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The extent of knee osteoarthritis patients adherence to exercise and reducing weight in Makkah, Saudi Arabia – A cross sectional study

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ABSTRACT

Introduction: Knee Osteoarthritis (OA) is a chronic disorder that is manifested by degeneration and cartilage loss which results in stiffness, pain, and limitation of movement. The common sites to be affected of this disease are knees, hips, hands, and spine joints. It is well known to use non-pharmacological path as a start before medications such as exercise and weight reduction. Researches before found were lack of knowledge about knee osteoarthritis among Saudi population. However, there are no studies conducted in Makkah, Saudi Arabia to assess the attitude of patients with Knee osteoarthritis towards weight reduction and daily exercise in Makkah population. *Aim:* our main aim was to examine the knowledge and adherence of subject suffering from knee osteoarthritis to weight reduction and daily exercise. *Methods:* we used a cross-sectional survey (questionnaire) with a total duration of 6 months, and total sample size 200 participants selected randomly in the Western Region of the Kingdom of Saudi Arabia. *Results and conclusion:* We found in this study around 72% of the subjects were suffering from knee osteoarthritis. Moreover, 94.0% of them worked outside the medical field. Around 61.0% of the subjects mentioned that when they decrease a load of heavyweights the pain is reduced. Unlike them 62.5% did not believe that physical therapy helps. To conclude we observed that our community needed more awareness about the essential part of exercise and weight loss to reduce pain and symptoms of knee osteoarthrosis.

Keywords: Knee, Osteoarthritis, adherence, pain, Exercise, weight.

1. INTRODUCTION

Osteoarthritis (OA) is a disorder that is known with long term degeneration and cartilage loss which results in stiffness, pain, and limitation of movement.

This disease commonly affects places of gravity such as knees, hips, hands, and spine joints. Indeed, OA can be attributed to growing in age, however, it can be associated with many factors such as high weight, no activity or exercise, genetic factors, the health of the bone, any injury or trauma, and gender. Treatment aims to manage the pain and improve functional status. Moreover, patients should receive a combination of non-pharmacologic and pharmacologic treatment (Haq et al., 2003; McAlindon et al., 2014). Non-pharmacological therapies should always be attempted as the first line of treatment for knee OA, such as exercise is among the dominant non-pharmacological interventions recommended by international guidelines, and it relieves knee pain at all stages of OA with a non-weight bearing quadricep exercise program than with a weight-bearing program and should be tailored to every patient's tolerance and preferences, high impact activities should be avoided, and long-term adherence should be maximized to increase success (Hochberg et al., 2012; Jevsevar et al., 2013; Bennell & Hinman, 2011; Beckwee et al., 2013; Khormi et al., 2021; Joshi & Phansopkar, 2022).

The way to control body weight is essential in symptom management, and it has been noted that the benefit of exercise is potentiated by the reduction of weight. There is around 10% risk reduction of knee OA per kilogram of body weight decreased vas versa. A 50% risk reduction for knee OA resulted in a weight loss of 12 lb (Esser & Baily, 2011; Messier et al., 2005; Felson et al., 1992; Christensen et al., 2005). Some of the other non-therapeutics that can help in OA patients as thermal or heating processes however, no enough data that can suggest using transcutaneous electrical nerve stimulation (TENS) or ultrasound. Otherwise, pharmacologic treatment is Acetaminophen or Non-steroidal anti-inflammatory drugs (NSAIDs) (McAlindon et al., 2014; Felson et al., 1992; Christensen et al., 2005).

Currently, The FDA has approved a single-injection hyaluronic acid gel and an extended-release (ER) formulation of the synthetic corticosteroid triamcinolone acetonide for intra-articular (IA) treatment of osteoarthritic knee pain (Nelson et al., 2014; Nguyen et al., 2016; Wen, 2000). As the last treatment, orthopedic surgery is used with instability or decrease mobility, and the condition is affecting your quality of life (Wehling et al., 2016). The relationship of osteoarthritis of the knee and how severe is the pain and the health-related quality of life (HRQoL) among patients in Saudi Arabia has been reported. Patients with extreme knee OA had more pain and decreased (HRQoL) compared with patients with gentle/moderate knee conditions (Bindawas et al., 2018).

Some studies have been conducted to evaluate overall population awareness about the disease. General population in Aseer region showed familiarity regarding knee OA. Around 89.0% of participants had good awareness regarding knee OA preventive measurements. In addition, 84.1% of participants showed high awareness about relieving measurements of knee OA (Mukharrib et al., 2018). Among Jeddah population, inadequate level of knowledge about osteoarthritis and its related risk factor have been reported (Alyami et al., 2020). Up to our knowledge, no previous studies have been conducted in Saudi Arabia to assess the attitude of patients with knee osteoarthritis towards weight reduction and daily exercises. There is an international study that has different subgroups of Knee OA patients, there is no clear best type of exercise for clinical benefits, so one of the conducted studies on two group parallel design they participate in blinded randomized controlled trial which compared the efficacy of 2 different twelve-weeks prescribed physiotherapy protocol, and home-based exercise programs for people with medial knee OA and obesity (Nelligan et al., 2018).

In other studies that aim to see if obesity or physical activity are predictors of clinical outcomes in patients with knee arthroplasty due to osteoarthritis, the clinical results are shown in terms of pain, disability, quality of life, and complications, and the data were extracted as visual analog scale. The results have shown that Knee OA have worse outcomes with obese patients, but only at long term follow-ups (Pozzobon et al., 2018). As well study reported that obesity, weight gain, and severe pain are associated with physical inactivity in adult patients with knee osteoarthritis. Clinical studies showed that 48.9% of people with knee osteoarthritis are inactive where the study recommended physical activities because it reduces pain and delayed knee disability, while physical inactivity affects work and independent community life (Lee et al., 2013), and in another study that demonstrates the effect of short messages on patient's adherence to home sports recommended by a physiotherapist, as it is effective for promoting commitment to changing health behaviors (Chen et al., 2020). This study main aim is to estimate the extent of knee osteoarthritis patient's adherence to exercise and reducing weight.

2. METHODS

We used a cross-sectional survey (questionnaire), with the total duration of6 months from January 2022 to June 2022, and the total sample size 200 participants selected randomly in the Western Region of the Kingdom of Saudi Arabia. The criteria for inclusion were male and female adults aged between 30 up to 50 years and diagnosed with knee osteoarthritis. Patients older 51 and older were excluded because mostly will have more than one comorbidity and multiple issues. To choose the minimum sample size for structural equation modelling is known to be 200 subjects. Before collecting the data, the study was approved by Umm Al-Qura

University IRB committee (HAPO-02-K-012-2021-02-570). Then data were collected data via google Forms as the primary source of patient response collection.

Statistical Analysis

Data was collected and analyzed using SPSS. All the variables were analyzed using SPSS Var 23.0 software 2015. Descriptive analyses such as percentages and graphs were used to describe the results. Association between different relevant variables was calculated using Chi-Square Test. Values of $p < 0.05$ was being considered statistically significant.

3. RESULT

Respondents' responses about their knee osteoarthritis

Are you a knee osteoarthritis patient? The question was analyzed by calculating the frequency and percentage of each category. A graph was used to illustrate the frequencies. Table (1) and figure (1) declare the results. The table 1 declares that most of the respondents were suffers from knee osteoarthritis, 144 of whom were 72.0% of all respondents but other respondents (28%) not suffer from knee osteoarthritis and 13.5% from them the relationship between you and the patient her mother.

Table 1 Frequency distribution of are you the knee osteoarthritis patient? Question data sample

Are you a knee osteoarthritis patient?		
Choices	Frequency	Percent
Yes	144	72.0%
No	56	28.0%
Total	200	
If you aren't the patient, what is the relationship between you and the patient?		
Choices	Frequency	Percent
Myself	144	72.0%
Father	3	1.5%
Mother	27	13.5%
Sister	1	0.5%
My Son	3	1.5%
My daughter	7	3.5%
My relative	15	7.5%
Total	200	

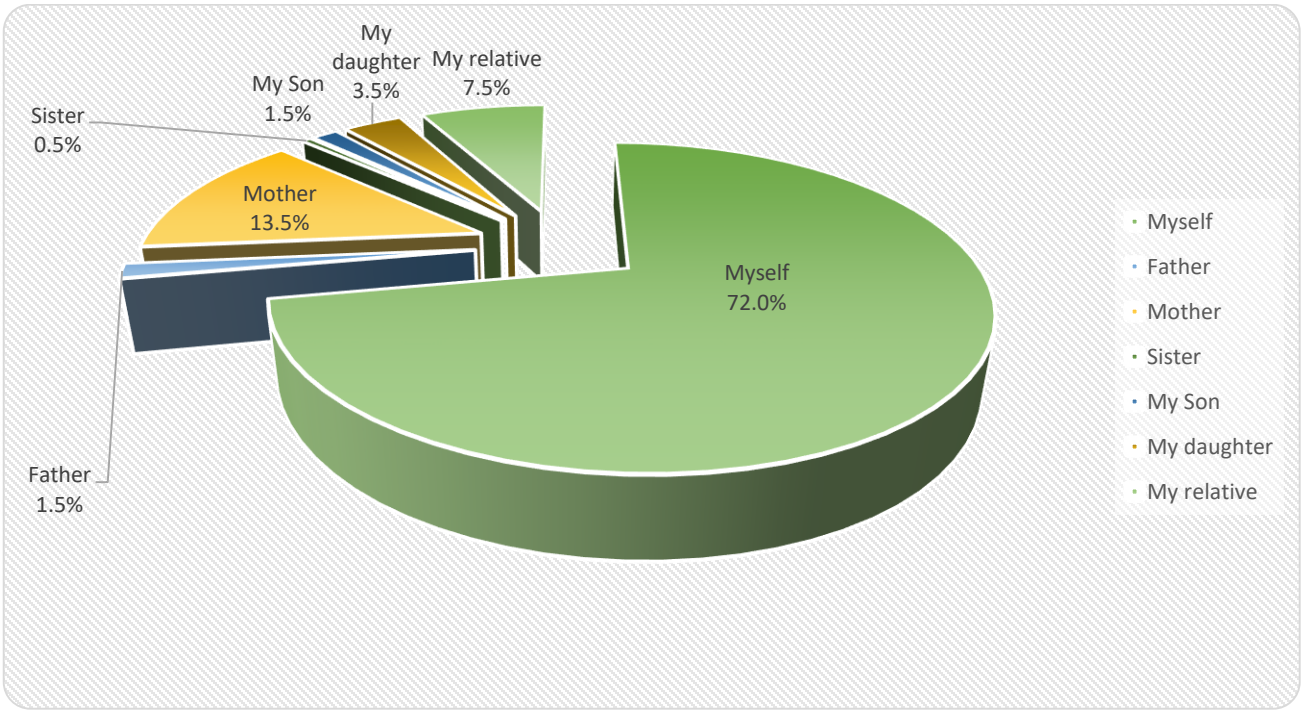

Figure 1 Respondent response about their diagnosis of knee osteoarthritis (n=200)

Demographic characteristics and obstetric history of the sample

Table 2 shows the frequency distribution of socio-demographic data. Among participant (47.5%) of the sample had their current age ranged between from 30 to 49 years, while only (16.0%) of the sample were age from 30 to 49 years. Most of the samples (80.0%) were female, while only (20.0%) were male. About (49.0%) of the sample there BMI is obese, while only (1.0%) of the sample was underweight. (73.0%) of the sample, their place of residence in Makkah, while only (3.0%) their place of residence in Medina. (55.5%) of the sample, their education level is the university, while only 3.5% of their education level is postgraduate. also, the majority of the sample (94.0%) their occupation outside the medical field. Also, most of the samples (79.5%) were married. About (52.0%) of the sample, their monthly income of fewer than 5,000 riyals, while only (23.5%) a monthly income of more than 10,000 riyals.

Table 2 Frequency distribution of socio-demographic data of sample

Variable & Choices	Frequency	Percent
Current age		
Under 30 years old	32	16.0%
From 30 to 49 years old	95	47.5%
More than 50 years	73	36.5%
Sex		
Male	40	20.0%
Female	160	80.0%
BMI		
Underweight	2	1.0%
Normal weight	38	19.0%
Overweight	62	31.0%
Obese	98	49.0%
What's your place of residence?		
Mecca	146	73.0%
Jeddah	37	18.5%
Taif	11	5.5%
Medina	6	3.0%
Education level		
High school and lower	82	41.0%
University	111	55.5%
Postgraduate	7	3.5%
Occupation		
In the medical field	12	6.0%
Outside the medical field	188	94.0%
Social status		
Unmarried	41	20.5%
Married	159	79.5%
Monthly income		
Less than 5,000 riyals	104	52.0%
From 5,000 to 10,000 riyals	49	24.5%
More than 10,000 riyals	47	23.5%
Is anyone in the first-class family suffering from knee osteoarthritis?		
Yes	121	60.5%
No	79	39.5%
Have you been awarded knee osteoarthritis by your doctor?		

Yes	128	64.0%
No	72	36.0%
Have you ever had a knee joint replacement?		
Yes	3	1.5%
No	197	98.5%
Where did you get the knee osteoarthritis information?		
Internet	72	36.0%
Friends	53	26.5%
Doctor	75	37.5%

Table 3 shows that the frequency distribution of measure the awareness of knee osteoarthritis patients to reduce weight and daily exercise. (53.0%) of the sample, females suffer from knee osteoarthritis more than men. (49.0%) of the sample don't know if menopausal females more vulnerable to knee osteoarthritis than osteoporosis. 66.0% of the sample, people older than 50 years of age are considered more likely to suffer from knee osteoarthritis most of the sample 85.5% obesity a factor in knee osteoarthritis. (52.5%) of the sample having knee injuries in the past, relate to future roughness of the knee. Also, 53.0% the sample don't know climate change increase the risk of knee osteoarthritis. 67.0% of the sample would an incorrect seating increase the risk of knee osteoarthritis. 64.0% of the sample improperly standing increases the risk of knee osteoarthritis. 67.5% of the sample knee pain, one of the most important symptoms of knee osteoarthritis, and 40.0% of the sample suffer from Knee fever a symptom of knee osteoarthritis. (58.0%) the sample doesn't know the Knee redness a symptom of knee osteoarthritis also, 58.0% of the sample knee stiffness a symptom of knee osteoarthritis.

About 41.0% of the sample not feeling pain at knee pressure has nothing to do with knee osteoarthritis. 42.0% of the sample doesn't reduce long-standing times and the frequent ascent of reducing the pain of osteoarthritis. 61.0% of the sample, decrease the load of heavyweights reduces the pain of the knee, and 62.5% of the sample doesn't believe that physical therapy does not help in relieving knee osteoarthritis pain. 66.0% of the sample considers difficulty getting out of bed is a complication of knee osteoarthritis. 76.5% of the sample considers difficulty getting up from taking a seat as a complication of knee osteoarthritis. 63.5% of the sample thinks difficulty bending to touch the ground is due to problems in the knee and not the pelvis. 68.0% of the sample think difficulty kneeling is a complication of knee osteoarthritis. 48.5% of the sample don't believe analgesics aren't considered helpful in relieving knee pain.

About 44.5% of the sample don't believe Anti-inflammatories aren't considered helpful in relieving knee pain. 70.0% of the sample doesn't know to think Steroid injections in the knee help relieve knee pain. Also, 54.5% of the sample doesn't know to think the replacement of the knee joint helps relieve knee pain in the early stages. About 49.0% of the sample doesn't think the use of cold or hot compression helps in relieving pain knee.

Table 3 Assessment of the awareness of knee osteoarthritis patients to reduce weight and daily exercise

Variable	Choices	Yes	No	I don't know
Do you think exercise is important for improving pain?	Number	143	8	49
	Percent	71.5%	4.0%	24.5%
Do you think there is a relationship between weight and knee osteoarthritis?	Number	153	17	30
	Percent	76.5%	8.5%	15.0%
Do females suffer from knee osteoarthritis more than men?	Number	106	7	87
	Percent	53.0%	3.5%	43.5%
Are menopausal females more vulnerable to knee osteoarthritis than osteoporosis?	Number	85	17	98
	Percent	42.5%	8.5%	49.0%
Are people above 50 of age considered more likely to suffer from knee osteoarthritis?	Number	132	15	53
	Percent	66.0%	7.5%	26.5%
Is obesity a factor in knee osteoarthritis?	Number	171	10	19
	Percent	85.5%	5.0%	9.5%
Does having knee injuries in the past, relate to future roughness of the knee?	Number	105	18	77
	Percent	52.5%	9.0%	38.5%
Does climate change increase the risk of knee osteoarthritis?	Number	53	41	106

	Percent	26.5%	20.5%	53.0%
Would an incorrect seating increase the risk of knee osteoarthritis?	Number	134	11	55
	Percent	67.0%	5.5%	27.5%
Does improperly standing increase the risk of knee osteoarthritis?	Number	128	12	60
	Percent	64.0%	6.0%	30.0%
Is Knee pain one of the most important symptoms of knee osteoarthritis?	Number	135	17	48
	Percent	67.5%	8.5%	24.0%
Is Knee fever a symptom of knee osteoarthritis?	Number	80	15	105
	Percent	40.0%	7.5%	52.5%
Is Knee redness a symptom of knee osteoarthritis?	Number	51	33	116
	Percent	25.5%	16.5%	58.0%
Is knee stiffness a symptom of knee osteoarthritis?	Number	113	9	78
	Percent	56.5%	4.5%	39.0%
Does Femoral weakness have nothing to do with knee osteoarthritis?	Number	32	56	112
	Percent	16.0%	28.0%	56.0%
Does knee swelling have nothing to do with knee osteoarthritis?	Number	26	63	111
	Percent	13.0%	31.5%	55.5%
Is the inability to stretch a knee a symptom of knee osteoarthritis?	Number	122	8	70
	Percent	61.0%	4.0%	35.0%
Is knee numbness a symptom of knee osteoarthritis?	Number	50	30	120
	Percent	25.0%	15.0%	60.0%
Does feeling pain at knee pressure have nothing to do with knee osteoarthritis?	Number	39	83	78
	Percent	19.5%	41.5%	39.0%
Does the reduction of long-standing times and the frequent ascent reduce the pain of osteoarthritis?	Number	53	84	63
	Percent	26.5%	42.0%	31.5%
Does the reduced load of heavyweights reduce the pain?	Number	122	22	56
	Percent	61.0%	11.0%	28.0%
Do you believe that physical therapy does not help in relieving knee osteoarthritis pain?	Number	30	125	45
	Percent	15.0%	62.5%	22.5%
Do you consider difficulty getting out of bed is a complication of knee osteoarthritis?	Number	132	14	54
	Percent	66.0%	7.0%	27.0%
Do you consider difficulty getting up from taking a seat is a complication of knee osteoarthritis?	Number	153	4	43
	Percent	76.5%	2.0%	21.5%
Do you think difficulty bending to touch the ground is due to problems in the knee and not the pelvis?	Number	127	23	50
	Percent	63.5%	11.5%	25.0%
Do you think the difficulty in kneeling is a complication of knee osteoarthritis?	Number	136	30	34
	Percent	68.0%	15.0%	17.0%
Do you believe analgesics aren't considered helpful in relieving knee pain?	Number	68	97	35
	Percent	34.0%	48.5%	17.5%
Do you believe anti-inflammatories aren't considered helpful in relieving knee pain?	Number	48	89	63
	Percent	24.0%	44.5%	31.5%
Do you think steroid injections in the knee help relieve knee pain?	Number	48	12	140
	Percent	24.0%	6.0%	70.0%
Do you think the replacement of the knee joint helps relieve knee pain in the early stages?	Number	81	10	109
	percent	40.5%	5.0%	54.5%
Do you think the use of cold or hot compression helps in relieving pain knee?	Number	28	98	74
	Percent	14.0%	49.0%	37.0%

Table 4 shows that the frequency distribution of measure the adherence of knee osteoarthritis patient's commitment to weight reduction and daily exercise. About 60.5% of the samples in the first-class family suffering from knee osteoarthritis. Also, (64.0%) of the sample have awarded knee osteoarthritis by your doctor. Most of the samples (98.5%) have not ever had a knee joint replacement. (36.0%) of the sample do exercise rarely and 70% of them the kind of exercise they do is walking. 54.5% of the sample, the exercise has relieved the pain of the knee. Also, (55.0%) of the sample don't carry heavy weights now and then. (76.5%) of the sample think there is a relationship between weight and knee osteoarthritis. 76.0% of the sample have tried to lose weight. 34.0% of the sample plan to lose your weight by Information from the internet. 57.5% of the sample when started losing weight, they noticed a difference in the pain. 77.5% of the sample don't eat fast food and soda a lot.

Table 4 Measure the adherence of knee osteoarthritis patient's commitment to weight reduction and daily exercise

Variable & Choices	Frequency	Percent
How often do you exercise?		
Once a week or less	26	13.0%
Three times a week or more	36	18.0%
Five times a week or more	25	12.5%
I don't play exercises	41	20.5%
I do exercises rarely.	72	36.0%
What kind of exercise do you do?		
Walking	141	70.5%
Football	18	9.0%
Do not apply	41	20.5%
Has exercise relieved the pain of the knee?		
Yes	109	54.5%
No	50	25.0%
I don't play exercises	41	20.5%
Do you carry heavy weights now and then?		
Yes	90	45.0%
No	110	55.0%
Have you tried to lose weight?		
Yes	152	76.0%
No	48	24.0%
How did you plan to lose weight?		
Doctor / nutrition specialist	57	28.5%
Friend	27	13.5%
Information from the internet	68	34.0%
Do not apply	48	24.0%
When you started losing weight, did you notice a difference in the pain you felt?		
Yes	115	57.5%
No	37	18.5%
Do not apply	48	24.0%
Do you eat fast food and soda a lot?		
Yes	45	22.5%
No	155	77.5%

4. DISCUSSION

Our main objective was to estimate the extent of knee osteoarthritis patient's adherence to exercise and reducing weight. Moreover, this study indicates to evaluate the awareness of knee osteoarthritis patient's commitment to weight reduction and daily exercise. The results indicate that 72% of the respondents were suffering from knee osteoarthritis. Therefore, 94.0% of the samples

occupations are outside the medical field. The results showed (61.0%) of the sample decreases a load of heavyweights reduces the pain of osteoarthritis. Therefore, on the other hand (62.5%) of those don't believe that physical therapy does not help in relieving knee osteoarthritis pain. The results also showed (76.5%) of the sample consider difficulty getting up from the sitting situation as a complication of knee osteoarthritis while about (63.5%) also of the sample that thinks difficulty bending to touch the ground is due to problems in the knee and not the pelvis. Furthermore, (64.0%) of the sample have awarded knee osteoarthritis by the doctor. As well, (36.0%) of the sample do exercise rarely, (70%) of them the kind of exercise they do is walking and (54.5%) of the sample believe the exercise has relieved the pain of knee osteoarthritis. Also, (55.0%) of the sample don't carry heavy weights now and then. As well, (76.5%) think that there is a relationship between weight and knee osteoarthritis.

The results showed that there was no relation between measure doing exercise and age, while it showed that there was a relation between exercise relieved the pain of knee osteoarthritis and age, but there was no relation between age and (carrying heavyweights, tried to lose weight, plan to lose weight, started losing weight and notice a difference in the pain, fast food, and soda). The results also showed that there was a relation between employment/education and "how often the patient does exercise", "when the patient started losing weight" and "the patient noticed a difference". On the other hand, there was no relationship between educations and (kind of exercise, exercise relieved the pain of knee osteoarthritis, carrying heavyweights, tried to lose weight, plan to lose weight, fast eating food and soda a lot). Also, the results showed that there was a relation between monthly income and only the item of (eating food and soda a lot).

This study agreed with most previous foreign and Arab studies in terms of methodology, objectives, and tools used in the study and the most important results (Beckwée et al., 2013; Bindawas et al., 2018). Our study found that around (53%) of the participants had aware of knee osteoarthritis. On the other hand, there is a difference with our study in Asser takes around (84.1%) of awareness of Knee Osteoarthritis (Mukharrib et al., 2018). However, there is a study in Jeddah that disagreed with our study duo it has a lower level of awareness about (37%) (Alyami et al., 2020).

The limitations of study were physically impossible to sample people face to face with the outbreak of the COVID-19 epidemic on March 11, 2020. So, the study was therefore heavily dependent on the online questionnaire in collecting data. Also, the sample size over 6 months was only 200 which's a low number of responses compared with the period that we determined, and the number of responses is more in females by 80% while males by 20%, and we recommend in future studies include more males. As well, we have received responses in the city of Makkah by 73%, followed by 18.5% in the city of Jeddah, and the remaining percentages are distributed between cities of Taif and Medina, as well as we recommend in future studies include more people from Taif and Medina.

In this study, we found that the community's awareness of the importance of exercise and weight loss and knowledge of the causes that reduce pain and symptoms of knee osteoarthrosis is low. Here lies the role of the medical team in educating the community about the importance of exercise and weight loss, especially in knee osteoarthritis patients, because it plays an important role in relieving pain. In our community, they practice rarely, but they observe an improvement in relieving pain when they did exercise. Most of society likes walking attitude and they notice a difference in the pain severity when they reduce their weight, so we encourage people to do exercise frequently and keep their weight down and should focus on increasing Health Awareness Campaigns to improve community attitude.

5. CONCLUSION

In this study, we found that the community's awareness of the importance of exercise and weight loss and knowledge of the causes that reduce pain and symptoms of knee osteoarthrosis is low, but they observe an improvement in relieving pain when they did exercise. However, most of society likes walking attitude and they notice a difference in the pain severity when they reduce their weight, so we encourage people to do exercise frequently and keep their weight down and should focus on increasing Health Awareness Campaigns to improve community attitude.

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We thank the participants who were all contributed to the sample of the study.

Author Contribution

Shimaa Mashrai, Ohud Alwadaani, Reema Alsaadi, Safa Albijali, Mawaddah Zahrani, Yosra Alhind and Arwa Fairaq contribute to study conception, supervision, project administration, and revision.

Shimaa Mashrai, Ohud Alwadaani, Reema Alsaadi, Safa Albijali1, Mawaddah Zahrani, Yosra Alhind and Arwa Fairaq contribute to the literature review and writing/ manuscript preparation: writing the initial draft, data collection, formal analysis and data presentation, data collection.

Ethical Approval

The study was approved by the Medical Ethical Committee of Umm Al-Qura University with number (HAPO-02-K-012-2021-02-570).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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