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Sleep Quality and Its Association with Level of Irritability in Patients with Frozen Shoulder in Peshawar

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ABSTRACT

Background: Frozen shoulder also known as Adhesive capsulitis (AC), is a condition associated with shoulder pain and stiffness. It is a common shoulder ailment that is marked by pain and a loss of range of motion, particularly in external rotation. Frozen shoulder is one of the most common MSK problems and it is one of the reasons for clinical visits. Irritability of frozen shoulder have strong relation with quality of sleep. **Objective:** To evaluate sleep quality and its association with level of irritability in patients with frozen shoulder in Peshawar. **Methodology:** It was analytical cross sectional study to explore association between quality of sleep association with level of irritability in frozen shoulder. 112 patients were examined for quality of sleep by using PSQI questionnaire. And level of irritability by using DASH questionnaire. **Results:** Most of the participants 79% had significant sleep disturbance. Patients were from age 22-65 years having mean age 39± 10.7, the mean score of Pittsburgh sleep quality index was 8±4.0, the chi square test showed strong association of level of irritability with disturbance of sleep as their P- values were 0.01<0.05, 0.023<0.5, 0.05>0.015 respectively. **Conclusion:** This study concluded that irritability of frozen shoulder have strong association with disturbance of sleep.

INTRODUCTION

Frozen shoulder was first described by Codman and the term is generally used to describe a patient with limited shoulder motion and chronic pain (1). Pain and limited movement are the symptoms of frozen shoulder, a chronic and particular inflammation that can cause shoulder muscle atrophy due to disused (2). Syndrome consists of three stages: painful frozen stage in which type of discomfort is prior to losing range of motion. A 10- to 36-week frozen or adhesion phase lasting 4 to 12 months, during which pain gradually decreases while range of motion remains worse, and a fusion or regression phase, during which range of motion gradually improves (3) .The disorder can be broadly classified into two groups: primary (when a cause is found by history, clinical examination, and radiological appearances) and secondary (where a cause is found but not immediately apparent) (4). FS can significantly impair a patient's capacity to function in daily life and at work, and it more severely affects people who use their shoulders more frequently. Patients with frozen shoulder are typically older. 40–70 years old, and it affects women more frequently than men (5).

Pathology of Frozen Shoulder

It is thought that the pathophysiological process involves shoulder joint capsule fibrosis and synovial inflammation. When the tissue is examined under a microscope, fibroblasts make up the majority of the cells, while there are also some mast cells. The inflammatory process may be aided by cytokines including platelet-derived growth factor and transforming growth factor β. Hand et al.'s discovery of a persistent inflammatory response

accompanied by fibroblastic proliferation led them to propose immunomodulation as a possible mechanism(6).

Clinical Features

The arm is frequently held in internal rotation and adduction when the patient first appears. Atrophy of the shoulder muscles can occur occasionally. Diffuse soreness along the shoulder joint may be palpable. In the early and intermediate stages of the condition, the shoulder's range of motion is typically completely restricted and painful. The nearly total loss of external rotation which is practically pathognomonic is very significant. Testing the active and, more crucially, the passive ranges of motion validates this(7).

Stages of Frozen Shoulder

There are three stages to frozen shoulder. The first, known as "freezing," lasts for two to nine months and is characterized by moderate to severe shoulder discomfort and stiffness. While shoulder stiffness grows, the pain's intensity decreases. The disease's second stage, known as frozen, lasts between four and fourteen months. The third stage, known as "thawing," lasts for five to twenty-four months during which time the symptoms progressively become better and the shoulder joint's restricted motion begins to heal (8).

Prevalence of Frozen Shoulder

Shoulder pain affects over 16% of the general population globally and is a widespread condition (9) . The incidence and prevalence of shoulder pain vary greatly amongst nations worldwide. According to reports, it ranks as the third most frequent musculoskeletal complaint presenting for medical attention and accounts for 4% of adult primary care consultations in the UK each year(10) . Globally, the general population is thought to have frozen shoulder between 2% and 5% of the time (11). When diagnosed, the majority of patients are between 40 and 60 years old. Frozen shoulders, however, may develop later in life, according to certain data. The following conditions increase the risk of getting frozen shoulders: diabetes, thyroid issues, hormone fluctuations, shoulder injuries, surgery, open heart surgery, and cervical disc disease(12) . The illness has been prevalent in several locations of Saudi Arabia. An investigation was out in the Western region of Saudi Arabia found that 31.6% of diabetes patients had frozen shoulders(13) .

Causes and Risk Factors of Rozen Shoulder

There are two types of adhesive capsulitis (ACS): primary and secondary. Secondary causes of ACS include diabetes, thyroid disease, trauma, prolonged immobilisation, Dupuytren disease, and other autoimmune conditions. When no underlying reason is identified, patients with painful, restricted shoulder movements may have primary idiopathic frozen shoulder(14)(24) .

Sleep Quality Due To Frozen Shoulder

Additionally to making it more difficult to initiate or sustain sleep, shoulder pain can also worsen when a person moves positions during the night. These factors can both contribute to sleep disorders and lower sleep quality. A reduction in the quantity and quality of sleep may have an impact on the relaxing and healing of shoulder muscles since sleep lowers and relaxes shoulder muscular tone. Ultimately, this vicious cycle perpetuates itself when poor sleep quality exacerbates shoulder discomfort, which in turn exacerbates sleep disorders, and worsening shoulder pain ultimately leads to shoulder dysfunction(15).

Level of Irritability in Frozen Shoulder

Martin J. Kelley, propose another classification system based on the patient's propose a second classification system based on the degree of irritability (high, moderate, low) of the patient, which we believe is useful to guide the clinical decisions about the rehabilitation intervention. Pain, range of motion, and extent of disability determine irritability. Patients with low irritability feel passive capsular end and experience less pain; therefore, there are equal amounts of active and passive motion and disability is less. Patients tend to complain of stiffness rather than pain as a chief complaint. Patients with high irritability have significant pain and limited passive motion due to muscle guarding and a higher disability. Typically, the chief complaint reported by these patients is pain, not stiffness. However, unlike the criteria, these are not time based criteria but most often, frozen shoulder patients at early stage of frozen shoulder have high irritability whereas at late stage's patient in frozen shoulder are not so much irritability(16) (25).

Objective

To evaluate sleep quality and its association with level of irritability in patients with frozen shoulder in Peshawar.

METHODOLOGY

This study employed an analytical cross-sectional design and was conducted at Peshawar General Hospital and Habib Physiotherapy Complex in Peshawar to ensure a diverse and representative sample. The study duration was six months, commencing after approval from the research committee of MMI. The sample size was calculated using the Raosoft sample size calculator, yielding 111 participants with a 95% confidence interval. A non-probability convenience sampling technique was used for participant selection. The inclusion criteria comprised individuals aged 40–60 years who were diagnosed with frozen shoulder (duration: 4–12 months) and exhibited moderate to high irritability, as well as a positive capsular pattern. Exclusion criteria included other shoulder pathologies (e.g., rotator cuff tears, fractures), pregnancy (due to potential impact on treatment response), and uncontrolled systemic conditions (e.g., diabetes, cardiovascular diseases) that could compromise exercise safety. The participant selection process was thorough, ensuring the reliability and validity of the study. Following ethical approval from the graduate committee and ASRB, official permissions were secured from respective departments, and participants were briefed on the study's objectives and methodology before providing written consent. Eligible participants were screened based on inclusion and exclusion criteria, and data were collected using the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire and the Pittsburgh Sleep Quality Index (PSQI). Data analysis was performed using SPSS (version 26), with results presented in tables and charts. A chi-square test was applied to assess the associations between variables.

RESULTS

Demographic data

The sample size was 111 frozen shoulder patients. The female participants were 61 (54.1%) and male participants were 50(45.9%). The mean age of the participants was 39.4595and standard deviation were 9.37868.The minimum age of the participants were 22 and maximum age were 65.

Gender

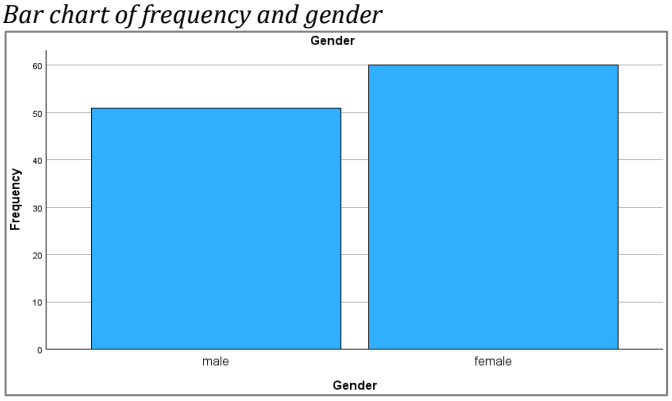
Table 1

Frequency and percentages of gender

	Frequency	Percent	Valid Percent	Cumulative percent
Male	51	45.9	45.9	45.9
Female	60	54.1	54.1	100
Total	111	100	100	

Figure 1

Bar chart of frequency and gender



Participant's Age

The participants' ages ranged in age from about 27.7 years on average to about 4.5 years on average, which indicates a substantial amount of age variation. The oldest participant was 65 years old, and the youngest was 22.

Age Statistics

Table 2

Age statistics of participants.

Valid	**111**
Missing	0
Mean	39
Median	38
Mode	33
Std. deviation	9.37
Minimum	22
Maximum	65
Sum	4380

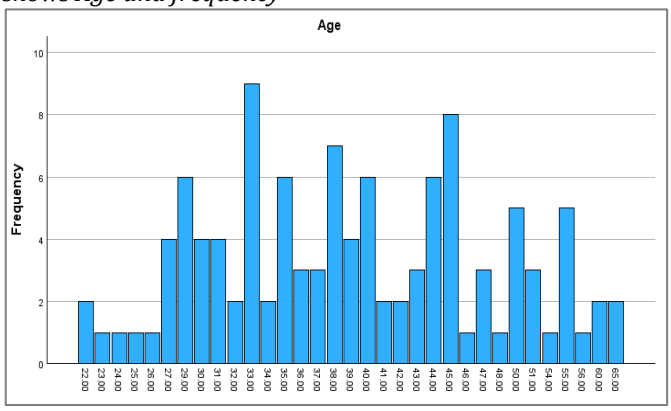
Table 3

Shows frequencies of Age

	Frequency	Percent	Valid percent	Percent
22	2	1.8	1.8	1.8
23	1	.9	.9	2.7
24	1	.9	.9	3.6
25	1	.9	.9	4.5
26	1	.9	.9	5.4
27	4	3.6	3.6	9.0
29	6	5.4	5.4	14.4
30	4	3.6	3.6	18.0
31	4	3.6	3.6	21.6
32	2	1.8	1.8	23.4
33	9	8.1	8/1	31.5
34	2	1.8	1.8	33.3
35	6	5.4	5.4	38.7
36	3	2.7	2.7	41.4
37	3	2.7	2.7	44.4
38	7	6.3	6.3	50.5
39	4	3.6	3.6	54.1
40	6	5.4	5.4	59.5
41	2	1.8	1.8	61.3
42	2	1.8	2.7	63.1
43	3	2.7	2.7	65.8
44	6	5.4	5.4	71.2
45	8	7.2	.7.2	78.4
46	1	.9	.9	79.4
47	3	2.7	2.7	82
48	1	.9	.9	82.9
50	5	4.5	4.5	87.4
51	3	2.7	2.7	90.1
54	1	.9	.9	91.0
55	5	4.5	4.5	95.5
56	1	.9	.9	96.4
60	2	1.8	1.8	98
65	2	1.8	1.8	100
Total	111	100		

Figure 2

shows Age and frequency



Quality of Sleep

The sample size was 111 frozen shoulder patients After taking data from frozen shoulder patient we find that 28 patients have severe difficulty in sleeping and there percentage is (25.2%) and 4 patients have no difficulty in sleep and there percentage is (3.6%) the remaining 79 patients have significant sleep disturbance and there percentage is (71.2%)

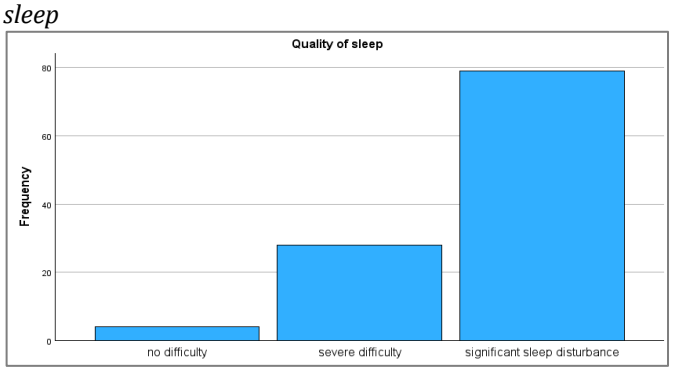
Table 4

Shows Frequency of categories of Quality of sleep

	Frequency	Percent	Valid percent	Cumulative percent
No difficulty	4	3.6	3.6	3.6
Severe difficulty	28	25.2	25.2	28.8
Significant sleep disturbance	79	71.2	71.2	100
Total	111	100	100	

Figure 3

Shows Frequency of categories of Quality of sleep Quality of sleep



Disability

The sample size was 111 frozen shoulder patients. In the frozen shoulder patients we will now look at the level of disability. After taking data from frozen shoulder patients we find that 15 patients have minimal disability and there percentage is (13.5%) and 63 patients have moderate disability and there percentage is (56.8%) the remaining 33 patients have high disability and there percentage is (29.

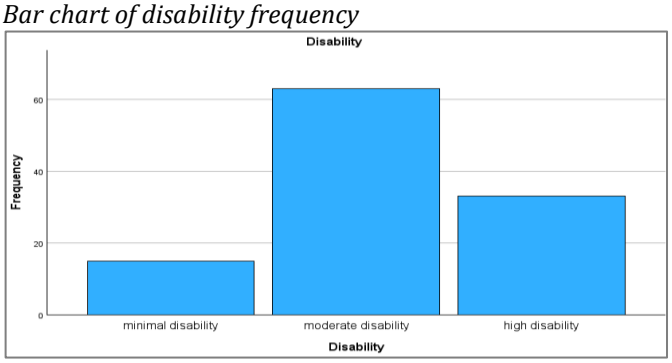
Table 5

Disability frequency

	Frequency	Percent	Valid percent	Cumulative percent
Minimal disability	15	13.5	13.5	13.5
Moderate disability	63	56.8	56.8	70.3
High disability	33	29.7	29.7	100
Total	111	100	100	

Figure 4

Bar chart of disability frequency



Pain

The sample size was 111 frozen shoulder patients After taking data from frozen shoulder patient we find that 15 patients have low pain and there percentage is (13.5%) moreover 63 patients have moderate pain and there percentage is (56.8%) the remaining 33 patients have high pain and there percentage is (29.7%).

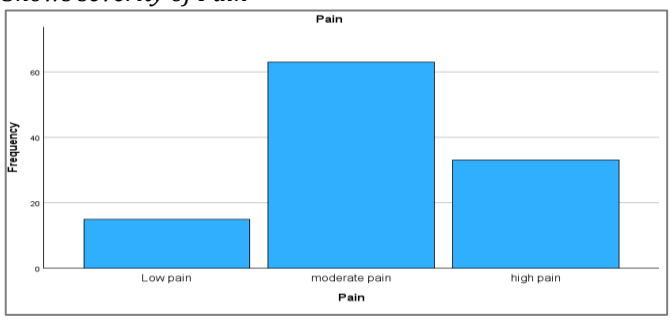
Table 6

Shows severity of Pain.

	Frequency	Percent	Valid percent	Cumulative percent
Low pain	15	13.5	13.5	13.5
Moderate pain	63	56.8	56.8	70.3
High pain	33	29.7	29.7	100
Total	111	100	100	

Figure 5

Shows severity of Pain



Night Pain or Resting Pain

The sample size was 111 frozen shoulder patients. In the frozen shoulder patients we will now look at the night pain or resting pain. After taking data from frozen shoulder patients we find that 15 patients have no pain at night or resting and there percentage is (13.5%), moreover 63 patients have intermittent pain at night or resting and there percentage is (56.8%) the remaining 33 patients have constant pain at night and there percentage is (29.7%

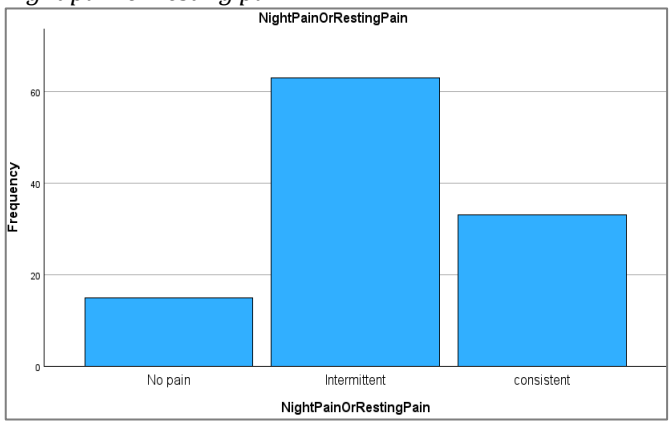
Table 7

Night pain or resting pain

	Frequency	Percent	Valid percent	Cumulative percent
No pain	15	13.5	13.5	13.5
Intermittent	63	56.8	56.8	70.3
Constant	33	29.7	29.7	100
Total	111	100	100	

Figure 6

Night pain or resting pain



Irritability

The sample size was 111 frozen shoulder patients. In the frozen shoulder patients lastly we will now look at the level of irritability. After taking data from frozen shoulder patients. we find that 15 patients have low irritability and there percentage is (13.5%) and 63 patients have moderate irritability and there percentage is (56.8%) the remaining 33 patients have high irritability and there percentage is (29.7%)

Table 8

Irritability

	Frequency	Percent	Valid percent	Cumulative percent
Low irritability	15	13.5	13.5	13.5

Moderate irritability	63	56.8	56.8	70.3
High irritability	33	29.7	29.7	100
Total	111	100	100	

DISCUSSION

This is the first study to examine the connection between adhesive capsulitis patients' sleep quality, level of irritability, and functional impairment. Dash was utilized to evaluate functional impairment and discomfort. We used the widely recognized and often used PSQI measure to evaluate sleep disruption and quality. Its components make it simple to identify the impacted part of sleep quality. Few research on the quality of sleep in FS patients have been published in the literature. This analytical cross-sectional study's most significant finding was that the majority of patients with frozen shoulder frequently have nocturnal shoulder pain and sleep disturbances. This study demonstrates the complex link between shoulder dysfunction and sleep disturbance in patients with frozen shoulders. In line with earlier research that found a correlation between pain and functional disability and sleep disturbance in chronic shoulder disease, the results of this study demonstrated a positive moderate correlation between sleep disturbance and pain as well as between disability and sleep disturbance.

The few studies focused on sleep quality in patients with FS; prior studies including this study, have focused on sleep quality in patients with shoulder impingement syndrome (5). Reported in Castro-Contreras and Valdez-Pardo's (23) results of a systematic review describing patients with rotator cuff injury have 100% of the patients reporting sleep disturbances and up to 93% reporting pain at night.

The findings of Canivet et al, Tekeoglu et al, and Park et al[4,5,24] explain shoulder pain can cause arousal from sleep that disturbs the initiation and maintenance of sleep, reducing the quality of sleep.[24] Although the shoulder muscles are relaxed and recoverable in sleep, poor quality sleep would not allow the shoulder muscles to relax and recover imparting shoulder disability in the day (15). In previous study to evaluate the sleep quality of patients with shoulder impingement syndrome, there was a significant difference regarding all sub parameters of sleep, while FS [shoulder functional status improvement] showed significant difference in habitual sleep efficiency and sleep disturbance divisions. . We also observed significantly higher scores for habitual sleep efficiency, sleep disturbance PSQI subcategories and d PSQI global score in patients with FS compared to healthy controls, as well as a significant negative impact of FS on the quality of life. DASH has demonstrated moderate correlation with the physical domain of WHOQoL-BREF (Harris et al. 2001)[5].

CONCLUSION

This study concluded that irritability of frozen shoulder have strong association with disturbance of sleep.

Limitations

This study considered only in patients of HPC and PGH, Peshawar.
Sample size was very small

Recommendations

This study should be conducted on province level and longitudinal study should be performed for different level of irritability and quality of sleep. Population and sample size should be larger.

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