



## NURSING EVALUATION OF TYPE 2 DIABETES MELLITUS PATIENTS' KNOWLEDGE OF OSTEOPOROSIS

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### Abstract

**Objective:** This study aimed to evaluate the awareness of osteoporosis among patients with type 2 diabetes mellitus at the Center for Endocrine and Diabetes in Al-Nasiriyah City and to identify the relationship between demographic factors such as age, sex, educational level residency, and osteoporosis.

**Study Methodology:** A descriptive study approach was used throughout the current investigation, which lasted from 20 October 2022 to 20 April 2023. Three hundred seventy-three patients were meticulously examined at the Center for Endocrine and Diabetes in Al-Nasiriyah City. It should be noted that the sampling method used was nonprobability. A self-reported questionnaire was used to acquire data for the administrative reporting procedure. The questionnaire consists of two parts: the parents' age, gender, education level, and place of residence, among other sociodemographic variables. In the second section of the survey, we ask. Older people with chronic diseases can have their understanding of osteoporosis tested with the Osteoporosis Knowledge Assessment Tool (OKAT). Twenty questions related to osteoporosis knowledge make up the quiz. The scale was tested in Arab nations, where it was found to have a validity index of 0.76 (Alpha). Using IBM's Social Science Statistical System (IBM SPSS) version 26.0, descriptive and inferential statistical methods were used for the data.

**Results:** The results showed that the highest sample, 88 (30.4 percent) for the study, was between the 51-60 age group. According to the gender revealed, most were women, accounting for 139 (50.9%). Most of the study sample had a secondary level of education, with 115 participants (42.1%) and inside city residents; overall evaluation of the osteoporosis knowledge assessment tool (OKAT) was a low level of knowledge. Results indicate no significance or relationship between demographic data and the evaluation among patients with type 2 diabetes mellitus toward the osteoporosis knowledge assessment tool (OKAT) at a value of p. greater than 0.05.

**Conclusions** The overall evaluation of the osteoporosis knowledge assessment tool (OKAT) showed a low level of knowledge.

**Recommendations:** According to the research, people with type 2 diabetes who received health education had a favourable impact on their self-care and management practices regarding their understanding of osteoporosis..

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### Introduction

Diabetes mellitus (DM) is a chronic medical condition that requires a rigorous daily commitment to and implementation of medication regimens, dietary restrictions, and lifestyle changes. For some diabetic patients, these requirements can be demanding and challenging. According to a recent estimate from the World Health Organization (WHO), 422 million people were diagnosed with DM in 2014, up from 108 million in 1980. In every part of the world, including the Arab Middle East, the prevalence of DM is increasing (Ishtaya et al., 2018).

As a metabolic disorder, osteoporosis has become one of the most rapidly expanding consequences of diabetes mellitus, a disease of extreme affluence. To find out how common osteoporosis is in people with type 2 diabetes mellitus (DM2), we previously performed a systematic study covering 2001 through 2016. However, newer and more in-depth studies have shown that there remain hazy and debatable risks for osteoporosis (Si et al., 2020; Gundtoft et al., 2018).

Osteoporosis is a prevalent disease that can have severe consequences, although it is clinically silent. However, it is largely preventable. Osteoporosis is a widely acknowledged public health concern around the world, particularly among postmenopausal women and the elderly population. Furthermore, the prevalence of osteoporosis among Asian people is a significant concern in the field of public health because individuals of Asian ancestry and type 2 diabetes mellitus (DM2) are recognized to be at risk for osteoporosis, which is characterized by low bone mineral density (BMD) compared to other ethnic groups (Abdulameer et al., 2019).

Osteoporosis is influenced by factors that can be modified and those that cannot be changed. Risk variables that may be altered include a person's gender, race/ethnicity, age, and even their family history. Health problems can be exacerbated by several variables, some of which are changeable. Lack of vitamin D and calcium, being overweight, sitting all day, smoking, excessive drinking, and using medications such as corticosteroids and proton pump inhibitors for long periods are all risk factors (Mohamed Elsyad & Elbadwy Ezzat, 2022a).

Possible factors contributing to lower bone quality include advancing age, oral antidiabetic medications, and nutritional deficiencies. On the contrary, a higher body mass index has been shown to protect against bone density loss in females. A more extensive comparative study is necessary to elucidate the potential risks and correlation between type 2 diabetes mellitus (DM2) and bone fragility (Khaleel & Atiyah, 2022).

Osteoporosis is more prevalent in women than in men due to the earlier onset of bone loss and a more rapid increase in older women. Osteoporotic fractures incur substantial medical expenses, decrease quality of life, decrease work productivity,

and increase mortality rates. The primary objective of osteoporosis management is to prevent fractures. It is recommended that healthcare professionals provide patients with nonpharmacological and pharmacological interventions. Osteoporosis is a condition that various risk factors can influence. To reduce the risk of developing this condition, exercise regularly, learn proper nutrition, get enough calcium and vitamin D, and use tobacco and alcohol, which are all Crucia (Huang et al., 2023).

#### **Aims of the study:**

This study aims to evaluate the knowledge of patients with type 2 diabetes about osteoporosis and the association between the Osteoporosis Knowledge Assessment Tool, often known as OKAT, and demographic variables' characteristics.

#### **Materials and Methods**

##### **Research Design and Subjects:**

In this chapter, we present the following :

**1- Study design:** The descriptive descriptive study approach was used throughout the current investigation, which lasted from October 2022 to April 2023.

**2- Study settings:** - The study was conducted at the Center for Endocrine and Diabetes in Al-Nasiriyah City.

**3-** The study involved a sample of 373 patients with type 2 diabetes mellitus selected randomly. The patients were recruited from the endocrine and diabetes center located in the city of Al-Nasiriyah.

##### **Criteria :**

A- Age more than 20 years.

B- Patients agreed to cooperate in the study.

C- Patients, male and female

##### **4-A Study Tools:**

The research was conducted at the Center for Endocrine and Diabetes in Al-Nasiriyah. The researchers went and made a questionnaire consisting of:

**Part 1: Among sociodemographic characteristics are ( age,gender, education level, and residency ).**

**Part 2:** The Osteoporosis Knowledge Assessment Tool, often known as OKAT, is a scale used to evaluate the knowledge about osteoporosis held by senior adults living with chronic diseases. The questionnaire consists of 20 questions regarding osteoporosis knowledge and has been verified in Arab countries (Sayed-Hassan & Bashour, 2013). The scale has been used in these countries.

##### **Data Collection Tools:**

Study participants were required to provide official consent, which was obtained from the Health Management Authority's administrative office and patients at the Al-Nasiriyah city endocrine and diabetes center. Before their inclusion in the study, each participant received a detailed explanation of the study objectives and requirements.

Scoring and classification:

The presented designs were utilized to rank and score the items.

Respondents were asked to rate their evaluations for each question with a (1) for yes or a (0) for no.

2: A higher ranking on the questionnaire (MS).

The scoring and rating system of this scale was divided into three levels, which were: low (L)

**RESULTS**

The study's results reveal notable demographic trends among patients with type 2 diabetes mellitus, showcasing a predominant representation of individuals aged 51-60, a majority of whom were female and possessed a secondary level of education. Additionally, a substantial number of participants resided in urban centers. Analysis of osteoporosis knowledge, as assessed by the Osteoporosis Knowledge Assessment Tool (OKAT), demonstrated that while more than half of the knowledge items achieved a moderate

assumed between 0.0 and 0.33, Moderate level (M) 0.34 into 0.66, and finally high (H) between 0.67 and 1.00 .

Data analysis by (SPSS, 26) will be done using the Social Sciences Statistics Package.

level, the overall evaluation of osteoporosis knowledge was reported as low. Crucially, statistical examinations found no significant association between demographic factors and participants' overall osteoporosis knowledge. These findings underscore the imperative for targeted educational interventions to augment awareness and understanding of osteoporosis, especially among patients with type 2 diabetes mellitus, transcending conventional demographic considerations.

**Table (1) Distribution age of (373) of patients with type 2 diabetes mellitus.**

Age group	Number	Present
20-30 years	33	12.1
31-40 years.	51	18.7
41-50 years	68	24.9
51-60 years	83	30.4
61 years and older	38	13.9
<b>Total</b>	<b>273</b>	<b>100.0</b>

**Table (2): Distribution of (373) patients with type 2 diabetes mellitus by sex.**

Gender	Frequency	Percentage
Male	134	49.1
Female	139	50.9
<b>Total</b>	<b>273</b>	<b>100.0</b>

**Table (3): The distribution of (373) patients with type 2 diabetes mellitus is according to educational level:**

Education Level	Number of	Present
Illiterate	8	2.9
Primary	25	9.2
Intermediate	48	17.6
Secondary	115	42.1
University	74	27.1
Postgraduate studies	3	1.1
<b>Total</b>	<b>273</b>	<b>100.0</b>

Table 4 shows the distribution of 373 patients with type 2 diabetes mellitus according to residency.

Residency	Number of	Present
City Center	215	78.8
Out-of-town	58	21.2
<b>Total</b>	<b>273</b>	<b>100.0</b>

**Table (5) Summary statistical distribution of Type 2 diabetes patients to the Osteoporosis Knowledge Assessment Tool (OKAT):.**

No	Items	MS	SD	Eva.
1	Osteoporosis is a condition that increases the probability of bone fractures.	0.44	0.498	M
2	Pain is often experienced before a fracture occurs in people with osteoporosis.	0.48	0.501	M
3	A strong bone structure during childhood does not necessarily mean you will be as strong as an ox in your golden years.	0.34	0.476	M
4	Well, it is not all beer and Skittles for men regarding osteoporosis. The odds are stacked against them as it is a tough row to hoe for the male population.	0.27	0.447	L
5	Smoking can cause osteoporosis.	0.20	0.399	L
6	White women are more likely to have fractures than other races.	0.42	0.495	M
7	Falls are just as significant as low bone strength to cause fractures.	0.38	0.487	M
8	By the age of 80, most women will develop osteoporosis.	0.36	0.482	M
9	Once women hit the big 5-0, they can break a bone or two before kicking the bucket.	0.36	0.481	M
10	Getting off the couch and hitting the ground running can do wonders for your bones regarding osteoporosis.	0.24	0.429	L
11	It is a piece of cake to figure out if you are walking on thin ice for osteoporosis based on my clinical risk factors.	0.33	0.472	L
12	If it occurs in the family, the probability of developing osteoporosis is higher.	0.37	0.484	M
13	Two glasses of milk daily keep the doctor away with enough calcium to spare.	0.21	0.405	L
14	For people who cannot consume dairy products, sardines and broccoli are excellent sources of calcium.	0.42	0.494	M
15	Consuming calcium supplements alone can help prevent bone mass loss.	0.40	0.491	M
16	Moderate alcohol consumption has minimal impact on the development of osteoporosis.	0.43	0.496	M
17	Consuming too much salt increases the likelihood of developing osteoporosis.	0.40	0.491	M
18	Bone loss occurs to a small extent during the ten years following the onset of menopause.	0.11	0.309	L
19	Hormone therapy can effectively prevent bone loss at any age after menopause.	0.26	0.437	L
20	In Iraq, there is currently a lack of effective treatments for osteoporosis.	0.11	0.318	L
<b>The following is an evaluation of the Osteoporosis Knowledge Assessment Tool (OKAT).</b>		0.33	0.131	L

M.S. = mean score. Eva Evaluation: The values of L, M, and H correspond to low ranges (0.00 – 33.33), moderate ranges (33.34 – 66.66), and high ranges (66.67 – 100) ranges, respectively.

**Table (6) Summary statistics for the association between the Osteoporosis Knowledge Assessment Tool (OKAT) and the General Evaluation and the General Evaluation and Demographic Data:**

Demographic data	Scale	Overall evaluation Osteoporosis Knowledge Assessment Tool (OKAT)			Statistical analysis		
		Low	Moderate	High	Chi-square	d.f	p.value
Age/ years	20-30 years	17	16	0	8.518	8	0.385
	31-40 years.	24	27	0			
	41-50 years	33	34	1			
	51-60 years	28	55	0			
	61 years and older	15	23	0			
Gender	Male	59	75	0	1.079	2	0.583
	Female	58	80	1			
Marital Status	married	115	146	1	3.324	2	0.837
	Single	1	7	0			
	widower/divorced	1	2	0			
Educational Level	Illiterate	0	7	1	14.297a	10	0.160
	Primary	3	19	3			
	Intermediate	9	29	10			
	Secondary	12	81	23			
	University	4	64	7			
	Postgraduate studies	0	3	0			

**Discussion**

In addition to making the literature and relevant research accessible, the graphics systematically explain the results and guide debate to a respectable extent of the findings.

Descriptive and infective

Data were examined using descriptive and inferential statistics to satisfy the study goals.

Part-1: Discussion of socioeconomic characteristics of 373 patients with type 2 diabetes mellitus according to demographic variables:

The results of this research showed that Table 1 shows that the majority of the study sample was in the age range 51-60. These results are compatible with the results of the following investigations (Ishtaya et al., 2018), which revealed that the participants' age was reported as 58.5 ± 9.3 years (mean ± standard deviation).

Results show the distribution of the research sample according to gender. The majority of the participants were

found to be women, accounting for 139 (50.9%) of the total. These findings were supported by a study carried out by. (Abdulameer & Sahib, 2019a), That mentions that most participants identified as female, comprising 54% of the sample.

Results show the level of education of the study sample, where most had a secondary level of education 115 (42.1%). Results show that the residency of the study sample was where most of them lived in the city center. 53.3% of women received primary education, and the majority of them attended rural colleges, according to data supported by (Mohamed Elsyad & Elbadwy Ezzat, 2022b)

Part 2: Discuss the statistical distribution of patients with type 2 diabetes toward the Osteoporosis Knowledge Assessment Tool (OKAT).

A significant proportion of the items featured in the osteoporosis knowledge assessment tool (OKAT) were deemed to have a moderate degree of knowledge. However,

the comprehensive evaluation of the osteoporosis knowledge assessment tool (OKAT) gave a low knowledge level verdict. The conclusions mentioned above were corroborated by a research endeavor conducted by the esteemed American Diabetes Association (Khaleel & Atiyah, 2022); results confirm that the majority of participants had type 2 diabetes mellitus and also show that the majority of individuals who visited a diabetic clinic had a poor degree of knowledge regarding osteoporosis. Also, according to the findings of a study carried out by (Winzenberg et al., 2003), they note that the Flesch reading ease score was 45, which was higher than the target level. However, this was attributable to the fact that "osteoporosis" was frequently used in the items. Seventeen of the things had a difficulty index lower than 0.75. Both Ferguson's sigma and Cronbach's alpha indicated that the questionnaire had excellent levels of internal consistency. Ferguson's sigma was 0.96, while Cronbach's alpha was 0.70. According to the results of the factor analysis, the questionnaire only evaluated one factor, which was the knowledge of the osteoporosis of the respondents. The fact that the average score on OKAT was 8.8 out of 20 indicates poor knowledge of osteoporosis and suggests that the test may be sensitive to change. In a study carried out in Palestine in 2018, findings from (Ishtaya et al., 2018) revealed that diabetic individuals exhibited inadequate awareness of osteoporosis and moderate levels of perceived susceptibility and severity towards the condition. Awareness programs should be implemented among patients with DM to improve their adherence to preventive measures for osteoporosis, such as calcium intake and exercise.

Part 3: Discuss the statistical distribution of patients with type 2 diabetes toward the Osteoporosis Knowledge Assessment Tool (OKAT).

These tables show that the study results indicate no significance or relationship between demographic data and evaluation among the elderly osteoporosis knowledge assessment tool (OKAT) with a value of p. greater than 0.05. Although there are statistically significant correlations between gender and evaluation among the elderly osteoporosis knowledge assessment tool (OKAT) with a value of p. less than 0.05. These findings do not agree with the study by (Abdulameer et al., 2019), that the study found significant correlations between osteoporosis knowledge and variables such as education level, monthly income, employment status, and family history. Also, the study had no agreement (Abdulameer & Sahib 2019b). Furthermore, the scores for OKT-A and its subscales were below 50%. The study found notable variations in total OKT-A scores based on certain independent variables, namely, educational level and awareness of osteoporosis. In addition, osteoporosis also

showed a significant difference in scores. There was a substantial correlation between osteoporosis awareness and OKT-A knowledge levels.

### **Conclusions**

1-The highest percentage of research samples is in the age group between 51-60 years, female more than male, secondary level of education, read and write, married, and primary school.

2- Overall evaluation of the osteoporosis knowledge assessment tool (OKAT) was a low level of knowledge.

3. results indicate no significance or relationship between demographic data and evaluation among type 2 diabetes mellitus patients toward osteoporosis knowledge assessment tool (OKAT) with p. value greater than 0.05.

### **Recommendations**

Based on the study conclusions, the study can recommend that:

1. A national population-based analysis could comprehensively and systematically assess osteoporosis knowledge in patients with type 2 diabetes.
2. Provides informational and instructional health education on osteoporosis to people with type 2 diabetes to increase their awareness of the condition.
3. Patients with type 2 diabetes showed improved self-care and management practices when understanding osteoporosis, thanks to health education.
4. Continued educational programs on osteoporosis for patients with type 2 diabetes and their caregivers can enhance their understanding of treatment issues and improve their knowledge.

### **ETHICAL CONSIDERATIONS CONSIDERATIONS COMPLIANCE WITH ETHICAL GUIDELINES**

The study was carried out after approval from the Thi-Qar Health Office Directorate and the Diabetes and Endocrine Center and obtaining consent from the patients.

**FUNDING**There was no funding for this study from the government, businesses, or nonprofits.

### **AUTHOR'S CONTRIBUTIONS**

The author investigates the idea, drafts, and evaluates the finished product.

### **DISCLOSURE STATEMENT:**

The author has disclosed no conflicts of interest.

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