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**PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES OF DEPRESSION IN
ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS ATTENDING A TEACHING
HOSPITAL IN SOUTHWEST NIGERIA**

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES OF DEPRESSION IN ELDERLY PATIENTS WITH KNEE OSTEOARTHRITIS ATTENDING A TEACHING HOSPITAL IN SOUTHWEST NIGERIA

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ABSTRACT

Introduction: Knee Osteoarthritis (OA) is a common disease of the aged population and one of the leading causes of disability. Depressive symptoms are associated with increases in pain and functional limitations in knee OA. An increased risk of depression has been observed among the elderly that have knee OA due to unrelenting pain, excess suffering, and disability. This study aims to determine the prevalence and sociodemographic correlates of depression in elderly patients with knee OA attending UNIOSUN Teaching Hospital (UTH) Osogbo to help healthcare providers better understand the risk factors for these conditions and develop interventions that are tailored to the needs of this specific population.

Methods: A hospital-based cross-sectional descriptive study of 147 elderlies with knee OA attending Geriatric and Orthopaedic clinics was carried out. A geriatric depression scale (GDS) was used to assess depressive symptoms. The co-interaction of sociodemographic variables and GDS were determined using Chi-square and logistic regression statistics. Statistical significance was set at p-value of ≤ 0.05 .

Results: There was a male-female ratio of 1:1.49 in this study. Most respondents were in their seventh decade, female, in a monogamous and nuclear family setting. Most had 3-5 children, and had secondary-

level education. The prevalence of depression in the elderly with knee Osteoarthritis was 40.8% with a predominance of mild-moderate depression (34.7%), while severe depression was lower (6.1%). Age 60-64 years, extended family, and having six or more children were predictive of depression.

Conclusion: The prevalence of depression was high among elderlies with knee Osteoarthritis with a predominance of mild to mild-moderate depression.

Keywords: Elderly, Depression, Knee Osteoarthritis

INTRODUCTION

The defective integrity of the articular cartilage with or without changes in the underlying bone and the joint margin underlies the constellation of symptoms and signs in the joints of patients diagnosed with Osteoarthritis.¹ Knee OA is important because of its high prevalence rate compared to other types of OA. The incidence of knee OA increases with age.² Knee OA (KOA) is one of the frequent and functionally impairing disorders of the musculoskeletal system. It is a common disease of the aged population and one of the leading causes of disability.¹

In humans, the role of the knee in supporting most of the body weight increases its

vulnerability to the development of knee OA. Increasing age, obesity, genetics, and trauma to the knee joint due to repetitive movements, in particular, squatting and kneeling are common risk factors of knee OA.¹ OA strongly correlates with aging and has a rising prevalence with advancing age. In Nigeria, a community-based study by Akinpelu *et al.* in 2009 had an estimated point prevalence of knee OA as 19.6%.^{1,3} In the study, the highest prevalence of knee OA (48.3%) was among the elderly.³

Studies suggest that there may be a link between knee osteoarthritis and depression. Chronic pain which is a common symptom of knee osteoarthritis has been linked to depression in numerous studies.⁴ One meta-analysis found that individuals with knee osteoarthritis who experience pain are more likely to develop depression than those without pain.⁵ Knee osteoarthritis can lead to reduced physical activity levels which leads to decreased physical functioning, and greater difficulty performing the activities of daily living, resulting in a decline in health-related quality of life. Depression is associated with locomotor function derangement such as in walking, ascending or descending stairs, sitting and standing, which are essential for the maintenance of daily activities.^{6,7}

Several longitudinal studies have demonstrated association between depressive symptoms and OA symptoms. Rathbun *et al* found that depressive symptoms had a nonlinear direct effect on the physical functioning of patients with KOA and an indirect effect mediated through pain severity.⁸ They also found that the persistence of depressive symptoms had a cumulative effect on knee pain.⁵ These studies suggest that depressive symptoms may lead to prolonged and increased OA pain, thus creating a vicious cycle between depression and OA pain.⁵ A systematic review and meta-analysis by Stubbs *et al.* shows that the risk of depression was

significantly higher in patients with osteoarthritis than in those without.⁹

Depression has been described as a mood disorder associated with persistent feelings of sadness, loss of interest and pleasure in daily activities, which may occur independently as a separate health condition, or in reaction to the presence of other chronic illnesses, adverse life events, and losses, as well as mobility losses.¹⁰ Determining the prevalence and sociodemographic correlates of depression in the elderly with knee OA is important in order to help healthcare providers and researchers better understand the risk factors for depression and develop interventions that are tailored to the needs of this category of the population. However, plans for these interventions may not be feasible for the Nigerian population owing to the paucity of data on depression in elderly with knee OA.

While this study seeks to address this knowledge gap, the main aim is to determine the prevalence and sociodemographic correlates of depression in elderly patients with knee OA attending UNIOSUN Teaching Hospital (UTH), Osogbo, Nigeria. We anticipate that the study outcomes will provide empirical information required to help develop targeted interventions and preventive efforts as regards the mental health of this category of the population.

METHODS

This was a hospital-based cross-sectional descriptive study carried out between April 2019 and June 2019 in both the Geriatric Unit of the Family Medicine Department and the Orthopaedic clinic of LAUTECH Teaching Hospital (LTH), now UNIOSUN Teaching Hospital (UTH), Osogbo, Osun State, in the southwest geopolitical zone of Nigeria. The study was approved by the institution's Ethical Committee (LTH/EC/2018/03/356) and informed consent was obtained from each patient. One

hundred and forty-seven elderly patients with knee osteoarthritis, fifty-eight from the Geriatric clinic, and eighty-nine from the Orthopaedics clinic were studied. The diagnosis of knee OA was made based on the American College of Rheumatology (ACR) criteria of 1987 for knee OA. It includes pain in the knee with any 3 of the following: age > 50 years, morning stiffness < 30 minutes, crepitus on active motion, bony tenderness, bony enlargement, or no palpable warmth of synovium.¹¹

Study population

The target population for this research was the elderly aged 60 years and above with knee OA that attended the Geriatric and Orthopaedic clinics of the hospital.

Within three months, the hospital records revealed that 106 elderlies with knee OA attended the Geriatrics unit clinic and 168 attended the Orthopaedic clinic outside of those referred to the Geriatrics unit. The population over 3 months was 274.

Sample size determination

The sample size formula for a single proportion for a descriptive cross-sectional study was used to calculate the sample size using a 28.8% prevalence of depression in the elderly with knee OA.^{6,12-14} The final sample size was 147.

Sampling method

A systematic random sampling technique was used at both clinics to recruit participants for this study. For this study, based on the sample frame from each clinic, 2/5 (58) of the sample size was taken at the Geriatrics clinic while 3/5 (89) was taken at the Orthopaedic clinic. The Geriatric clinic held five clinics a week while the Orthopaedic clinic held three times a week. At each of the clinics, the first participant at the beginning of the study was selected randomly by a ballot method from the first two patients that presented at the start of this study. Until the sample size was reached, every second patient was selected.

Inclusion criteria

All elderlies with knee OA who presented at the Geriatric clinic and Orthopaedic clinic of UTH who were previously diagnosed and on follow-up or newly diagnosed and met the ACR Clinical criteria within the study period were recruited for the study.

Exclusion criteria

Patients were excluded from the study if they were younger than 60 years, had a known inflammatory joint disease or metabolic bone disease, systemic, neurological, or another musculoskeletal problem leading to chronic pain. Other criteria for exclusion were those with previous psychiatric disorder, those who suffered recent bereavement, acute illnesses and history of knee surgery

Data collection

Sociodemographic data of all participants were recorded, and all patients were physically examined by the researcher. Depression was also assessed by the researcher using an interviewer-administered semi-structured questionnaire - the modified Geriatric Depression Scale (M-GDS). This instrument has been used in Nigeria by many researchers.^{15,16} The modified Geriatric Depression Scale is a useful screening tool in the clinical setting to facilitate the assessment of depression in older adults. It is a validated questionnaire with 15 items successful in differentiating depressed from non-depressed adults with a high correlation ($r = .84$, $p < .001$)¹⁷. Of the 15 items, 10 indicated the presence of depression when answered positively while the other five are indicative of depression when answered negatively. A point was given for each of the answers and the total was added together. The severity was assessed as follows: scores ≤ 5 were suggestive of no depression, 6-10 were suggestive of mild depression, and scores ≥ 11 were suggestive of severe depression.¹⁷

Analysis

All data were entered into a Microsoft excel software and transferred into the Statistical Package for Social Sciences (SPSS) windows software version 20 for further processing and statistical analysis.

Before analysis, data entries were crosschecked for outliers using Boxplot and the whisker method/diagram. Outliers were identified as data points located outside the fence (whiskers) of the Boxplot i.e. above the upper quartile and below the lower quartile. All outliers were crosschecked and attributed to entry errors and were immediately corrected. Crosschecked data were subjected to descriptive analysis using frequency tables, measures of central tendency (mean) and measures of dispersion (range, standard deviation and confidence intervals of means). Further analysis using nonparametric statistics (i.e. Chi-square) and cross-tabulation was used to explore the statistical association between variables because data from this study was largely ordinal (based on ranking e.g. mild, moderate, and severe).

The nature and strength of sociodemographic data and M-GDS data were analysed using Chi-square statistics. Statistical significance was set at a p-value of ≤ 0.05 . Where scores were generated, parametric statistics were used. The co-interaction of sociodemographic variables and M-GDS was determined using multiple and logistic regression statistics.

RESULTS

Characteristics of the participant's sociodemographic variables

Table 1 presents the characteristics of the 147 study participants. Most respondents were in their seventh decade, female and had a nuclear family setting. Most had 3-5 children, practiced Islam and had secondary-level education.

Prevalence and pattern of depression in participants

As shown in Figure 1, the prevalence of depression was 40.8%. The presence of mild-moderate depression was identified in 34.7% of the participants while 6.1% of the participants were severely depressed

according to the modified geriatric depression scale used.

Table 1: Socio-demographic characteristics of participants

| Variable | Frequency | Percentage (%) |
|------------------------------------|-----------|----------------|
| Age (years) | | |
| 60-64 | 27 | 18.4 |
| 65-69 | 50 | 34.0 |
| 70-74 | 54 | 36.7 |
| 75 years Above | 16 | 10.9 |
| Sex | | |
| Male | 59 | 40.1 |
| Female | 88 | 59.9 |
| Marital Status | | |
| Married | 82 | 55.8 |
| Widowed | 37 | 25.2 |
| Divorced/Separated | 28 | 19 |
| Separated | 19 | 12.9 |
| Family Type | | |
| Nuclear | 97 | 66.0 |
| Extended | 50 | 34.0 |
| Number of Children | | |
| 1-2 | 13 | 8.8 |
| 3-5 | 87 | 59.2 |
| 6-Above | 47 | 32.0 |
| Living Arrangement | | |
| Living alone | 08 | 5.4 |
| Living with a spouse | 24 | 16.3 |
| Living with children and or spouse | 61 | 41.6 |
| Living with significant others* | 54 | 36.7 |
| Education | | |
| No education | 30 | 20.4 |
| Primary level | 39 | 26.5 |
| Secondary level | 52 | 35.4 |
| Tertiary level | 26 | 17.7 |
| Tribe | | |
| Yoruba | 131 | 89.1 |
| Igbo | 15 | 10.2 |
| Hausa | 01 | 0.7 |
| Religion | | |
| Christianity | 62 | 42.2 |
| Islam | 77 | 52.4 |
| Traditional | 08 | 5.4 |

Table 2: Occurrence of Depression in Various sociodemographic groups

| Variables | No depression (n=87) (%) | Depression (n=60) (%) | p-value |
|-----------------------------|--------------------------|-----------------------|----------|
| Age (years) | | | |
| 60-64 | 21(24.1) | 6(10.0) | <0.0001* |
| 65-69 | 40(46.0) | 10(16.7) | |
| 70-74 | 21(24.1) | 33(55.0) | |
| 75-Above | 5(5.7) | 11(18.3) | |
| Gender | | | |
| Male | 44(50.6) | 15(25.0) | 0.002* |
| Female | 43(49.4) | 45(75.0) | |
| Marital Status | | | |
| Married | 62(71.3) | 20(33.3) | <0.0001* |
| Widowed | 19(21.8) | 18(30.0) | |
| Divorced | 2(2.3) | 7(11.7) | |
| Separated | 4(4.6) | 15(25.0) | |
| Family Type | | | |
| Nuclear | 49(56.3) | 48(80.0) | 0.003* |
| Extended | 38(43.7) | 12(20.0) | |
| No of Children | | | |
| 1-2 | 10(11.5) | 3(5.0) | 0.014* |
| 3-5 | 43(49.4) | 44(73.3) | |
| 6-Above | 34(39.1) | 13(21.7) | |
| Living arrangements | | | |
| Living alone | 1(1.1) | 7(11.7) | <0.0001* |
| With spouse | 15(17.2) | 9(15.0) | |
| With children and or spouse | 27(31.0) | 34(56.7) | |
| With sig. others | 44(50.6) | 10(16.7) | |
| Education | | | |
| No education | 20(23.0) | 10(16.7) | 0.770 |
| Primary level | 22(25.3) | 17(28.3) | |
| Secondary level | 29(33.3) | 23(38.3) | |
| Tertiary level | 16(18.4) | 10(16.7) | |
| Tribe | | | |
| Yoruba | 77(88.5) | 54(90.0) | 0.405 |
| Igbo | 10(11.5) | 5(8.3) | |
| Others | 0(0.0) | 1(1.7) | |
| Religion | | | |
| Christianity | 40(46.0) | 22(36.7) | 0.484 |
| Islam | 42(48.3) | 35(58.3) | |
| Traditional | 5(5.7) | 3(5.0) | |

Sociodemographic variables associated with depression

Table 2 shows that among the sociodemographic factors of the one hundred and forty-seven participants of this study, age, gender, marital status, marriage type, family type, number of children and living arrangement had a statistically significant

relationship with depression. Additionally, Table 3 shows that holding all other predictor variables constant, ages between 60-64 years, the female gender, being separated, belonging to an extended family, having six or more children and, living with

significant others increases the odds of the presence of depression.

Table 3: Logistic Regression Analysis of Respondents' sociodemographic characteristics with Depression

| Sociodemographic Variables | OR (Confidence Interval) | P- Value |
|------------------------------------|--------------------------|----------|
| Age | | |
| 60-64 Years | 1 | 0.0001* |
| 65-69 Years | 0.101 (0.012-0.819) | 0.032 |
| 70-74 Years | 0.035 (0.005-0.238) | 0.001* |
| 75 Years And Above | 0.677 (0.129-3.551) | 0.644 |
| Gender | | |
| Male | 1 | 0.003* |
| Female | 2.353 (1.111-6.122) | 0.078 |
| Marital Status | | |
| Married | 1 | 0.031 |
| Widowed | 0.200 (0.009-4.284) | 0.303 |
| Divorced | 0.107 (0.017-0.679) | 0.018* |
| Separated | 1.950 (0.161-23.548) | 0.599 |
| Family Type | | |
| Nuclear | 1 | |
| Extended | 3.359 (1.314-8.589) | 0.011* |
| No of Children | | |
| 1-2 | 1 | 0.018* |
| 3-5 | 0.476 (0.052-4.350) | 0.511 |
| 6 And Above | 4.265 (1.173-15.498) | 0.028* |
| Living Arrangement | | |
| Living Alone | 1 | 0.164 |
| Living With Spouse Alone | 0.775 (0.093-3.604) | 0.043* |
| Living With Children And Or Spouse | 0.897 (0.053-15.133) | 0.940 |
| Living With Significant Others | 2.012 (0.111-36.616) | 0.637 |
| Education | | |
| No Education | 1 | 0.779 |
| Primary Level | 1.067 (0.170-6.514) | 0.944 |
| Secondary Level | 1.961 (0.341-11.283) | 0.451 |
| Tertiary Level | 1.045 (0.211-5.169) | 0.957 |

*Statistically significant

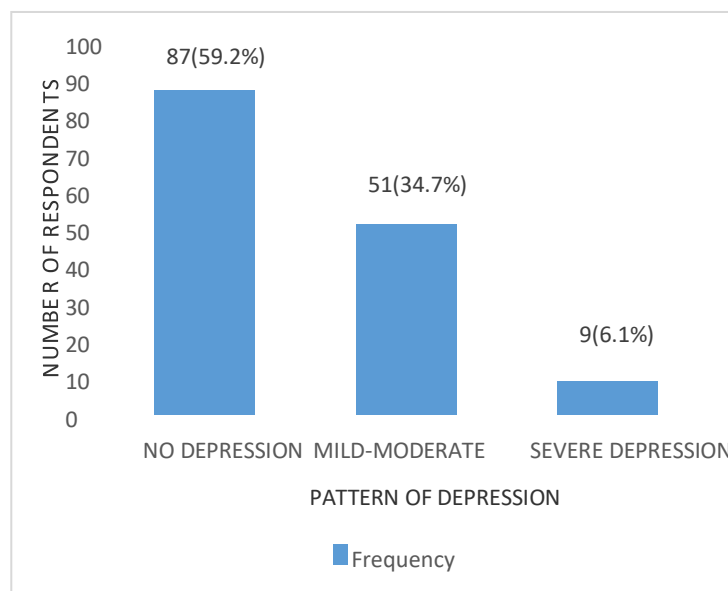


Figure 1: Prevalence and pattern of Depression Among Participants

DISCUSSION

This study set out to determine the prevalence and sociodemographic correlates of depression in elderly patients with knee Osteoarthritis.

Prevalence and pattern of depression among participants

This study revealed that 59.2% of the respondents had no depression. 34.7% had mild-moderate depression, and 6.1% had severe depression. The prevalence of depression among respondents in this study was 40.8%. This is slightly lower than the findings in a study by Küçükşen et al on the prevalence of depression.¹⁸

However, the finding does not agree with what was found in a systemic review and meta-analysis by Stubbs et al on the prevalence of depressive symptoms and anxiety in osteoarthritis. The meta-analysis estimated the pooled prevalence at 19.9%.⁹ The lower prevalence in this meta-analysis could be due to the combined outcome effect from different tools of assessment of depression and Osteoarthritis in studies included in the meta-analysis.

Odole *et al* in a study at the Ibadan metropolis reported a prevalence of 28.8% for depression among the 80 participants of the study.⁶ This is also lower than the prevalence of depression in this study. This could be due to the screening tool used in the study- the Becks depression inventory which was different from the Geriatric Depression Scale (GDS) that was used in this study. The study population in the study by Odole *et al* was recruited from three public hospitals, unlike this study which was done at a single tertiary hospital. Furthermore, the study by Odole *et al* was carried out in the Ibadan metropolis which is an urbanized city while Osogbo is a mixture of rural-urban settings.¹⁹ Previous studies have also reported a higher prevalence of depression in rural settings compared to urban settings.²⁰

Sociodemographic determinants of depression

Depression in this study was found to be higher in respondents that had the following characteristics: middle-old (70-79 years) respondents, female gender, separated/divorced, nuclear family type, living alone and no education. The relationship of these variables to depression was statistically significant except for educational status. There is an increased incidence and prevalence of both symptomatic and radiologic knee OA as age increases.²¹ As the incidence and prevalence of knee osteoarthritis increase so are the attendant challenges of pain, disability, and challenges/reduction of instrumental activities of daily living which reduce patients' quality of life thereby increasing the risk for depression. The higher occurrence of depression in the respondents with polygamous marriages could be due to increased conflict and stress inherent in this type of marriage in our environment or it could be gender influenced. A systematic review and meta-analysis by Shaiful Bahari I *et al.* showed that the psychological impact (including depression and anxiety) of polygamous marriage on women and children was found to be relatively higher than monogamous marriage.²²

At older ages, children are expected to provide people with different forms of support that enhance their physical and emotional well-being throughout their life course^{23,24} This is reducing due to the demographic transition, increased mobility, rural-to-urban migration and increasing financial instabilities.²⁵ A study found that intergenerational co-residence, which is often associated with children providing care for their elderly parents, has been declining. This decline was attributed to factors such as urbanization, increased education and employment opportunities for women, and changes in cultural values. As a result, elderly individuals are increasingly relying on formal care services, rather than family members, for support.²⁵

In this study, there was a statistically significant relationship between depression and the respondents' number of children. In the face of the economic hardship, unemployment, and poverty being encountered by many children of the elderly, many elderlies in this environment still support their children and grandchildren from their meager pension or income and they continue to engage in menial jobs and manual work on the farms with minimal earnings as long as their physical strength can allow.²⁶

This study demonstrated a statistically significant relationship between depression and respondents living arrangements. Living alone (compared to living with a family member) was associated with elevated levels of depressive symptomatology in a study by Stahi *et al.*²⁷ This relationship was found to be independent of the influence of expressive support from friends, face-to-face interaction with friends, undesirable life events, disability, and financial strain. Undesirable health events have a stronger impact on those who live alone.²⁸

Depression was associated with educational status in this study. This is similar to a study by Peyrot *et al.*²⁹ Education has been found to influence the development and the course of depression. This has been linked to

probable socio-economic and environmental influences, with little genetic links in a study using 9,662 cases of major depression by Peyrot *et al.*²⁹

The limitations of this study include the use of a specific group in the community, a small sample size and the cross-sectional nature of the study.

CONCLUSION

Our findings suggested that depression in the elderly with knee OA was high and ages between 60-64years old, female gender, being separated, belonging to an extended family setting, having 6 or more children and living with significant others were predictors of depressive symptoms in elderly people with knee OA. Focusing on this elderly group with increased screening for depression should help in the early identification and treatment of depression in them.

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