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ASSOCIATION OF FEAR AVOIDANCEWITHPAIN, DISABILITY AND QUALITY OF LIFE IN PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME - A CORRELATION STUDY

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ABSTRACT

BACKGROUND: Shoulder pain is a common presenting complaint for patients of all ages and activity levels. Shoulder impingement accounts for 44–65% of shoulder complaints. The shoulder impingement syndrome (SIS) consists of the rotator cuff tendonitis and bursitis of the shoulder. It shows the inflammation of the supraspinatus tendon inside the antero-inferior junction of the acromion and the greater tuberosity of the humerus. To cope with a painful medical condition or injury, patients can use adaptive strategies when patients avoid physical and/or social activities of daily living. Fear avoidance is an extreme form of fear of movement, is defined as an excessive, irrational, and debilitating fear to execute a determined movement or activity owing to a feeling of vulnerability to a painful injury or reinjury. These variables may affect the pain intensity, disability and quality of life of the patient with SIS.

OBJECTIVE: The aim of the study was to determine the associationfear avoidancewith pain, disability and quality of life in patients with shoulder impingement syndrome.

METHODS: In the present correlation study, total seventy-nine (79) Gujarati patients with shoulder impingement syndrome with age between 18-65 years were included. Fear avoidance was measured by Fear avoidance component scale of fear avoidancegujarati version (FACS-G),pain intensity was measured by VAS

scale, disability was measured by shoulder pain and disability index (SPADI) and quality of life was measured by WHOQOL_BREF gujarati version. Statistical analysis was done by using SPSS 20 version. Spearman's rank correlation coefficient test was applied for correlation between variables. Significance level was set at $p<0.05$.

RESULT: the mean FACStotal score was 52.52±13.27, moderate positive correlation exists between FACS and VAS score (rho=0.417), strong positive correlation between FACS and SPADI score (0.716), there was no statistically correlation between FACS score and WHOQOL_BREF domain 1, 2,3 and 4 score .

CONCLUSION: present study concluded that there is moderate positive correlation exists between fear avoidance and pain intensity, strong positive correlation between fear avoidance and disability, .there was no correlation between fear avoidance and quality of life

KEY WORDS: Shoulder impingement syndrome,fear avoidance, pain, disability, quality of life

INTRODUCTION

Shoulder pain is a common presenting complaint for patients of all ages and activity levels. [1] Shoulder impingement accounts for 44–65% of shoulder complaints.[2] The shoulder impingement syndrome (SIS) consists of the rotator cuff tendonitis and bursitis of the shoulder. [3, 4] it shows the inflammation of the supraspinatus tendon inside the antero-inferior junction of the acromion and the greater tuberosity of the humerus. Patients with SIS report severe acute pain which increases during over-head activities as well as sleeping on affected side. [3,5] The SIS comprises of three stages; stage I impingement is defined by edema and hemorrhage of the subacromial bursa and rotator cuff, it is found in patients who are less than 25 years old. Stage II impingement represents irreversible changes, such as fibrosis and tendinopathy of the rotator cuff. It is mostly found in patients who are up to 25 to 40 years old. Stage III impingement is marked by more chronic changes, such as partial or complete tears of the rotator cuff, and usually it is seen among the patients who are more than 40 years old.[5,6]Subacromial impingement syndrome (SIS) encompasses a spectrum of subacromial space pathologies including partial thickness rotator cuff tears, rotator cuff tendinosis, calcific tendinitis, and subacromial bursitis. These conditions may all present similarly and are often distinguishable only by magnetic resonance imaging (MRI) or arthroscopy. [1]

Although impingement symptoms may arise following trauma, the pain more typically develops insidiously over a period of weeks to months. The pain is typically localized to the anterolateral acromion and frequently radiates to the lateral mid humerus. Patients usually complain of pain at night, exacerbated by lying on the involved shoulder, or sleeping with the arm overhead. Normal daily activities such as combing one's hair or reaching up into a cupboard become painful, and a general loss of strength may be noted. Onset of shoulder pain and weakness following a fall in an individual over 40 years of age should raise concern for a complete tear of the rotator cuff. [1] The most frequently occurring shoulder disorders include rotator cuff disease or tendinopathy, which can progress to rotator cuff tear, glenohumeral joint instability, and adhesive

capsulitis.[2] It is important to differentiate shoulder impingement with other shoulder disorders. Narrowing the etiology of shoulder pain can be difficult as a number of conditions often coexist in older individuals. Adhesive capsulitis often presents with unremitting shoulder pain at rest, and early stages of adhesive capsulitis may present much like impingement syndrome. Later, patients will develop progressive loss of motion, with loss of internal rotation an early sign of the motion loss. Patients with adhesive capsulitis will be limited in both active and passive ranges of motion, particularly in contrast to SIS, where passive motion is unrestricted. Cervical radiculopathy may present with unilateral shoulder pain. This can be particularly difficult to sort out in older patients who may have both rotator cuff pathology and cervical spine osteoarthritis. Osteoarthritis of the glenohumeral joint presents with a painful diminished range of motion. [1]

In shoulder impingement syndrome, active and passive shoulder range of motion is typically normal. Two provocative examination techniques are highly sensitive but not very specific for diagnosing shoulder impingement syndrome. Neer's sign elicits pain with maximum passive shoulder elevation and internal rotation while the scapula is stabilized. [1,5] Hawkin's sign is pain with passive forward elevation to 90° and maximum internal rotation.[1,7] These 2 tests have a negative predictive value of greater than 90% when combined.[1,8] Marked rotator cuff weakness with positive impingement signs may indicate a complete cuff rupture. [1, 5]

Fear avoidance, an extreme form of fear of movement, is defined as an excessive, irrational, and debilitating fear to execute a determined movement or activity owing to a feeling of vulnerability to a painful injury or reinjury.Fear avoidance is often associated with escape behaviors such as hyper vigilance or avoidance.Fear avoidance is associated with less range of movement in people with chronic musculoskeletal pain.ROM also has been related to greater levels of shoulder pain and disability. 20 Fear avoidance component scale of fear avoidance (FACS) is used to measure the fear avoidance. The successful translation of FACS questionnaire into the Gujarati language shows good psychometric properties and factorial structure and approximates the results of the current English version of the FACS questionnaire. [11]

Disability is strongly associated with musculoskeletal conditions. The burden of these conditions may become exponentially high in the absence of rehabilitation. Disability in ICF term is defined as an impairment of the body functions and body structure and limited activity and restricted participation and can be influenced by environmental and personal factors. Musculoskeletal-related disability is amenable to rehabilitation and there is evidence to suggest the effectiveness of multidisciplinary forms of rehabilitation programs. Community-based programs as an extension of rehabilitation also have evidence to improve clinical and quality of life outcomes in people with musculoskeletal conditions.The Shoulder Pain and Disability Index (SPADI) was developed to measure current shoulder pain and disability in an outpatient setting. [16]

The definition of Quality of Life given by the World Health Organization Quality of Life (WHOQOL) Group is that it is the "individuals' perceptions" about their position in life in the context of the culture and value systems in which they live and also in relation to their goals, expectations, standards, and

concerns.[17]Quality of life is the general well-being of individuals and communities, outlining negative and positive aspects of life. It observes life satisfaction, including all aspects from physical health, family, education, employment, wealth, safety, and security to freedom, religious beliefs, and the environment. Quality of life (QOL) has become an important factor for health care providers and patients with acute and chronic health conditions which have many aspects including physical, financial, spiritual and psychological ones. The treatment and care of chronic diseases such as shoulder impingement syndrome, in addition to disease control, is improving the quality of life and issues such as social restrictions, physical and health problems caused by shoulder pain that are QOL assessment factors as well as discovering other difficulties related to QOL which is helpful in the treatment process.

The WHOQOL-BREF mainly evaluates the four domains (i.e., 1- Physical health, 2- Psychological health, 3- Social relationship, and 4- Environment). Each domain is scored individually and then the scores are converted into scores out of 100.

So, the need of the study is to find the association of fear avoidance with pain, disability and quality of life in patients with shoulder impingement syndrome.

METHODOLOGY:
STUDY DESIGN: Cross sectional study.
SAMPLING TECHNIQUE: Convenient sampling.
STUDY DURATION: 1 Year.

STUDY POPULATION: Patients of shoulder impingement syndrome with 18-65 years of age group.

SAMPLE SIZE: 79

STUDY SETTING: SPB Physiotherapy College OPD and other clinical OPDs of Surat.

INCLUSION CRITERIA: [3, 4, 5, 6]

1. Patients with shoulder pain aged 18-65 years.

2. Complaint of pain since last 3 months.

3. Patients with positive Neer test and Hawkins Kennedy tests.

4. Patients with no passive limitation of range of motion suggestive of adhesive capsulitis.

5. Tenderness present at subacromial space.

6. Patients who able to read and understand gujarati.

EXCLUSION CRITERIA [3, 4, 5, 6]

1. Previous surgery /trauma to the affected shoulder.

2. Other comorbid shoulder pathology such as instability, Glenohumeral arthritis,

Acromioclavicular arthritis.

3. Evidence of complete rotator cuff tear (positive drop arm test/ MMT grade <2 of the RC).

4. Symptoms of cervical radiculopathy.

5. Diagnosed inflammatory or neurological disorder.

6. Systemic disorders like fibromyalgia, rheumatoid arthritis, any cardiac, respiratory etc.

7. History of psychiatric disorder.

MATERIAL AND TOOLS:

1. Consent Form

2. Chair

3. Screening form

4. Data recording sheet

5. Individual sheet for each outcome measures

OUT COME MESAURES:

1. **Pain severity was assessed using VAS scale.**

The VAS provides a continuous scale for magnitude estimation and consists of a straight line, the ends of which are defined in terms of the extreme limits of pain experience. The VAS provides a continuous scale for magnitude estimation of pain. A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. In that a straight line of 100 mm was presented, the end anchors of which are labeled as the extreme boundaries of the pain sensation or feeling. To measure pain VAS is labeled as "no pain" on one end and "pain as bad as it could possibly be" on the other. Subject have to respond to the VAS by placing a mark through the line at a position which best represents their current perception of pain between the labeled extreme. The test–retest reliability of the VAS for disability proved to be moderate to good. [13, 14]

2. **Disability was assessed using Shoulder Pain and Disability Index (SPADI) Gujarati version scale**

The Shoulder Pain and Disability Index (SPADI) was developed to measure current shoulder pain and disability in an outpatient setting. The SPADI contains 13 items that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability. The intra rater reliability is ICC = 0.943 and interrater reliability is ICC = 0.959. This showed excellent inter- and intra-rater reliability. there is good concurrent validity.[15]

3. **Quality of life was assessed using WHOQOL BREF (world health organization quality of life) scale.**

The WHOQOL-BREF was derived from data collected using the WHOQOL-100. It produces scores for four domains related to quality of life: physical health, psychological, social relationships and environment. It includes total 26 Questions. It also includes one facet on overall quality of life and general health.50 The WHOQOL-BREF was derived from data collected using the WHOQOL-100. It produces scores for four domains related to quality of life: physical health, psychological, social relationships and environment. It includes total 26 Questions. It also includes one facet on overall quality of life and general health.36 Responses

to questions are on a 1-5 Likert scale where 1 represents "disagree" or "not at all" and 5 represents "completely agree" or "extremely". The WHOQOL-BREF covers four domains each with specific facets:

1)Physical health: Activities of daily living, Dependence on medicinal substances and medical aids Energy and fatigue, Mobility, Pain and discomfort, Sleep and rest, Work Capacity. 2)Psychological: Bodily image and appearance, Negative feelings, Positive feelings, Self-esteem, Spirituality/ Religion / Personal beliefs, Thinking, learning, memory and concentration. 3) Social relationships: Personal relationships, social support, Sexual activity. 4)Environment: Financial resources, Freedom, physical safety and security, Health and social care: accessibility and quality, home environment, Opportunities for acquiring new information and skills, Participation in and opportunities for recreation / leisure activities, Physical environment (pollution / noise / traffic / climate), Transport. There are also two separate questions which ask specifically about 1) the individual's overall perception of their health and 2) the individual's overall perception of their quality of life.51 The WHOQOL-BREF has good to excellent psychometric properties of reliability and performs well in preliminary tests of validity.[12]

4. **Fear avoidance was assessed using Fear avoidance component scale of Fear avoidanceGujrati (FACS-G) scale**

The FACS is a 17-item questionnaire used to assess the subjective rating of fear of movement or fear avoidance. It is a self-completed questionnaire and which has a range of scores from 17 to 68 where the higher scores point toward an increasing degree of fear avoidance. It has moderate test-retest reliability (ICC 0.696). Divergent validity showed low correlations with numerical pain rating scale(r=0.044), the RMDQ-G(r=0.06), and PHQ-9-G(r=0.269); but convergent validity showed highly significant correlation with FABQ-G (r=0.407, P=0.001). [11]

Procedure:

Research was approved by institutional ethical committee of SPB Physiotherapy College.

Pilot study was conducted for the sample size calculation for one month from various hospitals and clinics across the Surat, Gujrat prior to the main study. The sample size was calculated from following formula.

N=z2pq/d2

z=level of significance = 95%

p=proportion of patients in one month = 0.0545

q=1-p

d=allowable error=5%

So, based on that N was found 79.The patients were screened on the basis of inclusion and exclusion criteria and their age, sex, medical health history, shoulder symptoms, affected side, body mass index, duration of symptoms and impact of their symptoms on activities of daily living was taken by an assessment Proforma. Neers impingement test and Hawkins Kennedy test was performed to confirm the shoulder impingement syndrome according to inclusion criteria. Prior to the commencement of the study, detailed procedure and purpose of the study was explained to the patients in their vernacular language and a signed written informed consent form was taken from them. The patients were assessed with following outcome measures. i.e., the visual analogue scale, shoulder pain and disability index, WHOQOL BREF scale, Fear avoidance component scale of fear avoidanceGujarati. The patients were given the scales and asked to read and tick the scores as per the instructions are given into the forms.

- All outcome measures were assessed using scales and following instruction were given to the patients.
- VAS scale was given and asked to point of the continuous scale according to their pain severity between 0-10. The patient marks on the line the point that they feel represents their perception of their current state.
- SPADI scale was given and the patient is instructed to choose the number that best describes their level of pain and extent of difficulty using the involved shoulder.
- WHOQOL_BREF scale was given and ask to Respond to questions on a 1-5 Likert scale where 1 represents "disagree" or "not at all" and 5 represents "completely agree" or "extremely".
- FACS-G scale was given and asked to respond on the 6 points Likert scale from 0 is completely disagree to 5 is completely agree.

STATISTICAL ANALYSIS:

SPSS (ver. 20) statistical software was used for all statistical computations. Descriptive statistics for the continuous variables were presented as frequencies, whereas mean, standard deviation, minimum and maximum values were provided as counts and percentages for categorical variables.Normality testing was done for all the variables. Kolmogorov Smirnov test was used for the large sample size (>50). In the normality testing the p values of all the variables were < 0.05. So it concludes that the data is not normality distributed.

So, for correlation of variables non parametric test is used which is spearman's rank correlation coefficient test. For the correlation between VAS and FACS-Gspearman's correlation test was used to find the correlation coefficient.For the correlation between SPADI and FACS-G spearman's correlation test was used to find the correlation coefficient. For the correlation between WHOQOL_BREF and FACS-G, spearman's correlation test was used to find the correlation coefficient. The statistical significance level was considered as $p<0.05$ at 95% confidence interval for all the correlation analysis.

RESULTS

The study included the sample of 79 patients with the age between 18 to 65 years and the study was conducted in various hospitals and clinics across Surat.

Table 1: **Descriptive statistics of all the variables**

Variable	Mean SD
Age	44.80 ± 11.07
BMI	27.08 ± 3.02
Duration of symptoms (in months)	6.70 ± 2.15
SPADI score	55.91 ± 14.50
VAS score	6.46 ± 1.44
WHOQOL_BREF domain 1 score	48.95 ± 9.37
WHOQOL_BREF domain 2 score	49.65 ± 9.26
WHOQOL_BREF domain 3 score	52.94 ± 9.08
WHOQOL_BREF domain 4 score	50.81 ± 10.09
FACS score	52.52 ± 13.27

Table 2: Kolmogorov-Smirnov test of normality of data

Variable	P value
SPADI_score	.009
WHOQOL_BREF domain 1	.000
WHOQOL_BREF domain 2	.000
WHOQOL_BREF domain 3	.000
WHOQOL_BREF domain 4	.001
VAS_score	.000
FACS_score	.002

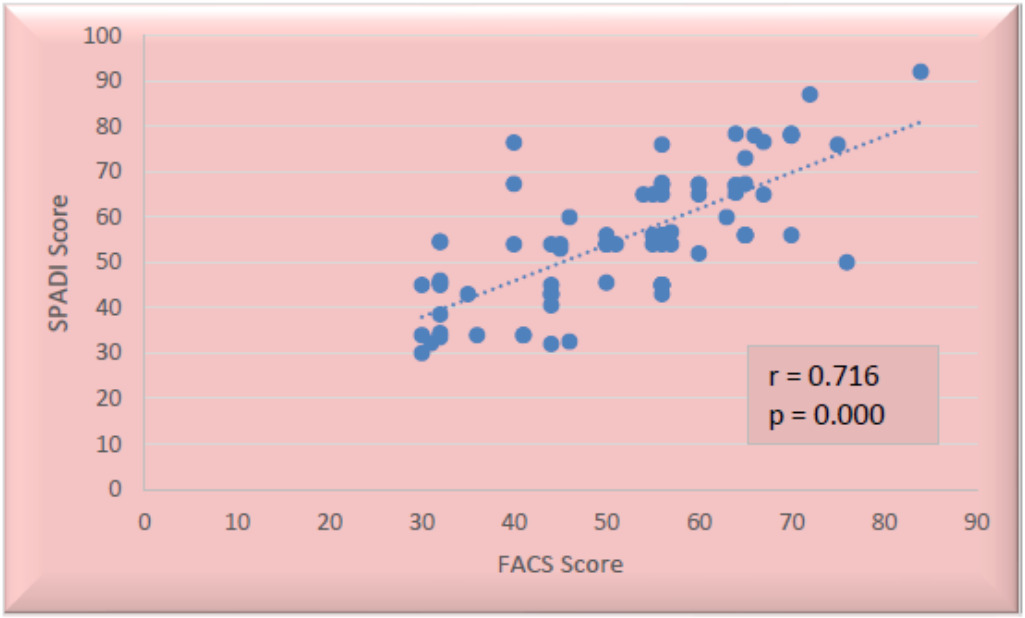
It can be concluded from Table 2 that p values of all the variables are <0.05.So, Non parametric spearman's correlation test was used to correlate the variables.

Table 3: Analysis including correlation between FACS score and SPADI score:

			SPADI score
Spearman's Rho	FACS score	Correlation Coefficient	0.716**
		Sig. (2-tailed)	0.000
		N	79

** correlation is significant at the 0.05 level (two tailed)

As the p values of FACS and SPADI in normality testing were < 0.05, spearman correlation was done. There is significant relevance between alterations in the fear avoidance with the disability of the patient as p < 0.05 It can be concluded from the table 5 that there is strong positive- correlation (rho=0.716, P= 0.000) between the FACS score and SPADI score.



Graph 1: Showing Linear relationship between FACS score and SPADI score

Table 4: Analysis including correlation between FACS score and VAS score:

			VAS score
Spearman's Rho	FACS score	Correlation Coefficient	0.417**
		Sig. (2-tailed)	0.000
		N	79

** correlation is significant at the 0.05 level (two tailed)

As the p values of FACS and VAS in normality testing were< 0.05, spearman correlation was done. There is significant relevance between alterations in the fear avoidance with the pain of the patient as p < 0.05 It can be concluded from the table 8 that there is moderate positive- correlation (rho=0.417, P=0.000) between the FACS score and VAS score.

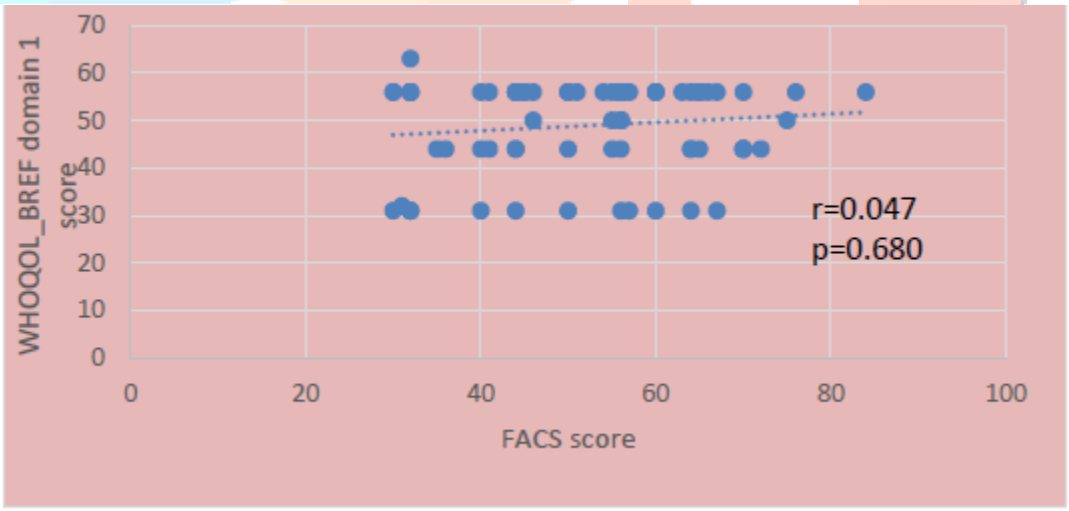
Graph 2: Showing Linear relationship between FACS score and VAS score

Table 3: Analysis including correlation between FACS and WHOQOL_BREF DOMAIN 1 scores:

Spearman's Rho	
FACS score and WHOQOL_BREF domain 1 Correlation Coefficient	.047
Sig. (2-tailed)	.680

*Correlation is significant at 0.05 levels

- There is no correlation between FACS score and WHOQOL_BREF domain 1 score, and CSI score and WHOQOL_BREF domain 1 score.

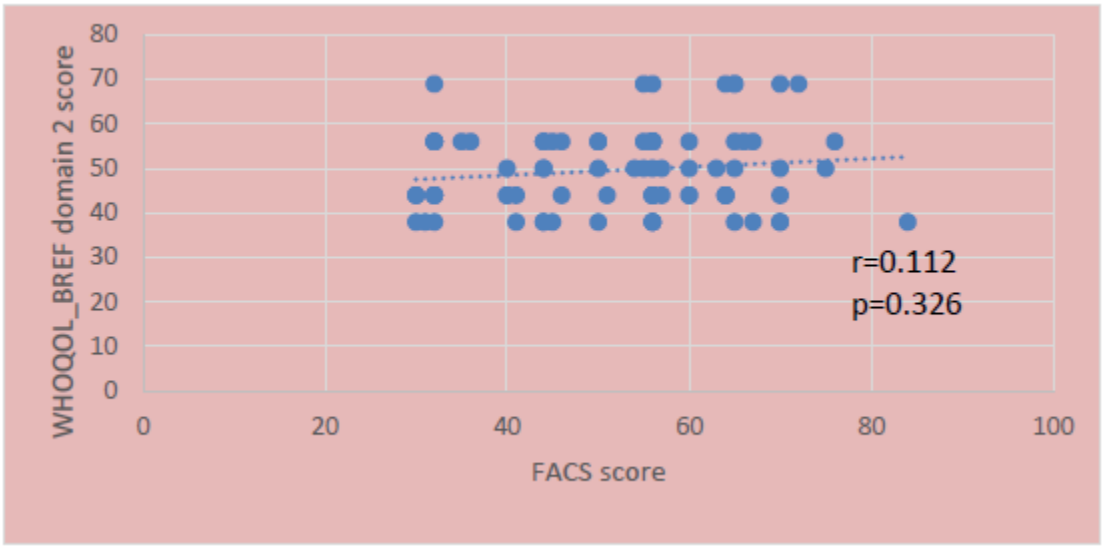


Graph 3: Showing Linear relationship between FACS score and WHOQOL_BREF domain 1 score

Table 4: Analysis including correlation between FACS and WHOQOL_BREF DOMAIN 2 scores:

Spearman's Rho	
FACS score and WHOQOL_BREF domain 2	.112
Correlation Coefficient	
Sig. (2-tailed)	.326

It can be concluded from table 4 that there is no correlation between the FACS score and WHOQOL_BREF domain 2 score. Thus, it implies that there is no relevance between alterations in the fear avoidance with the psychological domain of quality of life of the patient.

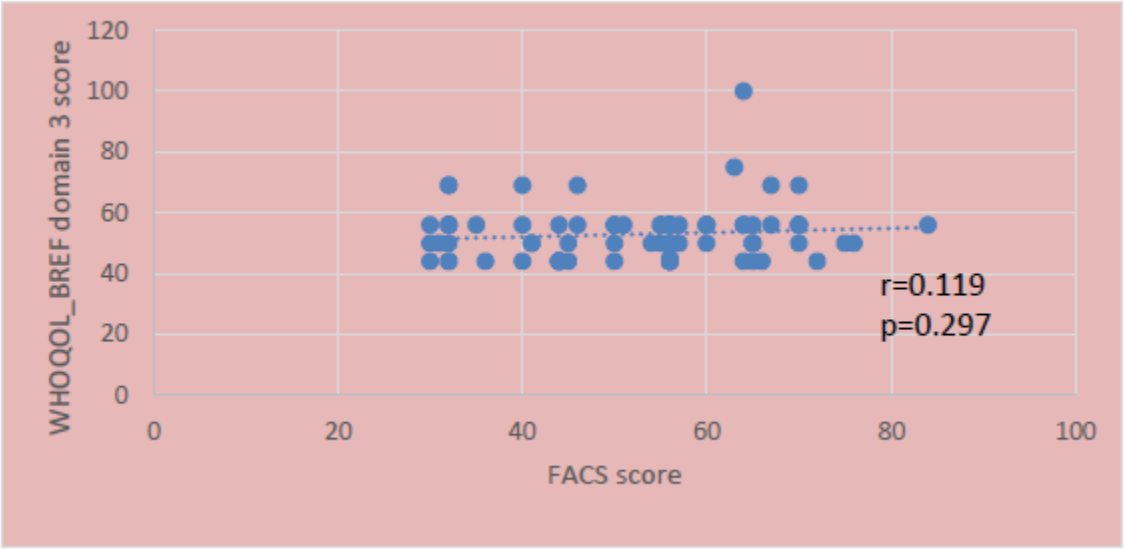


Graph 4: Showing Linear relationship between FACS score and WHOQOL_BREF domain 2 score

Table 5: Analysis including correlation between FACS and WHOQOL_BREF DOMAIN 3 scores:

Spearman's Rho	
FACS score and WHOQOL_BREF domain 3	.119
Correlation Coefficient	
Sig. (2-tailed)	.297

It can be concluded from Table 5that there is no correlation between the FACS score and WHOQOL_BREF domain 3 score. Thus, it implies that there is no relevance between alterations in the fear avoidance with the social domain of quality of life of the patient.

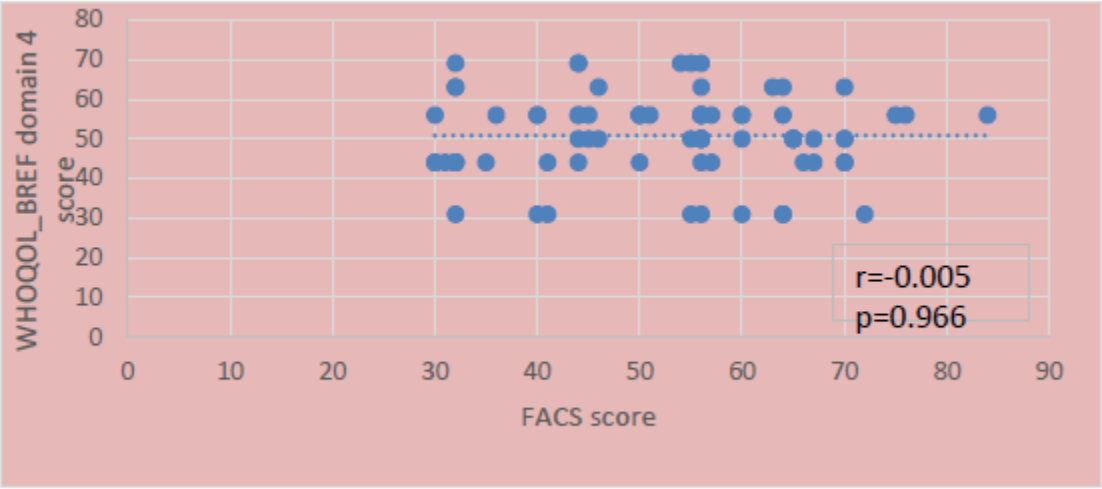


Graph 5: Showing Linear relationship between FACS score and WHOQOL_BREF domain 3 score

Table 6: Analysis including correlation between FACS and WHOQOL_BREF DOMAIN 4 scores:

Spearman's Rho	
FACS score and WHOQOL_BREF domain 4 Correlation Coefficient	-.005
Sig. (2-tailed)	.966

It can be concluded from Table 6that that there is no correlation between the FACS score and WHOQOL_BREF domain 4 score. Thus, it implies that there is no relevance between alterations in fear avoidance with the environmental domain of quality of life of the patient.



Graph 6: Showing Linear relationship between FACS score and WHOQOL_BREF domain 4 score

8.DISCUSSION:

This study was focused over correlation between fear avoidance, kinesiophobia, and central sensitization with pain, disability and quality of life in patients with shoulder impingement syndrome. This study duration was 1 year. The data was collected from different hospitals and clinics across the Surat. Pilot study was conducted for

one month for sample size calculation prior to the main study. Total 79 patients with shoulder impingement syndrome were selected according to inclusion and exclusion criteria.

Patients with age group 18-65 were selected. The mean age was 44.80. Among the total 79 patients with shoulder impingement syndrome male patients were 45 and female patients were 34. Patients with symptoms more than 3 months were selected.

In this study patients were assessed for pain by VAS scale, for disability by SPADI-G scale, for quality of life by WHOQOL_BREF scale, for fear avoidance by FACS-G scale.

Statistical analysis for correlations between variables with spearman's test was done as the data was not normally distributed. We hypothesized that there is an association between fear avoidance and pain, disability and quality of life. The statistical analysis confirmed our hypothesis for pain and disability. We found a moderate positive statistically significant correlation between fear avoidance and pain. (spearman's rho=0.417) Between disability and fear avoidance we found a strong positive statistically significant correlation (spearman's rho=0.716) at 0.05 level of significance. But we found no statistically significant correlation between quality of life.

From the result, it is clear that there is association between the fear avoidance with pain and disability. It implies that the patients who have more fear avoidance are having more pain and disability. In other hand there is an association between fear avoidance with quality of life but it is not statistically significant.

Other authors have supported our study. George et al. (2006) reported that fear-avoidance beliefs about work and temporal summation of evoked thermal pain had a significant influence on pain related disability.[18] Eun Jung Chung et al. (2013) also found significant correlation between fear avoidance belief, pain and disability index among low back pain patients. Thilo O. Kromer et al. (2014) also found that Correlations between clinical variables and disability were largely in line with the fear-avoidance model. [19]

CONCLUSION:

Present study concluds that there is moderate positive correlation exists between fear avoidance and pain intensity, strong positive correlation between fear avoidance and disability, there is no correlation between fear avoidance and quality of life.

LIMITATION AND FURTHER RECCOMENDATIONS:

- In this study sample size limited with only 79 patients and samples were collected from Surat City. In future studies larger sample size can be taken.
- FACS is patient-reported outcome, as used to assess a patient's symptoms or functional status at a specific time. However, this information is subjective. Future research can be done with objective measures.

- This study includes VAS, SPADI and WHOQOL-BREF outcomes, other outcomes also can be included in further studies.

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