

Assessment on Health Status of Adult Patients with Osteoarthritis of the Lower Limb by Western Ontario and McMaster's Universities Osteoarthritis Index (WOMAC): A Study in Chennai City

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Abstract

Adult patients with Osteoarthritis of the Lower Limb (OALL) is a widely recognized health burden. Western Ontario and McMaster's Universities Osteoarthritis Index (WOMAC) are widely used to assess osteoarthritis among patients. The study aimed to evaluate the health status of adult patients with OALL in Chennai City, India using the WOMAC scale. A cross-sectional study design was used. Respondents who arrived at the hospital and met the inclusion criteria were selected one after one. One hundred seven patients diagnosed with OALL participated in the study. Among them, 81 were female patients and 26 were male patients. To assess the health status of OALL patients, three instruments were used; the General information questionnaire, the WOMAC scale and the Self-rated Health status questionnaire. The variables were evaluated by mean and standard deviation. ANOVA was calculated by using SPSS Version 21. The mean \pm SD age of the adult patients was 60.42 ± 9.07 years. Experience of pain, stiffness, and performance of daily activities was significantly worse among female patients with OALL. There is a strong correlation between the gender and age group of adult patients (Male <0.003 and Female <0.001) and their level of physical suffering. More than half of the patients (57%) stated that their overall health condition was bad. OALL significantly impairs the health and daily activities of adult patients in India. The findings of this study may support policymakers in designing community-based geriatric health care and health policies.

Keywords: Adult patients, Health status, Lower limb, Osteoarthritis, WOMAC.

Introduction

Osteoarthritis (OA) is the most common type of joint disease which causes disability and impacts daily activities in adult patients. 528 million people (2019) worldwide were living with OA. Among them, the majority of patients are older than 55 years [1]. Patients with osteoarthritis of the lower limb (OALL) are affecting the hip and knee. It is a widely recognized public health burden [2, 3]. OALL will continue to increase due to the increased prevalence of obesity among the elderly population. It is strongly associated with an

ageing population [4]. OA prevalence varies depending on factors such as age, gender, and geographical condition. In India, it is estimated to be between 22% and 39%, with a higher prevalence in women and older adults. The diabetes risk is 32% higher in people with OALL. Obesity and old age are risk factors for both OALL and diabetes [5, 6].

Pain is the main reason patients with OALL seek help and there is a poor correlation between pain and structural damage [7]. Many rating scales are available to assess the health status of adult patients with OALL. Specifically, the Knee Injury and Osteoarthritis

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Outcome score (KOOS). The Knee Society Clinical Rating Scale, and the Western Ontario and McMaster's Universities Osteoarthritis Index (WOMAC) are widely used to assess OA among patients [8, 9]. The WOMAC is a self-assessed measure for patients with OALL introduced in 1982. The higher scores on the WOMAC indicate worse pain, stiffness, and functional limitations [10,11]. The study aimed to assess the health status and the impact of lower limb osteoarthritis among adult patients in Chennai City by using the WOMAC scale.

Materials and Methods

Study Design and Population

This study was carried out at the tertiary hospital and a cross-sectional design was used. Respondents who arrived at the hospital and met the inclusion criteria were selected one after one. The study was conducted from Oct 2023 to Mar 2024. Inclusion criteria were OALL patients, aged above 30 years and able to read and write in Tamil. Aged below 30 years, other types of osteoarthritis, and psychiatric disorders were excluded from the study. One hundred seven patients diagnosed with OALL were invited to participate in the study. Among them, 81 were female patients and 26 were male patients.

Study Instrument and Valuation Process

Three instruments have been used: A general information questionnaire, the WOMAC scale and the Self-rated Health Status Questionnaire.

Instrument-1: Sociodemographic characteristics and clinical data of the patients were collected using the General information questionnaire. The survey contentment included gender, age, marital status, educational status, occupation, family income, number of affected lower limbs, duration of the disease, number of comorbidities, and dependent members in the household.

Instrument-2: WOMAC is widely used in evaluating the lower limb of hip and knee osteoarthritis and is available in 65 languages

[12]. It consists of 24 items divided into 3 subscales: Pain (5 Items), Stiffness (2 Items), and Physical Function (17 items). The responses were scored on a scale of 0-4; None (0), Mild (1), Moderate (2), Severe (3), and Extreme (4). The total WOMAC score (96) was evaluated through all three subscales. The lowest scores on the WOMAC indicate a low level of pain, stiffness, and functional limitations. **Instrument-3:** Self-rated Health status Questionnaire which consists of 5 questions evaluated by a point scale.

Ethical Consideration and Statistical Analysis

The study was approved by the Institutional Scientific Review Board [ISRB] Chennai. All participants who gave their verbal consent to participate in the study were informed about the study protocol. The researcher was present throughout the completion of the questionnaire to clarify the doubts of the participants. Descriptive statistics were performed, and variables were presented as means and standard deviations for qualitative variables and frequencies and percentages for categorical variables. OALL was evaluated by using the scale WOMAC. Socio-demographic factors were evaluated by mean, and standard deviation, and ANOVA was calculated using SPSS Version 21. The p-value of significance was set at <0.05.

Results

Results revealed that the mean \pm SD age of the participants was 60.42 ± 9.07 years. Table 1 shows that nearly three-fourths of participants were in the age group of 51-70 years (74.8%). The majority of them were married (87.8%), higher secondary completed (65.4%), and 48 women patients were unemployed. Based on clinical variables lower limbs were affected more among women patients. 46.7% of patients were affected by both, hip and knee. More than half of the adult patients (51.4%) stated that they were affected by OALL from 5 to 10 years.

The majority of patients (52.4%) were affected by two comorbidities. The highest percentage (56.2%) of patients' family income was from

Rs 1 Lac to < 2 Lac. Three-fourths of patients (76.6%) had one to two dependent members in household work.

Table 1. Percentage Distribution of Socio-Demographic and Clinical Variables of OALL-Affected Patients

Variables	OALL affected patients		
	Male (26)	Female(81)	Total (%) n=107
Age group			
31 – 50	3	9	12 (11.2)
51 – 70	18	62	80 (74.8)
>70	5	10	15 (14.0)
Marital status			
Single	3	0	3 (2.8)
Married	20	74	94 (87.8)
Divorced	0	0	0 (0.0)
Widowed	3	7	10 (9.4)
Educational status			
Illiterate	0	0	0 (0.0)
Primary school	4	19	23 (21.5)
Higher Secondary	17	53	70 (65.4)
Graduate &above	5	9	14 (13.1)
Occupation			
Employed	22	33	55 (51.4)
Unemployed	4	48	52 (48.6)
Affected lower limbs			
Hip	2	0	2 (1.9)
Knee	7	48	55 (51.4)
Both	17	33	50 (46.7)
Duration of the Disease (Years)			
< 5	11	26	37 (34.6)
5 – 10	14	41	55 (51.4)
>10	1	14	15 (14.0)
Number of comorbidities			
0	1	0	1 (0.9)
1	18	21	39 (36.4)
2	7	49	56 (52.4)
>2	0	11	11 (10.3)
Family income (Per month - Rs)			
<50000	7	24	31 (28.9)
50001 to <1 Lac	3	12	15 (14.0)
1 Lac to <2 Lac	16	44	60 (56.2)
> 2 Lac	0	1	1 (0.9)
Dependent member of the household			
0	8	3	11 (10.3)

1-2	18	64	82 (76.6)
3-4	0	14	14 (13.1)
>4	0	0	0

Table 2 portrays the scores of 24 items on the WOMAC scale. Out of 5 items in the pain subscale, the highest score was observed in the case of item no, 2 (Going up and down stairs). Out of 2 items in the Stiffness subscale, item no, 6 (Awakening in the morning) secured the highest mean value. In the physical activity subscale, items no, 9, 16, and 23 secured the

highest scores (Ascending stairs, Putting on your socks, and Performing heavy domestic work). Higher scores on the WOMAC indicate worse condition of OALL. The total mean \pm SD of WOMAC shows (68.1 ± 9.5) the 70.1% of physical disability of adult patients with OALL in Chennai city.

Table 2. Assessment of Health Status of Adult Patients by WOMAC Score (Mean \pm SD)

Items	WOMAC Index	Mean	SD
A	Pain (5 Items – 20 scores)		
1	Walking on a flat surface	2.4	0.7
2	Going up and down stairs	3.6	0.9
3	Pain disturbs your sleep	2.8	0.8
4	Sitting or lying	2.6	0.7
5	Standing upright	3.1	0.8
Total Mean score of pain		14.5	2.8
B	Stiffness (2 Items – 8 scores)		
6	Awakening in the morning	2.9	0.7
7	Resting in the day	2.3	0.6
Total Mean score of stiffness		5.2	1.1
C	Physical activity (17 Items – 68 scores)		
8	Descending stairs	2.4	0.7
9	Ascending stairs	3.5	0.9
10	Rising from sitting	2.8	0.8
11	Standing	2.6	0.9
12	Bending to the floor	2.9	0.7
13	Walking on a flat surface	2.6	0.8
14	Getting in and out of the vehicle	2.8	0.9
15	Going shopping	3.0	0.8
16	Putting on your socks	3.2	0.7
17	Rising from the bed	3.0	0.8
18	Taking off your socks	3.1	0.7
19	Lying in bed	2.4	0.9
20	Getting in or out of the bath	2.7	0.7
21	Sitting	2.4	0.7
22	Getting on or off the toilet	2.6	0.8
23	Perform heavy domestic work	3.5	0.8
24	Perform light domestic work	2.9	0.7
Total Mean Score of Physical Activity		48.4	9.3

WOMAC Total Mean ± SD	68.1	9.5
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Table 3 shows the association of gender distribution by age group with OALL in WOMAC score. The mean ± SD of the WOMAC score shows the adult patients' OALL suffering level. Above 70 years of adult patients' WOMAC score portrays a high level

of suffering in the hip and knee. There is a strong correlation between the gender and age group of adult patients (Male <0.003 and Female <0.001) and their level of physical suffering (Functional activities, Pain, and Stiffness).

Table 3. Association of Gender Distribution by Age Group with OALL Scores

Gender Distribution by age group	N 107	WOMAC Scale (Max score – 96)		
		(Less scores = low level of suffering)		
		Mean ± SD	%	p-value
Male Patients				<0.003*
31 – 50	3	43.85 ± 4.2	45.67	
51 – 70	18	57.29 ± 6.1	59.67	
>70	5	64.05 ± 2.8	66.71	
Female Patients				<0.001*
31 – 50	9	51.76 ± 3.6	53.91	
51 – 70	62	66.01 ± 7.4	68.76	
>70	10	78.64 ± 3.2	81.91	
Note: *Significant at p <0.05				

Table 4 highlights the self-rated health status of adult patients in OALL. More than half of the patients (57%) stated that their overall health condition was bad. They also stated that compared to 6 months ago, their health status was in bad condition (52.3%). Nearly, three-

fourths of patients (73.8%) stated that their overall physical health was bad compared to others of their age. 53.3% of patients rated that their HRQol was bad. 29.9% of patients stated that they couldn't cope with their depression.

Table 4. Self-Rated Health Status of Adult Patients in OALL

S. No	Self-rated questionnaire	Very good	Good	Moderate	Bad	Very bad
1	How do you rate your overall health now?	0 (0.0)	6 (5.6)	23 (21.5)	61 (57.0)	17 (15.9)
2	How do you rate your overall health compared to 6 months ago?	2 (1.9)	1 (0.9)	14 (13.1)	56 (52.3)	34 (31.8)

3	How do you rate your overall physical health compared to others of your age?	0 (0.0)	2 (1.9)	10 (9.3)	79 (73.8)	16 (15.0)
4	How would you rate your HRQoL?	0 (0.0)	1 (0.9)	26 (24.3)	57 (53.3)	23 (21.5)
5	How do you cope with depression?	2 (1.9)	4 (3.7)	33 (30.8)	36 (33.7)	32 (29.9)

Note: The point scale used by WHO

Discussion

The result of this study revealed that the health status of adult patients was affected by OALL. The majority of women were affected more than the male patients [13]. OA prevalence is expected to increase due to several factors, such as overweight, lack of nutrition, and sedentary lifestyle which could result in increased cardiovascular morbidity [14]. The economic consequences of OALL need to be investigated. The most widely used disease-specific tool for assessing OALL is the WOMAC scores [15], which are determined to be valid and reliable. A recent meta-analysis study reported that muscle weakness was also associated with OALL among adult patients [16].

Patients with OA experience decreased health-related quality of life. Healthcare professionals need to be aware of the high prevalence of OALL and work toward improving OA patient management. Pain severity plays an important role in predicting health status, and these findings are consistent with the previous studies [17, 18]. A published study demonstrated that patients experiencing OA pain in both knees have poorer health status compared to patients with unilateral knee pain [19]. A population-based study in Japan revealed that patients with severe knee OA had significantly lower physical health status [20]. A large population-based cohort study from southern Sweden also confirmed that participants with knee OA reported lower HRQoL scores [21].

Knee osteoarthritis is a leading cause of osteoarthritis-related impairments in the general South Indian population. More attention is needed to cases with knee osteoarthritis in the highest age categories as well as the highest overweight categories. Meanwhile, many studies have shown that obesity is a risk factor for OALL [22]. When the BMI value exceeds the normal level, the load on the human knee joint will increase accordingly, thereby accelerating the degenerative changes of articular cartilage. Therefore, adult patients with OALL need to strengthen appropriate physical exercise, maintain a healthy diet, and control the intake of oil, sugar and salt [23]. They are recommended to maintain their weight within the normal range to reduce the pressure on the knee joint. Patients with higher WOMAC scores had significantly lower health status. Thus, it is crucial to improve the knee and hip function of patients with OALL. After the patient is diagnosed, healthcare professionals and the patient's family members should cooperate to standardize pain management, encourage patients to exercise properly and improve their lower limb joint function.

Conclusion

In this study, we investigated the health status of adult patients with WOMAC scores (Pain, Stiffness and Functional activities). Higher WOMAC scores (68.1 out of 96) show a lower level of health status. These findings may support policymakers in maintaining the health status of the population when designing

community-based geriatric health care and health policies.

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Conflict of Interest

The author confirms that this article's content has no conflict of interest.

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