

The Relationship between Emotional Status, Pain, Severity of Osteoarthritis on Radiograph and Quality of Life in Patients with Knee Osteoarthritis

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Abstract

Background: By 2050, India's 60 and older population is expected to encompass 323 million people, a number greater than the total US population in 2012

Osteoarthritis is the growing cause of social and economic burden to our aging society. It has been seen psychosocial status of patient with osteoarthritis have an impact on pain, functional ability and quality of life. The emotional status of osteoarthritis patient can have poor outcome on his/her Quality of life making the person disabled in their activities and functions.

The majority of osteoarthritis pharmacological and rehabilitation treatments are geared toward alleviating pain due to disease severity in the joint; therefore, it appears important to optimize treatment for people who have pain beyond peripheral sources.

Objective: This study will help to understand the association of emotional status, pain, radiographic severity and quality of life in patients with knee osteoarthritis so that a more holistic approach will be developed towards osteoarthritis.

Methodology: Study design was a cross sectional observational study. 100 subjects were assessed in the study. Participants were included in the study after screening for inclusion and exclusion criteria. All subjects were evaluated according to the assessment proforma for the following Pain on Visual Analogue Scale (VAS), Positive And Negative Affect Scale and Knee function on Knee Injury and Osteoarthritis Outcome Score (KOOS).

Conclusion: The findings of this study suggest an association between emotional status and pain, emotional status and quality of life. But no association is seen between emotional status and Kellgren Lawrence Scale.

Keywords : *Osteoarthritis, Emotional status, VAS, KOOS, Quality of Life, Radiographic Severity.*

Introduction

Osteoarthritis (OA) is a joint disorder characterized by the loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis, and range of biochemical and morphological alterations of the synovial membrane and joint capsule¹. Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease with a prevalence of 22% to 39% in India.^{2,3} By 2050, India's 60 and older

population is expected to encompass 323 million people, a number greater than the total US population in 2012.^{4,5} Nearly, 45% of women over the age of 65 years have symptoms while radiological evidence is found in 70% of those over 65 years.^{6,7}

Pain is the major clinical symptom in osteoarthritis of the knee and a key determinant for seeking medical care. Pain in osteoarthritis affects the ability to engage in activities of daily living, work, and other meaningful

activities, and is associated with a reduced quality of life⁹⁻¹⁰. Women with arthritis have more functional deficits than men, reporting more severe joint pain, more psychological distress, and greater limitations on activity¹¹. The chronicity of the disease can also produce emotional distress, depression and/or impairments of general health and vitality, reduced life quality, activity limitations¹², negative personal beliefs, as well as sleep disturbances.

Peripheral markers of disease severity (e.g., radiographs and magnetic resonance imaging) explain only a small to moderate proportion of the variability in OA-related pain and disability^{8,13-16}. Several investigators have shown discordance between these two features of osteoarthritis: people with clearly abnormal joint radiographs may have no or only mild pain, whereas others with pain may not have radiographic osteoarthritis, although this discordance is thought to be less with more severe stages of radiographic disease³. Radiographic severity of knee OA is frequently assessed using Kellgren Lawrence. This classification was proposed by Kellgren et al. in 1957 and later accepted by WHO in 1961.

There is growing evidence that central nervous system factors may be playing a prominent role in maintaining osteoarthritis pain in certain individuals. Central involvement in pain is often accompanied by non-region-specific symptoms that are systemically-mediated such as fatigue, cognitive problems, sleep problems, and perturbations of mood¹⁴⁻¹⁵.

Importantly, psychosocial factors have been consistently associated with symptoms of OA¹⁷. Psychological factors should also be considered with biological factors as potential factors prognostic for pain, because bio psychosocial perspective is now widely accepted as the most heuristic approach to chronic pain⁵.

In this respect, evidence from the chronic pain literature strongly suggests central nervous system influences of emotions and cognitions including individual behavioral characteristics along with psychosocial factors, and increased sensitivity to pain signals by the brain should not be ignored as potent factors that can mediate or moderate osteoarthritis outcomes in older adults².

It has been seen psychosocial status of patient with osteoarthritis have an impact on pain, functional ability and quality of life. The emotional status of osteoarthritis patient can have poor outcome on his/her Quality of

life making the person disabled in their activities and functions.

The majority of osteoarthritis pharmacological and rehabilitation treatments are geared toward alleviating pain due to disease severity in the joint; therefore, it appears important to optimize treatment for people who have pain beyond peripheral sources⁴. This study will help to understand the association of emotional status, pain, radiographic severity and quality of life in patients with knee osteoarthritis so that a more holistic approach will be developed towards osteoarthritis.

Materials and Method

Study design: Cross-sectional observational study

Participants:

The approval of the institutional ethics committee was taken for carrying out the study. The participants were screened based on the inclusion and exclusion criteria and then included in the study. A written informed consent was taken from all the participants

Inclusion Criteria-

1. Patients were selected according to the American College of Rheumatology criteria and minimum having Grade 1 on Kellgren Lawrence scale for Osteoarthritis of knee which will be assessed by a radiologist
2. In the age group of 45-70 yrs.
3. Those willing to participate.
4. Able to read English, Hindi or Marathi language.

Exclusion Criteria-

1. Patients with prosthetic knee replacement or other clinically significant surgery of the affected knee
2. Any cognitive impairment
3. Diagnosed Psychiatric illness
4. Hospitalization within the preceding year for psychiatric illness
5. Diagnosed Neurological illness
6. Rheumatoid arthritis, cancer, osteoporosis, joint infection and any other known illness

OUTCOME MEASURES

1. Visual Analogue Scale
2. Radiographic Classification of severity of osteoarthritis of knee using the Kellgren Lawrence scale. (Assessed by a radiologist of the institution.)
3. Positive Affect Negative Affect Scale
4. Knee injury and osteoarthritis outcome score (KOOS)

ASSESSMENT

All subjects were evaluated according to the assessment proforma for the following

1. Pain on Visual Analogue Scale
2. Positive Affect Negative Affect Scale
3. Knee Injury and Osteoarthritis Outcome Score

Data Analysis

Data was analyzed using the Graph pad prism 7 software.

Descriptive analysis of the data was done.

The data was checked for normality using the Shapiro- Wilk test. The data did not pass normality, thus, non-parametric tests were used.

Correlation of Positive PANAS with VAS, KOOS subcale pain, symptoms, ADL's and QOL, Kellgren Lawrence Scale using spearman test

Correlation of Negative PANAS with VAS, KOOS subcale pain, symptoms, ADL's and QOL, Kellgren Lawrence Scale using spearman test

The level of significance was set at 0.05

Findings

1. The total number of participant's were 100 who participated in the study. Out of which 64 were females and 36 were males.
2. The mean age group was 55.67 ± 7.85 years.
3. Distribution of grades of knee osteoarthritis divided according to Kellgren Lawrence Scales as follows Grade 1 -51, Grade 2 -30, Grade 3- 14, Grade -5.
4. There was a statistical significant difference ($p=0.02$) at 95% confidence interval between correlation

of Positive Panas and VAS , $r = -0.22$ showing weak negative correlation(graph1). This indicates higher positive emotions inhibit pain.

5. There is moderate negative correlation $r = -0.41$ between Positive PANAS and Symptoms of KOOS which is statistically significant ($p=0.00$) at 95% confidence interval. This indicates positive attitude or emotional status influences disability.

6. Statically significant($p=0.00$) difference was present between Positive PANAS and Pain of KOOS showing moderate negative correlation $r = -0.36$

7. There is weak positive correlation $r = 0.27$ between Positive PANAS and ADL of KOOS which is statistically significant ($p=0.00$) at 95% confidence interval.

8. There was a statistical significant difference ($p=0.00$) at 95% confidence interval between correlation of Positive Panas and QOL of KOOS (graph2), $r = -0.26$ showing weak positive correlation.

9. There was no statistically significant ($p=0.96$) correlation($r=-0.00$) found between Positive Panas and KL grade (graph3) .

10. Statically significant($p=0.00$) difference was present between Negative PANAS and VAS (graph4) showing moderate positive correlation $r = 0.38$

11. There is weak positive correlation $r = 0.26$ between Negative PANAS and Symptoms of KOOS which is statistically significant ($p=0.00$) at 95% confidence interval

12. There was a statistical significant difference ($p=0.00$) at 95% confidence interval between correlation of Negative Panas and Pain of KOOS, $r = 0.28$ showing weak positive correlation

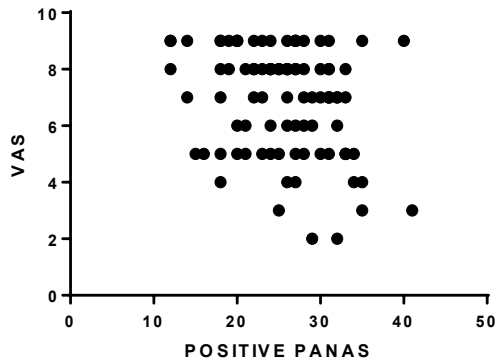
13. There is moderate negative correlation $r = -0.38$ between Negative PANAS and ADL of KOOS which is statistically significant ($p=0.00$) at 95% confidence interval

14. Statically significant($p=0.00$) difference was present between Negative PANAS and QOL of KOOS(graph5) showing moderate NEGATIVE correlation $r = -0.45$

15. There is no correlation $r = 0.03$ between Negative PANAS and KL grade(graph6) which is statistically not

significant $p=0.70$ at 95% confidence interval.

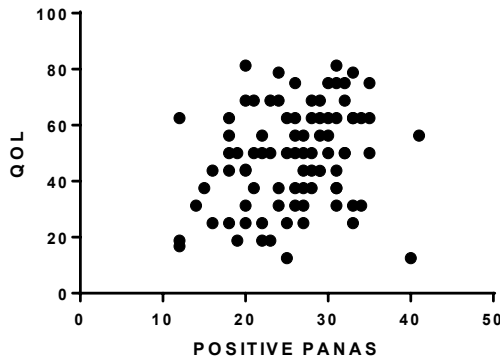
XY Data : Correlation of Positive Panas vs vas



Graph 1

Inference : There is weak negative correlation between Positive PANAS and VAS which is statistically significant at 95% confidence interval.

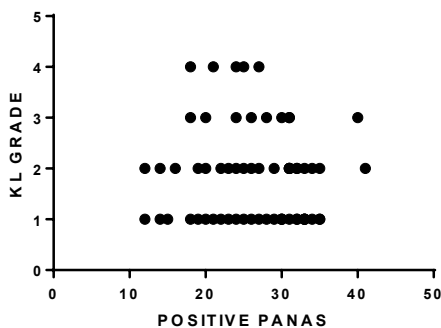
XY Data: Correlation of Positive Panas vs QOL



Graph 2

Inference : There is weak positive correlation between Positive PANAS and QOL which is statistically significant at 95% confidence interval

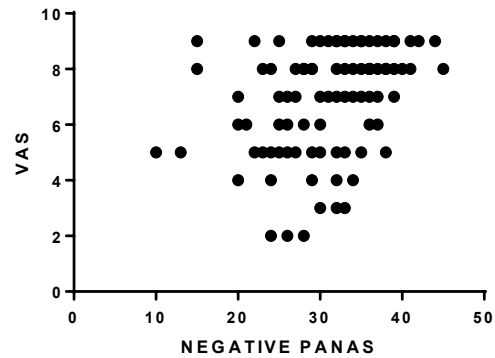
Correlation of POSITIVE PANAS VS KL grade



Graph 3

Inference : There is no correlation between Positive PANAS and KL grade which is statistically not significant at 95% confidence interval.

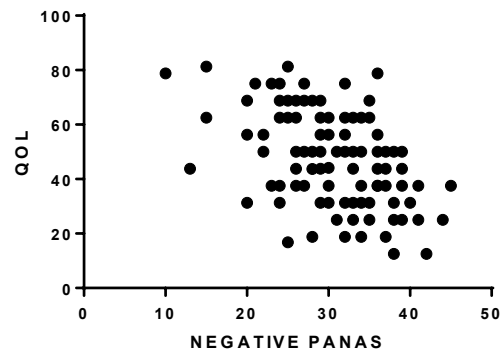
XY Data: Correlation of Negative Panas vs VAS



Graph 4

Inference : There is moderate positive correlation between Negative PANAS and VAS which is statistically significant at 95% confidence interval

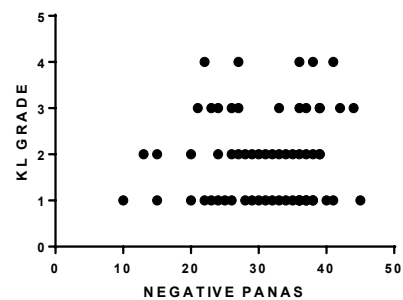
XY Data: Correlation of Negative Panas vs QOL



Graph 5

Inference : There is moderate negative correlation between Negative PANAS and QOL which is statistically significant at 95% confidence interval

XY Data: Correlation of NEGATIVE PANAS VS KL GRADE



Graph 6

Inference : There is no correlation between Negative PANAS and KL grade which is statistically not significant at 95% confidence interval.

Discussion

There are more females than males in the present study, as osteoarthritis of knee is more common in females than in males. This finding is supported by a meta-analysis by Srikanth VK, et al sows that osteoarthritis is more common in females than in males, and the most commonly affected joint in osteoarthritis is the knee joint.

Graph 1 shows negative correlation of Positive PANAS with Pain. This indicates that positive emotions inhibit pain. The more positive a person is they will experience less pain. Graph 4 positive correlation of Negative PANAS with pain. This shows that negative emotions increase pain perception of the individual. Almeida¹⁹ et al in a hierarchical cluster analysis study concluded that the participants with the greatest psychological distress experienced widespread pain and highest level of clinical pain and disability.

There is moderate negative correlation of Positive PANAS with symptoms subscale of KOOS. And positive weak correlation between Negative PANAS with symptoms subscale of KOOS. Riddle²¹ et al studied **Psychological Health Impact on Two-Year Changes in Pain and Function in Persons with Knee Pain** and concluded that persistent depressive symptoms may lead to self-reported pain and function worsening for patients with knee pain.

Weak positive correlation of Positive PANAS with Activities of Daily Living subscale of KOOS is seen. And moderate negative correlation of Negative PANAS with Activities of Daily Living subscale of KOOS. In a study conducted by Marks¹⁸ et al, variables assessed were pain, depression, levels of self-efficacy for pain and other-symptoms management, walking endurance, walking speed, and perceived exertion when walking. They imply that efforts to heighten self-efficacy for pain and other-symptoms management may influence the affective status, function, and effort-related perceptions of people with knee osteoarthritis quite significantly.

Graph 2 shows weak positive correlation of Positive PANAS with Quality of life subscale of KOOS . Graph 5 shows moderate negative correlation of Negative PANAS with Quality of life subscale of KOOS.

In a review article by Marks¹⁸ et al, it is seen anxiety is a serious health condition that may impact the extent of a chronic medical condition, as well as life quality and the ability to function optimally. Similarly, osteoarthritis, a progressive joint disease associated with pain and disability among aging adults has been linked to poor health outcomes and excessive usage of health resources. In particular, anxiety is commonly associated with poor adherence to self-care regimens and increased symptom burden. These factors can undoubtedly provoke or exacerbate osteoarthritis progression as suggested by findings of Katon et al.

Graph 3,6 shows no correlation of Positive PANAS and Negative PANAS with Kellgren Lawrence scale for grading severity of knee osteoarthritis . In a study conducted by Susan¹⁷ et al, the participants underwent knee radiographs, and had repeated assessments of pain severity and other centrally-mediated symptoms, such as fatigue, sleep quality, and depression accessed during a five day home monitoring period. The conclusion was both radiographic severity and centrally-mediated symptoms were independently and significantly associated with pain severity in women with knee osteoarthritis. In addition to more severe radiographic features, women with higher centrally-mediated symptoms had greater pain severity.

In addition, emerging evidence suggests the disability experienced by adults with osteoarthritis is not wholly explained by radiograph measures, and that some of the complaints experienced by affected individuals seeking medical help for painful symptomatic osteoarthritis may be related to psychological factors²⁰ .

However in the present study we did not find association between emotional status and radiographic severity of knee osteoarthritis using Kellgren Lawrence grade.

Conclusion

The findings of this study suggest an association between emotional status and pain, emotional status and quality of life. But no association is seen between emotional status and Kellgren Lawrence Scale.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: The ethical clearance for the study was obtained from Institutional ethics committee,

Ethics committee for Academic Research Project. (ECARP)

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