ASSESS THE KNOWLEDGE OF OSTEOARTHRITIS MANAGEMENT AMONG PRIMARY HEALTH CARE PHYSICIANS AT PRIMARY HEALTH CARE CENTERS OF MINISTRY OF HEALTH MAKKAHAL-MUKARRAMAH CITY, 2019

Mohammad Hamzah Mlibary[1], Hassan Ali Mohammad Saeed Alahmadi[2], Yasser Ali Mohammad Saeed Alahmadi[3], Ahmed Mohsen BakheetAlharbi[4], Mohammed Mohsen BakheetAlharbi[5], FahadMohammed Mosfer Alqarni[6], AbdulazizAbdullahhMayudhAlwuthaynani[6], Ahmad WaselAlharbi[7], WaadNaser Alotaibi[8]

[1] Family Medicine consultant, vision realization office at Makkah regional health directorate, Ministry of Health, Makkah, Saudi Arabia.

[2] Nursing technician, Public Health, Ministry of Health, Makkah, Saudi Arabia.

[3] Medical records technician, Al Noor Specialist Hospital, Ministry of Health, Makkah, Saudi Arabia.

[4] Nursing technician, Public health- Epidemiology, Ministry of Health, Makkah, Saudi Arabia.

[5] Assistant Pharmacist, IbinSina Hospital Ministry of Health, Makkah, Saudi Arabia.

[6] Technical director of a health center, Medicine and Public health, Ministry of Health, Makkah, Saudi Arabia.

[8] Health administration specialist, Jamoum Health Sector Ministry of Health, Makkah, Saudi Arabia.

[9] Nursing technician, Al Adel PHC, Saudi Arabia., Ministry of Health, Makkah, Saudi Arabia.

Abstract

Background:

Primary health care physicians manage most patients with osteoarthritis. Osteoarthritis (OA) is one of the leading causes of disability. The prevalence of OA is expected to increase because of ageing and obesity, and health care professionals must prepare for a rise in the demand for OA care. Osteoarthritis (OA) is the most common form of arthritis and the leading source of physical disability in elderly people. The Prevalence of OA is increasing and will continue to do so as the population gets older. The OA is predominantly managed in primary care centers by primary health care physicians and much can be done to alleviate symptoms from osteoarthritis by combinations of therapeutic options including pharmacological and non-pharmacological treatments, in the Kingdom of Saudi Arabia. The diagnosis is made by history, typical x-ray findings and non-contributory laboratory investigations. The understanding of the pathogenesis of the condition is undergoing change. The development of osteoarthritis is dependent on age, sex, genetic predisposition, and previous trauma to the joint and abnormal mechanical forces caused primarily by obesity.

Aim of the study: To assess the level of knowledge of Osteoarthritis Management among Primary Health Care Physicians at Primary Health CareCenters of Ministry of Health.

Methods: Cross-sectional study was done, including a representative random sample of PHC physicians working at PHC centers of MOH in Makkah city. during the October to December, 2019, the Sample size of physicians working at PHC centers . Our total participants were (150)

.**Results:**the majority of participant (44.0%) have weak level of total knowledge about Osteoarthritis Management followed by (35.0%) of participant average while Range(2-8) and Mean ±SD(5.15±2.877) and also shows that is a statistical significant were Chi-square 12.52and P=0.0019

Conclusion: Conduct Saudi guidelines and further studies to assess the practice of PHC physicians regarding osteoarthritis, is recommended. Overall knowledge of PHC physicians in Makkah city regarding OA is acceptable; despite being deficient in some important issues. Finally, when the conservative management by the primary care physician is of benefit no longer, judicious referral to an experienced Orthopedic Surgeon for the modern surgical approaches should be

Keywords:Assess, osteoarthritis, knowledge, primary healthcare

1. INTRODUCTION

Osteoarthritis (OA) is the most prevalent arthritis and among the leading causes of disability worldwide.[1] Its prevalence in many countries exceeds the prevalence of other common medical conditions such as diabetes mellitus, hypertension, ischemic heart disease, and tuberculosis.[2,3] It affects the quality of life physically, emotionally, and socially. [4, 5]

he disorder is one of the most common conditions encountered by both primary health-care (PHC) physicians and specialists.[6] It is a degenerative disorder involving not just the articular cartilage but the entire joint organ,

including the subchondral bone and synovium.[7] Despite many years of research, the condition still has an uncertain aetiology. However, wide range of systemic, genetic, biomechanical, and environmental factors contribute to the development of this condition.[8]

About 10% of the world's population aged 60 years or older have significant clinical problems attributed to OA according to the World Health Organization (WHO) Scientific Group on Rheumatic Diseases. [9]

In the United States, Osteoarthritis is affecting 22% of the population and expected to affect approximately 67 million adults.[10]Whereas about 8.5 million adults have osteoarthritis, and over 2 million patients consult their general practitioners in primary care regarding osteoarthritis-related symptoms each year in the United Kingdom.[11]

OA is a progressive degenerative disease characterized by joint pain, tenderness, and decreased the range of motion, and the most commonly affected joints are hands, hips, knees, back, and neck.[12] It can be categorized into primary or secondary depending on the presence or absence of the identifiable underlying condition, further divided as generalized or limited to a localized area.[13] The cause of OA is multifactorial, age, obesity, physical inactivity, trauma, and family history are risk factors for it. [10] Obesity is considered a strong risk factor for knee OA.[14]

Osteoarthritis (OA) is a serious joint disease characterized by pain, disability, and impaired quality of life. Prevalence of OA increases with age, and nearly one in two people will develop symptomatic knee OA and one in four symptomatic hip OA in their lifetime [15,16]. With an aging population and the epidemic of obesity, theprevalence of OA is set to rise [17]. OA is one of the leading causes of pain and disability for the adult population worldwide [18] and one of the major contributors to years lived with disability[5]. The costs of treatment and work-related losses represent a considerable economic burden [19,20]. Recommended first-line, core treatments include patient education, self-management, exercise, and weight reduction [5,17,21].

Regarding the diagnosis of OA, is clinical diagnosis without investigation if a patient aged 45 years or older, has activity-related joint pain and has either no morning joint-related stiffness or morning stiffness that lasts 30 minutes or less.[22] The primary goal of treatment of OA is educating the patient about the disease, minimizing pain, and improving joint function.[11] Non-pharmacological intervention such as weight loss and physical therapy considered the cornerstone of OA treatment.[23] However, the cornerstone of pharmacological therapy is Non-Steroidal Anti-Inflammatory Drugs(NSAIDs).[10]

Since it is estimated that only 12–53% of patients with symptomatic OA should be offered arthroplasties [22], it is important to improve the uptake of high-quality non-surgical care. In addition, previousresearch has suggested an overuse of resource intensive Magnetic Resonance Imaging (MRI) in the diagnosis and treatment of moderate to severe OA [23]. Since decisions on joint replacement can be made using the less resource intensive conventional radiographs, and use of Magnetic Resonance Imaging (MRI) is usually unnecessary [24], this resource overuse should be addressed.

1.2 Literature Review

Al-Rashdi et al [11] study in Oman which documented that PHC physicians with specialty degree had higher knowledge in osteoarthritis and its management than PHC physicians with diploma and/or general practitioners. Paskins study showed that the general practitioners need competent knowledge to deal with OA cases in primary health care centers [25]

Al-Arfaj A et al. performed a cross-sectional study in Saudi Arabia and showed the prevalence of OA in 46 to 55 years old is 30.8% and 60.6% of patients aged 66-75 years.[26]

Denoeud et al[17] study in France who detected that longer career duration since graduation for doctors is significantly related to their knowledge in osteoarthritis effective management.[17]

In 2011, Al-Hazmi A carried out a cross-sectional study among 150 of primary health care physicians (PHCPs) in Al-Jouf province of Saudi Arabia, and it showed that 75.3% of physicians considered OA one of common disease in Saudi Arabia and 55% knew that OA diagnosed clinically. Regarding most commonly prescribed medication for OA, it revealed 74% of physicians prescribed oral non-steroidal anti-inflammatory drugs, 18.2%prescribed acetaminophen, and topical NSAIDs in 6.5%. Furthermore, 71.4% of physicians educated their patients about OA, 79.2% discussed weight loss, and 36.4% of physicians considered continuity of care in their practice. However, most of them will refer OA patients to the rheumatologist immediately or later.[22]

Conversely to the previous study, Doubova S et al. in their cross-sectional study in 2015 regarding the quality of care for hip and knee osteoarthritis at family medicine clinics conducted that in-patients who are 20 years or older and had knee OA. It revealed that 26.1% of patients advised for exercise, physicians referred 19.6% of patients to the dietician and prescribed NSAIDs for 71.5 %of patients aged 65 years or more. However, Acetaminophen was used only in 5.2% of patients as the first line of treatment.[27]

Sancheti P et al. conducted a multi-center cross-sectional study on the management of knee pain and early OA in India, published in 2017. The study included patients with knee pain and their orthopedic surgeon. They completed

the questionnaire which constructed to assess patient's knowledge about OA and their surgeon regarding OA severity and management. It showed 91.6% of patients had received medication, whereas 81.9% had non-pharmacological treatment, and 55.2% of patients had physical therapy. On the other hand, physicians prescribed oral medication, intra-articular steroid, and surgical management in 83.3%, 29.8%, and 13.2% of patients, respectively.[28]

Additionally, in 2012, Gronhaug.G et al. performed a cross-sectional survey of the quality of hip and knee osteoarthritis management in primary health care. It carried out among patients diagnosed with OA, and the result discussed where 55% of patients with knee OA visited their GPs and 65% with hip OA. Patients who informed regarding exercise and physiotherapy was 84% and 76% referred to a physiotherapist. However, only 8% of patients referred to the dietician for weight reduction.[29]

On the other hand, Kingsbury SR et al. in 2012 conducted a study in the UK regarding current OA treatment, prescribing influences, and barriers to implementation in primary care. The survey carried out among UK general practitioners (GPs), and it revealed that 52% of GPs does not use educational materials for OA, most commonly due to lack of time 55%, material availability and material quality 54% and 67.28% respectively. Furthermore, 69% recommended exercise, 64% prescribed paracetamol, and topical non-steroidal anti-inflammatory drugs (NSAIDs), which were the most used management strategies. However, 35% who were prescribed NSAIDs and 31% who have referred their patients to a physiotherapist.[30]

2. RATIONALE

Osteoarthritis is common presents in primary care, it is usually diagnosed and treated initially by primary health care physicians. The primary health care physicians are the first contact with the patient, and they can provide comprehensive and continuing care for patients. Up to the researcher knowledge, only a few studies are carried out regarding OA in Primary care in Saudi Arabi

2.1 AIM OF THE STUDY

To assess the level of knowledge of the osteoarthritis Management among Primary Health Care Physicians at Primary Health Care Centers of Ministry of Health ..

2.2 OBJECTIVES

- To assess the level of knowledge of Osteoarthritis Management among Primary Health Care Physicians at Primary Health Care Centers of Ministry of Health 2019
- To identify if there is an association of socio-demographic characteristics and knowledge of the osteoarthritis Management among Primary Health Care Physicians at Primary Health Care Centers, 2019.

3. METHODOLOGY (MATERIALS AND METHODS)

3.1 STUDY DESIGN

Cross-Sectional study design

3.2 STUDY AREA

The study will be carried out in the city of Makkah Al-MokarramahMakkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi Arabia and called the Holy Capital. Contains a population around 1.578 million. This study was conducted in Makkah primary health–care centers at saudi Arabia, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the Makkah population. According to the Ministry of Health (MOH) website, the government provides free of charge medical services to all citizens of Makkah Al-Mukarramah urban and rural.The primary health care centers are arranged under seven supervisory sectors, in each sector; there are two reference centers. There are 37 PHCCs located inside Makkah Al-Mukarramah, organized under three supervisory sectors, namely (Al-Adel Sector, Al-ZahirSector, and Al-Ka'akiah Sector). The study was conducted at the 37 PHCCs located inside Makkah Al-Mukarramah.

3.3 STUDY POPULATION

The study was carried on primary health care physicians working at the 37 PHCCs of MOH located the Holy Makkah city. The total number of those physicians is 150.

3.4 INCLUSION CRITERIA

All Primary health care physicians who are working at PHCCs of the MOH inside Makkah Al-Mukarramah city, males and females were eligible for study inclusion.

3.5 EXCLUSION CRITERIA

- Primary health care physician on leave throughout the whole study period.
- Non-English-speaking physicians.

3.6 SAMPLE SIZE

The sample size is 150 physicians. It is calculated by using Raosoft website for sample size calculation and based on 95% confidence level, 5% margin of errors, and 50% response. However, it was increased by 10% for avoiding non-response error to become 150 physicians.

3.7 SAMPLING TECHNIQUE

- The researcher applied a simple sampling random technique.
- First, the researcher listed the names of primary health care physicians working at the 37 PHCCs in the three sectors (Al-Adel, Al-Ka'akiah, and Al-Zahir) inside Makkah, and she gave each physician a code number.
- Then the researcher used a random table generator website to select the sample from the prepared list.

4. DATA COLLECTION TOOL (INSTRUMENT)

A self-administered written, valid, and pretested questionnaire was utilized. The questionnaire is composed of (34) closed-ended questions, and it is divided into two parts:

- The first part consists of socio-demographic characteristics, which include (age, gender, post-graduate qualification, years in practice, and nationality).
- The second part contains (29) questions regarding knowledge (10 questions) and attitude (19 questions) of osteoarthritis management.
- For knowledge questions, a score was created by giving a score of "1" for a correct answer and "0" for an incorrect or missed answers. Thus, a total score ranged between 0 and ten was computed for each physician. The total knowledge score was abnormally distributed as proved by significant Shapiro-Wilk test (p=0.001).
- The questionnaire was revised and revalidated by two consultants.

4.1 DATA COLLECTION TECHNIQUE

Data were collected on October 2018 to December, 2019 , for three weeks (15 days) and the weak end was excluded. The researcher divided the total sample (150) on 30 days; therefore, she collected 5 samples every day. The researcher distributed the questionnaire. First, the researcher met each PHCC director and took permission for meeting each physician during the break time. Furthermore, the researcher took permission from each physician, gave them a brief idea about the research, explained that no more than 10 minutes will be taken from their time and asked them to fill the questionnaire.

4.2 STUDY VARIABLES:

- **Dependent variable:**

Knowledge and attitude regarding osteoarthritis management

- **Independent variables:**
  - Gender, Age, Post-graduate qualification, Years in practice at PHCCs, Nationality.

4.3 DATA ENTRY AND ANALYSIS

Statistical Program for the Social Science (SPSS), version 24 used for data entering and analysis**.**

Description:

Frequency and percentage applied to describe categorical data, whereas knowledge score described by median, inter-quartile range (IQR), and mean rank.

Statistical tests:

The Statistical Package for Social Sciences (SPSS) software version 24.0 has be used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using Chi-Square tests ($\chi2$) to test for the association and the difference between two categorical variables were applied. A p-value $\leq$ 0.05 will be considered statistically significant.

Significance: P-value *less or equal to 0.05* was used to indicate statistical significance.

4.4 PILOT STUDY/PRETESTING

The researcher performed a pilot study on 10% of the sample size, which is approximately 14 primary health care physicians to test the clarity of the questionnaire and the feasibility of the methods. No changes needed as feedback.

4.5 ETHICAL CONSIDERATIONS:

- Approval from the research committee was obtained.
- Approval from the concerned authority in the ministry of health and primary health care administration was obtained.
- The researcher obtained written permission from the Joint Program of Family Medicine in Makkah Al-Mukarramah.

- The researcher took written, informed consents from all participants.
- Acknowledgments provided to supervisor, advisor, facilitators, and participants.

4.6 RELEVANCE & EXPECTATIONS:

This study provided information regarding osteoarthritis management among PHCPs that might help in evaluating physician's knowledge and attitude toward OA management in primary health care centers.

4.7 BUDGET, FUND OR GRANT:

It was self-funded research.

5. RESULTS

Table 1. Distribution of the demographic characteristics of knowledge of Osteoarthritis Management about primary Health Care Physicians participants . (n=150)

Demographic data	N	%
Age		
<35	53	35.33
35-50	67	44.67
>50	30	20.00
Range	24-58	
Mean±SD	40.625±9.124	
Gender		
Male	74	49.33
Female	76	50.67
Nationality		
Saudi	69	46.00
Non-Saudi	81	54.00
Level of education		
MBBS	73	48.67
Diploma	15	10.00
Master	9	6.00
Board/equivalent	53	35.33
Years in experience		
≤5	60	40.00
>5-10	46	30.67
>10-20	30	20.00
>20	14	9.33
Range	2-23.	
Mean±SD	8.795±7.135	

Table 1 show the remaining socio-demographic characteristics of the physicians, the study included 150 physicians. Their majority of participant were (44.67%) from35-50 age ranged between (24 – 58) years with an Mean± SD were (40.625±9.124) and. Females represent 50.67% of them, and non-Saudis represent 54.0% of the physicians. Majority of them (48.67%) had MBBS whereas 35.33% had Board or equivalent degrees. Most of the participants (40.0%) had 5 years or less of experience in primary health care, while (9.33%) had an experience over 20 years. While ranged between (2 – 23) years with an Mean± SDwere (8.795±7.135)

Table 2. Distribution of knowledge of Osteoarthritis Management about primary Health Care Physicians

	Correct answer	N	%
The cause of primary osteoarthritis is:	Multifactorial in origin	132	88.00
Diagnosis of osteoarthritis can almost be made by history and physical examination.	TRUE	114	76.00
The following joints are commonly affected in osteoarthritis except:	Shoulders	45	30.00
All the following joints are often spared in osteoarthritis except:	Proximal interphalangeal [pip] joints	66	44.00
Radiographs changes of osteoarthritis include all the following except:	Symmetrical joint space narrowing	76	50.67
Selected key recommendations for the management of knee osteoarthritis include all the following except:	Pharmacologic therapy is the cornerstone of osteoarthritis management	77	51.33
Radiographs are generally the first line confirmation of the presence of osteoarthritis:	TRUE	105	70.00
Treatment should not be based solely on radiographic abnormalities:	TRUE	120	80.00
Primary and secondary osteoarthritis must be differentiated:	TRUE	129	86.00
Patients with osteoarthritis usually presents with all, except:	Moderate joint hotness	90	60.00

From table 2, it is seen that most of the physicians correctly knew that the cause of osteoarthritis is multifactorial, and primary and secondary osteoarthritis must be differentiated (88.0%). Most of them could recognize that radiographs are generally the first line confirmation of the presence of osteoarthritis (70.0%) treatment should not be based solely on radiographic abnormalities (80.0%), and diagnosis of osteoarthritis can almost be made by history and physical examination (76.0%)

On the other hand, more than half of the physicians (51.33%) knew that pharmacologic therapy is not the cornerstone of osteoarthritis management, proximal interphalangeal [pip] joints are often not spared in osteoarthritis (44.00%) and only (30.0%) could recognize that shoulders are not commonly affected in osteoarthritis.

Table 3. Distribution of total knowledge of Osteoarthritis Management about primary Health Care Physicians

Total knowledge		
	N	**%**
Weak	66	44
Average	53	35
High	31	21
Total	150	100
Score	**Range**	2-8.
	Mean±SD	5.15±2.877
Chi-square	12.52	
	0.0019*	

This table shows the majority of participant (44.0%) have weak level of total knowledge about Osteoarthritis Management followed by (35.0%) of participant average while Range(2-8) and Mean ±SD(5.15±2.877) and also shows that is a statistical significant were Chi-square 12.52and P=0.0019

Figure 1 Overall knowledge score of the primary health care physicians in Makkah regarding osteoarthritis
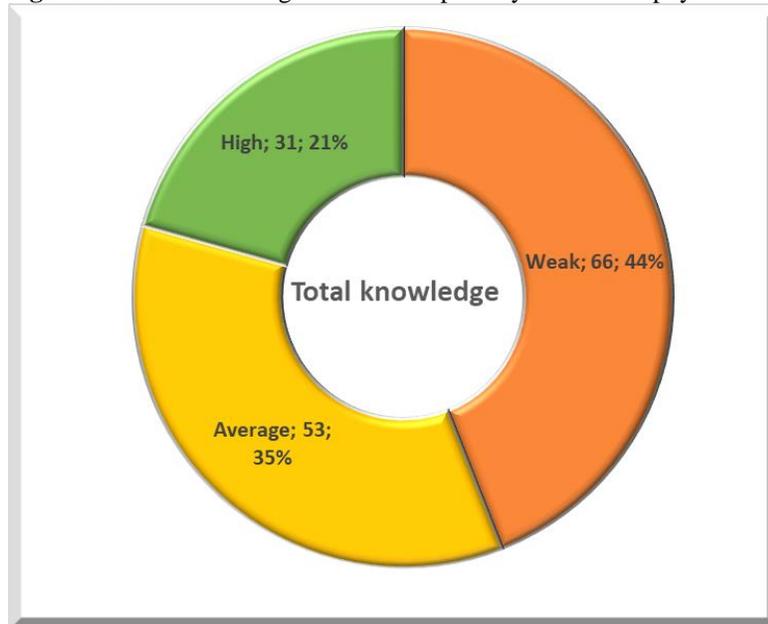
**Table(5)** Distribution of knowledge of Osteoarthritis Management about primary health care physicians and Socio-demographic factors (age, gender, level of education, Years in experience, sources of knowledge)

Knowledge		N	Knowledge			F or T	ANOVA or T-test	
			Mean	±	SD		test value	P-value
Age	**<35**	53	3.532	±	1.139	F	51.586	<0.001*
	35-50	67	5.315	±	2.153			
	>50	30	7.433	±	0.504			
Gender	**Male**	74	5.405	±	1.820	T	1.276	0.204
	Female	76	4.961	±	2.402			
Nationality	**Saudi**	69	4.551	±	2.304	T	-3.443	0.001*
	Non-Saudi	81	5.716	±	1.839			
Level of education	**MBBS**	73	3.616	±	1.350	F	64.174	<0.001*
	Diploma	15	5.200	±	2.396			
	Master	9	7.222	±	0.972			
	Board/equivalent	53	6.981	±	1.201			
Years in experience	**≤5**	60	3.050	±	0.964	F	191.960	<0.001*
	5-10.	46	5.630	±	1.289			
	10-20.	30	7.467	±	0.507			
	>20	14	7.929	±	0.267			

Show that is a significant relation between knowledge and demographic data regarding age (increase in >50 years follow) where F=51.586and P-value=0.001 by mean+ SD (7.433± 0.504).Regarding gender In our study the majority of our participants were noticed in male more than female with Mean± SD (5.405±1.820) with no significant relation between knowledge and gender were T=-1.276and P-value=0.204.Regarding Nationality show that a significant relation between knowledge and Nationality (increase in Non-Saudi) were T=-3.443and P-value=0.001 by mean+ SD (5.716 ±1.839).Regarding Level of education show that a significant relation between

knowledge and Level of education (increase in master) were F=64.174and P-value=0.001 by mean+ SD (7.222±0.972). Regarding Years in experience show that a significant relation between knowledge and Years in experience (increase in >20) were F=191.960 and P-value=0.001 by mean+ SD (7.929±0.267).

Figure 2 Distribution of knowledge of Osteoarthritis Management about primary health care physicians and Socio-demographic factors
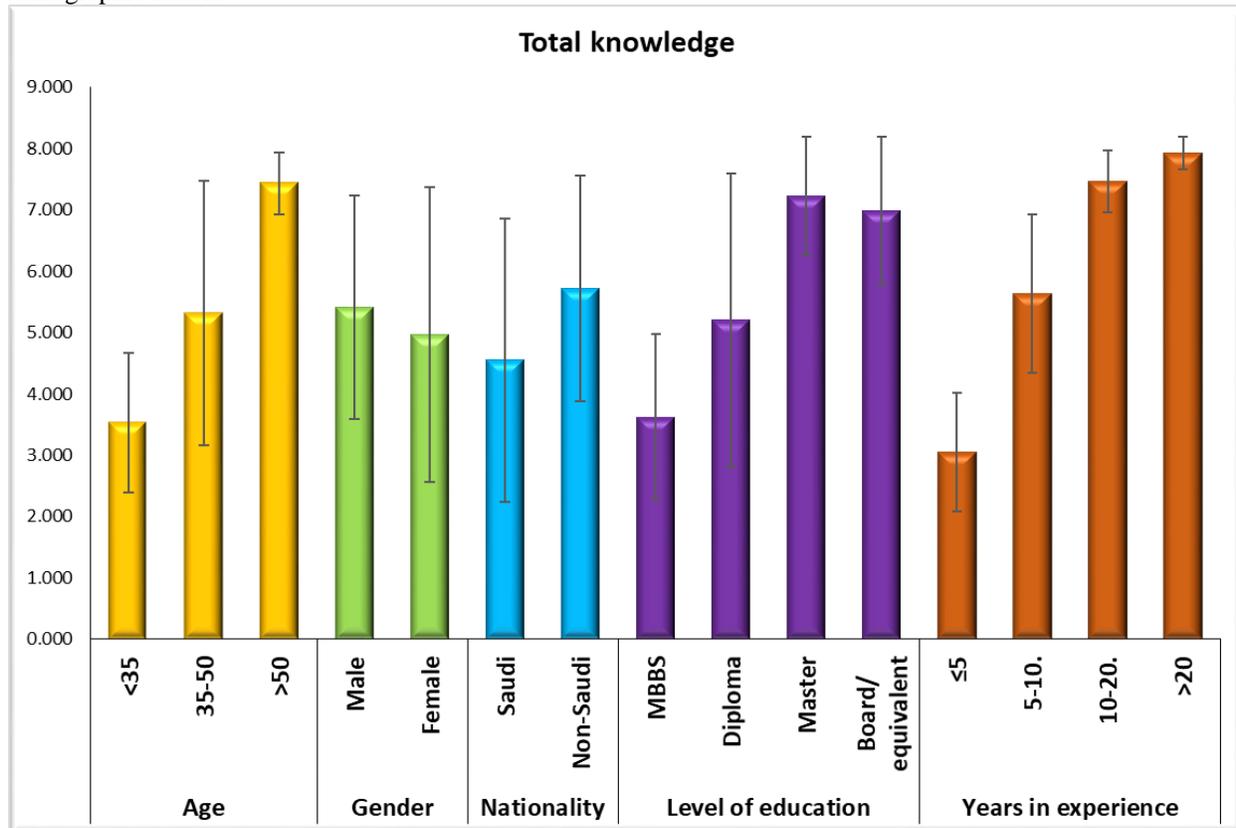
6. DISCUSSION

The primary healthcare (PHC) physiciansis mandatory for them to be familiar with the different management options to get maximum care for patients. Since the management of OA in primary health care settings has received limited attention in Saudi Arabia; the present study was conducted to evaluate knowledge of osteoarthritis management among primary health care physicians in Makkah Al-Mukarramah city. Osteoarthritis (OA) is one of the most prevalent disorders encountered among patients aged over 50 years by primary healthcare (PHC) physicians worldwide and in the Kingdom of Saudi Arabia.[31] Furthermore, PHC physicians are often the first and in many cases the only healthcare providers for patients with OA.(32, 8, 33). In the current study, almost three-quarters of physicians knew that the diagnosis of osteoarthritis can almost be made by history and physical examination were (88.0%) and exactly (70.0%)of them could recognize that Radiographs are generally the first line confirmation of the presence of osteoarthritis. It has been documented that for the diagnosis of OA, a careful history, physical examination, and radiographs may be needed to confirm the diagnosis.[34]In a study carried out in AlJouf, (14) more than two-thirds of physicians knew that the diagnosis of OA could almost be achieved by history and physical examination.

In accordance with Homoud AH,[22] nearly only a quarter of physicians in the present study knew that shoulder is less frequently affected by OA. Furthermore, about (60.0%) of the participated physicians knew that patients with OA usually not present with moderate joint hotness. This percentage was higher than that reported in a similar study carried out in AlJouf (39%).[22] A markedly hot joint suggests septic or inflammatory arthritis rather than OA.[35-30] So, this misconception among a considerable proportion of physicians could impact the quality of delivered

care.More than half of the physicians in this study (50.67%) compared to 39% in a study carried out in AlJouf[22] knew the characteristic radiographic changes in OA.[29-32] This finding is not satisfactory as radiography is generally helpful to confirm the diagnosis of OA.[29, 32]

Majority of the physicians (82.4%) in our study compared to only 59.7% in AlJouf`sstudy[22] could recognize that the etiology of primary OA is multifactorial. [34, 33]. Regarding OA management, proper management aims to relieve symptoms and improve the function of joints.[35] In the present study, less than half of the physicians knew that pharmacologic therapy is not the cornerstone of osteoarthritis management and, majority of them (particularly males) agreed with involvement of the family during education and management of OA patient.

The insufficient knowledge observed in this study regarding some issues could be explained by the fact that the most of the studied physicians claimed that their received training prepares them adequately to manage patients with osteoarthritis as well as the lack of Saudi guidelines to manage OA. Therefore, having adequate training and the existence of Saudi guidelines are essential in improving physician`s knowledge regarding OA in Makkah Al-Mukarramah city. In 2016, a systematic review of OA in general practice performed by Al-Rashdi A et al. found that the lack of adequate knowledge in OA treatment was one of the major limitations among GPs in osteoarthritis treatment.[32]

The overall knowledge score regarding OA was moderate as the median knowledge score was 6 out of 10. In AlJouf, Homoud AH described the knowledge of the PHC physicians regarding OA as inadequate.[22]

Fortunately, in the present study, the majority of PHC physicians were aware that OA is a common health problem in Saudi Arabia. In a similar study carried out in AlJouf,[22] more than 75% of the PHC physicians considered OA as a common health problem in KSA. Lim AY et al. (2011). [36] and Rosemann T et al. (2007) [37] reported that OA is an underestimated public health problem worldwide.

Regarding most commonly prescribed medication for OA, less than half of the surveyed physicians agreed that an oral non-opioid analgesic (e.g., acetaminophen) usually produce a satisfactory result in the treatment of osteoarthritis patients in general practice, and almost two-thirds of them perceived that non-drug therapy would be more beneficial than drug therapy for most osteoarthritis patients. In a study carried out in AlJouf, 74% of physicians prescribed oral non-steroidal anti-inflammatory drugs, 18.2% acetaminophen, and 6.5% topical NSAIDs.[22]

7. CONCLUSION

The knowledge, of primary health care centers physicians regarding osteoarthritis management was weak in general.The physicians with high degree of qualification (Board) had a better knowledge, attitude and practice than physicians with Diploma and GP. Better knowledge was seen for physicians who had less than 5 years in practice. Must be adherence to national guideline of osteoarthritis management with annual revision of these guidelines, continuous medical education should be maintained and monitored.

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