

## Association of Trans-theoretical Model (TTM) based Exercise Behavior Change with Body Image Evaluation among Female Iranian Students

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### Abstract

#### Background

Body image is a determinant of individual attractiveness and physical activity among the young people. This study was aimed to assess the association of Trans-theoretical model based exercise behavior change with body image evaluation among the female Iranian students.

#### Materials and Methods

This cross-sectional study was conducted in Sanandaj city, Iran in 2016. Using multistage sampling method, a total of 816 high school female students were included in the study. They completed a three-section questionnaire, including demographic information, Trans-theoretical model constructs and body image evaluation. The obtained data were fed into SPSS version 21.0.

#### Results

The results showed more than 60% of participants were in the pre-contemplation and contemplation stages of exercise behavior. The means of perceived self-efficacy, barriers and benefits were found to have a statistically significant difference during the stages of exercise behavior change ( $P<0.05$ ). Moreover, there was a significant correlation between the stages of exercise behavior change and fitness evaluation, fitness orientation, subjective weight and body areas satisfaction subscales ( $P<0.05$ ). The interaction effect of self-efficacy and body image on exercise behavior were reported to be statistically significant ( $P<0.05$ ).

#### Conclusion

The findings of this study indicated poor physical activity and effect of body image on doing exercise. Body image and designing interventions to promote exercise behavior are suggested to be taken into account.

**Key Words:** Adolescent, Body Image, Iranian students, Physical Activity, Trans-theoretical Model.

\*Please cite this article as: Rostami S, Fallahi A, Pashaei T, Roshani D. Association of Transtheoretical Model (TTM) based Exercise Behavior Change with Body Image Evaluation among Female Iranian Students. Int J Pediatr 2017; 5(3): 4613-23. DOI: [10.22038/ijp.2017.21152.1776](https://doi.org/10.22038/ijp.2017.21152.1776)

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Received date Dec.23, 2016; Accepted date: Jan.22, 2017.

## 1- INTRODUCTION

Physical inactivity is the fourth leading cause of mortality, which is followed by approximately two million deaths worldwide (1). According to the statistics of World Health Organization (WHO), 22% of deaths occur due to cardiovascular diseases and 10-16% of deaths are associated with colon and breast cancer and diabetes mellitus resulting from physical inactivity. Physical inactivity is a key factor threatening the health and causing the epidemic of non-communicable diseases (2). On the other hand, doing regular physical activities reduces the risk of cardiac diseases, stroke, hypertension, diabetes, cancers, osteoporosis and depression, and plays a pivotal role in balancing the energy, controlling the weight, increasing life-expectancy and promoting life quality and self-efficacy (3-4).

The physical activity model of adolescent girls is more alarming than that of the boys due to lower physical activity (5). LaFontaine carried out a study in 2008 and reported that the physical activity level among female adolescents was reduced from 41.5%, in 2012 to 33% in 2005 (6). The results of studies in Iran are indicative of low physical activity and unwillingness of the youth to do exercise (7-8). A study showed that only 36% of 12-17 year-old Iranian girls were in an acceptable level of physical activity compared with 61.5% of male counterparts at the same age (9).

Body image is one of the psychological factors affecting physical activity. Body image, a central concept in health psychology (10), involves perceived experiences and personal and cultural attitudes of an individual toward his/her own body. This factor is of great significance in self-evaluation, personal growth and life quality (11), sense of self-esteem, evaluation of social relations (12), and promotion of psychological health in the people, especially adolescent girls (13).

Studies have shown that the people dissatisfied with their body image experience by far higher levels of depression and social anxiety (14), cigarette and alcohol consumption (15), and eating disorder and physical inactivity (16). Several studies have confirmed the effect of body image on exercise (16-17). Other studies have evaluated the association of life quality (11), gender (13), cultural pressures (18) and self-esteem (19), with body image; but not the association of body image with stages of exercise behavior change based on Trans-theoretical model (TTM).

Trans-theoretical model (TTM), has been extensively used to promote exercise activities (20-21). The constructs of this model include stages of change (Pre-contemplation, Contemplation, Preparation, Action and Maintenance), change processes, decisional balance (perceived benefits and barriers), and self-efficacy (fulfillment of requirements). The questioned answered in this study include: How much is the mean body image in each stage of exercise behavior change? How does body image interact with self-efficacy in doing exercise?

In general, considering the high prevalence of physical inactivity among the female adolescents and importance of exercise among them (22), the role of physical activity in reducing psychological ailments(1), global increase of physical inactivity (23), significance of body image as a vital health factor for the youth (22), and scarcity of studies on the correlation of body image with stages of exercise behavior change, this study was carried out to investigate the association of body image evaluation with stages of exercise behavior change based on Trans-theoretical model among the female Iranian students.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

This cross-sectional study was performed in Sanandaj city, Kurdistan province, North West of Iran in 2016 (**Figure.1**). In questionnaire studies, determination of sample size was related to variables that are measured. Then in this study ten subjects were considered for each variable. Using multistage sampling technique, 816 high school female students in Sanandaj city, were included in the study. First, from among 40 high schools, 10 high schools were selected through systematic random sampling. Then, several classes were chosen from among the classes of each school by simple random sampling, and proportional to the size of each class, a proportion of students was selected by simple random sampling to complete the questionnaire.

## 2-2. Methods

The corresponding author distributed the questionnaires among the students at 9:00 AM and 2:00 PM. The questionnaires were checked for being completed, and in case they were incomplete, they were returned to be completed. All students (100%), were willing to take part in the study and completed the questionnaires in spring, 2016. It should be noted that the questionnaire took 15-20 minutes to complete.

## 2-3. Measuring tools: validity and reliability

Data were collected by a three-part questionnaire. The first part (1): included demographic information (such as age, weight, height, family income and membership in a sports club), the second part (2) consisted of 57 items, 4 constructs of Trans-theoretical model, that **A**) the self-efficacy construct included 10 items (four-point Likert scale, reliability of 95%, validity of 0.81 and cutting point of 20); **B**) perceived barriers construct included 14 items (five-point Likert scale, reliability of 87%, validity of 0.8, and cutting point of 35); **C**) perceived benefits construct

involved 29 items (five-point Likert scale, reliability of 94%, validity of 0.93 and cutting point of 72.5) ; **D**) four items of stages of exercise behavior change (kappa coefficient 0.78)(24-25), and the third part (3): comprised of a multi-dimensional body image scale.

The body image variable included 46 items with six dimensions, including **A**) appearance evaluation included 7 items (five-point Likert scale, reliability of 85%, validity of 0.81 and cutting point of 17.5); **B**) appearance orientation included 12 items (five-point Likert scale, reliability of 95%, validity of 0.83 and cutting point of 30); **C**) fitness evaluation included 3 items (five-point Likert scale, reliability of 95%, validity of 0.82 and cutting point of 7.5); **D**) fitness orientation included 13 items (five-point Likert scale, reliability of 95%, validity of 0.82 and cutting point of 37.5); **E**) subjective weight included 2 items (five-point Likert scale, reliability of 95%, validity of 0.83 and cutting point of 5); and **F**) body areas satisfaction included 9 items (five-point Likert scale, reliability of 95%, validity of 0.82 and cutting point of 22.5(26).

## 2-4. Ethical consideration

Having taken permission from Kurdistan University of Medical Sciences and Education Department of Sanandaj, as well as written informed consent from the authorities and students, the data collection was initiated.

## 2-5. Inclusion and exclusion criteria

The inclusion criteria comprised of studying in high school, being a resident of Sanandaj city, and being willing to participate in the study. The exclusion criterion, however, was the age less than 14 and over 18 years.

## 2-6. Data Analyses

The collected data were fed into SPSS version 21.0 software and analyzed by descriptive statistics (frequency, mean and

standard deviation), and inferential statistics (Kruskal-Wallis to analyze body image subscales with stages of exercise behavior change, Mann-Whitney to analyze relationship between history of membership in sports club and all subscales of body image, Spearman correlation coefficient to analyze relationship between body image subscales and ordinal regression analysis to determine of exercise behavior based on constructs of Trans-theoretical Model (TTM), and body image subscales). The normality of data was determined by Kolmogorov-Smirnov test. P-value less than 0.05 were significant.



Fig.1: The location of Kurdistan province

### 3. RESULTS

The means of age, height and weight of the female participants in this study were  $16.6 \pm 1.29$ , years old,  $164.7 \pm 6.4$  cm, and  $56.6 \pm 9.08$  kg, respectively. Of the students, 50% evaluated their family income status to be good, and 50.3% of them had a history of membership in a sports club. The results of Mann-Whitney test showed a significant relationship between history of membership in sports club and all subscales of body image except appearance orientation ( $P < 0.05$ ).

The mean scores of body image subscales in the students with a history of membership in sports club were higher ( $P = 0.03$ ). The findings of Kruskal-Wallis test indicated a statistically significant relationship between family income and all body image subscales except appearance status and appearance orientation ( $P < 0.05$ ). Students with high family income reported a very high score for body image. The results of Spearman correlation coefficient showed a statistically significant correlation between subjective weight and body areas satisfaction ( $r = 0.361$ ,  $P = 0.04$ ), height and appearance evaluation subscales ( $r = 0.421$ ,  $P = 0.03$ ), fitness orientation ( $r = 0.465$ ,  $P = 0.03$ ), and subjective weight ( $r = 0.259$ ,  $P < 0.02$ ), respectively.

Further, 254 (31.1%) students were in the pre-contemplation stage of exercise behavior, 288 (35.3%) were in the contemplation stage, 126 (15.4%) were in the preparation stage, 68 (8.3%) were in the action stage and 80 (9.8%) were in the maintenance stage of exercise behavior. The means of self-efficacy and perceived barriers and perceived benefits showed a significant difference ( $P < 0.05$ ), so that all three variables were on the rise during the stages of exercise behavior. **Table.1** demonstrates the Spearman correlation coefficient between the body image subscales. Appearance evaluation had a significantly direct correlation with all subscales except subjective weight ( $P < 0.05$ ). Subjective weight had a significantly reverse correlation with appearance orientation ( $r = 0.083$  and  $P < 0.05$ ).

The findings of Kruskal-Wallis showed a significant relationship between the stages of exercise behavior change and fitness evaluation, subjective weight, body areas satisfaction subscales. **Table.2** illustrates the correlation of body image subscales with stages of exercise behavior change. Appearance evaluation and appearance

orientation showed no significant difference during the stages of exercise behavior change. **Table.3** shows the exercise behavior prediction based on the body image subscales and perceived self-efficacy, barriers and benefits constructs through ordinal regression analysis. Perceived barriers with a coefficient of 1.33 had the maximum effect on the dependent variable ( $P<0.05$ ). Based on the results, the higher was the perceived

barriers and body areas satisfaction and the better was appearance evaluation, the less was exercise behavior. **Table.4** indicates the interaction effect of self-efficacy and body image on stages of exercise behavior change in the female students of Sanandaj city. The results showed that the interaction effect of self-efficacy and body image, increased exercise behavior ( $P<0.05$ ).

**Table 1:** The correlation coefficient between body image subscales

Body areas satisfaction	Subjective weight	Fitness orientation	Fitness evaluation	Appearance orientation	Appearance evaluation	Body image subscales
Appearance evaluation	1					
Appearance orientation	0.478*	1				
Fitness evaluation	0.463*	0.270*	1			
Fitness orientation	0.369*	0.228*	0.496*	1		
Subjective weight	-0.046	-0.083*	-0.047	0.020	1	
Body areas satisfaction	0.437*	0.243*	0.254*	0.237*	0.048	1

\* $P<0.05$  (tow-tailed).

**Table-2** Mean and SD of body image subscales with stages of exercise behavior change among female students

Body image subscales	Stages	Mean scores	SD	P-value
Appearance evaluation	Pre-contemplation	401.5	8.89	0.052
	Contemplation	384.1	9.96	
	Preparation	427.4	9.39	
	Action	440.0	10.23	
	Maintenance	461.4	10.89	
Appearance orientation	Pre-contemplation	409.12	4.23	0.557
	Contemplation	396.64	6.23	
	Preparation	435.15	3	
	Action	390.86	9.14	
	Maintenance	422.21	9.56	
Fitness evaluation	Pre-contemplation	366.86	32.12	0.001
	Contemplation	376.64	36.35	
	Preparation	464.77	42.85	
	Action	468.45	63.2	
	Maintenance	517.95	46.2	

Fitness orientation	Pre-contemplation	334.96	65.23	0.001
	Contemplation	395.91	66.56	
	Preparation	429.93	73.68	
	Action	528.45	65.41	
	Maintenance	551.62	52.89	
Subjective weight	Pre-contemplation	354.16	23.12	0.001
	Contemplation	453.84	25.96	
	Preparation	388.78	27.45	
	Action	428.12	31.21	
	Maintenance	432.18	21.54	
Body areas satisfaction	Pre-contemplation	397.27	13.12	0.023
	Contemplation	391.62	11.23	
	Preparation	424.77	11.38	
	Action	403.34	15.56	
	Maintenance	483.67	14.23	
Overall body image	Pre-contemplation	357.29	50.23	0.001
	Contemplation	382.86	46.28	
	Preparation	443.97	49.94	
	Action	496.91	49.54	
	Maintenance	532.39	52.14	

SD: Standard deviation.

**Table-3:** Prediction of exercise behavior based on constructs of TTM and body image subscales

Predictive variables	Test statistic( t)	Coefficients	P-value
Appearance evaluation	1.64	-0.335	0.104
Appearance orientation	5.22	0.568	0.022
Fitness evaluation	0.609	0.098	0.435
Fitness orientation	1.462	0.351	0.227
Subjective weight	0.082	0.131	0.109
Body areas satisfaction	0.211	-0.047	0.646
Perceived benefits	0.020	0.082	0.887
Perceived barriers	13.89	-1.332	0.001
Perceived self-efficacy	34.61	0.711	0.001

**Table-4:** Interaction of self-efficacy and body image on exercise behavior in female students

Predictive variables	Test statistic	Coefficients	P-value
Perceived self-efficacy	4.886	0.510	0.273
Body image	1.198	0.703	0.274
Interaction effect of self-efficacy and body image	2.63	0.335	0.027

#### 4- DISCUSSION

This study was aimed to assess the relationship between Trans-theoretical model-based exercise behavior change and body image evaluation among the female students of Sanandaj city, Iran. The results showed that 81.8% of participants had no exercise activity and 64.4% of them were in the pre-contemplation and contemplation stages of exercise behavior. In line with the results of the present study, the study of Wakui et al. on the Japanese women indicated that about 66% of them were in pre-contemplation and contemplation stages and 3.8% were in the maintenance stage of exercise behavior (27). Lack of knowledge about the benefits of exercise behavior, low perceived sensitivity about and intensity of the diseases due to physical inactivity, spending time on school/university entrance examination, low exposure to active exercise models at home and school, cultural limitations, shortage of appropriate sports facilities for the girls, low access to sports clubs, low motivation, commitment and self-efficacy of students in doing exercise behavior, lack of appearance and fitness orientation and shortage of promoters of exercise behavior among the girls can be the factors involved in placing the girls in the primary stage of exercise behavior change. These results draw the attention of the managers, policymakers and authorities to female health domain.

The results of this study showed a significant difference for the mean score of perceived barriers during the stages of exercise behavior change. The maximum and minimum scores of perceived barriers were reported for the maintenance and pre-contemplation stages of exercise behavior. In contrast with our findings, a study showed that the mean score of perceived barriers was reduced with a rise in stages of exercise behavior change (28). A possible reason for the difference between

the results of the present study and those of similar studies is lower mean age of the samples in this study than that of other studies; as Arzu et al. reported that perceived barriers were associated with age changes (29). Another possible reason for this difference is that the people with exercise activities, especially those with professional exercise activities encounter numerous barriers during activity and their perception of barriers is enhanced. It can be argued that the people with no exercise activity are unaware of the barriers and shortages ahead of exercise behavior.

The mean perceived benefits during the stages of exercise behavior change showed a statistically significant difference. The increased perceived benefits moving from preoperational to operational stage are in accordance with the principles of Prochaska's theory of change (30). The significant increase of perceived benefits in the maintenance stage in this study indicated that the samples who were in pre-contemplation stage, had a lower perception of the benefits of exercise (such as sense of success, increased power, stress relief and appropriate appearance achievement), than those who were in the action and maintenance stages of exercise behavior. On the other hand, those who were in the action and maintenance stages of exercise behavior experienced more benefits of exercise behavior like fitness and physical health; therefore, they had a better perception of the benefits of exercise behavior.

The self-efficacy of the participants in this study during the stages of exercise behavior change indicated a significant difference. In agreement with our findings, Dumith et al.(31), Tung et al.(32), Lee (33), Kim (34), and Prapavessive et al. (35), reported that self-efficacy would increase by moving toward higher stages of exercise behavior change. According to Health Belief Model, self-efficacy is a prerequisite to behavior change (36). Since

successful behavior enhances self-efficacy, it can be argued that the people who are in higher stages of exercise behavior have a higher self-efficacy owing to successful experiences in performing the behavior. Determining definite objectives for exercise activity in female adolescents, presence of reference models (friends and other important people) in exercise behavior, enlivening the exercise activities as well as encouragement and motivation can increase self-efficacy.

The results of this study demonstrated a significant relationship between the fitness evaluation, fitness orientation, subjective weight and body areas satisfaction subscales and stages of exercise behavior change. In all above subscales, the maximum and minimum ranks of body image were reported for the maintenance and pre-contemplation stages, respectively. Moreover, body image was one of the factors involved in doing exercise among the girls. In line with our findings, Johnson et al. (16), reported that the people who were in the action stage of exercise behavior, had a better body image and satisfaction than those who were in pre-contemplation and contemplation stages of exercise behavior. In the present study, body areas satisfaction was a significant factor involved in the placement of samples in the action stage (16). However, in the studies by Brudzynski and Ebben and Tiggemann and Williamson, dissatisfaction with body image led to more exercise in the samples (37-38).

In the above study, the body image rate in each stage of exercise behaviour change and differences of these stages with each other based on Trans-theoretical model were not evaluated (38). It should be noted that high self-confidence and self-efficacy in the athletes as well as positive perspective of community toward them, can be the factors affecting appropriate evaluation of body image in these people.

In addition, the findings showed that perceived barriers, self-efficacy and appearance orientation were able to predict exercise behavior. Shortage of sports facilities for the girls and limitations in the use of these facilities at night, restricted exercise activities at public places, full body cover while exercising, fear of physical injuries on the part of students' families and moral deviations in sports environments are important barriers to doing exercise in Iranian girls. It is noteworthy that students are aware of the positive effects of exercise on their appearance. Appearance is one of the priorities of maturing girls and is a reason for doing exercise. However, these findings emphasize the necessity of eliminating physical and cultural obstacles to doing exercise among girls.

Furthermore, the findings indicated that the interaction effect of self-efficacy and body image on exercise behavior was statistically significant. The results of the study by Alzubaidi and Kazem showed a significantly direct correlation between self-efficacy and body image; however, the interaction effect of these two variables on exercise behavior was not evaluated in this study (39). Our findings showed that doing exercise might not be a single factor and might have interacted with other factors. Moreover, it can be concluded that the more appropriate is body image among high school students and the higher is their self-efficacy, the more likely it is to progress from the early to higher stages of exercise behavior. In addition, participation in exercise activities will increase the abilities, physical fitness, self-efficacy and positive attitude toward oneself, thereby contributing to maintaining the behavior.

#### **4-1. Limitations of the study**

The limitations of this study were the cross-sectional design of this research, absence of keeping track of the results



over time, completion of the questionnaires through self-report and absence of the girls other than students.

## 5- CONCLUSION

The results showed more than female students were in the pre-contemplation and contemplation stages of exercise behavior and the majority of them had a poor body image and low self-confidence. Body image and better body image was one of the factors involved in doing exercise among the girls. Further studies are suggested to carry out interventions on improving body image and exercise behavior, identifying the cultural and social factors and benefits and barriers to exercise behavior from the perspective of adolescent girls through qualitative approach and analysis of the interaction effects of factors influencing exercise activity.

The results of this study can be helpful for the women health policymakers and planners, health experts and authorities, managers of organizations, education department, families and adolescent girls in order to reduce the barriers, to improve body image and to provide appropriate conditions and environment for doing sports activities.

**6- CONFLICT OF INTEREST:** None.

## 7- ACKNOWLEDGMENT

This article was taken from a master dissertation titled: "Association of Trans-theoretical model-based exercise behavior change with body image evaluation among female Iranian students". The authors appreciate the Vice Chancellor for Research and Technology, Kurdistan University of Medical Sciences, for providing the financial support.

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