



Factors Affecting Physical Activity Behavior Among Women in Kerman Based on the Theory of Planned Behavior (TPB)

Seyed Vahid Ahmadi Tabatabaei,¹ Hassan Eftekhari Ardabili,² Ali Akbar Haghdoost,³ Maryam Dastoorpoor,⁴ Nouzar Nakhaee,^{5,*} and Mohsen Shams⁶

¹Assistant Professor, Social Determinants of Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

²Professor, Department of Health Education and Promotion, School of Public Health, Institute of Health Research, Tehran University of Medical Sciences, Tehran, Iran

³Professor, HIV/STI Surveillance Research Center, WHO Collaborating Center for HIV Surveillance, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

⁴Assistant Professor of Epidemiology, Department of Epidemiology and Biostatistics, Faculty of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

⁵Professor, the Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran

⁶Associate Professor, Social Determinant of Health Research Center, Yasuj University of Medical Sciences, Yasuj, Iran

*Corresponding author: Nouzar Nakhaee, Professor, the Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran. Tel: +98-3432114848, Fax: +98-3432114848, E-mail: nakhaeen@yahoo.com

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Abstract

Background: Theory of planned behavior (TPB) has not been adequately addressed in the field of physical activity among Iranian women.

Objectives: This study aimed to determine factors affecting physical activity behavior among women based on the theory of planned behavior.

Methods: This cross-sectional study was conducted on 398 women in Kerman, Iran. The women were selected through the multi-stage random sampling method. Data were collected using the international physical activity questionnaire (IPAQ) and a researcher-made questionnaire based on the constructs of the theory of planned behavior and analyzed using structural equation modeling (SEM).

Results: The mean age (SD) of participants was 36.9 (9.9). Perceived behavioral control ($\beta = 0.16$, $P = 0.013$) and behavioral intention ($\beta = 0.16$, $P = 0.005$) had a significant positive direct effect on physical activity behavior. Moreover, instrumental attitude ($\beta = 0.04$, $P = 0.003$), subjective norms ($\beta = 0.04$, $P = 0.003$) and perceived behavioral control ($\beta = 0.03$, $P = 0.002$) had a significant positive indirect effect on physical activity behavior. Behavioral intention and perceived behavioral control constructs predicted 6% of variance of physical activity behavior.

Conclusions: Given that the constructs of behavioral intention and perceived behavioral control could predict physical activity behavior, health promotion interventions should be designed with an emphasis on these factors in order to promote physical activity in women.

Keywords: Physical Activity, Behavior, Theory of Planned Behavior, Women

1. Background

Physical activity reduces the risk of over 25 chronic diseases, including cardiovascular disease, type 2 diabetes, osteoporosis, and breast and colon cancers (1). Physical activity can help improve women's health and prevent many diseases in women (2). According to the recommendation of the world health organization (WHO), the heart association, and the American college of sports medicine, individuals aged 18 to 65 years, who do less than 150 minutes per week of moderate physical activity (30 minutes daily for 5 days per week) or less than 75 minutes of intense physical activity (25 minutes, 3 times a week) are considered to have

low mobility (3). Despite the enormous benefits of physical activity, a high percentage of adults do not engage enough in physical activity (4). Based on a systematic review conducted in 2016 in Iran, 30% to 70% of the population of Iran had low mobility or was inactive (5). In order to design effective health promotion strategies to change the behavior of physical activity and the complexity of this behavior, we need to understand better factors affecting our physical activity (2, 6).

One of the social-cognitive-based theories of behavior change is the theory of planned behavior (TPB), which is used to predict and understand behavior. This theory is

used regarding behaviors such as weight loss, smoking, physical activity, alcohol consumption, and so on (7-9). In addition, the results of meta-analyses support the TPB's ability to predict physical activity (10, 11). According to this theory, the most important determinant of the person's behavior is his/her intention; person intention is affected by three constructs of attitudes, subjective norms, and perceived behavioral control. In a study conducted in Tehran, subjective norms were the main predictor of intention for physical activity, and behavioral intention was the main predictor of physical activity behavior (12). In another study in Quebec, perceived behavioral control has been the main predictor of physical activity (13). Low sample size was a restriction for some of the cross-sectional studies in this field (2, 12, 14). According to Ajzen (1991), attitude includes both instrumental attitude and emotional attitude. Instrumental attitude emphasizes more the cognitive aspects of behavior while emotional approach emphasizes more the emotional aspects of behavior (15). Moreover, despite the differences between the instrumental attitudes and emotional attitudes and emphasis on measuring both attitudes in the theory of planned behavior (16), in most studies it has not been taken into account (14, 17). Furthermore, Ajzen, as the designer of this theory, suggests that measuring the attitude structure necessitates direct measurement of attitude and indirect measurement by measuring beliefs about the consequences of behavioral belief and appraisal of the consequences of outcome evaluation to discover the leading behavioral beliefs in order to design effective interventions (15). In most of the studies, however, the attitude of indirect measurement has not been taken into account. Thus, taking into account the limitations of the studies cited above, and considering the low level of physical activity of women in Kerman and the effective role of women in the formation of physical activity in family and society (12, 18), in order to design appropriate health promotion interventions, this study aimed to determine the physical activity status and factors affecting physical activity for the first time among women in Kerman, based on the theory of planned behavior.

2. Methods

2.1. Participants and Sampling Method

This cross-sectional study was conducted in 2015 in Kerman, Iran. According to the 2011 census, the city's population was 534441 (51.5% male and 48.5% female) and population growth rate and the literacy rate were 2.07% and 82.20%, respectively (19).

The rates of unemployment and economic participation in Kerman were 7.9% and 35.2%, respectively (19). In

terms of weather, generally, the city is fairly cool and temperate.

Considering the correlation coefficient of 0.14 between behavioral intention and physical activity behavior based on the results of some similar studies (12, 20), the confidence level of 95% and the test power of 80%, a sample size of 398 was estimated using the following formula:

$$n = \left(\frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2}{0.5 \times \ln \left(\frac{1+r}{1-r} \right)} \right)^2 + 3 \quad (1)$$

Inclusion criteria included 20 - 60-year-old women, having family files, and lack of physical disability while exclusion criteria included the presence of physical disability and not willingness to participate in the study.

For sampling, first, one area of the municipality was selected randomly among the four municipal areas of Kerman. Then, two health centers were selected randomly among the governmental and referral health centers. The two centers covered on average about 40000 people.

Next, among the comprehensive list of households registered in the health centers, 199 eligible women systematically were selected from each center. Finally, by a phone call, the head of the family was asked to ensure that women without mental and motor disabilities would refer to the health centers to measure the height and weight and complete a questionnaire.

2.2. Data Collection Tools

A demographic information checklist, the international physical activity questionnaire (IPAQ), and a researcher-made questionnaire based on the theory of planned behavior were used to collect data. The short-form IPAQ is a tool designed by the world health organization to evaluate physical activity of 15 - 69-year-old persons (21, 22). This seven-question questionnaire measures the duration of physical activity in the past week in four batches: walking and sitting activities, moderate physical activity, and intense physical activity. The amount of physical activity in the research units per week was determined and expressed as MET-min/Week. To rate this questionnaire, its international protocol scale was used. To calculate the total amount of physical activity per week (Total MET-min / week), the amount of short walk (MET × minute × day), the amount of moderate physical activity (MET × minute × day), and the amount of intense physical activity (MET × minute × day) for each individual during the last seven days were summed up (22). The total energy consumption less than 600 MET/Cal/week indicated inactivity or low physical activity, between 600 and 3000 MET/Cal/week indicated moderate physical activity, and more than 3000

Met/Cal/week suggested high physical activity (21). The validity and reliability of the questionnaire have been approved in several studies (21, 23, 24).

For demographic information, items such as age, marital status, level of education, occupation, the history of a certain disease, weight, and height were considered. Height and weight were measured by one person from the health staff of the health-therapeutic center.

Theory of planned behavior inventory: due to the lack of a standardized questionnaire based on this theory in the field of physical activity, we used recommendations by Pro. Ajzen (2002) as the designer of this theory (25), and studies conducted by Francis et al. (2004) (26) and Ahmadi-Tabatabaei et al. (2008) (27) to generate the content of the questionnaire for women.

To determine the content validity of the inventory, first the qualitative (judgmental) method was used.

Quantitatively, Lawshe method (28) was used to evaluate the content validity ratio (CVR) and Waltz and Bausell method to evaluate the content validity index (CVI) (29). Finally, the questionnaire was approved by CVR of 0.64 and CVI of 0.82.

Cronbach's alpha coefficient was calculated to determine internal consistency, which gave values higher than 0.8 for all the subscales. For scoring the responses, the scores 1, 3, 3, 4, and 5 were awarded for very low, low, average, high, and very high choices, respectively. It consisted of five subscales including behavioral intention (2 items), instrumental attitudes (14 items), behavioral beliefs and outcomes (15 items), subjective norms (7 items), and perceived behavioral control (10 items).

The self-administered questionnaire was completed by or by a trained interviewer for illiterate people. The average time to complete a questionnaire was about 15 minutes. Data were collected from January up to May 2015.

The study protocol was approved by the ethics committee of Tehran University of Medical Sciences (grant No: IR.TUMS.SPH.REC.1395.1341, Date: 2013/8/23). Informed consent was obtained from the participants.

2.3. Analysis

In this study before conducting any analysis, variables were studied in terms of missing data. To estimate the missing data, EM (expectation maximum) was used (30). The normality of the gathered data was not confirmed by Kolmogorov-Smirnov test ($P < 0.05$). To analyze the data, descriptive statistics such as median and interquartile range (IQR) and analytical statistics including Spearman's correlation coefficient were used.

To test the hypothesized relationships simultaneously in the present study, structural equation modeling (SEM) was used. The proposed model of the study had totally

six variables including four independent variables, one dependent variable, and one mediator. To determine the fit of the model, indicators of the ratio of chi-square to degrees of freedom (CH^2/DF), GFI, CFI, IFI, RFI, NFI, RMSEA, and Hoelter index were used. The analysis was performed using SPSS version 22 and AMOS18 software. The significance level was considered as ≤ 0.05 .

3. Results

The median (IQR) age of the participants was 36 (15) years. The median (IQR) weight and body mass index of the participants were 68.50 (17) kg and 26.88 (7) kg/m², respectively 36.6% of women were suffering from a chronic disease among which low back pain had the greatest frequency (10.3%). Women with a BMI higher than 25 kg/m² were the most frequent (65%) among the others. Other baseline variables of the participants in the study are presented in Table 1.

Median (IQR) score of total physical activity behavior was obtained as 240 (1188) Met/Cal/week. Median scores of the constructs including behavioral intention, instrumental attitude, emotional attitudes, subjective norms, and perceived behavioral control were 6.0, 60.0, 62.3, 27.0, and 30.0, respectively (Table 2).

Based on the Spearman's correlation coefficient, results showed that behavioral intention and perceived behavioral control had a direct significant correlation with total physical activity (Table 3).

In SEM, if the index CH^2/DF is smaller than 2, indices GFI, CFI, IFI, RFI, and NFI are greater than 0.9, RMSEA index is less than 0.08, and Hoelter indicator is more than 200, we can conclude that the model has a good fit. The results in Table 4 show that the indicators of the model are in a good range. RMSEA index with a zero value indicates the good fit of the model.

According to the SEM, among direct effects, the variables perceived behavioral control and behavioral intention with the amounts of β (standardized regression coefficient) of 0.161 and 0.165, respectively, had a significant positive effect on physical activity behavior. Nevertheless, no significant relationship was seen between emotional attitude and behavior of physical activity (Table 4).

Among the structures of TBP, the most influential variables on the variable "intention to do physical activity" were "instrumental attitude" and in a lesser degree, was "subjective norms" (based on standardized regression coefficients) (Figure 1). The model suggests that 17% (R^2) of the variance of behavioral intention is explained by the four main constructs of the theory of planned behavior (instrumental attitude, emotional attitude, subjective norms,

Table 1. The Frequency Distribution of Demographic Characteristics of Women Participating in the Study (398)

Variable	N	%
Marital status		
Married	374	94.0
Single	17	4.3
Widow	4	1.0
Divorced	3	0.8
Education level		
Primary or secondary	84	21.1
High school and diploma	205	51.5
University	109	27.4
Employment status		
Housekeeper	344	86.4
Employed	54	13.6
Chronic disease		
Yes	146	36.7
No	252	63.3
BMI		
Lower than 18.5 kg/m ²	9	2.3
18.5 to 25 kg/m ²	131	32.9
More than 25 kg/m ²	258	64.8
Physical activity behavior		
Inactivity or low physical activity (less than 600 Met / Cal / week)	244	61.3
Moderate physical activity (600 to 3000 Met / Cal / week)	111	27.9
Intense physical activity (more than 3000 Met / Cal / week)	43	10.8

and perceived behavioral control) and the rest (1 - R₂) is explained by the other variables.

Finally, with regard to the total direct and indirect effects (total effects), we can conclude that among all variables of TBP model, variables “perceived behavioral control” and behavioral intention, in sequence, are the most influential variables on physical activity behavior (Table 4). The model suggests that 6% (R₂) of variance of the variable physical activity is explained by behavioral intention and perceived behavioral control, and the rest (1 - R₂) is explained by the other variables (Figure 1).

4. Discussion

A few studies have been conducted on women' sense about physical activity. Therefore, the aim of this study was

to investigate factors affecting the behavior of physical activity in women based on the theory of planned behavior.

Among the women participating in the study, 61.5% had low or no physical activity. According to the results of a study conducted in 76 countries, the range of inactivity in persons over 15 years in several countries varies from 2.6% to 62.3%, and inactivity was observed more in women, richer and urban populations (31). The results of Tabassinezhad et al. study (2014) showed that 66.7% of women had mild physical activity in Kerman, Iran, (32). In a study (2007) in the city of Yazd, Iran, on 1500 people over 20 years, 54% of women had low levels of physical activity (33). Similarly, another study showed that 70 to 80% of people do not engage enough in physical activity and inactivity trend is on the rise (34). Based on Saedee (2004) study in Isfahan, approximately 70% of women do not have enough physical mobility (35). Therefore, it seems that probably among Iranian women, sitting activities and traditional female tasks in the family have more priority over physical activity.

In examining the constructs of the theory of planned behavior, the results showed that the median score of behavioral intention in women was 6.0, which by taking into account that the maximum score for this construct is 10, the women had a moderate intention for physical activity. In the studies conducted by Ahmadi Tabatabaei et al. (2008) (27) and Saber et al. (2013) (36) based on the theory of planned behavior, the subjects reported a moderate intention to do physical activity.

In a study conducted by Moeni et al. (2011), the behavioral intention was introduced as the most important factor affecting physical activity among the study students (37). In this study, the median scores of instrumental and emotional attitudes were 60.0 and 62.3, respectively; thus, given the maximum score of 70 and 75, it represents a good attitude and positive evaluation of the physical activity. According to Ajzen (1991), whatever one's attitude toward a behavior is more favorable and others who are in his/her life emphasize performing a behavior, and he/she feels control on the behavior, he/she is more likely to intend to perform the behavior (15).

The median score of subjective norms in the study was 27, which in a comparison with a maximum score of 35 indicates that subjective norms are at good level.

In this regard, the authorities can create supportive environments for physical activity, and promote and encourage women to be active in life. About the construct of perceived behavioral control, the median score was 30, which by considering 48 as the highest score; the women had a moderate control on physical activity. The study results of Saber et al. (2013) (36) and Ahmadi Tabatabaei et al. (2008) (27) are consistent with these findings. Accord-

Table 2. The Mean Scores of the Constructs of Theory of Planned Behavior

Variable	N	Median	IQR	Min-Max
Behavioral intention	398	6.0	3.0	1 - 10
Instrumental attitude	398	60.0	10.0	18 - 70
Emotional attitudes	398	62.3	9.0	27 - 75
Subjective norms	398	27.0	7.0	5 - 35
Perceived behavioral control	398	30.0	7.0	13 - 48
Physical activity	398	240	1188	0 - 17394

Table 3. Correlation Coefficient Matrix of Constructs of Theory of Planned Behavior and Total Physical Activity

Variable	Behavioral Intention	Instrumental Attitude	Emotional Attitudes	Subjective Norms	Perceived Behavioral Control	Physical Activity
Behavioral intention	1	0.33 ^a	0.27 ^a	0.33 ^a	0.18 ^a	0.20 ^a
Instrumental attitude	0.33 ^a	1	0.68 ^a	0.42 ^a	-0.03	0.05
Emotional attitude	0.25 ^a	0.68 ^a	1	0.47 ^a	0.03	0.07
Subjective norms	0.33 ^a	0.42 ^a	0.47 ^a	1	0.04	0.07
Perceived behavioral control	0.18 ^b	-0.03	0.03	0.04	1	0.16 ^b
Physical activity	0.20 ^a	0.05	0.07	0.07	0.16 ^b	1

^aP value < 0.001.^bP value < 0.05.**Table 4.** Directions and Standard Coefficients of Structural Model^a

Pathway	Total Effect			Indirect Effect			Direct Effect		
	β	SE	P	β	SE	P	B	SE	P
Instrumental attitude > physical activity	0.043	0.017	0.003 ^b	0.043	0.017	0.003 ^b	-	-	-
Emotional attitude > physical activity	-0.009	0.012	0.391	-0.009	0.012	0.391	-	-	-
Subjective norms > physical activity	0.036	0.014	0.003 ^b	0.036	0.014	0.003 ^b	-	-	-
Perceived behavioral control > physical activity	0.190	0.048	0.01 ^b	0.029	0.012	0.002 ^b	0.161	0.050	0.013 ^b
Behavioral intention > physical activity	0.165	0.048	0.005 ^b	-	-	-	0.165	0.048	0.005 ^b

^a $\chi^2/DF=0.05$, GFI = 0.99, CFI = 1.000, IFI = 1.006, RFI = 0.998, NFI = 1.000, RMSEA = 0.000, Hoelter Index = 29755. ^aStandardized beta.^b P Values is significant.

ing to this study, "intention" is an influential factor in the physical activity prediction, and behavioral intention and perceived behavioral control could explain 6% of the variance of physical activity behavior. McEachan et al. (2011) reported that TPB with a variance from 24% to 36% totally predicts the type of behavior. This range of prediction varies based on the type of behavior and different target groups (38). In the theory of planned behavior, the intention is introduced as an essential and immediate introduction to behavior (15). However, there is no 100% relationship between intention and behavior. The intention is necessary but not sufficient to conduct a behavior (39). In this regard,

a study conducted by Yekaninejad et al. (2012) showed that behavioral intention and perceived behavioral control are positively correlated with physical activity behavior. It is likely that people do not always have enough control over their intended behavior to show their intention (40). Studies by Martin et al. (2007) (41) and Armitage and Christopher (2005) (42) represented the positive role of perceived behavior control in addressing the physical activity.

Since the perceived behavioral control depends on the presence or absence of facilitators or barriers to do a behavior, this result suggests that the study population feels that, due to the obstacles, they do not have full control on

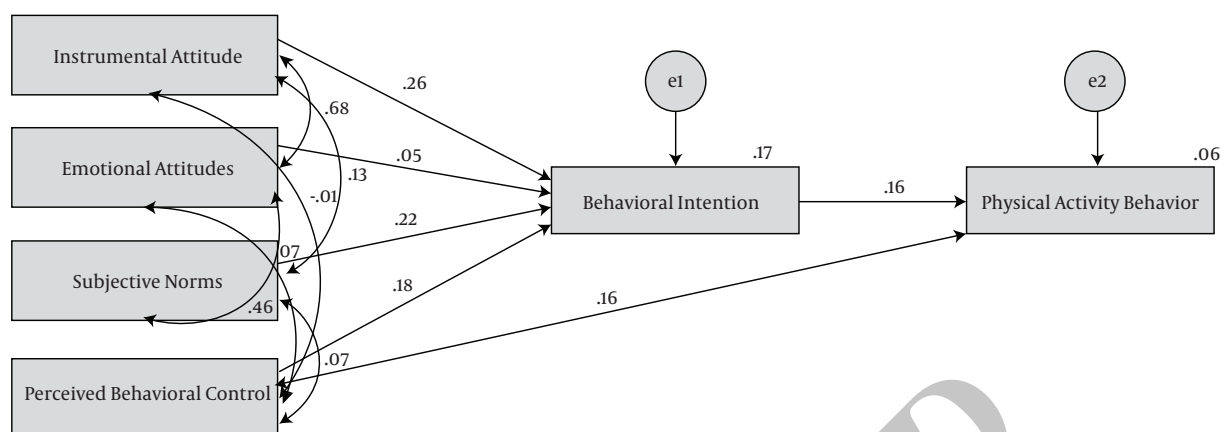


Figure 1. Conceptual Framework of the Determinants of Physical Activity According to the Explanatory Model

physical activity. In this regard, research has shown that one of the determining factors in physical activity is barriers that a person perceives to perform behavior and unlike this, the ability to overcome barriers to physical activity is in a significant positive correlation with increased physical activity (43). Physical activity is directly related to having a perfect place for sports, equipment and providing means to go to training or conduct exercise program (36). People are excited for health behaviors and even they do it in dealing with the challenges when they feel that they have control over that behavior. By providing the necessary facilities to perform physical exercises in parks and public places, we can overcome some of the barriers to physical activity.

The results of this study showed that merely a positive attitude to physical activity does not guarantee physical activity. Likewise, the most influential variable on the intention of physical activity is “instrumental attitude” followed by “subjective norms” and “perceived behavioral control”. Unlike the results of this study, a study conducted on women in Tehran showed there is no significant relationship between instrumental attitude and emotional attitude and intention of physical activity (12). Hagggar et al. (2002) showed that attitude is the strongest predictor of the intention for physical activity in most studies based on the TPB (10). In some studies, subjective norms were one of the important explication of the intention of physical mobility, while some researchers have reported subjective norms as a poor predictor of the intention for physical activity (2). Since in this study “instrumental attitude” and to a lesser extent “subjective norms” were the main predictors of intention for physical activity, to increase the intention for physical activity among women, instrumental attitude and women’s prominent cognitive beliefs about

physical activity as well as involving other family members, friends, and other important people to increase social support in this regard must be taken into account.

Some of the limitations of the present study included self-reported physical activity and limited generalizability of the study results to the entire population of women in Iran. Since the cross-sectional studies collect all the data at a specific time, it limits the ability to examine the causal relationship between the variables. Moreover, random selection of health centers only from a municipal area is another limitation of this study. Measurement of instrumental attitude and emotional attitudes and outstanding behavioral beliefs can be some of the strengths of this study.

4.1. Conclusions

Given that the factors of behavioral intention and perceived behavioral control are the strongest predictors of physical activity, it is expected that health promotion interventions be designed with more emphasis on these factors in order to promote the physical activity in women. It also seems that theory of planned behavior can be used as a framework for designing educational interventions in order to increase physical activity.

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