Original article

Adjustment and Its Association with Demographic and Clinical Factors among Iranian Population with Type 2 Diabetes Mellitus: The First Native Diabetes Adjustment Assessment Scale

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SUMMARY

The prevalence of diabetes is increasing worldwide. Middle Eastern countries will be confronting an immense increase in the number of diabetes mellitus cases by 2030. Living with diabetes mellitus has been characterized as a dynamic individual transitive adjustment, based on restructuring of the illness perceived experience and management of the self. Adjustment with type 2 diabetes mellitus is an integral part of diabetes care. The present study aimed to determine the adjustment level and its relationship with socio-demographic and clinical characteristics of diabetes. In this descriptive-correlational study, 800 diabetic patients in diabetes clinics and Iranian diabetes association in the northwest of Iran participated using a convenient sampling method. The data collection tool consisted of Diabetes Adjustment Assessment Scale (DAAS). Data analysis was performed using SPSS11 statistical software. The total score of DAAS was 166.24 ± 23.88 from a possible score between 43 and 215. The diabetic participants believed that they had a moderate level of adjustment with diabetes. The study showed a significant relationship between adjustment and some demographic and clinical characteristics; therefore, the necessity of health promotion interventions based on adjustment theories was inevitable.

Key words: adjustment, diabetes mellitus, diabetes adjustment assessment scale

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INTRODUCTION

Diabetes mellitus (DM) is one of the most problematic and serious chronic diseases of the 21ˢᵗ century, and it is a growing menace to the world's public health. According to the World Health Organization, 422 million people in worldwide had diabetes in 2014 (1), and the number is estimated to rise to 642 million by 2040, as forecasted by the International Diabetes Federation (2). Type 2 diabetes mellitus (T2DM) is conductive to 90 % of all cases of diabetes (1). Most new cases are in developing countries and it appears that the Middle East is among the regions that will have the largest increase in the prevalence of diabetes by 2030. According to the research results, the prevalence of diabetes is about 9 % in Iranian population aged 25-64 years (3). Chronic illness as diabetes works as a stressor and involves coping which can either facilitate or prevent adjustment. After the medical diagnosis of diabetes, patients are faced with new circumstances that dare their habitual coping strategies and enter a process of psychosocial adjustment (4). Living with DM has been characterized as a dynamic individual transitional adjustment (5). The experience of chronic disease engages in adjusting to and managing of the disease. Adjustment and management in diabetes are concurrent and related as the person comes to terms with the illness, gains support from a caregiver, creates relationships with others and learns about the illness and its management (6).

Precise knowing of adjustment is essential in the management of the disease (7). It looks that nursing care, increasing the adjustment level in diabetic patients, necessitate early identification of the adjustment level using a native instrument (8). The studies have shown that socio-cultural context could influence the management and adjustment to diabetes (9-11). Accessible literature is based on studies conducted in western communities that differ in terms of cultural and social backgrounds from eastern societies. On the other hand, most studies in Iran have been done using non-native tools (11-13). This is the first study with a native tool in this field. The results of the study are essential for planning care programs for diabetes and determining diabetes with low adjustment level. The study aimed to determine the adjustment level and its relationship with socio-demographic and clinical factors of diabetes.

PARTICIPANTS AND METHODS

In this cross-sectional study, participants were selected through convenience sampling. The sample size included 800 patients with type 2 diabetes referred to hospitals of North West in Iran, Tabriz, Iran. The inclusion criteria were as follows: being interested in participating in the research, being of Iranian nationality, being diagnosed within the last 6 months, and lack of other chronic severe illnesses and cognitive problems. A sample size of 800 participants was determined using the formula of the sample size, considering $\alpha = 0.05$ and p = 0.8 %.

Before the beginning of sampling, objectives, and benefits of the confidentiality of the information and the right to withdraw from the study were explained to the patients who signed the informed consent form.

Diabetes Adjustment Assessment Scale (DAAS) included two parts. The first part of the scale was related to the demographic and clinical characteristics of the participants. The second part was meant to measure adjustment which includes 43 items. Each item was designed based on a 5-point Likert scale scoring from 1 to 5 (completely agree to completely disagree). The maximum and minimum total score was 43 and 215, respectively. The questionnaire was assessed and confirmed in Iran; its content validity was reported to be acceptable and its reliability was 0.93 by Cronbach's alpha (14). Data were collected via DAAS after confirmation of the research project and approval of the ethics committee at Tabriz University of Medical Sciences (IR.TBZMED.REC.1395. 1244). This study was carried out in 2016. The data were analyzed using SPSS 11 software and descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (ANOVA, Independent T-test, Pearson's correlation coefficient).

RESULTS

Characteristics of study participants

A total of 800 complete responses were obtained. Almost 55% (441) of the 800 participants were men and 72.9% (583) of the participants were married. Other descriptive statistics are presented in Table 1.

The results indicated that the mean of adjustment score was 166.24 ± 23.88 from 43- to 215. The relationship between the adjustment and demographic and clinical characteristics of the participants are presented in Table 2. The gender, marital status, education, history of hospitalization, history of diabetes in the family, member in diabetes association, received treatment, job, use of glucometer, history of complication, smoking, age, number of children and A1C were significantly related to adjustment with diabetes (p ≤ 0.05).

Table 1. **Demographic and clinical characteristics of the participants**

Variable		Number (%)	Variable		Number (%)
Gender	Female	359 (44.9)	**History of previous illness**	Yes	646 (81.1)
	Male	441 (55.1)		No	151 (18.9)
Marital status	Single	101 (12.6)	**History of hospitalization**	Yes	675 (84.8)
	Married	583 (72.9)		No	121 (15.2)
	Divorced	18 (2.3)	**History of diabetes in the Family**	Yes	536 (67)
	Widow	98 (12.3)		No	264 (33)
Education	Illiterate	247 (30.8)	**A member in Diabetes Association**	Yes	565 (71)
	Under diploma	384 (48.1)		No	231 (29)
	Diploma	69 (8.6)	**Received treatment**	Oral drug	193 (24.2)
				Insulin	136 (17)
	Collegiate	100 (12.5)		Diet	114 (14.2)
				All	357 (44.6)
Income	Poor	523 (65.4)	**Use of glucometer**	Yes	738 (92.3)
				No	62 (7.7)
	Average	245 (30.6)	**Smoking**	Yes	427 (53)
	Good	32 (4)		No	376 (47)
Religion	Muslim	794 (99.2)	**History of complication**	Yes	313 (39.3)
	Christian	6 (0.8)		No	484 (60.7)
Job	Employee	114 (14.3)	**Income**	Low	119 (21.6)
	Self-employment	358 (59)		Average	427 (77.5)
	Retired	44 (5.5)		High	5 (0.9)
	Homemaker	186 (23.3)	**Insurance**	No	72 (9)
	Student	27 (3.4)			
	Unemployed	71 (8.9)		Yes	728 (91)
Age	**Mean ±SD**		**The Number of children**	**Mean ±SD**	
	62.02 ± 10.89			3.76 ± 2.37	
Duration of diabetes	3.77 ± 4.21		**HbA1c**	5.53 ± 1.23	

HbA1c glycated hemoglobin

Table 2. **The relationship between psychological adaptation and demographic and clinical characteristics of the participants**

Variable		Mean±SD	P
Gender	Female	163.83 ± 24/3	t = 2.59 df = 798 p = 0.01*
	Male	168.21 ± 23/4	
Marital status	Single	177.52 ± 14/3	f = 11.46 df = 3 p = 0.00*
	Married	165.60 ± 24/05	
	Divorced	158.56 ± 27.80	
	Widow	165.66 ± 16.52	
Education	Illiterate	162.63 ± 28.04	f = 7.07 df = 6 p = 0.00*
	Under diploma	167.45 ± 21.15	
	Diploma	173.71 ± 10.32	
	Collegiate	176.6 ± 7.5	
Insurance	Yes	166.08 ± 24.38	t = 0.6 df = 798 p = 0.54
	No	167.86 ± 18.07	
Income	Poor	162.73 ± 26.6	f = 17.78 df = 2 p = 0.00*
	Average	172.26 ± 16.22	
	Good	177.62 ± 25.66	
Job	Employee	175.92 ± 12.35	f = 7.6 df = 5 p = 0.00*
	Self-employment	161.49 ± 29.5	
	Retired	170.38 ± 17.23	
	Homemaker	166.6 ± 18.4	
	Student	169.18 ± 15.16	
	Unemployed		
History of complication	Yes	164.96 ± 23.43	t = 1.22 df = 795 p = 0.22
	No	167.08 ± 24.22	
Age		62.02 ± 10.89	r = -0.114 p = 0.001*
Duration of diabetes		3.77 ± 4.21	r = -0.034 p = 0.335

df = degrees of freedom

t = Independent T-test

*Significant difference (p ≤ 0.05)

r = Pearson's correlation coefficient

Variable		Mean ± SD	P
History of previous illness	Yes	165.5 ± 25.16	t = 1.89 df = 795 p = 0.05*
	No	169.58 ± 17.3	
History of hospitalization	Yes	164.97 ± 24.73	t = 3.31 df = 794 p = 0.00
	No	172.74 ± 17.32	
History of diabetes in the family	Yes	167.88 ± 23.95	t = 2.2 df = 319 p = 0.02*
	No	162.92 ± 23.41	
A member of Diabetes Association	Yes	165.77 ± 25.02	t = 0.7 df = 794 p = 0.47
	No	167.09 ± 20.94	
Received treatment	Oral drug	171.92 ± 10.3	f = 6.42 df = 4 p = 0.00*
	Insulin	167.78 ± 25.76	
	Diet	171.97 ± 13.42	
	All	162.93 ± 23.91	
Use of glucometer	Yes	167.10 ± 23.51	t = 3.7 df = 798 p = 0.00*
	No	155,42 ± 25.66	
Smoking	Yes	169.76 ± 20.95	t =-4.48 df = 798 p = 0.00*
	No	162.27 ± 26.26	
Religion	Muslim	166.25 ± 23.27	t = 0.07 df = 798 p = 0.93
	Christian	165.5 ± 3.67	
The number of children		3.76 ± 2.37	r = -0.212 p = 0.001*
HbA1c		5.53 ± 1.23	r = -0.115 p = 0.001*

df = degrees of freedom

t = Independent T-test

*Significant difference (p ≤ 0.05)

r = Pearson's correlation coefficient

DISCUSSION

This study aimed to assess the adjustment to diabetes in and its relationship with social and clinical factors in people with T2DM. The recent study has revealed that men are more likely to have better adjustment compared to women. The results of some studies are in line with the current study (15-17). Other studies have demonstrated that women are more likely to have better glycemic control compared to men (18, 19). For men with diabetes, it may be due to receiving more spousal support (15). The recent study has demonstrated that single participants with diabetes are more likely to have better adjustment compared to married participants. The results of most studies are in contradiction with the results of the study (20, 21). In the culture of the east, married people interact more with family members, but single people can interact with large groups of people in the community and use their experiences. The recent study revealed that high education is associated with better adjustment. The results of some studies are in line with the current study. It may be that higher levels of education commonly contribute to better work, higher income and better dwelling, neighborhood and working situations.

On the other hand, education of people with diabetes has been considered as a key ingredient of diabetes management for a long time and diabetic patients with higher education have a better understanding of education (20, 22). The recent study has shown that employed people with diabetes compared to non-employed had better adjustment. The results of some studies are in line with the current study (23-25). The economic inequality caused by unemployment can increase the disease-related problems via the inability to procure healthy food, to participate in exercise or amusing activities, to control capillary glucose at home, and to access the health care system to obtain appropriate care (20). In a recent study, with increasing age in diabetic participants, adjustment with the disease decreased. The results of some studies revealed that diabetes complications, hospitalization and mortality are more prevalent among older people with diabetes (26, 27). Also, with increasing history of hospitalization and history of complication in the participants, adjustment with the disease decreases. Diabetes complications are a risk factor for repeated hospitalizations (28, 29). The results of the study showed that history of diabetes in family members (presence of diabetes in the family members) due to the disease experience and its transfer facilitates adjustment with diabetes because a major part of the care for this disease is done at home and inside the family (30). In a recent study, smokers with diabetes compared to non-smokers had more adjustment, while most studies have inverse results (31, 32). The cause may have been the relationship between being a daily smoker and positive coping such as self-confidence, cognitive reappraisal, and minimization. An interpretation of this could be that with positive coping strategies, smoking-related disorders may seem less threatening to life and health than they actually are (33). The results of the study demonstrated that people with diabetes receiving oral and regimen treatments had more adjustment compared with those receiving insulin. Most patients perceive the beginning of insulin therapy as a reflection on their own defeat to control their disease. On the other hand, balancing the complexity of insulin regimen, high cost of insulin therapy, fear of hypoglycemia and pain were the causes for not accepting it. (34). In the current study, the participants with the high number of children due to their special care needs such as more energy for care and increased family expenses had less adjustment (35). Also, people with diabetes using the glucose meter system had more adjustment with their disease. The results of other research studies revealed that using the blood glucose meter resulted in improved glycemic control and diabetes management (36, 37). Glycated hemoglobin (HbA1c) value is useful in identifying diabetes management and its amount has an inverse relationship with the level of diabetes management (38).

Some limitations of the study could be mentioned using a self-report instrument and the inability to draw conclusions about causality within the relationships examined here.

In conclusion, since the accurate understanding of adjustment and its factors is necessary for the disease management, it is better for nurses, using this tool, to get an understanding of the level of adjustment and its related factors in order to provide the necessary care for people with diabetes.

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Competing interests
The authors declare no conflict of interests.

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Prilagođavanje i njegova povezanost sa demografskim i kliničkim faktorima kod Iranaca sa dijabetesom melitusom tipa 2: prva nacionalna skala za procenu prilagođenosti

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SAŽETAK

Prevalencija dijabetesa melitusa je širom sveta u stalnom porastu. Zemlje Bliskog istoka će se do 2030. godine suočiti sa neverovatnim porastom u broju obolelih od dijebetesa melitusa. Život sa ovom bolešću se karakteriše kao dinamično individualno prilagođavanje zasnovano na promeni percepcije bolesti i radu na sebi. Prilagođavanje dijabetesu melitusu tipa 2 je sastavni deo lečenja ove bolesti. Cilj ove studije bio je odredjivanje stepena prilagođavanja i njegove povezanosti sa sociodemografskim i kliničkim karakteristikama dijabetesa. U ovoj deskriptivno-korelacionoj studiji koja je spovedena na klinikama za lečenje dijabetesa i u Iranskoj asocijaciji za dijabetes učestvovalo je 800 bolesnika sa dijabetesom melitusom. Podaci su prikupljeni pomoću skale za procenu prilagođenosti dijabetesu (DAAS – eng.). Analiza podataka je urađena pomoću statističkog programa SPSS11. Ukupan skor na skali iznosio je 166.24 ± 23.88 od mogućeg skora koji se kreatao od 43 do 215. Učesnici su smatrali da su ostvarili umereni nivo prilagođavanja ovoj bolesti. Ova studija pokazala je značajan odnos između prilagođavanja i nekih demografskih i kliničkih karakteristika. Iz toga proizilazi da je promocija zdravstvenih intervencija baziranih na teorijama prilagođavanja bila neophodna.

Ključne reči: prilagođavanje, dijabetes melitus, skala za procenu prilagođavanja dijabetesu