].

Out of 607 articles screened based on inclusion and exclusion criteria, five studies were included and evaluated. The categories identified in the review included:

- i. ICR programs that used a multidisciplinary approach starting in the early postoperative stage;
- ii. ICR programs that incorporated multiple components delivered through an individualized approach; and
- iii. enablers and barriers to patient participation in ICR. Enablers to participate included religious faith and family support, while barriers included inconsistent referral pathways for cardiac rehabilitation and a lack of connection between the program and patients' needs and experiences.

Shuldham CM, et al. conducted a randomized controlled trial to assess the impact of pre-operative education on the postoperative recovery of patients undergoing surgery, with a focus on cardiac surgery. A total of 356 patients were randomized into the study, with 188 assigned to the experimental group and 168 to the control group. The experimental group received a day of education provided by a multidisciplinary team before their surgery, while the control group received the usual care, which included education upon admission and throughout their hospital stay. Measurements were taken at the start of the study, before randomization, and at 3 days, 6 weeks, 3 months, and 6 months after surgery. Various tools were used for assessment, including the SF-36 Health Status questionnaire, the Hospital Anxiety and Depression scale, the General Well-Being questionnaire, and a pain measurement tool [16].

Data analysis followed the intention-to-treat principle and utilized non-parametric statistics. No significant differences were found between the experimental and control groups in primary outcomes, such as anxiety ($P = 0.09$), pain ($P = 0.48$), depression ($P = 0.62$), and well-being measures (e.g., "worn out" $P = 0.11$; "tense and uptight" $P = 0.29$) at 6 months after surgery. Similarly, no differences were observed 3 days post-surgery. However, a significant difference was found in the length of hospital stay ($P = 0.01$), with the experimental group having a longer stay. These results contrast with much of the existing research and suggest that pre-operative education, in this form, does not provide benefits and may lead to an increased hospital stay. Future studies could explore alternative educational methods, such as ongoing education through CD-ROMs or the Internet, to assess their impact on recovery.

Kalogianni A, et al. conducted a quasi-experimental trial to assess the impact of preoperative education on patient satisfaction and postoperative outcomes in those undergoing cardiac surgery. The study included 69 patients, who were randomly divided into an intervention group (34 patients) and a control group (35 patients). The intervention group received both written and verbal education, delivered through patient-centered communication by specially trained nurses. Patient satisfaction, postoperative complications, and length of hospital stay (LOS) were measured [17].

The results indicated that the intervention group had significantly higher satisfaction scores across all dimensions ($p < 0.001$). There was no significant difference in ICU complications ($p = 0.150$) between the groups. However, the intervention group showed a lower total complication rate ($p = 0.028$) and a lower proportion of arrhythmia cases ($p = 0.011$). The median ICU LOS was shorter in the intervention group ($p = 0.035$), but no significant difference was found in the median overall

hospital LOS between the groups. The study concluded that nurse-led preoperative education improved patient satisfaction and potentially contributed to shorter ICU stays and better control of complications following cardiac surgery [23].

Cebeci F, et al. conducted a prospective quasi-experimental study to examine the effects of discharge training and counseling on the self-care abilities and post-discharge issues of patients who underwent CABG surgery. A total of 57 patients participated in the study, with 57 in the intervention group and 52 in the control group. The intervention group received discharge training and counseling from the researcher starting on the day of hospitalization, tailored to their individual knowledge needs, and they were provided with a booklet designed for training. The control group received routine care from a nurse [18].

Data were collected using a Personal Information Form and the Self-Care Agency Scale. The results revealed that the intervention group had higher mean self-care scores compared to the control group and encountered fewer post-discharge issues. The study concluded that the discharge training and counseling provided to the intervention group had a positive impact on their self-care abilities and helped reduce the problems they faced after discharge [24].

Ronco M, et al. conducted a systematic review to examine preoperative educational interventions, including their content and timing, and their impact on postoperative outcomes. The review focused on studies published between 2004 and 2010 that evaluated the effectiveness of educational interventions for patients undergoing major surgery. A search was conducted across PubMed, CINAHL, and EBM databases, including the Cochrane Central Register of Controlled Trials. Only randomized controlled trials or clinical trials with pre- and post-test evaluations, where educational interventions were delivered by nurses preoperatively and outcomes were assessed postoperatively, were included. A total of 19 studies involving 3,944 patients were reviewed, with 12 of these being randomized controlled trials [19].

The interventions consisted of verbal education, written/visual education, or a combination of both, with varying content. Commonly evaluated outcomes included anxiety, knowledge, pain, and length of hospital stay. The review found that objective knowledge (what patients retained from the education) was the only outcome positively influenced by the educational interventions. The review highlighted current trends in preoperative education, including scheduling sessions early, increasing message exposure through multiple interventions or reinforcements, and focusing content on postoperative management. It also emphasized the measurement of outcomes related to cognitive, experiential, and biophysiological aspects of patients. The clinical and research implications of these findings were discussed.

Lin HH, et al. conducted the prospective quasi-experimental study to the behavioral and clinical impact of a therapeutic lifestyle-change intervention for cardiac risk factors in patients after coronary artery bypass graft surgery. Total 73 patients were taken in the study. The results indicated that both groups experienced changes in cigarette smoking, blood pressure control, physical activity frequency, and dietary habits. Both groups showed significant improvements in blood lipid profiles and fasting glucose levels from pre-surgery to one month after discharge, with the experimental group demonstrating even greater improvements ($p < 0.05$). Similar improvements were observed in cigarette smoking and dietary behavior. Three months post-discharge, the experimental group exhibited significantly better blood pressure control and higher levels of physical activity compared to the control group. Integrating a therapeutic lifestyle-change intervention into a postoperative cardiac rehabilitation program effectively altered cardiac risk factors and may enhance postoperative recovery and long-term prognosis [20].

Nawaz R, et al. conducted the quasi-experimental study determining the effects of nursing interventions on self-care and wound management among post-coronary artery bypass

grafting patients. A total of 36 patients were taken in the study. There were notable improvements in various aspects of care, with Physical Care showing an increase from a pre-intervention average score of 51.61 (SD = 1.82) to 61.97 (SD = 2.55), witnessing a mean difference of -10.36 (95% CI: -10.79 to -9.93 , $p = 0.000$). Emotional care experienced a surge from 31.61 (SD = 1.82) to 38.72 (SD = 2.34), resulting in a mean difference of -7.11 (95% CI: -7.42 to -6.80 , $p = 0.000$). Spiritual care enhanced from 43.64 (SD = 1.82) to 50.94 (SD = 2.70) with a mean difference of -7.31 (95% CI: -7.78 to -6.84 , $p = 0.000$). Workplace Self-Care marked an increase from 36.61 (SD = 1.82) to 45.06 (SD = 2.03), having a mean difference of -8.44 (95% CI: -8.90 to -7.99 , $p = 0.000$). Balance scores bettered from 5.06 (SD = 0.98) to 7.58 (SD = 0.73), showing a mean difference of -2.53 (95% CI: -2.70 to -2.36 , $p = 0.000$). In contrast, Psychological Care saw a decline from 51.11 (SD = 2.38) to 41.61 (SD = 1.82) with a mean difference of 9.50 (95% CI: 9.06 to 9.94 , $p = 0.000$). The nursing interventions had a positive impact on various aspects of self-care, contributing to the overall recovery of post-CABG patients. However, the decline in psychological care scores highlights the need for a more comprehensive approach that balances all areas of care, including psychological support [21].

Matysek M, et al. conducted a study using a self-designed 56-item questionnaire to assess the impact of Coronary Artery Bypass Grafting (CABG) on lifestyle adherence and knowledge about coronary artery disease (CAD), comparing it with patients who had undergone Percutaneous Coronary Intervention (PCI). The study included 155 patients. The sample was divided into two groups: patients with a history of PCI (68%) and patients with prior CABG (32%), both groups having undergone their procedures at least 8 weeks earlier. The results indicated that the prior-CABG group had a higher knowledge score compared to the prior-PCI group, with the median scores being 22 (19–25) vs. 20 (12–24), respectively ($p = 0.01$). Similarly, the level of risk control was higher in the prior-CABG group (7 [6–8] vs. 6 [4–7]; $p = 0.002$). The study concluded that the method of treatment for CAD may influence the implementation of lifestyle modifications post-procedure, and emphasized the need for increased focus on secondary prevention, particularly in PCI patients [22].

El Baz N, et al. conducted a longitudinal quasi-experimental study using a pre-test/post-test design to compare the effects of clinical pathways (CP) versus conventional care on health-related quality of life (HRQoL), depression, and anxiety in patients following coronary artery bypass graft (CABG) surgery. The study found that implementing a CP significantly reduced hospital delays, from an average of 2.50 (7.19) days to 1.80 (1.60) days ($p = 0.002$). However, patients in the conventional-care group showed greater improvements in HRQoL compared to those in the CP group. Specifically, conventional-care patients had moderate effect sizes (ES) ranging from 0.50 to 0.80, whereas CP patients exhibited small effect sizes (ES 0.20 to 0.50), except for physical functioning and physical component summary domains where conventional care showed large effect sizes (>0.80). The study concluded that the goals of clinical pathways, which include reducing length of stay and costs while maintaining quality of care and improving patient outcomes, were not fully achieved in the CABG pathway. The authors recommended that future CP designs should consider patient characteristics, risk factors, and physiological conditions for better outcomes [23].

Ghavami H, et al. conducted a randomized controlled clinical trial to evaluate the effects of a precision early ambulation (PEA) program in cardiac rehabilitation. The study involved 178 patients who were randomly assigned to either the PEA group or a routine ambulation (control) group. The PEA regimen was tailored based on each patient's age-predicted maximal heart rate (APMHR) and maximal oxygen uptake (VO_{2max}). The primary outcome was the postoperative length of hospital stay (PLOS), while secondary outcomes included 90-day mortality, early discharge rates, laboratory test results, ICU stay length, occurrence of multiple organ complications, and post-traumatic stress disorder (PTSD) incidence. Ambulation outcomes were also recorded. The PEA group demonstrated better results in terms of the time to first bowel movement, partial pressure of oxygen (O_2), and PTSD scores compared to the control group. Additionally, participants in the PEA group walked significantly longer distances on day 3 (76.12 ± 29.02 meters) compared to those in the control group (56.80 ± 24.40 meters), with a statistically significant difference ($P < 0.001$) [24].

RESEARCH METHODOLOGY

The authors describe research methodology as the strategy or framework used by the researcher to approach problem identification or problem-solving. Polit and Beck (2004) define methodology as the processes used to collect, organize, and analyze data. Bowling (2002) further explains that methodology encompasses the overall structure of a research study, including sample size and selection methods, techniques for data collection, and procedures for data analysis.

This article outlines the methodology used in this study to assess the effects of nurse-led intervention on knowledge and practices related to the rehabilitation program for post-operative CABG patients in the Cardiothoracic Vascular Surgery (CTVS) department at Pt. B.D. Sharma PGIMS Rohtak. Research methodology provides a systematic approach for collecting valid and reliable data. It involves studying the processes and methods used to conduct research in a structured and scientific manner, making methodology an essential component of any research. This section describes the various steps followed in the study, including the research approach, design, setting, target population, sample selection criteria, development of research tools, content validity, tool reliability, pilot study, data collection procedures, challenges encountered, ethical considerations, and data analysis plan (Figure 2).

RESEARCH APPROACH

According to Polit Hungler, research approach refers to the overall plan for obtaining answer to the research questions and for testing hypothesis. It tells the researcher as to what data is to be collected, how to analyze the data and how to draw conclusions. The research approach serves as the method for testing hypotheses or addressing research questions. It encompasses a plan, structure, and strategy. For this study, a quantitative approach was chosen as it was deemed the most suitable for achieving the study's objectives. In quantitative research, data is gathered in numerical form and analyzed using both descriptive and inferential statistical techniques.

RESEARCH DESIGN

Research design is a framework that outlines the methods, timing, and location for data collection and analysis. The design chosen must align with the study's objectives. It refers to the structure of a scientific investigation that directs how data will be gathered and analyzed. The choice of research design is influenced by the study's goals, the experimental variables to be manipulated, and the conditions under which the experiment will take place. According to Suresh Kumar K, research design is the investigator's overall strategy for answering research questions and testing hypotheses. For this study, a pre-experimental design (one group pre-test and post-test) was used. The design implemented for this study is represented in a schematic format (Table 1).

Table 1. A pre-experimental design Format.

Subject	Pretest	Treatment	Posttest
Postoperative CABG patient	O ₁	X	O ₂

- O₁: Assessment on and knowledge practice of postoperative CABG patients on CTVS department.
- X: Nurse led intervention on postoperative CABG patient in CTVS department.
- O₂: Evaluation of knowledge and practice levels following the nurse-led intervention.

X₁: SETTING FOR THE STUDY

Polit and Hungler (1999) define "setting" as the physical environment and circumstances where data collection occurs in a study. Choosing the right setting is crucial because it can impact participants' behavior, emotions, and how they react during the study.

The chosen setting for this study is the CTVS Department at PGIMS, Rohtak. The rationale for selecting the PGIMS, Rohtak is:

- Feasibility of the subjects.
- Feasibility of time and easy access.

POPULATION

A population is an entire set of individuals having some common characteristics. Defining a population for a research study is essential because it helps identify the group to which the study's findings apply. The researcher must clearly specify the criteria for inclusion. Researchers usually take samples from an accessible population and hope to generalize to a target population.

The population for the present study was clients who were in CTVS Department at PGIMS, Rohtak. In the present study, the target population was patients diagnosed with CABG. The accessible population was the Post operative CABG patients who are admitted in CTVS department of PGIMS, Rohtak.

SAMPLING TECHNIQUE

Sampling is the process of selecting a representative group from the population being studied. The choice of sampling method depends on factors, such as the nature of the problem, the variables involved, the type of research, and the number of units to be sampled. A sample is a smaller segment of the population chosen to participate in the study. Sampling aims to select a portion that reflects the entire population.

In this study, a nonprobability convenient sampling technique was used. All patients who were available during the study period were included.

SAMPLING CRITERIA

The samples were chosen according to the specified inclusion and exclusion criteria.

Inclusion Criteria

- Post-operative CABG patients in the CTVS department of PGIMS, Rohtak, will be included in the study.
- Post-operative CABG patients in the CTVS department of PGIMS, Rohtak, who consent to participate in the study.
- Post-operative CABG patients in the CTVS department are available during the data collection period.

Exclusion Criteria

The study excludes the clients

- Post op CABG patient with poor prognosis.

VARIABLES

A variable, as the name suggests, is something that changes. It refers to a group, organism, or situation that can assume different values. Variables are attributes of a person or object that can fluctuate or take on various values. They represent the qualities, properties, or characteristics of a person or situation that change or vary. In this present study the variables used were:

- *Dependent variables:* knowledge and practice regarding rehabilitation program for postoperative CABG patients.
- *Independent variables:* Nurse led interventions.
- *Demographic variable:* Age, sex, occupation, weight, postoperative day, nutritional status.

DATA COLLECTION TOOLS AND TECHNIQUES

A key element of any research is gathering relevant information, which supplies the essential data for the study. The chosen instrument for research should be the most effective tool for collecting data that will lead to conclusions relevant to the study.

TOOLS OF DATA COLLECTION

The tool is selected after:

1. Extensive review of research and non-research literature related to the topic of study.
2. Consultation with the guide and co-guide.
3. Taking the research's professional experience into consideration.

In the present study the following Tools are used for Data Collection:

1. Socio-demographic profile.
2. Self-Structured Knowledge Questionnaire.
3. Structured interview schedule knowledge on practice regarding cardiac rehabilitation (Checklist).

CONTENT VALIDITY OF TOOL

An important aspect of any research is the collection of pertinent information, which provides the critical data needed for the study. The selected instrument for the research should be the most suitable tool for gathering data that will support conclusions related to the study.

The tool validity was obtained from experts in the field of Critical care, College of Nursing, Pt BD Sharma, PGIMS, Rohtak.

RELIABILITY

Reliability refers to the level of consistency and accuracy with which an instrument measures the attribute it is intended to assess. The test was conducted to establish reliability and assess the clarity of the language. After validation, the tool was tested for its reliability.

For testing the reliability of tool, a checklist for assessing patency of central venous catheter was done out to evaluate the impact of nurse-led intervention on knowledge and practice regarding rehabilitation program for postoperative CABG patient subjected to test for its reliability. In pilot study, the patency of 10 postoperative CABG patients was assessed in CTVS department of Pt. B.D. Sharma, Rohtak. The self-structured questionnaire was administered to the samples. The reliability was calculated by using t-test.

ETHICAL APPROVAL

The research was approved by the institutional ethical committee. The study was well within ethical norms and ethically justified. A formal introduction was given to the participants; and a written and verbally informed consent was taken from all subjects for the willingness to participate in the study. The confidentiality of the subjects and their response were assured.

PILOT STUDY

A pilot study is a small-scale preliminary investigation that mirrors the main study, intended to help the researcher identify and address potential issues before the larger research project. The purpose of the pilot study was to assess the feasibility of the study and the clarity of the tool's language. It was conducted with 10% of the total sample, selected using a convenience sampling method. The pilot study was conducted from 2-1-2024 to 10-1-2024 in CTVS Department of PGIMS, Rohtak (Haryana). The written permission to conduct the pilot study was obtained from HOD of CTVS department, PGIMS, Rohtak. The data was collected from 10 patients who had postoperative CABG patients which was 10% of total study subjects by using non purposive convenience sampling technique was used. Confidentiality was guaranteed to all participants in the study. Data was collected using designated tools. The findings of the data revealed that study was feasible and acceptable, and some minor modification was made as per discussion with the guide or CO-guide.

PROCEDURE FOR FINAL DATA COLLECTION

1. Final study was conducted from 25-01-2024 to 21-03-2024.
2. Prior formal permission was obtained from the HOD of CTVS department, Pt. B.D. Sharma, PGIMS, Rohtak.
3. Informed consent was taken from subjects.
4. The purpose of study was explained prior.
5. Administered self-structured questionnaire to collect demographic data to assess the knowledge and practice of postoperative CABG patients.

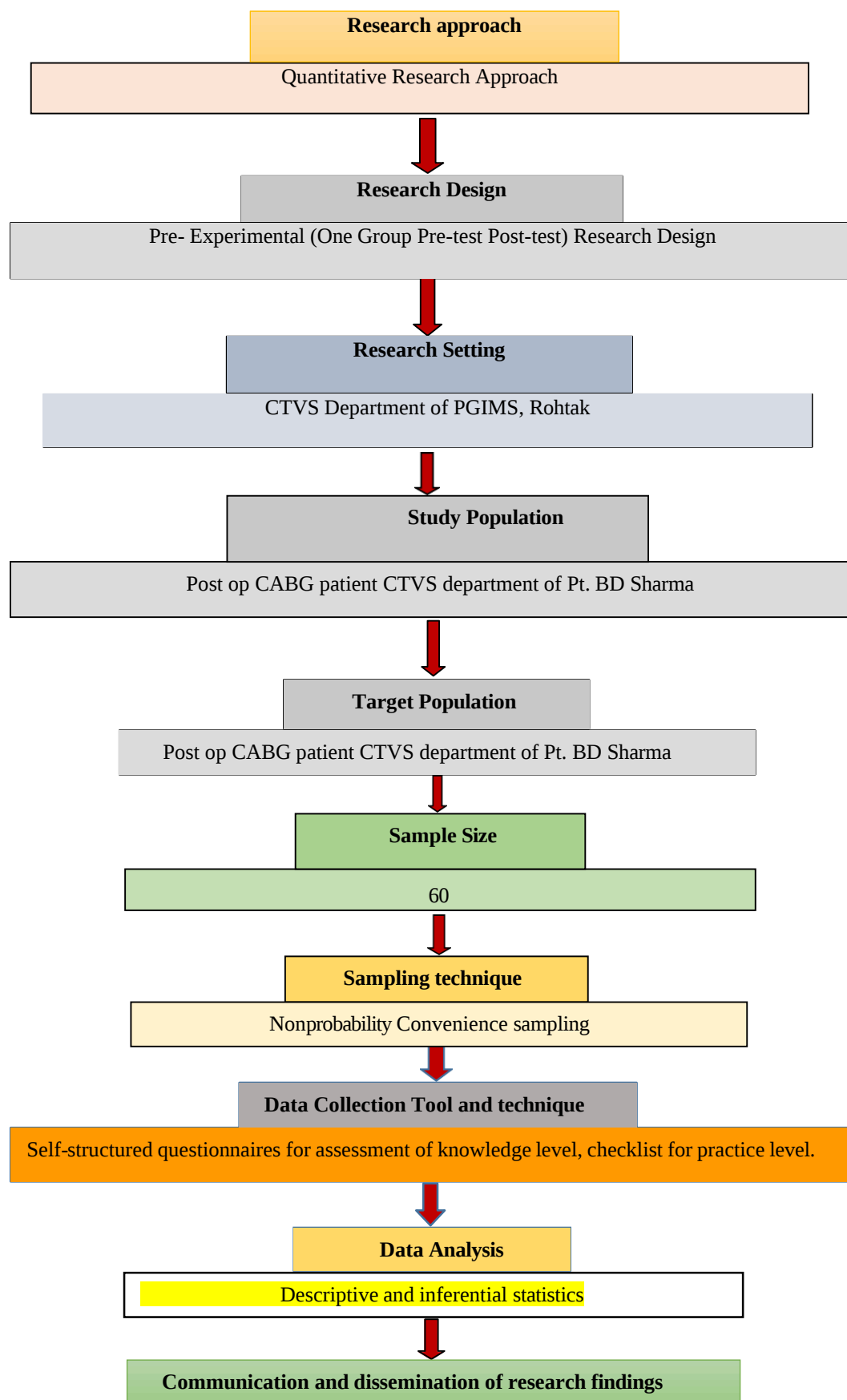


Figure 2. Schematic Representation of Research Methodology.

PLAN FOR DATA ANALYSIS:

The Data collection was organized, tabulated, and analyzed according to the objectives of the study. Descriptive and inferential statistics were used for the data analysis with the use of a statistical program – IBM’s Statistical Package for the Social Sciences (SPSS). A statistical significance of 0.05 ($p < 0.05$) was adopted throughout the study.

The data collected was analyzed based on the study’s objectives using both descriptive and inferential statistics:

- a. Data was organized in a master sheet.
- b. Demographic characteristics of the samples were described using frequency and percentage.
- c. The mean and standard deviation of the tool were calculated.
- d. A t-test was employed to compare the knowledge and practices of post-CABG patients. The findings were presented in tables and graphs.

ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of the data collected during the study to evaluate nurse led intervention on knowledge and practice regarding rehabilitation program for postoperative CABG patients.

Analysis is to organize the data in the desired format and the most understandable way. It involves the statistical procedure that enables the investigator to organize, interpret, analysis, summarize, evaluate and communication of data in numerical form. Kerlinger (1983) defines analysis as the categorizing, ordering, manipulating and summarizing of the data to obtain answers to research questions. The purpose of analysis is to simplify the data into an understandable format, allowing for the examination and testing of the relationship to the research problem.

Abdellah and Levine (1979) suggested that interpreting tabulated data can reveal the true significance of a study’s findings. Polit and Hungler (1999) noted that data analysis involves the systematic organization and synthesis of research data, as well as testing research hypotheses using that data.

In this study, the analysis and interpretation of data were carried out using data gathered from standardized questionnaires. Descriptive and inferential statistics were employed to analyze the data, which was processed using SPSS software.

ORGANIZATION OF THE STUDY FINDINGS:

Raw data was collected and entered in the master sheet for the statistical analysis. The data was interpreted using descriptive and inferential statistics and displayed in tables and diagrams.

The data finding have been organized and presented under the following sections:

- *Section A:* The samples were described based on demographic characteristics using frequency and percentage.
- *Section B:* To assess the pretest knowledge and practice regarding rehabilitation program among postoperative CABG patient in CTVS department.
- *Section C:* To evaluate the nurse led program on knowledge and practice regarding rehabilitation program among postoperative CABG patients in CTVS department.
- *Section D:* To assess the relationship between posttest knowledge and practice and the selected demographic variables of CABG patients in the CTVS department.

Section A: Description of Samples According to Demographic Characteristics by Frequency and Percentage

This part deals with the analysis of postoperative CABG patient’s demographic characteristics. These demographic variables are age, gender, education, occupation, religion, family income per

month, residence, previous hospitalization, lifestyle, comorbid, and family history. Tabulation is done for the sociodemographic data and frequency and percentage method is used for the description of the sample characteristics (Table 3).

Table 3. Demographic and lifestyle profile of the patients' demographic and lifestyle profile of the patients.

Profile	Demographic Variables	Frequency	Percentage
Sex	Male	40	66.7
	Female	20	33.3
Marital Status	Married	49	81.7
	Unmarried	9	15.0
	Divorce	2	3.3
Educational Status	Illiterate	9	15
	Primary School	33	55
	Higher Secondary	16	26.7
	Graduate	2	3.3
Occupation	Private	16	26.7
	Govt	14	23.3
	Self-employee	6	10.0
	Unemployed/Housewife	10	16.7
	Farmer	14	23.3
Religion	Hindu	47	78.3
	Christian	5	8.3
	Muslim	8	13.3
Family Monthly Income	10000–20000	21	35.0
	21000–30000	20	33.3
	31000–40000	12	20.0
	Above 40000	7	11.7
Area of Residence	Rural	30	50.0
	Urban	21	35.0
	Slum	9	15.0
Previous Hospitalization	Yes	36	60.0
	No	24	40.0
Family History	Yes	33	55.0
	No	27	45.0
Lifestyle	Smoking	4	6.7
	Alcoholic	25	41.7
	Smoking/Alcoholic	23	38.3
	Non-Smoking/Alcoholic	8	13.3
Comorbid	Hypertension	30	50.0
	Diabetes Mellitus	22	36.7
	Hypertension + Diabetes Mellitus	6	10.0
	Thyroids	2	3.3

Figure 3 shows 66.7% of the patients are male, while 33.3% are female. This suggests that males are more prominently represented in the study.

Figure 4 shows most patients (81.7%) are married, while a smaller proportion are unmarried (15.0%) or divorced (3.3%).

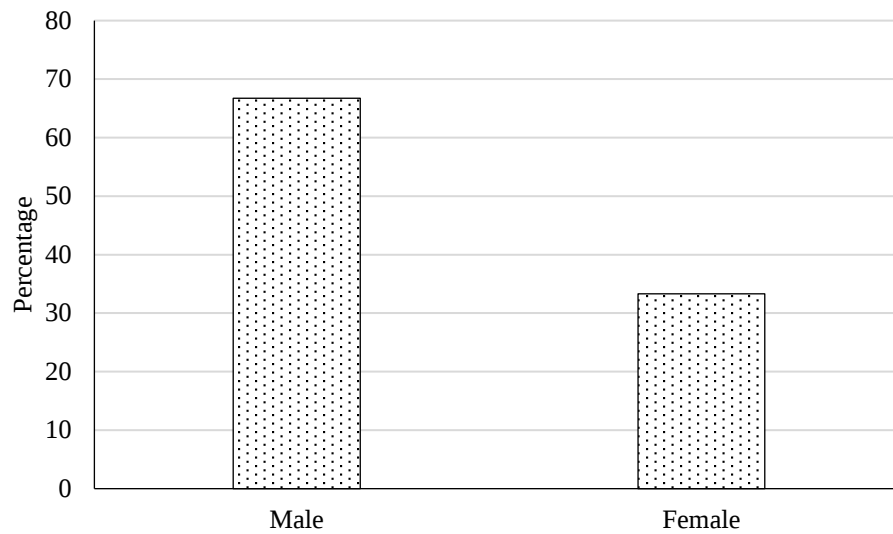


Figure 3. Bar chart of Gender of Patients.



Figure 4. Bar chart of Marital Status of Patients.

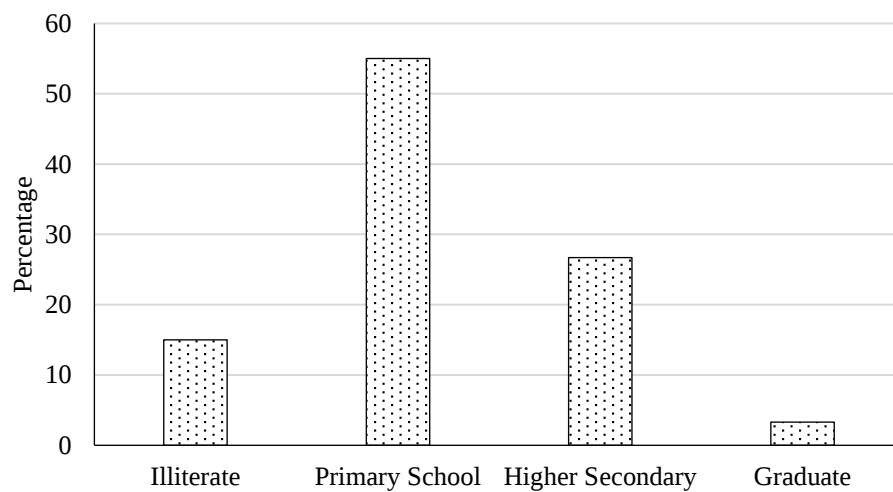


Figure 5. Bar chart of Educational Status of Patients.

Figure 5 shows Most patients have either attended primary school (55.0%) or achieved a higher secondary education (26.7%). A smaller proportion are either illiterate (15.0%) or graduates (3.3%).

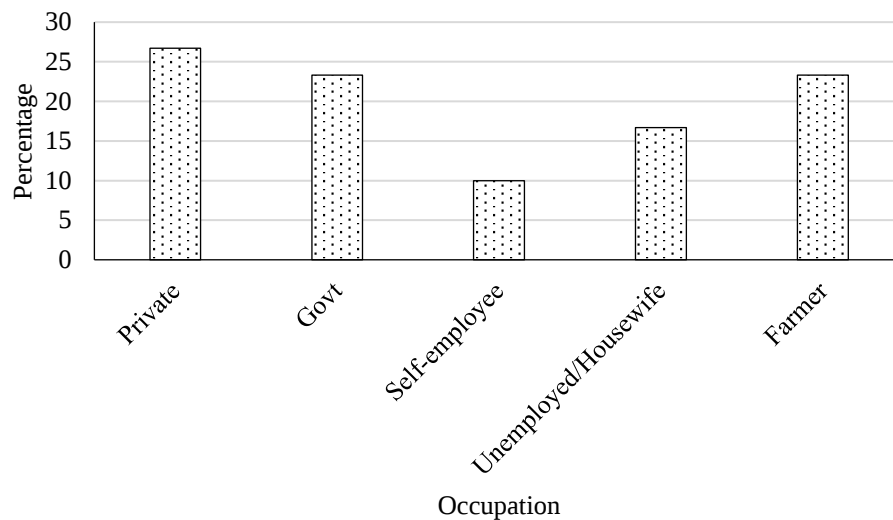


Figure 6. Bar chart of Occupation of Patients.

Patients have diverse occupational backgrounds, with the highest proportions being employed in the private sector (26.7%) or as farmers (23.3%). Other occupations include government employment (23.3%), self-employment (10.0%), and unemployment/housewifery (16.7%) (Figure 6).

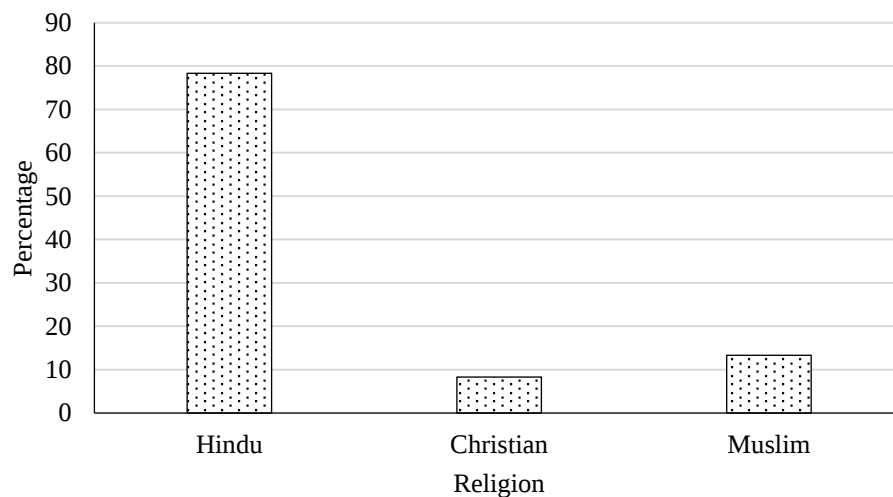


Figure 7. Bar chart of Religion of Patients.

Figure 7 shows the majority of patients identify as Hindu (78.3%), followed by Muslim (13.3%) and Christian (8.3%).

Participants' family monthly incomes vary, with the highest proportion falling in the 10000–20000 range (35.0%), followed closely by the 21000–30000 range (33.3%). A smaller percentage fall into the higher income brackets (Figure 8).

Half of the patients reside in rural areas (50.0%), while 35.0% reside in urban areas and 15.0% reside in slum areas (Figure 9).

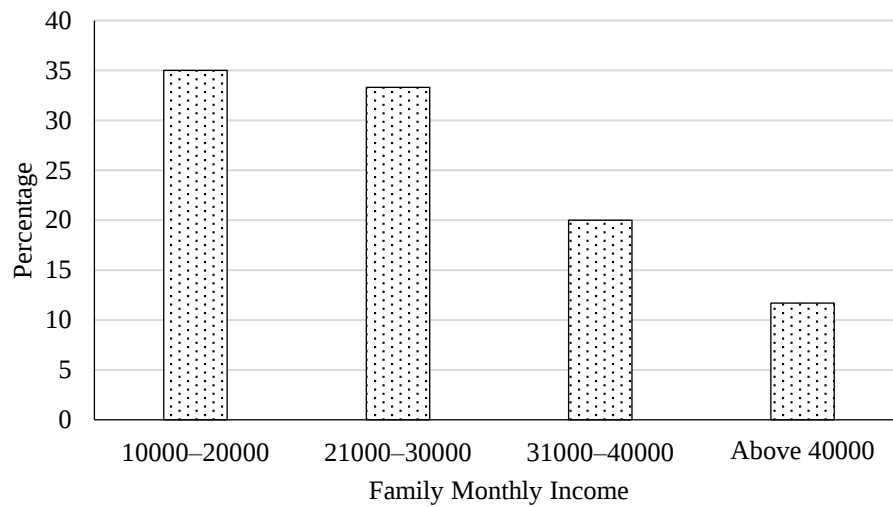


Figure 8. Bar chart of Family Monthly Income of Patients.

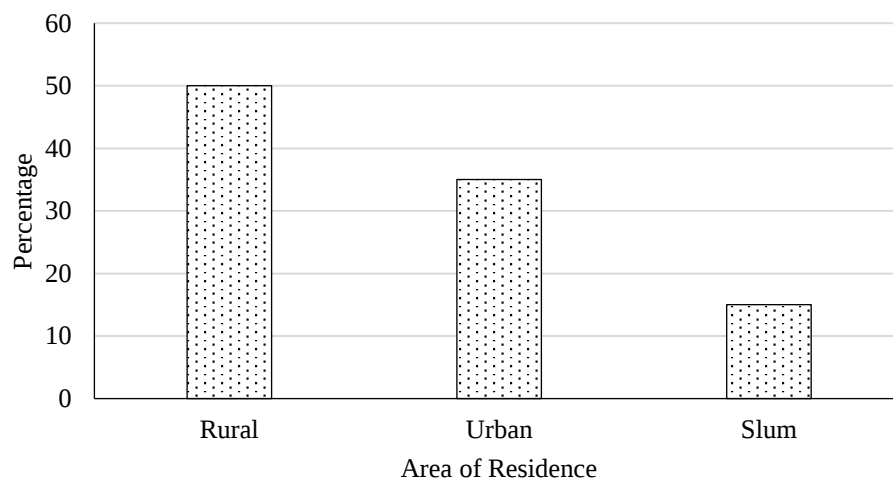


Figure 9. Bar chart of Area of Residence of Patients.

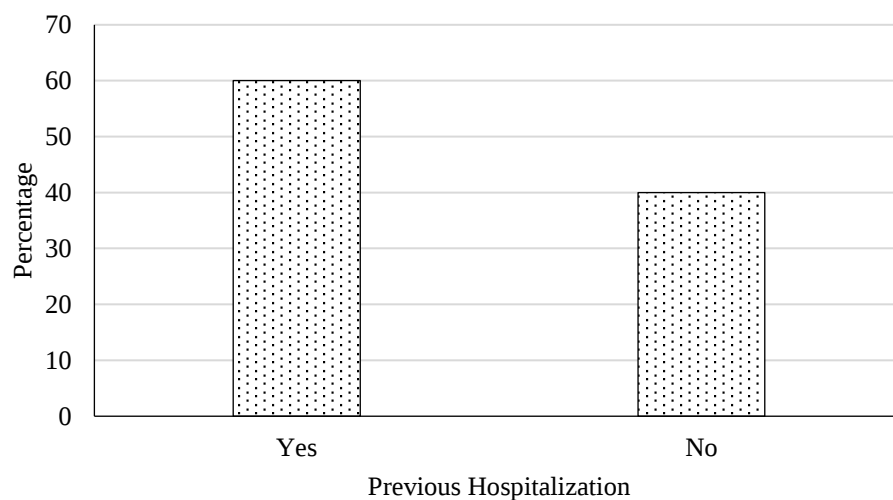


Figure 10. Bar chart of Previous Hospitalization of Patients.

Figure 10 shows 60.0% of patients have experienced previous hospitalization while 40.0% have not.

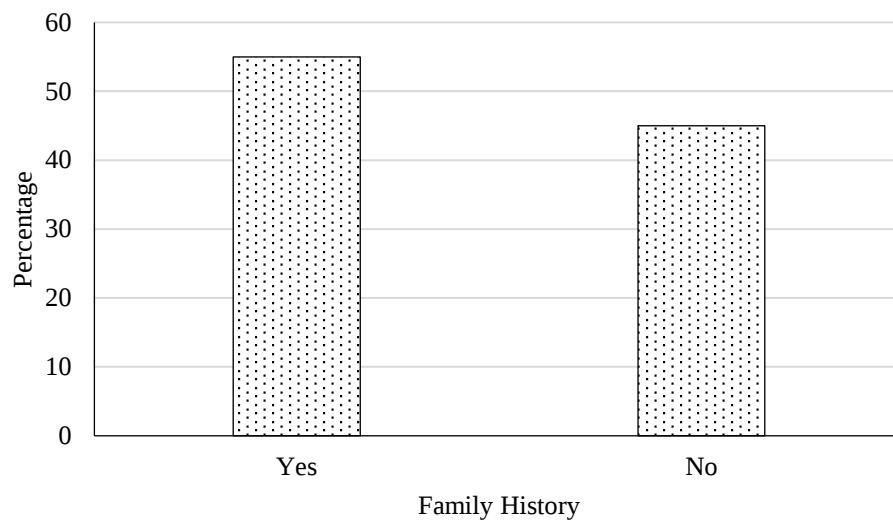


Figure 11. Bar chart of Family Monthly Income of Patients.

Figure 11 shows More than half of the patients (55.0%) have a family history of myocardial infarction, while the remaining 45.0% do not.

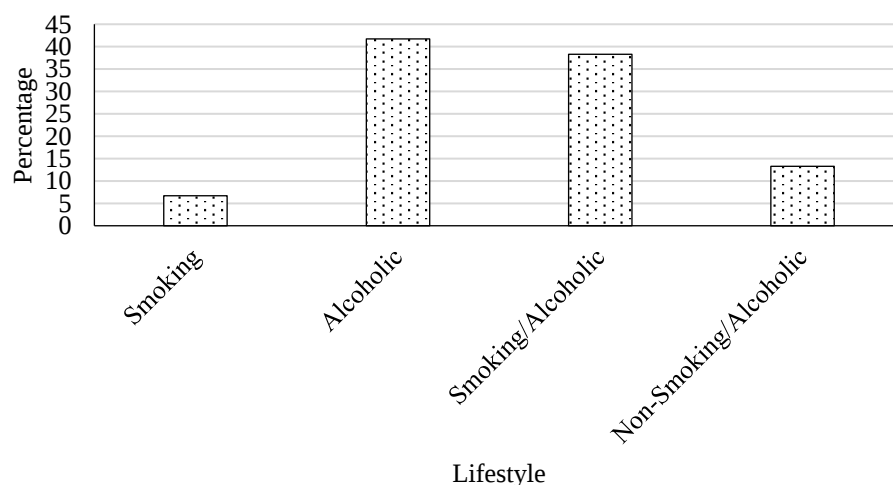


Figure 12. Bar chart of Lifestyle of Patients.

Figure 12 shows A notable proportion of patients are either smokers (6.7%), alcoholics (41.7%), or both (38.3%). A smaller percentage do not engage in smoking or alcohol consumption (13.3%).

Figure 13 shows Half of the patients have hypertension (50.0%), followed by diabetes mellitus (36.7%). A smaller percentage have a combination of hypertension and diabetes mellitus (10.0%), or thyroid issues (3.3%).

Section B: To Assess the Pretest Knowledge and Practice Regarding Rehabilitation Program Among Postoperative CABG Patients in CTVS Department

Descriptive Statistics

Based on the descriptive statistics provided (Table 4):

1. *Pre-Knowledge Score*: The pretest knowledge scores of post-operative CABG patients regarding the rehabilitation program in the CTVS department ranged from 2.0 to 13.0, with an average score of 7.717. The scores are moderately dispersed around the mean with a standard deviation of 2.3728.
2. *Post-Knowledge Score*: The post-test knowledge scores show improvement, ranging from 8.0 to 18.0, with an average score of 14.017. The scores are less dispersed compared to pre-test scores with a standard deviation of 2.1901.
3. *Pre-Practice Level and Skill Level*: The pre-practice level and skill level scores range from 1.0 to 8.0, with an average score of 4.183. The scores are moderately dispersed around the mean with a standard deviation of 1.6312.
4. *Post-Practice Level and Skill Level*: The post-practice level and skill level scores range from 4.0 to 10.0, with an average score of 7.400. The scores are less dispersed compared to pre-practice scores with a standard deviation of 1.5093.

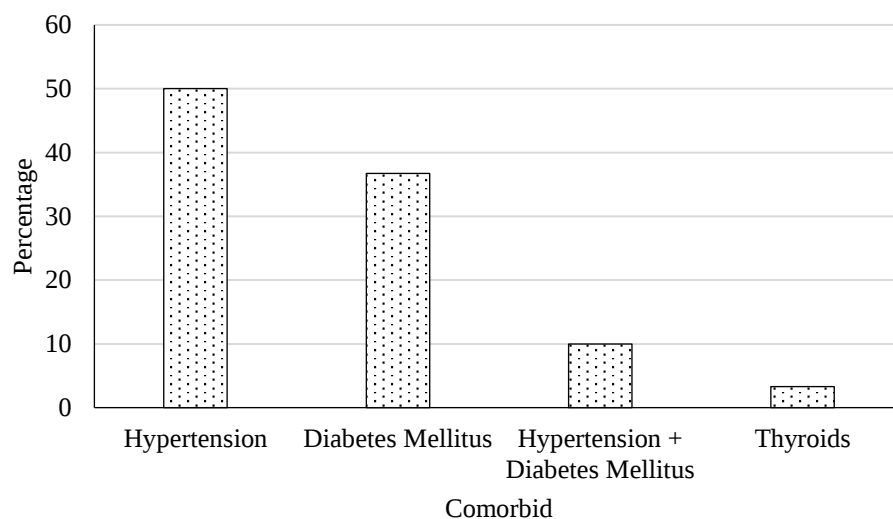


Figure 13. Bar chart of Comorbid of Patients.

Table 4. Descriptive statistics of pre- and post-scores of patients.

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Pre Knowledge-Score	60	11.0	2.0	13.0	7.717	2.3728	5.630
Post Knowledge Score	60	10.0	8.0	18.0	14.017	2.1901	4.796
Pre-Practice Level and Skill Level	60	7.0	1.0	8.0	4.183	1.6312	2.661
Post Practice Level and Skill Level	60	6.0	4.0	10.0	7.400	1.5093	2.278
Valid N (listwise)	60						

Section C: To Evaluate the Nurse Led Program on Knowledge and Practice Regarding Rehabilitation Program Among Postoperative CABG Patients in CTVS Department For Knowledge Score

The null and alternative hypotheses are as follows:

- *H₀*: There is no significant difference between the Pre- and Post-Knowledge Scores.
- *H_a*: There is a significant difference between the Pre- and Post-Knowledge Scores.

Paired Samples Test

The paired samples test results indicate a statistically significant difference between post-knowledge scores and pre-knowledge scores (mean difference = 6.3, $t(59) = 19.064$, $p < .001$, 95% CI [5.6387, 6.9613]). This suggests that the nurse-led intervention has had a significant impact

on improving knowledge regarding the rehabilitation program among postoperative CABG patients in the CTVS department. Therefore, the nurse-led program appears to be effective in enhancing knowledge levels among these patients regarding their rehabilitation program (Table 5).

Table 5. Paired sample test of pre- and post-knowledge scores of patients.

	Paired Differences					t	df	Sig. (2-Tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Post-Knowledge Score–Pre-Knowledge Score	6.3000	2.5598	.3305	5.6387	6.9613	19.064	59	.000

For Practice Level and Skill Level

The null and alternative hypotheses are as follows:

- *H₀*: There is no significant difference between the Pre- and Post-Practice Level Scores.
- *H_a*: There is a significant difference between the Pre- and Post-Practice Level Scores.

Paired Samples Test

The paired samples test results indicate a statistically significant difference between post-practice level and skill level scores and pre-practice level and skill level scores (mean difference = 3.2167, $t(59) = 28.162$, $p < .001$, 95% CI [2.9881, 3.4452]). This suggests that the nurse-led intervention has had a significant impact on improving practice levels regarding the rehabilitation program among post-operative CABG patients in the CTVS department (Table 6).

Table 6. Paired sample test of pre- and post-practice level and skill level scores of patients.

	Paired Differences					t	df	Sig. (2-Tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Post-Practice Level and Skill Level – Pre-Practice Level and Skill Level	3.2167	.8847	.1142	2.9881	3.4452	28.162	59	.000

Therefore, the nurse-led program appears to be effective in enhancing practice levels among these patients regarding their rehabilitation program.

Section D: To Determine the Association of Posttest Knowledge and Practice with Selected Demographic Variable of CABG Patient in CTVS Department

Post Knowledge Score vs. Demographic Variables

Interpretation of post knowledge score with respect to demographic variables is given below (Table 7):

1. *Sex*: There is a moderate association between sex and the post-knowledge score. This implies that there may be differences in post-knowledge scores across different sexes.
2. *Marital Status*: There is a weak association between marital status and post-knowledge score. It implies that marital status might have a slight influence on these levels, but it is not a strong relationship.
3. *Educational Status*: There is a moderate association between educational status and post-knowledge score. It indicates that individuals with different educational backgrounds may have varying levels of post-practice.
4. *Occupation*: There is a strong association between occupation and post-knowledge scores. It suggests that the type of occupation significantly impacts these levels.

5. *Religion*: There is a weak association between religion and post-knowledge score. It implies that religion might have some influence, but it is not a major factor.
6. *Family Monthly Income*: There is a weak association between family monthly income and post-knowledge score. It suggests that the income level has a slight influence, but it is not a strong relationship.
7. *Area of Residence*: There is a moderate association between the area of residence and post-knowledge score. It indicates that where individuals live may impact their post-knowledge score.
8. *Previous Hospitalization*: There is almost no association between previous hospitalization and post-knowledge score. It suggests that previous hospitalization has very little to no impact on post-knowledge score.
9. *Family History*: There is a weak association between family history and post-knowledge score. It implies that family history might have a slight influence, but it is not a major factor.
10. *Dietary Habit*: There is a weak association between dietary habits and post-knowledge score. It suggests that dietary habits may have some influence, but it is not a strong relationship.
11. *Lifestyle*: There is a weak association between lifestyle and post-knowledge score. This suggests that while lifestyle choices may have some impact, they are not a dominant factor.
12. *Comorbid*: There is a moderate association between comorbid conditions and post-knowledge score. It suggests that having comorbid conditions may impact post-knowledge score.

Table 7. Correlation between demographic profile and post-scores of patients.

	Post Knowledge Score	Post Practice Level and Skill Level
Sex	0.288	0
Marital Status	0.162	0.189
Educational Status	0.253	0.194
Occupation	0.351	0.276
Religion	0.192	0.165
Family Monthly Income	0.1	0.094
Area of Residence	0.212	0.322
Previous Hospitalization	0.006	0.032
Family History	0.038	0.027
Dietary Habit	0.081	0.083
Lifestyle	0.102	0.318
Comorbid	0.265	0.144

Post-Practice Level and Skill Level Score vs. Demographic Variables

Interpretation of Post-Practice Level and Skill Level Score with respect to demographic variables is given below:

1. *Sex*: This indicates no association between sex and the post-practice level and skill level. There is no difference in the post-practice level and skill level between different sexes.
2. *Marital Status*: There is a weak positive association between marital status and the post-practice level and skill level. It suggests that marital status may have a slight influence on these levels, with those who are married possibly having slightly higher scores.
3. *Educational Status*: Like marital status, there is a weak positive association between educational status and the post-practice level and skill level. Individuals with higher educational statuses may tend to have slightly higher levels.
4. *Occupation*: There is a moderate positive association between occupation and the post-practice level and skill level. It indicates that the type of occupation significantly impacts these scores, with certain occupations potentially associated with higher skill levels.
5. *Religion*: There is a weak positive association between religion and the post-practice level and skill level. It implies that religious affiliation may have some influence on post-practice level and skill level score, but it is not a strong relationship.

6. *Family Monthly Income*: There is a very weak positive association between family monthly income and the post-practice level and skill level score. It suggests that there might be a slight tendency for higher income families to have a slightly higher score but the relationship is not strong.
7. *Area of Residence*: A moderate positive relationship exists between the area of residence and the post-practice level and skill level scores. It indicates that where individuals live significantly impacts their post-practice and skill level scores with certain areas potentially associated with higher levels.
8. *Previous Hospitalization*: There is a very weak positive association between previous hospitalization and the post-practice level and skill level. It suggests that previous hospitalization may have a slight influence on these levels but it is not significant.
9. *Family History*: There is a very weak positive association between family history and the post-practice level and skill level. It implies that family history may have a slight influence but it is not a major factor.
10. *Dietary Habit*: There is a very weak positive association between dietary habits and the post-practice level and skill level scores. It suggests that dietary habits may have a slight influence but it is not a strong relationship.
11. *Lifestyle*: There is a moderate positive association between lifestyle and the post-practice level and skill level. It implies that lifestyle choices significantly impact these levels with certain lifestyles potentially associated with higher levels.
12. *Comorbid*: There is a weak positive association between comorbid conditions and the post-practice level and skill level scores. It suggests that having comorbid conditions may influence these scores, but the effect is not very strong.

Correlations

The correlation coefficient table provided shows the Pearson correlation coefficients between different variables in the study evaluating a nurse-led intervention on knowledge and practice regarding rehabilitation programs for postoperative CABG patients in the CTVS department (Table 8).

1. Age and Post Knowledge Score: There is a very weak negative correlation (not statistically significant) between age and post-knowledge score. This suggests that there is no clear relationship between age and the post-knowledge level score of patients.
2. Age and Post Practice Level and Skill Level: There is a weak negative correlation (not statistically significant) between age and post-practice level and skill level score.

Table 8. Correlation coefficient between age and post-scores of patients.

	Age	Post Knowledge Score	Post Practice Level and Skill Level
Age Pearson Correlation	1	-.086	-.167
Sig. (2-tailed)		.513	.201
N	60	60	60
Post Knowledge Score Pearson Correlation	-.086	1	.085
Sig. (2-tailed)	.513		.518
N	60	60	60
Post Practice Level and Skill Level Pearson Correlation	-.167	.085	1
Skill Level Sig. (2-tailed)	.201	.518	
N	60	60	60

RESULT AND DISCUSSION

This article focuses on discussing the findings of the study. In this section, the researcher draws conclusions regarding the significance and implications of the results. It aims to interpret what the

findings mean. The core of any research project is in presenting its findings. This chapter presents the summary, conclusions, implications for nursing practice, recommendations and limitations of the study

This chapter presents the discussion of findings based on samples as per their demographic characteristics, knowledge and practice regarding rehabilitation program for postoperative CABG patients.

To achieve the objectives of the study, standardized questionnaires were distributed to CABG patient to assess their knowledge and practice regarding rehabilitation program. A total of 60 subjects those who were fulfilling the inclusion criteria were selected by nonprobability convenience sampling. The samples were assessed by a self-constructed questionnaire to assess knowledge level and a checklist to evaluate practice level.

The gathered data was organized and analyzed using statistical software (SPSS Version 20). Descriptive and inferential statistics were applied for data analysis. The results of the study were discussed according to the objectives of the study to evaluate nurse led intervention on knowledge and practice regarding rehabilitation program for postoperative CABG patients. The findings were discussed under the following sections:

1. Description of the samples based on demographic characteristics using frequency and percentage.
2. To evaluate the pretest knowledge and practice of postoperative CABG patients regarding the rehabilitation program in the CTVS department.
3. To evaluate the nurse led program on knowledge and practice regarding rehabilitation program among postoperative CABG patients in CTVS department.
4. To examine the relationship between posttest knowledge and practice and selected demographic variables of CABG patients in the CTVS department.
5. Discussion related to the testing of the hypothesis.

MAJOR FINDINGS OF THE STUDY

Section A: Description of Samples According to Demographic Characteristics by Frequency and Percentage

Majority of patients were male 66.7%, majority of patients were married 81.7%, majority of patients were primary school 55%, majority of patients were private 26.7%, majority of patients were Hindu 78.3%, majority of patients were 10 k–20 k 35%, majority of patients were rural 50%, majority of patients were previous hospitalization 60%, majority of patients were family history 55%, majority of patients were alcoholic 41.7%, majority of patients were hypertension 50%.

Section B: To Assess the Pretest Knowledge and Practice Regarding Rehabilitation Program Among Postoperative CABG Patients in CTVS Department

Based on the descriptive statistics provided:

1. *Pre-Knowledge Score*: The pretest knowledge scores of post-operative CABG patients regarding the rehabilitation program in the CTVS department ranged from 2.0–13.0, with an average score of 7.717. The scores are moderately dispersed around the mean with a standard deviation of 2.3728.
2. *Post-Knowledge Score*: The posttest knowledge scores show improvement, ranging from 8.0 to 18.0, with an average score of 14.017. The scores are less dispersed compared to pre-test scores with a standard deviation of 2.1901.
3. *Pre-Practice Level and Skill Level*: The pre-practice level and skill level scores range from 1.0 to 8.0, with an average score of 4.183. The scores are moderately dispersed around the mean with a standard deviation of 1.6312.
4. *Post-Practice Level and Skill Level*: The post-practice level and skill level scores range from 4.0 to 10.0, with an average score of 7.400. The scores are less dispersed compared to pre-practice scores with a standard deviation of 1.5093.

Section C: To Evaluate the Nurse Led Program on Knowledge and Practice Regarding Rehabilitation Program Among Postoperative CABG Patient in CTVS Department

For Knowledge Score

The paired samples test results indicate a statistically significant difference between post-knowledge scores and pre-knowledge scores (mean difference = 6.3, $t(59) = 19.064$, $p < .001$, 95% CI [5.6387, 6.9613]). This suggests that the nurse-led intervention has had a significant impact on improving knowledge regarding the rehabilitation program among postoperative CABG patients in the CTVS department. Therefore, the nurse-led program appears to be effective in enhancing knowledge levels among these patients regarding their rehabilitation program.

For Practice Level and Skill Level

The paired samples test results indicate a statistically significant difference between post-practice level and skill level scores and pre-practice level and skill level scores (mean difference = 3.2167, $t(59) = 28.162$, $p < .001$, 95% CI [2.9881, 3.4452]). This suggests that the nurse-led intervention has had a significant impact on improving practice levels regarding the rehabilitation program among post-operative CABG patients in the CTVS department.

Therefore, the nurse-led program appears to be effective in enhancing practice levels among these patients regarding their rehabilitation program.

Section D: To Determine the Association of Posttest Knowledge and Practice with Selected Demographic Variable of CABG Patient in CTVS Department

Post Knowledge Score vs. Demographic Variables

Based on the provided data, we can assess the association of posttest knowledge with various demographic variables of CABG patients in the Cardiothoracic and Vascular Surgery (CTVS) department. Let us analyze the associations:

1. *Age*: There is no significant association between posttest knowledge and age groups (31–40 years, 41–50 years, above 50 years).
2. *Sex*: Posttest knowledge does not significantly vary with gender.
3. *Marital Status*: There is no significant relationship between posttest knowledge and marital status (married, unmarried, and divorced).
4. *Educational Status*: Posttest knowledge does not show a significant association with educational levels (illiterate, primary school, higher secondary, and graduate).
5. *Occupation*: There is no significant relationship between posttest knowledge and occupation (private, government, self-employed, unemployed/housewife, and farmer).
6. *Religion*: Posttest knowledge does not significantly differ across religions (Hindu, Christian, and Muslim).
7. *Family Monthly Income*: There is no significant relationship between posttest knowledge and the family's monthly income brackets.
8. *Area of Residence*: There is a significant association between posttest knowledge and the area of residence. Patients from rural areas tend to have different knowledge levels compared to those from urban or slum areas.
9. *Previous Hospitalization*: Posttest knowledge does not significantly vary with previous hospitalization status.
10. *Family History*: There is no significant relationship between posttest knowledge and family history of the disease.
11. *Lifestyle*: Posttest knowledge does not significantly differ based on lifestyle factors, such as smoking, alcohol consumption, or both.
12. *Comorbidities*: Posttest knowledge does not show a significant relationship with comorbid conditions like hypertension, diabetes mellitus, or thyroid disorders.
13. *Duration*: There is no significant association between posttest knowledge and the duration of the condition.

14. In summary, posttest knowledge among CABG patients in the CTVS department is significantly associated with the area of residence, while it does not significantly associate with other demographic variables listed.

Post-Practice Level and Skill Level Score vs. Demographic Variables

Based on the provided data, let us assess the association of post-practice scores with selected demographic variables of CABG patients in the CTVS department:

1. *Age*: There is no significant association between post-practice scores and age groups (31–40 years, 41–50 years, above 50 years).
2. *Sex*: Post-practice scores do not significantly differ based on gender.
3. *Marital Status*: There is no significant association between post-practice scores and marital status (married, unmarried, and divorced).
4. *Educational Status*: Post-practice scores do not show a significant association with educational levels (illiterate, primary school, higher secondary, and graduate).
5. *Occupation*: No significant association between post-practice scores and occupation (private, government, self-employed, unemployed/housewife, and farmer).
6. *Religion*: Post-practice scores do not significantly vary across religions (Hindu, Christian, and Muslim).
7. *Family Monthly Income*: There is no significant association between post-practice scores and family monthly income brackets.
8. *Area of Residence*: There is no significant association between post-practice scores and the area of residence.
9. *Previous Hospitalization*: Post-practice scores do not significantly vary with previous hospitalization status.
10. *Family History*: No significant association between post-practice scores and family history of the disease.
11. *Lifestyle*: Post-practice scores do not show significant differences based on lifestyle factors, such as smoking, alcohol consumption, or both.
12. *Comorbidities*: Post-practice scores do not show a significant association with comorbid conditions like hypertension, diabetes mellitus, or thyroid disorders.
13. *Duration*: There is no significant association between post-practice scores and the duration of the condition.

In summary, post-practice scores among CABG patients in the CTVS department do not significantly associate with the selected demographic variables listed.

Section E: Discussion Related to Testing of the Hypothesis

As there is the significant difference in the pretest and posttest knowledge and practice regarding rehabilitation program for then postoperative CABG patients after nurse led interventions.

So, H1 hypothesis is accepted and H01 hypothesis is rejected, because value of p is less than 0.05(level of significance).

Since there is no significant relationship between pretest knowledge and practice scores and the selected demographic variables regarding the care of CABG patients in the CTVS department.

So, the H03 hypothesis is accepted and H3 hypothesis is rejected, because value of p is greater than 0.05 (level of significance).

CONCLUSIONS

CVDs are an emerging epidemic and the primary cause of premature death, disability, hospitalization and healthcare expenditure throughout the world. CVDs include vascular diseases of the brain and diseases of the blood vessels and heart. Each year, more people die from CVDs, mainly

from stroke and heart attack, than from any other cause. In 2019, approximately 17.9 million people died from CVDs, accounting for 32% of all global deaths. Of these, 85% were attributed to heart attack and stroke.

The main objective of the study is to evaluate nurse led intervention on knowledge and practice regarding rehabilitation program for postoperative CABG patients. The study recruited 60 patients who had CABG in cardiac units in CTVS department by using non-probability Convenience sampling. Knowledge and practice regarding rehabilitation program for postoperative CABG patients was assessed by using standardized questionnaires for assessment of knowledge level, checklist for practice level.

IMPLICATIONS

The study has the following implications in nursing for the nursing services, nursing education, and nursing research.

Implication in Nursing Service

- Nurses should actively participate to assess the needs of postoperative CABG patients.
- Nurses should educate the importance of postoperative CABG by incorporating the findings of the present study.
- It is the responsibility of the nursing personnel to understand the physical and mental healthcare needs of clients with post CABG.

Implication in Nursing Education

Training needs to be conducted for nursing students for skill enhancement postoperative CABG rehabilitation program.

Implication in Nursing Research

The replication of further studies with rigorous research designs can create better awareness of postoperative CABG rehabilitation program.

Recommendations

1. Based on the study's findings, the research could be repeated with a larger sample to confirm the results.
2. Similar study can be conducted for general population and academic professionals.
3. Awareness must be spread in society.
4. The credibility and generalization of the results can be further enhanced by following rigorous designs and sampling methods.

LIMITATIONS

The present study was based on pre-experimental (One Group Pretest Posttest). Research Design and data were collected over a short period of time.

Sampling calculation was not performed, and study is a single centered study. Result of the present study is purely based on self-reported measures.

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