



Evaluation of the Physical Activity of Health Volunteers Using the Planned Behavior Theory and the Stages of Change Structure

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Abstract

Background: Lack of physical activity is the leading cause of many diseases such as obesity, weakness of the cardiovascular and respiratory systems, and threatens human health. In this study, the physical activity of healthy volunteers was examined using the planned behavior theory and the stages of change structure.

Materials and Methods: In this cross-sectional study, 262 female healthy volunteers were selected using a simple random sampling method. A questionnaire with three sections addressing demographic information, structures of the Planned Behavior Theory, and the stages of change structure was used to collect the required data. Moreover, the International Physical Activity Questionnaire (IPAQ) was used to assess the healthy volunteers' physical activity. Data analysis was performed with SPSS software (version 16.0). To this end, descriptive statistical tests, Spearman correlation, and Chi-square tests were run.

Results: The healthy participants' mean age was 40.9 ± 88.66 years. According to IPAQ, 41.6%, 55.7%, and 2.7% of the participants revealed low, moderate, and moderate-high levels of physical activity, respectively. There was a direct and significant correlation between the structures of attitude, mental norms, and control of perceived behavior with physical activity ($p < 0.05$). However, there was no significant correlation between the structures of behavioral intention and physical activity ($p > 0.05$). Furthermore, a significant structural difference was noticed between the stages of change and the level of education among the participants ($p < 0.001$).

Conclusion: The present study highlighted the need to consider a set of effective factors in converting the healthy volunteers' behaviors to physical activity. The factors can provide the grounds for the development of theory-based educational interventions aimed at promoting physical activity.

Key Words: Change Structure, Health Volunteers, Physical Activity, Planned Behavior Theory.

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1- INTRODUCTION

In recent decades, in line with economic advances, there have been some changes in the epidemiology of diseases, including a decrease in infectious diseases and an increase in lifestyle-related diseases (1). 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 was 76.3% and 58.8%, respectively (2). Adults' estimated physical inactivity and estimated average physical activity (<2.5 hours per week) are 17% and 31-51%, respectively. Physical inactivity accounts for 11.7 percent of all deaths and about 2 million deaths worldwide. 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 one of the main public health concerns in disease control centers (3).

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 (4). To promote healthy behaviors in the community, healthy volunteers learn health skills, take necessary training, and transfer what they have learned to at least 50 families (5). 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. Due to the widespread expansion of urbanization, the provision of active and reliable health services is not possible, except with the broad involvement of individuals. Accordingly, this considerable resource is now being used to promote public health in many countries (5). The Planned Behavior Theory (PBT) was proposed in 1885 and developed in 1991 by Ajzen and Fishbein

(6). 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: 1) individuals' attitudes towards behavior, 2) individual perception of social norms of others and life environment, and 3) individuals' perception of control required to do or not to do a specific behavior (7). One of the practical models in health education and health promotion is the model of behavior stages of change or the Transtheoretical Model (TTM) proposed by James Prochaska in the late 1970s, one of the main components of which is the stages of change. According to this model, not all individuals are at the same level of readiness (5). The stages of change 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: pre-thinking stage, thinking stage, readiness stage, functional stage, and maintenance stage (7). According to the stages of change model, which considers behavior change as a step-by-step process, the interventions appropriate to individuals' readiness stage are required to change individuals' behavior toward healthy behaviors and help them pass through different stages (8). Accordingly, this study examined the physical activity of healthy volunteers using PBT and the stages of change structure.

2- MATERIALS AND METHODS

2-1. Study design and population

This descriptive cross-sectional study included women volunteering for health in Mashhad's urban health centers, 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 estimated to be 260 subjects

(9). Healthy 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.

2-2. Inclination criteria

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

2-3. Measuring tools

2-3-1. 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.

2-3-2. Questions on the PBT structures: In the questionnaire developed by Solhi et al. (10), 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.

2-3-3. Stages of Change (SOC) questions: The SOC questions were developed based on the standard questionnaire of Marcus et al. (11) and scored based on a five-point Likert scale, addressing pre-thinking (1), thinking (2), readiness (3), functional (4), and maintenance (5).

2-3-4. International Short-Term Physical Activity Questionnaire (IPAQ): This questionnaire included questions about the intense and moderate physical activity and walking in the last week (12).

The questionnaires were provided to the studied samples.

2-4. Reliability and Validity

This study's content validity index (CVI) was 0.92 for attitude, 0.94 for mental norms, 0.93 for perceived behavioral control, 0.93 for behavioral intention, and 0.90 for change stage structures. The 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 coefficients 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 considerations

The present study was approved by the Ethics Committee of Mashhad University of Medical Sciences (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 healthy 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 planned theory structures.

The Spearman correlation test was used to determine the relationship between physical activity and the PBT structures. The chi-square test was used to determine the relationship between the healthy volunteers' level of education and the stages of change structure.

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. The average monthly income of

the healthy volunteers' families was $12,816,790 \pm 823,859$ 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 12.1 ± 17.86 (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 (**Table.1**).

Table-1: Frequency distribution of subjects according to levels of physical activity.

Levels of physical activity in terms of met-minute/ week	Number	%
Only poor activity	109	41.6
Only moderate activity	146	55.7
Moderate and severe activity	7	2.7

There was a positive and significant correlation between attitude, mental norms, and perceived behavior control with physical activity ($p < 0.05$). However, there was no significant correlation between behavioral intention and physical activity ($p > 0.05$) (**Table.2**). Since there was no requirement to use the Chi-square test, the pre-thinking, thinking, readiness,

functional, and maintenance stages were merged, and the results indicated a significant difference between the stages of change and the level of education among the healthy volunteers ($p < 0.001$), indicating that the higher levels of education led to the participants being in the higher stages (functional and maintenance) of change (**Table.3**).

Table-2: Correlation between constructs of the theory of planned behavior with physical activity (according to MET).

Variables	Attitude	Mental norms	Perceived behavior control	Behavioral intention	Physical activity
Attitude	1				
Mental norms	R=0.441 P=0.001	1			
Perceived behavior 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=0.0151 P=0.015	R=0.195 P=0.002	R=0.119 P=0.054	1

MET: Metabolic equivalent task.

Table-3: Frequency distribution of change stages according to the education of health volunteers.

Variables	Elementary	Middle school	High school	Associate	Bachelor	Total	*P-value
Pre-thinking Thinking- Readiness	15 (20.3)	16 (21.6)	28 (37.8)	1 (1.4)	14 (18.9)	74 (100)	<0.001
Action- Maintenance	30 (16)	30 (16)	119 (63.3)	5 (2.7)	4 (2.1)	188 (100)	
Total	45 (17.2)	46 (17.6)	147 (56.1)	6 (2.3)	18 (6.9)	262 (100)	

* Chi-square test.

4- DISCUSSION

According to the research findings, the healthy volunteers had a positive attitude toward physical activity. In this regard, Hosseini et al. (13), and Blu et al. (14) mention that most women have positive attitudes toward physical activity. Moreover, the findings in the present study showed that attitudes toward physical activity had a positive and significant correlation with physical activity. In this regard, Karvinen et al. (15), Hosseini et al. (13), and Alipour-Anbarani et al. (16) obtained similar results. Furthermore, the correlation between mental norms and physical activity was positive and significant. This finding was similar to those proposed by Guinn et al. (17), Rhodes et al. (18), and Marashi et al. (19); however, it was not consistent with those reported by Hosseini et al. (13), and Karvinen et al. (15). Furthermore, the correlation between perceived behavior control and physical activity was positive and significant. This finding is similar to the findings proposed by Hosseini et al. (13), Rhodes et al. (18), and Marashi et al. (20). The findings also showed that behavioral intention had no significant correlation with physical activity. This finding is not in line with the findings reported by Taghipour et al. (21) and is consistent with those of Karvinen et al. (15), and Blu et al. (14); the findings also showed that the higher levels of education led to the participants being at higher stages (functional-maintenance) of change. This finding is similar to Jalilian et al.

(22), and Fahrenwald et al.'s studies (23). The present findings showed that the majority of women were in the functional and maintenance stages; however, regarding the frequency distribution of individuals in terms of physical activity, more than 97% of the individuals were at poor and moderate activity levels. Accordingly, training interventions based on the behavior change theories and models seem necessary. Some obstacles to physical activity can be removed by providing necessary facilities for physical activity in parks and public places. Health staff can also encourage healthy volunteers to have an active lifestyle by creating a supportive and encouraging environment for physical activities. Training programs also need to reinforce this idea in healthy volunteers that they can have enough physical activity. In this regard, using motivational interviews and holding sessions to increase their self-efficacy can be effective. Although the findings contribute to expanding our insight into factors explaining the behavior of physical activity based on the proposed pattern, 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 have completed the questionnaire honestly.

5- CONCLUSION

The present study showed that the majority of women were in the action and maintenance stages; however, regarding the frequency distribution of individuals in terms of physical activity, more than 97% of the individuals were at poor and moderate activity levels. Accordingly, training interventions based on the behavior change theories and models seem necessary. Some obstacles to physical activity can be removed by providing necessary facilities for physical activity in parks and public places. Health staff can also encourage healthy volunteers to have an active lifestyle by creating a supportive and encouraging environment for physical activities. Training programs also need to reinforce this idea in healthy volunteers that they can have enough physical activity. In this regard, using motivational interviews and holding sessions to increase their 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.

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