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Research

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

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## ABSTRACT

Physical inactivity was 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 sample of Iranian diabetic patients. This cross-sectional study was conducted among 301 type 2 diabetics patient in Gachsaran, Iran. Data collection based on an interview; were analyzed by SPSS version 21 using bivariate correlations, and ordinal regression statistical tests at 95% significant level. Result 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, which the burden of type 2 diabetes is increasing worldwide (1, 2). Type 2 diabetes is a serious chronic disease and a major health problem throughout the world (3, 4). Several recent alarming projections suggest that the epidemic of type 2 diabetes will become even worse in the near future (5). Estimated that the worldwide prevalence of diabetes would nearly, double by 2030 and affecting 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 (5). Of this number 10-15 percent type 1 diabetes and 85-90 percent have type 2 diabetes (9, 10). According to the (WHO) the number of cases of type 2 diabetes in Iran were 2103000 in year 2000 and its will rise to 6421000 by the year 2030 (5, 6). The prevalence of type 2 diabetes reported in Iran 2-3 percent in throughout population and above 30 age 7.3 percent (3). It has now become evident that type 2 diabetes is reaching epidemic proportions in the 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 activi-

ties, 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 ration of 0.70–0.59 compared with no physical activity (14). Information about status physical activity in people, and identifies factors affecting them, could be usefulness for health educator in designing and implementing physical activity education promotion program (15). Furthermore, theories explain behavior and suggest ways to achieve behavior change, helps describe and identify why an existing problem also predict behaviors (16). In this regard, Physical activity predicting interventions especially among diabetic patients that have frequently been based on the transtheoretical 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 diabetics patient 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 questioner were used an international physical activity questioner (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's 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

	Physical Activity Status		
	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

Variable	Physical Activity Status	95% Confidence Interval for Mean					
		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	0.195	0.037	0.124	0.267	0.001*

process of change					
Decisional	0.043	0.025	-0.006	0.091	0.083
Balance					
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 the weak category. In this regard, Moeini stated that 29.8% of diabetic who 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, determine barriers of exercise in order to develop appropriate strategies to increase physical activity among diabetic patients is necessary. In addition, our findings showed not 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 sex. 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). Assess physical ability in older patients and providing facilities for them might be beneficial for promoting physical activity among them. Our findings showed reduce of physical activity with increase 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, would have negative impact on physical activity. Nourouzi et al in their study among diabetic patient who refers 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 Mazloomi et al (23, 24). Training for patients with less education was more necessary. Furthermore, our result

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indicated most of 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 the steps before physical activity action (19). In addition, Kirk et al reported relatively similar results (25). Determine patients in each of the stage help to health educator for designing appropriate program. 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 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.

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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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