Scientific research

University of Baghdad / AL-Kindy college of medicine

Title :

The relationship between diabetes and osteoarthritis

A project submitted by :

Toka Kareem Abed

Jihan Assim Farhan

Toka Mohanad Abbas

Baraa muayad meteab

Supervised by

Dr.Mohammed Shihab Ahmed

بسم الله الرحمن الرحيم

نَرفَعُ دَرَجَاتٍ مَن نَّشَآءُ

وَفَوقَ كُلِّ ذِى عِلمٍ

عَلِيمٌ

Content:

ABSTRACT

Background: Osteoarthritis (OA) is the most common form of arthritis. Some people call it degenerative joint disease or "wear and tear" arthritis. It occurs most frequently in the hands, hips, and knees. With OA, the cartilage within a joint begins to break down and the underlying bone begins to change.

OBJECTIVE: We aim to explore the role that DM plays in the acceleration of OA leading to increased reports of joint pain in those with both diseases.

MATERIAL AND METHOD:

A descriptive cross sectional study on (211) of populations enrolled in the year 2022-2023 at all age groups . Self-completed online questionnaire by Google form was designed to obtain information from patients and by taking information from patients at Al-kindly teaching hospital. We also searched for articles in the references of selected publications of rheumatology for OA . The excluded samples was patients who have joints pain as a result of fracture or trauma on the affected joint, patients who have joints pain before getting diabetes and patients who was using steroids after getting diabetes. The problems that we faced are the lack of awareness of patients toward insulin resistance and also toward steroids.

RESULT:

A total of 211 of population who filled the survey and collected from Al-kindy teaching hospital, (66%) among them were suffering from diabetes associated with knee pain and (59.7%) of them were female and (40.3%) of male suffering from diabetes .Among the female (58.5%) and male (41.5%) suffering from knee pain.

Regarded to the association between diabetes and other joints pain (60.3%) of females and (39.7%) of males which have diabetes are suffering from other joint pain .

The majority of population who suffered from diabetes ,knee pain and other joints pain was in the age group (49-59).

While regarded to the effect of steroids on diabetes we found that (18.9%) of diabetic patients using steroids.

CONCLUTION:

This cross sectional study highlight a high frequency of OA in patient with DM and association between both disease, representing a further steps toward the individualization of DM related OA within a metabolic OA phenotype.

KEY WORDS:

Diabetes, knee pain, joint pain and steroids.

INTRODUCTION

Osteoarthritis is the most frequent and disabling joints disease in adults , We believe this topic of discussion to be important due to the increased prevalence of both diseases over the last several decades, potentially leading to an increased medical burden on both patients and the community at large. OA and Tybe2 DM share common risk factors such as obesity and advanced aging, which may explain the higher prevalence of OA in the diabetic population[1]. Obesity contributes to the development of OA via biomechanical and systemic pathways.

The biomechanical pathway is based on the direct effects of increased body weight. For example, increased body weight imposes greater loads on the weight-bearing joints, which has shown to affect cartilage wear has also been associated with misalignment of weight-bearing joints (particularly the knee joint), which increases joint stress and promotes cartilage degradation that lead to OA[2].

More recently, OA has been associated with systemic metabolic disturbances commonly seen in Tybe2 DM, these metabolic alterations have been proposed to serve as an underlying link between OA and Tybe2 DM[3-4]. the microcellular environment of patients with DM showed accelerated joint destruction and increased inflammation in every anatomical aspect of the joint including the bones, tendons, ligaments, cartilage, and synovium[5]. Additionally, the link between to diseases maybe supported by the deleterious role of glucose excess through the accumulation of advanced glycation end-stage (AGE) products, oxidative stress and promotion of systemic inflammation[6].

We also don't forget to highlight the osteoarthritis treatment on DM , where corticosteroid Intra-articular (IA) injections that used for the local symptomatic control of joint arthritis due to their anti-inflammatory properties. However, it has been shown that locally-injected corticosteroids

are absorbed into the systemic circulation. Parentally- administered steroids are known to affect glucose metabolism and can cause abnormal blood glucose levels in patients with diabetes, which may be a concern when administering IA corticosteroid injections[7].

AIMS: The purpose of this paper is to review the evidence on common risk factors and to discuss emerging underlying links between OA and Type2DM..

METHODOLOGY:

Descriptive cross sectional study was conducted among population during year 2022-2023.

The data collected during the period from 7th of November 2022 to 18th of February 2023

The sample size was 211 which include patients at all age group by using online questionnaire by google form sampling method and by collection of the data from Al-kindy teaching hospital patients

The data were analyzed using the statistical package for social science (SPSS) version 26,Microsoft excel version 2016, tables and figures also used

The questionnaire was filled by the population and some samples collected from patients directly , privately and separately. The google form contain 13 questions. The first three items assessing personal data. Other items assessing diabetic patients , knee pain, other joints pain and steroids using as following :

1.Gender

2.Age

3.occupation

4.If they are diabetic

5.If they have insulin resistance

6.Period of illness

7.Knee pain

8.Other joints pain

9.Period of joints pain

10.Use analgesic

11.Period of analgesic

12.Use steroids

13.knee injury

We take x-rays of OA of knee joint from a number of patients seen in figures (1,2 and 3):

figure1 (x-ray \ both knee with OA bilaterally)

figure 2 (x-ray \ both knee with OA bilaterally)

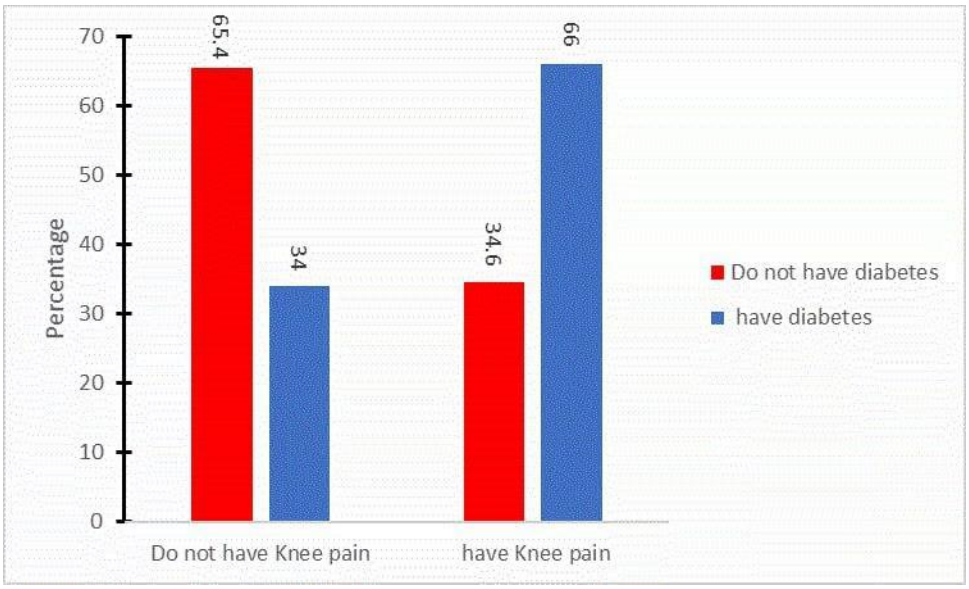
figure 3(x-ray \ both knee with OA bilaterally)

Results

Table (1): diabetic patients with knee pain:

		Knee pain		Total	P value
		No	Yes		
diabetes	NO	34	18	52	0.000
	Yes	54	105	159	
Total				211	

In the study of table(1) from the study sample of (211) show (105) of the particiepants (66%) suffer from knee pain with DM while (54) of them (34%) are not suffer from knee pain. The P value is (0.000) and it considers significant because the value is less than(0.05)



Figure(4):diabetic patients with knee pain

Table(2):diabetic patient with other joints pain:

		Other joint pain		Total	P value
		No	**Yes**		
diabetes	**NO**	36	16	52	0.000
	Yes	59	100	159	
Total				211	

In this study of (159)who suffer from diabetes, the table(2) show (100) of them (62.9%) suffer from other joint pain, while (59) of them (37.1%) are not suffer from other joints pain.

The P value is (0.000) and it considers significant because the value is less than(0.05)

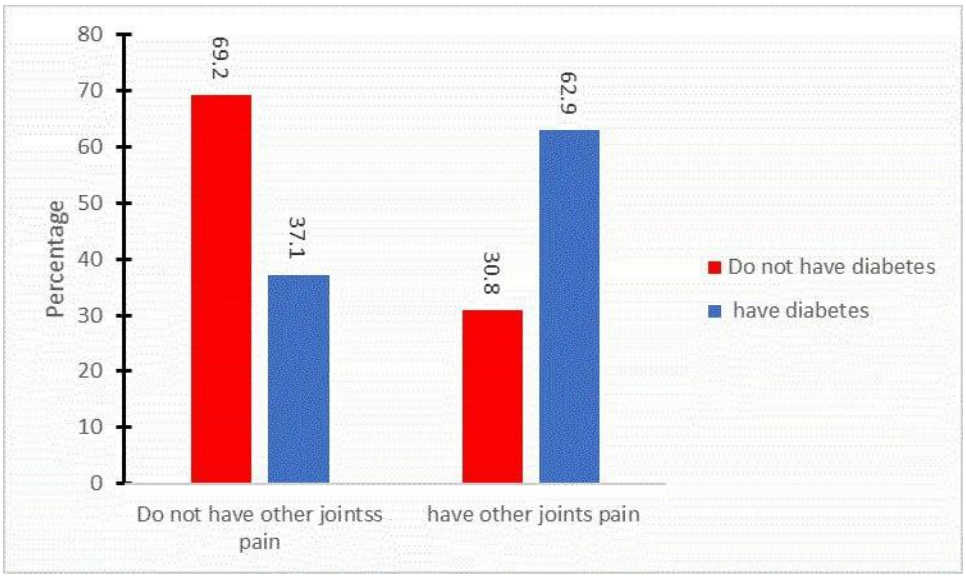


Figure (5):diabetic patient with other joints pain.

Table(3): classification of gender according to those with diabetes, knee pain and other joint pain

		Diabetes		Total	P value
		No	**Yes**		
sex	**Male**	20	64	84	0.819
	Female	32	95	127	
Total				211	
		Knee pain		**Total**	**P value**
		No	**Yes**		
SEX	**Male**	33	51	84	0.562
	Female	55	72	127	
Total				211	
		Other joint pain		**Total**	**P value**
		No	**Yes**		
sex	**Male**	38	46	84	0.959
	Female	57	70	127	
Total				211	

In this study of (159) who suffer from diabetes (95) of them (59.7%) are females , while (64) of them (40.3%) are males . regarded to knee pain, (72) of them (58.5%) are females , while (51) of them (41.5%) are males. But in regard to the other joints pain ,(70) of them (60.3%) are females ,while (46) of them (39.7%) are males. There is no significant between sex and diabetes, knee pain and other joints pain.

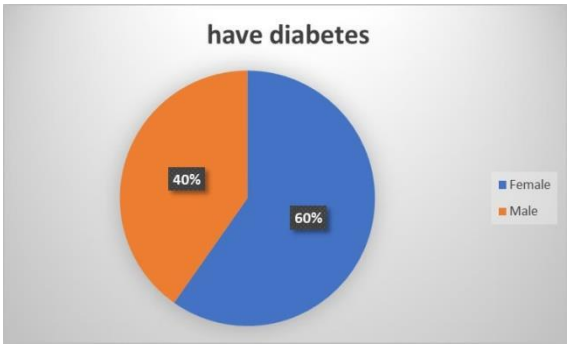


Figure (6): classification of gender according to those with diabetes

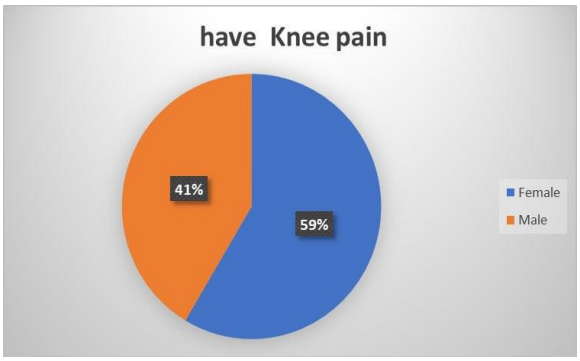


Figure (7): classification of gender according to those with knee pain

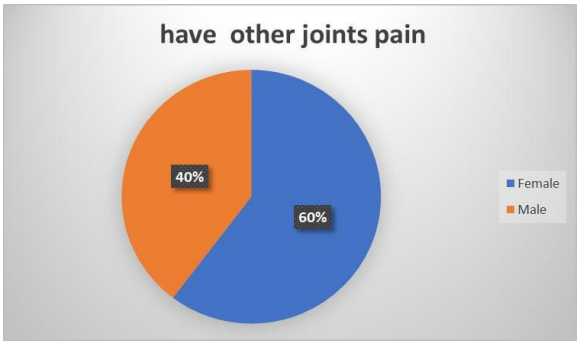


Figure (8): classification of gender according to those with other joints pain.

Table(4):classification of age groups according to those with diabetes, knee pain and other joint pain.

Age category	diabetes		Total	Knee pain		Total	Other joint pain		Total
	No	**Yes**		**No**	**Yes**		**No**	**Yes**	
20-30	30	10	40	28	12	40	30	10	40
30-39.5	3	7	10	6	4	10	5	5	10
40-49	4	36	40	13	27	40	9	31	40
49.5-59	5	53	58	16	42	58	21	37	58
59.-68	4	38	42	12	30	42	16	26	42
68.5-77	5	12	17	3	14	17	4	13	17
77.5-88	1	3	4	0	4	4	3	1	4

The table (4)show the predominance of cases who suffers from diabetes , knee pain and other joints pain were in the age group (49.5-59) . In percentage of (28.3%) , (26.8%) and (25%) respectively.

Table(5):classification of using steroid to those with diabetes

		Use steroid		Total	P value
		No	**Yes**		
diabetes	**NO**	50	2	52	0.009
	Yes	129	30	159	
Total				211	

This table show (30) of them (18.9%) who suffer from diabetes were using steroids. The P value is (0.009) and it considers significant because the value is less than (0.05)

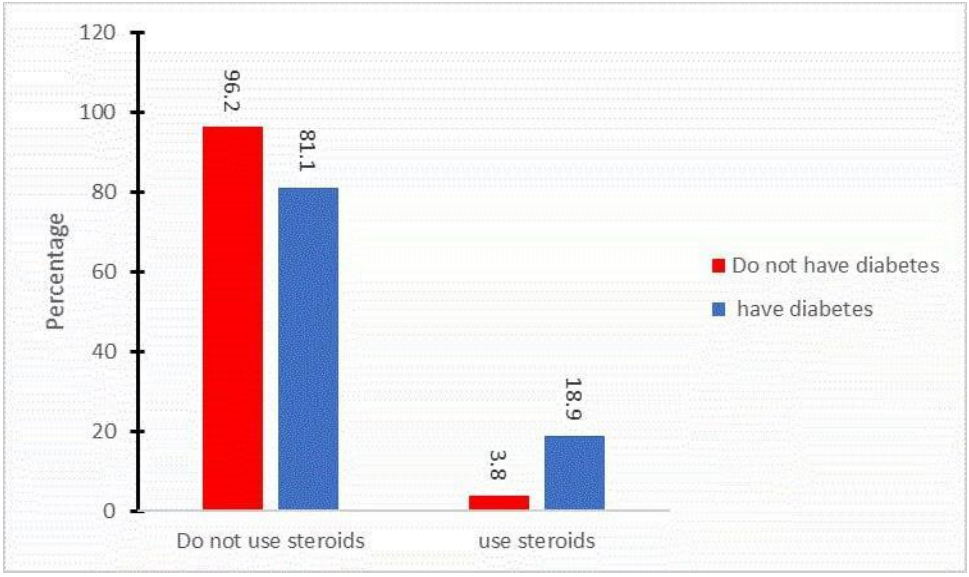


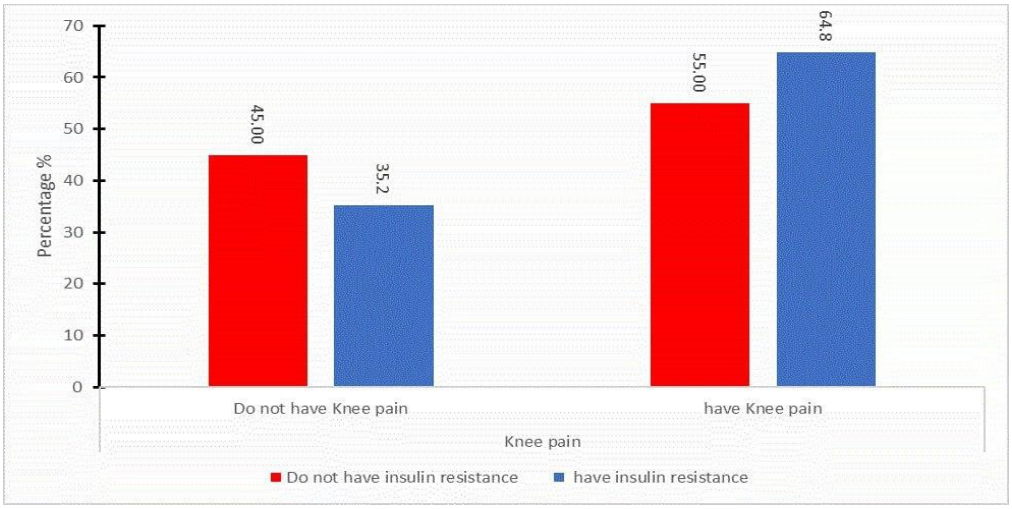
Figure (9): classification of using steroid to those with diabetes

Table(6):classification of insulin resistance according to those with knee pain and other joint pain

Insulin resistance		Knee pain			P value
		No	**Yes**	**Total**	
	No	63	77	140	0.000
	Yes	25	46	71	
Total				211	

Insulin resistance		Other joints pain			P value
		No	**Yes**	**Total**	
	No	75	65	140	0.000
	Yes	20	51	71	
Total				211	

This table show (46) of them (37.4%) who suffered from insulin resistance was suffering from knee pain and (51) of them (71.8%) were suffering from other joints pain The P value is (0.000) and it considers significant because the value is less than(0.05)



Figure(10) : classification of insulin resistance according to those with knee pain.

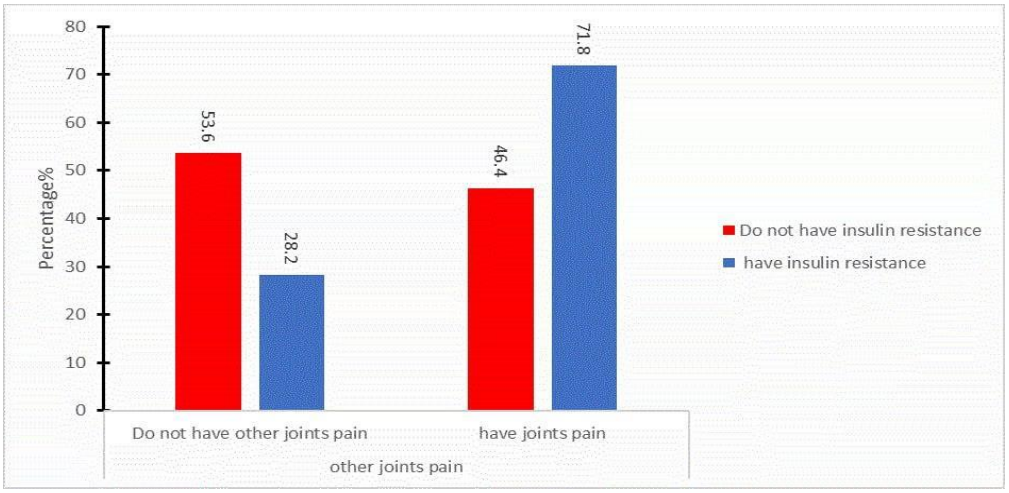


Figure (11): classification of insulin resistance according to those with other joints pain.

Discussion:

The present study was designed to assess the prevalence of osteoarthritis among diabetic patients . The results of the current study showed high percentage of people that suffer from diabetes have knee pain and other joints pain .These results agree with many internationals study's results around the world.

We started from the number of participants according table 1 (211) engaged in the study (105) of them (66%) are diabetic patients have knee pain, while (100) of them (62.9%) have other joints pain.

In comparison with data were provided by nationwide Danish national health survey 2013 which show the prevalence of knee pain among patients with DM was (43.5%) while (73.8%) have other joints pain[3]

The majority of cases were females (59.7%) suffering from diabetes ,(58.5%) suffering from knee pain and (60.3%) suffering from other joints pain while the statistical analysis show the majority of cases were males in percent of(51.8%) [3].

In table (4) revealed the relationship between age group and diabetes which represent the majority of cases seen in the age group (49-59) ,(28.3%) of them were suffering from diabetes , (26.8%) of them were suffering from knee pain and (25%) of them were suffering from other joints pain while the proteome-wide association study (PWAS) show the majority seen in the age group of (30-39) of male and (60-69) of female[2].

In regarding to table(5) the results show the relationship between using steroids and diabetes ,which reveal (18.9%) of diabetic patients was using steroids ,while a cross sectional study show steroid diabetes occurred in (20%) of the persons treated with corticosteroid drugs[7]

In table (6) the results show (46) of them,(37.4%) suffer from insulin resistance was suffering from knee pain and (51) of them, (71.8%) were suffering from other joints pain but in regarded to the cross sectional study the prevalence of patients that have insulin resistance and joints pain is (29.5%)[(1)].

Conclusion:

In conclusion ,the study revealed the high percent of population complained from joints pain with diabetes, the female represent the majority of cases and the age group (49-59) was predominate .The results also show the relation between steroids and diabetes.

Recommendation :

We recommend the patient who have insulin resistance to reduce their weight by exercise and follow a controlled diet.

REFRENCES: 1-Zaharia OP, Pesta DH , BAobrov P , et al : Reduced muscle strength is associated with insulin resistance in type 2 diabetes patients with osteoarthritis.J Clin Endocrinol Metab . 2021, 106: 1062 -73.10. 1210/ clinem/ dgaa912

2-Dubey NK, Ningrum DN, Dubey R, et al.: Correlation between diabetes mellitus and knee osteoarthritis: a dry-to-wet lab approach. Int J Mol Sci. 2018, 19:3021. 10.3390/ijms19103021

3- Rehling T, Bjørkman AD, Andersen MB, Ekholm O, Molsted S: Diabetes is associated with musculoskeletal pain, osteoarthritis, osteoporosis, and rheumatoid arthritis. J Diabetes Res. 2019, 2019:6324348. 10.1155/2019/6324348

4-King KB, Rosenthal AK: The adverse effects of diabetes on osteoarthritis: update on clinical evidence and molecular mechanisms. Osteoarthritis Cartilage. 2015, 23:841-50. 10.1016/j.joca.2015.03.031

5- Shi L, Lu PP, Dai GC, Li YJ, Rui YF: Advanced glycation end productions and tendon stem/progenitor cells in pathogenesis of diabetic tendinopathy. World J Stem Cells. 2021, 13:1338-48. 10.4252/wjsc.v13.i9.1338

6-Vos PA, DeGroot J, Barten-van Rijbroek AD, Zuurmond AM, Bijlsma JW, Mastbergen SC, Lafeber FP: Elevation of cartilage AGEs does not accelerate initiation of canine experimental osteoarthritis upon mild surgical damage. J Orthop Res. 2012, 30:1398-404. 10.1002/jor.22092

7- An article on [Corticosteroid induced diabetes mellitus: diagnosis and management] by Alberto De Micheli. G Ital Nefrol. 2016./PMID: 27960015.

The relationship between diabetes and osteoarthritis.

* Required

1. الجنس *

Mark only one oval.

- ذكر
- انثى

2. هل أنت مصاب بالسكري؟ *

Mark only one oval.

- نعم
- لا

3. هل أحد أفراد عائلتك مصاب بالسكري؟ *

Mark only one oval.

- نعم
- لا

4. العمر/عمره *

_____

5. مكان العمل *

_____

6. هل مرض السكري (لديك/لديه) مرتبط بمقاومة الأنسولين؟ *

Mark only one oval.

- نعم
- لا

7. منذ متى و(أنت/هو) مصاب بالسكري؟ *

Mark only one oval.

- منذ سنة
- منذ سنتين
- منذ 3 سنوات
- منذ 4 سنوات
- Other: _____

8. * هل (لديك/لديه) ألم في مفصل الركبة؟

Mark only one oval.

- نعم
- لا

9. * هل (لديك/لديه) آلام في مفاصل أخرى؟

Mark only one oval.

- نعم
- لا

10. * منذ متى و(أنت تعاني) (هو يعاني) من هذا الألم؟

_____

11. * هل (تستخدم/يستخدم) أي مسكن لهذا الألم؟

Mark only one oval.

- نعم
- لا

12. منذ متى و(أنت تستخدم) (هو يستخدم) هذه المسكنات؟ *

13. هل (تستخدم/يستخدم) ستيرويدات؟ *

Mark only one oval.

- نعم
- لا

14. هل (أنت/هو) متعرض لـ أصابة خارجية على الركبتين؟ *

Mark only one oval.

- نعم
- لا