Original Article :

Knowledge of Symptomatic Knee Osteoarthritis Among the General Population in the Hail Region

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Abstract

Background and Aims:
Osteoarthritis (OA) is the most common degenerative disease of the knee joint and can cause severe disability. Successful preventive methods depend on a high level of awareness among the general population. Therefore, the current study investigates the awareness about the knee OA among the general population in the Hail region of Saudi Arabia.

Methods: A cross-sectional study was carried out in the Hail region of Saudi Arabia. A total of 268 participants were included in the final survey analysis. A 36-item, self-administered questionnaire was used to collect data to measure the knowledge level of the participants regarding OA of the knee. Descriptive analysis, an unpaired sample t-test, and one-way analysis of variance (ANOVA) were conducted. Multiple linear regression was used to investigate the demographic variable associated with the total knowledge level.

Result:
Of 268 participants, 61.2 % had a high level of knowledge about OA of the knee. The regression analysis revealed that being female was associated with a higher total knowledge level and that being unemployed was associated with a lower total knowledge level.

Conclusion:
The present study revealed that people have a satisfactory level of knowledge about knee OA in general. However, further research is needed to increase awareness in the subdomain through awareness campaigns.

Keywords:
Osteoarthritis, Knowledge, Awareness, Knee, Preventive, Saudi Arabia

Introduction:

Osteoarthritis (OA) is a chronic condition that has no cure [1]. OA is a complex disorder and is considered the most common form of arthritis. All joints can be affected by OA; however, it is most common in the knee [2]. OA causes progressive wear and tear in the joints and a loss of articular cartilage. Initially, OA is manifested by abnormal tissue metabolism followed by anatomical and physiological alterations, which include cartilage degradation, bone remodelling, osteophyte formation, joint inflammation, and loss of normal joint function [3]. Interestingly, OA is considered the second most common cause of death due to the resulting disability [4].

A striking figure showed that more than 600 million people worldwide are affected by knee OA [5]. In the USA, it is estimated that 14 million individuals are affected by symptomatic knee OA [6] and that 20% of American citizens over 65 years old are at risk of developing OA by 2030. Bindaws et al. (2018) stated that knee OA is one of the health issues in Saudi Arabia with increasing prevalence [7]. A study showed that the prevalence of knee OA in Saudi Arabia increases with age to 60.5% in the population between 66 and 75 years old [8] while a more recent study showed that the prevalence of knee OA reached 45.77% in individuals older than 59 [9]. Interestingly, a study showed that 39.75% of individuals attending a hospital in Saudi Arabia were diagnosed with knee OA [10].

Knee OA can cause severe knee pain, which is associated with limitations on functional activities and quality of life [11]. Other signs and symptoms include redness, swelling, stiffness, numbness, and crepitus due to effusion, which may further aggravate the instability of the joints, restricting the range of motion (ROM) and muscle weakness [12-14]. The effect of such a disease on the economy is devastating. In the UK, 108,713 knee replacement surgeries were conducted in 2016 [15]. Nearly all (99%) knee replacements were conducted for individuals affected with knee OA [15]. It is estimated that rheumatoid arthritis and OA cost £2.58 million due to working days lost, and this figure is estimated to increase in 2030 (£3.43 billion) [16]. To clarify this point, it is estimated that 1 to 2.5 % of the gross national product (GDP) is spent on such diseases [16]. The previous statements show the high impact of the OA and the need to understand the risk factors.

Several factors have been identified to increase the risk of knee OA; they can be divided into modifiable factors and non-modifiable factors. The most common risk factor for OA is age [17], which is a nonmodifiable factor. Obesity and biomechanical load are considered modifiable risk factors.

A previous study showed that weight reduction by approximately 5 kg reduces the risk of developing knee OA by half [18]. Prior injury is another powerful risk factor; a previous study showed that those with previous knee injuries have an increased risk of developing knee OA by a 3.95 odds ratio (OR)[9,19]. The occupation that includes long-standing posture, repetitive squatting, and abnormal knee alignment (varus or excess valgus) also exposes the knee to stress[17]. Although OA has no treatment, management is aimed at preventing and enhancing joint mobility, reducing disability, and decreasing pain. Treatment modalities range from conservative approaches such as exercise to surgical approaches such as total knee replacement [11,20]. Although several treatments can be used, preventive programs should be the main aim for reducing the prevalence of OA.

Primary prevention strategies can be used with adequate knowledge. Several studies have shown that weight reduction could prevent OA [21]. It has been stated that knee OA should be controlled by the patient through knowledge about the disease, which could prevent its onset [22]. However, to implement such techniques, the population should have adequate awareness. The Arthritis Foundation and the National Institute for Health and Care Excellence (NICE) Guidelines stated that a lack of preventive knowledge among the general population and caregivers is considered a barrier to a successful preventive program [3].

An earlier study showed a low awareness level of knee OA among railway workers in Malaysia [3]. This finding highlighted the importance of conducting awareness campaigns. In Saudi Arabia, a previous study investigated the knowledge, attitude, and practices of physicians towards knee OA management in physicians [23]. However, for preventive measures, the general population's knowledge about OA is more important than that of the medical staff. Some studies were conducted to investigate the general population's awareness of knee OA in Saudi Arabia [24-26]. However, more studies are required in other regions to direct the most effective prevention and intervention strategy to OA. There is a gap in the literature that determines the level of knowledge of knee OA in the Hail region of the Kingdom of Saudi Arabia (KSA). Therefore, the objective of the present study is to assess the general population regarding their understanding and knowledge of knee OA.

Materials and Methods:

Study Design and Population:

The present study was conducted among the general population in the Hail region for a duration of six months from December 2020. This study received ethical

approval from the Hail University ethical committee under ethics number H-2020-227.271. The sample size was calculated using Roasoft online software with a 90% confidence interval, 5% marginal error, and 50% response distribution. To be included in the study, participants must have lived in the Hail region for the last year and be at least 18 years old.

A self-administered questionnaire was used to collect the data in the current study. The questionnaire was developed and used in previous studies [3,25]. Permission was obtained by email from the Ganasegeran Group before using the questionnaire in the current study. The questionnaire was translated into the local Arabic language, which was approved by two language experts. The translated Arabic version of the questionnaire was validated by five multidisciplinary experts to ensure that it suited the target participants. Before conducting the study, a copy of the questionnaire was sent to 10 individuals of the targeted population to eliminate any ambiguity in the questions and to assess whether these questions addressed the objective of the study. The collected feedback was used to create the final version of the questionnaire.

The questionnaire was imported into the online questionnaire module, a weblink was created through Google Forms, and then the questionnaire was administered. The data were collected from all participants and stored for statistical analysis. A total of 268 participants were approached through an online survey.

Study Instruments:

A self-administered questionnaire regarding knowledge about the knee, which consists of 36 items, was given to all participants after validation. The final questionnaire consists of five subdomains (risk factors, knee OA symptoms, disabilities, prevention methods, and management). The questions in the first subdomain assess whether 11 items are considered risk factors for knee OA. The questions in the second subdomain (knee OA symptoms) assess whether 10 items are considered symptoms and signs for knee OA. The questions in the third subdomain (disability) assess whether seven disabilities are caused by knee OA. The questions in the fourth subdomain (method of prevention) assess whether four procedures prevent the development of knee OA. The questions in the final subdomain (management) assess whether four measures alleviate knee OA symptoms.

Each item response had an option of 'Yes,' 'No,' or 'I do not know.' Each question answered correctly was given a score of 1; otherwise, it received a score of 0. The maximum possible score was 36, while the minimum possible score was 0. Seven

demographic characteristics were collected: gender, age, weight, height, job, material status, and the average daily hours of exercise. In addition, the body mass index (BMI) was calculated by dividing the weight by the height squared.

Statistical Analysis:

After data were collected, they were retrieved from Google Forms as an Excel sheet and then analysed by SPSS (Version 26). Microsoft Excel was used to construct graphs and tables, after calculations were performed in SPSS. Descriptive analysis (frequency and percentage) was utilised to describe each categorical variable. Age and BMI were converted to categories to facilitate comparison between groups in the total score. Three age groups were created as follows: 18–27, 28–37, and >37. For BMI, three groups were created: 16–20, 21–30, and >30. These groups were divided to ensure that the size of each group was adequate.

For the analysis, the group was divided into two groups based on the median total knowledge score of 20. Individuals who scored at least 20 represent approximately 60% of the total participants. Individuals who scored at least 20 were categorised as having a high level of awareness, while individuals who scored less than 20 were categorised as having a low level of awareness. The same method was used to assess high awareness and low awareness for each subdomain of the questionnaire (median for each subdomain presented in Table 1).

The data were checked for normality and were approximately normally distributed based on a Q-Q plot. To test if there is any significant difference in the total score for the subdomain with two groups, an independent sample t-test was performed, while a one-way analysis of variance (ANOVA) was performed when there were more than two groups. Multiple linear regression analysis (stepwise) was used to investigate significant demographic variables associated with knee OA knowledge (total score). In the current study, a 0.05 level of significance was selected.

Results:

A total of 268 participants were recruited in the current questionnaire study. The mean age, height, weight, and BMI are 30.71 years (± 11.82 years), 166.93 cm (± 9.84 cm), 74.20 kg (± 19.13 kg), and 26.61 kg/m2 (± 6.45 kg/m2), respectively. Male participants comprised 60.1% of the sample, while females comprised 39.9% of the sample. More than half of the sample were single, representing 56.7% of the current study population, while the remainder of the sample were married. Most participants in the sample admitted to exercising less than an hour daily with a percentage equal to 72.8%. Interestingly, of 268 par-

ticipants, 55 (20%) participants were unemployed, while 39.6 % were students and 39.9 % were employed.

With respect to the awareness level of the participants regarding knee OA, in general and based on the median, 61.2 % of the participants had a high level of knowledge The percentage of awareness ranged from 53.7% to 72.8% based on the median of each subdomain of the questionnaire (Table 1).

Table 1: Descriptive statistics for each subdomain of the awareness questionnaire:

Subdomains	Method of calculation	Mean	SD	Median	Percentage of awareness	Max	Min
Risk factors	Number out of 11	6.42	1.94	7	53.7	11	0
Knee OA symptoms	Number out of 10	5.22	2.35	5	64.2	9	0
Disability	Number out of 7	3.43	1.56	4	54.1	7	0
Methods of prevention	Number out of 4	2.63	1.09	3	58.6	4	0
Management	Number out of 4	2.37	1.31	2	72.8	4	0

Interestingly, an individual assessment of each question revealed that some questions showed low-level knowledge among participants, as shown in (Table 2).

Table 2: Percentage and number of participants who answer the questions correctly:

Statement	Correct answer	Number	%
Risk factors			
Female gender	Yes	101	37.7
Postmenopausal women are more likely to have osteoporosis than knee osteoarthritis	No	26	9.7
Age 50 years or older	Yes	228	85.1
Obesity is not a risk factor	No	227	84.7
Previous knee injury	Yes	184	68.7
Sports and leisure time physical activities	Yes	90	33.6
Repetitive knee strain injury	Yes	165	61.6
Working in a kneeling or squatting position	Yes	156	58.2
Climate change has no risks	Yes	89	33.2
Sitting improperly for long time	Yes	234	87.3
Standing improperly for long time	Yes	221	82.5
Knee OA symptoms			
Knee pain	Yes	218	81.3
Stiffness of the knee during the night	No	31	11.6
Feeling of increased warmth in the knee	Yes	91	34.0
Redness of the knee	Yes	92	34.3
“Clicking” or “catching” of the knee	Yes	197	73.5
“Locking” of the knee or unable to fully straighten	Yes	205	76.5
Weakness of muscles of the thigh	Yes	136	50.7
No swelling of the knee	No	124	46.3
Numbness or tingling sensation of the knee	Yes	139	51.9
Pain when touched or pressed the knee	Yes	167	62.3

Disability			
Bed ridden rather than difficulty rising from bed	No	116	43
Difficulty putting on stockings	Yes	120	44.8
Difficulty rising from sitting	Yes	220	82.1
Difficulty bending to the floor involves osteoarthritis of the hip, not knee	No	62	23.1
Difficulty kneeling	Yes	194	72.4
Difficulty squatting	Yes	179	66.8
Movements are totally impaired	No	28	10.4
Methods of prevention			
Regular exercises	Yes	196	73.1%
Optimal body weight is not necessary for prevention	No	195	72.8%
Avoiding excessive and prolonged weight bearing to the knees during work	Yes	128	47.8%
Supportive footwear	Yes	185	69.0%
Management			
Pain killers and anti-inflammatory drugs help to relieve pain temporarily	Yes	200	74.6%
Intra-articular steroid injections help to relieve severe symptoms temporarily	Yes	102	38.1%
Knee replacement surgery is indicated for sever osteoarthritis	Yes	163	60.8%
Hot or cold packs to the knees help to resolve osteoarthritis symptoms temporarily	Yes	169	63.1%

An analysis of the difference in awareness for each demographic characteristic indicated that none was significant. BMI categories and job status were nearly approached the level of significance (Table 3).

Table 3: Difference in awareness level in each demographic characteristic:

Characteristics	Sub-division	Mean (SD)	Parametric P-value
Age	18-27	20.3 (5.5)	0.78
	28-37	19.6 (6.4)	
	>37	20.0 (6.1)	
BMI	16-20	21.0 (5.1)	0.087
	21-30	19.2 (6.1)	
	>30	20.6 (5.6)	
Exercise	Less than 1 hour	19.7 (5.8)	0.145
	1 hour	21.3 (6.0)	
	2 hours	19.79 (4.9)	
	More than 2 hours	24.5 (5.9)	
Job	Unemployed	18.5 (6.13)	0.052
	Student	20.84 (5.73)	
	Employed	20.1 (5.71)	
Gender	Male	19.7 (6.0)	0. 17
	Female	20.7 (5.4)	
Status	Single	20.4 (5.6)	0.37
	Married	19.7 (6.0)	

A multiple linear regression model was applied for all demographic characteristics. Weight and BMI showed multicollinearity; therefore, weight was removed from the model. The OR indicated an increase in total knowledge with being female by 1.85 (95% CI; 0.12–3.04). Interestingly, being unemployed reduced the OR by -2.50 (95%CI (-4.27)–(-0.73)) (Table 4).

Table 4: Multiple Linear Regression model for the demographic characteristics:

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound	
1	(Constant)	18.37	1.06		17.35	0.00	16.29	20.46
	Job (Unemployed)	-2.50	0.90	-0.18	-2.79	0.01	-4.27	-0.73
	Gender	1.58	0.74	0.13	2.13	0.03	0.12	3.04

Discussion:

The current study was aimed at determining the knowledge level regarding knee OA among the general population in the Hail region of Saudi Arabia. Knee OA is characterised by degeneration of the cartilage that cushions weight-bearing joints [3]. It has been reported that OA affects the middle-aged and older population [27]. OA predominantly affects the joints, such as the knees, hips, feet, and lower back, which are major weight-bearing joints. However, the knee is considered the most commonly affected weight-bearing joint, where maximum cartilage destruction occurs [28]. Whenever cartilage breaks down, and friction between bony surfaces causes pain and loss of movement. It was found that increasing the knowledge of patients about the disease may prevent onset of the disease [22]. To the best of our knowledge, this is the first study that explored the knowledge of knee OA symptoms in the general people in the Hail region of Saudi Arabia.

The most striking result to emerge from the data is that more than 61.2 % of the participants had a high level of knowledge about knee OA. In all the subdomains used in the questionnaire for determining awareness, 58.6% of the participants had good knowledge of the prevention of knee OA. A previous study in Malesia showed different results for awareness with 46.4% of the sample showing a high level of knowledge about knee OA [3]. This difference may be attributed to the difference in the selected sample since the current study included the general population, while the previous study included only railway workers. A previous study in Saudi Ara-

bia showed a higher level of knowledge (82.8%), which is different than the current study. However, this finding may be attributed to the difference in the region selected and or method used.

The present study demonstrated a broad spectrum of knowledge about preventive measures among the sample, including exercise, body weight management, and the use of supportive footwear. A previous study reported that regular exercise and optimal body weight are major components of OA prevention [29]. This finding may be explained by the notion that regular exercise accelerates knee extensors muscle strength and helps prevent knee OA [30]. Isometric strengthening exercises are considered a suitable choice to begin an exercise regimen, and then one can progress to isotonic resistance exercises. It is important to provide adequate advice and education to patients to promote increased physical activity [30].

Furthermore, our results showed that more than 74.6% of respondents agreed that analgesics and anti-inflammatory drugs would provide symptomatic relief. Furthermore, the current study population scored high in understanding that age and obesity are considered significant risk factors for developing OA, which is consistent with the literature [31]. Interestingly, not everyone who demonstrates radiographic findings of knee OA will be symptomatic [32]. One study found that only 15% of patients with radiographic findings of knee OA were symptomatic. Not accounting for age, the incidence of symptomatic knee OA is roughly 240 cases per 100,000 people per year [33,34].

The present study found that the awareness of knee OA based on knowledge was adequate for 61.2 % of the total participants, suggesting that nearly 38.8% of them had low knowledge about the disease. Subdomains in which less than 60% of the total participants had adequate knowledge about knee OA (risk factors, disability, and method of prevention) should be targeted for improvement. Specifically, items with a low score, such as women after menopause more susceptible to osteoporosis than OA (9.7%), movements that are totally impaired (10.4%), and stiffness of the knee at night (11.6%), should be targeted when conducting awareness campaigns.

Interestingly, the current study showed that being female increases the OR by 1.58 (95% CI; 0.12–3.04) for total knowledge. A previous study found similar results with higher knowledge for females compared to males [27]. In contrast, being unemployed reduced the OR by -2.50 (95% CI; (-4.27)–(-0.73)) for total knowledge. This finding

may be indirectly linked to lower education levels, which may contribute to unemployment. Contrasting results were obtained in a previous study, which may be attributed to using different outcomes [26].

Considering the overall awareness of knee OA among the general population in the Hail region, it was found that 61.2 % of the respondents had a high level of awareness about OA of the knee. However, some questions achieved scores indicating a low level of knowledge, and more strategies are needed in the Hail region to increase the awareness of knee OA among its residents to reduce the impact of the disease. A similar study showed that participants had a moderate knowledge about knee OA in Sudair, Saudi Arabia [26]. From our study, it is apparent that there is a need to increase the general population's awareness of OA. Consequently, people should be motivated to promote bone health, prevent osteoporosis, reduce obesity, and improve physical activity through education and awareness programs that target the whole population in the Hail region of Saudi Arabia.

Study Limitations:

The self-administered questionnaire used in this study may have the disadvantage of being applicable to only those who can read and are interested in participating in the study. Although the previous study assessed the face validity of the questionnaire [3], the reliability of the questionnaire is not known, and future studies should investigate this unknown. In the present study, we targeted a sample size from one geographical region; therefore, the results cannot be generalised to other regions. Future studies should investigate the awareness of knee OA among the entire population of Saudi Arabia, including its 13 regions.

Conclusions:

In conclusion, the present study revealed that awareness among the general population in the Hail region regarding knee OA was satisfactory, especially for knee OA symptoms and management subdomains. Other subdomains, including risk factors, disability, and method of prevention, were less than satisfactory. Primary preventive methods are important in reducing the prevalence of knee OA, which has a high impact on the quality of life and can lead to disability. It is recommended that more effort be made to promote improvement in awareness levels regarding knee OA among the general population. Moreover, future studies should be expanded to include different regions in Saudi Arabia and be conducted at the community-based level.

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