



Awareness of Diabetes and Obesity in Turkey

Türkiye’de Diyabet ve Obezite Farkındalığı

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Abstract

Purpose: Diabetes mellitus (DM) and obesity (OB) are rising problems globally, and are also rapidly growing health issues in Turkey. The lack of a proper public awareness has worsened the situation, thereby hampering the implementation of preventive measures. The aim of the present study was to evaluate a questionnaire, specifically designed for measuring the level of awareness of the general Turkish population on DM and OB.

Material and Method: The International Diabetes Federation (IDF) questionnaire was modified to measure the influence of knowledge about diet and physical activity on DM and OB among the Turkish population. We investigated the relationship between the level of knowledge of volunteers on DM and OB and other factors, such as age, gender, socioeconomic status (SES), education, and having DM or a family history of DM. The results were analyzed appropriately using Student’s t-test, Mann–Whitney U test, Kruskal–Wallis test, One-way analysis of variance (ANOVA), and multiple logistic regression model. The present study was observational and designed prospectively.

Results: According to the observations, only 30.1% of the total volunteers that took part in the study had an awareness of DM and OB. There was no statistical difference on the level of knowledge about DM and OB between the various gender groups included in the study ($p=0.590$). The participants with university level education scored the highest. The mean scores of knowledge on DB and OB were found to be lowest among the people with low SES; however, surprisingly, people with high/very high SES also scored low.

Discussion: The results obtained indicated that the level of awareness of DM and OB was moderate and insufficient. DM and OB were present in approximately 6.5 and 15.2 million people in Turkey, respectively. With a diminished awareness among the Turkish people on DM and OB, the responsibility lies on the shoulders of the young population to create awareness on a large scale for the betterment of the future generations.

Keywords: Diabetes mellitus; awareness; obesity

Özet

Amaç: Diabetes mellitus (DM) ve obezite (OB), diğer ülkelerde olduğu gibi Türkiye’de de giderek büyüyen problemlerdir. Fakat halkın bu sorunlar karşısındaki farkındalığı sorunların önlenmesi için yeterli değildir. Bu çalışmada bizde sokaktaki insanın DM ve OB’nin farkındalığının özel olarak tasarlanmış bir anketle değerlendirilmesi hedeflenmiştir.

Gereç ve Yöntem: Türk popülasyonunun diyet ve fiziksel aktivitesinin DM ve OB üstündeki etkisi ile ilgili bilgi düzeyini araştırmak için Uluslararası Diyabet Federasyonu (IDF) tarafından hazırlanan anket modifiye edilerek uygulandı. Bu çalışmada, diyabet ve obezite hakkındaki bilgi düzeyi ile insanların yaşı, cinsiyeti, sosyoekonomik durumu, eğitimi, diyabetik olması veya ailede diyabet hikâyesi olması arasında olabilecek ilişkiler değerlendirilmiştir. Sonuçlar gereğine uygun olarak Student t-testi, Mann-Whitney U testi, Kruskal-Wallis testi, One-way ANOVA ve çoklu lojistik regresyon analizi ile elde edildi. Bu çalışma, prospektif ve gözlemsel olarak planlandı.

Bulgular: Yapılan anketlerin sonuçlarına göre sadece %30.1 gönüllü DM ve OB farkındalığına sahipti. Diyabet ve OB bilgi düzeyi ile cinsiyet arasında anlamlı bir istatistiksel ilişki saptanamadı ($p=0.05$). Üniversite eğitimi alan gönüllüler en yüksek bilgi düzeyine sahipti. En az bilgi düzeyine sahip olanlar ise sosyoekonomik düzeyi düşük gönüllülerdi. Fakat şaşırtıcı olarak, sosyoekonomik düzeyi yüksek/çok yüksek gönüllülerde bilgi düzeyi beklendiği gibi yüksek değildi.

Tartışma: Elde ettiğimiz sonuçlar DM ve OB farkındalığının orta düzeyde olduğuna işaret etse de sonuçlar ülkemizde sırasıyla 6,5 ve 15,2 milyon insanı etkileyen bu sorunlar için yeterli değildir. Fakat gençler arasında farkındalığın yüksek olduğunu görmek umut verici olarak nitelendirilebilir.

Anahtar kelimeler: Diabetes mellitus; farkındalık; obezite

Introduction

The prevalence of diabetes mellitus (DM) is on the rise in the developed and developing countries due to changes in lifestyle (1). Type 2 DM is the most frequent type of diabetes (2). There were 135 million patients with type 2 DM in 1995 and this number is expected to rise to around 438 million by 2025 (3,4). Similarly to other countries around the world, the prevalence of DM is increasing tremendously in Turkey. A cross-sectional survey, the Turkish Epidemiology Survey of Diabetes, Hypertension, Obesity, and Endocrine Diseases (TURDEP-1) conducted between 1997 and 1998, comprised a national representative sample of 24,788 Turkish adults (aged ≥ 20 years). The same survey known as TURDEP-2 was conducted (n = 26,499) at the same centers in 2010, 12 years after the first one. The prevalence of type 2 DM was 7.2% in 1998 according to results of TURDEP-1 that increased to 13.7% (an increase of 90% in 12 years according to results of TURDEP-2). According to this study, the prevalence of impaired glucose tolerance (IGT), obesity, and central obesity was elevated to 106, 40, and 35%, respectively (5). In addition, age, hypertension, waist measurement, body mass index (BMI), low level of education, and living environment in women and age, BMI, and hypertension in men were found to be independently associated with an increased prevalence of DM.

DM reduces the life expectancy by about 5–10 years (6). It ranks fifth on the list of mortality rates of various diseases (7,8). The risk of cardiovascular diseases is two to four times higher in diabetic adults (9). Moreover, DM has been found to be the most frequent reason for renal replacement therapy or blindness among population less than 65 years. It is also associated with the amputation without trauma. Furthermore, the cost of these complications is very high (6). The cost involved in the treatment of DM constitutes 3% to 12% of the total health care expenditure in some countries (10).

The main reasons for the growing number of DM cases can be listed as the increasing population, aging, problems due to urbanization, and the reduced physical activity (11). In fact, the majority of the risk factors associated with DM can be avoided (12). Some studies suggest that the risk of DM can be reduced only by a change in an individual's lifestyle (13,14). We believe that increasing the awareness about DM can act as a pivotal factor for its prevention in the long run. In the present study, our goal was to evaluate the level of awareness about DM and OB, as the prevalence of DM is rapidly increasing in Turkey and is intricately associated with OB.

Material and Methods

The questionnaire, which was proposed by the International Diabetes Federation (IDF) to evaluate the knowledge of how diet and physical activity affect DM and OB among Turkish people was validated according to the lifestyle of Turkey. The original Turkish questionnaire translated into English is given below.					
Diabetes and Obesity (Fight against to Diabetes, Prevent Diabetes)					
Date					
Age					
Gender					
Education Level	Literate	Primary Education	Secondary School	High School	University
Income Level	Low	Middle	High	Very High	
Having Diabetes	No	Yes			
Having Diabetes Family history	No	Yes			
Test Your Knowledge About Diabetes					
The development of diabetes depends on excessive consumption of sweet foods		Yes	No	Don't Know	
Is it possible to prevent diabetes		Yes	No	Don't Know	
Diabetes symptoms always appear		Yes	No	Don't Know	
Less physical activity is one of the causes of diabetes		Yes	No	Don't Know	
Advanced is may be a risk factor for diabetes		Yes	No	Don't Know	
Type 2 diabetes occurs only in adults and elderly people		Yes	No	Don't Know	
Is there a relationship between impaired glucose tolerance (prediabetes) and diabetes		Yes	No	Don't Know	
Insulin is the only treatment for diabetes		Yes	No	Don't Know	
Some patients with type 2 diabetes may need insulin		Yes	No	Don't Know	
Small changes in weight, for example, slight weight loss can affect diabetes positively		Yes	No	Don't Know	
Did you know the diet and physical activity can affect diabetes?					
Daily exercise less than 30 minutes may benefit health		Yes	No	Don't Know	
Can exercise reduce the blood glucose levels?		Yes	No	Don't Know	
Diet plus exercise may help to normalize the blood glucose level?		Yes	No	Don't Know	
The first step to weight loss is reducing the number of meals by skipping the meals.		Yes	No	Don't Know	
Should elderly patients (age 65 and over) with diabetes exercise?		Yes	No	Don't Know	
Exercise reduces the requirement of the medications.		Yes	No	Don't Know	
Low-calorie foods can be freely consumed.		Yes	No	Don't Know	
Diabetic patients can consume freely sugarless desserts.		Yes	No	Don't Know	
Diabetic patients can drink alcohol.		Yes	No	Don't Know	
The best way to weight loss is consuming foods high proteins and low carbohydrates.		Yes	No	Don't Know	
Should patients with diabetes measure the blood glucose levels before the exercise?		Yes	No	Don't Know	
The patients who used to have insulin have to consume the high-carbohydrate food more than others.		Yes	No	Don't Know	
Consuming fruit juice a better choice then fruit itself		Yes	No	Don't Know	
Patients with type 1 diabetes have to exercise if their blood glucose is very high.		Yes	No	Don't Know	
Should patients with renal impairment exercise?		Yes	No	Don't Know	

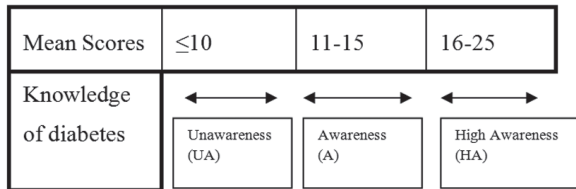


Figure 1: The scale of the questionnaire

The present study was a population-based cross-sectional study. After we obtained the approval of the Local Ethics Committee, the procedure was carried out on 1,000 participants in different areas of Istanbul. The sample age was between 18 and 75 years. The malls and the underground stations were listed in alphabetic order. We used cluster random sampling with random sequence generator at www.random.org, and the first 10 places were selected to ask people to fill out the questionnaires between January and June 2014. The application of the questionnaires was prepared by medical students who were trained about the questionnaire, and the volunteers willing to participate answered the questions. This questionnaire consisted of 25 questions and each correct answer was scored as 1 point. The participants were classified according to their scores that helped to categorize them based on their knowledge of DM. We determined the group having scores between 25 and 16 as high awareness (HA), the ones with scores between 15 and 11 as awareness (A), and the ones with scores less than or equal to 10 as unawareness (UA, Figure 1).

The level of knowledge of the participants about DM and OB was evaluated. Also, the age, gender, socioeconomic status (SES), the level of education, and having DM or a family history of DM were noted, and further investigations on the relationship between the level of knowledge about DM and OB and other factors was realized.

Statistical Analysis

The statistical analyses were performed using the Social Sciences® for Windows® (version 21, SPSS, Chicago, IL, USA) software. Student's t-test, Mann-Whitney U test, Kruskal-Wallis test, and one-way analysis of variance (ANOVA) were used to detect the specific contribution of each variable to the knowledge of awareness. Univariate and multivariate logistic regression models were built to evaluate the factors predicting awareness.

Results

A total of 1,000 participants (537 women [53.7%] and 463 men [46.3%]) with the mean age 38.4 ±15.14 years (range 18–75 years) were included in the study. Unfortunately, there was no participant having a score between 16 and 25. Only 30.1% of the participants scored 11–15 points and were aware of the problem; the rest of the participants constituting 69.9% of the total scored less than or equal to 10 points on the questionnaire and constituted the unaware category. The general characteristics of the participants and mean scores of groups are presented in Tables 1 and 2, respectively.

Table 1. General characteristics of the participants (n:1000)

Characteristic	Number (%)
Age (years)	
< 20	128 (12.8%)
20–39	429 (42.9%)
40–59	280 (28.0%)
> 60	164 (16.4%)
Gender	
Female	537 (53.7%)
Male	463 (46.3%)
Education	
Literate	76 (7.6%)
Primary	328 (32.8%)
High school	258 (25.8%)
University	338 (33.8%)
Socioeconomic status (SES)	
Low	45 (4.5%)
Medium	688 (68.8%)
High	252 (25.2%)
Very high	15 (1.5%)
Having Diabetes	
Yes	66 (6.6%)
No	934 (93.4%)
Family history of diabetes	
Yes	293 (29.3%)
No	707 (70.7%)

Table 2. The mean scores and the level of significance of the participant groups

Participants's Specifications	Mean ±SD	p value
Age Groups		0.030
<20 years	13.58 ±4.34	
20–39 years	12.57 ±3.92	
40–59 years	12.48 ±3.66	
>60 years	13.56 ±4.77	
Gender		0.590
Male	12.85 ±3.99	
Female	12.61 ±4.04	
Socioeconomic Status		0.025
Low	10.33 ±4.97	
Moderate	12.98 ±3.97	
High/ Very High	12.74 ±3.76	
Educational Level		<0.001
Literate/ Primary	11.61 ±3.60	
High School	12.63 ±4.35	
University	14.06 ±3.72	
History of Diabetes in family		<0.001
Yes	13.88 ±3.59	
No	12.31 ±4.08	
Having Diabetes		<0.001
Yes	14.94 ±3.59	
No	12.57 ±3.98	

When we compared the results by the means of gender, the scores were similar in males and females ($p = 0.590$, Table 2).

The mean scores of awareness about DM and OB were found to be at the highest level with 13.58 ± 4.34 points among people aged less than 20 years and were at the lowest level with 12.48 ± 3.66 points among people aged 40 to 59 years (Table 2). There was a statistical difference among all the groups ($p < 0.05$), but there was no statistical difference between the awareness of DM and age groups in binary comparisons ($p > 0.05$, Table 2).

The level of knowledge about DM and OB significantly differed when the participants were classified by SES and the level of education ($p = 0.025$ and < 0.001 , respectively, Table 2).

Mean scores of knowledge about DM and OB were found to be in the lowest level among people with low SES; however, even people with high/very high SES had lower mean scores of awareness than the moderate SES group (Table 2). As indicated in Table 2, the participants with a history of diabetes in their families had significantly higher scores than the others ($p < 0.001$).

Awareness was higher among the people with DM with a mean score of 14.94 ± 3.59 in the diabetic group ($p < 0.001$, Table 2).

We investigated the existence of any relationship between the knowledge level about DM and OB and other factors such as age, gender, SES, formal education, having DM, and a family history of DM. The results were analyzed with univariate ANOVA test and multiple logistic regression model (Tables 3 and 4). The statistical significances were based on SES, education, DM, and a family history of DM according to the univariate analysis. In the multivariate analysis based on these data, the significance was determined by education, DM, and a family history of DM.

Discussion

The incidence of DM is increasing rapidly (11). The factor that adds to the problem is that half of the diabetic patients possess a limited knowledge about their illness and are not aware of the possible

Table 3. The factors that were associated with awareness (Univariate)

	B	p	OR	95% CI	
				Lower	Upper
Age (vs. <20 years)		0.072			
20-39 years	-0.445	0.015	0.641	0.447	0.918
40-59 years	-0.347	0.094	0.707	0.471	1.061
>60 years	0.093	0.731	1.098	0.644	1.872
Gender Male (vs. Female)	-0.012	0.955	0.988	0.659	1.483
SES (vs. poor)		0.035			
Middle	0.411	0.014	1.509	1.087	2.095
High	0.226	0.213	1.253	0.878	1.787
Education (vs. <5 years)		<0.001			
High school	-0.072	0.658	0.931	0.677	1.279
University	0.522	0.001	1.685	1.242	2.288
Diabetes Yes (vs. No)	1.270	0.019	3.562	1.232	10.299
Family history DM (vs. No)					
Yes	0.885	0.001	2.423	1.461	4.020

Table 4. The factors that were associated with awareness (Multivariate)

	B	p	OR	95% CI	
				Lower	Upper
SES (vs. poor)		0.109			
Middle	0.363	0.038	1.437	1.020	2.025
High	0.131	0.491	1.140	0.785	1.654
Education (vs. <5 years)		0.001			
High school	-0.100	0.547	0.905	0.653	1.254
University	0.537	0.001	1.712	1.249	2.346
Diabetes Yes (vs. No)	1.110	0.047	3.035	1.017	9.061
Family history DM (vs. No)					
Yes	0.597	0.028	1.817	1.068	3.094
Constant	1.297	0.000	3.660		

complications that may occur in the future. In the recent years, some organizations involved in improving the quality of life are making efforts to increase awareness about DM.

People around the world, especially in the developing countries lack the sufficient knowledge of DM and OB (15,16). A lack of interest, cultural factors, lack of opportunities, and inadequate disclosure about DM by the governments are seemed to be the major reasons related to the low DM awareness. In this regard, the present study is one of the rare studies in Turkey.

Pakistani and Iranian studies reported female participants to be less aware of DM than their male counterparts (16,17). However, in another Pakistani study, female participants scored higher in terms of awareness about DM when compared to males (18). Also, in a Turkish study, male diabetic patients were more likely to be informed than the female patients (15). But in our study, no gender-based differences were observed with respect to awareness on DM and OB. A possible underlying reason may be the cultural differences. Most of our participants were of Turkish origin and resided in the urban areas, which might have contributed to the indifference.

A number of studies are available in the literature that report the rural and low-income populations to be less aware of DM, whereas a higher level of education causes an increase in diabetes knowledge (17-21). A study from Cameroon demonstrated that educational level had a direct influence on the level of knowledge regarding topics such as risk factors, symptoms, complications, and the management of DM (22). The results of these studies are similar to our study. This may be attributed to the fact that uneducated people with low income who have experienced several difficulties in retrieving any kind of information throughout their lives due to lack of facilities, were not aware of DM and OB as expected.

In our study, we demonstrated that the participants with an age less than 20 years had the highest scores of knowledge on DM, whereas the participants with age between 40 and 59 years had the lowest scores of diabetic awareness. According to a study on investigating the awareness of diabetes, no significant differences were observed among the scores of participants be-

longing to different age groups. However, the participants aged 20 to 35 years and 36 to 50 years had the highest scores and participants aged less than 20 years; those more than 50 years of age had the lowest scores (18). Also, another study showed old age to be a major barrier toward knowledge about DM (23). Our results were similar to the above-mentioned study for the aged participants. However, the highest number was scored by young people. Surprisingly, the population above 60 years of age had greater awareness as compared to age groups of 20 to 39 and 40 to 59 years. The reason could be the inclusion of elderly population, especially, retired people who supposed to have more free time to collect all kinds of information about DM.

In one of the rare Turkish studies about awareness of DM, it was demonstrated that the total level of awareness of DM was 28.6% in 1,334 diabetic patients. Caliskan et al. showed in their multivariate analyses that patients who had university degree were 13.5 times more likely to be well-informed about DM compared to other groups (15). In our study, people with a university degree were 1.7 times more aware than the illiterate/primary group. Furthermore, people with DM were three times more aware than people without DM.

It is known from the literature that if there is a family history of a disease, it could lead to higher level of awareness among other members of that family (24). The possible risk factors are the primary motivational sources that can change the health belief model with less risky behavior (25). Harwell et al. showed an association between the likelihood of a risk of DM and its presence in family history in their study (26). However, some studies also exist with a contradictory argument. Pierce et al. reported, in a randomized controlled study, that the individuals who had family members with type 2 DM did not care about their own health risks (27). In our study, we found that the participants with DM in their family history were 1.8 times more aware than others. The underlying reason might be their opportunity to collect wider information when the participants had other family members with DM. But another study from Turkey about DM awareness suggests that there was no relationship between the knowledge about DM and presence of health insurance, DM history in the family, comorbidities, blood pressure levels, BMI values, and smoking status (15).

In conclusion, the level of awareness about DM and OB is moderate in a Turkish population. The fact that the prevalence of DM and OB reached 2.6 and 8.5 million, respectively, the present level of knowledge is insufficient to improve the diabetic health crisis. Improving the level of awareness among the general population can help patients with DM as well as people with a history of DM in their families to take better care of the disease.

Acknowledgements

We especially thanks to Dilara Karsidag for English Editing.

Ethics

The study was accepted by Local Ethics Committee of Istanbul Medical Faculty. Participants' informed consent form was filled out with the help of students.

Author Contributions

Concept: Nevin Dinççağ, İlhan Satman, Literature Search: Cemile İdiz, Selda Celik, Statistical analysis: Nevin Dinççağ, Yıldız Tütüncü, Sevdâ Özel Yıldız, Manuscript preparation: Cemile İdiz, Selda Celik, Nevin Dinççağ, Manuscript editing: Nevin Dinççağ.

Conflict of Interest: The authors declare that they have no conflict of interest.

Financial Disclosure: There is no organization that funded our research.

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