

Original Article

Correlation between Pain and Functional Disability in Patients with Adhesive Capsulitis

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ABSTRACT

Background: Adhesive capsulitis, commonly known as frozen shoulder, is a condition characterized by pain and restricted shoulder movement, affecting daily activities and quality of life. Despite its prevalence, the correlation between pain levels and functional disability remains inadequately explored, with a need for focused research to inform clinical practices.

Objective: To investigate the correlation between pain intensity and functional disability in patients with adhesive capsulitis and assess demographic characteristics to inform better management strategies.

Methods: A cross-sectional study was conducted on 60 patients diagnosed with adhesive capsulitis at various medical institutions in Lahore from July 2022 to January 2023. Participants aged 31-70 years were included. The study employed non-probability convenience sampling for data collection, with pain intensity measured using the Numeric Pain Rating Scale (NPRS) and functional disability assessed through the Shoulder Pain and Disability Index (SPADI). Statistical analysis was performed using SPSS version 25.0, focusing on Pearson correlation coefficients to determine the relationship between pain and disability.

Results: The majority of patients were females (68.3%), with a significant representation in the 41-50 year age group (31.7%). The mean pain intensity was 5.97 (SD = 0.88), and the mean SPADI score was 73.12 (SD = 10.37), indicating moderate to high levels of pain and disability. A strong positive correlation was observed between pain intensity and functional disability (Pearson correlation = 0.81, $p < 0.001$), suggesting a direct relationship between the severity of pain and the extent of functional impairment.

Conclusion: The study confirmed a significant positive correlation between pain and functional disability in patients with adhesive capsulitis, highlighting the impact of this condition on the affected population's functional capabilities. These findings emphasize the importance of comprehensive management strategies that address both pain and functional limitations to improve overall patient outcomes.

Keywords: Adhesive Capsulitis, Frozen Shoulder, Pain Intensity, Functional Disability, SPADI, NPRS, Cross-Sectional Study, Pearson Correlation.

INTRODUCTION

Adhesive capsulitis, commonly encountered in orthopedic practice, is a condition that manifests through shoulder stiffness and pain, which significantly impairs functional ability and diminishes the quality of life (1-3). Often arising without clear precipitating factors, this condition can also be linked to a range of local and systemic diseases. The disorder predominantly affects women between the ages of 40 and 60 and is primarily diagnosed through clinical evaluation rather than radiological evidence, setting it apart from other sources of shoulder discomfort such as calcific tendonitis, bicipital tenosynovitis, glenohumeral and acromioclavicular arthritis, rotator cuff tears, and shoulder tumors (2). The pathophysiological mechanisms, characterized by fibroblast proliferation and excessive collagen matrix deposition in idiopathic frozen shoulder, remain elusive (4), contributing to a complex clinical picture. This includes severe pain, sleep disturbances, anxiety, a selective limitation of passive external rotation, and disability, all of which severely disrupt almost every facet of daily life (4).

The condition is divided into primary and secondary adhesive capsulitis; the former has an insidious onset of idiopathic origin, while the latter is associated with a discernible event, such as trauma or underlying diseases like rotator cuff disease (5). Non-operative

treatments include patient education, physical therapy modalities, stretching exercises, joint mobilization, and corticosteroid injections (6), aimed at managing the three stages of pain, stiffness, and healing. Interestingly, the duration of the recovery phase is often linked to that of the stiffness phase, with a slight restriction of movement persisting even after significant recovery (7).

Among conservative treatments, supervised physiotherapy, non-steroidal anti-inflammatory drugs, passive stretching, manual mobilization versus supportive therapy, activities within pain thresholds, and oral or intra-articular corticosteroid injections are recommended (8). A comparative study of three mobilization techniques—end-range mobilization (ERM), mid-range mobilization (MRM), and mobilization with movement (MWM)—highlighted their efficacy in addressing clinical symptoms such as pain, limited range of motion (ROM), and muscle weakness due to disuse (9). Meta-analysis of 65 studies involving 4097 participants showed that intra-articular corticosteroid injections offer more short-term benefits compared to other non-surgical treatments, with potential additional benefits from combining home exercises, electrotherapy, or passive mobilizations (10).

Healthcare providers are advised to offer straightforward guidance and encourage active coping strategies in patients, while the cost-effectiveness of diagnostic approaches and treatments warrants further investigation (11). Although evidence is sparse, there is a suggestion of a hereditary component to frozen shoulder (12). This condition may spontaneously occur in the general population or be associated with other conditions such as trauma, myocardial infarction, cerebrovascular accidents, hyperthyroidism, and diabetes mellitus, typically affecting the non-dominant shoulder more frequently (13).

The study aimed to provide a comprehensive comparison of pain and functional disability in patients with adhesive capsulitis, employing the SPADI Questionnaire and NPRS scale to assess the impact of this condition, given its prevalence and the significant challenges it poses to affected individuals.

MATERIAL AND METHODS

This cross-sectional study was conducted to assess the correlation between pain and functional disability in patients diagnosed with adhesive capsulitis. The research took place across multiple sites, including Bahria International Hospital, Farooq Hospital Westwood branch, and Akhtar Saeed Trust Hospital, EME, Lahore, from July 2022 to January 2023. The study population comprised male and female subjects aged between 31 and 70 years. Following the approval from the ethics review committee of Akhtar Saeed College of Rehabilitation Sciences, Lahore (12), designed to capture a broad spectrum of individuals affected by adhesive capsulitis, facilitating a comprehensive analysis of the condition's impact on pain and functional disability.

The participants were selected through a non-probability convenience sampling method. Prior to data collection, informed consent was obtained from all participants, ensuring they were fully briefed on the study's aims, the nature of the data collection process, and both the potential risks and benefits of their involvement, adhering to the ethical principles outlined in the Declaration of Helsinki. The severity of shoulder pain was gauged using the Numeric Pain Rating Scale (NPRS) (16), while functional disability was assessed through the Shoulder Pain and Disability Index (SPADI).

Data collection was conducted via questionnaires, meticulously filled out by the participants to ensure the accuracy and reliability of the information gathered. The collected data was then analyzed using SPSS version 25.0, a shift from the initially intended version to incorporate the latest statistical analysis features. The analysis focused on quantitative variables such as pain severity and disability, presenting these measures with mean values and standard deviations to succinctly convey the data's distribution. Additionally, categorical variables were described using frequencies, percentages, cross-tabulations, bar charts, and pie charts, providing a comprehensive overview of the study's findings. The relationship between pain and functional disability was explored using the Pearson correlation test, a statistical method chosen for its efficacy in determining the strength and direction of associations between continuous variables. A p-value of less than 0.05 was considered statistically significant, underscoring the importance of the findings in relation to the study's hypothesis.

RESULTS

In the conducted study, a total of 60 participants diagnosed with adhesive capsulitis were assessed for their age distribution, gender, pain intensity, and functional disability through SPADI scores. The age of the participants ranged from 31 to 70 years, with a notable diversity across different age groups. The age range of 41 to 50 years had the highest frequency, representing 31.7% of the total sample, closely followed by the 51 to 60 age group, which accounted for 28.3%. The youngest cohort, ages 31 to 40, comprised 25.0% of the participants, while those aged 61 to 70 were the least represented at 15.0% (Table 1). This distribution highlights the prevalence of adhesive capsulitis across a broad age spectrum, with a particular emphasis on middle-aged to early senior populations.

Table 1: Age Distribution of Study Participants

Age Range	Frequency	Percent	Valid Percent
31 to 40	15	25.0%	25.0%
41 to 50	19	31.7%	31.7%
51 to 60	17	28.3%	28.3%
61 to 70	9	15.0%	15.0%
Total	60	100.0%	100.0%

Table 2: Gender Distribution of Study Participants

Gender	Frequency	Percent	Valid Percent
Male	19	31.7%	31.7%
Female	41	68.3%	68.3%
Total	60	100.0%	100.0%

Table 3: Correlation Between Pain Intensity and SPADI Score

Variable	N	Mean	Std. Deviation	Pearson Correlation	p-value
Pain Intensity	60	5.97	0.88	0.81	<0.001
SPADI Score	60	73.12	10.37	-	-

Gender-wise, the study observed a significant predominance of female participants, who constituted 68.3% of the total sample, compared to 31.7% male participants (Table 2). This finding aligns with existing literature suggesting a higher incidence of adhesive capsulitis among women, especially in the age groups predominantly represented in this study.

The analysis of pain intensity, measured on the Numeric Pain Rating Scale (NPRS), revealed an average score of 5.97, with a standard deviation of 0.88, indicating a moderate level of pain among the participants (Table 3). The Shoulder Pain and Disability Index (SPADI) scores, used to assess functional disability, had a mean value of 73.12 with a standard deviation of 10.37, suggesting a significant impact on the participants' functional ability due to adhesive capsulitis.

DISCUSSION

This cross-sectional study was designed to explore the correlation between pain and functional disability in patients diagnosed with adhesive capsulitis, commonly referred to as frozen shoulder. The demographic findings of this study indicated a predominant age group of 41 to 50 years among the participants, with a higher prevalence in females. The idiopathic nature of the onset in most cases, alongside a significant representation of the disease in its frozen stage, highlighted the complex and often unpredictable progression of adhesive capsulitis. A noteworthy outcome of this research was the identification of a significant positive correlation between the intensity of pain experienced by patients and the extent of their functional disability (7).

The findings from this study resonate with existing literature, indicating that the natural course of adhesive capsulitis encompasses stages of pain, stiffness, and recovery. The duration of the recovery phase, often exceeding initial expectations, was found to be directly proportional to the length of the preceding stiffness stage, underlining the prolonged impact of the condition on patients (7). This study further established idiopathic frozen shoulder in cases devoid of trauma or rotator cuff injuries, with a notable association between adhesive capsulitis and systemic conditions such as diabetes and thyroid disorders, emphasizing the need for a holistic approach to patient assessment and management (14).

A review of meta-analyses, assessed through the Measurement Tool to Assess systematic Reviews (AMSTAR), compared conservative treatment options, revealing the superiority of proprioceptive neuromuscular facilitation over traditional physiotherapy in the short term for pain relief and improvement in external rotation. This highlights the potential for specific physiotherapeutic interventions to alter the course of treatment efficacy in adhesive capsulitis (15). Furthermore, the long-term assessment of patients undergoing non-operative treatment showcased a continuum of pain and functional limitations, significantly affecting the quality of life and sleep patterns, underscoring the broader implications of the disease beyond physical mobility (16, 17).

The relationship between diabetes mellitus and frozen shoulder was reinforced, with an increased incidence in diabetic patients compared to the general population, suggesting an intricate link between systemic metabolic conditions and the manifestation of adhesive capsulitis (18). Despite advancements in understanding the condition's pathogenesis, as evidenced by research into the roles of fibroblast and myofibroblast proliferation and aberrant lipid profiles, the exact etiological factors remain elusive, presenting a significant challenge in the development of targeted therapeutic interventions (19).

This study acknowledges the efficacy of standardized non-operative treatment programs as a viable alternative to surgical intervention for most patients, with spontaneous recovery to normal function levels being a realistic outcome. However, it also identifies specific patient cohorts, such as those with diabetes mellitus or bilateral symptoms, who may benefit from early surgical consideration. The introduction of the AMQPP score as a tool for assessing the quality of publications emphasizes the importance of rigorous academic scrutiny in the evaluation of research, although it is recognized as an area for ongoing development (20).

CONCLUSION

In conclusion, the association between pain and functional disability in adhesive capsulitis underscores the condition's significant impact on patients' daily activities and quality of life. The direct relationship between pain severity and restriction of movement at the shoulder joint calls for a nuanced approach to management, incorporating both patient-reported outcome measures and tailored therapeutic strategies. This study's insights into the demographic and clinical characteristics of adhesive capsulitis, alongside its exploration of treatment outcomes and the broader implications of the condition, contribute valuable knowledge to the field. However, it also highlights the need for further research, particularly in understanding the disease's pathogenesis and in optimizing treatment protocols to mitigate its impact on patients' lives. Future studies should aim to address these gaps, incorporating longitudinal designs and larger sample sizes to validate findings and recommendations.

This study elucidates the significant correlation between pain and functional disability in patients with adhesive capsulitis, emphasizing the condition's impact on the 41-50 year age group's ability to perform daily activities. The findings highlight the necessity for healthcare providers to adopt a multifaceted approach in managing adhesive capsulitis, incorporating patient-reported outcome measures to tailor interventions effectively. It underscores the importance of early identification and comprehensive treatment strategies, including physiotherapy and consideration of underlying systemic conditions such as diabetes, to improve patients' quality of life and functional outcomes. This research reinforces the need for ongoing investigation into the pathophysiology and optimal management strategies for adhesive capsulitis to enhance patient care and treatment efficacy.

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