

Effect of Body Mass Index and Physical Activities on Risk of Osteoporosis in Babylon Iraq

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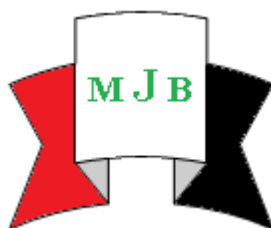
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Abstract

Objectives: To identifying effect of body mass index and physical activities on risk of osteoporosis in Babylon governorate.

Methods: A descriptive cross-sectional study carried out during the period from December 2012 till the end of March 2013. Data were collected by the researcher depending on the direct interview with the participants using especial questionnaire, was constructed for the purpose of the study, consisted of five parts: the first part was concerned with the socio-demographic characteristics, second part was physical activities levels, third part was about obstetric-gynecological history of female, fourth part measured body mass index, fifth part dealt with Medical history and family which consist of Chronic diseases, Medications used, Certain features and Family history. The study sample was (312), (281) females and (31) males.

Results: The results indicated that the prevalence rate of osteoporosis in this study was 25.6%. The higher percentage of osteoporosis (26.7%) were female, while (16.1%) were males and (58.3%) were within age group (70+) years. The majority of osteoporosis were (35.1%) were illiterate, (34.3%) female at menopause, (36.5%) had rheumatoid arthritis, (47.1%) had intestinal disease, (27.6%) did not take Calcium supplement, (30.5%) had backache, (50%) were change in height, (54.8%) had fracture bone and (60%) family history with osteoporosis.

The present study showed that (52.6%) of patients with osteoporosis had normal body mass index, while (11.9%) were obese (3+). In addition to, the study revealed that (55.4%) of patients with osteoporosis were within lowest quartile of physical activities

Recommendation: For prevention and control of osteoporosis, the researcher recommends the following: We suggest Dual Energy X-ray Absorptiometry examination to be done as a survey for all females above 50 years and all males above 70 years with serial assessment and follow up to be done yearly or every two years to decrease possibility of risk of fracture or osteoporosis. In addition, the high risk groups should be identified, educated and well communicated by the health personnel.

Key Word: Body Mass Index, Physical activities, Osteoporosis

الخلاصة

الهدف : تحديد تأثير مؤشر كتلة الجسم و الأنشطة البدنية على خطر الإصابة بهشاشة العظام في محافظة بابل.

المنهجية: أجريت دراسة وصفية، مقطعية نفذت خلال الفترة من ديسمبر ٢٠١٢ وحتى نهاية مارس ٢٠١٣. تم جمع البيانات من قبل الباحث اعتماداً على مقابلة مباشرة مع المشاركين باستخدام استبيان خاص، تم إعداده لغرض الدراسة، ويتألف من خمسة أجزاء: الجزء الأول كان يعني مع الخصائص الاجتماعية و الديموغرافية، وكان الجزء الثاني مستويات الأنشطة البدنية، وكان الجزء الثالث حول تاريخ الولادة و أمراض النساء من الإناث، الجزء الرابع قياس مؤشر كتلة الجسم، الجزء الخامس التعامل مع التاريخ الطبي و العائلي

الذي يتضمن من الأمراض المزمنة ، الأدوية المستخدمة ، بعض الميزات و التاريخ العائلي . كانت عينة الدراسة ٣١٢ ، (٢٨١) إناث و (٣١) ذكور .

النتائج: أشارت النتائج إلى أن معدل انتشار هشاشة العظام في هذه الدراسة هو ٢٥,٦ ٪ . وكانت أعلى نسبة من مرض هشاشة العظام (٢٦,٧ ٪) من الإناث ، في حين أن (١٦,١ ٪) من الذكور و (٥٨,٣ ٪) كانوا ضمن الفئة العمرية (٧٠ +) سنوات . وكانت غالبية من هشاشة العظام (٣٥,١ ٪) هم من الأميين ، وكان (٣٤,٣ ٪) من الإناث في سن اليأس ، (٣٦,٥ ٪) التهاب المفاصل الروماتويدي ، (٤٧,١ ٪) لديهم مرض معوي ، (٢٧,٦ ٪) لا تأخذ مكملات الكالسيوم ، (٣٠,٥ ٪) لديهم ألم الظهر ، (٥٠ ٪) التغير في الطول ، (٥٤,٨ ٪) كسر في العظم و (٦٠ ٪) تاريخ عائلي مع مرض هشاشة العظام .

وأظهرت هذه الدراسة أن (٥٢,٦ ٪) من المرضى الذين يعانون من هشاشة العظام كان مؤشر كتلة الجسم الطبيعي ، في حين أن (١١,٩ ٪) كانوا يعانون من السمنة المفرطة (٣٠ +) . وكشفت الدراسة أن (٥٥,٤ ٪) من المرضى الذين يعانون من هشاشة العظام كانت ضمن الربع الأدنى من الأنشطة البدنية .

التوصيات: للوقاية والسيطرة على مرض هشاشة العظام ، يوصي الباحث بما يلي : نقترح فحص (قياس الأشعة السينية مزدوج الطاقة) الذي يتعين القيام به لمسح جميع الإناث فوق ٥٠ سنة و جميع الذكور فوق ٧٠ عاما مع تقييم مستمر ومتابعة القيام به سنويا أو كل سنتين لتقليل احتمال خطر الإصابة بكسور أو هشاشة العظام . وبالإضافة إلى ذلك ، ينبغي تحديد الفئات المعرضة للخطر ، تعليمها وإبلاغها بشكل جيد من قبل العاملين في المجال الصحي .

Introduction

Osteoporosis is a disease in which the density and quality of bone are reduced, leading to weakness of the skeleton and increased risk of fracture, particularly of the spine, hip and wrist. The disease and its associated fractures are an important cause of morbidity and mortality affecting millions of people. The loss of bone occurs progressively over many years and without apparent symptoms, and often the first sign of osteoporosis is a fracture. For this reason, osteoporosis is often referred to as the “silent epidemic” [1].

The World Health Organization defines osteoporosis as a Body Mass Density (BMD) at the hip or spine that is less than or equal to 2.5 standard deviations below the young normal mean reference population[2].

Osteoporosis is a global health problem that will become increasingly important as individuals live longer and the world's population continues to increase in number[3]. It is estimated that over 200 million people worldwide currently have osteoporosis[4] Although the likelihood of developing osteoporosis currently is greatest in North America and Europe, it will

increase in developing countries as population longevity in these countries continue to increase[5].

Osteoporosis is highly prevalent especially in postmenopausal women ,imposing considerable burdens on the individual and significant costs on the society. The diagnosis of osteoporosis relies on the assessment of bone mineral density (BMD), usually by central dual energy X-ray absorptiometry (DEXA) [6].

Physical activity is considered to be the most important modifiable environmental factor with the potential to increase or maintain bone mineral density (BMD) in both children and adults and to reduce the risk of falling in older populations. Physical activity has therefore been recommended for the prevention and treatment of osteoporosis [7]. Weight loss or low body mass index (BMI) is an indicator of lower BMD [8].

Osteoporosis can affect either gender, it is much more common in women than in men [9]. Many risk factors are associated with osteoporotic fracture, including low peak bone mass, hormonal factors, the use of certain drugs (eg, glucocorticoids), cigarette smoking, low intake of calcium and

vitamin D, race, small body size, and a personal or a family history of fracture[5].

Osteoporosis risk is also increased in a number of diseases with an inflammatory component, such as inflammatory bowel disease (IBD), celiac disease and rheumatoid arthritis[3].

All of these factors should be taken into account when assessing the risk of fracture and determining whether further treatment is required. Because osteoporotic fracture risk is higher in older women than in older men , all postmenopausal women should be evaluated for signs of osteoporosis during routine physical examinations. Radiologic laboratory assessments of bone mineral density generally should be reserved for patients at highest risk, including all with other risk factors.

Methodology

Study Design

A descriptive cross sectional study was carried out during the period from December 2012 till the end of March 2013.

Setting of the Study

It was conducted in Merjan Teaching Hospital in Rheumatology department in DEXA unit to examine Bone density. The Hospital is the only governmental hospital in Hilla which contain bone density measurement instrument. Patients were referred to DEXA unit from Merjan Teaching Hospital clinics and other governmental Hospitals clinics and out Patients. Merjan Teaching Hospital in Hilla city the center of Babylon governorate south of Baghdad about 100km from Baghdad.

Sample of the Study

The sample of the study is a convenient (non-probability) sample, which depends on all of referred patients to DEXA unit for measuring bone

women over the age of 65, younger postmenopausal women with risk factors, and all postmenopausal women with a history of fractures[5].

Aim of the Study

1. General Objective:

-To identify the effect BMI and physical activity on frequency osteoporosis of a sample of patients attending the DEXA unit in Merjan Teaching Hospital/Rheumatology department in Babylon governorate.

2. Specific Objectives:

- 1.To identify important risks factor induce osteoporosis.
2. Identifying prevalence of osteoporosis in study sample.
- 3.To compare the strength of association between BMI& Physical activities.

density. On average the weekly load is at least 20 patients (divided on 2 working days). A total number participants of 330 subjects were gathered during the study period of 4 months were (34) males and (296) females, the study sample composed of (312),(31) males and(281) females, because (eighteen) of them were selected for a pilot study which were excluded from the main sample.

The Study Population:

Subjects in this study, included all patient admitted to Merjan Teaching Hospital to examine bone density in DEXA unit founded in Rheumatology department in the study hospital, while

Exclusion criteria include:

- Vertebral deformities due to osteoarthritis or Scheuermann disease.
- Overlying metal objects.
- Laminectomy.
- less than 18 years old.
- Body weight over 120 kg.

Patients and Methods

This study included the precipitants(males and females) aged

more than 18 years who visited Merjan Teaching Hospital in Rheumatology department in DEXA unit, the data were gathered through structured direct interview technique and developed questionnaire that include many questions about socio-demographic information, physical activities, information for women only and medical history and family for the participants to measure BMI and BMD.

Data Collection

The method of collecting information depends on direct (personal) interview in a private small room attached to unit DEXA measurement. The data were collected through the utilization of developed questionnaire and the structured interview technique participants. Researcher began collecting data from the participants in organized fashion and individually with all the participants. The interview lasted for about (30) minutes, knowing that the data collection was only every Monday and Wednesday from every week ,begin at 8:00 am and continue until 2:00 pm.

Calculating physical activity score:[10]

Each item measuring a certain activity in the questionnaire was

weighted by its frequency first. The sum of frequencies for items belonging to a specific level of physical activity (light, moderate and vigorous level) were summed and then multiplied by 2 for the mild (light) category, by 4.5 for the moderate category and by 7 for the strenuous (vigorous) category to reflect their METs equivalent. Finally a total score of physical activity was calculated and transformed into an ordered categorical variables using the unbiased method of quintiles (quartiles). METs are metabolic equivalents. One MET is defined as the energy it takes to sit quietly. These MET estimates are for healthy adults[11].

Statistical Analysis:

Data were translated into a computerized database structure. The database was examined for errors using range and logical data cleaning methods, and inconsistencies were remedied. An expert statistical advice was sought for. Statistical analyses were done using SPSS version 20 computer software (Statistical Package for Social Sciences) in association with Excel version 5.

Results

Table 1 factors associated with risk of having osteoporosis.

Variables	Total N	Positive for Osteoporosis (t- score <= -2.5)		P (Chi- square)	OR	95% CI for OR	inverse OR
		N	%				
Gender				0.2[NS]			
Female	281	75	26.7			Reference	
Male	31	5	16.1		0.53	(0.2 - 1.43)	1.89
Age group (years)				<0.001			
<50	100	9	9			Reference	
50-69	176	50	28.4		4.01	(1.88 - 8.57)	**
70+	36	21	58.3		14.16	(5.46- 36.71)	**
$r=-0.333, p<0.001$							
skin colour				0.5 [NS]			
Fair skin	71	16	22.5			Reference	
Dark skin	241	64	26.6		1.24	(0.66 - 2.32)	**
Education level				<0.001			
Illiterate	171	60	35.1		3.57	(1.32 - 9.62)	**
Primary School	48	10	20.8		1.74	(0.54 - 5.6)	**
Secondary School	55	5	9.1		0.66	(0.18 - 2.46)	1.52
University / Higher education	38	5	13.2			Reference	
$r=0.329, p<0.001$							
Residency				0.19[NS]			
Urban	160	36	22.5			Reference	
Rural	152	44	28.9		1.4	(0.84 - 2.34)	**
smoking				0.46[NS]			
Negative	269	67	24.9			Reference	
Positive	43	13	30.2		1.31	(0.64 - 2.65)	**

HS: P<0.01, S: P<0.05, NS: P>0.05 **=no calculated

As shown in table(1), An obviously higher proportion of females(26.7%) had osteoporosis compared to 16.1% of males, but the difference failed to reach the level of statistical significance. Male gender decreased the risk of osteoporosis by 1.89 times. Age had a statistically significant weak inverse (indirect) linear correlation with t-score ($r = -0.333, p < 0.001$). The rate of osteoporosis significantly increased from 9% among those <50 years of age to as high as 58.3% among older ages (70+ years). Being of a middle age group (50-69 years). Significantly increase the risk of osteoporosis by 4.01 times compared to <50 years of age.

Being elderly(70+ years) significantly increase the risk of osteoporosis by 14.16 times compared to <50 years old. Education level had statistically significant weak linear correlation with t-score($r = 0.329, p < 0.001$). The rate of osteoporosis significantly increased from 13.2% among University/Higher education of education level to as high as 35.1% among low education level illiterate, while Secondary School increase from 9.1%. Being of low education level (illiterate) significantly increase the risk of osteoporosis by 3.57 times compared to University/Higher education of education level. Being primary School education level

significantly increase the risk of osteoporosis by 1.74 time compared to University/Higher education of education level. On the other hand those participants had a Secondary School education level appeared to be protected against of osteoporosis (OR=0.66). Secondary School education level

decreased the risk of osteoporosis by 1.52 time. Finally, The results indicated that there were no important or statistically significant difference at $P>0.05$ between osteoporosis and all items: (Skin colour, Residency, smoking).

Table 2 BMI and Osteoporosis.

BMI-categories Kg/m ²	Total N	Positive for Osteoporosis (t- score $\leq$ -2.5)		OR	95% CI for OR	inverse OR
		N	%			
Normal (<25)	57	30	52.6		Reference	
Overweight (25-29.9)	87	30	34.5	0.47	(0.24-0.94)	2.13
Obese (30+)	168	20	11.9	0.12	(0.06-0.24)	8.33
$r=0.519, p<0.001$						

HS: $P<0.01$, S: $P<0.05$, NS: $P>0.05$

As shown in table(2), BMI had a statistically significant strong linear correlation with t-score ($r =0.519$, $p<0.001$). The rate of osteoporosis significantly increased from 11.9% among Obese patients (30+) of BMI-categories to as high as 52.6% among

Normal (<25) of BMI-categories, while Overweight (25-29.9) of BMI-categories was 34.5%. Obesity (30+) of BMI-categories decrease osteoporosis by 8.33time, while Overweight (25-29.9) of BMI-categories decrease osteoporosis by 2.13time.

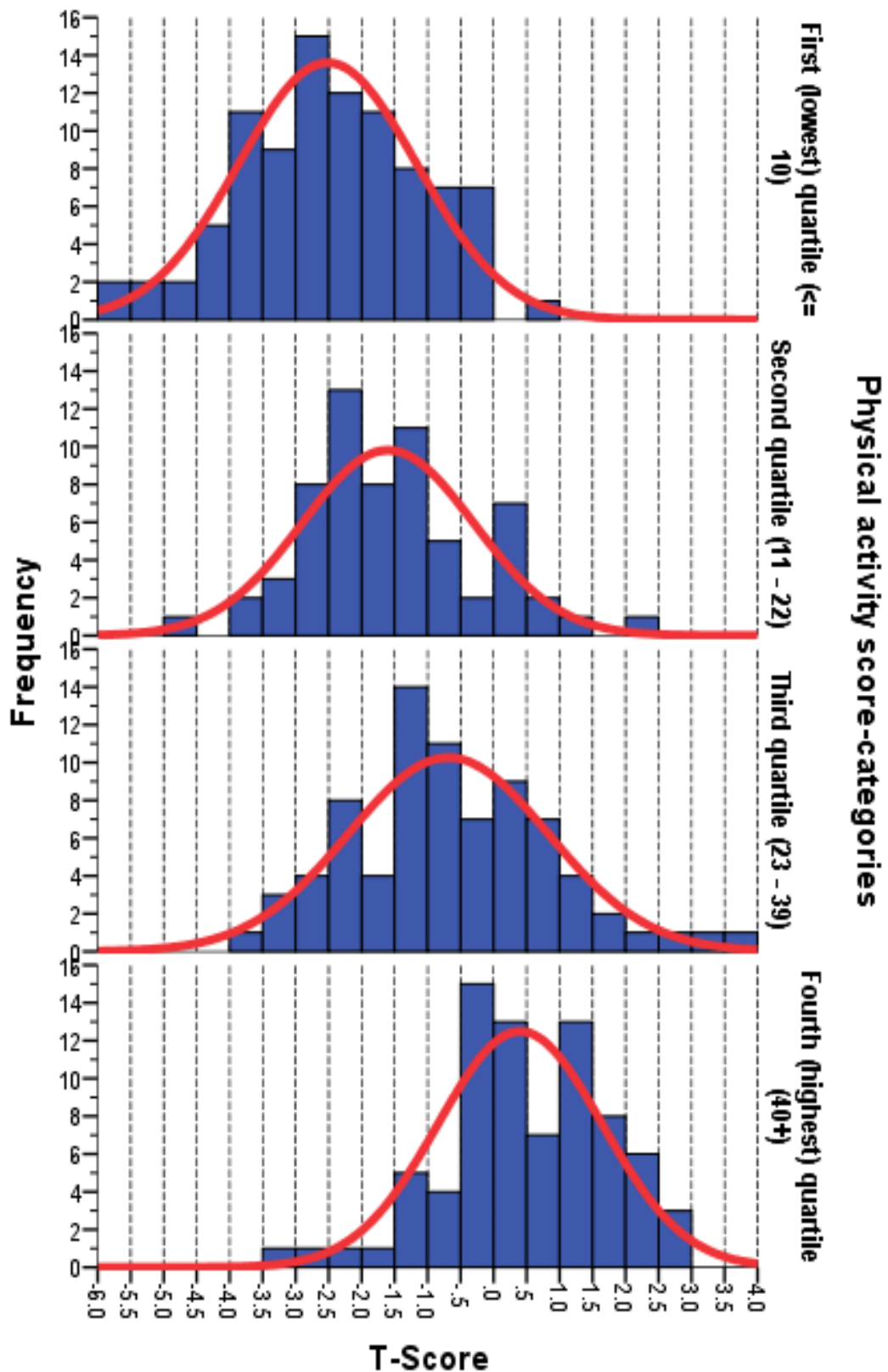


Figure 1 Histogram showing the t-score distribution by physical activity categories.

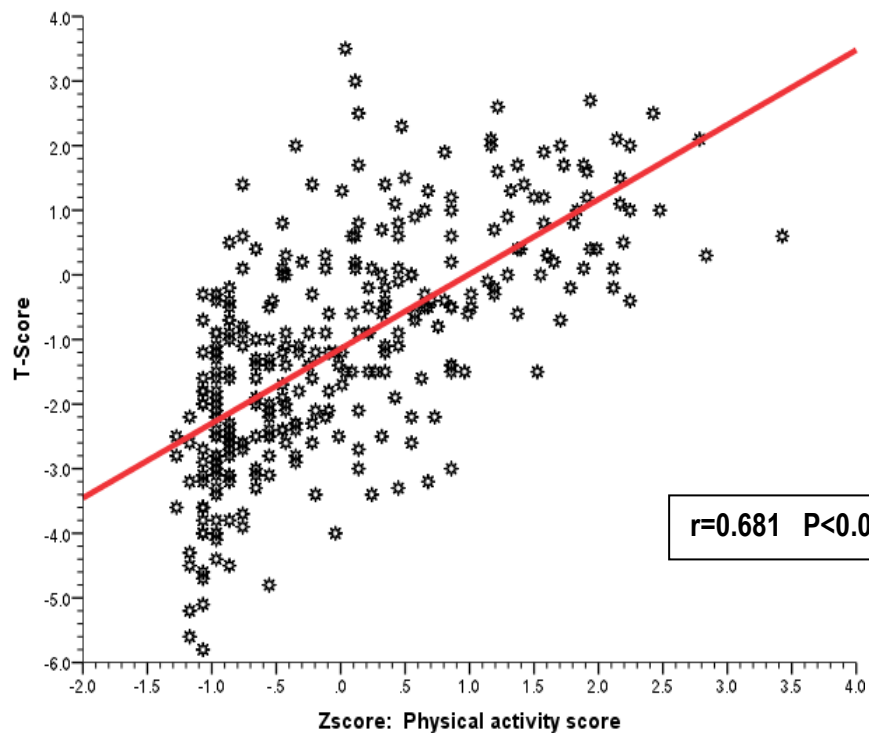


Figure 2 Scatter diagram (with fitted regression line) showing the linear correlation between t-score and Physical activity score.

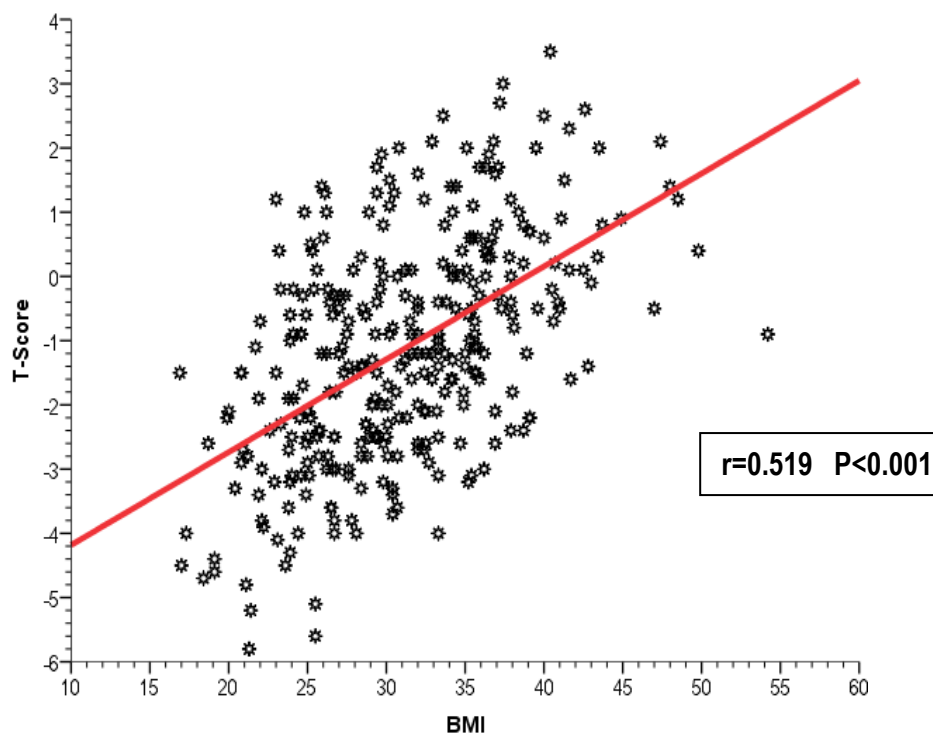


Figure 3 Scatter diagram (with fitted regression line) showing the linear correlation between t-score and BMI.

Table 3 The rate of having osteoporosis by Physical activity score categories.

Physical activity score	Total N	Positive for Osteoporosis (t- score <= -2.5)		OR	95% CI for OR
		N	%		
First (lowest) quartile	92	51	55.4	47.27	(10.9- 204.1)
Second quartile	64	17	26.6	13.74	(3.04 - 62.2)
Third quartile	78	10	12.8	5.59	(1.2 - 26.4)
Fourth (highest) quartile	78	2	2.6		Reference
r=0.681 P<0.001					

HS: P<0.01, S: P<0.05, NS: P>0.05

As shown in table (3), Physical activity score-categories had a statistically significant strong linear correlation with t-score ($r = 0.681$, $p < 0.001$). The rate of osteoporosis significantly increased from 2.6% among fourth(highest) quartile (40+) Physical activity score-categories to as high as 55.4% among First(lowest)quartile(≤ 10) Physical activity score-categories, while Second quartile (11-22) Physical activity score-categories was 26.6% and Third quartile (23-39) Physical activity score-categories was 12.8%.Being First(lowest)quartile(≤ 10) Physical activity score-categories significantly increase the risk of osteoporosis by 47.27 time compared to fourth(highest) quartile (40+) Physical activity score-categories. Being Second quartile (11-22) Physical activity score-categories significantly increase the risk of osteoporosis by 13.74 time compared to fourth(highest) quartile (40+) Physical activity score-categories, while Third quartile (23-39) Physical activity score-categories significantly increase the risk of osteoporosis by 5.59 time compared to fourth(highest) quartile(40+) Physical activity score-categories.

Discussion

1-factors associated with risk of having osteoporosis.

The present study indicates that the majority of osteoporosis (26.7%) were female, this is because the women are at greater risk of osteoporosis as they have smaller bones and hence lower total bone mass. Additionally, women lose bone more quickly following the menopause, and typically live longer[8] ,therefore; females were more than males. This result agrees with a study of Mai B., in Palestine-Nablus (2013),who founded that Probability of major osteoporosis fracture in female more than in male [12], also agrees with results by Baddoura R., et al., in Lebanon(2007) ,which revealed that prevalence of osteoporosis by DXA using total hip was 33% in women and 22.7% in men [13].

The present study stated that most of the osteoporotic patients (58.3%) were more than 70 years old age, and this is due to the decrease in BMD, and consequently the risk of osteoporosis increases with age [8]. This result was comparable to a study done by Jasim in Iraq-Baghdad(2004), who found that (64.3%) were more than 70 years old age had osteoporosis [14]. This result is similar to the result of El-Desouki MI. in kingdom of

Saudi Arabia (2003), who demonstrated that the higher percentage of osteoporosis accounted for (73.8%) were more than 70 years old age, while less percentage (24.3%) were in age 50-59 years [15].

Regarding the skin colour, the results in this study demonstrated that insignificant association was found between skin colour, and osteoporosis ($p > 0.05$). The finding of the present study is in agreement with findings reported by Nelson DA. et al., in USA-Michigan (1993), who stated that no significant correlation between skin color and BMD [16]. In addition, the results agreement by Vivanco-Munoz et al., Mexico (2012), when measurement BMD by DXA for total hip region, who founded no significance between skin color and osteoporosis ($P > 0.05$) [17]. This result was not comparable to a study done by Gemalaz A., et al., in Turkey (2007), who found that low T-score were related to fair skin color (P -value=0.005) [18].

Regarding the educational levels, the results in this study demonstrated that the higher proportion of osteoporosis (35.1%) were illiterate, while the lower proportion of osteoporosis (9.1%) were secondary school, this result could be due to the part that illiterate people are not aware of osteoporosis and therefore took no precautions against it. These results were similarity with study of Mai B., in Palestine- Nablus (2013), in a comparative study, who stated that illiterate subjects were higher risk of developing osteoporosis than School educated [12], which agrees with results of this study. In addition, the results supported by Allali F. et al., Morocco-Rabat (2010), who stated that the level of education was the strongest predictor of osteoporosis, among patients with no formal education were 50% developing

osteoporosis whereas only 22.4% of those with primary education or more had osteoporosis [19]. As well as agreement with Shin A., et al., Korea-Seoul (2004), his report was a significant association between education levels and calcaneal BMD in both male and female; individuals educated at or over high School level had a decreased risk of osteoporosis compared with individuals educated at elementary School level (OR=0.4 in male and OR=0.2 in female) [20], which strongly agree with this study.

With regard to type of residence, the present study shows that majority of patients (28.9%) who had osteoporosis were from rural areas and in contrast the minority percentage (22.5%) of them were from urban areas. This is because the rural community less availability of health services and treatment which leads to lack of early detection of osteoporosis as well as lack of awareness of food and health education in this community. These results are in disagreement with the results of Pongchaiyakul C., et al., in Thailand (2006) in a comparative study, who reported that the majority of the osteoporosis (18.2%) were from urban areas, while the rest (9.2%) were from the rural areas [21]. This disagreement may be due to different environmental condition between Iraq and Thailand.

Among smoking, the findings of the study indicated that insignificant association was found between smoking and osteoporosis ($p > 0.05$). In comparison with other study, this is agreement with the finding of Mai B., Nablus (Palestine), 2013, and El Maghraoui A., et al., in Rabat (Morocco), 2010, they founded that no association between smoking and osteoporosis (p -value > 0.05) [12], [22].

2- BMI and Osteoporosis.

Among BMI that found a statistically high significant

association with osteoporosis (p -value=0.001). Overall, the results showed that the majority of osteoporosis was (52.6%) normal (<25), while (11.9%) of osteoporosis were obese, this is because the body mass index is a measure of how lean someone and can be used as a guide to measure of osteoporosis risk [23]. Weight loss or low body mass index (BMI) is an indicator of lower BMD [8]. These results are supported by El Maghraoui A., et al., in Morocco-Rabat (2010), who found that high significant between BMI and BMD with $p < 0.0001$ [22]. Additionally, this study had similarity to other studies that reported by Bener A., et al., in Qatar-Doha (2007), that BMD was significantly higher in those with higher BMI (BMI > 30, $P < 0.001$) [24]. As well as the results regarding BMI was similar to that reported by Romana M. Sta., et al., in Espana (2007), who found that the majority of osteoporosis (64.93%) were normal BMI, while the minority of osteoporosis (29.1%) were extreme BMI [25]. As noted similarities with the study of Tanaka S., et al., in Japan (2013), who found that more percentage of osteoporosis (31.3%) were normal BMI, while rest percentage (15.3%) were obese [26], all these studies agreed with the results of our study.

3- The rate of having osteoporosis by Physical activity score categories.

The present study revealed a high relationship between Physical activity and osteoporosis with p -value < 0.001, this agrees with the study of Sharami S., et al., in Iran, 2008, who reported that a significant relationship was observed between physical

activity and osteoporosis (p -value=0.001) [27]. As well as compatible with El Maghraoui A., et al., in Morocco-Rabat (2010), who founded high significant association between low physical activity and osteoporosis with p -value < 0.0001 [22], which strongly agree with the results of this study. Also, a study done by Hania H., in Palestine (Gaza) 2008, found that there is high a significant association between physical activity less than 20 minute and osteoporosis in menopausal women with p -value < 0.0005 [28]. Also, this study had similarity to another study by Morseth B., et al., in Norway (2012), who found that the risk of any non-vertebral fracture decreased significantly with increasing physical activity level in men with (p -value = 0.006) [29].

Recommendation

1. Health education program for peoples which is conducted by ministry of health.
2. Early detection of osteoporosis through survey to peoples at risk, women at menopause & on corticosteroid.
3. Further larger studies should be include on larger sample to find out the size of problem in Iraq.
4. We suggest DEXA to be done as a survey for all females above 50 years and all males above 70 years with serial assessment and follow up to be done yearly or every two years to decrease possibility of risk of fracture or osteoporosis.
5. Support the comprehensive education of health professionals, including general practitioners, about early detection of osteoporosis & proper management.

Appendix: (Questionnaire).

EFFECT OF BODY MASS INDEX AND PHYSICAL ACTIVITY ON RISK OF OSETOPOROSIS IN BABYLON GOVERNORATE

Serial No.()

Socio-Demographic Characteristics:

1-Age ()years

2-Gender: 1= Male 2= Female

3-skin color: 1= Fair 2= Dark

4-Education level: 1= Illiterate 2= primary School 3= Secondary School
4= university/higher education

5-Marital status: 1= married 2= single 3= Divorced

4= Widow 5= separated 6-Residency: 1= urban 2= rural

7- Smoking: 1= Yes 0= No

Physical activity:

8-Over the past 7 days, did you engage in **light sport or physical activities**? Such as: I-Light cycling on an exercise bike.

1=Yes 0=no, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

II- Shopping. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

III- Cooking. 1=Yes 0=No, If yes what is frequency?

1= Seldom (1-2days) 2= sometimes (3-4day) 3=often (5-7days) IV-

doing the laundry. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

V- Write desk work or typing. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

9-on average, how many hours per day you engage in these light physical activities on these days? 1=Never 2= Less than 1hour

3= 1-to less than 2 hours 4= 2-4hours 5= more than 4hours

10-over the past 7 days, did you engage in **moderate sport or physical activities**? Such as:

I-doubles tennis. 1=Yes 0= No, If yes what is frequency?

1= Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

II- Bicycling. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

III- general gardening. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

VI- Washing windows. 1= Yes 0= No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3= often (5-7days)

V- Carrying light loads. 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4days) 3=often (5-7days)

11- On average, how many hours per day did you engage in these moderate physical activities on these days? 1=Never 2= Less than 1hour

3=1but less than 2 hours 4=2-4 hours 5=more than 4 hours

12-over the past 7 days, did you engage **strenuous sport or physical activities**? Such as:

I- Jogging: 1=Yes 0= No, If yes what is frequency?

1= Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

II- Swimming: 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

III- fast cycling: 1=Yes 0=No ,If yes what is frequency?

1=Seldom (1-2days) 2=sometimes (3-4day) 3=often (5-7days)

IV- Heavy gardening: 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2= sometimes (3-4day) 3=often (5-7days)

V- Lifting heavy things: 1=Yes 0=No, If yes what is frequency?

1=Seldom (1-2days) 2=sometime (3-4days) 3=often (5-7days)

13- On average, how many hours per day did you engage in these strenuous sport or physical activities on these days? 1=Never

2= Less than1 hours 3=1 but less than 2hours

4=2-4 hours 5= more than 4 hours

14-the Following questions will be asked to women only:

I-Are you during menopause? 1=Yes 0=No

II-Have you had multiple pregnancies? 1=Yes 0=No

III- Are your uterus removed (Hysterectomy). ? 1=Yes 0=No

IV- are you taking Oral contraceptive pills? 1=Yes 0=No

15- **Body mass index (BMI):**

I- Body height:() cm.

II- Body weight:()Kg.

E-Medical history and family:

16-which of the following chronic diseases do you have?

I-Diabetes: 1=Yes 0=No

II-Hypertension: 1=Yes 0=No

III-Thyroid disease: 1=Yes 0=No

IV- Cancer: 1=Yes 0=No

V-Renal disease: 1=Yes 0=No

VI- Rheumatoid arthritis: 1=Yes 0=No

VII-Asthma: 1=Yes 0=No

VIII-Chronic Liver disease: 1=Yes 0=No

IX-Intestine disease: 1=Yes 0=No

X-SLE : 1=Yes 0= No

17-Which of the following medications do you use and its duration?

I-Corticosteroids 1=Yes 0=No It's duration-----

II-Cytotoxic drugs 1=Yes 0=No It's duration-----

III-PPI 1=Yes 0=No It's duration-----

IV- anti- hypertensive's 1=Yes 0= No It's duration-----

IV-Warfarin 1=Yes 0=No It's duration-----

V- thyroxin 1=Yes 0=No It's duration-----

VI- statins 1= Yes 0= No It's duration-----

VII-Diuretics 1= Yes 0= No It's duration-----

VIII- Calcium supplement 1=Yes 0=No It's duration-----

18-Do you have lower back pain? 1=Yes 0=No

19-Have you noticed a change in height? 1=Yes 0=No

20-have you fracture bone after a minor trauma or fall? 1=Yes 0=No

21-Had either of your parents's been diagnosed with osteoporosis?

1=Yes 0= No

22-Did your father or mother have fracture bone after a minor trauma or fall?

1= Yes 0= No

23-Do you have a positive family history of obesity? 1=Yes 0= No

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