International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Correlation between Pain, Functional Disability and Quality of Life with Sleep Disturbance in Patients with Adhesive Capsulitis

Ruchita Ravindra Bhagade[1], Sreeraj SR[2]

[1]Intern, [2]Professor,
MGM College of Physiotherapy, Kamothe, Navi Mumbai

Corresponding Author: Ruchita Ravindra Bhagade

ABSTRACT

Study Objective: To find out the correlation between pain, functional disability and low Quality of life with sleep disturbance in patients with adhesive capsulitis.
Method and Measurements: Sixty patients with adhesive capsulitis were included in this study according to inclusion and exclusion criteria. Pain and functional disability was assessed by using SPADI (Shoulder Pain and Disability Index), Sleep disturbance was assessed by using PSQI (Pittsburgh sleep quality index) and Quality of Life (QoL) was assessed by using SF-36 (Short Form Health Survey -36). Spearman's correlation test was done for correlation analysis.
Results: Spearman's correlation shows positive moderate correlation between sleep disturbance and pain (r = .516; p =0.00), sleep disturbance and functional disability(r = .647; p =0.00). Weak negative correlation of Sleep disturbance with physical health (r = -.261; p = .044), role limitation due to physical problems (r = -.329; p=.010), energy and fatigue (r = -.281; p =.030), social functioning (r = -.262; p =.043) and bodily pain (r = -.314; p =.015) respectively. There is Moderate negative correlation between sleep disturbance and General health (r = -.469; p =.000) which is statistically significant.
Conclusion: There is associated sleep disturbance which exists in adhesive capsulitis patients in absence of emotional problems. This associated sleep disturbance is moderately related to Pain, Functional Disability, and General Health and weakly related to role limitation due to physical problems, physical problems, energy and fatigue, bodily pain and social functioning. Hence a proper assessment of sleep quality could be added and accordingly the treatment could include sleep quality improvement measures in adhesive capsulitis patients.
Key Words: Correlation, pain, functional disability, quality of life, sleep disturbance, adhesive capsulitis.

INTRODUCTION

Shoulder is very essential joint for many daily activities. Adhesive capsulitis is a condition, which characteristically reduces the range of motion of glenohumeral joint. [1] The current consensus definition of a frozen shoulder by the American Shoulder and Elbow Surgeons is "a condition of uncertain aetiology characterized by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder". [2] The incidence of frozen shoulder is such that it affects almost 4-5% of population out of which 36% of the patients suffering from diabetes. Females are generally more affected than men. It affects people in the age group of 35-60 with the mean age of affection is 56 and non-dominant side is slightly more affected than dominant side. [3-5] Frozen shoulder is diagnosed clinically by the criteria described by Codman. [6] Symptoms associated with adhesive capsulitis are- localised pain, pain with movement, night pain (rendering the patient unable to sleep

on the affected side), marked limitation of active and passive range of movement of shoulder (particularly external rotation). [1] By presenting a chronic course, this condition affects shoulder functions, which are required for daily living activities thus it also compromised their quality of life. [7,8] There are several other health implications of chronic pain, which includes poor sleep quality. Chronic sleep disturbance is also associated with impaired daytime function, daytime sleepiness and fatigue, reduced quality of life, and increased health care utilization. [9] The pain intensity and associated functional disability directly related to the risk of causing sleep disturbance. [10] Studies support the hypothesis that sleep and pain have a bidirectional and reciprocal relation. [11] Adhesive capsulitis is the chronic disease, which affects a person clinically as well as functionally. The main clinical impact of adhesive capsulitis is pain. There are more complications of this chronic and painful disease which are generally unnoticed unless mentioned by the patients. Some of these complications are functional disability, reduced quality of life and sleep disturbance.

Earlier, studies on sleep disturbance and its relation to functional disability, quality of life and pain in chronic pain patients were indicated that there is sleep disturbance which is primarily due to secondary impact on emotional and psychological aspects patient faces. [12-13]

This study aims to find out the correlation between pain, functional disability and quality of life with sleep disturbance in patients with adhesive capsulitis who are emotionally and psychologically well. The study was conducted with the help of instruments for assessment of these factors. The instruments used to assessed pain and disability, sleep disturbance, quality of life were Shoulder pain and disability index (SPADI), [14] Pittsburgh sleep quality index (PSQI) [15] and short-form health survey questionnaires (SF-36) [15-17] respectively.

MATERIALS AND METHODS

An explorative study on patients with adhesive capsulitis was conducted after approval of Institutional ethics committee. 60 patients with adhesive capsulitis and having sleep disturbance but not having any emotional and psychological disturbances were selected for the study.

Inclusion criteria were women and men in the age group of 35-65yrs, participants diagnosed clinically as adhesive capsulitis, person with poor sleep quality diagnosed with ≥5 score in Global PSQI and Exclusion criteria were subjects with any known psychological disorder, Sleep disorders before the onset of disease, Person who mark low in SF-36 in Role limitation due to emotional health and emotional problem domain, any trauma to shoulder, any steroid injection within 3 months, any surgery around upper limb, neck, face and thorax, prolong immobilization of shoulder, any other inflammatory condition in and around shoulder, acromioclavicular joint arthropathy and bilateral shoulder involvement.

The patients were selected based on a high PSQI score which interprets as subjects are having poor sleep quality. The Role limitation due to emotional problems and the Emotional health domain of SF – 36 were administrated to exclude the patients with low emotional status. Assessment of subjects was taken to confirm diagnosis. Which includes Active as well as passive shoulder range of motion restriction in capsular pattern reduced joint play and differential diagnosis to rule out other shoulder pathologies. The selected subjects were explained about the need and the purpose of study and a consent form was taken before their participation in the study. The demographic data was collected which included the name, age, sex, occupation, past medical and past surgical history. The pain history of every subject was taken which included the duration of disease, onset, site; type of pain, aggravating factor. SPADI score which has 2 components, pain and functional disability was used as a

measure to assess shoulder specific symptoms. The score of individual component as well as total SPADI score were obtained from the participant's response. Pain Component was scored out of 50, Disability component was scored out of 80, and total SPADI score is summation of the pain and disability i.e.130. The QoL was evaluated by the SF-36 Questionnaire. This questionnaire is easy to administer and understand; moreover, it is a generic instrument. It has 8 components which have few sets of questions (total number of questions was 36) .physical functioning(10), role limitations due to physical function(3), role limitations due to emotional problems (4), energy/fatigue (5), emotional well-being(4), social functioning(2), pain (2), general health(5) these are the 8 components with number of questions each component has. Each question carries 100 points and the scoring of each component is calculated by adding all the questions of component and then divided by the no of questions attempted by the patient. The scoring of each component is out of 100. Sleep Quality and disturbance were assessed by using PSQI. The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. Sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. Each component has score from 0-3, and the Global PSQI score was calculated out of 21. Global PSQI ≥5 indicative of poor sleep quality.

DATA ANALYSIS

Collected data was recorded in the Excel 2010 spreadsheet and was analyzed using Statistical Package for the Social Science (SPSS) software (version 20). Qualitative variables were expressed as absolute number and percentage, and the Quantitative variables were expressed as mean and standard deviation. A non-parametric test i.e. Spearman's correlation test was used for the data analysis since the data were not normally distributed when subjected to Shapiro-Wilk test.

RESULTS

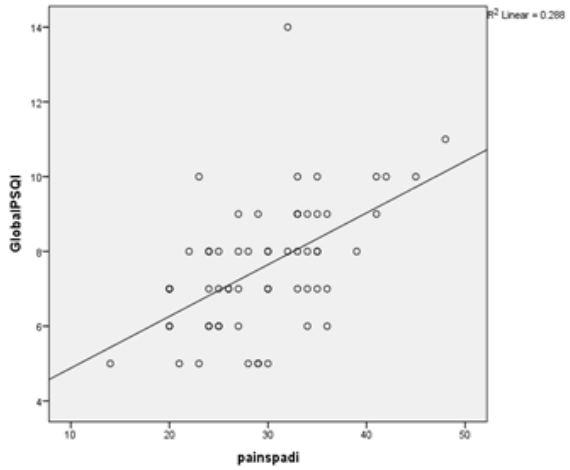
60 patients were included in this study with the mean age of 52 ± 6.724 years of which 25 were male and 35 were female. Out of 60 patients, 60 % of the patients are diabetic, 36% does not have any co-morbid factors and 2 % of the population has hypertension and hypothyroidism. Mean values of SPADI components are Pain (29.67±6.78), Functional disability (53.20±9.93) and total SPADI score (83.15±14.58). The Mean value of Global PSQI is 7.60±1.75, which has the maximum score of 14 and the minimum score of 5. The mean and the standard deviation of the components of PSQI suggests that the major affection of sleep quality was found in the components Sleep latency (1.7±0.69), Sleep Quality (1.55±0.51), Sleep Duration (1.41±0.59), Habitual sleep efficacy (1.16±0.52), Sleep disturbances (1.11±0.32) and daytime dysfunction (0.65±0.57).Mean value of SF-36 components shows that in adhesive capsulitis the components majorly affected are Role limitation due to physical health (23.33±29.78), Bodily pain (48.3±15.06), Social functioning (66.21± 20.71), Physical health (65.33±14.58), General health (75.42±17.11), Energy/ fatigue (76.42±10.04).

Table 1 shows the correlation statistics between SPADI and Global PSQI after using Spearman's correlation coefficient. **Figure 1** shows positive moderate correlation between sleep disturbance and pain ($r = .516$; $p=0.00$), positive moderate correlation between the disability and sleep disturbance. ($r= .647$; $p=0.00$) and positive Strong correlation between Total SPADI score and Global PSQI ($r= .700$; $p=0.00$) which is statistically significant ($p<0.01$).

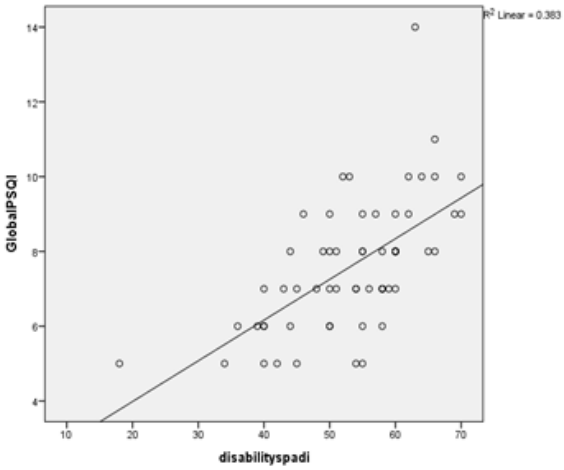
Table 1: Correlation between Pain and Functional Disability with Sleep Disturbance.

Factors	Value	Pain	Functional disability	Total SPADI score
Global PSQI	Spearman's correlation coefficient (r)	.516**	.647**	.700**
	Sig.(2-tailed) (p)	.000	.000	.000

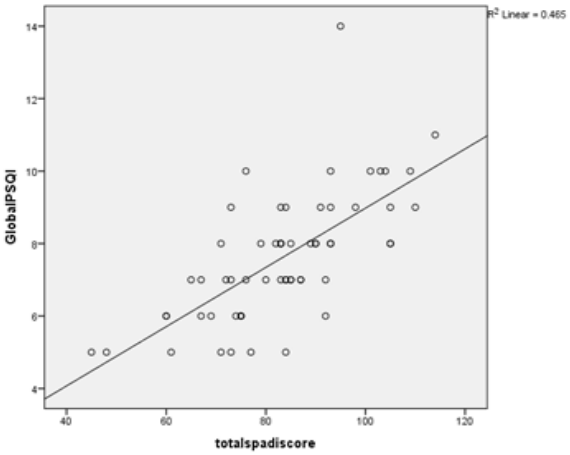
**Correlation is significant at the 0.01 level (2-tailed)



Scatter plot shows positive moderate correlation between sleep disturbance and pain (r = .516; p=0.00) which is statistically significant (p<0.01)



Scatter plot show positive moderate correlation between the disability and sleep disturbance (r= .647; p=0.00) which is statistically significant
(p<0.01)



Scatter plot shows positive strong correlation between Total SPADI score and Global PSQI (r= .700; p=0.00) which is statistically significant (p<0.01)

Figure 1: Correlation between SPADI components and Global PSQI.

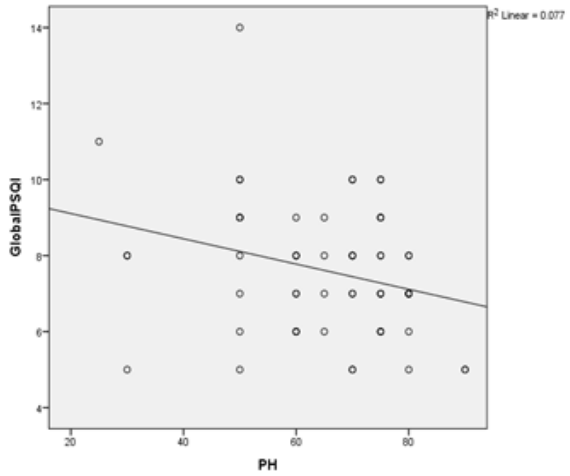
Table 2 shows the correlation statistics of SF 36 components and Global PSQI

Figure 2 shows that there is weak negative correlation of Sleep disturbance with physical health (r= -.261; p = .044), role limitation due to physical problems (r=.329; p=.010) Figure 3 shows that there is weak negative correlation of Sleep disturbance with energy and fatigue (r = -.281; p=.030), social functioning (r = -.262; p=.043)and bodily pain (r = -.314; p=.015) respectively which is statistically significant(p<0.05). Figure 4 shows that there is Moderate negative correlation between sleep disturbance and General health (r = -.469; p=.000) which is statistically significant.

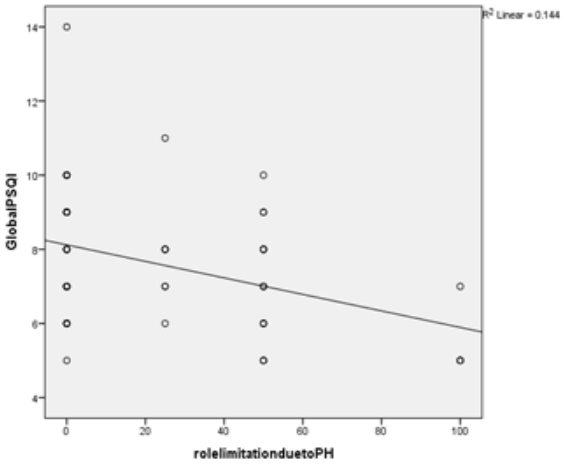
Table 2: Correlation between Sleep Disturbance and SF-36 Components.

Factors	Values	Physical Health	Role limitation due to Physical Health	Energy/ Fatigue	Social Functioning	Pain	General Health
Global PSQI	Correlation Coefficient (r)	-.261*	-.329*	-.281*	-.262*	-.314*	-.469**
	Sig.(2taile) (p)	.044	.010	.030	.043	.015	.000

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

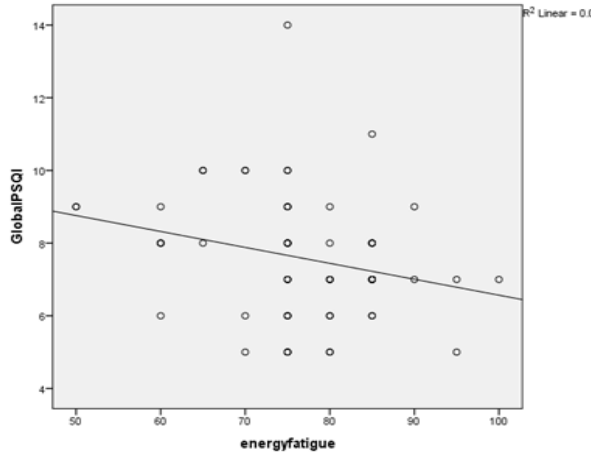


Scatter plot shows a weak negative correlation between Global PSQI and Physical health (PH) **(r= -.261; p = .044)** which is statistically significant. (p<0.05)

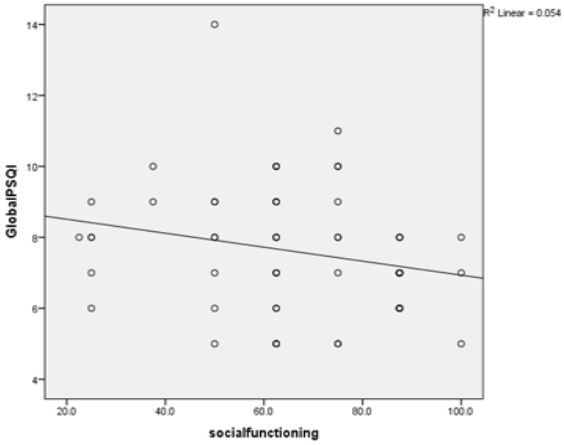


Scatter plot shows a weak negative correlation between Global PSQI and role limitation due to physical problems **(r = -.329; p=.010)** which is statistically significant. (p<0.05)

Figure 2: Correlation between Global PSQI with SF- 36 components physical health and role limitation due to physical problems.

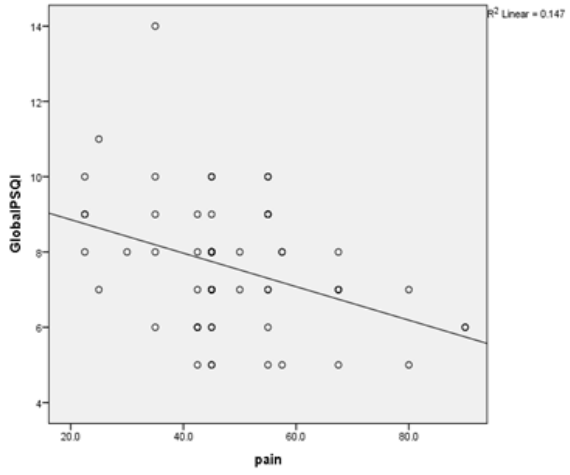


Scatter plot shows a weak negative correlation between Global PSQI and energy and fatigue (r = -.281; p=.030) which is statistically significant. (p<0.05).

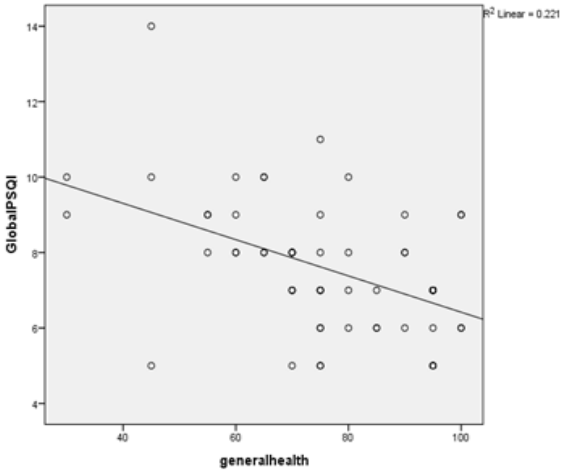


Scatter plot shows a weak negative correlation between Global PSQI and social functioning (r = -.262 p=.043) which is statistically significant. (p<0.05).

Figure 3: Correlation between Global PSQI with SF- 36 components energy and fatigue, social functioning



Scatter plot shows a weak negative correlation between Global PSQI and bodily pain (r = -.314; p =.015) which is statistically significant. (p<0.05)



Scatter plot shows a moderate negative correlation between Global PSQI and general health **(r = -.469; p=.000)**.which is statistically significant. (p<0.01)

Figure 4: Correlation between Global PSQI with SF- 36 component bodily pain and general health.

DISCUSSION

This is the first study that was conducted on relationship between sleep disturbance with pain, functional disability and lower quality of life in adhesive capsulitis patients. We used SPADI for assessment of pain and functional disability instead of DASH because it is more specific to the shoulder and functional activities of shoulder unlike entire upper limb.

For the assessment of sleep quality and disturbance we selected the instrument PSQI which is universally accepted and commonly used. It has the components that can easily find out the aspect of sleep quality that is affected. We selected SF 36 over another accepted score WHO-QOL Brief. Both the scales have similar fields and the SF-36 is more inclined to health-related QoL, whereas WHOQOL-BREF measures global QoL. [18] For this study we had used SF 36 instrument also as an inclusion and exclusion criteria.

The result of this study showed that there is positive moderate correlation between sleep disturbance and pain, positive moderate correlation with the Disability and Sleep Disturbance which is matching with the previous research in which result shows correlation between pain and functional disability with sleep disturbance in chronic shoulder disease. [19] Since pain and sleep are in bivariate relation which means that in chronic pain patients there is significant reduction in total sleep time, increased night time wakening because of which there is increased sensitivity to pain and this in turns causes more sleep disturbance, also studies suggested that when there is improvement in sleep quality there is reduction in pain sensitivity. [11,20,21] Functional disability is mainly caused due to pain while movement. Thus, sleep disturbance causes more pain and more functional disability.

This study also shows that there is a significant negative weak correlation of sleep disturbance with physical health, role limitation due to physical problems, social functioning, bodily pain, energy /fatigue. As present with chronic symptoms adhesive capsulitis causes pain and functional disability. Because of this the physical functioning is affected which causes limitation of that limb for the activities of daily living. This causes more energy expenditure and in turns cause fatigue. Due to pain and disability, person with adhesive capsulitis has the fear of aggravating pain if incorporated in social functioning and thus social activities are limited. As mentioned above, sleep, functional disability and pain are related to each other and hence, these components of quality of life are in indirect relationship with sleep disturbance which has a direct relation with pain and functional disability.

There is moderate negative correlation of sleep disturbance with general health. Due to high fatigability and chronic disease, the general health of patient is affected. Studies also suggested that sleep affection has an indirect relationship with general health through mediators such as fatigue, pain, disability and fear. [22]

Further study is needed to check the impact of adhesive capsulitis on sleep quality in larger sample size, specifically in primary idiopathic frozen shoulder without diabetes. It is in need to analyze the effect of improved pain and functional ability in the sleep patterns of such patients and to check the factors, which are influencing the relationship.

CONCLUSION

There is associated sleep disturbance which exists in adhesive capsulitis patients in absence of emotional problems. This associated sleep disturbance is moderately related to Pain, Functional Disability, and General Health and weakly related to role limitation due to physical problems, physical problems, energy and fatigue, bodily pain and social functioning. Hence a proper assessment of sleep quality could be added and accordingly the treatment could include sleep quality improvement measures in adhesive capsulitis patients.

ACKNOWLEDGEMENT

We are heartily thankful to each and every participant who took part in this study and given their precious time as well as thankful to everyone who contributed their efforts for completion of this project.

REFERENCES

1. Gupta S, Raja K, Manikandan N. Impact of adhesive capsulitis on quality of life in elderly subjects with diabetes: A cross sectional study; INT J. Diabetes Dev Ctries. 2008 Oct- Dec; 28(4): 125–129.
2. Zuckerman JD, Rokito A. Frozen shoulder: a consensus definition. *J Shoulder Elbow Surg*. 2011 Mar. 20 (2):322-5.
3. Nagy MT, MacFarlane RJ, Khan Y and Waseem M; The Frozen Shoulder: Myths and Realities; The Open Orthopaedics Journal, 2013, 7, (Suppl 3: M10) 352-355 1874-3250/13 2013.
4. Fernandes M. Correlation between functional disability and quality of life in patients with adhesive capsulitis. Acta Ortop Bras.2015;23 (2) :81-4.
5. Rizk TE, Pinals RS. Frozen shoulder; Seminars Arthritis Rheumatism 1982; 11:440-52
6. Codman E (1934) The shoulder. Rupture of the supraspinatus tendon and other lesions in or about the sub acromial bursa. Thomas Todd, Boston.
7. Vastamäki H, Kettunen J, Vastamäki M. The natural history of idiopathic frozen shoulder: a 2- to 27-year follow up study; ClinOrthopRelat Res. 2012;470 (4):1133-43
8. Cho C, Jung S, Son E, Hwang I. Sleep status and quality of life in patients with frozen shoulder; J Korean orthop assoc.2012 Jun;47(3): 205-210.
9. Parimi N, Blackwell T, Stone K, Lui L, Ancoli-Israel S, Tranah G et al. Hip pain while using lower extremity joints is associated with sleep disturbances in elderly caucasian women: The study of osteoporotic fractures. Arthritis Care & Research [Internet]. 2012 [cited 15 May 2018];64(7):1070–1078. Available from: https://doi.org/10.1002/acr.21630
10. Hong JH, Kim HD, Shin HH, and Huh B. Assessment of depression, anxiety, sleep disturbance, and quality of life in patients with chronic low back pain in Korea; Korean J Anesthesiology 2014 Jun 66(6): 444-450 http://dx.doi.org/10.4097/kjae.2014.66.6.444
11. Cheatle M, Foster S, Pinkett A, Lesneski M, Qu D, Dhingra L. Assessing and Managing Sleep Disturbance in Patients with Chronic Pain. Anesthesiology Clinics. 2016;34(2): 379-393.
12. Tang N, Wright K, Salkovskis P. Prevalence and correlates of clinical insomnia co-occurring with chronic back pain. Journal of Sleep Research. 2007;16(1):85-95.
13. Ding H, Tang Y, Xue Y, Yang Z, Li Z, He D et al. A report on the prevalence of depression and anxiety in patients with frozen shoulder and their relations to disease status. Psychology, Health & Medicine. 2014;19(6):730-737.
14. MacDermid J, Solomon P, Prkachin K. The Shoulder Pain and Disability Index demonstrates factor, construct and longitudinal validity. BMC Musculoskeletal Disorders. 2006;7(1).
15. Buysse D, Reynolds C, Monk T, Berman S, Kupfer D. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Research. 1989;28(2):193-213.
16. Portney L, Watkins M. Foundations of clinical research: Applications to practice. 2nd ed. Connecticut: Appleton and Lange; 2000.
17. Kwan Y, Fong W, Lui N, Yong S, Cheung Y, Malhotra R et al. Validity and reliability of the Short Form 36 Health Surveys (SF-36) among patients with spondyloarthritis in Singapore. Rheumatology International. 2016;36(12):1759-1765..
18. Huang I, Wu A, Frangakis C. Do the SF-36 and WHOQOL-BREF Measure the Same Constructs? Evidence from the Taiwan Population*. Quality of Life Research. 2006;15(1):15-24.
19. Peters R, Menendez M, Mellema J, Ring D, Vranceanu AM. Sleep Disturbance and Upper-Extremity Disability. The Archives of Bone and Joint Surgery, 2016; 4(1): 35-40.
20. Vitiello M, Rybarczyk B, Von Korff M, Stepanski E. 2009. Cognitive behavioral therapy for insomnia improves sleep and decreases pain in older adults with comorbid insomnia and osteoarthritis. Journal of Clinical Sleep Medicine 5:355–362.
21. Purabdollah M, Lakdizaji S, Rahmani A, Hajalilu M, Ansarin K Relationship between

Sleep Disorders, Pain and Quality of Life in Patients with Rheumatoid Arthritis ; tbzmed JCS Sep 2015; 4 (3), 233-24 doi:10.15171/jcs.2015.024.

22. Herrero-Sánchez M, García-Iñigo M, Nuño-Beato-Redondo B, Fernández-de-las-Peñas C, Alburquerque-Sendín F. Association between ongoing pain intensity, health-related quality of life, disability and quality of sleep in elderly people with total knee arthroplasty. Ciência & Saúde Coletiva. 2014;19(6):1881-1888.

How to cite this article: Bhagade RR, Sreeraj SR. Correlation between pain, functional disability and quality of life with sleep disturbance in patients with adhesive capsulitis. Int J Health Sci Res. 2018; 8(6):116-123.

****