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ORIGINAL ARTICLE

Work Disability and Quality of Life among Working Patients with Primary Knee and Hip Osteoarthritis

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Background: Osteoarthritis (OA) affects adults more than any other type of arthritis and can cause a variety of disabilities, such as limitations in daily activities and the capacity to work. This work aimed for assessment of the work disability, and quality of life (QOL) among working patients who had knee and hip OA. **Methods:** The current research is cross-sectional study that was carried out upon 150 working patients with OA diagnosed according to American College of Rheumatology (ACR) criteria of knee and hip OA. Assessment of work disability was done via the Work Productivity and Activity Impairment (WPAI) questionnaire. QoL of the OA cases was evaluated by the Osteoarthritis Quality of Life Lower Limbs Questionnaire (MiniOAKHQOL). **Results:** There was a negative significant correlation between WPAI with MiniOAKHQOL score and WOMAC score (p=0.013, 0.022 respectively). Significant positive correlations were found between Mini-HKOAQoL score with BMI, WOMAC score, VAS, and K-L grades (p=0.0159, <0.001, <0.001, 0.031 respectively). Significant associations were found regarding Mini-HKOAQoL score and DM, Socioeconomic, education, and work stress (p=0.043, 0.006, 0.001, and 0.009 respectively). Significant associations were revealed between WOMAC score with socioeconomic, education, and work stress (p=0.008, 0.012, and 0.001 respectively). Significant associations were found between K-L grades and sex, socioeconomic, education, and work stress (p=0.015, 0.001, 0.008, and 0.035 respectively). **Conclusion:** While OA pain is more commonly associated with the elderly, it affects underrecognized proportion of the working population. Presence of OA pain could have a great impact on the quality of life of working patients and their work productivity. There is association between grades of OA and quality of life of working personnel. OA workers with pain reported significantly reduced quality of life across both physical activities and mental health, so it affects their work and daily activities.

Keywords: Osteoarthritis, Quality of Life, Work Disability, knee and Hip

INTRODUCTION

As the most prevalent type of arthritis in adults, osteoarthritis (OA) is a degenerative joint disease. Pain and functional impairment are hallmarks of this condition, which can progress to disability and even limit a person's capacity to work [1]. OA is rapidly becoming the most common cause of disability globally, and it is a major contributor to both chronic pain and mobility issues. People with OA are less productive and use healthcare resources more frequently than those without the disease, and it begins to manifest in people while they are still in the workforce. Pain, sleep disturbances, and stiffness are among signs of OA, which can hinder occupational performance in both physically demanding jobs and non-manual office employment [2].

The inability to carry out everyday tasks due to OA's limitations (i.e., pain and stiffness) makes people disabled and limits their social roles and involvement. An individual's functional

restrictions due to OA are condition-specific, meaning they vary according to the individual's work and leisure demands as well as the location and degree of the disease [3]. Impaired health-related quality of life (HRQoL) is still a substantial part of the disease burden, according to a new big sample evaluation of research involving OA patients. And by 2020, OA is predicted to have surpassed all others to become the fourth leading cause of disability globally, accounting for the majority of the economic loss associated with arthritis [4].

Clinicians' focus has recently shifted to musculoskeletal disorders, such as OA, because they are the primary cause of decreased work participation. OA is the tenth biggest cause of years lived with disability worldwide, affecting 240 million people; it affects around 10% of men and 18% of women over the age of 60. The incapacity caused by OA can have a significant impact on the ability to continue working as the population ages [5]. Any attempt to increase the working life of today's workforce is jeopardized by the rising incidence of chronic debilitating diseases like OA [1]. Studying the impact of OA on work productivity and quality of life among OA working patients is considered an important topic of research. So, this research aimed to assess the work disability, and quality of life among working patients who had knee and hip OA. Up to our knowledge, this is the first study in Zagazig University Hospitals to evaluate Health-related quality of life and productivity among working individuals suffering from osteoarthritis.

METHODS

This cross-sectional research was carried out upon 150 working patients with OA who were diagnosed according to the American College of Rheumatology (ACR) criteria of knee and hip OA in the Rheumatology and Rehabilitation Department, Zagazig University Hospitals and Al-Ahrar Teaching hospital during the period from March 2022 to February 2023, after giving their written consent for ethical consideration. The Declaration of Helsinki, which is the World Medical Association's code of ethics for research involving human subjects, was followed in this study. All participants provided informed and written consent. The Institutional Review Board has approved this research (#6487/1-11-2020).

Inclusion criteria:

Working personnel who had Primary OA diagnosed based upon the American College of Rheumatology (ACR) criteria of knee OA with presence of knee pain along with 5 of the following items to classify the knee OA in the patients [6]**:** aged more than 50 years, to have a morning stiffness that was less than 30 minutes, to have bony enlargement or tenderness, crepitus on knee motion, with non-palpable warmth of synovium, having ESR less than 40mm/hour and to have rheumatoid Factor (RF) less than 1:40 or to have synovial fluid (SF) signs of OA, ACR criteria of Hip OA: Presence of Hip pain and any 2 of the following [7]; ESR less than 20mm/hr, imaging of osteophytes in the femur and/or acetabulum or axial, medial, and/or superior joint space narrowing on radiographs.

Exclusion criteria:

We excluded all who had any of the following conditions: patients with other diseases, which would influence the function & disabling comorbidity individuals who were not included also were housewives and those without jobs, as well as those with a history of hip or knee surgery, significant back or hip discomfort, inflammatory joint illness, or any neurological ailment that could impair their mobility.

A thorough medical history was taken from each patient, clinical examination involving: general examination of vital signs, general appearance, and locomotor system examinations involving redness, swelling, deformity and muscle wasting.

Laboratory investigations included: Complete blood count (CBC), Rheumatoid factor (RF), Erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) were measured.

Assessment of disease severity was based upon A-P knee radiographs using Kellgren and Lawrence classification [8]. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC Osteoarthritic Index) was used for evaluation of knee and hip OA. Pain, joint stiffness, and physical function [9]. The level of pain was evaluated using a Visual Analogue Scale (VAS), which varied from 0 (no pain) to 10 (extreme pain) (worst possible pain).

Work Productivity and Activity Impairment Questionnaire: General Health (WPAI:GH) [10] elicited: In the last seven days, the total number of days and hours worked, the total number of days when completing work was difficult, and the total number of days when the individual was limited at work (work impairment), Higher percentages representing more impairment and lower productivity, i.e. worse outcomes, characterize the WPAI results. The questions given marks as: (1) for those who Currently was employed, (2) =for those who had missed hours owing to health problems, (3) for hours that were missed due to other reasons, (4) for the hours that were actually worked, (5) for the degree of health that affected

the productivity while working and (6) for the health degree that affected regular activities. Scoring; Multipling the score by 100 to express in percentages. Percent overall work impairment due to health: Q2/ (Q2 + Q4) + ((1 - (Q2/ (Q2 + Q4)) × (Q5/10)).

Quality of Life in patient with hip &knee OA was assessed by the Quality of Life in Osteoarthrosis in Lower Limbs Questionnaire MiniOAKHQOL questionnaire, comprising a total of 43 items spread over five categories: physical activity (16 items), mental health (13 items), pain (4 items), social support (4 items), social functioning (3 items), and three distinct items A normalized scale from 0 (worst) to 100 is used to derive scores, which are computed by averaging the item scores for each domain (best possible QoL) [11].

Statistical Analysis:

For this data, SPSS (Statistical Package for the Social Sciences), version 14. The Shapiro-Whitney U test was used to ensure that the data followed a normal distribution. The qualitative data was shown using relative percentages and frequencies. According to what was mentioned, the difference between qualitative variables was calculated using the chi-square test ($\chi 2$) and Fisher exact. When looking for relationships between variables, Spearman's correlation coefficient was utilized Values close to 1 as strong correlation and values near 0 as weak correlation. The (+) sign indicates direct correlation, meaning that an increase in the frequency of the independent variable leads to an increase in the frequency of the dependent variable. The (-) sign, on the other hand, indicates inverse correlation, meaning that an increase in the frequency of the independent variable decreases the frequency of the dependent variable.

RESULTS

The age of the study population ranged from 48 – 60 years with mean BMI was 34.26 kg/m2 and (52%) of them were females while 54% were urban and 38% were smokers, 26% of the cases had diabetes mellitus and 22% of the cases were hypertensive, 12% of the patients had a high socioeconomic level while 36% of the patients had a middle socioeconomic level and 52% had a low socioeconomic level, that 34% of the patients had a higher education (university) while 60% of the patients had low education level, and 6% were illiterate, mean disease duration was 5.56 years, 24% of the patients were grade 1, 32% of the patients were grade 2, 34% were grade 3, and 10% were grade 4, the mean total Mini-OAKHQoL score was 43.1 ± 20.24, the mean total WOMAC score was 46.24 ± 13.18, the mean WPAI score was 68.4 ± 20.24 and the mean VAS was 5.86 ± 1.83 .

There were positive significant correlations between VAS with mini-HKOAQoL score and WOMAC score ($p<0.001$), positive significant correlations were found between mini-HKOAQoL score and WOMAC score ($p<0.001$), meanwhile, negative significant correlations were found between WPAI with mini-HKOAQoL score and WOMAC score ($p=0.013$, and 0.022 respectively) (Table 2 and Figure 1).

Significant associations were revealed between WPAI score with socioeconomic, education, and work stress ($p=0.039$, 0.026, 0.002 respectively), also significant negative correlations were found between WPAI score with BMI, Mini-HKOAQoL score, WOMAC score, and K-L grades ($p=0.028$, 0.013, 0.022, and 0.038 respectively) while the other characters were not significantly associated with WPAI (Table 3).

Significant associations were found regarding Mini-HKOAQoL score and DM, Socioeconomic, education, and work stress ($p=0.043$, 0.006, 0.001, and 0.009 respectively). There were significant positive correlations between the Mini-HKOAQoL score with BMI, WOMAC score, VAS, and K-L grades ($p=0.0159$, <0.001, <0.001, 0.031 respectively), a significant negative correlation was found between Mini-HKOAQoL score and WPAI score ($p=0.013$) (Table 4).

Significant associations were revealed between the WOMAC score with socioeconomic, education, and work stress ($p=0.008$, 0.012, and 0.001 respectively). Significant positive correlations were found between WOMAC score with BMI, Mini-HKOAQoL score, WPAI score, VAS, and K-L grades ($p=0.048$, <0.001, <0.001, and 0.042 respectively). While significant negative correlations were found between WOMAC score and WPAI score ($p=0.022$) (Table 5)

There were significant associations between K-L grades and sex, socioeconomic, education, and work stress ($p=0.015$, 0.001, 0.008, and 0.035 respectively). Positive significant correlations were revealed between K-L grades with BMI, Mini-HKOAQoL score, WOMAC score, and WPAI score ($p=0.041$, 0.031, 0.042, and 0.038 respectively) (Table 6).

Table (1): Demographic and Clinical Data and Scores of the studied patients.

	All patients (n=150)	
	Mean ± SD	**Range**
Age (years)	54.8 ± 3.6	48 - 60
Weight (kg)	92.94 ± 13.28	55 - 125
Height (cm)	165.38 ± 9.23	150 - 184
BMI (kg/m^2)	34.26 ± 5.2	24 - 49
	N	%
Smoking	57	38
Gender	N	%
Female	78	52%
Male	72	48%
Residence	N	%
Rural	69	46%
Urban	81	54%
	N	%
DM	39	26%
HTN	33	22%
	N	%
Socioeconomic Level Low	24	52%
Middle	54	36%
High	72	12%
	N	%
Level of Education Illiterate (uneducated)	9	6%
Low	90	60%
High	51	34%

DM: Diabetes mellitus, HTN: Hypertension

Table (2): Correlation of Clinical scores with each other among the studied patients.

	VAS		WOMAC		WPAI	
	r	P	r	p	r	p
Mini-HKOAQoL score	0.543	**<0.001**	**0.736**	**<0.001**	**-0.416**	**0.013**
WOMAC score	0.655	**<0.001**	--	--	--	--
WPAI score	0.057	0.696	**-0.372**	**0.022**	--	--

WOMAC: Western Ontario and McMaster Universities Osteoarthritis, HKOAQoL: health-related quality of life, WAPI: Work Productivity and Activity Impairment.

Table (3): Association and correlation between WPAI score and disease characteristics among the studied patients.

	All patients (n=150)	P
	Mean ± SD	
Gender		
Female (n=78)	69.62 ± 20.1	0.419
Male (n=72)	67.08 ± 20.74	
Residence		
Rural (n=69)	73.48 ± 16.13	0.077
Urban (n=81)	64.1 ± 22.58	
Smoking		
No (n=93)	68.39 ± 21.15	0.722
Yes (n=57)	68.42 ± 19.23	
DM		

	Mean ± SD	P
No (n=111)	68.11 ± 19.27	0.779
Yes (n=39)	69.23 ± 23.62	
HTN		
No (n=117)	60.91 ± 21.19	0.137
Yes (n=33)	70.51 ± 19.73	
Socioeconomic		
Low (n=24)	63.34 ± 19.54	**0.039**
Middle (n=54)	70.46 ± 22.44	
High (n=72)	76.51 ± 23.71	
Education		
Illiterate (n=9)	64.42 ± 18.26	**0.026**
Secondary (n=90)	70.83 ± 20.45	
University (n=51)	79.55 ± 21.86	
Work stress		
No (n=59)	65.21 ± 22.76	**0.002**
Yes (n=91)	76.35 ± 19.24	

	WPAI score	
	R	P
Age	-0.162	0.261
BMI	**-0.156**	**0.028**
Disease duration	-0.054	0.709
Mini-HKOAQoL score	**-0.416**	**0.013**
WOMAC score	**-0.372**	**0.022**
VAS	0.057	0.696
K-L grades	**0.302**	**0.038**

DM: Diabetes mellitus, HTN: Hypertension, BMI: body mass index, VAS: Visual analogue scale, WOMAC: Western Ontario and McMaster Universities Osteoarthritis, HKOAQoL: health-related quality of life, K-L: Kellgren/Lawrence.

Table (4): Association and correlation between Mini-HKOAQoL score and disease characteristics among the studied patients**.**

	All patients (n=150)	P
	Mean ± SD	
Gender		
Female (n=78)	43.92 ± 18.99	0.587
Male (n=72)	42.1 ± 21.89	
Residence		
Rural (n=69)	42.66 ± 19.47	0.832
Urban (n=81)	43.37 ± 21.24	
Smoking		
No (n=93)	44.13 ± 16.98	0.588
Yes (n=57)	42.38 ± 22.25	
DM		
No (n=111)	47.27 ± 11.41	**0.043**
Yes (n=39)	41.56 ± 22.49	
HTN		
No (n=117)	43.59 ± 17.44	0.847
Yes (n=33)	42.89 ± 21.17	
Socioeconomic		
Low (n=24)	26.38 ± 18.63	**0.006**
Middle (n=54)	40.03 ± 17.39	

	Mean ± SD	
High (n=72)	50.89 ± 19.35	
Education		
Illiterate (n=9)	18.23 ± 19.5	
Low (n=90)	41.91 ± 18.41	**0.001**
High (n=51)	49.42 ± 20.44	
Work stress		
No (n=59)	48.94 ± 16.46	**0.009**
Yes (n=91)	35.27 ± 19.53	

	Mini-HKOAQoL score	
	r	P
Age	0.031	0.832
BMI	**0.202**	**0.0159**
Disease duration	0.067	0.642
WOMAC score	**0.736**	**<0.001**
WPAI score	**-0.416**	**0.013**
VAS	**0.543**	**<0.001**
K-L grades	**0.348**	**0.031**

DM: Diabetes mellitus, HTN: Hypertension, BMI: body mass index, VAS: Visual analogue scale, WOMAC: Western Ontario and McMaster Universities Osteoarthritis, HKOAQoL: health-related quality of life, K-L: Kellgren/Lawrence, WAPI: Work Productivity and Activity Impairment.

Table 1: Association and correlation between WOMAC score and disease characteristics among the studied patients.

	All patients (n=150) Mean ± SD	P
Gender		
Female (n=78)	48.58 ± 13.65	0.336
Male (n=72)	43.71 ± 12.43	
Residence		
Rural (n=69)	48.09 ± 14.15	0.592
Urban (n=81)	44.67 ± 12.34	
Smoking		
No (n=93)	47.16 ± 13.53	0.515
Yes (n=57)	45.68 ± 13.15	
DM		
No (n=111)	48.62 ± 13.81	0.492
Yes (n=39)	45.41 ± 13.04	
HTN		
No (n=117)	45.91 ± 11.81	0.994
Yes (n=33)	46.33 ± 13.68	
Socioeconomic		
Low (n=24)	39.32 ± 9.34	**0.008**
Middle (n=54)	44.86 ± 12.52	
High (n=72)	48.59 ± 13.18	
Education		
Illiterate (n=9)	41.1 ± 3.01	**0.012**
Low (n=90)	44.75 ± 9.38	
High (n=51)	48.53 ± 7.74	
Work stress		
No (n=59)	48.88 ± 13.53	**0.001**
Yes (n=91)	41.31 ± 12.49	

	WOMAC score	
	R	P
Age	0.100	0.489
BMI	**0.101**	**0.048**
Disease duration	0.053	0.714
Mini-HKOAQoL score	**0.736**	**<0.001**
WPAI score	**-0.372**	**0.022**
VAS	**0.655**	**<0.001**
K-L grades	**0.287**	**0.042**

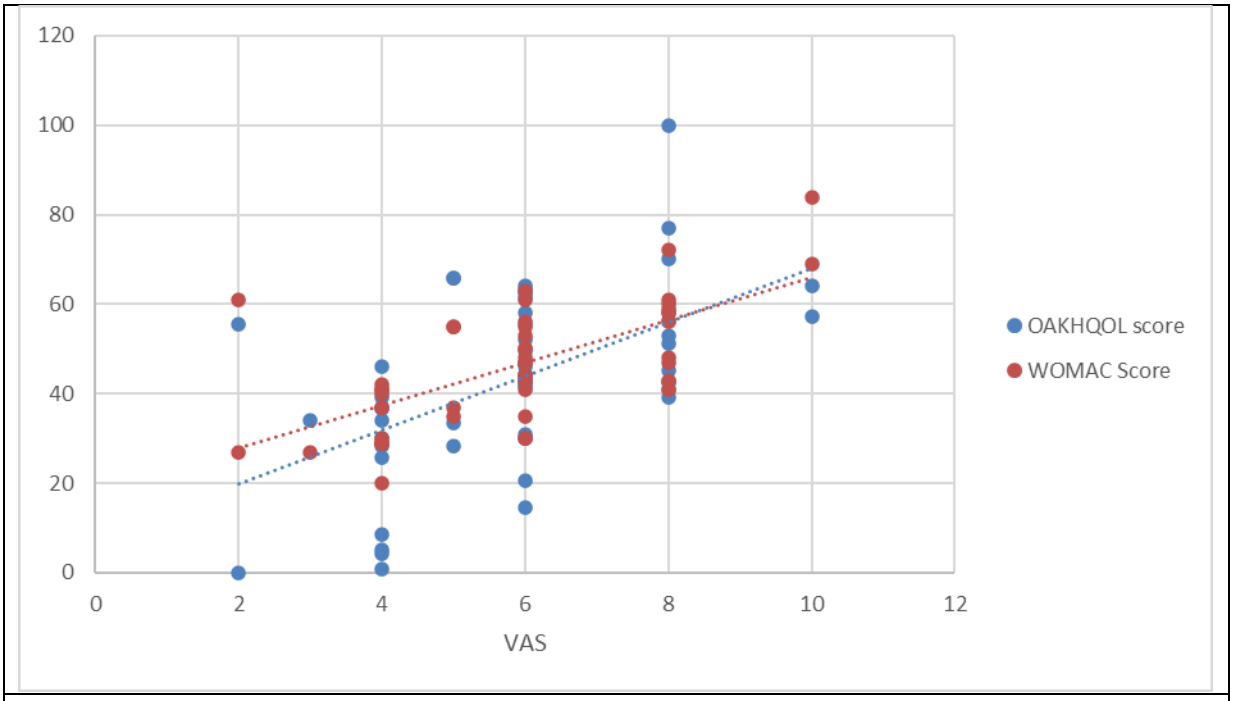
DM: Diabetes mellitus, HTN: Hypertension, BMI: body mass index, VAS: Visual analogue scale, WOMAC: Western Ontario and McMaster Universities Osteoarthritis, HKOAQoL: health-related quality of life, K-L: Kellgren/Lawrence, WAPI: Work Productivity and Activity Impairment.

Table 6: Association and correlation between K-L grades and disease characteristics among the studied patients.

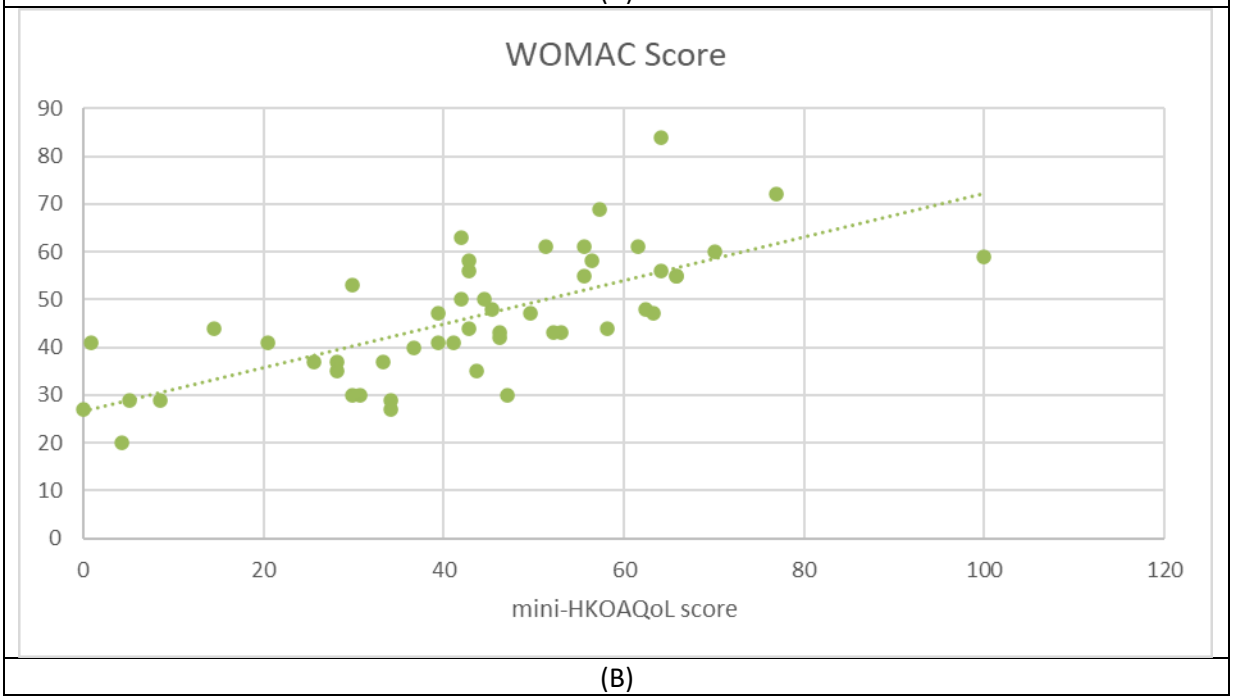
	All patients (n=150)				P
	Grade 1	Grade 2	Grade 3	Grade 4	
Gender					
Female (n=78)	9 (25%)	21 (43.8%)	42 (82.4%)	6 (40%)	**0.015**
Male (n=72)	27 (75%)	27 (56.2%)	9 (17.6%)	9 (60%)	
Residence					
Rural (n=69)	6 (16.7%)	21 (43.8%)	36 (70.6%)	6 (40%)	0.068
Urban (n=81)	30 (83.3%)	27 (56.2%)	15 (29.4%)	9 (60%)	
Smoking					
Yes (n=57)	15 (41.7%)	20 (41.7%)	13 (41.7%)	9 (60%)	0.074
No (n=93)	21 (58.3%)	28 (58.3%)	38 (58.3%)	4 (40%)	
DM					
No (n=111)	6 (16.7%)	18 (37.5%)	12 (23.5%)	3 (20%)	0.147
Yes (n=39)	30 (83.3%)	30 (62.5%)	39 (76.5%)	12 (80%)	
HTN					
No (n=117)	15 (41.7%)	6 (12.5%)	6 (11.8%)	6 (40%)	0.137
Yes (n=33)	21 (58.3%)	42 (87.5%)	45 (88.2%)	9 (60%)	
Socioeconomic					
Low (n=24)	3 (8.3%)	6 (12.5%)	9 (17.6%)	6 (40%)	**0.001**
Middle (n=54)	18 (50%)	18 (37.5%)	9 (17.6%)	9 (60%)	
High (n=72)	15 (41.7%)	24 (50%)	33 (64.7%)	0	
Education					
Illiterate (n=9)	4 (11.1%)	3 (6.2%)	2 (3.9%)	0	**0.008**
Low (n=90)	18 (50%)	21 (43.8%)	38 (74.5%)	13 (86.7%)	
High (n=51)	14 (38.9%)	24 (50%)	11 (21.6%)	2 (13.3%)	
Work stress					
Yes (n=91)	23 (63.9%)	35 (72.9%)	28 (54.9%)	5 (33.3%)	**0.035**
No (n=59)	13 (36.1%)	13 (27.1%)	23 (45.1%)	10 (66.7%)	

	K-L grades	
	R	P
Age	0.098	0.531
BMI	**0.127**	**0.041**
Disease duration	0.201	0.299
Mini-HKOAQoL score	**0.348**	**0.031**
WOMAC score	**0.287**	**0.042**
WPAI score	**0.302**	**0.038**
VAS	0.148	0.305

DM: Diabetes mellitus, HTN: Hypertension, BMI: body mass index, VAS: Visual analogue scale, WOMAC: Western Ontario and McMaster Universities Osteoarthritis, HKOAQoL: health-related quality of life, K-L: Kellgren/Lawrence, WAPI: Work Productivity and Activity Impairment



(A)



(B)

Figure (1) (A): Correlation between VAS Score and both mini-KHOAQOL Score and WOMAC Score. **(B):** Correlation between WOMAC Score and mini-KHOAQOL Score.

DISCUSSION

OA can be debilitating, limiting a person's capacity to go about their daily lives and succeed at work. The high expense of therapy, the frequency of doctor's appointments, and other medical interventions all contribute to a poor quality of life for patients (QoL); having the potential to foretell death and illness. The functional impact of KOA is crucial and may be measured by many metrics; it has a considerable negative influence on functioning, poor health related quality of life (HRQoL) for the patient,

and his socioeconomic status [12]. In this study we demonstrated that age of the study population ranged from 48 – 60 years with mean BMI was 34.26 kg/m2 and (52%) of them were females while 54% were urban. The present study agreed with Gazar *et al*. [13] as the average age of OA patients was 47.6 ± 6.3 years, and their ages range from 35 to 62 years. The majority of patients have been women (88 percent). In line with our findings, Abd Elstaar *et al*. [14] studied 116 patients diagnosed with primary knee OA; of these, 86 were female (74.1%) and 30 were male (24.9%). The average age of the people who were part in the study was 51.37 ± 8.85 years.

In this study we illustrated that 26% of the cases had DM and 22% of the cases were hypertensive, 12% of the patients had a high socioeconomic level while 36% of the patients had a middle socioeconomic level and 52% had a low socioeconomic level, 34% of the patients had a higher education level (university) while 60% of the patients had low education level, and 6% were illiterate.
The present study findings disagreed with Abd Elstaar *et al*. [14] who found that among the patients surveyed, 49.1% had high sociodemographic characteristics, 35.3% had middle-class characteristics, and 15.5% had low-class characteristics. While we agreed with Araujo *et al*. [15] as Forty-five percent had completed primary school or less in their educational background.

In this study we found that mean of disease duration was 5.56 ± 3.38 and (26%) of them had right knee affected, 22% had left knee affected while 52% were bilateral affected, 100% had knee affected while 20% had hip affected. In this study we cleared that according to Kellgren-Lawrence Grades, 24% of the patients were grade 1, 32% of the patients were grade 2, 34% were grade 3, and 10% were grade 4. As our study has mean relatively young age and the disease still in its early stages. The present study results were not in concordance with Araujo *et al*. [15] who found that in terms of the severity of the arthrosis, the patients were distributed as follows: 8 (8.6%), 19 (20.4%), 17 (18.3%), 30 (32.3%), and 19 (grade V) (20.4 percent).

In this study we illustrated that mean total Mini-OAKHQoL score was 43.1 ± 20.24, mean Physical activities was 46.8 ± 12.21, mean Mental health was 24.42 ± 6.82, mean Pain was 16.2 ± 6.41, mean social support was 11.98 ± 5.12, mean social functioning was 11.54 ± 3.58 and mean sexual activity was 6.42 ± 2.58. These results were in line with Mahmoud *et al*. [16] as they found that with a total score of 56.54 ± 11.7, the normalized OAKHQoL questionnaire revealed that the pain domain had the lowest and poorest score at 49.8 ± 15.4, while the mental health domain had the highest score at 60.1 ± 8.2.

In this study we demonstrated that mean total WOMAC score was 46.24 ± 13.18, mean of pain was 12.22 ± 4.1, mean of stiffness was 2.16 ± 1.46 and mean of physical function was 31.86 ± 8.82. Also, Gazar *et al*. [13] found that twelve plus or minus three points is the WOMAC overall pain score, and seventy-five percent of their patients have reported severe WOMAC pain. In this study we illustrated that mean WPAI score was 68.4 ± 20.24, Work time missed due to health was 36.7 ± 32.75, mean Impairment while working due to health was 47.7 ± 27.18 and Overall work impairment due to health was 56.0 ± 30.31. These results were in agreement with Östlind *et al*. [17] as they found that workplace absenteeism and impairment (WPAI: OA) was low, although presenteeism and impairment were more prevalent.

In this study we found that mean VAS was 5.86 ± 1.83. Also, Gazar *et al*. [13] found that A pain VAS average of 6.95± 0.97 was found. No patient reported minor pain; instead, the intensity of the pain ranged from moderate (29% to 71%). In this study we demonstrated that there were significant associations between WPAI score with BMI, socioeconomic, education, and work stress. While we didn't find significant association between WPAI score with age and disease duration as our cohort study has mean short duration and mean relatively young age. Our findings that education was the sole socio-demographic or health-related variable that differentiated between groups were corroborated by Nakata *et al*. [4]. Particularly, higher levels of education were associated with a smaller proportion of presenteeism ($p = 0.017$). In this study we found that there was a negative significant correlation between WPAI with mini-HKOAQoL score and WOMAC score. This was in agreement with Gupta *et al*. [18] who revealed that the main cause of the higher work impairment among employees with OA pain compared to those without the pain was presenteeism, with 34.4% versus 17.8% of the workforce experiencing impairment as a result (impaired activity while at work).
Consistent with our findings, Kiadaliri *et al*. [19] found that baseline pain was the strongest indicator of results showed a favorable and

statistically significant relationship between Mini-HKOAQoL and WOMAC, VAS, and K-L grades. In contrast to us Mahmoud *et a*l. [16] found that lower HKOAQoL scores are associated with K-L grade 3.

In this study we demonstrated that there were significant positive correlations between WOMAC score with Mini-HKOAQoL score, WPAI score, VAS, and K-L grades. Also, Gazar *et al*. [13] agreed with us that The VAS pain score and the WOMAC pain score showed a moderate connection (r=0.472, p<0.0001). The present study findings were in line with Bernad *et al*. [20] who suggested that the three dimensions of the WOMAC questionnaire—pain, stiffness, and functional capacity—are most affected by the Kellgren/Lawrence scale of radiological OA degrees and the Timed Up & Go test, which objectively measure joint damage and functional capacity, respectively. This is also true for patients with OA in the hip and knee.

In this study we found that there were positive significant correlations between K-L grades with Mini-HKOAQoL score, WOMAC score, and WPAI score. Similar to us, Muraki *et al*. [21] found that when comparing patients with OA and KL grade 3 or 4, the physical quality of life was found to be significantly lower on the SF-8 and the pain domains of the WOMAC. On the other hand, when comparing patients with OA and KL grade 0 or 1, mental quality of life was higher on the SF-8 and measured by the mental component summary score. In agreement with our findings, Nikolic *et al*. [22] found that patients whose Kellgren-Lawrence scores were higher (3 or 4) were younger ($p < 0.001$), had a significantly higher body mass index ($p < 0.004$), and had a significantly longer illness duration ($p < 0.001$) compared to patients whose scores were lower (1 or 2). The late-stage group also had significantly higher VAS scores ($p < 0.002$), pain/discomfort EQ-5D subscores ($p < 0.001$), WOMAC pain ($p <0.041$), and function subscores ($p < 0.005$).

In this study we illustrated that there is a significant association regarding Mini-HKOAQoL score and DM, Socioeconomic, education, and work stress. Kawano *et al*. [23] agreed with us that in the domains of functional ability and functional limitations of the Mini-HKOAQoL score, there was a statistically significant difference according to the typical level of education. Patients with higher levels of education had better scores. The functional capacity domain Mini-HKOAQoL score also differed significantly between groups according to occupational characteristics (active vs. retired) and OA severity (mild, moderate, or severe). In another study, Jhun *et al*. [24] agreed with us that having OA and a poor quality of life are both increased by up to twofold in those with a low level of education. Manual labour or other forms of repetitive physical labour are common among those with lower levels of education, claim these writers. However, he came to the opposite conclusion as us in the same study: a correlation between mini-HKOAQoL score and female gender, obesity, and age over 60. In this study we found that there were significant associations between WOMAC score with socioeconomic, education, work stress and body mass index. Bernad *et al*. [20] agreed with us that Patients with knee and hip OA showed a clear correlation between body mass index and stiffness, perhaps because joint function is worse in overweight individuals, and patients' perceptions of pain were inversely and significantly influenced by their level of education. Kawano *et al*. [23] agreed with us that there was a statistically significant association between WOMAC score and the characteristic level of education (patients with more education had better score) in the areas of pain.

In this study we illustrated that there was a significant association between K-L grades and sex, socioeconomic, education, and work stress. Kumar *et al*. [25] agreed with us that the degree of physical exercise at work was significantly related to K-L grades. A p-value that was statistically significant further demonstrated the same (0.007) There may be a correlation between the higher prevalence of obesity in women and OA in women.

Limitations:

Some limitations are imposed by our research. The study was not intended to be a follow-up but rather a cross-sectional analysis. The limited ability to generalize the results may also be a consequence of the tiny sample size. In order to rule out any confounding factors, it is necessary to use a broad sample that includes people from both urban and rural areas. This study used the x-ray-based K-L scale as its diagnostic criterion

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CONCLUSION

While OA pain is more commonly associated with the elderly, it affects underrecognized proportion

of the working population. Presence of OA pain could have a great impact on the quality of life of working patients and their work productivity. We found association between grades of OA and quality of life of working patients. workers with OA pain reported significantly reduced quality of life across both physical activities and mental health, so it affects their work and daily activities. Notably, this study showed a higher prevalence of presenteesim than absenteeism, as high percentage of worker with OA are low socioeconomic level and in need of work. Although, presenteeism rate is high but the overall work impairment is high because workers with OA find difficulties to perform their work due to severe pain. We recommend providing working patients with proper management and early intervention, so they can perform their work perfectly and therefore increase work productivity and improve their quality of life.

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