Original Article

Predictors of Comorbid Depression in Osteoarthritis Patients at Tertiary Care Settings of Islamabad

Rehana Khadim[1], Muhammad Tahir Yusuf[2], Wajahat Hussain[3], Ijaz Ahmed Shah[4], Zahid Ahmed Butt[5], Aysha Babar[6]*

[1]Managing Editor, Army Medical College

[2]Registrar, Department of Orthopedics, Jinnah Hospital, Lahore

[3]Associate professor, Department of Community Medicine, QAMC, Bahawalpur

[4]Professor, Department of Community Medicine, QAMC, Bahawalpur

[5]Associate professor, Department pf Public health, HSA

[6]Associate professor, Department of Public Health, HSA

Correspondence to

Dr. Rehana Khadim

Managing Editor, Army Medical College

E-mail: *dr.rehana.butt@gmail.com*

OPEN ACCESS

Abstract

Objective: To estimate the co-morbid depression in the patients of knee osteoarthritis at the tertiary care hospital settings of Islamabad.

Study Design: Cross sectional analytical study

Methods: Data of four hundred and four patients (n=404; 307 females and 97 males) was collected. Patients were selected from the OPD of Rheumatology Units of two Tertiary Care Hospitals of Rawalpindi/Islamabad and were assessed for co-morbid depression using Urdu translated Depression scale (CES-D). Basic demographical data and some variables directly having an impact with depression were assessed.

Results: Frequency of co-morbid depression in osteoarthritis patients was 27.7%, of which females were 19.8% and males were 7.9%. Old age, illiteracy, rural residence, employment status, joint family system, obesity, co-morbidity with osteoarthritis, duration of disease and inability in performing routine activities were the variables positively associated with the depression (p< 0.05).

Conclusion: Comorbid-depression is comparatively prevalent in the osteoarthritis patients in Pakistan. Medical practitioners and rheumatologists must be vigilant about this co-morbidity and identify depression timely for the better attributions to life of the patients.

Key Words: Comorbid-depression, Osteoarthritis, Center for Epidemiologic Studies Depression Scale (CES-D),

INTRODUCTION

Depression is a leading public-health issue. Around one-third of people with a chronic health issues do have depression. Patients of osteoarthritis have shown the ongoing pain, sleep disturbance, depression, joint instability, missed work, financial constraints, social isolation and overall decline in the every of life.[1]

Physicians should be vigilant in identifying the probability of depression in osteoarthritis patients. Depression markedly increases the total burden of disease, with 50% to 100% rise in health services utilization and expenditure, poor quality of life, long period of activity constraints and work loss because of osteoarthritis as compared to the patients without depression.[2] Depression, osteoarthritis and disability contribute to the vicious circle. Osteoarthritis brings bouts of depression and interferes with the successful treatment. Early detection and timely treatment of depression can possibly lessen the anguish along with risk of complications of osteoarthritis. Patients who receive treatment for depression along with the treatment of osteoarthritis face an overall improvement in their osteoarthritis, live better life, and are easily able to stick around to their treatment plans.[3,4]

Patients with osteoarthritis have high prevalence of co-morbid depression. Depression is triggered by imposing pain, fatigue and activity limitations. When mental condition coexists with other medical illness, it affects the onset, progression and outcome of the disease, causing longer duration, more complications and more difficult to treat thus increasing both morbidity and mortality.[5,6] Depression also causes patients poor compliance to the medical regimens. Greater degree of depression are associated with higher levels of pain, fatigue, disability, physical distress, worse health outcomes, overall poor health, significant restriction of life activities and greater use of healthcare resources.[7,8]

Osteoarthritis precipitates co-morbid depression. It is considered as osteoarthritis being a chronic disease and so having depression with this condition is a natural phenomenon. However, how much it affects a person's life, its association with the duration of osteoarthritis and co morbidity with other diseases are studied often. Depression can possibly affect the mortality and morbidity of osteoarthritis patients; thus it is important to screen for the symptoms of depression. The objective of the study was to estimate the co-morbid depression among osteoarthritis patients and to identify the different associated factors with depression.

METHODOLOGY

This cross-sectional analytical study was conducted at the OPD of Rheumatology Units of two tertiary care hospitals of Islamabad from April to July 2018. All the physician diagnosed patients (both genders) of knee osteoarthritis (either symptomatic unilateral or bilateral), who had been diagnosed for two or more years, were included in the study (Diagnosis already done by the rheumatologist based on radiological and physical findings).

Original Article

(Patients with two or more years of osteoarthritis were taken because it takes time for the complications of osteoarthritis to develop; so as co-morbid depression).Those patients who had psychological diseases other than depression, patients already taking anti-psychotic drugs, patients having family history of depression, patients whose close relative died within the previous 3 months, HCV positive patients on interferon therapy, terminal patients, dementia and brain injury patients were excluded on the basis of history taking, previous medical records of the patients and from the patient record software of the hospital.

The formal permission was taken from the administration of tertiary care hospitals of Rawalpindi/Islamabad. Patients were recruited in the study after their written informed consent. The confidentiality of all the patients and other information was ensured by not sharing personal details of patients with anyone. Consultants were informed about high scores of CES-D scale and frequency of depressive symptoms.

For sample size calculation, estimated population was taken one million and confidence level as 95%. By using the anticipated frequency of 50%, the sample size calculated through OpenEpi software was three hundred and eighty four. Then applying the 15% refusal rate, sample size increased by 384 + 15% = 441.

Center for Epidemiologic Studies Depression Scale (CES-D) was used to screen the patients of knee osteoarthritis for depression. CES-D was first created by Lenore Radloff, in 1977. It is a 20-items questionnaire that asks the interviewer to rate, how often a person felt or behaved or experienced the symptoms which are associated with depression.9 Response scores range from zero to three for each question (zero = Rarely or less than one day, one = Some or 1-2 days, two = Moderately or 3-4 days, three = Most or 5-7 days, Almost all the time). Total scores range from zero to sixty (American Psychological Association, 2015). Cut-off score of sixteen or greater is highly indicative for the depression. CES-D has a sensitivity of 93% and specificity of 62%.10 The questionnaire was tested in the pilot study, conducted on the forty patients (10% of the sample size) and some questions were adjusted after the pilot study.

During data collection, Patients' OPD slips were collected from the nursing counter in the morning before the arrival of physicians in out-patient department. Patients with knee osteoarthritis were listed; those who met the inclusion criteria for our study were interviewed for CES-D scale using consecutive sampling technique. Questionnaire was translated in Urdu. Patients, who complied to participate, were provided with the questionnaires to fill. It was narrated to the illiterate patients and their findings were recorded. Those questionnaires were discarded, in which 20 questions of depression were not fully completed.

Statistical Package for Social Sciences (SPSS) version 20.0 was used for the data analysis. Quantitative variables were summarized as mean±SD and qualitative variables were summarized as frequency and percentages. Chi-square test was applied to find out the association between co-morbid depression and different independent variables. The p value of 0.05 was considered statistically significant.

RESULTS

A total of 441 osteoarthritis patients were recruited in the study. (In thirty-seven questionnaires, the 20 items of depression scale were not fully completed; those questionnaires were not considered in the data analysis). The overall frequency of comorbid-depression among osteoarthritis patients was found to be 27.7%.

Table-I: Descriptive summary table showing distribution of different variables among osteoarthritis patients

Parameters	n (%)
Gender	
Female	307 (76.0%)
Male	97 (24.0%)
Age (years)	
Less than 40	8 (1.9%)
41-50	49 (12.1%)
51-60	117 (28.9%)
61-70	140 (34.6%)
>70	90 (22.2%)
Age (years)	
Urban	258 (63.8%)
Rural	146 (36.1%)
Marital Status	
Married	212 (52.4%)
Un married	25 (6.1%)
Widow/Widower	98 (24.3)
Divorced	42 (10.3%)
Separated	27(6.6%)
Family Type	
Nuclear family	228 (55.0%)
Joint family	176 (45.0%)
Education level	
Illiterate	

Original Article

Primary	106 (26.0%)
Secondary	102 (25.2%)
Higher Secondary	36 (8.9%)
University	20 (4.9%)
Occupation	
Employed	32 (7.9%)
Un-employed	22 (5.4%)
House wife	266 (65.8%)
Retired	69 (17.7%)
Any other	15 (3.7%)
BMI	
Low weight (<18.5)	28 (6.9%)
Normal weight (18.5-24.9)	98 (24.2%)
Over weight(25.0-29.9)	131 (32.4%)
Obese (30.0-39.9)	105 (26.0%)
Grade III obese/Morbid obesity (≥40.0)	42 (10.3%)
Presence of other diseases	
No other disease	118 (29.2%)
Diabetes Mellitus	48 (11.8%)
Hypertension	95 (23.5%)
Any other disease	29 (7.1%)
More than one disease	114 (28.2%)
Duration of osteoarthritis	
≤ 5 years	98 (24.2%)
6-10 years	132 (32.6%)
> 10 years	174 (43.0%)
Inability in performing routine activities	
No	134 (33.1%)
Yes	90 (22.2%)
Some activities	180 (44.5%)

In the remaining 404 sample population, 76.0% were female and 24.0% (n=97) were male. 19.8% (n=80) females and 7.9% males (n=32) had depression. With the increase in the age, there was also an increasing tendency in the depression. Depression was highest in the age group > 70 years, which was 12.87% (n=52). In the rest of the groups depression was, 61-70 years age group 5.94% (n=24), in 51-60 years age group 5.69% (n=23), and in 41-50 years age group 3.21% (n=13) as shown in the Table-I.

Housewives had highest frequency of depression 12.1%. While in the other groups, retired participants 6.18%, employed 2.97%, un-employed 4.2% and any other occupation participants had depression 2.2% .Among the participants who fell into the category of any other occupation were either shopkeepers, or farmers, or seamstresses.

The participants with grade III morbid obesity had highest prevalence of depression (9.4%, 38).

Individuals with more than one co-morbid disease had highest prevalence of depression 12.12%. While in the other groups, hypertensive had depression 7.17% (n=29), diabetic 3.96%, individuals with no co-morbid disease 2.47% and with any other disease had 1.98% depression. Any other disease, were found to be asthma, glaucoma, inflammatory bowel diseases or tuberculosis. More than one disease appeared to be diabetes and hypertension both, cardiac diseases with hypertension alone or with diabetes.

Individuals who had osteoarthritis for more than 10 years were most in number, (43%, 174) and had depression 16.08% (n=65), those with 6-10 years duration 32.7% (n=132) had depression 9.4% (n=38) and persons with duration ≤5 years were 24.3% (n=98) and had depression 2.22% (n=9).

People, who were facing inability in some activities, described trouble while climbing stairs, sitting on the floor or getting up etc. Individuals having inability in the routine work were 22.2% (n=90) and had highest depression 16.08% (n=65), those with some problem were most common 44.5% (n=180), had depression 8.41% (n=34), people with no inability in routine work were 33.1% (n=134), had depression 3.21% (n=13).

Table-II: Association of co-morbid depression with study parameters in osteoarthritis patients (Chi-square test)

Parameters	Categories	Osteoarthritis Patients (Comorbid-Depression)	Osteoarthritis Patients (No Comorbid-Depression)	p-Value
Gender	Male	32(7.9%)	65(16%)	0.180
	Female	80(19.8%)	227(56%)	
Age (Years)	<40	0	8(1.98%)	<0.001
	41-50	3(3.21%)	36(8.91%)	
	51-60	23(5.6%)	94(23.22%)	
	61-70	24(5.9%)	116(28.7%)	
	>70	52(12.8%)	38(9.4%)	
Marital Status	Married	4(11.6%)	166(41.8%)	0.024
	Unmarried	5(1.2%)	20(4.9%)	
	Widow	36(8.9%)	62(15.3%)	
	Divorced	16(3.96%)	26(6.4%)	
	Separated	9(2.2%)	18(4.4%)	
Family Type	Nuclear Family	53(13.1%)	175(43.3%)	0.022
	Joint Family	59(14.6%)	117(28.9%)	
Education Level	Illiterate	55(13.6%)	85(21%)	0.003
	Primary	23(5.6%)	83(20.5%)	
	Secondary	20(4.9%)	82(20.2%)	
	Higher Secondary	11(2.7%)	25(6.1%)	
	University	3(0.7%)	17(4.2%)	
Occupation	Employed	12(2.9%)	20(4.9%)	<0.001
	Unemployed	17(4.2%)	5(1.2%)	
	Housewife	49(12.1%)	217(53.7%)	
	Retired	25(6.1%)	44(10.8%)	
	Another	9(2.2%)	6(1.4%)	
Basal Metabolic Index (BMI)	Low weight	4(0.9%)	24(5.9%)	<0.001
	Normal	9(2.2%)	89(22%)	
	Overweight	26(6.4%)	105(25.9%)	
	Obese	35(8.6%)	70(17.3%)	
	Grade III Obese	38(9.4%)	4(0.9%)	
Duration of Osteoarthritis	< 5years	9(2.2%)	89(22%)	<0.001
	6-10 years	38(9.4%)	94(23.2%)	
	>10 years	65(16%)	109(26.9%)	
Inability in performing routine activities	Yes	65(16%)	25(6.1%)	<0.001
	No	13(3.2%)	121(29.9%)	

Chi-square test was applied to find out the association of co-morbid depression with different parameters as shown in the Table-II. The association of co-morbid depression with age, residence, marital status, family type, educational level, occupation, BMI, other diseases, duration and inability in performing routine work were statistically significant (p<0.05).

DISCUSSION

Osteoarthritis has been comparatively prevalent in Pakistan, thus significantly contributing to the burden of disease. This study recruited on the osteoarthritis patients and conducted in Rawalpindi/Islamabad city, the co-morbid depression was found to be quite high (27.7%). This result was almost in accordance with the results of previous studies, like the research done in Spain, the depression among osteoarthritis patients was 24.3% and a study done in Northwest Portugal, the prevalence was found to be 32.5%.[11,12] Nevertheless, in some studies the prevalence of depression was relatively high as compared to our study. The study conducted in Iran the prevalence of depression was found 66%, in India, the prevalence was 57%, the study done in Philippines depression was found to be 54.4%.[4,13] Some research article reported less depression. The difference with other studies might be because some previous researches were community-based or population-based studies. The high frequency of depression in

our study could be because of the fact that in Pakistan due to ever-increasing population, poverty and malnutrition, people develop bone health problems and resulted in poor health, depression and physical limitations.

In this study, the depression was more in females 76% as compared to the males 24%. Our result was unlikely from the previous study conducted in Germany where 19.2% females and 19.8% male osteoarthritis patients had depression.[14] Apparently, in our study more number of female patients reported in the outpatient departments for their knee osteoarthritis. The most possible reason for more females reporting in the hospitals is due to multiple pregnancies, menopause and deficient dietary intake of calcium products, women have poor bone health and develop joint problem early in their life.

 In our study, depression was more prevalent in the age group of above seventy years (12.8%) which manifested that depression was highest in the older age group. While those in the age group of less than forty years had no depression. This result was in correspondence with previous study done in South Korea where the most prevalent age group of participants was above seventy with the odds ratio of 5.87.[15] Older people had more depression because with the advancing age joint problem deteriorate owing to more emotional vulnerability, more physical dependence on the others and more financial burden on the family (which is also a major contributing factor of the depression due to economic crisis in Pakistan).

In our research study, educational level was statistically significant , with literate individuals having less likely risk of depression as compared to the illiterate ones. The findings of our study were thought provoking to discover that, with the increase in the educational level of participants there was decrease in the prevalence of depression. This could be the fact that educated individuals are more aware of their health problems and they seek medical advice far more early as compared to the illiterate individual.

In our study people with morbid obesity (Grade III obese or ≥ 40.0 BMI) had maximum depression (9.4%) followed by in obese people (≥30.0 BMI) (8.66%) and then in overweight individuals (6.44%). The individuals with normal and under-weight had minimum depression showing the pattern that obesity and depression had a direct link. The results were statistically significant and over-weights and obese were having 3 times more risk of developing depression. These results of our study were in accordance with the previous studies.[16]

In our study, people with more than one co-morbid disease were more in number (28.2%) and had depression twelve percent. A study in Philippines showed no statistical significance with presence of co-.morbid disease. As the presence of other diseases along with osteoarthritis deteriorates the health condition, individuals experience more depression.

In our study, inability in performing routine activities was statistically significant with depression, with people who were unable to perform their routine activities at the higher risk of depression. Depression was most prevalent (16%) in those with inability in performing daily routine tasks due osteoarthritis followed by people who had were unable to do some activities (8.4%) and

least (3.2%) in those who could do their activities. Our results were in coherence with the previous study in which physical limitations due osteoarthritis were strongest contributor to the depression.[17,18]

Depression is often under diagnosed in the presence of other disease. One of the strengths of our study was that, we try to highlight the existence of depression in osteoarthritis and also try to draw attention towards the various contributing factors like gender, age, residence, educational level, family type, occupation and some variables directly related with both depression and osteoarthritis like body mass index, co-morbidity with osteoarthritis, duration and inability in doing routine activities. Our study emphasized the significance of further extensive understanding of co-morbid depression with the chronic conditions like osteoarthritis, for the improvement in the quality of life of patients. In addition, our sample size (441) was good enough for the prevalence study. Further our study was performed in two tertiary care hospitals, having wide variety of patients.

Limitations of our study were that, the study was conducted in the hospitals of urban sectors thus less number of people of rural areas reported. In addition, most of the patients were illiterate and the whole questionnaires were narrated to them which may have induced the interview bias. The most important weakness in our study was the causal relationship between osteoarthritis and depression. As it was a cross-sectional study, so it was not possible to determine whether osteoarthritis was the cause of depression or the other factors involved like co-morbidity or life events etc.

CONCLUSION

This study showed the comparatively high frequency of comorbid-depression among osteoarthritis patients. Old age, illiteracy, rural residence, marital status, joint family system, employment status, obesity, co-morbidity, duration of osteoarthritis and inability in performing routine activities were the variables associated positively with the depression. As there is already lack of adequate mental health services in Pakistan, also mental health taken as social stigma, people also feel discomfort to reveal their distressing symptoms to the clinicians. Depression is mostly misdiagnosed by the medical practitioners and rheumatologists. Co-morbid depression with osteoarthritis should not be ignored and timely treatment should be given to the patients.

RECOMMENDATIONS

- General medical practitioners and rheumatologists must look for the depressive symptoms in osteoarthritis patients.

- Those osteoarthritis patients in which depressive symptoms are present should be referred to the psychiatrist.

- Depression should be promptly treated in osteoarthritis patients for their better health outcomes.

REFERENCES

1. American Psychological Association 2021 . Center for Epidemiological Studies Depression. Construct: Depressive symptoms. Available from http://www.apa.org/pi/about/publications/caregivers/practice.settings/assessment/tools/depres-

sion-scale.aspx.

2. Zis P, Daskalaki A, Bountouni I. Depression and chronic pain in the elderly: links and management challenges. Clin Interv Aging. 2017;12:709–20.

3. Bauer H, Emeny RT, Baumert J, et al. Resilience moderates the association between chronic pain and depressive symptoms in the elderly. Eur J Pain. 2016;20(8):1253–65. https://doi.org/10.1002/ejp.850 published Online First: 2016/02/26.

4. White DK, Neogi T, Zhang Y, et al. Association Of Slow Gait Speed With Trajectories Of Worsening Depressive Symptoms In Knee Osteoarthritis: An Observational Study. Arthritis Care Res. 2017;69(2):209–15.

5. Monroe SM, Slavich GM, Gotlib IH. Life stress and family history for depression: the moderating role of past depressive episodes. J Psychiatr Res. 2014;49:90–5.

6. Zheng S, Tu L, Cicuttini F, et al. Effect of vitamin d supplementation on depressive symptoms in patients with knee osteoarthritis. J Am Med Dir Assoc. 2019;20(12):1634–40.

7. Baldwin RC. Depression in Later Life. 2nd ed: Oxford University Press; 2014. https://oxfordmedicine.com/view/10.1093/med/9780199671632.001.0001/med-9780199671632-chapter-8.

8. Rathbun AM, Stuart EA, Shardell M, et al. Dynamic Effects of Depressive Symptoms on Osteoarthritis Knee Pain. Arthritis Care Res. 2018;70(1):80–8. https://doi.org/10.1002/acr.23239 published Online First: 2017/03/21.

9. Stubbs B, Aluko Y, Myint PK, et al. Prevalence of depressive symptoms and anxiety in osteoarthritis: a systematic review and meta-analysis. Age Ageing. 2016;45(2):228–35.

10. Nelson AE. Osteoarthritis year in review 2017: clinical. Osteoarthr Cartilage. 2018;26(3):319–25

11. 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 Musculoskelet Disord. 2021 Jan 7;22(1):40. doi: 10.1186/s12891-020-03875-1. PMID: 33413273; PMCID: PMC7791830.

12. Soltani S, Kopala-Sibley DC, Noel M. The Co-occurrence of Pediatric Chronic Pain and Depression: A Narrative Review and Conceptualization of Mutual Maintenance. Clin J Pain. 2019 Jul;35(7):633-643. doi: 10.1097/AJP.0000000000000723.

13. Nemeroff CB. The State of Our Understanding of the Pathophysiology and Optimal Treatment of Depression: glass Half Full or Half Empty? Am J Psychiatry. 2020;177(8):671–685. doi:10.1176/appi.ajp.2020.20060845.

14. Hall M, Dobson F, Van Ginckel A, et al. Comparative effectiveness of exercise programs for psychological well-being in knee osteoarthritis: a systematic review and network meta-analysis. Semin Arthritis Rheum. 2021;51(5):1023–1032. doi:10.1016/j.semarthrit.2021.07.007

15. Bay S, Kuster L, McLean N, Byrnes M, Kuster MS. A systematic review of psychological interventions in total hip and knee arthroplasty. BMC Musculoskelet Disord. 2018;19(1):201. doi:10.1186/s12891-018-2121-8.

16. Yang R, Wang J, Wang H, Tracy EL, Tracy CT. A cross-lagged model of depressive symptoms and mobility disability among middle-aged and older Chinese adults with arthritis. Geriatr Gerontol Int. 2020;20(10):873–877.

17. McClendon J, Essien UR, Youk A, et al. Cumulative Disadvantage and Disparities in Depression and Pain Among Veterans With Osteoarthritis: the Role of Perceived Discrimination. Arthritis Care Res. 2021;73(1):11–17. doi:10.1002/acr.24481

18. Bierke S, Häner M, Karpinski K, Hees T, Petersen W. Midterm Effect of Mental Factors on Pain, Function, and Patient Satisfaction 5 Years After Uncomplicated Total Knee Arthroplasty. J Arthroplasty. 2020;35(1):105–111. doi:10.1016/j.arth.2019.08.008