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ORIGINAL ARTICLE

DAILY FATIGUE AMONG PATIENTS WITH OSTEOARTHRITIS: A CROSS-SECTIONAL STUDY

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Summary

Background and Aim: Osteoarthritis is a degenerative chronic disease that affects the joints, it is strongly associated with age and affects the quality of life and fatigue in addition to its associated pain, stiffness, and loss of mobility. This study aimed to evaluate the daily fatigue score among patients with osteoarthritis.
Methods: A cross-sectional descriptive study was conducted among patients with osteoarthritis who were invited from three Rheumatology clinics. The fatigue scale (FACIT version) was used in addition to biochemical data collected from patients' records.
Result: A total of 370 patients were included in the final data analysis and a negative significant relationship between fatigue score with age, BMI, duration of the disease, and ESR ($P<.0.05$) were found. Significant differences in the fatigue scores were also found between groups of gender, glucosamine previous use, and former steroid injection.
Conclusion: The severity of fatigue among osteoarthritis patients was higher in females than males. The medication used either analgesics or supplements for the patients with OA was not significant to improve the severity of fatigue. The severity of fatigue was more common in groups of patients that had one co-morbid than the patients who had more than one co-morbid.

Key words: Osteoarthritis; Vitamin D; Steroid; Hyaluronic acid; Glucosamine; fatigue scale

Introduction

OA is a degenerative joint disease that involves the degradation of joints, articular cartilage, and subchondral bone as a result of mechanical stress on the area (1). OA is one of the more common types of arthritis that affected the musculoskeletal and leads to functional decline with loss of quality of life, causing fatigue and tiredness. OA is estimated that approximately 250 million people are affected by osteoarthritis of the knee, comprising 3.6% of the global population (2, 3).

OA often leads to pain, stiffness, disability, and loss of mobility in the affected joints. The long-term disability and pain associated with OA reduce the quality of life and increase fatigue which are the common problems of OA (4). It is strongly associated with aging, the disease affected many joints, such as hips, knees, spines, hands, and feet. Hip and knee osteoarthritis are most significant because of the association between pain and disability (5, 6).

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Fatigue is a significant constituent of health-related quality of life and it is more prevalent among many patients with chronic inflammatory arthritis diseases with approximately (47%) of the persons with OA suffering fatigue (7).

Fatigue refers to a progressive loss of the ability to generate maximum force during (or after) a particular activity, which is more common in older people (8). It can also be defined as the unpleasant feeling associated with tiredness, loss of energy, and exhaustion and is a result of the complex interaction of biological function, cognitive activity, and behavior; it affects both physical activity and mental activity, resulting in depression, insomnia, and poor social interactions (4).

Fatigue was described by participants as exhaustion, being tired, and coming up against a brick wall. Fatigue affected sleep quality. Numerous factors contribute to fatigue in patients with OA, such as osteoarthritis pain, pain medications, aging, weather, and poor sleep (9). Their mental health was affected by ted whether they felt fatigued at their mood was affected by fatigue. Fatigue interfered with physical functioning, including their ability to participate in social activities and other usual daily activities (such as household chores) (10). This study aimed to evaluate the daily fatigue score among patients with OA and its associated factors.

Patients and Methods

This study is designed to be a cross-sectional descriptive study with suitable cases among patients invited from the three Rheumatology clinics in the following hospitals (Ibn-Seena Teaching Hospital, Al - Jumhory Teaching Hospital, Al-Salam Teaching Hospital) respectively. The clinics were visited weekly starting from Sunday for Ibn-Seena, Monday for Al-Jumhory, and Tuesday for Al-Salam, then restart the cycle from Wednesday and continued in this manner for the whole period of data collection. A total sample of 370 participants aged 40 years and older were successively included. The data collection was continued from 1-12 2021 until 31-3-2022.

Research instruments

The data collection form consisted of personnel with demographic and socioeconomic information, comprehension of the OA symptoms, and fatigue scale. The diagnosis of the patients was performed by the specialist rheumatologist in the above-mentioned clinics without interference from the researcher. However, OA diagnosis was determined and confirmed using the American College of Rheumatologists' Criteria, in addition to the Kellgren-Lawrence Grading Scale on standing anteroposterior images (11).

The data collection was personal with demographic information, the fatigue scale of OA patients, and biochemical data. The demographic part was collecting some basic information in addition, to basic information about the disease like the duration of the disease, the number of consulting visits, diseases that are concurrent with OA, and previous medication used to treat OA.

Functional Assessment of Chronic Illness Therapy (FACIT) (12,13) Fatigue Scale (Version 4) is an ordinary self-report questionnaire to evaluate fatigue. It consists of a short, 13-item, easy-to-administer tool that measures a person's level of fatigue during their usual daily activities over the past week. The phase of fatigue is measured on a four-point Likert scale (4 = not at all fatigued to 0 = very much fatigued). The FACIT scale is one of many different FACIT scales that are part of a group of Health-Related Quality of Life (HRQOL) questionnaires aimed at the treatment of chronic illness referred to as The FACIT Measurement System. A higher score on the fatigue scale (FACIT-version) means a better condition for patients (lower fatigue). Biochemical tests were carried out in three consulting hospitals in Mosul city. Uric acid, C-Reactive Protein (CRP), and Erythrocyte Sedimentation Rate (ESR) were evaluated.

Inclusion and exclusion criteria

Adults of both gender that were diagnosed with primary OA with or without gout were included in this study. Where the exclusion criteria included patients that were investigated for malignant disease, rheumatoid arthritis, septic arthritis, neurological disease, trauma, intraarticular fracture, meniscus and ligament injury, joint surgeries, Parkinson's disease, metabolic bone disease, degenerative disease, knee and hip replacement surgery, secondary OA, heart disease, liver failure and renal failure were excluded.

Statistical analysis

All data was statically tested by SPSS descriptive and inferential statics where be apply appropriately. The correlation between continuous groups was evaluated by the Spearman coefficient test. The difference between continuous groups and categories groups by Mann-Whitney test and Kruskal Wallis test.

Results

Socio-demographic characteristics

This study showed that OA was more common in females than in males, in which 301 (81.4%) out of 370 patients were female; in addition to that, most of the patients were married 276 (74.6%). Different medications were taken by patients 311 (84.1%) of participants used muscle relaxants, vitamin D was used by 349 (94.3%) of the patients, and Glucosamine was taken by 153 (41.4%). In addition to that, 158 (42.7%) of the patients were treated with intra-articular injection steroids, and 97 (26.2%) of them were previously treated with hyaluronic acid. Furthermore, patients with OA had taken muscle relaxants in 311 (84.1%) and 59 (15.9%) had not taken muscle relaxants. The co-morbid among patients with OA was 159 (43.0%) had one co-morbid where was 84 (22.7%) had more than one co-morbid as shown in Table 1.

Table 1. Socio-demographic characteristics of the study participant (N=370).

Categorical variable	Frequency	Percent%
Gender		
male	69	18.6
female	301	81.4
Marital status		
married	276	74.6
single	14	3.8
divorced	4	1.1
widow	76	20.5
Steroid injection. (n=158)		
taken	158	42.7
not taken	212	57.3
Vitamin D supplement (n=349)		
taken	349	94.3
not taken	21	5.7
Hyaluronic acid in. (n=97)		
taken	97	26.2
not taken	273	73.8
Glucosamine (n=153)		
taken	153	41.4
not taken	217	58.6
Taken muscle relaxant or not taken (n=311)		
take muscle relaxant	311	84.1
not take a muscle relaxant	59	15.9
Co-morbidity		
had co-morbid	243	65.7
had not co-morbid	127	34.3

Difference between fatigue score study parameters

In this study, the FACIT version scale was (12, 13) used to assess fatigue in patients with OA, consisting of 13 questions, each with five choices. The total score of the fatigue scale after calculated according to the standard method of its calculation. the mean of the fatigue score was 24.68 ± 9.33 and the median was 24.00. To examine the relationship between the fatigue score (FACIT-version) scale and age, BMI, duration of the OA, uric acid, and ESR,

the Spearman coefficient test was used. A negative significant relationship between fatigue score and age, BMI, duration of the disease, and ESR ($P<.0.05$). Also, regarding the relationship between the fatigue scores and the demographic characteristics of the patients, non-parametric statistical tests to find differences in fatigue scores between independent groups were used (Mann-Whitney test). Significant differences in the fatigue scores were found with gender, the severity of the fatigue was more in females than males. Glucosamine shows significant differences with fatigue scores that patients were not taken glucosamine had less severity of fatigue compared with those who had taken glucosamine. In addition, intra-articular steroid injection and muscle relaxant drugs show a significant effect that patients with had not taken steroid and muscle relaxants respectively, with less severity of fatigue compared with patients who had taken steroid injection and muscle relaxant drugs. Furthermore, patients with OA show significance with co-morbid, where the patients without co-morbid had less severity of fatigue compared with patients who had co-morbid. Table 2 shows the difference in fatigue scores with demographic characteristics.

Table 2. Difference between fatigue score with demographic characteristics.

Variables		Mean ±SD	*P* value
Age*		56.6 ± 10.54	**0.039**
BMI		32.66 ± 6.10	**0.020**
duration of disease		4.68 ± 5.13	**0.014**
uric acid		21.25 ± 51.39	0.814
ESR		23.79±13.0	**0.018**
gender**	Male	29.60 ± 9.98	**≤0.05**
	Female	23.55 ± 8.81	
CRP	Positive	25.04 ± 8.67	0.900
	Negative	24.62 ± 9.44	
vitamin D	Taken	24.58 ± 9.20	0.417
	Not taken	26.23 ± 11.37	
glucosamine	Taken	23.19 ± 8.60	**0.019**
	Not taken	25.72 ± 9.69	
steroid injection	Taken	23.37 ± 8.69	**0.031**
(intra-articular in.)	Not taken	25.65 ± 9.68	
hyaluronic acid	Taken	23.25 ± 8.95	0.079
(intra-articular in.)	Not taken	25.18 ± 9.42	
muscle relaxant	Taken	24.17 ± 9.37	0.010
	Not taken	27.37 ± 8.70	
co-morbidity	Had co-morbid	23.50 ± 9.06	**0.001**
	Had not co-morbid	26.92 ± 9.46	

*Spearman coefficient test** Mann Whitney test

Discussion

OA is a chronic degenerative disease that not only affects the QoL but is also one of the chronic diseases that may cause fatigue. The FACIT version scale was used to assess fatigue in patients with OA who participated in this study, the fatigue can be described by fatigue, weakness in the body, tiredness, lethargy, need for help in daily activity, and sleep quality. Many articles show that OA is the most common disease associated with fatigue (14-16).

The study of fatigue in older adults found that patients with OA were four times more likely to have more fatigue than people without OA (4). Fatigue was associated with age, pain, stiffness of joints, pain medication, and poor sleep. In this study, a correlation between age and the fatigue score shows a significant relationship with (*p-value* 0.0.39). In 2008 USA (17), the author's concert study shows a significant relationship between fatigue and age for both genders. Logically fatigue increases with growing old. As people with increased age, the joints become stiffer and less flexible due to the quantity of fluid in the joints being reduced and the cartilage becoming thinner. In addition to that people growing old may develop certain chronic diseases such as heart disease, diabetes mellitus, and even OA, all the chronic diseases cause fatigue (14, 18).

The BMI was one of the risk factors for developing and progressing OA, also obesity caused fatigue in patients with OA (19). In this study, a significant relationship showed between the fatigue score and BMI which illustrated that being overweight and obese was associated with fatigue. A study in the USA in 2012 (20) showed a significant relationship between BMI and fatigue in patients with OA, and also both studies in the USA in 2009 (17) and 2006 at Kentucky College of Medicine (21), performed a significant correlation between fatigue and BMI. However, obesity not only affects joints but also affects heart work, metabolic pathways, and quality of sleep as sleep apnea or other sleep problems, resulting in daytime fatigue. Also, Lack of exercise, using extra energy to move more body weight and metabolic changes that often accompany obesity also contribute to fatigue. Obese people especially when associated with OA had difficulties in daily life and became tired in doing physical activity, daily function status, and mobility inside and outside the home.

The duration of OA was another impact factor for the progression of fatigue in patients with OA, the significant relationship between fatigue and duration of OA. No studies were available to illustrate the relationship between the duration of OA and fatigue. However, the longer the suffering and duration of the OA, the chance or probability of fatigue increases due to the severity of the OA growing time may increase as pain, stiffness, and other symptoms affect daily activity, function status, sleep quality, and even to social life.

Both biochemical data obtained from this study include uric acid and ESR and when correlated with fatigue score show that ESR had a significant relationship with fatigue score in contrast with uric acid had a non-significant relationship with fatigue score. On the other hand, a study in Japan 2016 (22), perform that ESR was slightly evaluated in OA. Where a study in Bangkok 2014 (23), shows that ESR is not elevated in patients with OA. The ESR was the biochemical marker for the inflammation, although OA is not an inflammatory disease and the serum maker of inflammation was not elevated in patients with OA, the ESR may be elevated in case of the tenderness of the OA joint which means the inflammation of the joints that patients sever from pain, tenderness, and stiffness with edema that all these lead to limitation in the movement, or performance of the daily functional activity and that may lead to feeling fatigue and tired.

As the result from this study shows OA was more common in females than males with significant differences between gender and the fatigue score. Several studies in Canada 2010 (24), also in Australia 2019 (25), and Norway 2020 (26) show a significant difference between gender and the fatigue score. Nevertheless, gender was related to the OA through the females having more susceptibility to OA than males and the female had more severe fatigue compared to the male due to many reasons related to the nature of the hip joint and also hormonal change, especially in menopausal females. In addition to that, the female may need additional health care, because of clinical pain and inflammation, reduced cartilage capacity, daily physical and functional difficulty, and smaller joint parameters and size as compared to males, therefore the OA is more common in females than males and logically the severity of fatigue can increase (27). The glucosamine showed a significant relationship with fatigue score, that the patients with OA who no take glucosamine had less severity of fatigue than patients who take glucosamine. A study shows the benefit of using glucosamine treatment the patients with OA (28). Also study in China 2022 (29), illustrated the efficacy of the combination of both glucosamine and Chondroitin in the treatment of OA. Moreover, other studies in 2012 (30), and 2018 (31), suggested the rationale for using glucosamine was unknown or showed small and arguably clinically non-significant management effects. Glucosamine had no clinically important effects on pain and function at medium-term and long-term follow-ups. Although it may delay the development of OA especially knee OA for long-period but still it efficacy uncertain(32). In addition to that the duration of treatment, type of salt used in its preparation, bioavailability, and structure efficacy (33) must be considered in the determination of the benefit of the glucosamine, and this is not available in the Mosul hospitals.

Although the significant difference between the fatigue score and the inter-articular steroid injection. Many of the studies (34, 36) illustrated the effect of the steroid as an inter-articular injection in treated OA. The steroid injection was effective in decreasing pain, stiffness, redness, and inflammation and improving the physical activity, function status of the patients, improved mobility another study in 2020 (37), perform the uncertain efficacy of the steroid injection in treated patients with OA in the time not exceed the six months(38). Since the treated patients with steroid for a long-time lead to damage to the joints and even bone and may badly progression of OA, the inappropriate and long time of using a steroid for patients with OA in the Mosul community may consider the main cause of the OA which not only progression of OA but also damage the joints.

The muscle relaxant is given for short-range use to treat acute, painful musculoskeletal conditions. And some time prescribed that used to decrease pain associated with OA and contraindications of using another analgesic (39).

The co-morbid of patients with OA shows a significant relationship with fatigue scores among a group of patients, that the severity of fatigue increases among patients with co-morbid than patients without any co-morbid. A study in Canada 2010 (24), shows a non-significant relationship between fatigue and co-morbid. Since co-morbid was another factor that can develop or progress fatigue in patients with OA. Chronic disease needed drug treatment forever and the drug itself causes side effect that with time may lead to other problems as diuretic was the main cause of gouty arthritis with an increased chance of fatigue. Furthermore, the NSAIDs (40) used in the management of OA causes adverse effect, especially in patients with heart disease, kidney disease, and gastric-intestinal disease.

Limitations of the study

The study was a cross-sectional study; which limit the generalization of the findings to the entire Mosul population. However, the sample size was 370 patients who participated in this study could represent all OA patients managed in the three rheumatological hospitals. The patients who participated in the study were only from the government hospital and not a private clinic, therefore the severity of fatigue may be confined only to these groups of patients. Those patients may suffer from less severe fatigue due to many of them may be higher education, the financial situation being good, and generally having a good life. Also, the three hospitals that were visited specialized rheumatology consultations, and no other hospital or general health centers. Since the specialized rheumatology consultation is more specific in the diagnosis and treatment of patients with OA. Each hospital was visited one day weekly due to the pandemic of covid-19.

Conclusion

OA is one disease that commonly affects life and is the main cause the fatigue. The FACIT version scale was significant and valid for detecting fatigue among a group of patients with OA. The BMI, age and gender were important factors to increase the development of fatigue in patients with OA. The severity of fatigue among OA patients was higher in females than males. The medication used either analgesic as a muscle relaxant or a supplement as glucosamine and intra-articular steroid injection for the patients with OA is not significant to decrease the severity of fatigue in the group of patients with OA. The severity of fatigue was more common in groups of patients that had one co-morbid than the patients of having more than one co-morbid.

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Conflict of interest

The authors declare no conflict of interest concerned in the present study.

Adherence to Ethical Standards

The study was approved and recorded by the Ministry of Health/Ninevah Health Directorate (Ref. 43996 on the 7th Dec. 2021).

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