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Stepping Toward Recovery: Effectiveness of 6-Minute Walking upon Post- Operative Outcomes in Post-CABG Patients at Selected Hospitals, Chennai

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Abstract: *Background: Cardiovascular disease is the leading global cause of death, responsible for approximately 16.7 million deaths annually. Coronary Artery Bypass Grafting (CABG) is performed to alleviate angina and reduce mortality from coronary artery disease. Postoperative rehabilitation is essential to improve recovery and outcomes. 6 Minute walking is a simple, low-cost, and objective method to assess and enhance functional status and oxygenation in post-CABG patients.*

Methods & Materials: A true experimental pre-test post-test research design was conducted in selected hospitals in Chennai among 70 post-CABG patients, selected through systematic random sampling. After obtaining institutional permission and informed consent, patients were assigned into experimental (n=35) and control (n=35) groups. Demographic and clinical variables were recorded. In the experimental group, 6minute Walking was performed from postoperative day (POD) 4 to POD 7. Pre-test SpO2 was assessed on POD 3 in both groups; post-test SpO2 was measured on POD 7. The 6-minute walk test and a structured rating scale were used to assess oxygenation. Data were analyzed using descriptive and inferential statistics.

Results: A significant improvement in SpO2 was observed in the experimental group (normal SpO2 in 94.29% of patients post-intervention) compared to the control group (persistent high risk of hypoxemia in 77.14% of patients). The results demonstrated the effectiveness of 6 Minute Walking in improving postoperative outcomes related to oxygen saturation.

Conclusion: Incorporating 6 Minute Walking as part of postoperative rehabilitation can significantly improve functional status and oxygenation among post-CABG patients. Nurses play a vital role in promoting and supervising this intervention to optimize patient recovery.

Keywords: CABG, 6 Minute Walking, Postoperative Outcomes and SpO2

I. INTRODUCTION

Cardiovascular disease remains the foremost global health challenge, contributing to nearly 29.2% of all deaths worldwide. Coronary artery disease (CAD), a major subset of cardiovascular disease, is responsible for over 7 million deaths annually, posing significant health and economic burdens across both developed and developing nations. Coronary Artery Bypass Grafting (CABG) surgery is a well-established intervention for patients with advanced CAD, aimed at alleviating symptoms, improving functional capacity, and enhancing long-term survival. Postoperative recovery following CABG is a complex process that requires careful management to reduce complications and promote early rehabilitation. Among the most frequent postoperative challenges are hypoxemia and a decline in functional capacity, which can prolong hospital stay and impair quality of life. Early mobilization and targeted exercise interventions have shown promise in mitigating these risks and accelerating recovery. The 6-Minute Walking (6MW)

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approach, derived from the widely used 6-Minute Walk Test (6MWT), offers a simple, objective, and cost-effective strategy to both assess and enhance functional status and oxygenation levels in post-CABG patients. By encouraging safe, structured ambulation during the early postoperative period, 6MW can contribute to better clinical outcomes and patient well-being. This study was undertaken to evaluate the effectiveness of 6-Minute Walking on key postoperative outcomes, specifically peripheral oxygen saturation (SpO_2), among patients undergoing CABG in selected hospitals in Chennai.

Need for the Study

Despite advances in surgical techniques and perioperative care, postoperative complications such as hypoxemia, deconditioning, and delayed functional recovery continue to affect a substantial proportion of CABG patients. Reduced mobility in the early postoperative phase can exacerbate respiratory dysfunction, increase the risk of thromboembolic events, and hinder overall rehabilitation. There is a growing need for interventions that are evidence-based, practical, and easily implemented within routine clinical care to enhance postoperative outcomes. Structured walking programs like 6-Minute Walking offer a promising solution by promoting early mobilization, improving pulmonary function, and supporting cardiovascular recovery. However, there is limited data from Indian healthcare settings regarding the feasibility and effectiveness of such interventions, particularly in the context of Chennai's diverse hospital environments. Generating local evidence is crucial to guide practice and inform rehabilitation protocols tailored to the needs of Indian patients. This study addresses this gap by systematically evaluating the impact of 6-Minute Walking on postoperative oxygenation and functional status among post-CABG patients in selected hospitals in Chennai.

Purpose

The purpose of the study is to assess the effectiveness of 6 minute walking upon post -operative outcome among post CABG patients.

Research Hypothesis

H1: There will be a significant difference in postoperative outcomes between control and experimental group of CABG patients before and after 6 minute walking.

H2: There will be a significant association between selected demographic variables and postoperative outcomes among the experimental group of patients.

H3: There will be a significant association between selected clinical variables and postoperative outcomes among experimental group of patients.

II. REVIEW OF LITERATURE

Importance of Functional Recovery in Post-CABG Patients

Optimizing functional recovery following CABG is crucial to reduce postoperative morbidity and hospital stay. Functional decline and hypoxemia are common complications that can impair recovery and increase healthcare costs.

Benefits of Structured Rehabilitation Interventions

Structured rehabilitation interventions, including early mobilization and walking programs, have been shown to enhance oxygenation, improve functional capacity, and reduce complications. The 6-minute walk test is an established tool to objectively assess exercise tolerance and functional status.

Role of Nurses in Promoting Rehabilitation

Nurses play a pivotal role in motivating, educating, and assisting post-CABG patients to engage in rehabilitation activities such as 6 minute Walking. Early mobilization under supervised conditions can safely accelerate recovery and improve outcomes.

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III. MATERIALS AND METHODS

A true experimental pre-test post-test design was employed to evaluate the effectiveness of 6 minute **walking** on postoperative outcomes among patients undergoing coronary artery bypass grafting (CABG). The study was conducted in selected hospitals in Chennai, targeting post-CABG patients who met predefined inclusion criteria. A total of **70 patients** were selected using **systematic random sampling** and were randomly assigned to either the experimental group (**n = 35**) or the control group (**n = 35**). Allocation was done based on the serial number of admission, with **even-numbered patients assigned to the experimental group** and **odd-numbered patients to the control group**.**I nclusion criteria** for participation included patients who had undergone **elective CABG**, were **hemodynamically stable from postoperative day (POD) 4 onwards**, and were **willing to participate and provide informed consent**. Patients were excluded if they had **significant postoperative complications** or were **unable to ambulate safely**. Data were collected using three tools: **Demographic and Clinical Variables Proforma**, which captured information such as age, sex, body mass index (BMI), level of physical activity, presence of comorbidities, preoperative echocardiogram findings, and type of CABG performed.**6-Minute Walk Test Recording Form**, used to assess peripheral oxygen saturation (**SpO_2**) levels before and after the intervention.**Rating Scale** to assess **patient acceptability** of the 6 minute Walking intervention. In the **experimental group**, 6 minute Walking was conducted by the investigator on a **flat indoor surface** for a **duration of 6 minutes per session**, starting from **POD 4 to POD 7**, with sessions scheduled **four times a week** (one session per day). Patients were encouraged to walk at a self-paced, comfortable speed while continuously monitored for safety. SpO_2 levels were assessed before and aftereach walking session. The **control group** received **routine postoperative care** as per hospital protocol, without any additional structured walking intervention. SpO_2 levels, the primary outcome measure, were recorded for both groups using a **pulse oximeter** on **POD 3** (pre-test) and **POD 7** (post-test). Inter-rater reliability of the pulse oximeter was established at **r = 0.80**. The internal consistency of the patient **acceptability rating scale** was also found to be **r = 0.80**. All data were collected by the investigator using standardized procedures to ensure consistency and accuracy.

IV. RESULTS AND DISCUSSION

The present study was conducted to evaluate the effectiveness of 6 minute walking on postoperative outcomes among patients undergoing CABG. The demographic and clinical profile of the study participants provides important insights into the characteristics of this patient population, which may influence postoperative recovery and response to interventions such as structured walking. In both the control and experimental groups, the majority of patients were aged **51-70 years**, which aligns with global epidemiological trends showing that **coronary artery disease (CAD)** prevalence and surgical interventions like CABG are most common in this age group. This finding underscores the importance of tailored rehabilitation strategies for middle-aged and older adults, who may have unique functional and recovery needs.

It was notable that **all patients (100%) were male**, reflecting a gender disparity often observed in cardiac surgery cohorts, where men are more likely to undergo CABG than women. This gender imbalance should be considered when generalizing the study findings and highlights the need for future research to explore gender-specific rehabilitation outcomes. Dietary patterns showed variation between groups, with **non-vegetarianism predominant in the control group** and **vegetarianism more common in the experimental group**. While the impact of diet on short-term postoperative outcomes was not directly measured in this study, dietary habits may influence overall cardiovascular health and recovery trajectories.

A significant proportion of patients in both groups had a **BMI above 25**, indicating **overweight or obesity**, which is a known risk factor for both CAD and postoperative complications. Sedentary work patterns were also common, which may contribute to reduced baseline functional capacity and underscore the need for interventions promoting early mobilization and physical activity post-surgery. Preoperatively, many patients demonstrated **limited walking ability (<2 miles/hr)**, further highlighting the relevance of introducing structured walking programs like 6 minute walking Walking to gradually enhance endurance and functional status. The relatively high rates of **current smoking** and **daily**

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alcohol intakeobserved in both groups reflect modifiable lifestyle risk factors that warrant targeted counseling and intervention as part of comprehensive postoperative care.

Regarding comorbidities, more than half of patients had **associated illnesses**, which may complicate recovery and necessitate individualized rehabilitation approaches. The majority of patients underwent **off-pump CABG**, a technique associated with reduced inflammation and potentially faster recovery, which may have positively influenced the capacity to engage in early ambulation.Overall, these findings suggest that the study population exhibited several characteristics—older age, male predominance, overweight status, sedentary lifestyle, and comorbidities—that underscore the importance of structured, safe, and effective postoperative interventions like 6 minute Walking. Tailored walking programs can address the common challenge of functional decline and promote improved oxygenation and overall recovery in this high-risk group.

Table 1: Frequency and Percentage Distribution of Pretest and Post test level of Post operative outcomes (SpO_2)among post CABG patients in the Control and Experimental group.

Parameters	Control Group (n=35)				Experimental Group (n=35)			
	Pre test		Post test		Pre test		Post test	
	f	%	f	%	F	%	f	%
Spo_2								
Low Risk (96 – 100)	0	0	1	2.86	0	0	33	94.29
High Risk (91 – 95)	25	71.43	27	77.14	25	71.43	2	5.71
Hypoxemia (<90)	10	28.57	7	20.0	10	28.57	0	0

Post-operative CABG patients in the control group had high risk level of hypoxemia (71.43 %, 77.14%) in pretest and posttest. On the other hand, most of experimental group of CABG patients (71.43 %,) had high risk and hypoxemia before walking and normal SpO_2 after walking (94.29%).

Table 2: Comparison of Mean and Standard Deviation of Pretest and Post Test Post Operative Outcomes SpO_2 among Post CABG Patients in the Control and Experimental Group.

Postoperative outcomes	Control group(n=35)		Paired t test	Experimental group (n=35)		Paired t test
	Mean	SD		Mean	SD	
Spo_2						
Pre test	89.88	2.22	2.35	89.94	2.14	27.65***
Post test	90.68	2.56		97.28	1.29	

The above table shows the comparison of pre-test scores of SpO_2 in the control group (M= 89.88, S.D=2.22) with the post test scores (M=90.68, S.D=2.56) shows a t value 2.35 which was not statistically significant at $p<0.05$ whereas, in the experimental group the posttest score was higher (M=97.28, S.D=1.29) than the pretest scores (M=89.94,S.D=2.14) with t value of 27.65*** which was statistically significant at $p<0.001$ and shows the effectiveness of 6 minute walking.

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Table 3: Association of Post test level of Post Operative Outcomes (SpO_2) among post CABG patients with their selected Demographic Variables in the Experimental group

Experimental	Spo_2				
Demographic Variables	Low Risk (96 – 100)		High Risk (91 – 95)		χ^2 df
	f	%	f	%	
Age in years					
31 – 50	5	14.3	1	2.9	χ^2=2
51 – 70	17	48.6	1	2.9	d.f=2
71 – 85	11	31.4	0	0	
Diet pattern					
Vegetarian	11	42.9	0	0	χ^2=1.59
Non-vegetarian	18	51.4	6	17.5	d.f=1

The above table shows that there was no significant association between the selected demographic variablesand post operative outcomes (Spo2). However there is no significant association between other clinical variables like BMI, Resistance/speed, Co-morbidity, Pre operative ECHO and post operative outcomes (SpO_2).

V. CONCLUSION

The present study concludes that 6 minute walking is effective for maintaining Spo_2, functional status, shortness of breath improving and the wellbeing of post operative CABG patients. A majority of the CABG patients in the experimental group were highly acceptable towards 6 minute walking with regard to the approach of the researcher, the method of 6 minute walking and its effectiveness.

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