

## The Application of the Transtheoretical Model to Identify Physical Activity Behavior in Women

### Abstract

**Background:** The low level of physical activity is a risk factor behind several chronic diseases. Evidence shows the level of physical activity is decreasing, especially in women. This study aimed to apply the transtheoretical model to identify physical activity behavior in women who referred to health centers of Isfahan. **Materials and Methods:** This cross-sectional study was carried out among 400 women in Isfahan's health centers. Data were collected using a questionnaire including demographic factors, the standard of exercise behavior, stages-of-change questionnaire, processes of change, self-efficacy, and decisional balance. Data were analyzed with the Statistical Package for the Social Sciences (SPSS) (version 16). Descriptive statistics, the Mann-Whitney test, one-way analysis of variance (ANOVA), and Pearson correlation were used. **Results:** The mean (SD) of age was 31.46 (8.92); 81.5% of women were housewives and the others employees. The mean score of physical activity per day for women was 10.66 min. Ninety-six persons (24%) were classified in the pre-contemplation stage, 100 (33.3%) in the contemplation stage, 102 (25.5%) in the preparation stage, 29 (7.2%) in the action stage, and 40 (10%) in the maintenance stage. The results showed the stages of change significantly correlated with the decisional balance ( $P = 0.04$ ), processes of change, and self-efficacy ( $P < 0.01$ ). **Conclusions:** With regard to the low level of physical activity in women and the role of the stages-of-change model in determining effective factors behind behavior, there should be an attempt to develop continuous and organized educational programs to promote physical activity in women by using the transtheoretical model.

**Keywords:** Iran, physical activity, transtheoretical model, women

### Introduction

One consequence of improvement in technology is decrease in people's physical activity.<sup>[1]</sup> Inactivity leads to several chronic diseases such as hypertension, cardiac disease, diabetes, and cancer.<sup>[2,3]</sup> In contrast, adequate physical activity leads to an increase in high-density lipoproteins (HDL) and reduction in triglycerides (TG).<sup>[3]</sup> Regular physical activity improves physical and mental health.<sup>[4]</sup> Physical activity also has an effective role in decreasing the mortality rate and some diseases.<sup>[5]</sup>

Findings from a national survey on Iranian adults indicate that more than 80% of the population is inactive.<sup>[6]</sup> Another grave problem of physical activity lies in differences in levels of different groups' physical activity, i.e., physical activity in women is less than that in men.

An epidemiological survey on an urban population of Yazd indicated that the prevalence of inactivity is 65.8%; i.e.,

54.4% among women.<sup>[7]</sup> Nikpour (2004) has declared that, out of 393 women, 22.4% were active and 77.6% inactive. Out of 88 active individuals, 12.2% got light and regular exercise and 10.2% got heavy and regular exercise.<sup>[8]</sup> The Healthy Heart Program in the province of Isfahan showed physical activity was not appropriate among women.<sup>[9]</sup>

Because the rate of physical activity among women is not enough and there is no precise statistics according to the WHO criteria, application of an exploratory model for identifying physical activity and its related effective factors appears to be necessary for appropriate planning and improving physical activity among them.

Among the exploratory models, the transtheoretical or stages-of-change model is used to identify behavior.<sup>[10]</sup>

One of the exclusive characteristics of this model is determining the categories of individuals in the following five stages:

**How to cite this article:** Pirzadeh A, Mostafavi F, Ghofarnipour F, Mansourian M. The application of the transtheoretical model to identify physical activity behavior in women. Iranian J Nursing Midwifery Res 2017;22:299-302.

**Received:** August, 2014. **Accepted:** December, 2016.

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**Website:** [www.ijnmrjournal.net](http://www.ijnmrjournal.net)

**DOI:** 10.4103/1735-9066.212979

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- Pre-contemplation: Individuals do not change their behavior now or later (up to 6 months)
- Contemplation: They will clearly change their behavior in the far future (until 6 months)
- Preparation: They will change their behavior in the near future (generally 30 days)
- Action: They will clearly change their behavior until 6 months
- Maintenance: They will try to prevent a relapse (usually up to 6 months).<sup>[11]</sup>

The second structure of the model is the processes of change with activities, processes, and strategies helping individuals move through the stages of change. These processes are divided into two categories, namely, cognitive processes (including consciousness raising, dramatic relief, environmental re-evaluation, social liberation, and self-re-evaluation) and behavioral processes (including counter-conditioning, stimulus control, helping relationships, reinforcement management, and self-liberation). Another structure is decisional balance to identify perceived pros (benefits) and cons (barriers) of physical activity. It is assumed that people do not intend to change until pros of behavior become more than its cons.

The ultimate structure is self-efficacy, having the ability to perform physical activity. Clearly, majority of studies have been conducted on students and diabetics,<sup>[12-14]</sup> however, nothing has been performed on women who referred to Isfahan's health centers to determine their level of physical activity by applying the transtheoretical model thus far. Thus, this study attempts to achieve this goal.

## Materials and Methods

The present study is a descriptive-analytic study. It was conducted among 400 women who referred to Isfahan's health centers during 2012–2013. Because Isfahan is divided into 14 city areas, one health center was selected from each area. Then, the proportional-categorical sampling method was conducted among women. The inclusion criteria were as follows: Following no specific medical activity, being literate, not being pregnant, and having no mental or physical disease.

After informed consent was obtained, questionnaires were completed by educated people in an interview. In addition to demographic information, the following questionnaires were completed: The first questionnaire evaluated weekly exercise and physical activity. The second questionnaire was a Stages-of-Exercise-Change Questionnaire (SECQ), developed by Marcus *et al.*<sup>[15]</sup> The third questionnaire concerned the cognitive and behavioral processes. It included 30 questions (1–15 covered cognitive strategies and 16–30 clarified behavioral strategies). The choices were “never,” “rarely,” “occasionally,” “often,” and “usually.” They were scored from 1 to 5, respectively.<sup>[16]</sup> The fourth

questionnaire was the decisional-balance questionnaire. It included 10 items and had 5 scales (1 as “extremely important” and 5 as “not important”), which were scored from 1 to 5 points.<sup>[17]</sup> The fifth questionnaire was self-efficacy and included 6 items and 5 scales (from 1 as “not confident” to 5 as “very confident”).<sup>[18]</sup> Reliability was determined by Cronbach's alpha, the scores of alpha were as follows: For exercise behavior 88%, stages of change 92%, processes of change 78%, decisional balance 82%, and self-efficacy 85%. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, IL, USA). The frequency distribution was used to classify the participants in 5 stages from pre-contemplation to maintenance. The data were analyzed using descriptive statistics including mean (SD) and frequency. Furthermore, analytic statistics such as one-way analysis of variance (ANOVA) test was used to compare the means of processes of change, structures, and self-efficacy. The Mann–Whitney test was utilized to compare the qualitative data with the structure of the stages of change. Finally, Pearson's correlation was used to determine the quantitative correlation of demographic items such as age with the physical-activity rate. The statistical significance was set at  $P < 0.05$ .

## Ethical considerations

The objectives of the study were explained to all participants and all of them accepted to participate and were assured of the confidentiality of their individual information as well as the voluntary nature of participating in the study.

## Results

Four-hundred women with the mean (SD) age of 31.46 (8.92) participated in this study. Among them, 327 participants (81.75%) were housewives. Concerning the educational level, 18.4% of women were illiterate and the rest had a diploma or higher degrees. Ninety-six women (24%) were classified in the pre-contemplation stage, 100 (33.3%) in the contemplation stage, 102 (25.5%) in the preparation stage, 29 (7.2%) in the action stage, and 40 (10%) in the maintenance stage. The mean (SD) time of physical activity per day was 10.66 (23.82) minutes. The mean of weekly heavy exercise was 0.16 (1.73), moderate exercise 0.34 (1.22), and light exercise 0.44 (1.40) minutes.

One-way ANOVA showed there was a significant difference between age and the stages of change so that the older individuals were placed in the primary stages of the model ( $P = 0.002$ ).

One-way ANOVA revealed that there was a significant difference between the stages-of-change model and processes of change. The individuals placed in higher structures of the stages of change used the processes

of change (cognitive and behavioral) more in this manner. There was a significant difference between the stages of change and processes of change. There was an insignificant increase in the mean of the processes of change in the self-re-evaluation structure and stimulus control in the stages of change, however, this difference was insignificant ( $P = 0.07$  and  $P = 0.14$ ) [Table 1]. The means of self-efficacy in the different stages of change were as follows: Pre-contemplation 44.92 (17.65), contemplation 46.83 (16.82), preparation 47.71 (14.16), action 54.31 (20.43), and maintenance 63.23 (20.71). The means of the self-efficacy structure increased from pre-contemplation to maintenance and led to a significant statistical difference between the stages of change and self-efficacy ( $P < 0.001$ ). The highest rate of self-efficacy was in action and maintenance, showing that the more self-efficacy people have, the more likely it is that they tend to do physical activity. The means (SD) of the decisional-balance structure in the different stages of change were as follows: Pre-contemplation 55.35 (13.60), contemplation 58.00 (13.34), preparation 59.36 (13.16), action 60.76 (14.98), and maintenance 62.55 (11.87). According to the findings of this research, there was a statistically significant difference between the stages of change and decisional balance ( $P < 0.03$ ).

Moreover, the pros increased from pre-contemplation to maintenance, and this difference was significant ( $P < 0.001$ ). However, no clear decreasing trend existed in the cons ( $P < 0.06$ ).

## Discussion

This study revealed that the physical activity of participating women was not adequate and the mean of physical activity in the daytime was 10.66 (23.82). Unfortunately, this rate is significantly less than the rate recommended by the American Disease Control Center, which suggested that all individuals should preferably have at least 30 minutes' moderate physical activity on most of the weekdays.<sup>[10]</sup>

In addition, only 17.25% of the individuals were placed in the action and maintenance stages (active group). This result was consistent with Pirzadeh's study.<sup>[19]</sup> In this study, there was a significant difference between age and the stages of change, with more young people in the action and maintenance stages. In Mori's study, only 10.5% of women in the 45–65 age range were placed in the action and maintenance stages. Seemingly, with aging, women's level of physical activity decreases.<sup>[20]</sup> In Sit's study, performed among women in the 30–59 age range, only 20% were in the active group.<sup>[21]</sup> Considering the role of physical activity in women's health and the low rate of physical activity in this group, there should be systematic and developed planning for motivating these individuals to do physical activity.

The results showed that the individuals' progress in the stages of change was accompanied by the increased use of the processes of change because the individuals went through the stages with the processes of change. This is consistent with other studies.<sup>[22]</sup>

The results also imply that there is a significant statistical relationship between the stages of change and decisional balance. In this relationship, the means of the pros increase as the individuals move from pre-contemplation to maintenance.

In fact, the more people understand the advantages of physical activity, the more they tend towards the action and maintenance stages. This has been reported in another study.<sup>[23]</sup>

No clear decreasing trend in the cons in the processes of change was observed. The role of the cons in moving the individuals towards the action was more effective. This has been noted in Mostafavi's study, where pros did not correlate with other structures.<sup>[24]</sup>

It was time-consuming to complete the questionnaires. Because this study was conducted only on women who had referred to health centers and was restricted to urban areas, it is necessary to perform comprehensive research among

**Table 1: The relationship between the stages of change and the processes of change**

Processes of Change	Stages of change					P
	Pre-contemplation Mean (SD)	Contemplation Mean (SD)	Preparation Mean (SD)	Action Mean (SD)	Maintenance Mean (SD)	
Consciousness Raising	41.25 (17.58)	48.52 (18.45)	51.57 (17.09)	57.07 (20.95)	60.67 (19.34)	0.0005
Dramatic Relief	66.25 (19.72)	68.37 (20.59)	73.46 (17.55)	71.03 (16.36)	79.00 (18.96)	0.002
Environmental Re-evaluation	65.33 (21.23)	66.82 (19.48)	73.33 (17.04)	73.10 (16.85)	87.33 (14.47)	0.001
Social Liberation	78.05 (23.93)	80.45 (19.39)	84.31 (19.87)	89.19 (8.57)	94.67 (8.57)	0.001
Self-re-evaluation	74.03 (21.57)	71.28 (19.51)	71.96 (18.20)	76.55 (15.60)	79.33 (16.60)	0.075
Counter-conditioning	44.86 (21.22)	47.27 (19.16)	47.32 (18.15)	62.30 (18.02)	64.17 (16.03)	0.001
Stimulus Control	48.12 (23.26)	52.13 (17.58)	48.32 (21.68)	59.77 (22.71)	54.33 (20.95)	0.144
Helping Relationships	66.12 (22.76)	71.63 (19.48)	72.48 (18.82)	81.15 (15.44)	87.00 (14.30)	0.001
Reinforcement Management	58.16 (22.93)	61.30 (19.82)	63.07 (17.72)	74.02 (16.94)	80.33 (18.61)	0.001
Self-liberation	45.83 (24.22)	47.62 (20.45)	47.25 (20.45)	61.61 (21.13)	72.33 (23.56)	0.001

One-way ANOVA was used in table.



women from other provinces, particularly those from rural areas.

## Conclusion

It is necessary to develop some regular educational plans to promote physical activity among women. Physical activity prevents and treats lots of diseases in women. Moreover, the role of the stages-of-change model in identifying parameters affecting behaviors must be considered.

## Acknowledgment

Our special thanks are given to the assistant director of student research committee and all the individuals who have helped us in this effort.

## Financial support and sponsorship

Student research committee of Isfahan University of Medical Sciences (project number 191001).

## Conflicts of interest

There are no conflicts of interest.

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