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The effectiveness of pre-operative care bundle on post-operative outcome among adult patients undergoing cardiac surgeries in selected hospitals

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Abstract

Background: Cardiovascular diseases (CVDs) are the leading cause of death globally, taking an estimated 17.9 million lives each year. CVDs are a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. More than four out of five CVD deaths are due to heart attacks and strokes, and one third of these deaths occur prematurely in people under 70 years of age. India has one of the highest burdens of cardiovascular disease (CVD) worldwide. The annual number of deaths from CVD in India is projected to rise from 2.26 million (1990) to 4.77 million (2020). Coronary heart disease prevalence rates in India have been estimated over the past several decades and have ranged from 1.6% to 7.4% in rural populations and from 1% to 13.2% in urban populations.
Purpose: To determine the effectiveness of preoperative care packages on postoperative outcomes of CABG patients and the relationship of postoperative outcomes with clinical and demographic variables.
Method: In this study the design used was a quasi-experimental design. In this study, a simple random sampling technique was used. sample size was 40 (experimental group 20 and control group 20) Study Findings 95% of patients were diagnosed with TVD, the remaining 5% were DVD patients.
Results: This shows that there is moderate with 30% and good with 70% recovery in the experimental group, while in the control group 85% is moderate, 10% is good and 5% is bad. This indicates that there is a significant difference between the postoperative outcome scores between the experimental and control groups as $p<0.05$
Conclusion: there is a significant effect of pre-operative care bundle in patients undergoing CABG on preventing CABG complications and increasing life expectancy.

Keywords: Adult patients; Cardiac surgeries; Pre-Operative; Care Bundle; CABG; DVD; TVD; Post-Operative.

INTRODUCTION

The heart is a muscular organ about the size of a fist, located just behind and slightly left of the breastbone. The heart pumps blood through the network of arteries and veins called the cardiovascular system. The coronary arteries run along the surface of the heart and provide oxygen-rich blood to the heart muscle. Over the years, cholesterol plaques can narrow the arteries supplying blood to the heart. The narrowed arteries are at higher risk for complete blockage from a sudden blood clot (this blockage is called a heart attack) (Elizabeth, Suzanne, Todd, 2022; Iaizzo, 2016; Thiriet, 2008; Weinhaus, & Roberts, 2005).

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of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. More than four out of five CVD deaths are due to heart attacks and strokes, and one third of these deaths occur prematurely in people under 70 years of age (World Health Organization, 2021; Skourtis, Stavroulaki, Athanasiou, Fragouli, & Iatrou, 2020; Mahmood, Levy, Vasan, & Wang, 2014; Mackay, Mensah, & Greenlund, 2004).

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Coronary heart disease can cause angina, which is chest pain that occurs when the supply of oxygen-rich blood to the heart becomes restricted. A coronary artery bypass graft may be recommended to reduce chances of having a heart attack. A coronary artery bypass graft (CABG) is a surgical procedure used to treat coronary heart disease. It diverts blood around narrowed or clogged parts of the major arteries to improve blood flow and oxygen supply to the heart (NHS, 2021).

Care bundles were first developed over 20 yr ago. They have been used in a number of different medical and surgical specialities and have been used particularly extensively in cardiology. The care bundle approach to providing medical care forms part of a more general philosophical change in the way that medicine is practised. Important key elements include the development and widespread application of evidence-based medicine (on which bundles are based), the introduction of audit and performance assessment, and the introduction of guideline and protocol-based care to ensure the delivery of a minimum standard (Horner, & Bellamy, 2012; Kang, & Ko, 2018; Zhang, Wu, Zhao, Zhang, & Li, 2021).

LITERATURE SURVEY

Review of literature is defined as a broad, comprehensive, in depth, systematic and critical review of scholarly publications, unpublished scholarly print material, and audio visual materials and personal communication.

Nicolini F, Fortuna D, Contini G et al. (2018) Retrospective multicenter registry study was conducted to investigate age-dependent trends in mortality, long-term survival, and comorbidity over time in patients who underwent isolated CABG from 2003 to 2015. The percentage of patients < 60 years of age was 18.9%. Female sex, chronic pulmonary disease, extracardiac arteriopathy, and neurologic dysfunction disease were significantly less frequent in this younger population. The prevalence of BMI ≥ 30, previous myocardial infarction, preoperative severe depressed left ventricular ejection fraction, and history of previous PCI were significantly higher in this population. After PS matching, at 5 years, patients < 60 years of age reported significantly lower overall mortality, cardiac-related mortality, incidence of acute myocardial infarction, and stroke rates. Patients < 60 years required repeated revascularization more frequently than older patients. Patients < 60 who underwent CABG had a lower risk of adverse outcomes than older patients. Patients < 60 have a different clinical pattern of presentation of CAD in comparison with more elderly patients (Nicolini, Fortuna, Contini, Pacini, Gabbieri, Zussa, & Gherli, 2017).

Polomsky M, (2013) The Society of Thoracic Surgeons National Cardiac Database was queried for all patients undergoing nonemergency, isolated coronary artery bypass between January 1, 2005, and December 31, 2010, who had Predicted Risk of Mortality scores and participant/surgeon identifiers. Of these 876,081 patients ("all sites"), 210,469 underwent surgery at participant sites that had performed more than 300 off-pump and 300 on-pump coronary artery bypass operations during the 6-year study period ("high-volume sites"). Results: Off-pump coronary artery bypass was associated with a significant reduction in risk of death, stroke, acute renal failure, mortality or morbidity, and postoperative length of stay compared with on-pump coronary artery bypass after

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adjustment for 30 patient risk factors in the overall sample. This held true within high-volume centers. In the overall sample, there was a significant (P < .05) interaction between off-pump coronary artery bypass and Predicted Risk of Mortality for death, stroke, acute renal failure, and mortality or morbidity.Conclusions: Off-pump coronary artery bypass was associated with reduced adverse events compared with on-pump coronary artery bypass after adjustment for 30 patient risk factors and center and surgeon identity (Polomsky, He, O'Brien, & Puskas, 2013).

American Association of Critical-Care Nurses (2010) developed a Demonstration Project to document fiscal costs and patient care effectiveness of critical care nursing in a unit characterized by valued organizational attributes. Data were collected by interview, observation, and written surveys from 42 nurses, 68 physicians, and 192 patient admissions. Decentralized administration, participatory management, high rate of CCRN certification, all-registered nurse staff, and high nurse-physician collaboration were present. Organizational and clinical outcomes were positive: high satisfaction, low turnover, low mortality ratio, no new complications, high patient satisfaction (Mitchell, Armstrong, Simpson, & Lentz, 1989).

Dorairaj Prabhakaran, et al (2016) Cardiovascular diseases (CVDs) have now become the leading cause of mortality in India. A quarter of all mortality is attributable to CVD. Ischemic heart disease and stroke are the predominant causes and are responsible for >80% of CVD deaths. The Global Burden of Disease study estimate of age-standardized CVD death rate of 272 per 100 000 population in India is higher than the global average of 235 per 100 000 population. Some aspects of the CVD epidemic in India are particular causes of concern, including its accelerated buildup, the early age of disease onset in the population, and the high case fatality rate. In India, the epidemiological transition from predominantly infectious disease conditions to noncommunicable diseases has occurred over a rather brief period of time (Prabhakaran, Jeemon, & Roy, 2016).

Samad E J Golzari, (2014**)** The World Medical Association's Declaration states that "the benefits, risks, burdens and effectiveness of a new intervention must be tested against those of the best proven intervention(s) except for cases in which due to convincing and scientifically acceptable methodological reasons, the use of any intervention less effective than the best proven one, the use of placebo, or no intervention is necessary provided that the patients who receive any intervention less effective than the best proven one, placebo, or no intervention will not be subject to additional risks of serious or irreversible harm as a result of not receiving the best proven intervention." Because in this study 60% of patients had endotracheal tubes and almost 70% had central venous catheters, the probable risks for patients of not receiving bundles for central-line-associated bloodstream infection or ventilator-associated pneumonia seem to have been overlooked (Golzari, & Mahmoodpoor, 2014).

RESEARCH METHOD

In this study the researcher has used order to achieve the objectives of the study, quantitative approach is considered appropriate, as the investigator aimed to find out the effectiveness of pre-operative care bundle on post-operative outcome of CABG patient and association of post-operative outcome with clinical and demographic variables. The design adopted in this study was quasi- experimental design. A quasi experimental design is one in which full experimental control randomization is not possible.In this study, sampling techniques used was simple random sampling technique. The researcher selected those units of population as a sample that appeared convenient until the desired number of sample size was met.

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RESULTS

Table 1. Demographic Data and Clinical Characteristics (N=40)

Parameters	No of cases (n/%)
Age (Years)	
45-54	14/35
55-64	26/65
Gender	
Male	35/87.5
Female	5/12.5
Educational status	
Secondary	7/17.5
Higher secondary	12/30
Graduate	21/52.5
Occupation	
Business	12/30
Farming	8/20
Retired	3/7.5
Service	17/42.5
Family income (Rs)	
20,000-40,000	29/72.5
More than 40,000	11/27.5
Area of Living	
Urban	28/70
Rural	12/30
Diagnosis	
DVD	2/5
TVD	38/95
Co-morbidities	
HTN	9/22.5
DM	7/7.5
HTN with DM	24/60
Previous Interventions	
Angioplasty	10/25
Angiography	27/67.5
MVR	3/7.5

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Diagram 1. The Diagnosis Wise Distribution of Cases

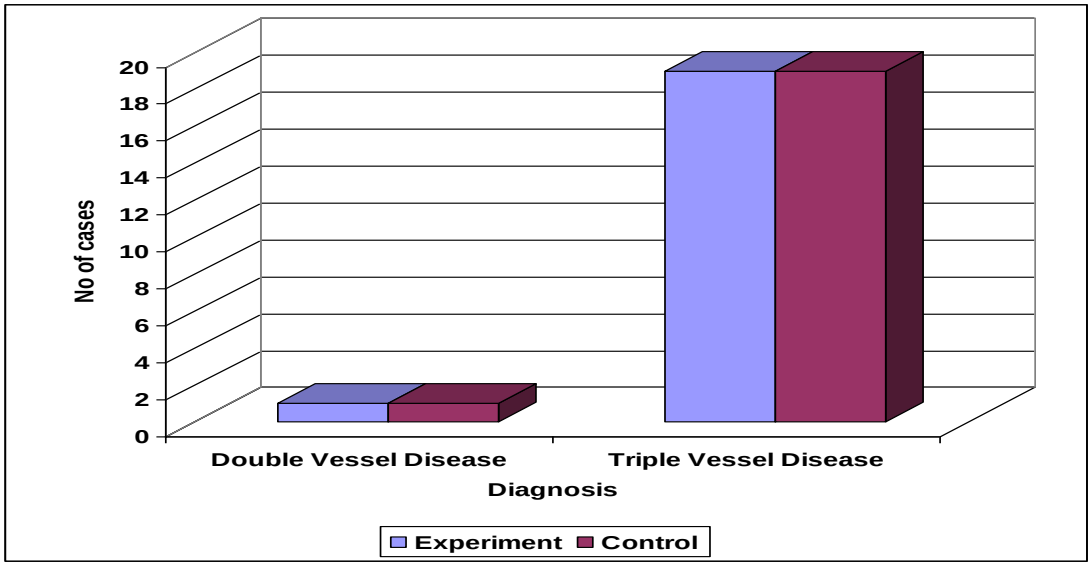

Table 2: Previous Cardiac Intervention Wise Distribution of Cases (N=40)

Previous cardiac intervention	Experiment	Control
Angiography	13	14
Angioplasty	5	5
Valve repair	2	1

Chi-square = 0.37, P=0.836

Table 3: Assess the post-operative outcome in patients undergoing CABG (N=40)

Post operative outcome	Experiment (%)	Control (%)
0 – 4 (Poor recovery)	0	1 (5)
5 – 9 (Moderate recovery)	6 (30)	17 (85)
10 – 13 (Good recovery)	14 (70)	2 (10)

Table 3. shows that there is moderate with 30% and good with 70% recovery in experimental group, while in control group it is 85% of moderate ,10% of good and 5% of poor recovery.

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Diagram 2. The Correlation of Post-Operative Outcome Score According to Age in Experiment Group

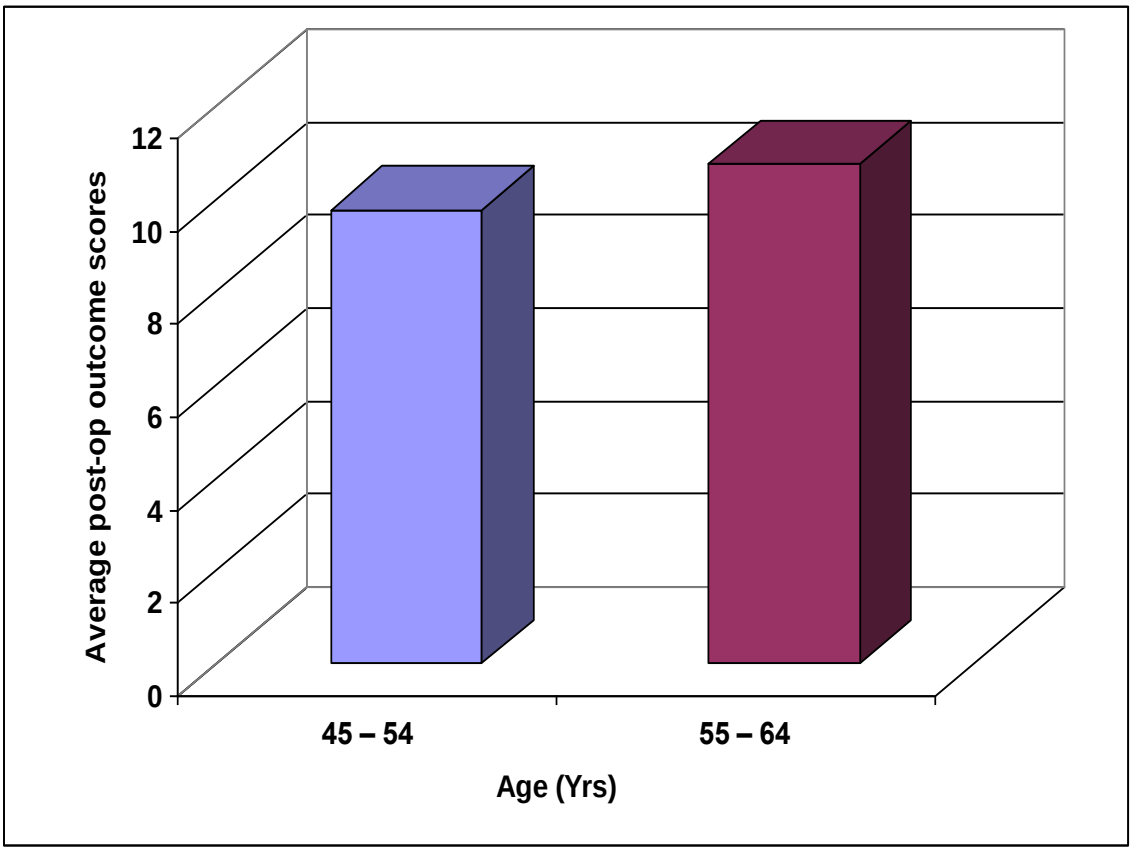

Table 4. Comparison of Post-Operative Outcome Score Between Experimental Group and Control Group

Parameter	Experiment (n=20)		Control (n=20)		MW test Z Value	P Value
	Mean	SD	Mean	SD		
Post op outcome score	10.35	2.159	7.35	1.954	3.73	<0.0001

Table 4. shows that there is significant difference of pre-operative care bundle between experimental and control group as $p<0.05$.

DISCUSSION

The present study was carried out on to evaluate the effectiveness of pre-operative care bundle in post-operative outcome for adult patient undergoing cardiac surgeries in selected hospital. This study was conducted on the adult patient who underwent CABG in selected hospital. The patients were in this study was selected on the basis of inclusion criteria determined at the beginning.

Finding related to demographic and Clinical characteristics of adult patients of undergoing cardiac surgeries, age: Out of 40 patients, most of the patients (65%) were seen in 55-64 years, whereas (35%); Gender: - majority of the sample (87.5%); Educational status:-52.5% were found in the group of graduate and above; Occupation 42.5% were dominated in the

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group of Service; income (72.5%) were found with income Rs 20,000-40,000; area of Living: (70%) of population were living in Urban; diagnosis: - 95% patients were diagnosed with TVD; comorbidities 60% were having both HTN with DM. previous Interventions: 65.5% were with angiography.

Findings related to the assessment of post-operative outcome in patients undergoing CABG among experimental and control group; it shows that there is moderate with 30% and good with 70% recovery in experimental group, while in control group it is 85% of moderate, 10% of good and 5% of poor recovery. Findings related to correlation of post-operative outcome with variables in experimental control group. It shows that there is no significant difference of pre-operative care bundle score according to age, sex, education, income, area of living between experimental and control group as $p>0.05$. Finding related to Comparison post-operative outcome score between experimental and control group. It shows that there is significant difference of Post-operative outcome score between experimental and control group as $p<0.05$

CONCLUSION

CABG is one of the important treatments for CAD but can also cause complications. These complications of CABG are very life threatening and can affect not only the quality of life but life can be lost of the patient. Based on the results the investigator concluded that there was significant impact of pre-operative care bundle on Patients undergoing CABG. Hence using pre-operative care bundle as an education material or an pre-operative Intervention can be helpful in better outcome post-operatively in patients, prevent the complications of CABG and improve the expectancy of life.

FUTURE SCOPE

Education

The nursing personnel should be given in-service education to update their knowledge and abilities to identify the learning needs and impart education, implement the pre-operative care bundle for patients undergoing CABG thereby improving the post-operative outcome of patients.

Administration

Nurse administrator should arrange continuing educational program for nursing personnel regarding Pre-operative care bundle for CABG patient. Nurse administrator should prepare adequate learning material for giving health education and making necessary educational material available to needy patient. The administrator should emphasize the need for implementing planned educational strategies for improving the knowledge of the patient and care takers. As a nurse administrator, one should encourage a specific association of care takers who can then carry out periodic meetings and programmes so as to be of help for the new care takers.

Clinical

The Cardiac nurse should be able to use the acquired knowledge to give health education to the patients and family members in the clinical area and will be able to supervise the symptomatic care measures adopted by the patients for the relief of the symptoms during post-operative phase.

Research

Study reveals that there is a deficit in the knowledge of the patients regarding post-operative outcome of CABG and there is a need for extended Nursing research into different aspects of CABG. Even today, there are no much study done on effectiveness of postoperative outcome for CABG patients. Future nurse researchers should take up various aspects and conduct interventional studies. Nursing research will emphasize to increase the knowledge regarding pre-operative care.

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