ASSESSMENT OF RISK FACTORS AND SEVERITY OF OSTEOARTHRITIS AMONG PATIENTS ATTENDING ALHADA MILITARY HOSPITAL-TAIF-SAUDI ARABIA

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Abstract

Background: Osteoarthritis (OA) is a degenerative disease that affects joint and causes cartilage loss and thinning. Literature reviews for OA prevalence and incidence are limited due to difficulties in determining and understanding its onset. Worldwide, it is estimated that 18% of women and 9.5% of men ≥ 60 years have OA symptoms. In Saudi Arabia, there are a limited number of OA studies.

Objective: This study was aimed to assess OA risk factors and severity among patients.

Methods: We conducted a case control study from October to December 2017 at ALHADA Military Hospitals-TAIF-Saudi Arabia. To assess OA severity, we used a validated questionnaire, which was The Western Ontario and McMaster universities Osteoarthritis Index. This scale was used to classify OA severity into moderate and severe.

Results: All the 98 OA patients were over 70 years old. Their mean weight was 96 kg, mean height was 164 cm, and the mean BMI was 35.5 kg/m2. The males represented 42.9% of the group. 29.6% of the participants were smokers. Fifty-seven percent of the participants said that they have family history of OA, and 18.4% said that they had history of trauma to the lower limbs. 69% of them presented with moderate OA while 31% had severe OA.

Conclusion: With the aging of the population throughout the world, the health professions must prepare for the large increase in the number of people with OA requiring health service. However, there are identifiable factors which can be targeted for prevention of disabling arthritic pain.

Keywords: *Osteoarthritis, risk factors and severity.*

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INTRODUCTION:

Osteoarthritis (OA) is a degenerative disease that affects joint and causes cartilage loss and thinning. It is a major cause of disability. The main complaint of patients with osteoarthritis is painful joints. Other complaints are joint stiffness and activity limitation (1). Literature reviews for OA prevalence and incidence are limited due to difficulties in determining and understanding its onset. Worldwide, it is estimated that 18% of women and 9.5% of men ≥ 60 years have OA symptoms (7). In England, about 1.3 to 1.75 million people have OA with an increasing percentage (10%–15%) among people >60 years having some degree of OA while in France, six million new cases are diagnosed each year (8). In the United States, >27 million individuals are affected by OA (9). In Saudi Arabia, there are a limited number of OA studies, so it is difficult to estimate the number of people with OA in Saudi Arabia.

OA has many risk factors that contribute to its course; one of them is the patient's age. There are many studies that have found the relationship between a patient's age and OA as it was shown that 27% of those aged 63 to 70 had radiographic evidence of knee OA, increasing to 44% in the >80 age group (2). Another risk factor for developing OA is obesity, which is a modifiable risk factor. The Chingford Study showed that for every two units increase in body mass index (approximately 5 kg), the odds ratio for developing radiographic knee OA increased by 1.36 (3).The Framingham Study found that men with a history of knee injury were at a 5- to 6-fold increase in the risk for OA development. Many other risk factors such as occupation, bone density, and diet will affect the prevalence and incidence of OA (4–6).

OA is usually diagnosed clinically and by radiological imaging, which are used to show many OA-associated pathological characteristics. X-ray images show osteophytes, joint space narrowing, bony cysts, and subchondral sclerosis (4), while ultrasound (US) is useful tool for visualization of soft tissues (5). Magnetic resonance imaging (MRI) has been used on various types of damage, occurring in joints such as meniscus tear, loss of thickness, and cartilage and bone marrow lesions (BMLs), which are associated with pain (6). There are many OA complications, which include chondrolysis, osteonecrosis, stress fractures, hemarthrosis, infections, and loss of joint stability.

Management of OA consists of two types: (1) non-pharmacological, which includes exercise (the most important intervention in OA management and body weight reduction (10, 11) and (2) pharmacological, which includes the non-steroidal anti-inflammatory drugs (NSAIDS), paracetamol, and acetaminophen (12).

There is an urgent need for the development of strategies to prevent osteoarthritis. Thus, risk factor assessment and identification early in life and through pre-geriatric ages are important steps and will be very helpful in the prevention of the disease and its complications. The aim of this study was to evaluate OA severity and to determine the factors that affect OA severity.

METHODS:

We conducted a case control study from October to December 2017 at rheumatology and orthopedic outpatient clinics of ALHADA Military Hospitals-TAIF-Saudi Arabia to assess OA risk factors and severity among patients. All cases >40 years old and known to have OA (determined via clinical examination or imaging) were invited to participate in this study. We excluded patients complaining of other joint diseases. The study proposal was submitted to Taif University School of Medicine Ethical Committee and was approved. All completed questionnaires were collected using an Excel spreadsheet and exported to the Statistical Package for the Social Sciences (SPSS) file.

The questionnaire included questions about the baseline characteristics such as sociodemographic data, family history of OA, and history of any chronic illnesses. Weight and height were self-reported by the participants, and body mass index (BMI) was calculated.

To assess OA severity we used a validated questionnaire, which was The Western Ontario and McMaster universities Osteoarthritis (WOMAC) Index. The WOMAC consists of 24 items divided into three subscales: (1) pain (five items); (2) stiffness (two items); and (3) physical function (17 items). Each item was scored on a scale of 0–4: (1) 0 for none; (2) 1 mild; (3) 2 moderate; (4) 3 severe; and (5) 4 extreme. The scores for each subscale are summed with a possible score range of 0 to 20 for pain, 0 to 8 for stiffness, and 0 to 68 for physical function. The severity of OA classification depended on the total WOMAC score: (1) asymptomatic joint disease when WOMAC scores were <7; (2) from 7 to 38 was considered mild/moderate; and (3) >39 was considered to be severe. Descriptive statistics were used to describe participants' answers in the study using numbers and percentages for categorical variables while mean and standard deviation were used for continuous variables. The comparison of

different factors between the moderate and severe groups is done using the chi-squared test. Statistical significance was set at p <0.05, and analysis was performed using IBM SPSS statistics, version 23 (IBM, Armonk, NY, USA).

RESULTS:

Patients with OA participated in this study. Their mean weight was 96 kg, mean height was 164 cm, and the mean BMI was 35.5 kg/m2 as shown in (Table 1).

Table No(1) summarizing the weight , height and BMI of participants

	N	Minimum	Maximum	Mean	Std. Deviation
Weight	98	72.0	123.0	96.000	8.1481
Heights	98	154.0	177.0	164.429	5.6769
BMI	98	27.0	43.5	35.5	2.9

53% the participants were over 70 years old. The males represented 42.9% of the group. 29.6% of the participants were smokers. The prevalence of chronic diseases among them was high and included diabetes (61.2%), 32.7% with hyperlipidaemia, and 27.6% with hypertension. Some of them had more than one chronic disease with 6% having diabetes, hyperlipidaemia, and hypertension.

Fifty-seven percent of the participants said that they have family history of OA, and 18.4% said that they had history of trauma to the lower limbs. Seven cases said that they are taking vitamin D, and only one case confirmed eating a basal diet. Some (29.6%) said that they had arteriovenous malformations, and 46.4% of the women (26 of the total 56 participants) said that they used contraceptive methods. (Table 2)

Table No(2) showing the characteristics of the participants in numbers and percentages (N=98)

		Frequency	Percent
Age	> 70	52	53.1
	50-60	9	9.2
	60-70	37	37.8
smoking	No	69	70.4
	Yes	29	29.6
sex	Female	56	57.1
	Male	42	42.9
Chronic diseases	Dm	22	22.4
	Dm, Htn	6	6.1
	Dm, Htn, Hyperlipidemia	6	6.1
	Dm, Hyperlipidemia	26	26.5
	Htn	15	15.3
	Nothing	23	23.5
DM	No	38	38.8
	Yes	60	61.2
Hyperlipidemia	No	66	67.3
	Yes	32	32.7
Hypertension	No	71	72.4
	Yes	27	27.6

Family history of OA	No	42	42.9
	Yes	56	57.1
tacking Vitamin supplements	No	89	90.8
	Yes, D vit	7	7.1
	missing	2	2
Having basal diet	No	95	96.9
	Yes	1	1.0
	missing	2	2
history of trauma to lower limbs	No	80	81.6
	Yes	18	18.4
Having AV malformations	No	69	70.4
	Yes	29	29.6
using contraception for women (n=56)	No	30	53.6
	Yes	26	46.4

Table No(3) showing summary of the scores of the patient.

	N	Minimum	Maximum	Mean	Std. Deviation
Pain	98	3	18	11.22	2.962
Stiffness	98	0	8	3.33	1.498
Physical Function	98	7	64	41.88	10.166
Total	98	13	88	56.43	13.705
Percentage	98	13.5%	91.7%	58.8%	14.3%

The calculated mean score of the pain dimension is 11.2 (out of 20), and the mean stiffness score was 3.3 (out of 8) while the mean score for physical function was 41.9 (out of 68). The mean total score was 56.4 (out of 96,) which represented 58.8%. The higher scores presented the worst symptoms. (Table 3)

Graph 1 shows the score distribution achieved by the patients. Based on the scores, the patients were categorized into moderate OA (score <64) and severe OA (score >64). The study showing that 69% presented with moderate OA, while 31% had severe OA. (Table 4)
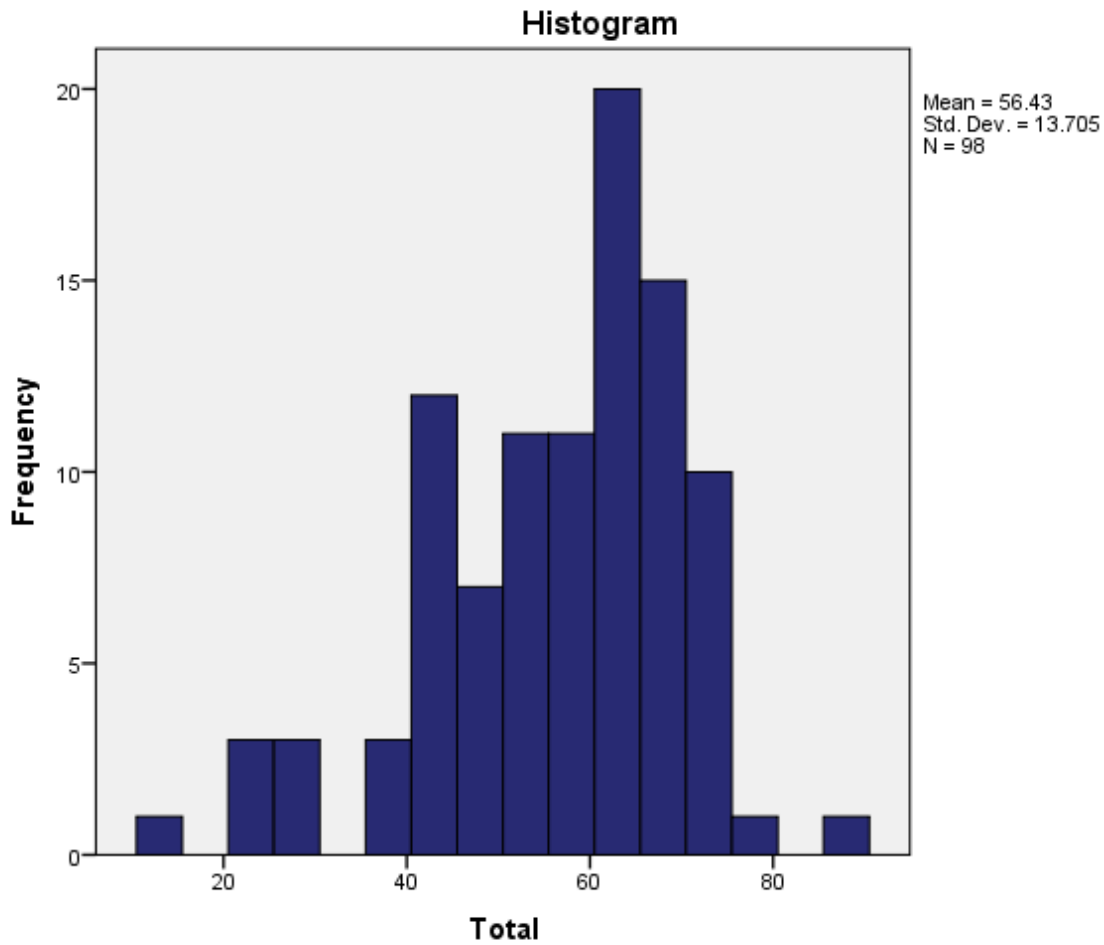
Graph No(1) a histogram showing the distribution of the total scores of the patients

Degree of OA	Frequency	Percent
Moderate OA	68	69.4
Severe OA	30	30.6

Table No(4) showing number and percentage of patients with moderate and severe OA

Distribution of different factors between the two groups (moderate and severe OA) was compared using the chi-squared test in order to check for differences between the groups. Age groups, sex, smoking status, having diabetes, hyperlipidaemia , and hypertension, family history of OA, taking vitamin supplements, arteriovenous malformations, history of trauma to lower limbs, and use of contraceptives for females were compared and all were found to have no significant impact on OA development. The P values in all cases were >0.05. (Table 5)

Table No(5) comparing different factors in both groups using chi squared test

Factors			degree of OA		p value
			moderate	severe	
Age	50-60	N	5	4	0.64
		%	55.6%	44.4%	
	60-70	N	26	11	
		%	70.3%	29.7%	
	>70	N	37	15	
		%	71.2%	28.8%	
Smoking	No	N	47	22	0.67
		%	68.1%	31.9%	
	Yes	N	21	8	
		%	72.4%	27.6%	
Sex	Female	N	37	19	0.41
		%	66.1%	33.9%	
	Male	N	31	11	
		%	73.8%	26.2%	
DM	No	N	26	12	0.87
		%	68.4%	31.6%	
	yes	N	42	18	
		%	70.0%	30.0%	
Hyperlipidemia	No	N	45	21	0.71
		%	68.2%	31.8%	
	Yes	N	23	9	
		%	71.9%	28.1%	
hypertension	No	N	52	19	0.18
		%	73.2%	26.8%	
	Yes	N	16	11	
		%	59.3%	40.7%	
Family history of OA	No	N	31	11	0.41
		%	73.8%	26.2%	
	Yes	N	37	19	
		%	66.1%	33.9%	
Vitamin supplements	No	N	62	27	0.92
		%	69.7%	30.3%	
	Yes	N	5	2	
		%	71.4%	28.6%	
History of trauma	No	N	58	22	0.16
		%	72.5%	27.5%	
	Yes	N	10	8	
		%	55.6%	44.4%	
arteriovenous malformations	No	N	46	23	0.37
		%	66.7%	33.3%	
	Yes	N	22	7	
		%	75.9%	24.1%	
Use of contraceptives (for females)	No	N	18	12	0.30
		%	60.0%	40.0%	
	Yes	N	19	7	
		%	73.1%	26.9%	

DISCUSSION:

One of the main findings in our study was that all of the participants were symptomatic. Sixty-nine percent of them presented with moderate OA while 31% had severe OA according to a validated scoring system based on OA symptoms achieved by the 98 study patients. This scale was used to assess OA severity and classify it into moderate and severe. In a similar Australian study using the same scoring system to classify the OA severity into three

categories, 15% of the patients were asymptomatic, 52% were moderate, and 27% were severe (13). Their results demonstrated less symptomatic patients than ours due to two reasonable factors. First, the mean age of our participants was >70 years old in 53% of them versus 57 years old in their study. After comparing our results with the Framingham Osteoarthritis Study in which the participants' mean age was about 59.2 years old and in the United States with a mean age of 40 years old (14, 15), we also observed differences in the results. We suppose these differences are because of inadequacies in standard assessment measures in diagnosing osteoarthritis early. Second, our BMI results show that all of the OA patients were overweight or obese versus less percentage represented by 54% in the Australian study, which confirmed a significant relationship between obesity and severe OA and included more pain, greater stiffness, and poor physical function. The BMI results agreed with a meta-analysis of 26 cohort studies in which it was reported that being overweight or obese are risk factors for OA onset in the knee joint (16). Furthermore, having a basal diet is not applied in 97% of the participants, which interferes with the reduction of body weight and exercise as the most important intervention in OA management (10, 11). Thus, there is a huge defect in the management plan and an urgent need for a comprehensive program to control these modifiable factors and improve OA therapy and prevention.

This study also provides descriptive information about OA-associated factors in patients such as obesity, old age, chronic disease (mostly diabetes), and lack of vitamin supplements, which have a higher prevalence in OA than other factors.

Many previous studies support this result with respect to obesity, old age, diet, and female gender after menopause. On the other hand, a history of trauma, race, environment, and genetics could be associated with OA (2, 17). More specifically, after comparing our study to a Swedish study, it was confirmed that women had a higher OA rate higher than men, which correlated with our results by 57.1% (18). Another study in The American Journal of Nursing suggested that the risk factors are similar in both sexes (19).

Having chronic diseases was high among our patients with 61.2% having diabetes, 32.7% with hyperlipidemia, and 27.6% with hypertension. Some of them had more than one chronic disease as 6% had diabetes, hyperlipidemia, and hypertension. When compared with a study in the Dutch population, it was confirmed that hypertension, obesity, and diabetes correspond to OA (20). We believe that applying well-structured educational programs to the community regarding the risk of chronic diseases and their association with OA will help decrease its incidence and prevalence.

Our study further found the distribution of the previous factors between moderate and severe is non-significant in all cases (P value is > 0.05) and it reveals that control the factors will not necessarily stop the progression of OA severity. However, another study suggested exercise therapy can benefit OA patients(21).

Overall, study the risk factors in our society and compare it with other races and environments is important to decrease the incident and the management burden.

Our strength include type of study case control and our limitation was in the sample size and measurement tool.

CONCLUSION:

With the aging of the population throughout the world, the health professions must prepare for the large increase in the number of people with OA requiring health service. However, there are identifiable factors which can be targeted for prevention of disabling arthritic pain.

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