

Prevalence of arthritis among a sample of medical students at Faculty of Medicine, Ain Shams University, Egypt; A Cross-Sectional study.

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Abstract

Background: Osteoarthritis is highly endemic disease in Egypt. In high income countries higher arthritis prevalence is associated with low social class, however in low to middle income countries less is known about arthritis prevalence or its predisposing factors. **Objective:** To measure the prevalence of arthritis among a sample of medical students at Ain Shams University and to identify its probable associated risk factors. **Methods:** A cross sectional study was carried out at Faculty of Medicine, Ain Shams University. A convenience sample of 340 students was selected. Data were collected using a self-administered questionnaire. Arthritis was assessed using 2 diagnostic methods: 1) doctor-/health care provider–diagnosed arthritis. 2) Four arthritis definitions based on the International Classification of Diseases, Tenth Revision and WHO. Collected data were revised, coded, entered to a personal computer and analyzed using SPSS version 16. **Results:** The total prevalence of arthritis among the studied students was 8.9% based on both doctor diagnosis and WHO algorithm (7.1% based on doctor diagnosis and 2.1% based on WHO algorithm). Logistic regression analysis revealed that, residence in urban areas and female gender were the two independent risk factors associated with arthritis ($p < 0.05$). **Conclusion** Findings suggest that further studied are needed across this age group, and proper interventions are needed to overcome the consequences of arthritis later in life.

Keywords: Arthritis, Prevalence, medical students, Egypt. WHO algorism, diagnosis

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Introduction

Musculoskeletal disorders have become a serious issue that endangers our healthy aging globally, because these disorders are classified as the second most common cause of disability, measured by years lived with disability (YLDs) (1). According to the WHO the YLDs attributable to osteoarthritis have increased by 75% from 1990 to 2013, it represents 21.3% of all YLDs (1,2). Arthritis is the most concerning type of the musculoskeletal disorders (3). According to the Center of disease control and prevention

(CDC), Arthritis means inflammation and/or swelling of one or more joints. It describes more than 100 conditions that affect the joints, tissues around the joint, and other connective tissues. Specific symptoms vary depending on the type of arthritis, but usually include joint pain and stiffness (4). Arthritis is classified into many different types but the most common one is osteoarthritis (5). Arthritis or osteoarthritis became a public health problem that rising up every day, according to a study that was

held in America, 52.5 million adults in 2010 to 2012 compared to 67 million (25% of the projected total adult population) adults aged ≥ 18 years will have doctor-diagnosed arthritis by the year 2030 (6).

Osteoarthritis affects the quality of life, even it makes climbing stairs and walking difficult than any other disease (5). This deterioration of musculoskeletal function affects the ability of working and social activities, in addition, it can be fatal as it may lead to osteoporotic fracture and higher mortality rates than other people in the same age or gender. Moreover, it is the most common reason for total hip and total knee replacement (5,7).

There is a consensus in literature about the risk factors affecting the prevalence of arthritis as gender, joint trauma, exercising sports, genetics and obesity (4–6).

Unfortunately, there is scanty epidemiologic studies which measure the prevalence of arthritis among the youth specifically in Egypt, so the current study was conducted to measure the prevalence of arthritis in a group of medical students at Ain Shams University and to find out the probable risk factors associated with it. This will help the health care organizations in Egypt to take the arthritis among youth as a real threat for their quality of life and to put suitable intervention for them.

Material and Methods

Study population and design

A cross-sectional study was carried out at Faculty of Medicine, Ain Shams University. A convenience sample of 340 students was selected from grade one to six from both sexes.

Sample size

Sample size was calculated based on the following assumptions:

Prevalence of the arthritis =30% (R), alpha error = 5%, power =80% and degree of precision = 5%. the least required sample size was equal to 323. Adding 5% more for possibility of incomplete or unreliable questionnaires, the total sample size = 337.

Study tools

Data were collected during July 2018 to January 2019 using the following tools:

1. Self-administered questionnaire,

consisted of three sections;

Section one for participants' socio-demographic characteristics (age, sex, study grade, residency, father and mother educational levels, smoking status, etc.).

Section two asking for some health related items, self-rated health, ability to do some daily activities, sports and history of chronic diseases.). Self-rated health standard questionnaire of the National Health and Nutrition Examination Survey (NHANES) and National Health Interview Survey(NHIS) was used to assess the students' general health (8).

Section three was used for assessing the presence of arthritis. Arthritis was assessed using 2 diagnostic methods: 1) doctor-/health care provider–diagnosed arthritis, self-reported diagnosis of arthritis was based on participant responses to the question; “Have you ever been diagnosed with/told by a health care professional you have arthritis (a disease of the joints; or by other names rheumatism or osteoarthritis)?” (1). 2) Four arthritis definitions based on International Classification of Diseases, Tenth Revision (ICD 10) and WHO (9). As a secondary endpoint, each participant was asked by applying an algorithm developed by the WHO SAGE Wave 1 study team (10); each participant was then classified as having arthritis or not. The questions and the

algorithm are presented in (Table1). If the student gave history of doctor diagnosed arthritis, he/she was asked about the affected joint and history of irritating symptoms (heaviness numbness hotness) and anti-arthritis medications.

2. Anthropometric assessment

weight and height measurements were taken using standard techniques. For students more than 20 years old BMI (Kg/m²) was calculated and categorized according to WHO classification (11). For ages less than 20, BMI-for-age was calculated with WHO AnthroPlus v1.0.4 and expressed in Z-scores. The students were classified into the following categories "wasting" (BMI-for-age <-2 Z-scores), "overweight" (BMI-for-age Z-score >+1 and ≤+2), "obese" (BMI-for-age Z-score >+2), and "normal weight" (BMI-for-age Z-score - 2 to + 1) (12,13).

Statistical analysis

Collected data were revised, coded, entered to a personal computer and analyzed using SPSS version 16. All the needed statistical tests for measuring association between presence of arthritis and the different probable risk factors were done and the level of significance used as p value less than 0.05.

We found that, 97% of participants did not answer the question about their smoking status, so this variable was excluded from the analysis. Also, only one gave history of a chronic disease, so this question was also excluded from analysis. Among the studied sample only 9 (2.6 %) of all students were underweight (BMI less 18.5), so this category was grouped with the normal body weight category.

Ethical considerations

The required administrative and ethical committee board approvals were obtained to

carry out the study at faculty of medicine, Ain Shams university, in addition verbal consent was obtained from all participants.

Results

The study comprised a total of 340 students (112 males , 228 females) from first to sixth grades (1st n=15, 2nd n=45, 3rd n=48, 4th n=77, 5th n=144, 6th n=11) enrolled in Faculty of Medicine, Ain Shams University, living in both urban areas(n=279) and rural areas(n=61), their age ranged from 18 up to 26 years old divided into 3 categories the first one from 18 to 20 years old (n=104), the second one from 21 to 23 years old (n=221) and the third one from 24 to 26 years old (n=15), all participants were single(Table 2).

Responses to the four questions included in the algorithm for symptom-based arthritis showed that, for all joints, the percentage of participants who had stiffness last more than 30 minutes was 6.2% (n=6) and the percentage of these participants that their stiffness didn't go away after movement was 7.6% (n=7) (Table 3).

The total prevalence of arthritis among the studied students was 8.9%(n=30) based on both doctor diagnosed and WHO algorithm; [(7.1%; 3 males,21 females) based on doctor diagnosed and 2.1% (7 females) based on WHO algorithm] with one case diagnosed by both methods (figure 1).

Results revealed that among the students diagnosed with arthritis; prevalence was higher among students resided in urban areas than rural areas (62.5% (n=15) based on doctor diagnosed, versus 71.4% (n=5) based on WHO algorithm). Moreover, the highest prevalence was found in the age group (21-23) (66.7% (n=16) based on doctor diagnosed, and 100% (n=7) based on WHO algorithm). Regarding gender, the highest prevalence was found among females (87.5% (n=21) based on doctor diagnosed, and 100% (n=7) based on WHO algorithm). Moreover, the highest prevalence was found among underweight to normal weight participants (the arthritis prevalence in

these participants based on doctor diagnosed was 58.3% and based on WHO algorithm was 57.1%). Regarding students' grade the highest prevalence was in the fifth grade participants (the total prevalence in this grade based on doctor diagnosed was 45.8%, and based on WHO algorithm was 57.1%), Moreover, the highest prevalence was found in participants with faculty graduated fathers and mothers (the total prevalence in these participants is 80% (n=24) and 73.3% (n=22) respectively). Regarding self-rated health, the participants who thought they had fair to poor health represented 26.7% of diagnosed students versus 4.6% of non-diagnosed students ($p < 0.05$), (Table 4).

We also asked the participants if they had felt any heaviness, numbness or hotness in their joints; students who had been diagnosed by arthritis or had filled the criteria of WHO algorithm had significantly the higher percent of feeling with heaviness, numbness or hotness, (36.7% , 30.0%, 20.0% respectively) versus (11.0%, 7.4% , 4.2% respectively) among the non-diagnosed students ($p < 0.001$) (data not shown)

Moreover, students experienced difficulty walking up 10 steps without resting represented 36.7% among diagnosed students versus 14.7% of non-diagnosed ($p < 0.05$), on the other hand difficulty stooping, crouching, kneeling was reported by 43.3% of diagnosed versus 9.4% of non-diagnosed students ($p < 0.05$), however no association was found between physical inactivity and occurrence of arthritis ($p > 0.05$) (Table 5)

Based on doctor diagnosed method, osteoarthritis was the most prevalent type among the different types of arthritis represented 37.5% followed by rheumatoid arthritis and gout (16.7% for each), and the most affected joint was the knee 70.8% (n=17) (figures 2& 3 respectively). Moreover, based on WHO algorithm, the most affected joint was also the knee joint 85.7% (n=6) (figure 4)

In addition, based on doctor diagnosed method, 70.8% (n=17) of the diagnosed students were

diagnosed at age of 18 years old or more. Participants diagnosed by physical examination represented 70.8% (n=17) among doctor diagnosed participants. In addition, 54.2% (n=13) of them had affected joints on both sides. Students who reported taking any medication for arthritis represented 41.7% (n=10), the medications were prescribed by physician in 9 participants (90.0%) and self-prescribed by only one student (10%). (data not shown).

Logistic regression analysis revealed that, residence in urban areas (odds ratio = 2.822 & 95% CI = 1.226-6.497) and female gender (odds ratio = 4.623 & 95% CI = 1.352 - 15.809) were the two independent risk factors associated with arthritis ($p < 0.05$) (Table 6).

Discussion

Arthritis is an increasing problem in the whole world. According to the CDC, by the year 2040 an estimated 78.4 million (25.9% of the projected total adult population) will have doctor-diagnosed arthritis (14). However, till now there is no definite prevalence of arthritis in Egypt specially among the youth. So this study was conducted to measure the prevalence of arthritis among the youth across age, gender, residence, and other variables in a sample consisting of 340 students aged 18 up to 26 years old enrolled in the Faculty of Medicine- Ain Shams University.

According to our findings, the total prevalence of arthritis among the studied students was 8.9%. The total prevalence of arthritis was significantly higher among female students (90%) than males (10%), and higher in students who lived in urban areas (63.3%) than those who live in rural areas (36.7%), and they were the two independent risk factors of arthritis among the studied sample. This is in line with the results reported by CDC where arthritis was more common among American women than men, from 2013 to 2015, since 26% of women versus 19.1% of men had ever reported doctor-diagnosed arthritis (15).

If we have a look on BMI, we can find that the diagnosed students were mostly non obese, this result may be because most students in our sample were non-obese or may be due to the advice carried out by the physicians.

According to our findings the most affected joints were the knee followed by the back, as detected by the two different methods used in our survey, this may be because our body weight is loaded on the knee and the back as reported by the Osteoarthritis Research Society International (OARSI) who reported that any joint can be affected by osteoarthritis but the disease occurs most commonly in joints that have experienced repetitive stress or injury and the knee is the most common lower-limb joint affected by osteoarthritis ,in addition to hip , hand , foot , ankle and back and neck (16) .

Our study also revealed that, a significant number of students who suffered from arthritis had some difficulties in walking quarter-mile, walking up-stairs, kneeling or stooping, this may also reflect the probability that they are going to suffer from more severe symptoms of arthritis later. Inconsistent with other studies practicing physical exercise did not differ between diagnosed and non-diagnosed groups in this study , a meta-analysis of community-based physical activity interventions indicated that physical activity may enhance the quality of life for those patients by approximately 40%(17) .

We also asked the participants if they had felt any heaviness, numbness or hotness in their joints; students who had been diagnosed by arthritis or had filled the criteria of WHO algorithm had the highest percent of feeling with heaviness, numbness or hotness, but also there were a percent of the non-diagnosed students had felt the same, so we suppose that these students unfortunately may have a chance to be diseased with arthritis in the future.

In our survey we also asked about the medications, and we found that 41.7% of the students who have arthritis by any of the two methods had taken medication for arthritis, and 90% of those who took medications, were physician guided, and the rest were self-

prescribed medication which may be due to financial constraints or to the availability of these medications as an over the counter drugs or to the availability of pharmacological knowledge as medical students. So, we may need to manage the financial obstacles of out-of-pocket healthcare expenses by encouraging the students' health insurance and screening of this important complain which may lead to many complications, especially as these students are still in their first working life

We have many strengths in our study, the most important one is that we used two methods to measure the prevalence: a symptom-based algorithm according to the Symptom-based questions and the related algorithm defined by the World health organization and self-reported (doctor - healthcare professional diagnosed according to the(NHANES) ICD 10 , so we could discover the largest possible number of patients in our sample . But also we had some limitations as we used a convenience sampling which makes generalization of our results questionable .so we recommend further studies with random sampling.

Conclusion

The total prevalence of arthritis among the studied sample was 8.9% based on both doctor diagnosed and WHO algorithm. Living in urban areas and female gender were the two independent risk factors associated with arthritis. Findings suggest that another study is needed on larger random sample among these age groups, and proper interventions are needed to prevent occurrence of consequences of arthritis later in life, and to prevent the development of the disease among the non- diagnosed group .

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Table (1): Symptom-based questions and the related algorithm to ascertain prevalent arthritis, developed as part of the World Health Organization SAGE Wave 1(10)

Question number	Question text and algorithm
1	During the last 12 months, have you experienced pain, aching, stiffness or swelling in or around the joints (like arms, hands, legs or feet) which were not related to an injury and lasted for more than A month?
2	During the last 12 months, have your experienced stiffness in the joint in the morning after getting up from bed, or after a long rest of the joint without Movement?
3	Did this stiffness last for more than 30 min?
4	Did this stiffness go away after exercise or movement in the joint?
Algorithm	If a participant responded with 'yes' to questions 1 and/or 2, and responded with 'yes' to question 3 and 'no' to question 4, then the participant was Categorized as having arthritis.

Table (2): Socio-demographic characteristics of the studied sample

Variables	N (%)
Age groups (years)	
18-20	104 (30.6)
21-23	221 (65.0)
24-26	15 (4.4)
Sex	
Male	112 (32.9)
Female	228 (67.1)
Residence	
Urban	279 (82.1)
Rural	61 (17.9)
Body mass index categories	
Non-obese	310 (91.2)
Obese	30 (8.8)
Grades	
1 st	15 (4.4)
2 nd	45 (13.2)
3 rd	48 (14.1)
4 th	77 (22.6)
5 th	144 (42.3)
6 th	11 (3.2)

Table (3): Responses to the four questions included in the WHO algorithm for symptom-based arthritis.

Questions	Shoulder N (%)	Elbow N (%)	Wrist N (%)	Hip N (%)	Ankle N (%)	Back\Neck N (%)	Knee N (%)
Any pain during last 12 months? (yes)	19 (5.6)	6 (1.8)	13 (3.8)	11 (3.2)	13 (3.8)	36 (10.6)	42 (12.4)
Any stiffness during last 12 months? (yes)	19 (5.6)	2 (0.6)	6 (1.8)	6 (1.8)	5 (1.5)	33 (9.7)	22 (6.5)
For all joints Did stiffness last for >30min? (yes)	6 (6.2)						
Did stiffness go away after movement? (No)	7 (7.6)						

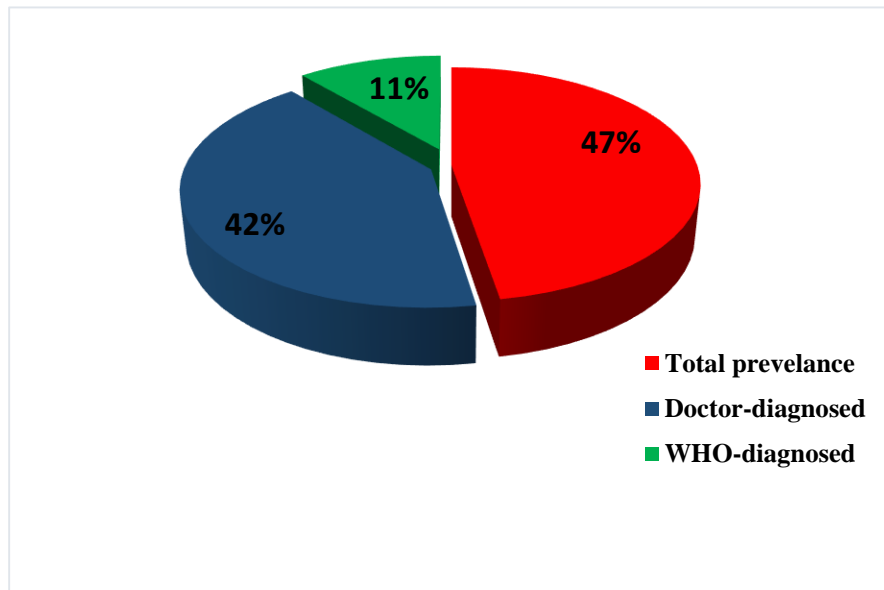


Figure (1) prevalence of arthritis among the studied students

Table (4): Arthritis prevalence and distribution among students' characteristics (n=340)

Variables	Total prevalence N(%)	Doctor diagnosed N(%)	WHO algorithm N(%)	Non- diagnosed N(%)
Overall arthritis prevalence *	30 (8.9)	24 (7.1)	7 (2.1)	310 (91.1)
Socio-demographic characteristics				
Age groups (years)				
18-	8 (26.7)	8 (33.3)	0 (0)	96 (31.3)
21-23	22 (73.3)	16 (66.7)	7 (100)	199 (64.2)
24-26	0 (0)	0 (0)	0 (0)	15 (4.6)
Sex				
Men	3 (10)	3 (12.5)	0 (0)	107 (34.5)
Women	27 (90)	21 (87.5)	7 (100)	203 (65.5)
P value (0.006)				
Grades				
1 st	0 (0)	0 (0)	0 (0)	15 (4.9)
2 nd	6 (20)	6 (25)	0 (0)	39 (12.7)
3 rd	4 (13.3)	4 (16.7)	0 (0)	44 (14.3)
4 th	6 (20)	3 (12.5)	3 (42.9)	71 (22.8)
5 th	14 (46.7)	11 (45.8)	4 (57.1)	130 (42)
6 th	0 (0)	0 (0)	0 (0)	11 (3.3)
P value (0.562)				
Residence				
Urban	19 (63.3)	15 (62.5)	5 (71.4)	260(84)
Rural	11 (36.7)	9 (37.5)	2 (28.6)	50 (16)
P value = 0.005				
Educational level of father				
Illiterate	0 (0)	0 (0)	0 (0)	2 (0.7)
Primary school	1 (3.3)	0 (0)	1 (14.3)	10 (3.3)
Secondary school	5 (16.7)	4 (16.7)	1 (14.3)	49 (16)
University	24(80)	20 (83.3)	5 (71.4)	247 (80.1)
P value (0.977)				
Educational level of mother				
Illiterate				
Primary school	2 (6.7)	2 (8.3)	0 (0)	14(4.6)
Secondary school	1 (3.3)	0 (0)	1 (14.3)	8(2.6)
University	5 (16.7)	4 (16.7)	1 (14.3)	55(17.6)
P value (0.949)	22 (73.3)	18 (75)	5 (71.4)	233(75.2)
Body mass index categories,				
Underweight\normal weight	17 (56.7)	14 (58.3)	4 (57.1)	192 (61.9)
Over weight	9 (30)	7 (29.2)	2 (28.6)	92 (29.6)
Obese	4 (13.3)	3 (12.5)	1 (14.3)	26 (8.5)
P value (0.64)				
Self-rated health				
Excellent	1 (3.3)	1 (4.2)	0 (0)	43 (14)
Very good	14 (46.7)	11 (45.5)	4 (57.1)	159 (51.1)
Good	7 (23.3)	5 (20.8)	2 (28.6)	94 (30.3)
Fair	5 (16.7)	4 (16.7)	1 (14.3)	10 (3.3)
Poor	3 (10)	3 (12.5)	0 (0)	4 (1.3)
P value(<0.001)				

*one individual diagnosed by two methods

p value was estimated using chi-square test between total prevalence and non- diagnosed groups

Table (5): Daily life activities among the studied students (n=340)

Variables*	Total prevalence N=30 N(%)	Doctor diagnosed N=24 N(%)	WHO algorithm N=7 N(%)	Non-diagnosed N=310 N(%)
Any difficulty walking quarter mile (2-3) blocks P value(0.100)	7 (23.3)	7(29.2)	0(0)	39 (12.7)
Any difficulty walking up to 10 steps without rest P value(0.002)	11 (36.7)	10 (41.7)	1 (14.3)	46 (14.7)
Any difficulty stooping, crouching, or kneeling P value(< 0.001)	13 (43.3)	11 ((45.8)	2 (28.6)	30 (9.7)
Any difficulty using fingers to grasp or handle small objects P value(0.612)	3 (10.0)	3 (12.5)	0 (0)	23 (7.5)
How do you go to faculty? Transportation Walking P value (0.220)	26(86.7) 4 (13.3)	20 (83.3) 4 (16.7)	7(100) 0 (0)	288(92.9) 22 (7.1)
Practice sports Yes No P value (0.451)	20 (66.7) 10(33.3)	18(75.0) 6(25.0)	3 (42.9) 4(57.1)	179 (57.7) 131(42.3)

*p value was estimated using chi-square test between total prevalence and non- diagnosed groups

Table (6) Logistic regression analysis for the variables associated with arthritis

Variables	P value	Odds ratio	95% C.I
Gender Male (Reference.) Female	--- 0.015	--- 4.623	1.352 - 15.809
Age	0.456	1.106	0.848-1.442
Residence Urban Rural(reference)	0.015 ---	2.822 ---	1.226-6.497
BMI categories Non- obese (reference) Obese	--- 0.500	--- 0.667	0.206-2.161

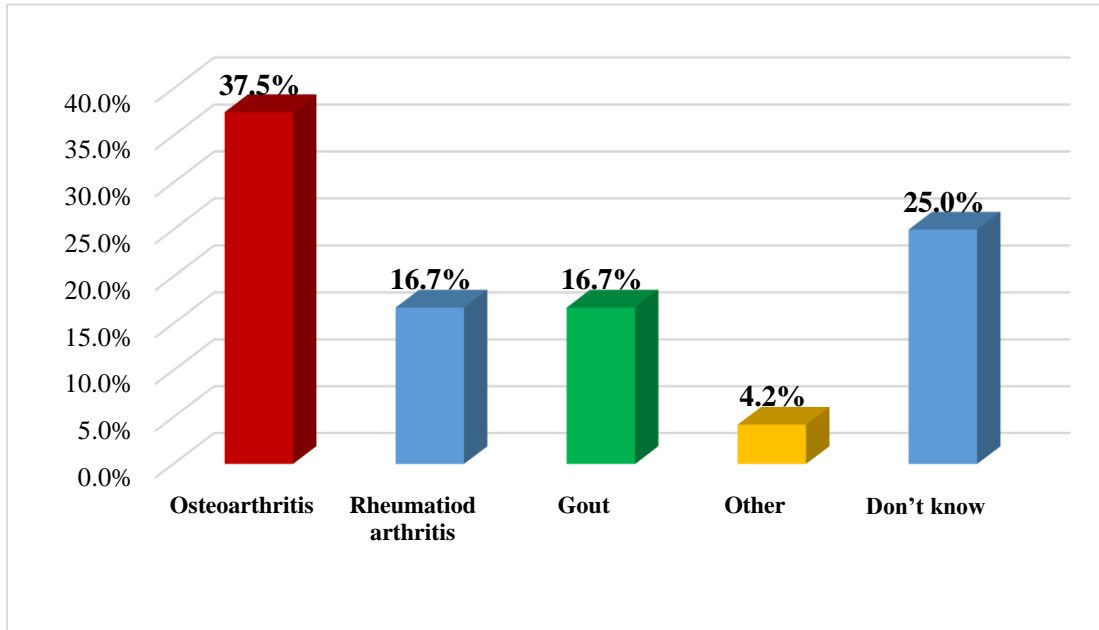


Figure (2) Types of arthritis among students diagnosed based on doctor diagnosed method.

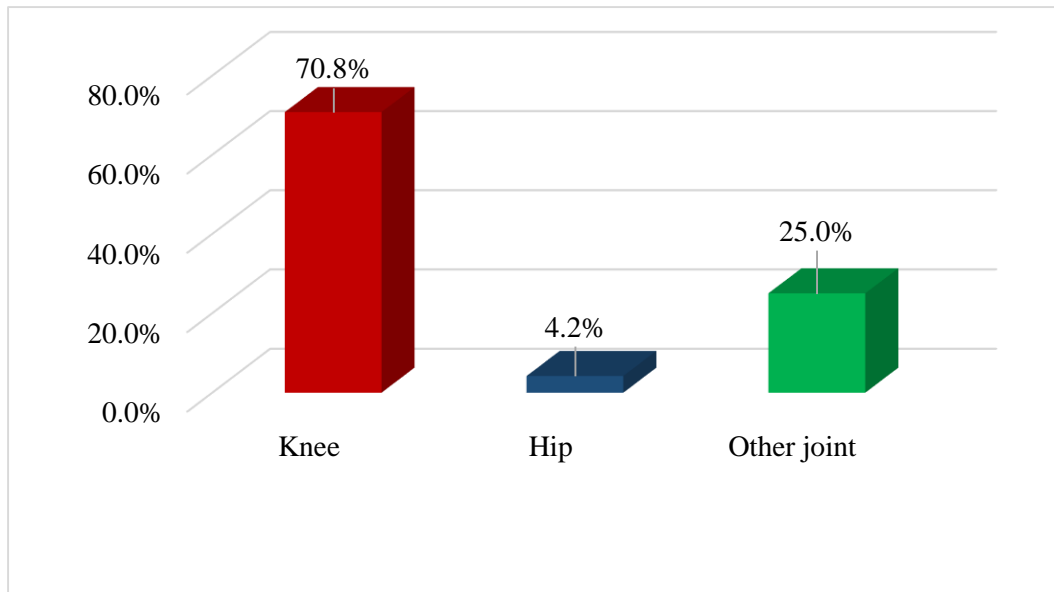


Figure (3) Distribution of the most affected joints based on doctor diagnosed method