

# Knowledge of knee osteoarthritis and its impact on health in the Middle East: are they different to countries in the developed world? a qualitative study in Jordan

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## Abstract

Rationale, aims and objectives: limited knowledge of knee OA and its management options decreases adherence to treatment and adversely affect symptoms and functioning. The knowledge and experience of people living in countries from the developed world have been previously explored. However, many socio-cultural differences exist when comparing Jordan, as representative of the Middle East, to developed countries which might influence the impact of knee OA on health. Therefore, this study aimed to explore the knowledge of the pathology and the experience of people diagnosed with knee OA living in Jordan. Method: fourteen participants were included in the study (13 females, one male). One focus group and seven in depth semi-structured interviews were conducted. The discussions were audio-taped and transcribed. Framework analysis was used and data were mapped to the International Classification of Functioning, Disability and Health framework. Results: four themes containing eleven sub-themes emerged: Theme 1) Body functions and structures included two sub-themes; physical changes, psychological impact; 2) Activity limitation and participation restriction included three sub-themes; factors influencing the activities, cultural and social perspective to activity limitation and participation restriction; 3) Personal factors included three sub-themes; knowledge and personal interpretation of disease process, knowledge of management options to relief symptoms, influence of personal factors on activity and participation; 4) Environmental factors included three sub-themes; service delivery process, ineffective communication across the care pathway, facilitators and barriers. Conclusion(s): knowledge of the disease was lacking as a consequence of inappropriate service delivery and the culture. Activity limitations and participation restrictions are similar in Jordan to other cultures in addition to limitations in religious, employment and transportation activities which are the consequences of the geography, the infrastructure, and culture. These results demonstrate the global impact of knee OA on health and the need to understand different cultures to devise optimal management plan.

## Introduction

Knee osteoarthritis (OA) has a major effect on function and quality of life (QOL)<sup>1</sup>. Limited knowledge of the disease and its management options are common problems for people diagnosed with knee OA<sup>2-5</sup>. This lack of knowledge is known to decrease adherence to treatment and consequently affect symptoms and functioning and increase healthcare costs<sup>6,7</sup>. The level of understanding of the pathology of knee OA, its symptoms, how others perceive knee OA, and functional impairment were also identified to affect the experiences of people diagnosed with knee OA<sup>8</sup>. However, those aspects were identified in a review exploring the experiences of people living mainly in the developed world. Thus, the results cannot express the experiences of people from different cultural backgrounds such as the Middle East.

Knee OA is a common musculoskeletal problem in Jordan, one of the countries in the WHO Eastern Mediterranean Region, however studies exploring its prevalence and risk factors are lacking. Hawamdeh and Al-Ajlouni<sup>9</sup> showed that Jordanians have a higher severity of knee OA compared to the developed world and

they referred this to the higher body mass index and the cultural habits such as praying and crossed legs sitting.

The population in Jordan are mainly Muslims and those who practice Islam prays five times a day, this involves transitioning between heel sitting, prostration with flexed knees, and standing. Moreover, cross sitting is common which could increase the stresses on the knees. The atmosphere and geography in Jordan does not support outdoor physical activity and exercise; the weather is hot in summer, proper infrastructure is lacking in winter, and it mainly consists of mountains and valleys with limited straight roads. Moreover, public transportation is not well-organized<sup>10</sup>. The culture in Jordan mostly favors men over women as demonstrated by the Global Gender Index with a Global Gender Gap Score of 0.605, where a score of less than 1 favors men over women e.g. women were mainly unemployed and wages were higher for men compared to women for similar work<sup>11</sup>. These socio-cultural differences when compared to countries of the developed world might affect the impact of knee OA on health.

To understand the impact of OA on health worldwide, the results could be mapped to international frameworks to offer optimal assessment and management options for different populations and to allow for international comparison. The International Classification of Functioning, Disability and Health (ICF) framework was approved by the World Health Organization in 2001<sup>12</sup>. The framework considers the symptoms, limited activities and restricted participation caused by any medical condition in addition to the environmental and personal factors that could affect the patient.

Xie et al<sup>14</sup> was the only study to explore the impact of knee OA on different cultures in Singapore and linked the result with the comprehensive and brief ICF core sets for OA<sup>15</sup>. A discrepancy was reported between the items identified by their participants and the comprehensive and brief core sets. They have reported new items such as religion and spirituality which was an important limitation for Malay participants who are Muslims. However, this item was not covered by the core sets demonstrating that the effect of knee OA varies among different cultures. A cultural adaptation of international frameworks might be suggested.

Therefore, this study aimed to explore the knowledge of people diagnosed with knee OA living in Jordan of their condition and its management options. In addition to exploring the impact of knee OA on their health and mapping the results to the ICF framework.

## Methods

### *Study design*

A qualitative study design was employed. Triangulations method was used for data collection by conducting both focus groups and in depth semi-structured interviews. Focus groups intended to explore the participants' perceptions and allowed discussions amongst participants to reflect and consider new ideas<sup>16</sup>. To further explore the participants' experiences and appreciate personal differences, semi-structured interviews were conducted<sup>17</sup>. The consolidated criteria for reporting qualitative research (COREQ) checklist was used in the report of our procedure and results<sup>18</sup>.

### *Recruitment and sample size*

A convenient sample of fourteen participants diagnosed with knee OA were recruited from the orthopedic clinics and rehabilitation department at a local hospital. Inclusion criteria included adults who speak Arabic, aged [?] 40 years, were diagnosed with knee OA based on clinical and radiographic evaluation by their physicians and radiologist or from medical records. Exclusion criteria included diagnosis of any orthopedic (other than OA) or neurological condition confirmed by self-report or from the medical records.

The principle investigator was the first to contact the participants in the hospital to inquire about their willingness to participant in the study. Those who consented to take part were contacted by phone to organize the date of the focus group or interviews.

### *Procedure*

This study was approved by the research ethics committee at Jordan University Hospital. All methods were carried out in compliance with the latest guidelines and regulations of the Declaration of Helsinki. All the participants provided informed written consent prior to participation in the study.

To allow for successful discussion and interaction among participants, it is suggested to include between six to eight participants in each focus group<sup>19</sup>. Therefore, we started by conducting one focus group of seven female participants to encourage dynamic discussions and enrich emerging data. To gain a deeper understanding of their experience, we conducted additional in depth semi-structured interviews with females until data saturation was achieved after the 7th interview where new information did not emerge<sup>20</sup>. Few female participants declined to take part in the study and all reported personal reasons including lack of time, cannot come alone, lives far away from the hospital, and not interested.

All potential male participants whom we contacted refused to participate in the study except for one and because of time restrictions to complete the study we conducted one semi-structured interview for him to explore his knowledge and experience in details and no focus group with males was performed.

The recommended procedures for focus groups and semi-structured interviews were followed<sup>19,21</sup>. The participants came once to the meeting room at the physiotherapy department at a main local university for a session that lasted approximately 90 minutes. The following information was collected from each participant: age, height, weight, living status, work status, education, duration since diagnosed with knee OA, and other medical conditions.

The principle investigator (L.K.) was the moderator for the focus group and the semi-structured interviews. She is a female physiotherapist who holds a PhD degree in Rehabilitation and works as an Assistant Professor at the Department of Physiotherapy since 2012. She had previous experience in conducting focus groups and interviews as she has several qualitative studies in progress. To improve the credibility of the data, the moderator ensured rephrasing, repeating and further explaining the questions when needed<sup>22</sup>. A relationship was not established with the participants before the start of the study. They were informed of the background of the principle investigator and the aims of the study.

Two note takers from the research team assisted the principle investigator during the focus group and the interviews. These notes were compared with the transcribed data to improve the confirmability of the data<sup>22</sup>.

The same topic guide was used for both the focus group and semi-structured interviews (Table 1). A conceptual review of the literature was performed to identify constructs relevant to knowledge of knee OA and its impact on health. Many key references were identified and included in the review<sup>23-30</sup>.

The topic guide was developed after a consensus meeting was held to agree on key constructs relevant to the research question. The researchers ensured that all relevant constructs from the literature were included in the topic guide to establish construct validity<sup>31</sup>. Constructs included were; knowledge of body changes with the disease, reasons for change in symptoms, management options to relief symptoms, and the impact of knee OA on physical activity and participation. The topic guide was translated to Arabic by two researchers separately, a final version was approved by both researchers and shared with the research team.

The first focus group was a pilot for the topic guide. The results were reviewed by the research team and there was a consensus that richness, variety and relevance were demonstrated in participants' responses that serves the research aims. Therefore, this focus group was included in the subsequent main analysis and no modification to the topic guide was performed.

*Insert Table 1 here*

The discussions were audio-taped and transcribed<sup>32</sup>. The sessions were conducted and transcribed in Arabic. Two separate researchers translated the transcripts to English and a third researcher compared and validated the translation. The moderator as well as the note takers confirmed the accuracy of the transcripts. Each participant was assigned a code number for data entry and quotations. Further analysis and interpretation were conducted in English.

## *Data analysis*

A pragmatic approach with an ontological approach of subtle realism was adopted during data analysis<sup>33</sup>. Framework analysis as described by Spencer et al<sup>34</sup> was selected because it facilitates looking into the participants' perspectives about an external existing reality. The method of analysis allows for an objective and transparent interpretation by setting forward existing knowledge and literature as a framework for organizing emerging data. Constructs included in the topic guide were used as a framework to organize the data for further indexing. The process includes five stages: 1) Familiarization; 2) Identifying thematic framework; 3) Indexing; 4) Charting; 5) Mapping and interpretation.

### **Familiarization**

This process involves getting familiar with emerging data and identifying key aspects, which was achieved when the researchers transcribed the data by themselves, followed by translation and verification of the transcription and translation through consensus meeting amongst the research team.

### **Identifying thematic framework**

The thematic framework was established prior to data collection based on constructs emerging from the literature review. However, following the focus group the framework proved to be adequate for indexing all of the data without the need for developing new themes in the framework.

### **Indexing**

Two research team members independently reviewed and indexed participants' narratives based on the pre-developed framework. In this process, the researchers identified all participants' narratives relevant to a certain theme in the thematic framework and organized them under that theme. This allowed for the verification of the breadth and variation in participants' response and to proceed to the next stage which is charting.

### **Charting**

This included two stages; the first stage is a progression from indexing, where important ideas were grouped into categories, based on the researcher's interpretation. This process was preformed jointly by two researchers. Discussions between researchers verified the emerging categories. When interpretations differed, a third researcher was consulted and the issue was further discussed until a decision was made. Finally, the emerging categories were grouped into classes. Three researchers performed this process separately and then approved one final version.

### **Mapping and interpretation**

Themes were generated from the data set and connections were made between participants and categories in an attempt to explain what was reported by them.

The final results were reported to the participants for feedback and they agreed that these were their perspectives on the topic.

### **Trustworthiness of the qualitative enquiry**

Strategies to achieve credibility, dependability, conformability, and transferability were implemented during the preparation, data collection and data analysis<sup>22</sup>. (Table 2)

*Insert Table 2 here*

### **Mapping to the ICF framework**

The ICF framework consists of different categories which include body structure and function, activity and participation restriction, environmental and personal factors. Three members of the research team mapped the data to the ICF independently. The identified items were confirmed by the research team and any disagreements were resolved by discussions to reach consensus.

## Results

Fourteen participants completed the study (age range from 43 to 77 years) and all of them lived with their families. The participants' characteristics are presented in Table 3.

*Insert Table 3 here*

The following themes and subthemes emerged:

### *Theme 1: Body functions and structures*

#### *Physical changes with knee OA*

The main concern for the participants was pain, they reported constant knee pain, pain with exercise, pain with certain activities, and night pain. In addition, they complained of stiffness, fatigue, swelling, crepitus, muscle tightness, and weakness. Other conditions complicated their condition and affected their symptoms such as disc (ID 7), asthma (ID 3), and back problems (ID 10).

*"I cannot go up and down the stairs or walk long distances. I have a back problem as well, so this might have increased the problem" (10)*

#### *Psychological impact of knee OA*

There is also the psychological impact of knee OA which limited physical activity and participation. The participants commonly expressed fear of pain as they linked this increase to worsening of knee OA. In addition, participants showed fear of flare ups (n=2), fear of increasing the damage in the knee (n=2), fear of operative procedures (n=1), fear of damaging the kidneys if analgesics were used (n=1), and fear of falling (n=1).

The participants were also frustrated by their condition as it has changed their lifestyle in many ways. Many activities were limited which increased their dependency on family members and restricted their participation in outings and social events due to fear of being injured.

*"...I am afraid that someone might bump into me and I would fall especially when I am outside and no one is with me to help. If my daughter was not with me today, I would not have come" (12)*

### *Theme 2: Activity limitation and participation restriction*

The reported activity limitations and participation restrictions and their ICF codes are presented in table 4.

#### *Factors influencing the activities (changes in symptoms)*

Most of the participants agreed that their symptoms were variable and not constant. They referred the increase in symptoms from one day to another to activities including sit to stand, ascending and descending stairs, house chores, twisting the knee, sleeping, sitting, walking long distances, walking uphill and downhill, and standing for a long time. Being tired or upset, cold weather, and gaining weight were also reported to increase knee OA symptoms.

*"My knees hurt more when I am tired, if I stood for too long, or did a wrong movement and twisted my knee" (1)*

Moreover, as a Muslim community, participants reported an increase in symptoms while praying. Only one participant did not know the reasons for increase in symptoms (ID 5).

Many participants believed an increase in symptoms suggests deterioration of knee OA and their knees will eventually get worse:

*"I would not consider the increase in pain something normal. I know that eventually things will get worse but at least now I am able to walk around compared to others who cannot" (12)*

#### *Cultural perspective to activity limitation and participation restriction*

As a Muslim community, many of our participants reported limitation in praying; they would pray sitting on a chair rather than standing and heel-sitting. Moreover, house chores are mainly performed in Jordan by women as they are perceived responsible for taking care of the families. Since the majority of our participants were females, limitation in performing house chores (n=10) was a common concern.

*"I do not move that much anymore and my housework is limited. I cannot clean high or low surfaces. I even pray sitting on a chair" (12)*

In addition, all female participants except for one were housewives which could also be a reflection of the culture in Jordan. The male participant was also unemployed (retired).

Therefore, there were not activity limitations or participation restrictions that are related to being employed.

#### *Social perspective to activity limitation and participation restriction*

The participants reported inability to attend social events because of their condition.

*"I do not use the stairs anymore because of my knee pain. So, I do not go to weddings or events if there was no elevator" (5)*

Also, dependency on family members to perform certain activities such as house chores and going out were mentioned:

*"I used to go out to get my things now I depend on my children to get them for me" (11)*

*Insert Table 4 here*

#### *Theme 3: Personal factors*

##### *Knowledge and personal interpretation of disease process*

On the individual level, there was lack of knowledge of body changes with knee OA. Most of the participants were uncertain of how knee OA affected their body (IDs 1,3,5,7,8,9,11,12,13,14). Knowledge for some was inferred from feelings:

*"I feel there is a knot at the back of my knee" (4)*

The participant's knowledge was limited to changes in structures; this included the cartilage (n=10), muscles of the lower leg (n=9), dryness (n=7) or increase (n=2) of the fluids inside the joint, and the patella (n=2). Two participants did not know which structures were affected by knee OA.

One participants explained the causes of knee OA:

*"There's a cartilage at the knee joint, this cartilage becomes dry either because of lack of movement, obesity, or genetic reasons, . . . . . " (8)*

Despite this lack of knowledge, the participants showed lack of interest in education about knee OA:

*"I do not know why my pain increases. I do not care why it increases I only know there is pain" (11)*

##### *Knowledge of management options to relief symptoms (self-management)*

There was lack of knowledge of self-management options and dependency on physicians to manage knee OA:

*"If I had a muscle spasm at home, I would not do anything and would book an appointment with my doctor" (3)*

The participants described a number of strategies to manage their symptoms including creams and medications (n=12), losing weight (n=7), ice (n=4), simple knee range of motion exercises (n=3), elevation of the legs (n=2), walking (n=2), rest and pacing activities (n=2), pillows under the knees (n=1), knee brace (n=1), physiotherapy (n=1), massaging (n=1), or stretching (n=1) a tight muscle.

Personal factors influenced the use of medication. Two participants did not use NSAIDs; one because of kidney problems and the other for fear of damaging the kidneys by medication. One participant refused to take medications because she did not want to expose her body to chemical substances. Another did not use medical creams because she hated their texture.

*"I would sit down and rub cream on my knees. I was given pills for the pain but I do not take them as I was told they would affect the kidneys" (10)*

In addition, the possibility of gaining weight limited the use of some medications:

*"The problem with medications is that they increase body weight. So, I do not take Brufen unless I am really in pain and the next day I do not take it if the pain decreased" (ID 6)*

#### *Influence of personal factors on activity and participation*

The participants knew that gaining weight would increase their symptoms and decrease their physical activity whereas losing weight would improve their condition. However, there seemed to be a difficulty in changing behavior and maintaining a healthy lifestyle to lose weight:

*"I know my body weight affects my knees. I lose weight but I gain it back again" (1)*

Also, emotional and behavioral perceptions such as being upset or tired were reported to affect level of physical activity:

*"If I feel energized and well I would move but if I am tired or upset, I feel sick and do not move at all. As if it affects me psychologically" (1)*

Lack of knowledge of how knee OA develops and its aggravating and relieving factors also caused fear and uncertainty that limited the participants' physical activity and participation:

*"For three years now I do not climb stairs because I am afraid my knees would hurt. I live on the ground floor (3)*

Finally, support from family members encouraged the participants to go out and move:

*"If my daughter was not with me today, I would not have come" (12)*

#### *Theme 4: Environmental factors*

Environmental factors influencing physical activity and participation were mapped to the ICF model and are presented in table 5.

#### *Service delivery process*

There is lack of standardized management pathway with limited access to physiotherapy. The healthcare system in Jordan does not allow self-referral to physiotherapy. Therefore, the first contact point by our participants was their physicians. They were offered different management options including medications, surgery, and physiotherapy without any justification. Medications were prescribed to all participants whereas surgery was offered to two participants only. Physicians referred eleven participants to physiotherapy however it was not considered a priority; mainly referral was either late or as an alternative to surgery.

*"First, the Dr. told me I need surgery, but I did not want to do it. He told me to try physiotherapy" (5)*

As for physiotherapy sessions, a predetermined package of 12 sessions that included hot or cold packs, electrotherapy, and exercise was prescribed to the eleven participants.

Inappropriate exercise prescription characterized by: late prescription, late introduction (home exercises only), lack of monitoring to the performance of exercises, ineffective communication, and limited use of exercise leaflets (n=2).

The exercises were also prescribed inappropriately demonstrated by the number of repetitions, type, and frequencies. Strengthening exercises were rarely prescribed and the exercises were not progressed throughout the sessions. Most participants were advised to walk.

*"I was told to pull my foot up and hold for 10 seconds then relax. I would do each leg separately and then both together. I was not provided with other exercises. My Dr. advised me to walk" (3)*

#### *Ineffective communication across the care pathway*

The limited knowledge on knee OA is the consequence of lack of communication with the physicians (IDs 2,6) and inadequate education offered by healthcare professionals. The participants mentioned that their physicians did not explain the underlying pathology, they mainly looked at X-rays and informed them if they were diagnosed with knee OA or not.

#### *Environmental factors (facilitators and barriers)*

Many environmental factors were reported to decrease physical activity and participation (barriers) including cold weather, stairs, and accessibility to services.

One participant reported waiting for two months for her physiotherapy sessions:

*"The doctor referred me to physiotherapy, but it took me two months to start the sessions" (8)*

On the other hand, facilitators to participation included tools to improve accessibility such as using cars, wheelchairs, and elevators.

*"I do not go out much anymore.....I always use the car. Even when I go to the mall I use a wheel chair..." (10)*

*Insert Table 5 here*

## **Discussion**

The culture and lifestyle in the Middle East are different when compared to the developed world, which could influence the experience of people with knee OA. This is the first study to explore the knowledge of knee OA and its impact on health in patients diagnosed with the condition living in the Middle East, particularly in Jordan. Limited knowledge of knee OA was reported, which in part is attributed to the inappropriate service delivery process with poor communication with healthcare professionals and lack of education. Knee OA significantly limited physical activity and participation, however this limitation was not only caused by their knees but also by the culture in Jordan. Mapping the results to the ICF framework allowed international comparisons emphasizing the impact of culture on health.

There was lack of understanding of body changes with knee OA as demonstrated by the mixed answers of the participants. Most limited the changes to affect body structures only and none mentioned changes to body functions as in muscle weakness. Knee OA is known in Arabic as "roughness of the knee" which might explain why most considered knee OA as dryness of the liquid inside the joint and increased friction. However, little was known on how it develops, risk factors, and prognosis. Limited knowledge of the pathology of knee OA was also reported in the United Kingdom<sup>3</sup>. Moreover, knee OA was perceived as an "inevitable" condition that would deteriorate with age. Similar perspectives towards knee OA were reported worldwide<sup>8</sup>.

When exploring our participants' understanding of the change in symptoms, they mainly linked other emotions and feelings such as tiredness and fear of pain. Fear would limit activities and participation and increase the risk of disability<sup>35</sup>. For example, people with knee OA decrease their activity fearing exacerbation of symptoms<sup>8</sup>. However, physical activity and exercises are self-management strategies used to decrease symptoms<sup>36,37</sup>. Therefore, it is essential to overcome fear of pain and falling which could be established through education and self-management programs<sup>38</sup>.

Our participants were not aware of appropriate self-management options or behavioral modification techniques to manage their symptoms. Comparable with other studies, the use of medication was the first

option<sup>39,40</sup>. One would expect the participants who were referred to physiotherapy to use exercises more often to decrease their symptoms and improve function. However, this was not demonstrated which could be justified by lack of education on the importance of exercise with knee OA and inappropriate exercise prescription resulting in lack of effectiveness and direct the participants to use medications to relief their pain. Hurley et al<sup>39</sup> reported similar results on the limited use of exercise as a self-management option. Nevertheless, their participants were aware of more self-management strategies such as ice, knee sleeves, and pacing which might be explained by the increased contact sessions with the physiotherapists compared to the physicians.

The lack of knowledge of knee OA and inability to manage it could also be caused by the inappropriate service delivery process. In Jordan, exercises were not considered core management options for knee OA as recommended by international guidelines<sup>24,25</sup>. This was demonstrated by the late referrals to physiotherapy and the limited and inappropriate prescription of exercises. A systematic review showed that GP's beliefs varied from advising complete rest to recommending exercises, still their actual behaviour showed low physiotherapy referral rate<sup>41</sup>. These results should be considered carefully as they are based on small number of studies and some depended on patient's reporting of their GP's behaviour.

Moreover, our participants referred their limited knowledge to the insufficient information provided by health-care professionals. It is worth noting that many of our participants had basic school education so their ability to read and seek information by themselves was limited. Several studies reported that patients with knee OA lacked the knowledge that would enable them to manage their pain<sup>2-5</sup>. Lack of education resulted in more pain, depression, and lack of coping strategies<sup>42</sup>. Therefore, international guidelines recommend providing education individualised to the participant including: knowledge of OA, pacing activities, exercise, weight loss, and assistive technology<sup>25</sup>.

Our participants' experience of symptoms with knee OA were comparable to those of other populations worldwide including pain, stiffness, fatigue, swelling, muscle weakness, crepitus, and fear<sup>8</sup>. Fear included fear of falling, fear of deterioration of OA, fear of becoming a burden<sup>8</sup>. Our participants depended on their families to overcome these fears. However, there was a sense of frustration caused by this dependence on others. Many studies reported frustration of people with knee OA as a result of limited activity and loss of independence<sup>5,43</sup>.

Exploring the experiences of people diagnosed with knee OA worldwide, mainly in developed countries, demonstrated activity limitations were similar across populations including walking, standing, sitting, ascending and descending stairs<sup>2,3,8,14</sup>. Our study showed similar results in addition to restrictions in religious activities as people living in Jordan are mainly Muslims. Xie et al<sup>14</sup> reported comparable results from the experiences of participants from Singapore as they have a large Muslim population.

A Few of our participants reported limitation in walking long distances (n=6) and none reported limitation in activities such as getting on or off a bus, travelling, driving, or activities needed for a certain job. Those activities were restricted by knee OA in Singapore<sup>14</sup>. Also, limitation in work performance was reported by different populations<sup>8</sup>. However, Jordan has a different culture; most female participants in our study are housewives which is common for women in Jordan and the male participant is retired, the transportation system is not well structured and people have to walk long distances to reach a bus stop thus limiting physical activity. In addition, Jordan has many hills and valleys limiting walking long distances. From the social perspective, families are accustomed to attending many social events. Our participants reported restrictions in socializing where they would depend on family members to help them.

Environmental facilitators reported by our participants included using cars, elevators, and wheelchairs. On the other hand, uneven grounds, cold weather, and service accessibility difficulties adversely affected the participants' experience. Xie et al<sup>14</sup> was the only study to explore environmental factors affecting participants from Singapore and reported similar results.

This is the first study to explore the knowledge of knee OA and its impact on the health in the Middle East and to compare the results with developed countries. The results increase the awareness of healthcare

professionals in Jordan on the limitations in delivered services and the importance of education. They also highlight the role of healthcare professionals worldwide in understanding the impact of culture on health when managing people with knee OA from different populations. Using a triangulation method enriched the data. The ICF was used to comprehend the experiences of participants as it provides a common language for research and clinical practice. Therefore, mapping our results to this framework allowed comparability with other studies and both environmental and personal factors were explored which was limited in previous studies. Furthermore, the principle investigator conducted the focus group and interviews which allowed close observation of the participants' responses and eliciting more responses based on her experience with knee OA. Nonetheless, consensus meetings were held by the research team to interpret the data to avoid imposing previous knowledge on emerging data<sup>44</sup>.

We had access to one local hospital therefore a convenient sampling method was used instead of the ideal purposive method. Although this is a central hospital in the Capital Amman, the results might not be generalised to the Jordanian population. Moreover, the majority of the participants were middle-aged unemployed females. We aimed to recruit both genders and conducted gender-specific focus groups to respond to cultural sensitivity, to avoid any embarrassment when expressing ideas, and to take into consideration that activities and participation might be gender-specific. However, we were able to recruit one male participant only; which might have biased our results. This could be explained by the culture as men are perceived the main providers for their homes and do not have time to participate in research whereas older women are mainly housewives and have time to spare. Therefore, future studies should explore the perspectives of a larger sample of both genders with a wider educational background and work experiences and in different settings in Jordan.

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## Conflict of interest

The authors report no conflicts of interest

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Table 1. Topic guide for the focus group and the semi-structured interviews

### Knowledge of knee osteoarthritis (OA)

Structures affected by knee OA Reasons for increase in symptoms Management options to relief symptoms Management of knee OA Options offered by physician

### Impact of OA

Chief complaint Variability of symptoms Impact on activities of daily living Impact on participation

Table 2. Techniques to ensure trustworthiness of the study

Criteria	Techniques used to meet the criteria
<b>Credibility</b>	Accurate description and identification of research participants The interpretation of the data was validated through regular meetings with the research team During the focus group, the moderator rephrased, repeated and further explained the questions when need
<b>Transferability</b>	The interpretations developed from the focus group were verified from the semi-structured interviews
<b>Dependability</b>	Keeping a research diary of all processes, activities, and decisions Using the triangulation method The techniques used to rephrase and summarize the data from the interviews and the focus group Using focus groups and semi-structured interviews (triangulation mehod)
<b>Confirmability</b>	The transparency of the analysis process by using a pre developed framework analysis The analysis was performed by more than one researcher and final interpretations were developed after discussions with the research team Revising the transcribed data with the notes taken in the focus group and the semi-structured interviews

Table 3. Demographic data of the participants (mean (SD))

VAS = Visual Analogue Scale, K/L = Kellgren and Lawrence scale

<b>Age (years)</b>	60.21 (9.4)	60.21 (9.4)	<b>Gender</b>	F (n=13) M (n=1)
<b>Height (cm)</b>	166 (10.18)	166 (10.18)	<b>Weight (kg)</b>	85.5 (13.68)
<b>VAS (out of 10)</b>	5.43 (2.21)	5.43 (2.21)	<b>Time since diagnosis (years)</b>	6.51 (8.13)

<b>Age (years)</b>	60.21 (9.4)	60.21 (9.4)	<b>Gender</b>	F (n=13) M (n=1)
<b>Unilateral OA</b>	n= 2	n= 2	<b>Bilateral OA</b>	n= 12
<b>Education</b>	High school (n=6) Diploma (n=3) Illiterate (n=2) 8 <sup>th</sup> grade (n=1) 6 <sup>th</sup> grade (n=1) BSc. (n=1)	High school (n=6) Diploma (n=3) Illiterate (n=2) 8 <sup>th</sup> grade (n=1) 6 <sup>th</sup> grade (n=1) BSc. (n=1)	<b>Occupation</b>	House wife (n=12) Retired (n=1) Teacher (n=1)
<b>Other medical conditions</b>	Hypertension (n=7) Diabetes (n=3) Heart disease (n=2) Degenerative disc disease (n=1)	Hypertension (n=7) Diabetes (n=3) Heart disease (n=2) Degenerative disc disease (n=1)	<b>Physiotherapy referral</b>	Referred (n=11) Not referred (n=3)
<b>K/L grade</b>	<b>Unilateral</b> <b>Bilateral</b>	<b>Grade 3</b> <b>Grade 2</b> <b>Grade 3</b> <b>Grade 2&amp;3</b>	Kidney problems (n=1) Inner ear problem (n=1) None (n=3)  n=2 n= 6 n=4 n= 2	Kidney problems (n=1) Inner ear problem (n=1) None (n=3)  n=2 n= 6 n=4 n= 2

Table 4. The reported activity limitations and participation restrictions and their ICF codes

<b>Activity limitations</b>	<b>ICF code and title</b>	<b>ICF code and title</b>	<b>Activity limitations</b>	<b>Activity limitations</b>	<b>ICF code and title</b>
Sit to stand (n=11)	d4103 Sitting	d4103 Sitting	Sleeping (n=2)	Sleeping (n=2)	d4150 Maintaining a lying position, b1343 Quality of sleep
Ascending and descending stairs (n=11)	d4551 Climbing	d4551 Climbing	Pain when carrying heavy objects (n=2)	Pain when carrying heavy objects (n=2)	d4302 Carrying in the arms
House work (n=10)	d6400 Washing and drying clothes and garments d6401 Cleaning cooking area and utensils d6402 Cleaning living area	d6400 Washing and drying clothes and garments d6401 Cleaning cooking area and utensils d6402 Cleaning living area	Pacing (n=2)	Pacing (n=2)	d2101 Undertaking a complex task
Praying at home (n=6)	d9308 Religion and spirituality, other specified	d9308 Religion and spirituality, other specified	Moving around at home (n=2)	Moving around at home (n=2)	d4600 Moving around within the home

<b>Activity limitations</b>	<b>ICF code and title</b>	<b>ICF code and title</b>	<b>Activity limitations</b>	<b>Activity limitations</b>	<b>ICF code and title</b>
Walking long distances (n=6)	d4501 Walking long distances	d4501 Walking long distances	Difficult to pick up anything from the ground or even the lower kitchen cupboards (n=2)	Difficult to pick up anything from the ground or even the lower kitchen cupboards (n=2)	d4101 Squatting, d4102 Kneeling, d4105 Bending
Walking short distances (n=3)	d4500 Walking short distances	d4500 Walking short distances	Walking on uneven surfaces (n=1)	Walking on uneven surfaces (n=1)	d4502 Walking on different surfaces
Standing (n=3)	d4104 Standing	d4104 Standing	Standing for a long time (n=1)	Standing for a long time (n=1)	d4154 Maintaining a standing position
Sitting for a long time (n=1)	d4153 Maintaining a sitting position	d4153 Maintaining a sitting position			
<b>Participation restrictions</b>	<b>Participation restrictions</b>	<b>ICF code and title</b>	<b>ICF code and title</b>	<b>ICF code and title</b>	<b>ICF code and title</b>
Do not go out of their homes as before for errands, shopping, or social events (n=11)	Do not go out of their homes as before for errands, shopping, or social events (n=11)	Do not go out of their homes as before for errands, shopping, or social events (n=11)	Do not go out of their homes as before for errands, shopping, or social events (n=11)	d4602 Moving around outside the home and other buildings d6200 Shopping d9205 Socializing	d4602 Moving around outside the home and other buildings d6200 Shopping d9205 Socializing

Table 5. The environmental factors affecting the participants and their ICF codes

<b>Environmental factors</b>	<b>ICF code and title</b>
Support from family members (facilitator) (n=4)	E310 Immediate family
Using a car (facilitator) (n=1)	e1 200 General products and technology for personal indoor and outdoor mobility and transportation
Using a wheelchair (facilitator) (n=1)	
Elevators (facilitator) (n=1)	e1501 Design, construction and building products and technology for gaining access to facilities inside buildings for public use
Lack of education (barrier) (n=10)	e450 Individual attitudes of health professionals e5850 Education and training services
Cold weather (barrier) (n=1)	e2 250 Temperature