



## Original Article

# Predictive Factors of Regular Physical Activity among Middle-Aged Women in West of Iran, Hamadan: Application of PRECEDE Model

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## ABSTRACT

**Background:** Regular physical activity is important for midlife women. Models and theories help better understanding this behavior among middle-aged women and better planning for change behavior in target group. This study aimed to investigate predictive factors of regular physical activity among middle-aged women based on PRECEDE model as a theoretical framework.

**Methods:** This descriptive-analytical study was performed on 866 middle-aged women of Hamadan City western Iran, recruited with a proportional stratified sampling method in 2015. The participants completed a self-administered questionnaire including questions on demographic characteristics and PRECEDE model constructs and IPAQ questionnaire. Data were then analyzed by SPSS-16 and AMOS-16 using the Pearson correlation test and the pathway analysis method.

**Results:** Overall, 57% of middle-aged women were inactive (light level) or not sufficiently active. With SEM (Structural Equation Modeling) analysis, knowledge  $b=0.84$ ,  $P<0.001$ , attitude  $b=0.799$ ,  $P<0.001$ , self-efficacy  $b=0.633$ ,  $P<0.001$  as predisposing factor and social support as reinforcing factor  $b=0.2$ ,  $P<0.001$  were the most important predictors for physical activity among middle-aged women in Hamadan.

**Conclusions:** The framework of the PRECEDE model is useful in understanding regular physical activity among middle-aged women. Furthermore, results showed the importance of predisposing and reinforcing factors when planning educational interventions.

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## Introduction

Midlife is a period of life, after youth and before ageing. In this period people are faced with various physiological, physical, social and cognitive changes<sup>1</sup>. According to the latest Iran Statistic Center estimates, the country's population is going towards middle-aged and people aged 30 to 64 yr will be 39% of the population in near future<sup>2</sup>. This period for women accompany with menopause and its associated problems such as: increase cardiovascular, respiratory, osteoporosis, obesity, hypertension, and diabetes and cancer dangers<sup>3, 4</sup>. Regular physical activity, reduces risk of morbidity and mortality, physical activity also promotes the development of mental, physical and skeletal performance and plays role in energy balance<sup>5</sup>. Regular physical activity is the best lifestyle for middle-aged and old people to manage problems that increase with ages<sup>3,6</sup>. Promote regular physical activity in middle-aged women leads to a healthy lifestyle and functional independence and follows health in aging period<sup>7</sup>. Inactivity in the world is considered a major health problem; it is more

common in older age groups. One study in the United States, as Behavioral Risk Factors Program (BRESS) showed that more than half (52%) of people aged 45 to 54 yr and 55-64 yr old (55%) are less physically active than recommended amounts and not sufficiently active according CDC (Centers for Disease Control and preventive) 2005 reports<sup>8</sup>.

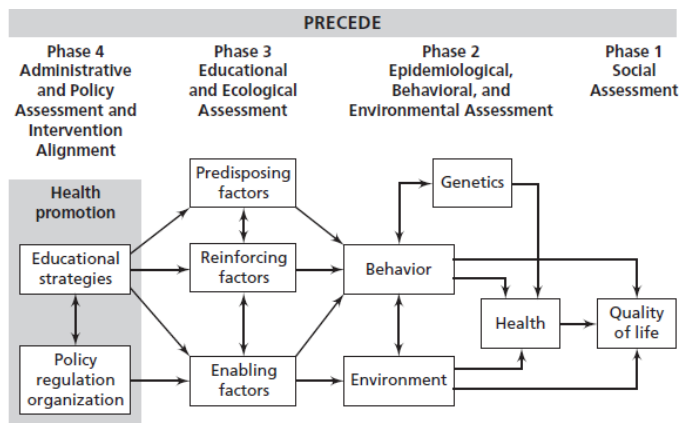
In Iran according to the WHO, 42.9% of 18 yr and over were inactive or had insufficient physical activity<sup>9</sup>. In some other sources inactivity was reported up to 80%<sup>10</sup> in Iran. Understanding the cognitive determinants of physical activity behavior is very important because they are more modifiable than other factors in health education and health promotion in communities<sup>11,12</sup>. Using theory and models of behavior change for understanding regular physical activity in middle-aged women help analyzing this behavior and its predictors<sup>13-15</sup>. So plan the map of effective intervention, and changing the physical activity behavior will become simple among middle-aged especially women. Several behavioral theories

and models were used to identify determinants of regular physical activity among middle-aged women. Johnson et al. in a 15-year longitudinal study of regular physical activity among middle-aged women showed that women with higher internal motivation and higher self-efficacy had higher consistency in physical activity<sup>16,17</sup>.

Barg et al. have reported the most important predictor of physical activity among middle-aged women was self-efficacy<sup>18</sup>. Intervention program for postmenopausal women should increase their self-efficacy<sup>16</sup>.

In Tehran, Iran knowledge, perceived benefits and self-efficacy were factors facilitate regular physical activity in the elderly people<sup>19</sup>. Perceived social support<sup>20, 21</sup> and enabling factors<sup>22</sup> are among other predictors of regular physical activity.

This study aimed to investigate predictive factors of regular physical activity among middle-aged women based on PRECEDE model as a theoretical framework (Figure 1).



**Figure 1:** Diagram of the Precede Model and relations of the assessment phases

## Methods

### PRECEDE Model

PRECEDE is a model for planning of health education programs developed by Green (1980). This model has even been revised and extended by Green himself into the PRECEDE-PROCEED model<sup>13</sup>. In PRECEDE part of model consisting of four assessments phase including (a) social assessment; (b) epidemiological, behavioral and environmental assessment; (c) educational and ecological assessment that with predisposing and reinforcing and enabling factors try to divide items for educational intervention; and (d) administrative assessment which try to assess individual or community interventions.

Predisposing factors are antecedents to behavior that provide the rationale or motivation for the behavior<sup>20</sup>. They include individuals' knowledge, attitudes, personal preferences, existing skills, and self-efficacy beliefs. Reinforcing factors are those factors following a behavior that provide continuing reward or incentive for the persistence or repetition of the behavior<sup>23</sup>. Examples include social support, peer influence, significant others, and vicarious reinforcement. Enabling factors are antecedents to behavioral or environmental change that allow a motivation or environmental policy to be realized<sup>23</sup>. Enabling factors can affect behavior directly or indirectly through an environmental factor. They include programs, services, and

resources necessary for behavioral and environmental outcomes to be realized and, in some cases, the new skills needed to enable behavior change.

### Participants

This descriptive-analytical study was performed among 866 middle-aged women covered by 34 health centers in Hamadan City, western Iran in 2015. Participants were selected in groups of 40-44, 45-49, 50-54, 55-59, 60-64 yr old by proportional stratified sampling. So the number of participant in every age group was not equal. In every age group the participants were selected from household files randomly.

The sample size with considering  $P=0.37$  and  $\alpha=0.05$  and  $d=0.05$ , with 1.5 coefficient for the effect clustering design. With assumption reliability of questionnaire as 0/7 the sample size was 852.

Inclusion criteria were all middle-aged women 40-64 yr old in Hamadan City. Exclusion criteria were not involved with special diseases such as (Diabetes, hypertension, osteoporosis, cardiovascular).

This study was approved by Ethics Committee of Hamadan University of Medical Sciences. Informed consent was obtained from all study participants before the project began. Researchers informed participants to ensure that they can reach a truly informed decision about whether or not to participate in the research.

### Measures

The study was done with closed questions and self-reported questionnaire. It took less than 20 min to complete the questions. The questionnaire included of three parts: (1) demographic factors: including age, weight, height, Body Mass Index (BMI), marital status, number of children, education level, occupation status and place of residency; (2) PRECEDE theoretical constructs: PRECEDE scales were measured in relation to regular physical activity that were designed by authors and 56 items were composed under five major constructs: (a) predisposing factors (33 items); (b) enabling factors (10 items); (c) reinforcing factors (6 items); and (d) behavior (7 items). This part of questionnaire was designed by author. The content validity of designed questions was calculated as CVI (content validity index) = 0.85 and CVR (content validity ratio) = 0.90. The final approval was earned with panel of 10 experts in health education and promotion.

#### Predisposing factors

**Knowledge:** Twelve items were designed to measure knowledge of physical activity among middle-aged women (e.g., "which physical activity is appropriate for middle-aged women?"). The scale was multiple choices, in analysis the answers difference was done among correct answer, incorrect answer and I don't know. Reliability coefficient for knowledge of physical activity was 0.70.

**Attitude:** Eleven items were designed to measure the attitude toward physical activity among middle-aged women (e.g., "I think sufficient physical activity can control my menopausal signs"). The items were rated on a 5-point scale ranging from strongly disagree=1 to strongly agree=5. Higher scores show more positive attitude toward physical activity. Reliability coefficient for physical activity attitude was 0.87.

**Self-efficacy:** Ten items were designed to measure self-efficacy toward physical activity among women. For example, it was asked "in bad weather also I can go for daily physical activity". The items were rated on a 5-point scale ranging from completely sure =5 to not completely sure=1. Higher scores indicate higher level of self-efficacy for physical activity. Estimated reliability coefficient for self-efficacy was 0.90 that reveals internal consistency of this part of questionnaire.

**Reinforcing factors**

**Social support:** Six items were designed to measure social support among middle-aged women (e.g., which ones persuade you to do physical activity). The items were rated on a 10-point scale ranging from 0 to 10 point. Higher score indicate more social support and reinforcing factors in doing physical activity. Estimated reliability coefficient for reinforcing factors was 0.90, this reveals internal consistency of reinforcing questions.

**Enabling factors**

This section was measured with 10 items that assessed enabling factors including, existence of place and vehicle for transporting to club for exercise, having sufficient time, having appropriate dress and sporting goods, and having instructor and guideline for exercise. Each item was rated on a 5-point Likert-type scale ranging from 1 (not at all) to 5 (very). Higher scores indicate higher enabling factors for doing physical activity. An estimated reliability coefficient for this part was 0.76, which shows the internal consistency of enabling part of questionnaire.

**Behavior**

Regular physical activity was measured with international physical activity questionnaire (IPAQ) in short form, with the reliable and valid Persian form of which measure physical activity behavior in past seven days. Participants with this IPAQ classified into three categories: light, mediate and severe<sup>34</sup>. Total intensity of physical activity during the last 7 days was calculated according to the IPAQ protocol. Light-intensity physical activity was considered when consumption was 600 met/cal/for a total week, when activity was 600 to 3000 met/cal/week it was considered as mediate and severe category is more than 3000 met/cal/week<sup>22, 34</sup>. The light level consider as inactivity or not sufficient physical activity

**Data analysis**

To assess the developed model’s fit in the Path analysis we applying many fit indices; chi square ( $\chi^2$ ) should be non-significant to indicate a good fit, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA)  $\leq 0.06$ , Root Mean Square Residual (RMSR)  $\leq 0.08$  show a good fit. In the Path analytic model direct effects was considered based on conceptual PRECEDE theory. We analyzed the data through SPSS16 (Chicago, IL, USA) and Amos 16. We utilized the Cronbach’s alpha coefficient to assess reliability of questionnaires. Standardized regression coefficients ( $\beta$ ) were used to direct effects determination.

**Results**

The mean age of respondents was 49.82 yr (SD= $\pm 6.91$ ), ranged from 40 to 64 yr. The frequency of the 40-44 yr-old was the highest (28.9%). Regarding the BMI status, 1.4% of

respondents had an underweight status, 33.6% had a normal status (BMI 19 to 25), 55.9% were overweight (BMI greater than or equal to 25 is overweight), and 9.1% were obese (a BMI greater than or equal to 30 is obesity), respectively. More details of demographic characteristics of the participants are shown in Table 1.

Descriptive statistics (means, standard deviation and range of scores) of PRECEDE constructs presented in Table 2. Constructs of attitude (59.3% of maximum attainable score) and enabling factors (55.1% of maximum attainable score) are in moderate conditions, but constructs of reinforcing factors (15.5% of maximum attainable score), self-efficacy (38.3% of maximum attainable score) and knowledge (42.2% of maximum attainable score) don't have proper and favourite conditions.

**Table 1:** Demographic characteristics of middle-aged women (n=866)

Variables	Frequency	Percent
Age (yr)		
40-44	250	28.9
45-49	199	23.0
50-54	176	20.3
55-59	143	16.5
60-64	98	11.3
Education		
Illiterate	85	9.8
Primary	114	13.1
Secondary	185	21.4
High school	213	24.6
Academic	269	31.1
Job Status		
Housewife	631	72.9
Employed	235	27.1
Number of Children		
0	124	14.3
1-2	427	49.3
3-5	298	34.4
$\geq 6$	17	2.0
Body mass index (kg/m <sup>2</sup> )		
<19.9	12	1.4
20-24.9	291	33.6
25-29.9	484	55.9
$\geq 30$	79	9.1
Marital Status		
Married	705	81.4
Unmarried	54	6.2
Separated	107	12.4

**Table 2:** Mean, standard deviation, range of scores and percent of mean from maximum obtainable score for PRECEDE constructs (n=866)

Variables	Mean	SD	Range of Scores	Percent of mean
Knowledge	5.07	2.8	0-12	42.3
Attitude	37.09	6.7	11-55	59.3
Self-efficacy	25.30	8.2	10-50	38.3
Reinforcing factors	9.32	4.4	0-60	15.5
Enabling factors	32.01	5.6	10-50	55.1

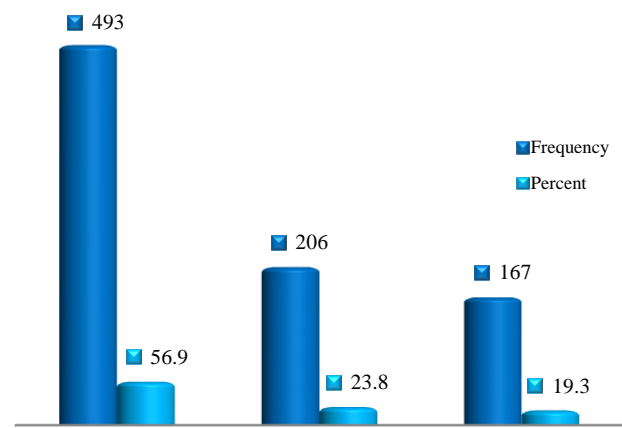
Regarding frequency of RPA status, a number of 493 women (56.9%) had light levels of physical activity, and 206 (23.8%) and 167 (19.3%) women had mediate and severe level of physical activity, respectively (Figure 2)

A path analysis revealed good fit of proposed model ( $\chi^2=14.62$ ,  $P=0.21$ , CFI=0.91, SRMR=0.7, RMSEA=0.21). The model explained 46% of variances observed. Knowledge ( $\beta=0.84$ ,  $P<0.001$ ), attitude ( $\beta=0.799$ ,  $P<0.001$ ), and self-efficacy ( $\beta=0.63$ ,  $P<0.001$ ) had a positive significant relation to predisposing factors, and knowledge had the greatest direct

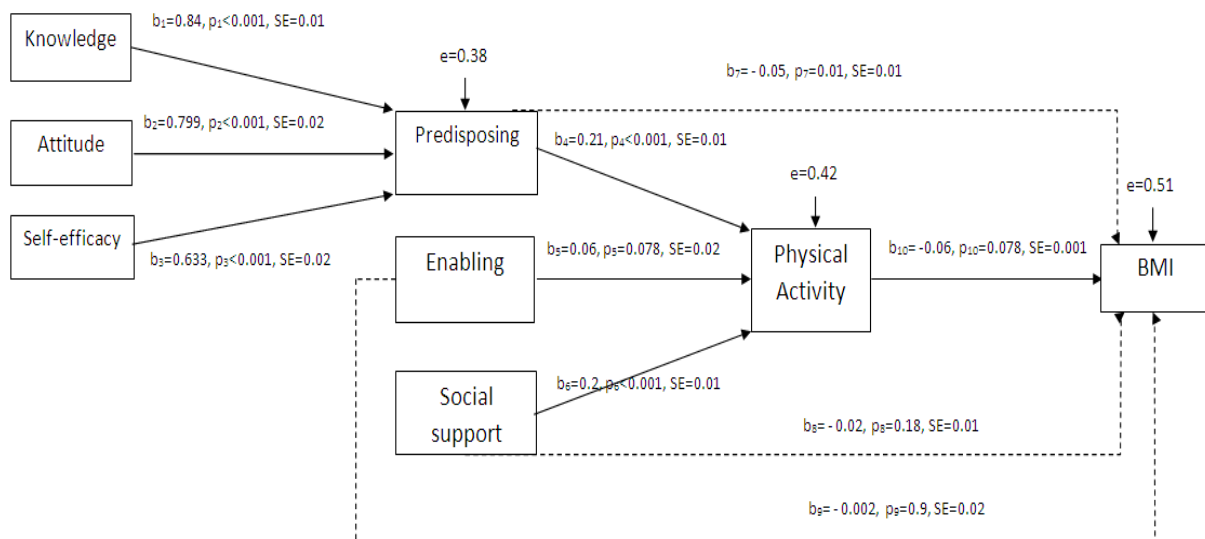
effect on predisposing Factor. In addition, predisposing ( $\beta=0.21$ ,  $P<0.001$ ) and social support as reinforcing factor ( $\beta=0.20$ ,  $P<0.001$ ) had positive significant effect on physical activity; while there was no significant relation between enabling factor and physical activity ( $\beta=0.06$ ,  $P=0.078$ ). Physical activity had no effect on BMI ( $\beta=0.06$ ,  $P=0.078$ , Figure 3). Correlation coefficient matrix of variables presented in Table 3.

**Table 3:** Pearson correlation coefficient matrix. Number at parenthesis is  $P$ -value at the 0.05 level.

Variables	1	2	3	4	5
1 Body mass index	1.000				
2 Physical Activity	-0.060	1.000			
3 Enabling	-0.010	0.210	1.000		
4 Social Support	-0.050	0.060	0.140	1.000	
5 Predisposing	-0.110	0.210	0.360	0.330	1.000



**Figure 2:** Frequency distribution of RPA levels among middle-aged women (n=866)



**Figure 3:** Path-analytic model of PRECEDE theory examining the direct effects of variables on body mass index

## Discussion

This study aimed to determine predictors of physical activity among middle-aged women in Hamadan City using Proceed Model. The results of this study showed that about 57% of middle-aged women in Hamadan were in light level or have not regular and enough physical activity. The rate of inactivity in the world is 58%, which is consistent with the findings of the present study<sup>24,25</sup>. In other studies, similar results have been reported<sup>22,26</sup>. Middle-aged women's behavioral performance was generally very poor and the design and implementation of educational interventions to promote the physical activity among these groups is necessary. According to the results of the path analysis of the PRECEDE Model in this study, the constructs of knowledge, attitude and self-efficacy were considered as predisposing factors of predicting physical activity among middle-aged women. Therefore, at first we ought to increase predisposing factors as knowledge and attitude and self-efficacy of physical activity among the middle-aged women in Hamadan City. In this regard, knowledge as a facilitator factor predicted physical activity for the elderly in Tehran<sup>19</sup>. Knowledge, attitude and subjective norms are predictive factors of intent to do postpartum physical activity among women<sup>27</sup>. Knowledge has been reported as a predictive factor of physical activity<sup>28</sup> which is confirmed by the current study. In other words, by increasing the knowledge, their

physical activity had increased. Therefore, educational interventions to increase middle-aged women's awareness about the benefits of physical activity are recommended.

In this study, attitude was considered as one of the predictive factors of physical activity in middle-aged women. Attitude was the predictive factor of women's physical activity<sup>22</sup>. Moreover, attitude has been reported as a predictor of physical activity<sup>29,30</sup>. Similar findings have been reported with the results of the present study<sup>27</sup>. In this study, despite the light level of physical activity, the women's attitude was assessed relatively favorable, which shows the gap between attitude and practice. It seems that factors such as lack of physical space and lack of financial and tool support by the family had an impact on this issue.

In this study, self-efficacy was considered as one of the predictive factors of physical activity among women. This finding is consistent with the results of similar studies<sup>3,7,19,21,31,32</sup>. In this study, self-efficacy related to physical activity in middle-aged women in Hamadan was assessed at light level. So planning should be increased self-efficacy in middle-aged women. We showed the least relation between enabling factor and physical activity, so we think, as the most middle-aged women had not knowledge and desirable attitude about physical activity, thus they did not think about enabling factors like existence of park or facilities for PA (physical activity). Likewise, the relation of PA with

BMI is effected with this low relation of enabling factors and PA.

Physical activity requires knowledge, skills and different sources. Middle-aged women must access required facilities in addition to have physical activity skills. Because it is difficult to provide all the requirements, so the promotion of women's self-efficacy is essential in this field. Study showed the other predictive factor of physical activity among women was social support. The role of social support in predicting physical activity has been emphasized<sup>20,33</sup>. According to findings, the perceived social support of middle-aged women was assessed very low for middle-aged women. It seems attention of family, friends and neighbors to support physical activity among women will be important to promote their activity level. This is a cross-sectional study with self-reporting of physical activity behavior considered as the limitations of the research.

## Conclusions

About 57% of total women were in light level or inactive or not sufficiently active. Recognition the predictors of physical activity among middle-aged women Hamadan help better planning and interventions to promote physical activity among them. Appropriate program should consider enhancing knowledge, attitude self-efficacy, and social support among middle-aged women in Hamadan.

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## Conflict of interest statement

There is no Conflict of interest with this paper.

## References

1. Ministry of Health and Medical Education. Guideline and action plan to provide menopause health Services for 45-60 years old women. Tehran: MOHME: 2014.
2. Statistical Center of Iran. Census of 2011 (middle-aged population). 2012; [cited 10 Murch, 2015]; Available form: www.amar.org .ir/portals/sarshomari90.
3. Janssen I, Powell LH, Kazlauskaitė R, Dugan SA. Testosterone and visceral fat in midlife women: the Study of Women's Health Across the Nation (SWAN) fat patterning study. *Obesity*. 2010;18(3):604-610.
4. Lewis TT, Everson-Rose SA, Sternfeld B, Karavolos K, Wesley D, Powell LH. Race, education, and weight change in a biracial sample of women at midlife. *Arch Intern Med*. 2005;165(5):545-551.
5. Baer HJ, Glynn RJ, Hu FB, Hankinson SE, Willett WC, Colditz GA, et al. Risk factors for mortality in the nurses' health study: a competing risks analysis. *Am J Epidemiol*. 2011;173(3):319-329.
6. Eliassen AH, Hankinson SE, Rosner B, Holmes MD, Willett WC. Physical activity and risk of breast cancer among postmenopausal women. *Arch Intern Med*. 2010;170(19):1758-64.
7. Barg CB LA, Pomery EA, Rivers SE, Rench TA, Prapavessis H, et al. Examining predictors of physical activity among inactive middle-aged women: An application of the Health action process approach. *Psychol Health*. 2012;27(7):829-845.
8. Centers for Disease Control and Prevention. Behavioral risk factor surveillance system survey data. Atlanta: CDC; 2005. .
9. World Health Organization. Prevalence of insufficient physical activity. WHO; 2010; [cited 10 Murch, 2015]; Available from: [http://www.who.int/gho/ncd/risk\\_factors/physical\\_activity\\_text/en/](http://www.who.int/gho/ncd/risk_factors/physical_activity_text/en/)
10. Sheikholeslam R MA, Mohammad K, Vaseghi S. Non-communicable Disease risk factors in Iran. *Asia Pac J Clin Nutr*. 2004;13(Sppl):125-130.
11. Barati M, Allahverdipour H, Hidarnia A, Niknami S, Bashirian S. Belief-based tobacco smoking scale: evaluating the psychometric properties of the Theory of Planned Behavior's Constructs. *Health Promot Perspect*. 2015;5(1):59-71.
12. Conner M, Norman P. Predicting health behaviour. New York: McGraw-Hill; 2005.
13. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: theory, research, and practice: New York: John Wiley & Sons; 2008.
14. Speck BJ, Harrell JS. Maintaining regular physical activity in women: evidence to date. *J Cardiovasc Nurs*. 2003;18(4):282-293.
15. Tavares LS, Plotnikoff RC. Not enough time? Individual and environmental implications for workplace physical activity programming among women with and without young children. *Health Care Women Int*. 2008;29(3):244-281.
16. Barnett F, Spinks WL. Exercise self-efficacy of postmenopausal women resident in the tropics. *Maturitas*. 2007;58(1):1-6.
17. Janssen I, Dugan SA, Karavolos K, Lynch EB, Powell LH. Correlates of 15-year maintenance of physical activity in middle-aged women. *Int J Behav Med*. 2014;21(3):511-518.
18. Barg CJ, Latimer AE, Pomery EA, Rivers SE, Rench TA, Prapavessis H, et al. Examining predictors of physical activity among inactive middle-aged women: An application of the health action process approach. *Psychol Health*. 2012;27(7):829-845.
19. Salehi L TM, Ghasemi H, Shekarvash B. Study the facilitators and barriers in performing physical activity in older adult in Tehran. *Iran J Epidemiol*. 2010;6(2):7-15.
20. Anderson ES WJ, Winett RA, Williams DM,. Social Cognitive Determinants of physical activity : The influence of Social Support ,Self-Efficacy, Outcome Exepectations, and Self-Regulation among Participants in a church-Based Health Promotion Study. *Health Psychol*. 2006;25(4):510-520.
21. McAuley E JG, Elavsky S, Marquez DX, Ramsey SN. Predicting long-term maintenance of physical activity in older adults. *Prev Med*. 2003;37:110-118.
22. Hazavehie SMM, Otogara M, Moeini B, Roshanaei G, Kafami V. Physical activity and its related factors among female employees: applying BASNEF model. *J Res Health*. 2013;3(4):551-557.
23. Green LW, Kreuter MW. Health program planning: An educational and ecological approach: New York: McGraw-Hill; 2005.
24. United States Department of Health and Human Services. *Physical Activity*. Washington, D.C.: HHS; 2008.
25. Tucker JM WG, Beyler NK. Physical activity in U.S. Adults compliance with the physical Activity Guidelines for Americans. *Am J Prev Med*. 2011;40 (4):454-461.

26. Jalilian F, Emdadi S, 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. *Toloeh Danesh*. 2011;4(30):89-98. [Persian]
27. Ouji Z, Barati M, Bashirian S. Application of BASNEF Model to Predict Postpartum Physical Activity in Mothers Visiting Health Centers in Kermanshah. *J Edu Commun Health*. 2014;1(3):54-62.
28. Emami SR, Eftakhar Adabili H, Golestan B. Effect of health education Intervention on physical Activity Knowledge, Attitude and Behavior in Health Volunteers. *J Faculty of Nursing and Midwifery Tehran University of Medical Sciences*. 2010;16(3-4):48-55. [Persian]
29. Armitage CJ. Can the theory of planned behavior predict the maintenance of physical activity? *Health Psychol*. 2005;24(3):235-245.
30. Hagger MS CN, Biddle SJ. . The influence of autonomous and controlling motives on physical activity intention within the theory of planned behavior. *Be J Health Psychol*. 2002;7(3):283-97.
31. Hashemi SZ, Rakhshani F, Keykhaei R, Zareban I, Tizvir A. Relationship between self-efficacy with physical activity stages of change in housewives. *J Res Health*. 2013;3(2):363-369.
32. Solimani A, Niknami S, Hajizadeh I, Shojaezadeh D, Tavousi M. Predictors of physical activity to prevent osteoporosis based on extended health belief model. *Journal of the Institute for Health Sciences*. 2014;13:313-320. [Persian]
33. Booth ML ON, Bauman A, Clavisi O, Leslie E. Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Prev Med*. 2000;31:15-22.
34. IPAQ Research Committee IR. Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ)—short and long forms. Retrieved September. 2005;17:2008.