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A Study to Assess the Effectiveness of Chest Binder on Reduction of Pain and Kinesiophobia Among Coronary Artery Bypass Grafting Patients: A Prospective Experimental Study

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ABSTRACT

Background: Coronary Artery Bypass Grafting (CABG) is associated with pain and kinesiophobia, which can hinder rehabilitation. This study evaluates the effectiveness of chest binders in reducing these challenges.

Objective: To assess pain and kinesiophobia levels in CABG patients and evaluate the impact of chest binders over two weeks.

Methods: A prospective experimental study was conducted with 60 hemodynamically stable post - CABG patients aged 40–80 years. Pain and kinesiophobia levels were measured using the Visual Analogue Scale (VAS) and the Tampa Scale for Kinesiophobia – Heart (TSK-Heart) respectively, pre intervention. Chest binders were applied, and post-test assessments were conducted after 7 and 14 days. Data analysis was performed using Wilcoxon Signed Rank and Mann-Whitney tests.

Results: Statistically significant reductions in mean pain scores (Day 7: 43.45; Day 14: 39.51; $p < 0.05$) and kinesiophobia scores (Day 7: 43.42; Day 14: 35.82; $p < 0.05$) were observed post-intervention (following chest binder application over two weeks).

Conclusion: Chest binders are effective in alleviating pain and kinesiophobia in CABG patients, thereby facilitating early rehabilitation.

Conclusion: Chest binders effectively reduce pain and kinesiophobia in CABG patients, facilitating improved rehabilitation outcomes.

KEYWORDS: *ChestBinder, Kinesiophobia, CABG, PainManagement, Rehabilitation*

1. INTRODUCTION

Cardiovascular diseases are a leading cause of morbidity and mortality globally. CABG is a critical surgical intervention for coronary artery disease. Coronary Artery Bypass Grafting (CABG) is a widely performed cardiac surgery that alleviates ischemia and improves cardiac function. However, post-operative challenges like pain and kinesiophobia can impede recovery and rehabilitation. Kinesiophobia, defined as the irrational fear of movement, often results in reduced physical activity, delaying recovery. Chest binders are often proposed as a non-invasive intervention to mitigate these issues, yet empirical evidence remains sparse regarding their efficacy. This study aims to assess the effectiveness of chest binders in reducing pain and kinesiophobia among CABG patients.

2. OBJECTIVES

1. To assess the level of pain in CABG patients.
2. To evaluate the level of kinesiophobia in CABG patients.
3. To determine the effectiveness of chest binders in reducing pain and kinesiophobia.
4. To identify associations between pain, kinesiophobia, and demographic variables.

Operational Definition

Cardiac Diseases and CABG

The literature highlights CABG's transformative impact on managing advanced coronary artery disease. Studies emphasize the importance of minimizing postoperative complications such as pain and kinesiophobia.

Pain Management

Postoperative pain adversely affects recovery. Evidence suggests that mechanical supports like chest binders can alleviate pain by stabilizing the sternum.

Kinesiophobia

Fear of movement post-surgery is a barrier to effective rehabilitation. Interventions targeting psychological and physical recovery are critical.

3. Hypothesis

- **H1:** Chest binders significantly reduce pain and kinesiophobia in CABG patients.
- **H2:** No significant difference exists in demographic variables' influence on pain and kinesiophobia.

4. METHODOLOGY

Study Design: Prospective experimental study (One group Pre Test - Post Test)

Setting: Selected tertiary care hospital,Belagavi, Karnataka, India.

Sample: 60 post-CABG patients aged 40–80 years, thermodynamically stable, with TSK-Heart scores > 55.

Sampling Method: Convenient Sampling Technique.

Inclusion Criteria: Patients aged 40-80 years, post-CABG via median sternotomy, hemodynamically stable, with TSK-Heart scores > 55.

Exclusion Criteria: Patients with complications, cognitive impairments, or non-consent.

Tools: Visual Analogue Scale (VAS) for pain, TSK-SV Heart Scale for kinesiophobia.

Procedure:

1. Baseline assessments of pain and kinesiophobia were conducted and measurements were recorded (pre-intervention).
2. Subsequently, chest binders were applied to all the participants.
3. Post-intervention assessments were conducted on Days 7 and 14.

Data Analysis:

- Wilcoxon Signed Rank test for intra-group comparisons.
- Mann-Whitney test for between-group comparisons.
- SPSS software was employed for statistical analysis.
- A p-value < 0.05 was considered statistically significant.

5. Results

Demographics: The sample included 40 males and 20 females, aged 40–80 years. A summary of demographic details is provided in Table 1.

Table 1. Socio-Demographic Characteristics of the Sample with Frequency

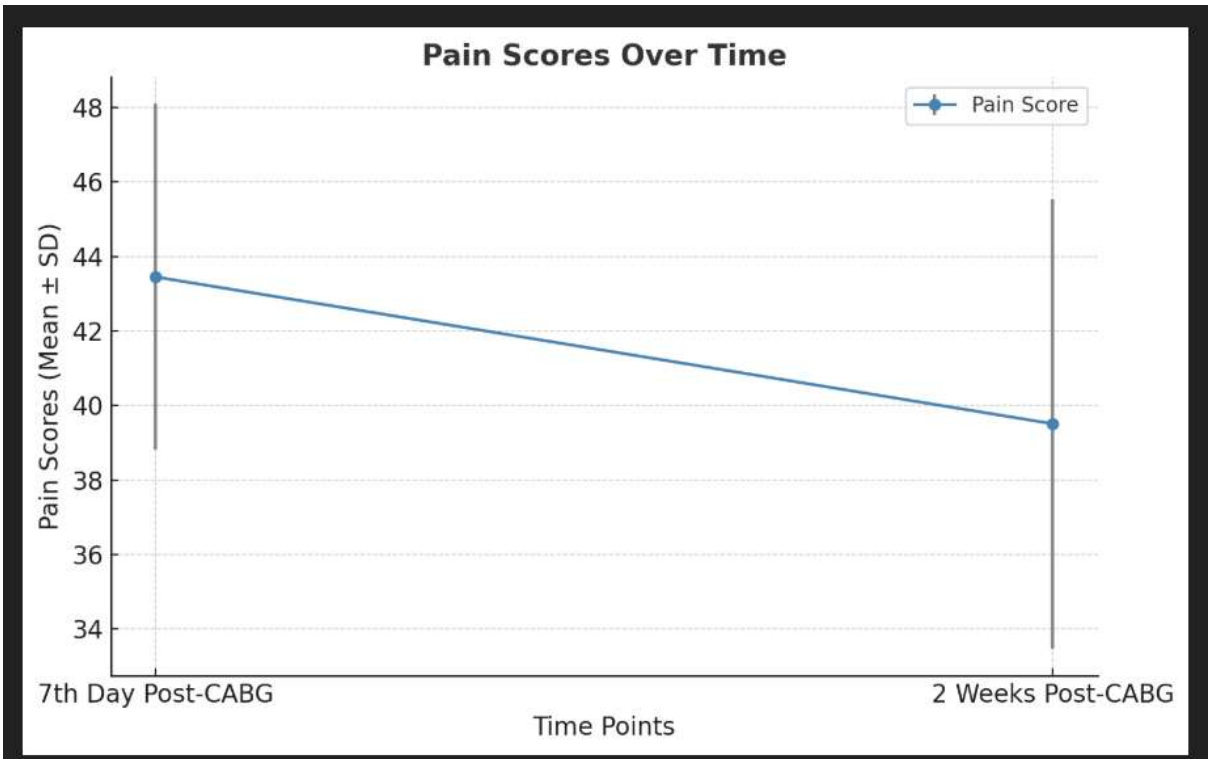
Variable	Category	Frequency	Percentage
Age	40-50 years	15	25%
	51-60 years	20	33.3%
	61-70 years	15	25%
	71-80 years	10	16.7%
Gender	Male	40	66.7%
	Female	20	33.3%
Socio-economic Status	Low	25	41.7%
	Middle	30	50%
	High	5	8.3%

Pain Scores: Significant reduction was observed (Baseline: 43.45 ± 4.64; Day 14: 39.51 ± 6.03; $p < 0.05$).

Mean pain scores reduced significantly from 43.45 (±4.64) to 39.51 (±6.03) over two weeks.

Figure 1 illustrates the change in pain scores over time.

Figure 1. Pain Scores Over Time



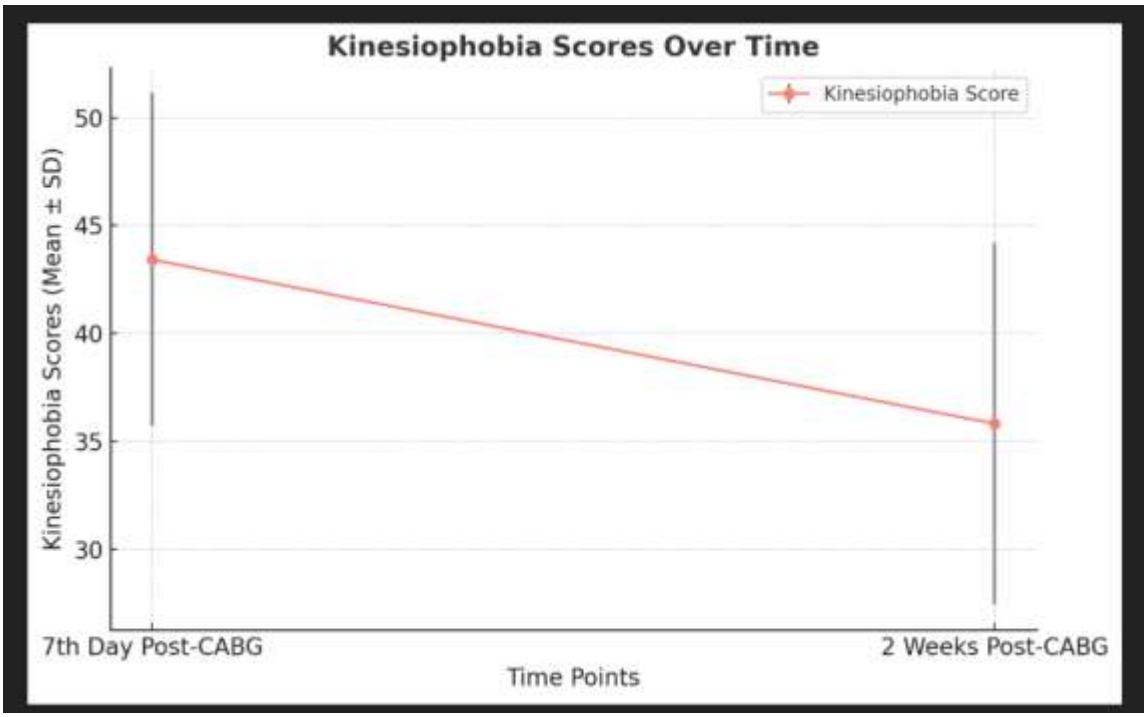
Graph illustrating the reduction in pain scores from baseline to Day 14.
The y-axis represents pain scores, and the x-axis represents time points (Baseline, Day 7, Day 14).

Pain Reduction:

- Baseline VAS Score: 43.45 ± 4.64
- Day 7: 39.72 ± 5.12
- Day 14: 35.82 ± 6.03 ($p < 0.05$)

Kinesiophobia Scores: Significant reduction was observed (Baseline: 43.42 ± 7.717; Day 14: 35.82 ± 8.372; $p < 0.05$).
Mean TSK-SV scores decreased from 43.42 (±7.72) to 35.82 (±8.37).
Figure 2 illustrates the reduction in kinesiophobia scores over time.

Figure 2. Kinesiophobia Scores Over Time



Graph depicting the reduction in kinesiophobia scores from baseline to Day 14.

The y-axis represents kinesiophobia scores, and the x-axis represents time points (Baseline, Day 7, Day 14).

Kinesiophobia Reduction:

- Baseline TSK-Heart Score: 43.42 ± 7.72
- Day 7: 39.45 ± 7.30
- Day 14: 35.82 ± 8.37 ($p < 0.05$)

Statistical Significance: The reductions in pain and kinesiophobia scores were statistically significant, with p-values of 0.00001188 and 0.00007886, respectively.

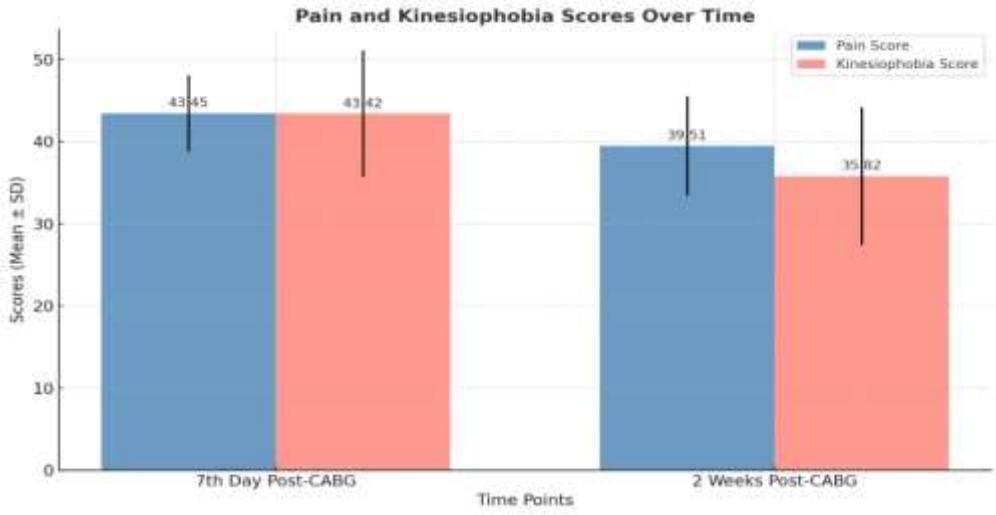


Table: Significance of Pre-Test Scores with Pain

Variable	Mean Pre-Test Pain Score	Standard Deviation	p-value
Age	43.45	4.64	0.056
Gender	43.10	4.72	0.072
Socio-economic Status	42.85	4.80	0.038*

(*Significant at $p < 0.05$)

Table: Significance of Pre-Test Scores with Kinesiophobia

Variable	Mean Pre-Test Kinesiophobia Score	Standard Deviation	p-value
Age	43.42	7.72	0.061
Gender	43.20	7.85	0.082
Socio-economic Status	42.95	7.90	0.045*

(*Significant at $p < 0.05$)

Significant associations were identified between pain and kinesiophobia reduction and socio-economic status, but not age or gender.

6. Discussion

Key Findings:

- Chest binders significantly reduced pain and kinesiophobia, facilitating early mobilization and improving participation in rehabilitation.
- Demographic factors, including socio-economic status and educational background, influenced recovery rates.

The findings align with existing literature, demonstrating the utility of chest binders in post-operative care. By stabilizing the thoracic cavity, chest binders reduce pain and alleviate the psychological barriers associated with kinesiophobia. This studyconfirms chest binders' effectiveness in reducing pain and kinesiophobia, andunderscores the importance of integrating such interventions into cardiac rehabilitation programs. Future studies should explore long-term outcomes and patient adherence.

7. Conclusion

The application of chest binders significantly reduces pain and kinesiophobia among CABG patients, enhancing recovery and participation in rehabilitation. These findings advocate for their routine use in post-operative care.

Clinical Implications

Chest binders should be integrated into postoperative care protocols to enhance recovery and patient outcomes.

8. Summary

This study demonstrates the utility of chest binders in enhancing recovery post-CABG by mitigating pain and kinesiophobia, promoting better clinical outcomes.

Limitations

1. Lack of a control group limits the ability to compare outcomes without intervention.
2. Short follow-up period; long-term effects remain unexplored.

3. Study can be conducted on a larger sample size.

9. Recommendations

1. Incorporate chest binders as standard postoperative care for CABG patients.
2. Train nursing staff on the proper application and monitoring of chest binders.
3. Conduct longitudinal studies to explore long-term effects.

10. Acknowledgments

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Ethical Considerations

Institutional Review Board approval was obtained. Informed consent was secured from all participants.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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