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Predicting Health Volunteers' Physical Activity regarding the Theory of Planned Behavior and the Stages of Change Structure

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Abstract

Background: Physical activity promotes mental health, life satisfaction, and quality of life and reduces the symptoms of depression and anxiety. Accordingly, the present study aimed to investigate predictors of physical activity of health volunteers regarding the theory of planned behavior and the stages of change model.

Materials and Methods: In this cross-sectional study, 262 women health volunteers were selected using the simple random sampling method. The required data was collected using a questionnaire with acceptable validity and reliability, which encompassed three sections addressing demographic information, planned behavior theory, and stages of change structure. Moreover, International Physical Activity Questionnaires (IPAQ) were used to assess the participants' physical activity. The data analysis was performed using descriptive statistics and Chi-square test, Spearman correlation, and general linear model (GLM) in SPSS software (version 16.0).

Results: In the present study, the participants' mean age was 40.9 ±88.66 years. There was a direct and significant correlation between attitude, subjective norms, and perceived behavioral control (PBC) with physical activity ($p<0.05$). However, there was no significant correlation between behavioral intention and physical activity ($p>0.05$). Moreover, all constructs of the theory of planned behavior (TPB), and the stages of change (SOC) could predict physical activity ($p<0.05$); however, the most powerful construct was PBC.

Conclusion: The findings indicated that effective physical activity outcomes can be achieved based on TPB and the SOC model and with a specific focus on the PBC improvement.

Key Words: Health volunteers, Stages of Change, Theory of Planned Behavior, Physical Activity.

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1- INTRODUCTION

Technological advancements have led to a sedentary lifestyle, thereby arousing a remarkable public health concern worldwide (1). In line with economic advances, the epidemiology of diseases has changed as such there have been a decrease in infectious diseases and an increase in lifestyle-related diseases (2). Physical inactivity has become the fourth leading cause of global mortality (3). A national survey published by the World Health Organization (WHO) in Iran revealed that the prevalence rate of inactivity in the age group of 15-64 years in urban and rural areas were 76.3% and 58.8%, respectively, and the total rate was 67.5% in the same age group (4). Physical inactivity also accounts for 10-16% of breast cancer, colon cancer, and diabetes cases, and about 22% of ischemic heart diseases; hence, it is also a significant public health priority in disease control centers (5). Physical activity improves bone health and function and is a crucial determinant for energy consumption and weight control; however, unfortunately, physical activity has decreased in all age groups over the last two decades (6).

Physical activity behavior is a complex behavior involving several key factors (7). To promote healthy behaviors in the community, health volunteers learn health skills, take necessary training, and transfer what they have learned to at least 50 families (8). The main component of this program is to teach health issues, transfer education to the families covered by the center, and establish a connection between healthcare centers and individuals to solve health problems. Considering the widespread urbanization, the provision of active and reliable health services is not possible except with the broad public involvement. Accordingly, this important resource is now being used to promote public health in many countries (8). The Planned Behavior Theory (PBT) was proposed in 1885 and developed in 1991 by Ajzen and Fishbein (9). This model consists of structures such as individual attitude, mental norms, perceived behavior control, and behavioral intention. According to this theory, behavioral intention is underpinned by: (a) individuals' attitudes towards behavior, (b) individual perception of social norms of others and life environment, and (c) individuals' perception of control required to do or not to do a specific behavior (10). TPB was developed with an emphasis on individuals' thoughts such as awareness in health education. All of these factors can validate the educational approaches to behavior changes. They also validate social norms and understand these norms, which are well-suited to community-based public health programs and the social components of health promotion programs (11). One of the practical health education and promotion models is the trans-theoretical model (Stages of change [SOC]) proposed by James Prochaska in the late 1970s. One of the main component of which is the stages of change. According to this model, not all individuals are at the same level of preparation (8). The SOC model introduces the time dimension, indicating that changes occur over time. In the field of behavior change and before accepting any health behavior, each person passes through the following five stages: precontemplation, contemplation, preparation, action, and maintenance (10). According to the stages of change structure, which considers behavior change as a step-by-step process, the interventions appropriate to individuals' action are required to change individuals' behavior toward healthy behaviors and help them pass through different stages (12). Accordingly, the present study aimed to investigate the predictors of physical activity based on TPB and the SOC structure among women health volunteers.

2- MATERIALS AND METHODS

2-1. Method

This is a descriptive cross-sectional study that was performed on women health volunteers in health centers in Mashhad, Iran. The sample size was estimated using the following formula (number of sample size = two × number of Likert points × number of questionnaire questions), according to which it was estimatd to be 260 subjects (9). Health volunteers were selected using the simple random method from urban healthcare centers covered by the health centers 1, 2, 3, and Samen in Mashhad, Iran. Data were collected using a written questionnaire addressing demographic information, PBT, the structure of the stages of change, and the short-term IPAQ (14-16).

2-2. Data collection

2-2-1. Demographic questions: This section covered nine items addressing age, weight, marital status, family's average monthly income, and the level of education of the participants and their spouses, etc.

2-2-2. Questions on PBT structures: In the questionnaire developed by Solhi et al. (14), there were nine items on attitude, five items on mental norms, four items on perceived behavior control, and three items on behavioral intention. The questions were scored based on a five-point Likert scale, including one "strongly agree, two "disagree, three "No idea, four "I agree, and five "strongly agree". In the first two questions, the perceived structure was scored reversely.

2-2-3. Stages of Change (SOC) questions: The SOC questions were developed based on the standard questionnaire of Marcus et al. (15), and scored based on a five-point Likert scale, addressing precontemplation (1), contemplation (2), preparation (3), action (4), and maintenance (5).

2-2-4. International Short-Term Physical Activity Questionnaire (IPAQ):

This questionnaire included questions about the intense and moderate physical activity and walking in the last week (16). The questionnaires were provided to the studied samples.

2-3. Inclusion criteria

The participant had one year of membership as a health volunteer, willingness to participate in research, and no physical disability.

2-4. Reliability and validity

In the present study, content validity indices (CVI) were 0.92, 0.94, 0.93, 0.93, and 0.90 for attitude, subjective norms, PBC, behavioral intention and SOC constructs, respectively. Content validity ratios (CVR) were 0.71, 0.48, 0.75, 0.84, and 0.68 for attitude, mental norms, perceived behavior control, behavioral intention, and stages of change, respectively. Cronbach's alpha for the planned behavior theory questionnaire and stages of change structure were as follows: 0.90 for attitude, 0.96 for mental norms, and 0.99 for perceived behavior control, 0.88 for behavioral intention, and 0.96 for stages of change structure. The present questionnaire had acceptable validity and reliability.

2-5. Ethical consideration

The present study was approved by the Ethics Committee of the Mashhad University of Medical Sciences (ID-code: IR.MUMS.REC.1394.395). All stages were performed after obtaining formal approval from the Vice-Chancellor for Research, the Vice-Chancellor for Health, and the head of the provincial health centers. Ethical issues such as information confidentiality, non-instrumental use of the findings, and the participants' satisfaction and willingness to participate in the research were considered. Moreover, the

participants' informed consent to participate in the study was obtained from health volunteers before the study.

2-6. Data Analysis

After completing the questionnaires, the collected data was imported into SPSS software version 16.0, and descriptive statistics were used for statistical analysis to determine the mean and standard deviation of the TPB constructs. The Spearman correlation test was used to determine the relationship between physical activity and the PBT constructs. Since our response variable was mixed with Tweedie with log link distribution, the generalized linear model (GLM) was also used to determine the strongest predictor of promoting physical activity of health volunteers to change behavior in educational interventions.

3- RESULTS

In this study, the participants' mean age was 40.88 ± 9.66 years, 50% of the participants had overweight body mass index, 94.7% were married, 56.1% had high school and diploma literacy, and 33.9% had spouses with middle school literacy. Moreover, the participants' husbands had middle-school education in 33.9% of cases. The average monthly income of the health volunteers s' families were 12,816,790 ± 8,238,590 Rials, respectively, and 94.7% of the participants were not sports club members. The mean scores were 40.03±3.70 (out of score 45) for attitude, 20.78 ±2.65 (out of score 25) for mental norms, 14.36 ± 2.47 (out of score 20) for perceived behavior control, and 12.17 ±1.86 (out of score 15) for behavioral intention, indicating high levels of each structure. According to the IPAQ, 41.6% of the individuals had poor activity, 55.7% had only moderate activity, and 2.7% had moderate and severe activity, suggesting poor and moderate performance for most of the participants. Moreover, there was a positive and significant correlation between the attitude, subjective norms, and PBC with physical activity ($p< 0.05$). However, there was no significant correlation between behavioral intention and physical activity ($p>0.05$) (**Table.1**).

Table-1: Correlation between constructs of the theory of planned behavior with physical activity (according to MET).

Variables	Attitude	Subjective norms	Perceived behavioral control	Behavioral intention	Physical activity
Attitude	1				
Subjective norms	r=0.441 P=0.001	1			
Perceived behavioral control	r=0.355 P=0.001	r=0.243 P=0.001	1		
Behavioral intention	r=0.323 P=0.001	r=0.192 P=0.002	r=0.564 P=0.001	1	
Physical activity	r=0.170 P=0.006	r=0.151 P=0.015	r=0.195 P=0.002	r=0.119 P=0.054	1

r= Spearman's correlation coefficient, MET: Metabolic equivalent task.

GLM test showed that the TPB and the SOC constructs had significant effects on the health volunteers' physical activity ($p<0.001$). However, among the above constructs, the most robust construct was PBC with its higher coefficient; in addition to all the TPB constructs, more emphasis should be put on the PBC construct during the training sessions of the intervention group (**Table.2**).

Table-2: Results of GLM analysis to predict physical activity by planned behavior theory and structure of change stages.

Variables	B	Std. Error	95% CI		Chi-square	DF	P-value
			Lower	Upper			
Intercept	6.208	0.124	5.964	6.452	2491.329	1	0.001
Precontemplation	-1.358	0.092	-1.538	-1.177	217.405	1	0.001
Contemplation	-0.870	0.042	-0.953	-0.787	424.927	1	0.001
Preparation	-0.568	0.032	-0.632	-0.505	312.138	1	0.001
Action	-0.401	0.024	-0.447	-0.355	289.876	1	0.001
Maintenance	0[a]	.	.	.	.	.	.
Attitude	0.020	0.003	0.013	0.026	35.093	1	0.001
Subjective norms	0.024	0.004	0.015	0.032	30.995	1	0.001
Perceived behavioral control	0.037	0.005	0.026	0.047	49.541	1	0.001
Behavioral intention	-0.028	0.007	-0.042	-0.014	16.232	1	0.001
Scale	1[b]	.	.	.	.	.	.
Dependent Variable: total MET. Model: Intercept, stage, Attitude, Subjective norms, Perceived behavioral control, Behavioral intention.							
a. Set to zero because this parameter is redundant.							
b. Fixed at the displayed value.							

GLM: Generalized linear model, DF: Degree of freedom, MET: Metabolic equivalent task, CI: Confidence interval.

4- DISCUSSION

According to TPB, attitudes refer to the general evaluation of individuals' advantages and disadvantages in exhibiting a behavior. Abstract norms refer to individuals' perception of social pressure posed by famous persons to perform a behavior, and PBC usually measures individuals' perception of the simplicity or difficulty of performing a concerned behavior. A behavior is more likely in individuals holding more positive attitudes, Subjective norms, PBC, and stronger intentions (11). We aimed to investigate the predictors of physical activity based on TPB and the SOC structure among health volunteers. In the present study, the results of the generalized linear model test showed that attitude, subjective norms, PBC, and behavioral intention as the constructs of TPB and the SOC structure could predict the health volunteers' physical activity, and that PBC played a more critical role than other constructs. In their study, Rhodes et al. (17) used TPB to predict the intention to do physical activity in children. Data analysis revealed that, the PBC and behavioral intention were two acceptable predictors of behavior in the study group. This finding is consistent with that of the present study. Martin et al. (18) also conducted a study to detect the potentials of TPB in predicting intense and moderate physical activity in Mexican American children. In this regard, the multiple regression analysis confirmed the potentials of the TPB constructs in predicting intense and moderate physical activity. The researchers also reported that attitude, social norms, and PBC explained 45% of the variance in intention to do physical activity. Armitage (19) conducted a study entitled "TPB can be a stable predictor of physical activity," and reported that PBC was an important predictor of the intention to exhibit real behaviors. This finding is in line with those of the present study. Chun-Ming et al. (20) documented a direct relationship between intention and physical activity, while the present study revealed that intention was not significantly associated with physical activity. In a study entitled

"On the relationship between attitude, self-efficacy, subjective norms with tendency to do physical activity in female students", Hosseini et al. (21) found that a majority of students had a positive attitude towards physical activity. Moreover, there were positive correlations between "attitude towards physical activity" with "subjective norms about physical activity" ($r = 0.209$, $p < 0.001$), "self-efficacy about physical activity" ($r = 0.097$, $p=0.032$), and "willingness to do physical activity" ($r=0.155$, $p = 0.001$). The findings are not consistent with the findings of the present study regarding the correlation between intention and physical activity; however, the findings of the two studies are similar regarding the correlations between other constructs of TPB with physical activity.

In a study entitled "Investigating TPB construct regarding the physical activity of students at Payame Noor University of Naein", Saber et al. (22) showed a significant relationship between the intention to perform physical activity with attitude and abstract norms, which is in a similar vein with the findings of the present study. Jalilian et al. (23) examined the physical activity status of women working at the Hamadan University of Medical Sciences and investigated the relationship between benefits, barriers, and self-efficacy with the stages of change. According to their findings, up to 65% of the participants were not active enough, 25.7% of these women exercised irregularly, there was a significant relationship between benefits, barriers, and self-efficacy with the stages of change ($p<0.05$). This finding is somewhat consistent with the present study's findings. In contrast, in a study entitled "On the relationship between TPB constructs with safe street crossing behaviors among fourth-grade elementary students in Tehran", Khalfe nilsaz et al. (24) reported a significant relationship between safe street-crossing behavior and behavioral intention construct ($p<0.001$). In line with the findings of the present study, there was a significant relationship between PBC, subjective norms, and attitudes with behavioral intention. The linear regression test results also showed that behavioral intention ($B = 2.35$) was an acceptable predictor of safe street-crossing behavior. All TPB constructs could predict behaviors in the present study; however, PBC was much stronger than other constructs. Ashoogh et al. (25) investigated the TPB application to predict safe driving behaviors among truck drivers. According to the multivariate regression analysis results, perceived attitude and behavioral control predicted the intention to perform safe driving behaviors ($R2 = 0.21$, $F = 21$, $p <0.001$).

Drivers who had a positive attitude and higher PBC were more likely to exhibit safer driving behaviors. Furthermore, multivariate regression analysis showed that the intention to perform safe driving behaviors and PBC predicted safe driving behaviors ($R^2 = 0.15$, $F = 21$, $p<0.001$). Drivers who had higher intentions and more PBC were more likely to engage in safe driving behaviors, which is consistent with the present findings. Dojam et al. (26) carried out a study on the TPB constructs regarding screening mammography in housewives aged above 40 years. Their study revealed that the behavioral intention was the main predictive construct in the proposed model to predict mammographic behaviors. However, PBC is the most important predictor of physical activity in the present study. This finding was not consistent with the findings reported by Dojam et al. however, they were in line with those suggested by Taghipour et al. (27), and Marashi et al. (28). In a study entitled "Application of the developed planned behavior model in predicting the use of helmets in motorcyclists in Yazd", Mazloomy MahmoodAbad et al. (29) showed a significant positive correlation

between all variables of the developed planned behavior model with the intention to use helmets ($p<0.01$). The finding is consistent with those of the present study regarding the correlations between attitudes, subjective norms, and PBC constructs with performance. However, the findings are in contrast in terms of the correlation between behavioral intention and performance in the present study. The regression analysis results showed that attitude, PBC, and perception of helmet use in other motorcyclists predicted 59% of variance in intention to use helmets.

Among these variables, PBC was more effective than other variables. PBC, along with the intention and perception of helmet use in other motorcyclists, predicted 49% of variance in the use of helmets ($p<0.05$), which is consistent with the present study's findings. Although the findings contribute to expanding our insight into factors explaining the behavior of physical activity based on the proposed pattern, it the study had some limitations. First, a cross-sectional design was used to describe the relationships among the variables. A key feature of a cross-sectional study is that the data is collected over a period as determining causal relationships among variables is limited. Data collection was also self-reported, and it was assumed that the respondent would state the correct and true information. However, some respondents may not complete the questionnaire honestly.

5- CONCLUSION

The findings of present study showed that more than 97% of health volunteers were at poor and moderate activity levels; hence, it seems necessary to carry out educational interventions based on the behavior change theories and models. Some barriers to physical activity can be removed by providing necessary facilities for physical activity in parks and public places. Health personnel can also encourage health volunteers for a lifestyle by creating a supportive and encouraging environment for physical activity. Educational programs also need to reinforce the idea in health volunteers that despite barriers, they can be physically active enough. In this regard, using motivational interviews and holding sessions to promote self-efficacy can be effective.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: MA, AT, MV, and HT; Data analyzing and draft manuscript preparation: MV, MA, MN, and HT, Critical revision of the paper: MA and AT, Supervision of the research: AT, MN, and MA; Final approval of the version to be published: MA, MV, HT, MN, and AT.

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8- CONFLICT OF INTEREST: None.

9- REFERENCES

1. Alipour-anbarani M, Mohammad-pour S, Akhavan H, Habibnezhad M, Marashi T. Understanding the Physical Activity Behavior of Iranian Female Students: Two Approaches to Analyzing the Theory of Planned Behavior. International Journal of Pediatrics. 2021;9(6): 13763.

2. Peyman N, Alipour-Anbarani M. The Effect of Training Diabetes Prevention Behaviors on Promotion of Knowledge, Attitude and Practice of Students for Prevention of Diabetes in Mashhad City. Int J Pediatr. 2015;1.3(2-2):501-7.

3. Sisson S, Katzmarzyk P. International prevalence of physical activity in youth and adults. Obesity Reviews. 2008;9(6):606-14.

4. AhmadiTabatabaei S, Taghdisi MH, Sadeghi A, Nakhaei N, Balali F. The effect of

education in physical activities on knowledge, attitude and behavior of Kerman health center's staff. Journal of Research & Health. 2012;2(1):137-44.

5. Ahmadi Tabatabaei SV, Taghdisi MH, Nakheei N, Balali F. Effect of Educational Intervention Based on the Theory of Planned Behaviour on the Physical Activities of Kerman Health Centers Staff. Journal of Babol University of Medical Sciences. 2011;12(2):62-9.

6. Ramezankhani A, Alipour Anbarani M, Saeidi M. The Factors Determining the Physical Activity of Students: A Systematic Review. International Journal of Pediatrics. 2019;7(8). 9977-85.

7. Marashi T, Safari-Moradabadi A, Ahmadi F, Alipour-Anbarani M. The effect of education based on the theory of planned behavior on the promotion of physical activity and knowledge of students about diabetes prevention. International Journal of Health Promotion and Education. 2020:1-13.

8. Pourhaji F, Vahedian Shahroodi M, Esmaily H, pourhaji F, harooni J. Effects of training program-based on Stage of change Model to promote Breast self-examination behavior. Scientific Journal of Hamadan Nursing & Midwifery Faculty. 2014;21(4):59.

9. Ajzen I. The theory of planned behavior. Organizational behavior and human decision processes. 1991;50(2):179-211.

10. Saffary M, Shjaeizadeh D, Ghofranipour F, Heydarnia A, Pakpour A. Health education and promotion (Theorise, Models and Methods). Tehran: Tehran Sobhan; 2009.

11. Ghahremani L, Nazari M. Comparing prediction power of exercise intention and behavior based on self-efficacy and theory of planned behavior. Payesh. 2013;12(1):99-107.

12. Moradi M, Heydarnia AR, Babai GHR, Jahangiri M. To evaluate the effect on university students. Pre-olympic Congress. 2004.

21. Hosseini M, Khavari Z, Yaghmaei F, Majd HA, Jahanfar M, Heidari P. Correlation between attitude, subjective norm, self-efficacy and intention to physical activity in the stages of change model in the prevention of drug use in the petrochemical workers. Medical Science Journal of Islamic Azad Univesity. 2009;19(4):246-55.

13. Bandalos DL, Boehm-Kaufman DL. Four Common Misconceptions in Exploratory Factor Analysis. New York: Routledge; 2009.

14. Solhi M, ZinatMotlagh F, Shirazi K, Taghdisi MH, Jalilian F. Designing and Implementing Educational Program to Promote Physical Activity Among Students: An Application of the Theory of Planned Behavior. ofoghedanesh. 2011;18(1):45-53.

15. Marcus BH, Banspach SW, Lefebvre RC, Rossi JS, Carleton RA, Abrams DB. Using the stages of change model to increase the adoption of physical activity among community participants. American journal of health promotion. 1992;6(6):424-9.

16. Shojaezadeh D, Mehrab baic M, Mahmoodi M, Salehi L. To Evaluate of Efficacy of Education based on Health Belief Model on Knowledge, Attitude and Practice among Women with Low Socioeconomic Status Regarding Osteoporosis Prevention. Iranian Journal of Epidemiology. 2011;7(2):30-7.

17. Rhodes RE, Macdonald HM, McKay HA. Predicting physical activity intention and behaviour among children in a longitudinal sample. Social science & medicine. 2006;62(12):3146-56.

18. Martin JJ, Oliver KL, McCaughtry N. The theory of planned behavior: Predicting physical activity in Mexican American children. 2007.

19. Armitage CJ. Can the theory of planned behavior predict the maintenance of physical activity? Health Psychology. 2005;24(3):235-45.

20. Chun-Ming Ch, Liang-Mei Y, Stuart B. Applying the theory of planned behaviour and ecological model to physical activity of female students. Journal Of Health Promotion Managemen. 2014;3(1):52-61.

22. Saber F, Shanazi H, Sharifrad GR. The survey of Theory of planned behavior constructs regarding girl student's physical activity in Naein payame NoorUniversity.

Journal of Health System Research. 2013;9(9):1014-21.

23. Jalilian F, Emdadi SH, Mirzaie M, Barati M. The Survey Physical Activity Status of Employed Women in Hamadan University of Medical Sciences: The Relationship Between the Benefits, Barriers, Self-Efficacy and Stages of Change. Tolooe Behdasht. 2011;9(4):88-99.

24. Khalfe nilsaz M, Tavassoli E, Ramezankhani A, Dehdari T, Soori H, Akbarpor S, et al. Survey on Elationship Between Constructs of The Planned Behavior and Road Crossing Safe Behaviors Among The Fourth Grade Students of Tehran City. Scientific Journal of Ilam University of Medical Sciences. 2013;21(3):155-61.

25. Ashoogh M, Aghamolaei T, Ghanbarnejad A, Tajvar A. Utilizing the theory of planned behavior to Prediction the safety driving behaviors in truck drivers in Bandar Abbas 2013. Iranian Journal of Health Education and Health Promotion. 2013;1(3):5.

26. Dojam S, Roozbahani N, Khorsandi M. The variables of the theory of planned behavior regarding screening mammography in housewives over 40 years. Daneshvar Medicine. 2015;22(114):33-40.

27. Taghipour A, Vahedian Shahroodi M, Tabesh H, Safari-Moradabadi A, Alipour-anbarani M. The effect of educational intervention based on the theory of planned behavior and stages of change construct on women's physical activity. Journal of Education and Health Promotion. 2019;8:195.

28. Marashi T, Ahmadi F, Saeidi M, Alipour-anbarani M. Investigating the Determinants of Physical Activity in Students in Order to Prevent Diabetes based on Planned Behavior Theory. International Journal of Pediatrics. 2019;7(3):9189-95.

29. Mazloomy MahmoodAbad SS, Mehri A, Morovati SharifAbad M, Fallahzadeh H. Application of extended model of planned behavior in predicting helmet wearing among motorcyclist clerks in Yazd (2006). Journal of Birjand University of Medical Sciences. 2006;14(4):33-40.