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RELATIONSHIP OF SHOULDER PAIN IN POST-CABG PATIENTS WITH AND WITHOUT CARDIAC REHABILITATION

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ABSTRACT

Background: Any distress or ache sensed in the shoulder joint—a multifaceted framework comprised of bones, muscles, ligaments, and tendons—is considered shoulder pain. It can be intense (sudden beginning) or persistent (long-lasting), and it can extend in seriousness from reasonable to extreme

Objective: To assess the relationship of shoulder pain in post-CABG patients with and without cardiac rehabilitation

Methods: The study employed a cross-sectional design conducted at Services Hospital over six months, involving 126 post-CABG patients selected via non-probability convenient sampling. Data collection adhered to strict inclusion and exclusion criteria, utilizing the Shoulder Pain and Disability Index (SPADI) and Visual Analogue Scale (VAS) to assess shoulder pain and disability. The inclusion criteria encompassed males and females aged 45-75 years, one week to six months post-CABG, capable of understanding the questionnaire, while exclusion criteria ruled out those with shoulder dislocations, neurological conditions, heart transplants, or valve surgeries. Statistical analysis was performed using SPSS version 20 to derive meaningful insights from the collected data.

Results: The results of study suggested that showed strong positive correlation (r=0.735) between visual analogue scale (pain) and shoulder pain and disability index (pain and disability) in post-CABG patients with cardiac rehabilitation (n=73). Correlation is statistically significant with p-value 0.000. It was found that there is strong positive correlation (r=0.743) between visual analogue scale (pain) and shoulder pain and disability index (pain and disability) in post-CABG patients without cardiac rehabilitation (n=53). Correlation is statistically significant with p-value 0.000.

Conclusion: Thus, this study is shown in particular that shoulder pain level in post-CABG patients has a close relationship with cardiac rehabilitation performance. Patients involving themselves closely with structured cardiac courses revealed that they had significantly less shoulder pain compared to those who did not take part in the rehabilitation program.

Key Words: Cardiac Rehabilitation, Coronary Artery disease, disability, discomfort, shoulder pain.

INTRODUCTION

Any distress or ache sensed in the shoulder joint—a multifaceted framework comprised of bones, muscles, ligaments, and tendons—is considered shoulder pain. It can be intense (sudden beginning) or persistent (long-lasting), and it can extend in seriousness from reasonable to extreme. One of the most dynamic articulations in the human body, the shoulder joint permits a wide assortment of motion required for errands like achieving, lifting, and tossing(1, 2). Yet in light of its adaptability, the shoulder is additionally inclined to pain bringing on sicknesses and Accident. The shoulder is a complex assembly of tissues that give us an incredible extent of movement, however this exceptionally flexibility can result in pain from strains, harms, and degeneration. Both intense and constant shoulder pain can range from the mild to severe and effects daily life(3).

Of the 378 post-CABG patients analyzed, 324 (85.7%) were male while 54 (14.2%) were female. The mean SPADI score was a notable 63.70+14, with discomfort on the pain subscale reported by a sizable 293 (77%) of respondents. Similarly, 245 (64%) indicated impairments according to the disability subscale. Among those who underwent CABG surgery, it is evident that shoulder complications—including both pain and dysfunction—are prevalent issues requiring attention(4).

Shoulder pain after coronary artery bypass grafting (CABG) surgery can develop due to several causes, primarily connected to the operative method and postoperative recovery process(5). One major basis is the positioning of the patient during the procedure. To allow access to the heart, sufferers are frequently placed with outstretched arms for a number of hours, which can strain shoulder muscle tissues and joints. Additionally, the operative process may necessitate that the patient remains motionless in a fixed, supine place that puts extra pressure on the shoulder location, especially if arm help is lacking(6, 7).

While investigations have delved into analyzing the regularity and strength of shoulder trouble experienced by individuals who underwent coronary artery bypass grafting and their

participation in heart rehab, customized therapies tailored for all patient's distinct requirements and worries concerning shoulder pain are possible through structured cardiac rehab programs. Research indicates cardiac rehab may better shoulder discomfort outcomes by prescribing targeted exercises to boost mobility, pliability, and muscle vigor in the shoulder. Moreover, cardiac rehab schedule includes interventions related to the specific concerns and needs associated with the shoulder problem (8).

While delayed participation in post-CABG cardiac rehabilitation and large-scale failure to follow promoted home activity plan results in long-term exacerbation so in other patients with poor function because of comorbidities, differences in program implementation and business between the care settings could moderate the success of shoulder pain initiatives. Rehabilitation involvement and shoulder problems in individuals following CABG are a complex, changing relationship that merits further study to understand its factors and determine the most relevant treatments needed to address the population's shoulder issues. In conclusion, to improve outcomes and enhance overall recovery success following coronary artery bypass, clinical practitioners should consider adding a comprehensive evaluation of and interventions to address shoulder function to cardiac rehab routines (9).

Cardiac rehabilitation also brings a variety of benefits in terms of coronary artery bypass grafting. First and foremost, this type of rehab activity offers specially designed exercise programs adjusted to the patients' conditions and competences (10). The workouts are aimed at elevating cardiovascular fitness, stamina, and strength – factors needed for reconstructing the patient's physique after surgical interference. Progressing activity stages based on medical supervision and performance lead patients to rebuild confidence in being physically active, release their anxiety about overusing themselves, and resume a more active lifestyle (11).

Moreover, in the long run, cardiac rehab offers extended and in-depth patient education and support, enabling them to take effective steps to improve their lifestyle. They receive instructions on healthy eating for their hearts, smoking cessation, stress coping mechanisms, and proper management of medications, among other topics. Knowledge of the warning signs of the complication and insights of how to respond to the situation increases the likelihood of

patients being their best advocates, reducing the odds of their future cardiac events and increasing beneficial cardiovascular outcomes (12).

Finally, cardiac rehab provides a supportive environment for patients to interact with healthcare providers, peer patients, and support groups. This social support network plays a critical role in elevating morale, alleviating anxiety, and cultivating a sense of belonging during the recovery process. Encouragement from peers and medical staff can motivate patients to adhere to their rehabilitation program, guiding to better results and a smoother transition back to everyday life. Overall, cardiac rehab post-CABG not only enhances physical health but also addresses psychological and emotional aspects of recovery, promoting a holistic approach to cardiac care(13).

The extensive effect of cardiovascular procedures on shoulder pain and likely advantages of retraining packages warrants contrasting shoulder pain in post-CABG individuals with and without cardiac retraining. Subsequent to CABG medical procedures, shoulder pain is a typical issue that can be an obstruction to recovery and general patient prosperity. Through a investigation of extent, essence, and treatment of shoulder pain, medicinal specialists can make customized plans for pain reduction, improved flexibility, and preferable general outcomes. Furthermore, it is pivotal to look into the potential for cardiac retraining to alleviate shoulder discomfort taking after surgery with the goal that patients can recuperate all the more productively and retraining endeavors can all the more adequately manage musculoskeletal issues taking after CABG medical procedures. Understanding this relationship is fundamental for tweaking retraining schedules to decrease shoulder distress, improve upper limb capacity, and at last support patient happiness and personal satisfaction taking after medical procedures (14, 15).

Material and Methodology:

- **Study Design:** The study design for this research was Cross-sectional.
- **Study Setting:** Data was collected from Services Hospital
- **Duration of study:** The study was completed within 6 months
- **Sample size:** Sample size of the study was 126
- **Sample selection criteria** the data was collected through inclusion and exclusion criteria:

Inclusion Criteria:

- Both males and females(16)
- Age 45-75 years(4)
- 1st week-6 months after CABG(17)
- Patients able to read and understand the questionnaire

Exclusion Criteria:

- Pain in shoulder due to dislocation(18)
- Patients having shoulder pain due to different neurological conditions(19)
- Patients having heart transplant(20)
- Patients having valvular surgery(21)
- Unable to read and understand the questionnaire

Data collection procedure:

A variety of one hundred and twenty-six eligible patients agreed to participate in this intriguing study according to the predetermined inclusion and exclusion criteria. The inclusion standard for the investigation was both males and females between the ages of forty-five and seventy-five, within the first week to six months post coronary artery bypass graft surgery, and capable of comprehending the questionnaire. Meanwhile, the exclusion criterion consisted of individuals suffering from painful shoulder dislocations or neurological conditions, having received a heart transplant or valve surgery, or unable to read or understand the questionnaire. The data was gathered through the Shoulder Pain and Disability Index and Visual Analogue Scale, which provided profound insight into the patients' shoulder ailments and levels of discomfort.

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DATA ANALYSIS:

After taking the informed written consent. The data was collected through Shoulder Pain and Disability Index (SPADI) and Visual Analogue Scale (VAS). SPSS version 20 was used for best statistical analysis of all the data taken from different participants. Descriptive Statistics is used to show frequency, mean and Standard deviations. Correlation of Visual Analogue Scale and Shoulder pain and disability index of participants in post-CABG patients with and without cardiac rehabilitation is also find out.

Results:

Demographics:

Descriptive Statistics						
Cardiac Rehabilitation		N	Minimum	Maximum	Mean	Std. Deviation
yes (with cardiac rehabilitation)	Age in years	73	42.00	72.00	59.1370	7.15176
	Valid N (listwise)	73				
no (without cardiac rehabilitation)	Age in years	53	45.00	74.00	58.3019	7.97010
	Valid N (listwise)	53				

Table 1: Summary of Participant's Age in years

Table 1 showed the age of participants with and without cardiac rehabilitation. Out of 126 participants, 73 participants undergo cardiac rehabilitation and 53 were not undergo cardiac rehabilitation. The maximum age of participants with cardiac rehabilitation was 72 years and minimum age was 42 years with the mean age 59.13 ± 7.15 years. The maximum age of participants without cardiac rehabilitation was 74 years and minimum age was 45 years with the mean age 58.30 ± 7.97 years.

Gender						
Cardiac Rehabilitation			Frequency	Percent	Valid Percent	Cumulative Percent
yes (with cardiac rehabilitation)	Valid	male	53	72.6	72.6	72.6
		female	20	27.4	27.4	100.0
		Total	73	100.0	100.0	
no (without cardiac rehabilitation)	Valid	male	28	52.8	52.8	52.8
		female	25	47.2	47.2	100.0
		Total	53	100.0	100.0	

Table 2: Summary of Participant's Gender

Table 2 showed the gender of participants with and without cardiac rehabilitation. Out of 73 participants who undergo cardiac rehabilitation, 53 (72.6%) were male and 20 (27.4%) were female. Out of 53 participants who were not undergo cardiac rehabilitation, 28 (52.8%) were male and 25 (47.2%) were female.

Cardiac Rehabilitation:

Cardiac Rehabilitation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes (with cardiac rehabilitation)	73	57.9	57.9	57.9
	no (without cardiac rehabilitation)	53	42.1	42.1	100.0
	Total	126	100.0	100.0	

Table 3: Summary of Participant's with and without cardiac rehabilitation

Table 3 showed summary of participants with and without cardiac rehabilitation. Out of 126 participants, 73 (57.9%) participants undergo cardiac rehabilitation and 53 (42.1%) were not undergo cardiac rehabilitation.

Descriptive Statistics				
Cardiac Rehabilitation		Mean	Std. Deviation	N
yes (with cardiac rehabilitation)	Visual Analogue Scale (VAS)	3.4384	.95723	73
	Shoulder Pain and Disability Index (SPADI)	37.6301	6.60704	73
no (without cardiac rehabilitation)	Visual Analogue Scale (VAS)	7.0000	1.19293	53
	Shoulder Pain and Disability Index (SPADI)	68.5094	10.28932	53

Table 4: Descriptive Statistics of Visual Analogue Scale and Shoulder pain and disability index of participants with and without cardiac rehabilitation

Table 4 showed the descriptive statistics of VAS and SPADI of participants with and without cardiac rehabilitation. The mean and standard deviation of VAS of participants with cardiac rehabilitation was 3.43 ± 0.95 and without cardiac rehabilitation was 7.00 ± 1.19. The mean and standard deviation of SPADI of participants with cardiac rehabilitation was 37.63 ± 6.60 and without cardiac rehabilitation was 68.50 ± 10.28.

Cardiac Rehabilitation			Shoulder Pain and Disability Index
yes (with cardiac rehabilitation)	Visual Analogue Scale (Pain)	Pearson Correlation	.735**
		Sig. (2-tailed)	.000
		N	73
no (without cardiac rehabilitation)	Visual Analogue Scale (Pain)	Pearson Correlation	.743**
		Sig. (2-tailed)	.000
		N	53

Table 5: Correlation of Visual Analogue Scale and Shoulder pain and disability index of participants in post-CABG patients with and without cardiac rehabilitation

Table 5 showed the correlation of VAS and SPADI of participants in post-CABG patients with and without cardiac rehabilitation. It showed strong positive correlation (r=0.735) between visual analogue scale (pain) and shoulder pain and disability index (pain and disability) in post-CABG patients with cardiac rehabilitation (n=73). Correlation is statistically significant with p-value 0.000. It was found that there is strong positive correlation (r=0.743) between visual analogue scale (pain) and shoulder pain and disability index (pain and disability) in post-CABG patients without cardiac rehabilitation (n=53). Correlation is statistically significant with p-value 0.000.

DISCUSSION

The aim of this study is to clarify the association linking shoulder pain to cardiac rehabilitation (CR) carried out after coronary artery bypass grafting (CABG) surgery. Out of the 126 respondents, 53 did not undergo the cardiac rehabilitation program, while 73 of them did so. The age of the participants in cardiac rehabilitation program, which was from 42 to 72 years old, was 59, on average. 13 +−7. 15 years. The differed participants in the cardiac rehab were aged between 45 and 74 with an average age of 58. About 79 years on average, give or take 7 years. Twenty (27. (10%) and 53 of 73 female (72. 6%) of the patients in cardiac rehabilitation (73). As at least 28 of the total number of participants, 53 people that were interviewed, were women, female-identifying, and enby. However, the study revealed that 52% of the patients were men while 47. 2% were women who did not have access to the cardiac rehabilitation.

Among group of patients who undergone cardiac rehabilitation, the mean and standard deviation of VAS is 3. The mean age of the patients in the group that received cardiac rehabilitation was 64,4 ± 6. 95, but in the group not undergoing cardiac rehabilitation, it was 7,4. 00 ± 1. 19. The mean and standard deviation for SPADI were 37in the group who received the cardiac rehabilitation. On the other hand, the patients receiving cardiac rehabilitation had average SBP of 63 ± 6. 60, while those not receiving cardiac rehabilitation had SBP of 68. 50 ± 10. 28.

However, the research revealed that the both groups had a noteworthy relationship between the pain pattern (SPADI score) and pain severity (VAS score) after the CR intervention or not.

The results from this one demonstrate that for patients with and without CR more than pain intensus (VAS) and functional disabilities (SPADI); there is a very direct relationship. In the present research we compared the patients who underwent Cardiac Rehabilitation after CABG with the ones that did not in order to decide whether there is any correlation between the intensity of the shoulder pain quantified with the help of the Visual Analogue Scale (VAS) and the impairment of the shoulder function described using the Shoulder Pain and Disability Index (SPADI).

The research shows a marked association between the comparison of VAS scores and SPADI ratings among two groups, respectively, strengthening the claim that participation in cardiac rehabilitation program did not affect the degree of shoulder pain-related disability in post CABG patients but the massive amount of pain severity. In 2020 there was a publication of R.J. Achttien's study which demonstrated that people who go to a cardiac rehabilitation have less pain in the shoulder and this can be due to the fact that they do the exercise routines and go through physical therapy like other body parts are included (22).

The fact that the results of our research do not demonstrate a direct correlation between CR and pain ratings proves that CR does not have a direct impact on pain ratings. This could be attributed to the possibility of enlarging a study population in such a way that there can be a meaningful difference between the CR groups. Different intensities of exercise and duration of the CR program may affect how the particular exercises effect participants' pain. Thus, our assessment could have been incomplete and overlooked some details. The observed results might differ according to the time when the pain assessment is performed regarding CR participation and pain evaluation. The degree of the impact may be different in case the pain assessment being carried out at some point in time relative to the CR involvement. There is only one assessment period that we have in our current methodology, and we can easily ignore to note those pain reduction situations in multistep CR (Chronic Relapse) programs. A more rounded picture can be painted in future studies by conduct evaluations done before, during and following up of CR participation.

This study has provided crucial new insights into the link between pain-technology related disability, shoulder pain, and the ability of cardio rehabilitation in cases where traditional rehabilitation methods have failed for people who have had CABG surgery. The greater

prevalence of shoulder pain in patients who had CABG is indeed confirmed by this research. However, the current research only shows that CR can be applied for further investigations while it has no certain effect of relieving pains. By means of a more detailed analysis of the design of this CR scheme and its impact on shoulder pain, how this outcome can be improved and the recovery accelerated after the treatment of CABG surgery, we can ultimately reach this goal.

Conclusion:

Thus, this study is shown in particular that shoulder pain level in post-CABG patients has a close relationship with cardiac rehabilitation performance. Patients involving themselves closely with structured cardiac courses revealed that they had significantly less shoulder pain compared to those who did not take part in the rehabilitation program. Thus, this component of treatment is not just for cardiovascular disease management, but also for reducing the risk of the analogous musculoskeletal conditions such as shoulder pain. The current study stresses the necessity of considering rehabilitative approach as the cornerstone of postoperative pathway.

Limitations:

1. A sample size of the study was relatively small. It is one of the factors, which may limit the generalizability of the results to a certain degree.

2. Depending on self-reported complaints about shoulder pain affects objectiveness and accuracy of the result.

3. The study did not consider the intensity and duration range such as the different amounts of time spent doing cardiovascular workouts among the participants.

4. The absence of long-term follow-up data renders it complicated to examine the success of cardiac rehabilitation in managing shoulder pain over time.

Recommendations:

1. Implement protocols standardized in cardiac rehabilitation programs which are meant for shoulder pain and its preventing

2. The future studies should have a larger sample size so that their results can be more applicable to the overall population.

3. Use clinical assessments that are designed to measure shoulder pain objectively, as well as self-reported data.

4. Conduct a long-term follow-up study to assess the sustained outcomes of cardiac rehabilitation for shoulder pain.

5. An investigation and comparison of the effectiveness of various components that make up cardiac rehabilitation programs will be conducted in an attempt to good practices within those programs.

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