

Original Research Article

Unmasking the hidden struggle: anxiety and depression in recovery of osteoarthritis knee

Aavrati Rastogi, Roop B. Kalia*, Pradeep K. Meena

Department of Orthopedics, AIIMS, Rishikesh, Uttarakhand, India

Received: 28 August 2025

Accepted: 16 February 2026

*Correspondence:

Dr. Roop B. Kalia,

E-mail: roop.orth@aiimsrishikesh.edu.in

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: A gradual degenerative condition that severely impairs mobility and quality of life is knee osteoarthritis (KOA). It has been hypothesized that mental health issues, including anxiety and depression, play a role in how OA symptoms are perceived and developed. The degree of the association is still undetermined, though.

Methods: The study comprised one hundred individuals with KOA as defined by the EULAR classification. Age, gender and BMI were noted. With an emphasis on gender-based differences, this study compared the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) scores of patients with osteoarthritis in the knee with mental health measures, specifically the PHQ-9 (Patient Health Questionnaire-9) for depression and the GAD-7 (Generalized Anxiety Disorder-7) for anxiety.

Results: The study population's BMI was 27.19 ± 4.31 kg/m² and their mean age was 56.34 ± 8.81 years. Overall, the correlation between PHQ-9 and WOMAC was small ($R = -0.026$, p value = 0.79), with males exhibiting a poor correlation ($R = 0.043$, p value = 0.80) and females exhibiting a moderate but non-significant positive correlation ($R = 0.374$, p value = 0.33). Overall, there was no significant correlation between GAD-7 and WOMAC ($R = -0.13$, p value = 0.20), with a weak positive correlation in females ($R = 0.075$, p value = 0.55) and an insignificant correlation in men ($R = -0.16$, p value = 0.35).

Conclusions: While mental health factors like depression may influence OA severity in females, this study found no significant relationship between anxiety levels and WOMAC scores.

Keywords: Anxiety, Depression, Knee osteoarthritis, Mental health, WOMAC

INTRODUCTION

Millions of people worldwide, especially older ones, suffer from osteoarthritis (OA), a significant source of chronic pain and impairment. Joint pain, stiffness and decreased mobility are caused by the disease's characteristics of subchondral bone remodelling, synovial inflammation and progressive cartilage deterioration.¹ Beyond its physical symptoms, OA is becoming more widely acknowledged as a disorder with severe emotional and psychological repercussions, especially when it comes to anxiety and depression.² Emerging research emphasizes the involvement of psychological factors, especially anxiety

and depression, in regulating OA symptomatology in addition to mechanical and physiological components.³ Mental health issues can impact inflammation, central sensitization and pain perception, which may worsen symptoms.⁴

Further complicating the management of the disease, feelings of depression and anxiety may also affect a patient's compliance with treatment plans and rehabilitation initiatives.⁵ One effective measure for evaluating pain, stiffness and functional limitations in OA patients is the WOMAC.^{6,7} Evaluating the connection between psychological variables and WOMAC scores

might highlight the necessity of a multidisciplinary approach to patient care and offer essential insights into the more significant influence of mental health on the course of OA and treatment results.⁸

METHODS

With institutional ethical committee approval, this cross-sectional time-bound study was carried out in the Department of Orthopaedics at AIIMS Rishikesh from July 2023 to December 2024. According to the 2010 EULAR diagnostic criteria for KOA, 100 patients, both men and women, who had a history of pain, unilateral or bilateral osteoarthritis in their knees with Kellgren-Lawrence grades of 2 or 3 and a Karnofsky performance score between 80 and 90% were included in the study.

The study excluded patients who had received an intra-articular injection, a prescription footwear alteration or any aided device required for ambulation in the previous three months. GAD-7 and PHQ-9 scores were used to measure anxiety and depression and WOMAC (modified CRD Pune version) was used to measure pain and physical function.

Statistical analysis

The mean and standard deviation followed by a 95% confidence interval were used in frequency tables, among other descriptive statistics, for normally distributed data. 'T-test was used when comparing means between two sets of normally distributed data.' Descriptive analysis was used to find the percentage level and p values of 0.05 or less were considered significant. SPSS version 21 was used to do the statistical analysis.

RESULTS

The study comprised individuals with a mean age of 56.34±8.81 years and an average BMI of 27.19±4.31 kg/m². The results indicate that in males, PHQ-9 had a very weak correlation with WOMAC (R=0.04) and was not statistically significant (p value 0.80). In contrast, females showed a moderate positive correlation (R=0.37) between PHQ-9 and WOMAC, though it was not statistically significant (p value 0.33).

The total correlation for PHQ-9 (R=-0.02) was weak and non-significant (p value 0.79). Regarding GAD-7, a weak negative correlation (R=-0.16) was observed in males with a non-significant (p value 0.35). At the same time, females showed a weak positive correlation (R=0.07) with a (p value 0.55), indicating no statistical significance. The cohort's overall correlation (R=-0.13) was also weak and not statistically significant (p=0.19). These findings suggest that depressive symptoms, as measured by PHQ-9, may have a moderate association with OA severity in females, whereas anxiety levels, as measured by GAD-7, do not appear to have a meaningful impact on WOMAC scores for either gender.

Table 1: Correlation analysis of anxiety and depression with WOMAC.

Mental health score	WOMAC		
GAD-7	Male	Female	Total
R	-0.16	0.075	0.19
P value	0.35	0.55	0.19
PHQ-9			
R	0.043	0.37	0.80
P value	0.80	0.33	0.79

DISCUSSION

The findings indicate search indicates that while anxiety levels (GAD-7) had no discernible impact on WOMAC scores in either gender, depressive symptoms, as assessed by the PHQ-9, have a moderate correlation with the severity of OA in females. These results, which show significant gender-specific variations, point to the possible contribution of psychological distress, especially depression, to pain perception and functional impairment in OA.

The well-established gender variations in pain processing and emotional control may be one reason for the higher correlation between depression and the severity of OA in females. Neurobiological factors like estrogen fluctuations, which affect nociceptive pathways and inflammatory responses, maybe the cause of women's elevated pain sensitivity.⁹ Increased pain perception and a higher incidence of chronic pain syndromes, such as OA, have been associated with postmenopausal estrogen reduction.

Moreover, pain catastrophizing, a maladaptive cognitive-emotional reaction that intensifies subjective pain and functional limits and raises WOMAC scores, is more common in women.¹⁰ The lack of a significant correlation between anxiety and the severity of OA in either gender implies that anxiety disorders may not directly affect pain-related impairment in OA, even though they may contribute to psychological suffering in general. This is consistent with earlier studies showing a stronger correlation between chronic pain and impairment in muscular disorders and depression than anxiety.¹¹⁻¹³

Changes in central pain modulation, such as disturbances in serotonergic and noradrenergic pathways which are essential for descending pain suppression mechanisms have been connected to depression. Furthermore, systemic inflammation, which is frequently seen in both OA and depression, may be a molecular mechanism that is shared by both conditions that increase pain perception and functional deterioration.^{14,15} Psychosocial and behavioral factors may also affect the reported gender-based disparities. Social stressors, caregiving obligations and role limits are more common in women with OA and these can all lead to depressed symptoms and a diminished ability to adapt. Conversely, men might be more prone to

conceal psychological suffering or use avoidant coping mechanisms, which could account for the lower correlation between the severity of OA and depression in men.¹⁶ These results highlight the value of gender-sensitive depression screening in the treatment of OA, especially for female patients who may be more susceptible to pain-related impairment as a result of co-occurring affective disorders. Clinically speaking, incorporating psychological evaluations into regular OA care could improve patient outcomes. In patients with OA, interventions like exercise therapy, mindfulness-based stress reduction (MBSR) and cognitive-behavioral therapy (CBT) have shown promise in lowering depressed symptoms and enhancing pain-related function. A multidisciplinary strategy that addresses the psychological and physical elements of OA may result in more effective symptom management because of the reciprocal association between depression and OA severity.^{17,18}

Future studies should investigate the mechanisms behind the relationship between depression and the advancement of OA, including potential gender-specific neuroinflammatory and neuroendocrine connections. Longitudinal research examining how specific psychological therapies affect the course of OA may help clarify the part mental health plays in the development of musculoskeletal disorders. Individualized treatment plans that combine pharmacological and non-pharmacological methods must be established to improve patient care.

CONCLUSION

In conclusion, this study indicates an evident gender-based association between the severity of OA and depressive symptoms, with a higher correlation shown in females. The absence of a substantial correlation between anxiety and WOMAC scores raises the possibility that depression is the primary psychological element causing impairment associated with OA. These results highlight the necessity for all-encompassing, interdisciplinary care approaches that take into account the physical and mental health aspects of OA patients, especially women who may be more susceptible to pain exacerbation as a result of depressed symptoms.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bayrak G, Alkan H. Factors influencing pain intensity in knee osteoarthritis: a cross-sectional biopsychosocial perspective. *BMC Musculoskeletal Disorders.* 2025;25;26(1):196.
2. Felson DT, Lawrence RC, Dieppe PA, Hirsch R, Helmick CG, Jordan JM, et al. Osteoarthritis: new insights. Part 1: the disease and its risk factors. *Ann Int Med.* 2000;133(8):635-46.
3. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley III JL. Sex, gender and pain: a review of recent clinical and experimental findings. *J Pain.* 2009;10(5):447-85.
4. Hawker GA, Stewart L, French MR, Cibere J, Jordan JM, March L, et al. Understanding the pain experience in hip and knee osteoarthritis—an OARSI/OMERACT initiative. *Osteoarth Cartil.* 2008;16(4):415-22.
5. Neogi T. The epidemiology and impact of pain in osteoarthritis. *Osteoarth Cartil.* 2013;21(9):1145-53.
6. Stubbs B, Chen LJ, Chung MS, Ku PW. Physical activity ameliorates the association between sedentary behavior and cardiometabolic risk among inpatients with schizophrenia: a comparison versus controls using accelerometry. *Compreh Psychiat.* 2017;74:144-50.
7. Tamres LK, Janicki D, Helgeson VS. Sex differences in coping behavior: A meta-analytic review and an examination of relative coping. *Person Social Psychol Rev.* 2002;6(1):2-30.
8. White DK, Neogi T, Nguyen US, Niu J, Zhang Y. Trajectories of functional decline in knee osteoarthritis: the Osteoarthritis Initiative. *Rheumatology.* 2016;55(5):801-8.
9. Arden NK, Perry TA, Bannuru RR, Bruyère O, Cooper C, Haugen IK, et al. Non-surgical management of knee osteoarthritis: comparison of ESCEO and OARSI 2019 guidelines. *Nature Rev Rheumatol.* 2021;17(1):59-66.
10. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. *British J Anesth.* 2013;111(1):52-8.
11. Brady TJ, Jernick SL, Hootman JM, Sniezek JE. Public health interventions for arthritis: expanding the toolbox of evidence-based interventions. *J Women's Health.* 2009;18(12):1905-17.
12. Felson DT, Lawrence RC, Dieppe PA, Hirsch R, Helmick CG, Jordan JM, et al. Osteoarthritis: new insights. Part 1: the disease and its risk factors. *Ann Int Med.* 2000;133(8):635-46.
13. Zheng S, Tu L, Cicuttini F, Zhu Z, Han W, Antony B, et al. Depression in patients with knee osteoarthritis: risk factors and associations with joint symptoms. *BMC Musculosk dis.* 2021;22:1-10.
14. Gleicher Y, Croxford R, Hochman J, Hawker G. A prospective study of mental health care for comorbid depressed mood in older adults with painful osteoarthritis. *BMC Psych.* 2011;11:1-10.
15. Creamer P, Hochberg MC. The relationship between psychosocial variables and pain reporting in osteoarthritis of the knee. *Arthritis care and research. J Arthr Health Profess Assoc.* 1998;11(1):60-5.
16. DeVeugh-Geiss AM, West SL, Miller WC, Sleath B, Gaynes BN, Kroenke K. The adverse effects of comorbid pain on depression outcomes in primary care patients: results from the ARTIST trial. *Pain Med.* 2010;11(5):732-41.
17. Gleicher Y, Croxford R, Hochman J, Hawker G. A prospective study of mental health care for comorbid

depressed mood in older adults with painful osteoarthritis. *BMC Psychiatry*. 2011;11:1-10.

18. Steffens DC, Skoog I, Norton MC, Hart AD, Tschanz JT, Plassman BL, et al. Prevalence of depression and its treatment in an elderly population: the Cache County study. *Arch Gen Psych*. 2000;57(6):601-7.

Cite this article as: Rastogi A, Kalia RB, Meena PK. Unmasking the hidden struggle: anxiety and depression in recovery of osteoarthritis knee. *Int J Res Med Sci* 2026;14:975-8.