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Effectiveness of Structured Teaching Programme on Knowledge Regarding Follow-Up Care After Coronary Angioplasty in Indian Patients

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ABSTRACT

Percutaneous Transluminal Coronary Angioplasty (PTCA) is one of the most widely accepted treatment modalities in patients with myocardial infarction. Although coronary angioplasty can prolong life, it can lead to several complications. This research aimed to determine the effectiveness of a structured teaching programme on knowledge regarding follow-up management of coronary angioplasty for patients who are undergoing coronary angioplasty in India. The selection for this research to be conducted in India is based on different aspects. For instance, India has a large population [1] that can help utilise the data and compare them with less populated countries, such as Kuwait, in future studies, considering socio-cultural aspects and their influence on knowledge. Hence, the selection of the sample from India is to facilitate the data collection process (selecting and recruiting participants conveniently). The objective of the research is to assess the knowledge on follow-up management of coronary angioplasty among patients undergoing coronary angioplasty, to assess the effectiveness of structured teaching programmes on follow-up management of coronary angioplasty among patients undergoing coronary angioplasty, and to find the association between the level of knowledge in relation to the selected demographic variable. Imogene King's Theory of Goal Attainment has been used as a conceptual framework, and a pre-experimental one-group pre-test design was used in this research. The data was collected from 50 samples. Data was analysed using descriptive and inferential statistics. A significant difference between pre-test and post-test knowledge scores was found (mean difference = 12.1). The paired 1 test (t=19.59, p<0.01) shows that the score significantly increased, and the score is significant at a 0.01 level of significance. The research reveals that there is a significant improvement in the knowledge of patients on follow-up management of coronary angioplasty after a structured teaching programme.

Keywords

Follow-Up Management, Effectiveness, Knowledge, Structured Teaching Programme, Coronary Angioplasty.

List of Abbreviations

CAD: Coronary Artery Disease, IHD: Ischemic Heart Disease, PTCA: Percutaneous Transluminal Coronary Angioplasty, PCI: Percutaneous Coronary Intervention, AMI: Acute Myocardial Infarction, NIC: National Interventional Council, CVD: Cardiovascular Diseases, HRQOL: Health-Related Quality of Life, CS: Coronary Stenting, CI: Confidence Interval, SD: Standard Deviation.

Introduction

There are five vital organs in the human body, including the heart, the brain, the lungs, the kidneys, and the liver. The main part of the cardiovascular system is the heart, which is surrounded by blood vessels. The function of the cardiovascular system is to circulate blood all over the body in order to deliver oxygen and nutrients to the tissues [1]. The heart is a muscle of size similar to a closed fist. The heart is located in the thoracic cavity, median to the lungs and posterior to the sternum. The heart functions as the body's circulatory pump to supply oxygen to all body systems and tissues. The heart rate on average is 80 times/minute, 115,000 times in a day and 42 million times annually. The human heart beats more than 3

billion times during an average lifetime; therefore, the amount of blood pumped is equal to 1 million barrels. Furthermore, the heart is continuously working even if the person is sleeping or resting [2].

The leading cause of morbidity and mortality in India during the last three decades is cardiovascular disease [1]. The genetic predisposition and acquisition of traditional risk factors at a rapid rate as a result of growth seem to be the major cause. However, there are consistent efforts to limit this epidemic by enhancing public education along with applying preventive measures to reduce the burden on nurses and health organisations. Patients with symptomatic and life-threatening indicators of the disease are considered as a major challenge for the countries and the entire health system. Therefore, additional strategies must be adopted to increase the awareness of the population and develop modern resources to manage affected patients with cardiovascular disease. The healthcare system aims to manage these high-risk patients by applying advanced methods such as percutaneous coronary revascularization or surgical interventions, which have been proven to be a very promising movement during the last decade [3].

Coronary heart disease and atherosclerotic heart disease are also known as coronary artery disease (CAD) [4]. Further, Ischemic Heart Disease (IHD) is considered the most common type of heart disease, that leads to heart attacks. The disease begins with the accumulation of plaque alongside the inner walls of the arteries of the heart, which reduces the blood flow to the heart [4]. Indeed, most individuals who suffer from coronary artery disease show no clear evidence of the disease. Consequently, the disease progresses and leads to a "sudden" heart attack, usually, which develops before the first onset of symptoms [5]. One of the most significant procedures that is used to eliminate blocked coronary (heart) arteries by opening the narrowed arteries is known as Coronary Angioplasty. The procedure facilitates restoring blood flow to the heart muscle by widening the tightness in the arteries [6]. The procedure is about the installation of a thin, flexible catheter (tube) with a balloon at the tip, which passes via the blood vessel to reach the affected artery wall. As a result, the narrowing in the artery decreased, thus allowing blood flow to be restored in the artery [7].

Dotter and Judkins were the first ones who proposed the technique of transluminal angioplasty-enlargement of the lumen in the stenotic vessels by a catheter, in the year 1964. Basically, the idea was developed by inserting a spring-coil guidewire across arteriosclerotic arterial stenosis, while remaining in place to serve the purpose of keeping the artery open. However, the guidewire serves as a rail over which it remains in place without moving, so a series of progressively larger rigid dilators could be advanced to enlarge the vessel lumen. It is noteworthy that the transluminal angioplasty technique is highly recommended due to its effectiveness; hence, inserting a large-calibre rigid dilator via the arterial puncture eventually restricts the "Dotter" technique application.

Gruentzig, in the year 1974, attempted to make some modifications to the above technique by replacing a series of rigid dilators with an inflatable non-elastomeric balloon that fitted on a smaller catheter shaft [8]. He succeeded in the procedure with minimal trauma; the balloon catheter could be introduced percutaneously, across the vascular stenosis, and after that could be inflated with reasonable force to widen the stenotic lumen [8]. Even though this technique did not get preference from other researchers, who had surmised that the balloon could lead to dilatation. In spite of that, Gruentzig is considered to be the first researcher who develop the technique into a useful and practical tool. Four years later, Gruentzig, along with his team, conducted persistent experiments on animals or a dead body by examining the peripheral and coronary arteries of patients undergoing bypass surgery. These experiments assisted them in developing their performance in relation to percutaneous balloon angioplasty of a stenotic coronary artery for a conscious human in 1977 [8].

Initially, coronary angioplasty was performed to treat patients with stable angina or discrete lesions in a single coronary artery. However, after many years of experiments, researchers have discovered that coronary angioplasty can effectively be used to treat patients with unstable angina, multivessel Coronary Artery Disease (CAD), and Acute Myocardial Infarction (AMI). The researchers have also discovered that the previous problems could be treated effectively with the non-surgical procedure, by using a combination of sophisticated equipment and experienced operators, and further by using drug therapy. Therefore, advanced technologies assist researchers in developing non-invasive procedures, this allows patients who suffer from CAD to be successfully treated percutaneously with Chronic Total Occlusions (CTO) [8].

Angioplasty is no longer considered a difficult procedure due to the use of advanced technology for performing the procedure safely. Further, cardiologists nowadays are more familiar with such a procedure due to continuous training [9]. The rate of restenosis in a patient with CAD could reach 50% after the intervention of Percutaneous Transluminal Coronary Angioplasty (PTCA). Lifestyle has been significantly slowing the progression of restenosis and decreasing cardiovascular events after PTCA. This is why the lifestyle and culture must be modified to increase physical abilities. For example, in Arab society, there is a perception that eating fatty food could enhance human physical strength, which contradicts the latest research. Moreover, fostering self-determination and social support might help to change the behaviour. Since nurses play a vital role in educating, preventing complications, and managing the patient during and after the procedure [9,10]. This implies that the nurse's role is important to increase the awareness of the patients, as well as prevent complications and promote health. In this regard, this research aims to explore the importance of the nursing role in decreasing Coronary Artery Disease through their structured knowledge.

Significance of the Research
Coronary artery disease is considered a major challenge that is associated with morbidity and mortality rates in developing

countries like India [4]. As mentioned earlier, surgical intervention for CAD includes PTCA and other interventions. The second half of the 20th century has witnessed a global spread of coronary artery disease, especially in developing countries. It accounts for 16.7 million in India, approximately 29% of total worldwide deaths in the year 2003 [10]. In 2011, the prevalence of CAD in urban and rural areas in India was 15.1% and 16.2% respectively [*ibid*]. Beyond India, 600,000 percutaneous coronary procedures are conducted frequently every year in the United States (US) [11]. Based on the American Heart Association (AHA) in the U.S., 1.313 million PCI procedures were performed in the year 2006 [*ibid*]. However, there is a considerable variation in the countries that using coronary angioplasty. For example, in 2009, the U.S. had the highest rates of angioplasty, followed by Germany, Belgium, Norway then Austria. In contrast, Mexico and Chile had the lowest rate of using angioplasty [12]. The prevalence of CAD is increasing extremely in India, hence there is an exponential need for the interventional procedure. India is known for its high population, and this, of course, increases the pressure on health facilities. For instance, the number of diagnostic and interventional coronary procedures is high; as a result, there is a need to deal with this increase in the workload at interventional centres which offer cardiologists and PCI. The first angioplasty was performed in India in 1987 [13]. In 2009, the number of performed coronary angioplasties declined to 67371. However, in 2010, about 152,332 coronary angioplasties were carried out [14]. The alarming rise in the number of heart attack cases reported in India, particularly in Kerala. Unhealthy food habits, sedentary lifestyles, and genetic factors have all contributed to this scenario. In Ernakulam city alone, every month on average, more than 400 people undergo Angioplasty procedures from the various private medical institutions in the city. In 2006, about 13,500 angioplasties were carried out in Kerala, and in 2011, there was a drastic increase to 49,590 [15]. In 2011, the angioplasty rate was 236, in 2012 the number reached 306 and increased to 423 in 2013 [*ibid*]. This elevation in the number of cases requires an intervention by boosting people's awareness about heart problems and diseases, and further changing their lifestyle.

Furthermore, research was conducted at Karl-Franzens University, Austria, to evaluate the effect of lifestyle modification after Coronary Angioplasty. About 60 patients were selected randomly. Interventions include maintaining body weight according to the Body Mass Index (BMI), control of blood pressure, maintaining daily physical activity, along with changing the lifestyle, further changes in the diet to be healthier with less salt and avoiding fatty food. The data highly support that strengthened modification can help to eliminate morbidity and mortality rates after performing PTCA on a coronary artery disease patient [16]. Similarly, the researcher's clinical background helped to identify that many patients undergoing angioplasty had a lack of knowledge regarding procedural outcomes and lifestyle modification. Helping patients to set reasonable expectations related to the procedural outcome, besides lifestyle modifications, is an essential part of health promotion and patient education. Keeping all this in mind, education needs to be knowledge-centred for a better outcome. From the available literature reviewed, it was found that patients have inadequate knowledge regarding lifestyle modification after

PTCA, so the researcher found it relevant to assess and explore the effectiveness of the structured teaching programme in improving patients' knowledge related to following up with the health practitioner and preventing further complications in coronary angioplasty patients.

Problem Statement
This research helps to assess and explore the effectiveness of a structured teaching programme in improving patients' knowledge related to following up with the health practitioner and preventing further complications in coronary angioplasty patients in India.

Objectives of the Research
1. To assess the nurse's knowledge of coronary angioplasty follow-up among patients undergoing coronary angioplasty.
2. To assess and explore the effectiveness of a structured teaching programme on follow-up patients undergoing coronary angioplasty.
3. To find out the link between knowledge level and demographic variables in India.
4. To compare the research findings with other countries in future research.

Operational Definitions
Assess
It is related to gathering information of knowledge on follow-up management.

Effectiveness
It is associated with knowledge improvement after a structured teaching programme.

Structured Teaching Programme
It refers to a PowerPoint presentation and brochure that is given to the patient or the caregiver, on the follow-up management of coronary angioplasty, which includes the dietary pattern, exercise, medication, smoking and alcohol restriction, stress management, and the need for a follow-up visit.

Patients
It refers to individuals undergoing coronary angioplasty.

Caregiver
It refers to an individual who takes care of a patient undergoing coronary angioplasty.

Coronary Angioplasty
It refers to a procedure in which a balloon-tipped catheter is inserted into the coronary arteries and then inflated to widen the narrowed arteries.

Follow-up management
It refers to measures needed to be followed by the patient or the caregiver after undergoing coronary angioplasty in relation to the dietary pattern, exercise, medications, smoking and alcohol restriction, stress management, and the need for a follow-up visit.

Hypotheses

H1: A considerable difference in the knowledge in the pre- and post-test knowledge scores regarding follow-up management among patients undergoing coronary angioplasty after a structured teaching programme.

H2: A significant connection between knowledge scores related to follow-up management and selected demographic variables.

Conceptual Framework

A conceptual framework describes the variables and guides the best method to perform the research effectively; further, it provides direction for the evaluation, interpretation, and integration of research findings [17].

This research is on patients undergoing angioplasty, and the efficiency of the structured teaching programme in follow-up management. The adopted conceptual framework for the proposed research is Imogine King's Theory of Goal Attainment. Imogine King is a theorist, educator, and leader who developed the theory of Goal Attainment and attempted to shape the content for a new graduate program [18]. The main reason for establishing healthcare goals is to provide guidance and support for patients/ caregivers. Therefore, this research mainly focuses on helping the patient to maintain and restore health. The basic assumption of the theory is related to nurses' and patients' communication and the transfer of information effectively by setting goals and then acting to attain those goals. The nurse aims to provide useful knowledge for the patient/caregivers, whereas the patient/caregivers must show interest and interact effectively with the nurse and develop perceptions of the problem and how to deal with it.

Assessment

Nurses use assessment, interviewing, and communication skills to enhance the ability to combine knowledge in natural and behavioural sciences for easy application by the patients/ caregivers. Communication is necessary to verify the accuracy of perception.

Nursing diagnosis: This is developed from shared information during the assessment.
Planning: after identifying the problem, nurses plan for how to achieve the goal.
Implementation: the activities that apply to meet the proposed goals. King identified that implementation is a continuous process.
Evaluation: describing the findings to achieve the goal.

Summary

This chapter addressed the research background, the significance of the research, the problem statement, the objective, operational definitions, and hypotheses. Further, Imogene King's theory of goal attainment model was covered as the conceptual framework.

Literature Review

In this research, the researcher reviewed and organised the literature based on the effectiveness of the knowledge related to the structured teaching programme and follow-up management of coronary angioplasty among patients undergoing angioplasty.

A Literature Review on Coronary Angioplasty

The impact of PTCA on the perceived quality of life and health-related quality of life has been explored. Therefore, the research was conducted by using a group of pre-test/post-test designs, pre-test data were collected in the evening before PTCA, and post-test data were collected between four to six weeks from 40 patients after PTCA. By using the Ferrans and Powers Quality of Life Index, the perceived quality of life was assessed. Furthermore, health-related quality of life was assessed for any cardiac symptoms, exercise capacity, tolerance of physical activity, general health condition, and significant lifestyle changes, for example, being unable to drive or go to work. When the level of satisfaction increases with the health and general function, this significantly changes the quality of life; hence, the perceived quality of life will increase [19]. Considerable improvement in cardiac symptoms as follows: frequency of cardiac symptoms, along with chest pain incidence, was reduced. The physical activity tolerance level reduced in the intensity of the symptoms with activity, the ability to walk increased, and interference with recreational activities decreased because of the existing symptoms. In addition, significant lifestyle changes occur, related to increasing the frequency of exercise and quitting smoking, although no significant improvement is shown in the prescribed diets [20].

A research was conducted to determine the relationship between depression, anxiety, and health-related quality of life post-PTCA. Overall, 35 patients were included for PTCA, and informed consent was explained and signed by the patients. The Coronary Scale, Settle Angina Questionnaire, a health-related quality of life measure (EQ 5D), and Hospital Anxiety and Depression Scale were all gathered one day before PTCA. Patients who underwent PTCA were reassessed after three days with the Settle angina questionnaire and the EQ 5D, and the Hospital Anxiety and Depression Scale. The outcome of the analysis revealed that 32.1% of patients had a high level of depression before PTCA, and 46% of patients had significant anxiety. None of the patients who had a successful PTCA reported anxiety despite that, only 3.6% suffered from depression. Disease perception increased from 21.2% to 37.1%, which affects the health status of the EQ5D. It improved from 42.7% before PTCA to 78.7% after PTCA. According to the Settle Angina Questionnaire, a few changes occur in physical activity and are reduced from 67.9% to 48%. This illustrates that anxiety, depression level, and physical limitation could be managed and reduced with a successful PTCA, alongside disease status and perception would be improved too [21].

A research of a multifactorial programme of two years duration was conducted in Sweden to examine the achieved behaviour and associated risk factor-related changes. The sample includes 151 patients from a consecutive population who were treated with percutaneous transluminal angioplasty under the age of 65. A total of 87 patients out of 151 patients were randomly allocated

to a control group (n=41) and an intervention group (n=46). The programme began within four weeks of residential stay; the main focus was given to health education to achieve a positive behavioural change. In the first year of the follow-up, more concern was given to maintaining the programme through regular contact with the nurses; however, in the second year, no further rehabilitative efforts were offered. One client underwent follow-up for the control group (4% vs 20%; P<0.05). In the intervention group of patients, their lifestyle improved based on their behaviour: exercise, diet, and smoking. There was no considerable difference between the two groups in relation to the serum cholesterol level at 0 and 24 months. In addition, both groups did not show any differences in psychological factors or quality of life [22].

One research study was conducted in Australia to explore participants' perceptions about recovery after angioplasty. Stent placement and Coronary angioplasty procedures are considered as one of the main and fastest-growing specialities in cardiac care; their patients have limited interaction with nurses and short stay admission. Three women and eight men were interviewed one month after the discharge date. Qualitative techniques of grounded theory were used to analyse verbatim transcripts; the participants reported working around a problem-solving process in response to the perceived health threat associated with undergoing angioplasty. In the initial step, the problem was identified; therefore, in step two, the problem was solved based on coping responses. Furthermore, coping responses were evaluated and reviewed in step number three. As a result, the identified problems were related to constant chest pain and anxiety associated with fear of the unknown. The coping responses include trusting health care professionals such as doctors and nurses, acquiring knowledge of angioplasty, and psychological support from family. Finally, coping responses considered the participant's decision toward either undergoing or postponing the angioplasty procedure. This research results indicate that the angioplasty preparation provides new knowledge of thoughts and challenges that faced participants when undergoing an invasive procedure within a limited stay in the environment, also it represents a short period of adjustment that might lead to anxiety-provoking. This illustrates that the nursing care psychosocial aspect is a fundamental factor in nursing practice for angioplasty patients [23].

Another research was performed to evaluate the health and quality of life of patients after coronary procedures. The methodology for this research includes a collaboration between research literature and the research review of Greek and international bibliography that relate to the quality of life and coronary intervention. A high number of patients reported that the health-related quality of life is influenced by coronary procedures. The most significant factors that have an impact on the quality of life after coronary intervention are demographic and clinical variables such as gender, age, family status, physical status, co-existing disease, anxiety, depression, and symptoms of angina. Moreover, patients' compliance with the required lifestyle modifications, such as quitting smoking and avoiding excessive exercise, is essential to improving their health condition. Indeed, planning a rehabilitation programme for

patients after coronary intervention helps to improve their health and quality of life [24].

In Saskatchewan, a research study was conducted based on 210 patients to explore the information related to their drive for changing their lifestyle and the rehabilitation behaviours of patients undergoing Percutaneous Transluminal Coronary Angioplasty (PTCA). The scale that has been used to obtain this information was previously introduced to verify the risk factor for patient knowledge as well as lifestyle-changing behaviours among myocardial infarction (MI) patients during the rehabilitation phase. This research aims to discuss the outcome of PTCA patients' responses and compare these findings to previously obtained data from MI patients. Risk factors most frequently reported by both PTCA and MI patients as causative factors of their heart problems included diet, job stress, low levels of exercise, and other patient-perceived factors. Following hospitalisation, the participants reported that PTCA involved more lifestyle restrictions than patients with MI, such as in social life, job, driving and sexual activity. Both groups of patients stated that the changes in the nutritional intake occurred only post-hospitalisation; however, the findings reflected that MI patients had initiated more modifiable risk factor changes overall than PTCA patients. Comparative results show that MI patients were more likely to initiate risk factor reduction behaviour for modifiable factors such as smoking, weight reduction, stress, and exercise than PTCA patients. These findings offer insight into differences between PTCA and MI patients concerning cardiac rehabilitation behaviours, which might suggest the need for different teaching-learning approaches and/or a more focused education program for patients with PTCA. A goal of cardiac rehabilitation is to encourage patient initiation and maintenance of lifestyle modification behaviours based on identified risk factors [25].

The influence of continued cigarette smoking on restenosis after percutaneous transluminal coronary angioplasty (PTCA) was retrospectively determined through a study of 160 patients with primary success who underwent follow–up angiography after a mean of 7±7 months. The average number of patients at risk for restenosis was 1.7 patients among 84 patients to continued smoking (group 1) and 1.9 patients among 76 patients who were smoking at the time of PTCA (group 2) difference was not significant. These two groups of patients at baseline were similar with respect to gender, frequency of diabetes mellitus, number of packs per year smoked, angina class, and number of coronary artery diseases. The location of the dilated narrowing, the residual luminal diameter stenosis, and the trans stenotic gradient after the procedure were similar in both groups. The recurrence of angina ≥ class II was the reason for restudying in 43% and 36% of group 1 and group 2 patients, respectively. Restenosis, defined as the presence of ≥ 50% narrowing at the site of previous successful dilatation at follow–up angiography, was significantly higher in group 1 compared with group 2 patients (55% vs 38%, P=0.03). Continued smoking was selected as an independent predictor of restenosis by logistic regression analysis. The incidence of coronary artery disease progression (14% vs 10%) was not significantly different

between the 2 groups. In conclusion, continued smoking after successful PTCA is associated with an increased risk of restenosis. The higher restenosis rating for smokers emphasises the need to strengthen educational programs after PTCA [26].

In order to search for an effective drug to reduce restenosis incidence after coronary angioplasty, research was conducted to determine the effects of a Chinese herb, extract of Andrographis paniculata Nees (APN), and Fish Oil (FO) on atherosclerotic stenosis and restenosis after experimental angioplasty. Preliminary results showed that APN can significantly alleviate atherosclerotic iliac artery stenosis induced by both re-endothelialisation and high cholesterol diet (control group, stenosis incidence 100%, stenosis severe degree 60.53±31. 03%, of which 30% Arteries). Total occlusion; FO group: stenotic incidence and serve degree is 77% and 53.00 ± 21.17% respectively, and in the APN group they are 70% and 25.39 ± 10.52%, respectively (<0.01), and follow-up angiography four weeks after angioplasty showed that dilated iliac artiest in control group all had severe restenosis, but in APN group no/or only mild restenosis occurs, and FO group restenosis is as server as stenotic degree prior to angioplasty. These preliminary results suggest that APN and FO can significantly alleviate stenosis induced by re-endothelisation and high cholesterol diet and restenosis after angioplasty, while the former has a more marked effect. The above findings lead the authors to conclude that APN may play an important role in preventing restenosis after coronary angioplasty, but FO might be useful in reducing the extent of restenosis after coronary angioplasty [27].

A Descriptive research was conducted to examine the trajectory of uncertainty and symptoms of psychological stress during the first three months after coronary angioplasty to study the impact of social support on uncertainty and psychological stress in these populations. Male patients with angioplasty (n= 22) in the first and third months after treatment were selected, and the age range was 39 to 75 years (mean 58 years). Mishel Uncertainty in Illness scores, General Health Questionnaire scores, and Perceived Social Scale scores were used for measurement. Data was analysed with repeated measures for the analysis of variance and Pearson correlation coefficients. Results showed that at both periods of angioplasty, patients were uncertain (p< 0.05) and that regardless of the procedure, patients reported fewer symptoms of psychological stress at three months than at the first month (p <0.01). Patients with high social support had less uncertainty and psychological stress than patients with low support (p< 0.05). Analysis of the social support and treatment group interaction showed that angioplasty patients with low perceived social support had significantly more psychological stress than angioplasty patients with high support (p<0.01). Analysis of the correlations between uncertainty and psychological stress in angioplasty after control for social support revealed that social support was a significant mediator of the relationship between uncertainty and stress only among patients undergoing percutaneous transluminal coronary angioplasty. These results suggest that angioplasty patients might be in particular need of intervention to reduce uncertainty, and that intervention needs increasing social support, which could be important in order to achieve this reduction [28].

A literature review on the knowledge of patients regarding follow-up management of coronary angioplasty A research was conducted to assess the required information of patients treated with primary angioplasty. A total of twenty-nine patients were selected for the research. A qualitative methodology was applied, and a semi-structured interview was carried out in the United Kingdom. The need for more specific information about the risk of reoccurrence, level of heart muscle damage, discharge medications, an appropriate level of physical activity, and diet was highlighted by the patients [29]. Another research assessed the knowledge and lifestyles of patients admitted for coronary angioplasty in the Coronary Care Unit of an Italian hospital. The lifestyles before hospital admission, knowledge of their illness, and lifestyles after the acute coronary event were analysed with questionnaires, in three different samples of patients:

A. All the patients admitted for an acute coronary event from May 2003 to May 2005 were included to explore lifestyles before an acute coronary event (416 patients).
B. All the patients submitted from May 2003 to April 2004 (before the start of health information meetings organised by nurses), to explore the knowledge of the illness and its causes (132 patients).
C. A total of 83 patients were followed in a day hospital, to explore their lifestyles after the acute coronary event.

The result shows that most patients have inappropriate lifestyles: 50% eat cheese every day and never exercise for at least 30 minutes every day. Even after the acute coronary event, some improper lifestyles are still present. 75% of patients have incorrect or insufficient knowledge of illness and risk factors at discharge, and only 50% are willing to add fruits and vegetables to their diet. The research concluded that these results are worrying and call for the systematic adoption of secondary prevention strategies with an effective intervention that aims to increase knowledge and modify lifestyles [30].

A hospital-based, cross-sectional research was conducted at All India Institutes of Medical Science (AIIMS), a major tertiary care hospital in New Delhi, India, to assess the Knowledge of patients undergoing PTCA. Participants (n=217) who were waiting in the emergency room were provided with standardised questionnaires to assess their knowledge of modifiable risk factors for CAD. The risk factors specifically included smoking, hypertension, elevated cholesterol levels, diabetes mellitus, and obesity. Identifying three or fewer risk factors was considered as a poor level of knowledge, whereas identifying four or more risk factors was viewed as a good level of knowledge. A multiple logistic regression model was used to isolate independent demographic markers predictive of a participant's level of knowledge. 41% of the sample surveyed had a good level of knowledge. Around 60%, 72%, 73%, and 57% of the population identified smoking, obesity, hypertension, and high cholesterol, respectively. In addition, 30% identified diabetes mellitus as a modifiable risk factor for CAD. In multiple logistic regression analysis, independent demographic predictors of a good knowledge level with statistically significant (P<0.05). Adjusted

Odds Ratio (AoR) were a routine exercise of moderate intensity, AoR 8.41 (compared to infrequent or no Exercise), no history of smoking, AoR 8.25, and former smokers, AoR 48.28 (compared to current smokers). Although statistically insignificant, a trend towards a good level of knowledge was associated with higher levels of education [31].

A longitudinal study was conducted on charges in health linked to the quality of the following precautions related to coronary intervention in regional public hospitals in Hong Kong. Sixty-five sample that have undergone PTCA were selected in a regional public hospital. In the longitudinal research, a one-group observational design was used. Health-related to the quality of life, data using the medical outcome research questionnaire were collected before the percutaneous coronary intervention. The research results showed that the benefits of the percutaneous coronary intervention procedure have a positive impact on health-related quality of life, a month after the intervention, the effect did not last long. Nursing interventions are needed to maintain and enhance the health-related quality of life of these patients, and lifestyle notification should be introduced immediately after percutaneous coronary intervention [32].

A research was conducted in Chennai on the effects of lifestyle behaviour change in coronary artery disease and its effects on events after PTCA. This research evaluated the effects of lifestyle changes and secondary prevention on coronary recurrence rates. Patients were recently treated with percutaneous coronary intervention with an aggressive focus on lifestyle changes (smoking, diet, exercise, and stress; n=46) or in a standard–care control group (n=42). Results showed that the intervention group was significantly larger. Overall lifestyle changes that the control group had after 12,24,36, and 60 months. The intervention group had significantly lower rates of all coronary events (acute myocardial infarction, coronary artery bypass graft, PCI, cardiac death; 30.4% vs 53%), and cardiovascular mortality (2.2% vs. 14.6%). The need for future large–scale and long-term evaluations of lifestyle-oriented secondary preventive interventions of this kind is emphasised [33].

A Descriptive research done in Australia provided details on the rationale and influences behind the decisions of four male participants to change or not change their lifestyle patterns three months later, after a percutaneous transluminal coronary angioplasty/intracoronary stent procedure utilising a naturalistic inquiry approach, a semi-structured interview schedule, and non-probability purposive sampling. One of the participants made a noticeable lifestyle pattern change in this period. The remaining participants failed to exhibit any discernible lifestyle pattern change or continued with their previous behaviour. Results suggest that reluctance to participate in cardiac rehabilitation is the major factor influencing lifestyle pattern change. Because nurses spend the greatest amount of time with patients during hospitalisation, they have the best opportunity to provide up-to-date and relevant information to patients that will enable them to make decisions concerning cardiac healthy lifestyle changes [34].

Another research was conducted to examine patients' reactions to the suggested lifestyle changes, to identify barriers and facilitators to risk reduction, to identify sources of health information, and to elicit suggestions for nursing interventions to aid in long-term recovery. It was a Qualitative study used for 2 hours, with focus group sessions recorded. Participants were controlled in one of seven groups (four to nine members each). The sample size was 45 patients (26 men,19 women) who had undergone PTCA three to eighteen months earlier and were recruited from a university-affiliated midwestern Medical Centre. Using a constant–comparative method for data analysis, six major themes emerged. Positive things included seeking control from successful changes made, compromising with medical recommendations to maintain the quality of life and acceptance of the uncertain nature of their disease. Negative themes included powerlessness to stop disease progression, frustration with enacting lifestyle changes, and concerns about the uncertainty of the future. Specific barriers and facilitators for risk reduction were readily identified. Though future patients had few suggestions, the most predominant requests were for newsletters and videos. These results provide insight into the experiences of the relatively understudied PTCA population. Patients were making at least some of their necessary lifestyle changes, though often with some difficulty [35].

A descriptive research study was conducted to establish a comprehensive multidisciplinary cardiac prevention and rehabilitation programme for patients with coronary artery disease in London. This research aims to achieve lifestyle modification, risk factor control, and optimal use of cardiac protectivity medication for patients with a new onset of angina, unstable angina following coronary angioplasty. Main outcome measures include non-smoking status, body mass index (BMI), blood pressure (BP), cholesterol, and the use of prophylactic drug therapies. Patients were assessed at the beginning and after the programme (re-screening) and also one year after completing the programme. A total of 537 patients were eligible for the programme; however, 443 (83%) were recruited, 404 could potentially have completed the programme at the time of this analysis, 308 (76%) participated, and 215 (53%) completed the programme. At the end of the programme, 92% were non-smokers (86% in one year). The mean BMI on completion of the programme was 27.2 kg/m2 (SD 4.3), which was maintained at one year (mean 27.0, SD 4.1). Further, 76 % of the patients achieved their blood pressure target (140 /85 for non-diabetics, 130/80 for diabetics) on completion of the programme. This dropped to 53% within one year, but absolute systolic BP changed only from a mean of 125mm Hg (SD 17) on completion to 135mm Hg (SD 18) at one year. A total of 87% achieved fasting total cholesterol < 5.0 mmol/ l at re-screening (78 % at one year). 95 % of participants were taking antiplatelet therapy on completion of the programme (94% at one year). In conclusion, a multi-disciplinary cardiac prevention programme can achieve secondary prevention [36].

A research was performed to assess the coronary risk factors and patient understanding of the severity of their condition. The objective is to explore self-reported changes in coronary risk factors

by the patient, three or nine months following coronary artery angioplasty. Two hundred and thirty-four patients were selected by convenience sampling among patients who had undergone angioplasty within six months in two major metropolitan hospitals in Melbourne. The finding revealed that 42% of the patients believed that their condition had been cured. The researcher had also emphasised that health education was given efficiently to patients undergoing coronary artery angioplasty [37].

Further, a descriptive study was conducted to assess the level of knowledge regarding modifiable risk factors of myocardial infarction among 50 coronary heart disease patients in a cardiac centre in Chennai. The result showed that 82 % had inadequate knowledge, whereas 12% had moderately adequate knowledge, and 6% had adequate knowledge regarding modifiable risk factors of myocardial infarction. The research concluded that there is an immense need for educational programmes in related fields [38].

Literature Review on the Effectiveness of Structured Teaching among Patients Undergoing Coronary Angioplasty

A research was organised to evaluate the knowledge level of the cardiovascular risk factors and the proposed lifestyle modifications in rehabilitated patients following an angioplasty with a 31-patient sample size. The result revealed that once the rehabilitation programme finished, the subject had a considerable knowledge improvement regarding the recommended cardiovascular risk factors, along with lifestyle changes. To conclude, patients with acute coronary syndrome stated having inadequate and poor knowledge of cardiovascular risk factors and recommended lifestyle modifications. Moreover, the level of knowledge could boost cardiac rehabilitation [39].

Several interventional procedures have proven that pre-procedure education eliminates anxiety and leads to better outcomes. On the other hand, post-procedure cardiac education or rehabilitation might also be useful in addressing patients' risk factors, hence, reducing re-admission rates along with enhancing the post-discharge quality of life. However, the length of time that patients remain in contact with health professionals before and after interventions is becoming gradually shorter; therefore, nurses have limited time to address the cardiac rehabilitation topic. As a result, the patient could find it difficult to understand the information they are given [40]. Structured teaching was conducted in Norway on "positive psychological and lifestyle changes after myocardial infarction-a follow-up research after two to four years". An interview was performed with 84 males, demonstrating the number of positive changes regarding lifestyle and factors related to the quality of life within three to five months after the index infarction. Recently, extensive research has been conducted among 74 of 75 survivors who responded to a postal questionnaire. The answers concerning the total life situation, as compared to the last month before the myocardial infarction. Response after three to five months improved by 29% (33%), remained unchanged by 47% (47%), and deteriorated by 24% (30%). There were appreciable positive changes in follow-up regarding physical activity, alcohol consumption, and smoking. Positive changes in psychosocial and

lifestyle factors are seen shortly after MI and seem to persist after two to four years [40,41].

A structured educational programme for patients undergoing coronary angioplasty was designed and administered to 97 patients undergoing their first procedure. Knowledge, coping style, social support, health locus of control, IQ, and demographic and medical factors were assessed before the procedure. Risk factor knowledge, anxiety, and the medical status were assessed prior to discharge, for six months and two years after angioplasty. The total knowledge mean score for all patients was higher at discharge (p less than 0.05). There was no major difference between knowledge scores at baseline and at either six months or two years. Analyses revealed that patients with a repressive coping style learned less during hospitalisation (p less than 0.05). No factors predicted retention of knowledge at six months or two years. These results indicated that a structured educational approach might have beneficial effects on immediate knowledge gain, although these results are not sustained. Copying assessments may provide information valuable for understanding differences in knowledge retention [42]. A total of 93 patients who were treated with percutaneous transluminal coronary angioplasty (PTCA) were randomly allocated to a control group or an intervention group. The intervention group participated in a comprehensive behaviour-oriented programme in order to achieve a significant long-term transformation in lifestyle risk factor behaviour. Besides, applying assessments for lifestyle behaviours, biological and psychological risk factors, further secondary prevention and rehabilitation were carried out 12 months later. The results revealed that applied measures such as assessing smoking, exercise, and changing diet habits were significantly improved in the participating patients, as compared with controls. These behavioural changes were evaluated according to the weight reductions, the exercise capacity improvement, and in between the participants who complained of chest pain during an exercise test. Nevertheless, a few changes were found in morbidity, ability to return to work, and various psychological variables [43].

Another research was conducted on patients who received a coronary stent (CS) or percutaneous transluminal coronary angioplasty (PTCA), to determine the impact of exercise training (ET) on the quality of life (QOL) and functional capacity. The same research aims to assess the effects (ET) on the restenosis rate and the general outcome on patients' health. A total of 118 consecutive patients who are suffering from coronary artery disease were included in the research. So, (mean age 57+/-10 years) who are experienced CS or PTCA, one (69%) or two (31%) native epicardial coronary arteries. As a result, patients were divided into two groups. Group T (n=59) was exercising every other day, which means three times a week for a period of six months at 60% of peak VO2. Group C (n=59) is known as the control group; hence, only trained patients are significantly showing some improvements in peak VO2 (26%, p<0.001) and quality of life (26.8%, p=0.001 vs C). On the other hand, the angiographic restenosis rate was unaffected by ET (T: 29%; C:33%, P=NS); besides, the trained patient's angiographic restenosis rate was not drastically different after PTCA or CS. However, residual diameter stenosis was lower in (29.7% p

= 0.045). The thallium uptake for patients with angiographic restenosis improved only in group T (19%; P<0.001). During the follow-up (33+/-7 months) trained patients had significantly lower event rates than controls (11.9 vs 32.2%, RR: 0.71, 95% confidence interval [CI]: 0.60 to 0.91, p= 0.008) and a lower rate of hospital readmission (18.6 vs 46%, RR: 0.69, 95% CI: O.55 TO 0.93, P,0.001). Moderate ET improves functional capacity and QOL after PTCA or CS. During the follow-up, trained patients had fewer events and a lower hospital readmission rate than controls, despite an uncharged restenosis rate [44].

Additionally, a research study was designed to evaluate the impacts of behaviourally oriented cardiac rehabilitation, coronary recurrence rates, and lifestyle changes (secondary prevention program). Recently, patients who are treated with percutaneous coronary intervention (PCI) were randomised to intervention with an aggressive focus on lifestyle changes (diet, exercise, smoking, and stress: n = 46) or to a standard-care control group (n=42). After 12, 24, 36, and 60 months, the intervention group had higher lifestyle changes than the control group. On the other hand, the intervention group had a lower rate than all coronary incidents, such as coronary artery bypass graft, acute myocardial infarction, PCI cardiac death (30.4% vs 53.7%), and cardiovascular mortality (2.2% vs 14.6%). The need was highlighted for future large-scale and long-term evaluation for lifestyle-oriented and secondary prevention [45].

Moreover, research was performed in Italy to assess the efficiency of informative videos for coronary angioplasty patients to reduce their anxiety and concerns, and to increase their satisfaction with the obtained information. Ninety-three patients took part in the research; the Spielberger Scale was used to measure a scale with severe indications. Findings suggested that the application of informative videos in cardiology departments is highly recommended as an instrument that can be used to eliminate anxiety and increase satisfaction levels based on the received information [46]. Further, the concern increased in assessing the knowledge level of cardiovascular risk factors and the recommended lifestyle changes for short-term participating patients (22 males, 56.6+/-10.9 years), with early comprehensive cardiac rehabilitation. This includes admission and discharge, three months later from the discharge day, a questionnaire was developed to assess the participants' knowledge. The results found that on admission, patients had poor knowledge of the recommended lifestyle and cardiovascular risk factors, especially for those with hypertension, diabetes, and unhealthy eating habits. Despite that, the result shows that after completing the rehabilitation programme, the patients were familiar with the recommended lifestyle and risk factors, and their answers were correct to the questions. For example, they were familiar with a cholesterol-rich diet as a risk factor for cardiovascular disease and replacing animal fat with vegetables as a lifestyle modification. Besides, systolic blood pressure was under control, and patients answered correctly all the questions related to the blood pressure value. The research concluded that the knowledge level could be improved in the short term if implemented effectively, yet the degree is not entirely satisfactory [47].

Summary
This chapter covered literature related to coronary angioplasty, knowledge on follow-up management of coronary angioplasty, and the effect of structured teaching on coronary angioplasty. These reviews showed that structured teaching programmes have a significant effect on knowledge of follow-up management of coronary angioplasty.

Methodology
This chapter describes the different steps carried out for gathering and organising the available data. In this chapter, the following will be considered: research design, sample size and sampling technique, criteria of sample selection, research approaches, the procedure for data collection, research setting, development and description of the instruments of the tool, and finally, data analysis plans and interpretation.

Research Approach
The research approach guides the researcher in data collection and analysis. It helps to develop the conclusion according to the research findings, by giving the nature of the problem to draw the aim and the objectives of the present research [48]. A quantitative evaluative approach was adopted for this research to assess the effectiveness of a structured teaching programme on patients' knowledge related to the follow-up after coronary angioplasty management among patients undergoing coronary angioplasty. The quantitative evaluative approach is an objective that applies a systematic process, and it uses numerical data to obtain information about the issue.

Research Design
Overall, the plan in the research design focuses on research questions to enhance the research integrity. It provides a backbone structure for the research study. It determines how the research has been managed and how data has been collected and investigated. Research design indicates how all research projects work together; further, it is used to form the research and to illustrate how all major parts of the research project are working together to address the research questions [48]. A pre-experimental research design has been selected to achieve the research objectives. So, the research considers one Group Pre-Test and Post-Test design to assess the outcome of the teaching programme on patients' knowledge related to follow-up management of coronary angioplasty.

Figure 1: Study design.

Key
X - Intervention
O_1 - Pre-test
O_2 - Post-test

O_1 x O_2

Variables
Variables are known as concepts related to different qualitative values.

Independent variables

Independent variables are identified as variables that are considered to influence ideas and behaviours [49]. In this research, the independent variables are believed to be structured teaching programmes regarding follow-up management of coronary angioplasty.

Dependent variables

It is described as the variables that the researcher is interested in understanding, explaining, and proceeding [49]. The dependent variables are the level of knowledge regarding follow-up management of coronary angioplasty.

The setting of the study

The places where the research has a setting for data collection. It also refers to the setting or the area where the research is conducted. The setting was selected based on the feasibility of conducting the study [46]. The research was conducted at the Cardiac Care Unit (CCU), AG Block in NIMS Hospital, Neyyattinkara.

Population

It refers to the total number of all subjects or collective numbers that are confirmed to a set of specifications [50]. The population in this research represents the patients who were undergoing coronary angioplasty.

Sample

The sample is a subsection of the population, those who were selected to participate in the research study; it is known as a part of the population which represents the entire population [17]. The sample in this paper was patients who were admitted for coronary angioplasty to the CCU and AG Block of NIMS Hospital, Neyyattinkara.

Sample Size

It is decided based on the following: the nature of the research and population, the type of sampling technique, the total number of variables, followed by the statistical test for analysis, and finally, the sensitivity of measures and additions [51]. The sample size was 50 patients who were undergoing coronary angioplasty.

Sampling Technique

It refers to the process of selecting the population to represent the total sample [18]. The applied sample technique in this research was non-probability, in which convenience sampling was used to select the proper sample.

Sampling criteria
Inclusion criteria

· Patients undergoing coronary angioplasty.
· Patients are interested in taking part in this research.
· Patients who are present in the hospital throughout the research.
· Both genders.

Exclusion criteria

· Patients who are included in any other ongoing research.
· Cognitively impaired Patients.

Tools and Techniques
Development of tools

The adopted tools were developed through reviewing several pieces of literature and academic work, discussion with experts in the medical and nursing field and personal experience of the researcher. The methods and procedures used for the data collection are called 'techniques' and the instruments used for the technique are called a 'tool'. This research adopts the following tools:

The structured questionnaire consists of:
Part 1 - Socio-demographic data (10 items)
Part 2 – Questionnaire on follow-up management of coronary angioplasty (25 items).

Description of the Tool

The tool is considered an instrument that helps to collect and assess the respondent data [17]. The used tool is divided into two sections:

Section A: This section had 10 questions which dealt with socio-demographic data, including gender, age, education, occupation, marital status, family income, type of family, domicile, source of information, and unhealthy habits.

Section B: This section had 25 questions which dealt with coronary angioplasty, diet, exercise, cessation of smoking and alcohol, medications, stress reduction and follow-up.

Content validity

Validity is the degree to which is intended to measure or an instrument measure. The validity of the content in the questionnaire and socio-demographic variables was validated in consultation with 6 field experts and the guide. Those experts include research guides, medical experts, nursing specialists from medical/surgical departments, and statisticians. The tool was revised according to the expert's suggestions and recommendations.

Tool reliability

The reliability of an instrument is developed according to the degree of consistency or dependability with which the instrument measures an attribute; further, the attribute is known as the ability of the instrument to create reproducible results [51]. The tool's reliability could be determined by using the split-half and forming a self-correlation of the half-test. The reliability measurement of the entire test may be estimated from the following formula:

$$r^1 = \frac{2r}{1 + r}$$

(Spearman-Brown prophecy formula for estimating reliability from two comparable halves of a test).
r = correlation between the odd-even split
r^1 = reliability factor of the whole test

The tool's reliability was tested by applying the tool to five patients undergoing angioplasty in NIMS Hospital, Neyyatinkara. The split-half method (Spearman Brown Formula) was adopted to test

the reliability of the tool; the finding illustrates that the tools were reliable ($r^1 = 0.082$).

Pilot study
The pilot study took place in the same hospital where the main research is intended to be carried out. It is done to test the feasibility of the research. Prior to the research, permission was obtained from the authority of the hospital, such as the hospital director and the administration departments. After giving a brief introduction and explanation regarding the research, along with assuring the confidentiality of the information provided to the participants. The participant's information sheet, along with the informed consent, was distributed and obtained. Over a period of one week, the research was carried out between 3rd February 2020 to 10th February 2020, and five samples were selected. Pre-tests and post-test scores were obtained to determine the viability of the research. In addition, the pilot study sample was excluded from the main research.

Data Collection Process
The study was conducted after securing permission from the ethical committee, the medical superintendent, nursing superintendent and director of NMS, Heart Foundation of NIMS hospital. The main research was conducted among 50 patients. Before data collection, a brief introduction and explanation about the research were given by the author. To ensure more understanding of the research, a participant's information sheet was provided to the participants. Furthermore, to ensure confidentiality, an informed consent form was distributed to give information to the participants. The main research was conducted among 50 patients. After collecting the pre-test answers, the researcher gave an education on follow-up management of coronary angioplasty. The data was collected from 17th February 2020 to 28 March 2020. The schedule of the study was from Monday to Saturday, between 9.00 am to 1.00 pm, and then 2.00 to 4.00 pm. Post-test was given 24 hours after coronary angioplasty. The data was organised, presented, summarised, and analysed by applying descriptive and inferential statistics for more explanation about the issue.

Plan for Data Analysis
The data analysis describes the statistical tests that were applied to test the research hypotheses [44]. Descriptive and inferential statistics were used to analyse the data and link to the research objectives. To describe the distribution of sociodemographic variables in the research, the researcher used Frequency and Percentage. Further, the Mean and Standard Deviation of pre- and post-test knowledge were computed to determine the improvement and retention of knowledge in each area. Inferential statistics were set to test the hypotheses. Analysis with a paired t-test was used to assess the effectiveness of a structured teaching programme. A correlation between the selected demographic variables and the pre-test knowledge score was obtained by the chi-square test.

Summary
In this section, the data collection process, along with the data analysis plan, was addressed. This research adopted a one-group pre-test and post-test design. In addition, the planned data has been analysed using descriptive and inferential statistics.

Results and Analysis
This research was conducted to determine the effectiveness of a structured teaching programme regarding the knowledge of follow-up management of coronary angioplasty among patients undergoing coronary angioplasty in NIMS Hospital, Neyyattinkara.

Organise the Research Findings
Section 1: Description of the demographic variables

Table 1: Description of the sample according to age (n=50).

Age	Count	Percent
	f	%
30-39 years	3	6
40-49 years	7	14
50-59 years	18	36
>=60 years	22	44

Table 1 shows that 6% are in the age group of 30-39 years, 14.0% belong to an age group of 40 to 49 years, 36.0% an age group of 50-59 years, and 44.0% are 60 years and above.

Table 2: Description of sample according to Gender (n=50).

Gender	Count	Percent
	F	%
Female	6	12
Male	44	88

Table 2 shows that 12.0% of the sample are male and 88.0% are female.

Table 3: Description of sample according to Marital Status (n=50).

Marital Status	Count	Precent
	F	%
Married	43	86
Unmarried	2	4
Widow/Widower	1	2
Divorced	4	8

Table 3 shows that 86.0% of the sample were married, 4.0% were unmarried, 2.0% were widows/widowers, and 8.0% were divorced.

Table 4: Description of sample according to Educational Status (n=50).

Educational Status	Count	Percent
	F	%
Primary	18	36
High School	17	34
Higher secondary	11	22
College level	4	8

Table 4 illustrates that 36.0% of the sample had a primary school education, 34.0% had a high school education, 22.0% had a higher secondary school education, and 8.0% had a college-level education.

Table 5: Description of sample according to Monthly Income (n=50).

Monthly Income	Count	Precent
	F	%
Less than Rs. 5000	16	32
Rs. 5000 – Rs. 10,000	28	56
More than Rs. 10,000	6	12

Table 5 illustrates that 32.0% of the sample had a monthly income of less than Rs. 5000. 56.0% had Rs. 5000 – Rs. 10,000 and 12.0% had more than Rs. 10000.

Table 6: Description of sample according to the Source of information (n=50).

Source of Information	Count	Precent
	F	%
Health professional	26	52
Mass media	11	22
Friends and relatives	7	14
None	6	12

Table 6 shows that 52.0% of the sample got the information from health professionals, 22.0% from mass media, 14.0% got the information from friends and relatives, and 12.0% did not belong to any of the above information sources.

Table 7: Description of sample according to Bad Habits (n=50).

Source of Information	Count	Precent
	F	%
Sniffing	1	2
Alcoholism	9	18
Smoking	23	46
None	22	44

Table 7 shows that 2.0% had experience with sniffing, 18.0% had alcoholism, 46.0% were smokers, and 44.0% had none of these habits.

Table 8: Description of sample according to Dietary Pattern (n=50).

Dietary Pattern	Count	Precent
	F	%
Vegetarian	11	22
Non-vegetarian	39	78

Table 8 shows that 22.0% were vegetarians and 78.0% were non-vegetarians.

Table 9: Description of sample according to Domicile (n=50).

Domicile	Count	Precent
	F	%
Urban	39	78
Rural	11	22

Table 9 shows that 78.0% reside in an urban area and 22.0% reside in a rural area.

Table 10: Description of sample according to Occupation (n=50).

Occupation	Count	Precent
	F	%
Unemployed	12	24
Coolie/ agriculture	28	56
Private employee	3	6
Government employee	7	14

Table 10 illustrates that 14.0% of the sample were Government employees, 6.0% were private employees, 24% were unemployed, and 66% were coolie workers.
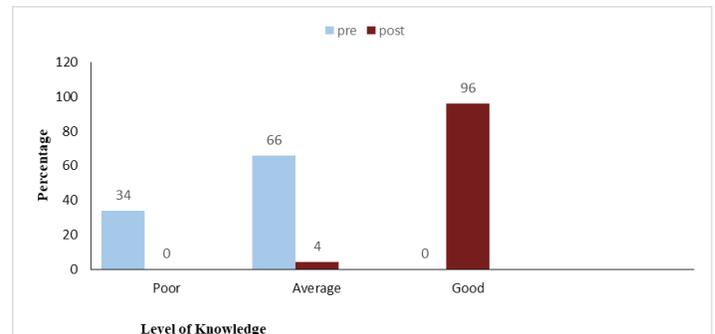

Figure 1: Distribution of sample according to knowledge during pre-test and post-test.

Figure 1 shows that 34.0% had poor knowledge during the pre-test, 60.0% had average knowledge, and 0.0% had good knowledge during the pre-test. During the post-test, 0.0% had poor knowledge, 4.0% had average knowledge, and 96.0% had good knowledge.

Table 11: Mean, Standard Deviation and t value of the effectiveness of the intervention on knowledge regarding follow-up management of coronary angioplasty.

Knowledge	Mean	SD	N	Mean Difference	Paired t	P
Pre	8.9	2.9	50	12.1	19.59**	0
Post	21	3.1	50			

**: Significant at 0.01 level

Table 11 reveals that the mean for the pre-test score is 8.9 and the mean for the post-test score is 21.0. The mean difference is 21.1. The paired t-test (t=19.59, p<0.01) showed that the score significantly increased, and the increase in the score was substantial at the 0.01 level of significance. Thus, it can be concluded that the structured teaching programme was statistically effective in increasing the knowledge regarding the follow-up management of coronary angioplasty.

Table 12 shows that the percentage of the level of knowledge on follow-up management of coronary angioplasty is 73.1, sources of information received from a health professional, 45.5 from mass media, 100.0 from friends and relatives 33.3 had no source of information. The Chi-square test was used to find out whether there is a correlation between the level of knowledge and the

Table 12: Description of the correlation between the knowledge and selected demographic variables.

		Poor		Average		X²	P
		Count	Percent	Count	Percent		
Age	<50 years	3	30	7	70	2.47	0.291
	50-59 years	4	22.2	14	77.8		
	>=60 years	10	45.5	12	54.5		
Gender	Male	14	31.8	30	68.2	0.78	0.378
	Female	3	50	3	50		
Marital Status	Married	13	30.2	30	69.8	1.94	0.163
	Others	4	57.1	3	42.9		
Educational Status	Primary School	10	55.6	8	44.4	5.87	0.053
	High School	4	23.5	13	76.5		
	Higher Secondary and above	3	20	12	80		
Monthly Income	Less than Rs. 5000	5	31.3	11	68.8	0.08	0.778
	More than Rs 5000	12	35.3	22	64.7		
Source of Information	Health Professional	7	26.9	19	73.1	9.11*	0.028
	Mass media	6	54.5	5	45.5		
	Friends and relatives	0	0	7	100		
	None	4	66.7	2	33.3		
Sniffing	No	17	34	32	65.3	0.53	0.468
	Yes	0	0	1	100		
Alcoholism	No	14	34.1	27	65.9	0	0.963
	Yes	3	33.3	6	66.7		
Smoking	No	9	33.3	18	66.7	0.01	0.914
	Yes	8	34.8	15	65.2		
None	No	10	35.7	18	64.3	0.08	0.773
	Yes	7	31.8	15	68.2		
Dietary Pattern	Vegetarian	4	36.4	7	63.6	0.04	0.0851
	Non- Vegetarian	13	33.3	26	66.7		
Domicile	Urban	15	38.5	24	61.5	1.57	0.21
	Rural	2	18.2	9	81.8		
Occupation	Unemployed	7	60.3	5	41.7	5.78	1.056
	Coolie/agriculture	9	32.1	19	67.9		
	Employed	1	10	9	90		

*: Significant at 0.05 level

source of information. The Chi-square test (X² =9.11, p<0.05) indicates that the level of knowledge differs regarding the source of information. At the pre-test level was 100.0% from friends and relatives, 73.1% from a health professional, 45.5% from mass media and 33.3% didn't get any source of information. Hence, there was a significant relationship between the level of knowledge and the source of information. Furthermore, there was no significant relationship between knowledge of follow-up management of coronary angioplasty and other variables that were selected for the research.

Summary

H₁: The paired t-test was applied to analyse the data, therefore, the result showed that the score significantly differs between the groups at the 0.01 level. To conclude, the structured teaching programme is statistically significant in improving knowledge, hence the research hypotheses were accepted.

H₂: The Chi-square test was useful to find out that there was an association with the source of information at a 0.05 level. There was no significant relationship between other variables that were

selected for the research; thus, it can be concluded that the research hypothesis is partially accepted.

Discussion

This chapter discusses the research's major findings and then reviews them in terms of results from other studies which the investigator reviewed. This research revealed that 34.0% had poor knowledge during the pre-test, 66.0% had average knowledge, and 0.0% had good knowledge during the pre-test. During the post-test, 0.0% had poor knowledge, 4.0% had average knowledge, and 96.0% had good knowledge.

The following literature reviews support this research findings:
A structured educational program for patients undergoing coronary angioplasty was designed and administered to 97 patients undergoing their first procedure. Knowledge, coping style, social support, health locus of control, IQ, and demographic and medical factors were assessed before the procedure. Risk factor knowledge, anxiety, and medical status were assessed before discharge, and at six months and two years after angioplasty. The total knowledge

Mean score /for all patients was higher at discharge (p less than 0.05). There was no significant difference between knowledge scores at baseline and either six months or two years. Analyses revealed that patients with a repressive coping style learned less during hospitalisation (p less than 0.05). No factors predicted retention of knowledge at six months or two years. These results indicate that a structured educational approach may have beneficial effects on immediate knowledge gain, although these results are not sustained. Coping assessment may provide information valuable for understanding differences in knowledge retention. Similarly, this research also had a good emphasis on a structured teaching programme for follow-up management of coronary angioplasty.

A research was conducted in Australia to evaluate whether a pre-procedural education/counselling program can improve the knowledge of the coronary risk factors for 130 patients (65 experimental: 65 comparisons) about four months after having percutaneous transluminal coronary angioplasty (PTCA). The Knowledge and physical activity levels (p=0.00) were improved for both groups from pre-PTCA to the follow-up. Further, the experimental group revealed positive changes in total cholesterol level (p=0.02) at follow–up. The above studies supported this research in organising a structured teaching programme on the improvement of lifestyle practices in preventing cardiac diseases.

Summary
The major findings of the research were summarised as follows:
Section A: Description of the socio-demographic variables
* The majority of samples (44.0%) belong to the age group above 60 years.
* The majority of samples (88.0%) were males.
* The majority of samples (86.0%) were married.
* The majority of samples (36.0%) had primary education.
* The majority of samples (56.0%) had a family income of 500 – 10000.
* The majority of the sample group (52.0%) gets prior information from health professionals.
* The majority of samples (4.0%) had the habit of smoking.
* The majority of samples (78.0%) were non-vegetarians.
* The majority of samples (78.0%) reside in an urban area.
* The majority of samples (56.0%) were coolie workers.

Section B: description of the samples according to the effectiveness of the intervention on knowledge
* During the pre-test majority of samples (66.0%) experienced average knowledge, and during the post-test majority of samples (96.0%) experienced good knowledge.

Section C: Description of the sample according to the effectiveness of the intervention on knowledge
The mean post-test score was significantly higher than the mean pre-test score (p<0.01). The mean difference between pre-test and post-test knowledge is 12.1. The pre-test (t=19.59, p<0.01) showed that the score significantly differs between the groups at a 0.01 level of significance. It reveals that the structured teaching programme was statistically effective in increasing the knowledge regarding follow-up management of coronary angioplasty.

Section D: Description of the correlation between knowledge and selected demographic variables
The percentage of the knowledge level in follow-up management of coronary angioplasty was 73.1 sources of information received from a health professional, 45.5 from mass media, 100.0 from friends and relatives 33.3 had no source of information. The Chi-square was used to determine whether there was a relationship between the level of knowledge and the source of information. The Chi-square test (X^2 =9.11, p<0.05) illustrates that the level of knowledge differs about the source of information at the present level, that is, 100.0% from friends and relatives, 73.1% from a health professional, 45.5% from mass media, and 33.3% did not get any source of information. There was no significant relationship between knowledge of follow-up management of coronary angioplasty and other variables selected for the research.

Conclusion
The following conclusions were drawn from the findings of the research. The research showed that the majority of the clients undergoing coronary angioplasty were readmitted with restenosis and other complications. Further, the research revealed that there was a significant improvement in knowledge regarding follow-up management of coronary angioplasty after a structured teaching programme.

Nursing Implications
The research had implications in the field of nursing education, research, practice, and nursing administration.

Nursing Practice
· Based on the findings, nurse professionals should implement protocols to explain the procedure well for patients undergoing coronary angioplasty.
· The nurses can play a vital role in reducing the stress and anxiety among patients undergoing coronary angioplasty and educating the patients regarding the follow-up management of coronary angioplasty. This enables the cardiologist to perform the procedure more effectively and improve standards in nursing practice.

Nursing Administration
· Nurse administrators can post one nurse educator to educate the patient regarding follow-up management of coronary angioplasty, thus reducing their stress and anxiety and preventing further complications following angioplasty.
· The research findings can be utilised by nurse administrators to formulate a teaching plan based on the follow-up management of coronary angioplasty.
· The research was relevant for the nurse administrators to determine the need for explaining follow-up management properties to reduce complications after the procedure.

Nursing Education

· The structure's teaching programme is beneficial to the patients undergoing coronary angioplasty to reduce complications and improve follow-up after the procedure.
· Research findings can be utilised as a resource material for teaching nursing students.
· The research results can be kept in the school or college library for future reference.

Nursing research

· A similar research can be done with a large sample size.
· A similar research can be used to compare and contrast different countries in the Middle East with less population.
· A research can be done to analyse each problem faced by the patients after the procedure.

Limitations

· Included only 50 patients undergoing coronary angioplasty.
· The research is limited to samples of NIMS hospital, Neyyattinkara.

Recommendations

The following recommendations are offered by the researcher for future study for the:
1. A similar research can be conducted on a larger population.
2. Future research can focus on the sociocultural aspect and its influences on coronary angioplasty and heart disease.
3. The research can focus on other interventions to improve follow-up management after coronary angioplasty.
4. Studies can be included to focus on complications regarding coronary angioplasty.

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