Michigan Diabetes Knowledge Test: translation and validation study of the Arabic version

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ABSTRACT: *The quality of life and patients' self-management is crucial for planning and maintaining a system of patient-centered care. To our knowledge, there have been no valid, reliable, and well conducted translation into Arabic to assess diabetes knowledge of patients with diabetes mellitus. The aim of this study was to translate and validate the Michigan Diabetes Knowledge Test (MDKT) into the Arabic language, and to examine the psychometric properties of the Arabic version. A total of 90 patients were interviewed in the primary care center. The results showed good internal consistency , cronbach's alpha = 0.60. The results showed that Arabic version of MDKT is reliable and valid tool for assessing patients' knowledge about DM*

Keywords: *Arabic, Diabetes, knowledge, Translation, validation*

I.   INTRODUCTION

World Health Organization (WHO) described the term "diabetes mellitus" as "a metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both".[1]

Diabetes mellitus (DM) has become a major health concern in populations around the world and according to 2013 annual report[2] from the International Diabetes Federation (IDF), the available evidence shows that the prevalence and incidence of diabetes is on the rise. Globally, however, the number of people diagnosed with DM is estimated to be in excess of 380 million and this figure may go up, because of aging and urbanization, to as high as 590 million (an increase of approximately 55%) in the year 2030.[3]

Scientists have classified diabetes into three main types namely: type 1, type 2 and gestational diabetes. Although it is unclear of the causes and etiology of Type 1 diabetes which comprises 5- 10% of all diabetes, it is documented that it results from the destruction of the insulin producing cells of the pancreas by the body's own defense system and is mainly diagnosed in children and young adults. The onset is usually sudden and characterized by elevated blood sugar, frequent urination, being thirst and dry mouth. Unlike other types of diabetes, patients with type 1 diabetes may need to be treated in an intensive care and, when controlled, take insulin on daily basis to control the levels of glucose in their blood.

Type 2 diabetes, while common in adults, is being increasingly diagnosed in children as childhood obesity increases.[4] Pancreas of patients with type 2 diabetes can produce insulin but not enough to burn the sugar that is in circulation. As a result, glucose builds up in the blood instead being sent to the cells. This will

cause the cells not function properly. During pregnancy, women do suffer from glucose fluctuation as a result of hormonal changes that takes place during these months. This type of diabetes is called gestational diabetes.

Diabetes is a chronic disease and requires proper medical care and extensive self-management and education to avoid long term complications such nephropathy and retinopathy. Self-management is regarded as one of the important factors that increase the quality of live for patients with diabetes. However, this necessitates for the diabetic patients to acquire proper knowledge and skills to manage their day to day care.[5] Evaluating diabetes knowledge has been conducted in different parts of the world in the last two decades using the Michigan Diabetes Knowledge Test, an instrument that was developed by The Michigan Diabetes Research Training Centre.[6] This instrument was found to be valid and reliable in assessing diabetes patients' knowledge and understanding.

The IDF included Saudi Arabia in the top ten countries with the highest prevalence rates of diabetes.[7] This may partly be attributed to the changing lifestyle such as dietary habits and urbanization among the Saudi population.[8] In a report by WHO, it is estimated that the number of people with diabetes in Saudi Arabia may treble from just under one million in 2000 to over 2.5 million in 2030.[9]

Because of high prevalence of DM, and lack of data about the patients' knowledge and understanding of their disease, medications, and nutrition, this study aims to develop a valid and reliable instrument in Arabic language to assess the knowledge among DM patients attending Khashm Al Aan, an specialized primary care facility at King Abdulaziz Medical City in Riyadh.

II. METHODS

A standard forward and backward translation was used to create the Arabic version of the MDKT from the original English version. Certain modifications were necessary in the pre-final version to achieve idiomatic equivalence and to account for the socioeconomic and cultural levels of the target population. Reliability was tested for internal consistency using Cronbach's alpha coefficient. A total of 90 diabetes mellitus patients were interviewed at Khashm Al Aan primary specialized clinic using the Arabic translated Michigan Diabetes knowledge Test

III. DATA MANAGEMENT

Descriptive statistics were used to describe patients' demographic and disease characteristics and their diabetes knowledge scores. Percentages and frequencies were used for the categorical variables, while means and standard deviations were calculated for the continuous variables. The characteristics of the whole sample and of the knowledge groups were presented

IV. RESULTS

The expert panel was satisfied with the content and face validity of the instrument. Good internal consistency (Cronbach's alpha = 0.60) was found among the 14-items that the instrument contained. Table (1) shows demographic characteristics of the patients with diabetes and their diabetes level of knowledge. Majority of the patients had either low or acceptable levels of diabetes knowledge. There were no gender, level of education and physical activity did not show any major variation as also did by smoking, compliance and the BMI of the participants. Table (2) shows percentages of correct answer according to the questions asked. Question four which had only 16%, asked about the free food was not clear to majority of the respondents followed by question eight (26%) which asked the treatment of low blood sugar.

Table 1:Demographic characteristics of patients with Diabetes

		Low		Acceptable		Good	
		N	%	N	%	N	%
Gender	Male	24	37.5	34	53.1	6	9.4
	Female	7	26.9	13	50	6	23.1
Marital status	Married	24	32.4	39	52.7	11	14.9
	Single	6	54.5	4	36.4	1	9.1
Level of Education	college/University	8	22.2	21	58.30	7	19.4
	Secondary	11	40.7	12	44.40	4	14.8
	Up to Intermediate	11	42.3	14	53.80	1	3.8
Exercise	Yes	21	45.7	21	45.7	4	8.7
	No	9	20.9	26	60.5	8	18.6
Smoking	Yes	4	25	7	43.8	5	31.3
	No	26	36.1	39	54.2	7	9.7
Who provides DM Edu	No One	4	80	1	20	0	0
	Health Educator	12	52.2	10	43.5	1	4.3
	Physician	4	11.8	21	61.8	9	26.5
	All of them	9	36	14	56	2	8
Type of Medication	Oral Tablets	11	40.7	11	40.7	5	18.5
	Insulin	16	32.7	26	53.1	7	14.3
	Oral tablets and insulin	4	28.6	10	71.4	0	0
No of Medication Types	None	15	32.6	24	52.2	7	15.2
	One type	9	52.9	8	47.1	0	0
	Two types	7	28	15	56	5	16
Compliance with medication	Yes	30	34.9	44	51.2	12	14
	No	1	25	3	75	0	0

	Low		Acceptable		Good	
	Mean	SD	Mean	SD	Mean	SD
Age of Participants	47	17	50	14	50	10
Body mass index	28.28	5.97	30.1	5.74	30.61	8.47
Duration of DM since diagnosed	13	11	12	7	10	9

Table 2. Reliability test of the 14-item MDKT

MDKT Question Number	Percent of Correct answer	Cronbach's Alpha if Item Deleted
Question 1	72%	0.571
Question 2	38%	0.554
Question 3	32%	0.628
Question 4	16%	0.616
Question 5	43%	0.579
Question 6	68%	0.613
Question 7	53%	0.588
Question 8	26%	0.576
Question 9	74%	0.623
Question 10	43%	0.617
Question 11	56%	0.626
Question 12	81%	0.557
Question 13	76%	0.547
Question 14	78%	0.552

CONCLUSION

The results of this study showed that the Arabic version of MDKT is reliable and valid tool to measures the diabetes knowledge of Saudi diabetic patients, which can be used in clinical practice.

Acknowledgment

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