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Understanding Physical Activity Behavior among Iranian Type 2 Diabetes Patients: A Test of the Trans theoretical Model

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ABSTRACT

Physical inactivity is a major underlying factor for Type 2 diabetes patients. The aim of this study was to determine factors related to physical activity based on trans-theoretical model among samples of Iranian diabetic patients. This cross-sectional study was conducted among 301, type 2 diabetics patient in GACHSARAN, Iran. Data collection based on interviews; were analyzed by SPSS version 21 using bivariate correlations, and ordinal regression statistical tests at 95% significant level. Results showed, 19.6% of participants have a physical activity (moderate or severe). Ordinal regression analysis showed self-efficacy and behavior process of change was the best predictors for physical activity among diabetic patients. Our findings recommended in physical activity promotion program for diabetic patients should be focus on increasing self-efficacy toward doing physical activity and attention to behavior process of change.

Key words: Diabetes Patients, Physical Activity, Self-efficacy

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1. INTRODUCTION

Diabetes is the most common chronic disease with devastating complications, while the burden of type 2 diabetes is increasing worldwide type 2 diabetes is a serious chronic disease and a major health problem throughout the world (1-4). Several recent alarming projections suggest that the epidemic of type 2 diabetes will become even worse in the near future (5). It is estimated that the worldwide prevalence of diabetes would nearly double by 2030 affecting almost 366 million people. These figures are also in accordance with those from the International Diabetes Federation (IDF) that predict 333 million people will suffer from diabetes by 2025 (6). Diabetes represents a major problem for developing countries being estimated that just China and India combined will be home to 24% of all subjects with diabetes worldwide by 2050

(7, 8). More than 270 million of which will occur in developing countries out of this 10-15 percent will have type 1 diabetes and 85-90 percent will have type 2 diabetes (5, 9, 10). According to the (WHO) the number of cases of type 2 diabetes in Iran were 2103000 in year 2000 and it will rise to 6421000 by the year 2030 (5, 6). The prevalence of type 2 diabetes reported in Iran was 2-3 percent in total population and above 30 years of age 7.3 percent people (3). It has now become evident that type 2 diabetes is reaching epidemic proportions worldwide the underlying causes are multifactorial, but overweight, physical inactivity and genetic predisposition are believed to be major underlying factors (1). Paradoxically, despite extensive data indicating the importance of physical activity and exercise, 60–80% of adults with type 2 diabetes do not exercise sufficiently, and adherence to exercise programs is low in these patients (11).

The relationship between physical activities with diabetes showed that lower habitual physical activity was associated with increased mortality in this group (12, 13). In another epidemiological study, even occasional physical activity (one or less bouts per week) conferred a hazard ratio of 0.70–0.59 compared with no physical activity (14). Information about the status of physical activity in people and identifying the factors affecting them could be useful for the health sectors in designing and implementing physical activity education programs (15). Furthermore, theories explain that behavior change helps describe and identify why an existing problem is there (16). In this regard physical activity predicting interventions especially among diabetic patients have frequently been based on the trans-theoretical model (TTM). The model proposes that exercise behavior change is a dynamic process in which individual's progress or relapse between five main stages (17, 18). The aim of this study was to determine factors related to physical activity based on TTM among sample of Iranian diabetic patients.....

2. MATERIALS AND METHODS

This cross-sectional study was conducted among 301 type 2 diabetic patients in GACHSARAN, Iran. Four health centres randomly selected within all health centres in GACHSARAN, Iran, and the patients, participants were selected randomly. For measured TTM variable we used a TTM standard questionnaire about physical activity among diabetic patients (19). For physical activity, questionnaires were used in an international

physical activity questionnaire (IPAQ) (20). In addition prior to conducting the main project a pilot study was carried out. Initially the relevant questionnaires were administered to 30 diabetic patients who were similar to participants in the main study to obtain feedback about the clarity, length comprehensiveness, time of completion, and also internal reliability of the measures. Most participants have a low education so data collection was based on an interview with them. Data were analyzed by SPSS version 21 using bivariate correlations, and ordinal regression statistical tests at 95% significant level.

3. RESULTS AND DISCUSSION

The mean age of respondents was 54.4 years [95% CI: 51.4, 53.3], ranged from 35 to 65 years. Regarding the educational status: 46.5% (140/301) illiterate, 17.9% (54/301) primary school, 30.2% (91/301) secondary school, and 5.3% (16/301) was diploma. Furthermore, 28.2% (85/301) of the participant were reported positive family history of diabetes. Our findings showed, nearly 80.4% (242/301), 14.6% (44/301), and 5 % (15/301) of the respondents reported have a weak, moderate and severe physical activity respectively. In addition, 64.1% (193/301), 17.6% (53/301), 7.6% (23/301), 8.3% (25/301) and 2.3% (7/301) of the respondents reported were in precontemplation, contemplation, preparation, action and maintenance, for doing physical activity, respectively. The association between level of education and physical activity, showed in

Table 1.

Table 1. Association between level of education and physical activity

	<i>Physical Activity Status</i>		
	Weak	Moderate	Severe
Illiterate	127 (90.7%)	6 (4.3%)	7 (5%)
Primary school	50 (92.6%)	4 (7.4%)	0 (0%)
Secondary school	56 (61.5%)	31 (34.1%)	4 (4.4%)
Diploma	9 (56.2%)	3 (18.8%)	4 (25%)

$\chi^2 = 59.534, p - Value = 0.001$

We found the correlation between increasing age, and disease duration with physical activity among the participants, showed

in Table 2.

Table 2. Correlation between increasing age, and disease duration with physical activity

<i>Variable</i>	<i>Physical Activity Status</i>	<i>95% Confidence Interval for Mean</i>					
		Mean	SD	Lower	Upper	F	P
Age	Weak	54.71	7.10	53.81	55.61	67.398	0.001
	Moderate	43.68	7.61	41.36	45.99		
	Severe	40.66	3.68	38.65	42.68		
Disease Duration	Weak	138.90	78.99	128.90	148.91	20.860	0.001
	Moderate	69.54	56.16	52.47	86.61		
	Severe	66.40	45.77	41.04	91.75		

In addition, bivariate associations between different components of TTM, showed in Table 3.

Table 3. Predictor Variables Correlation Matrix

Variables	Mean(SD)	X1	X2	X3
X1. Cognitive	17.49 (3.98)			
X2. Behavior process of change	14.17 (4.61)	0.085		
X3. Decisional Balance	37.27 (8.89)	0.244*	0.235*	
X4. Self-efficacy	18.79 (6.16)	0.247*	0.311*	0.167*

* p < 0.01

An ordinal regression analysis performed to explain physical activity among the participants based on TTM. As can be seen in

Table 4, self-efficacy and behavior process of change was best predictors for physical activity among diabetic patients.

Table 4. Ordinal Regression Analysis for Variables Related to Physical Activity

Variables	Estimate	Std. Error	95.0% CI		P value
			Lower	Upper	
Cognitive	0.069	0.046	-0.022	0.160	0.138
Behavior process of change	0.195	0.037	0.124	0.267	0.001*
Decisional Balance	0.043	0.025	-0.006	0.091	0.083
Self-efficacy	0.260	0.037	0.188	0.333	0.001*

* p < 0.01

Based on our result only 19.6% of patients have a physical activity (moderate or severe) and most of them, in terms of physical activity were in the weak category. In this regard MOIENI stated that 29.8% of the diabetics who were referring to diabetes research center of Hamadan County have a moderate physical activity and only 5.3 % of them have severe physical activity (19). In addition MORRATO et al in his study among diabetic patients in USA reported that 39% of them have a good activity (11). The low levels of exercise between diabetic patients could be underlying for undesirable disease control thus determining barriers of exercise in order to develop appropriate strategies to increase physical activity among diabetic patients is necessary. In addition, our findings showed no statistically significant difference between male and female patients about doing physical activity. These findings are consistent with results of MORRATO et al (11). It seems behavioral interventions to promote physical activity must be considered by both sexes. Another finding of present study reduced physical activity with increasing age. These findings are consistent with results of Costanzo, and NOUROUZI et al (21, 22). Physical ability in older patients and providing facilities for them might be beneficial for promoting physical activity among them our findings showed reduction of physical activity with increase in disease duration. However, this may be because of older age it should be noted that with increasing disease duration physical and psychological complications of disease had an impact on the patients' perception of their health status, also would have negative impact on their physical activity. NOUROUZI et al in their study among diabetic patient who were referred to Karaj

diabetes association, reported similar results (22). We found correlation between high level of education and more physical activity. These findings are consistent with results of SALMON et al, and MAZLOOMY et al (23, 24). Training for patients with less education was more necessary. Furthermore, our results indicated most of the participants (89.3% of them) were on the pre-contemplation, contemplation, and preparation. In this regard, MOEINI stated that 69.3% of diabetic patients were in steps before every physical activity action (19). In addition, Kirk et al reported relatively similar results (25). Determined patients in each of the stage helped the health educators for designing appropriate programs. Ordinal regression analysis showed the behavior process of change and self-efficacy was best predictors for physical activity among diabetic patients. In this regard, Bandura notes the self-efficacy was a strong factor for predicting behavior (26). Kim and Kirk in their TTM based study were reported relatively similar results (25, 27).

4. CONCLUSION

Our findings recommend that physical activity promotion program for diabetic patients should focus on increasing self-efficacy towards doing physical activities and giving attention to behavior process of change.

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AUTHORS CONTRIBUTION

This work was carried out in collaboration between all authors.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

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