

# Stages of Changes for Physical Activity among Iranian Adolescent Girls

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**Abstract**—Background: Regular physical activity contributes positively to physical and psychological health. In the present study, the stages of change of physical activity and the total physical

**Aims:** The aim of this study was to investigate the proportion of adolescent girls in each stages of change and the causative factors associated with physical activity such as the related social support and self efficacy in a sample of the high school students.

**Methods:** In this study, Social Cognitive Theory (SCT) and the Transtheoretical Model (TTM) guided instrument development. The data regarding the demographics, psychosocial determinants of physical activity, stage of change and physical activity was gathered by questionnaires. Several measures of psychosocial determinants of physical activity were translated from English into Persian using the back-translation technique. These translated measures were administered to 512 ninth and tenth-grade Iranian high school students for factor analysis.

**Results:** The distribution of the stage of change for physical activity was as follow: 18/5% in precontemplation, 23.4% in contemplation, 38.2% in preparation, 4.6% in action and 15.3% in maintenance. They were in 80.1% pre-adoption stages (precontemplation stage, contemplation stage and preparation stage) and 19.9% post-adoption stages (action stage and maintenance stage) of physical activity. There was a significant relate between age and physical activity in adolescent girls (age-related decline of physical activity)  $p < 0.001$ .

**Conclusion:** The findings of the present study can contribute to improve health behaviors and for administration of health promotion programs in the adolescent populations.

**Keywords**—Adolescent, Iranian girls, Physical activity, Stages of change

## I. INTRODUCTION

THE effects of regular physical activity on health are well documented in all age groups [1]. Exercising on a regular basis can help prevent and treat a variety of diseases and on conditions, such as coronary heart disease, hypertension, colon cancer, non-insulin-dependent diabetes mellitus, anxiety, and obesity [2]. Physical activity habits fostered and developed during the early stages of life may be expected to persist into adulthood, reducing the incidence of chronic

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diseases associated with a sedentary lifestyle in later life [3]. Given the age-related decline of physical activity, adolescence seems to be a critical period [4]. Promotion of physical activity level among adolescents can be desired by behavioral interventions. More effective interventions are needed because half of individuals who initiate a physical activity program drop out within six months [5]. The stages of change, known as stages of readiness, are the central construct of the transtheoretical model, intentional and temporal aspects of behavior change. This model was introduced in the 80's with smoking cessation, and later it was expanded to several health-related behaviors, including physical activity. It postulates that behavior change has a dynamic nature, and that the individuals move through a series of stages in their attempts to adopt the desired behavior [6], [7]. Understanding the distribution of the individuals across the stages of change enables stage-matched interventions to be developed for the entire population, not only for those ready to change. Especially in developing countries, very few researchers have investigated the prevalence and factors associated with these stages in population-based samples [8]. Assessment of the adolescents' stage of change can provide important additional information about population for specific health promotion strategies and health surveys. The aims of the present study were to identify: (1) the proportion of adolescents in each of the stages of change, (2) the factors associated with stage in sample of adolescents,

## II. MATERIAL AND METHODS

### A. Study Design and Participants

Participants were female students who meet the inclusion criteria of the study (i.e., studying in high school (9<sup>th</sup> or 10<sup>th</sup> grades) and being able to attend two survey sessions). The eligible subjects were recruited from 12 high schools in Tehran. A total of 545 students were recruited into the study, 33 subjects were omitted from the analysis due to missing data on one or more of the determinants physical activity items of interest. Current health recommendations from the Centers for Disease Control (CDC) and American College of Sports Medicine (ACSM) emphasize that everybody "should accumulate at least 30-60 minutes of endurance-type physical activity, of at least moderate intensity, on most — preferably all — days of the week" [9].

The Transtheoretical Model (TTM) of behavior change can also provide a useful framework for examining the issue of adoption and maintenance of physical activity with adolescents [10]. The TTM is an effective way of depicting individual's readiness to engage in a variety of healthy behaviors including smoking and alcohol cessation, diet change and, more recently, engaging in an exercise or in a

physical activity program [11]. The idea of stages of change, by Prochaska *et al.* [12], [13], [14], combines several phenomena and processes into one continuum. The basic elements of the model are both motivational (dealing with such phenomena as intention building, decision making and attitudinal readiness) and behavioral: the adoption process goes from stages of increased motivation, through tentative performance, to regular practice of the behavior. In this process, five stages are discernible: The first two, Precontemplation (no intention to change) and Contemplation (growing intention), are motivational stages without actual performance of the behavior; the next two stages, Preparation (strong intention and possible irregular or tentative performance of the behavior) and Action (recent initiation of regular behavior), bring a crucial shift into behavioral manifestation. The final stage, Maintenance, represents the establishment of permanent behavior. Either one or two stages of regular behavior or Maintenance are commonly distinguished, by the length of the time period during which the person has persisted in the practice or behavior [10]. The process can be stagnated at any of the stages or it can regress to a previous stage.

All variables were collected by interviews using standardized questionnaires. The interviewers were women, health educators, and were blinded to the aims of the study.

### III. MEASURES

#### A. Stage of Change for Physical Activity

The outcomes consisted in the stages of change for physical activity: precontemplation (not engaged in regular physical activity, and not intending to do so within the next six months); contemplation (not engaged in regular physical activity, but intending to do so within the next six months); preparation (not engaged in regular physical activity, but intending to do so within the next 30 days); action (engaged in regular physical activity, but for less than six months); and maintenance (engaged in regular physical activity for the past six months or more). The first three stages can be named pre-adoption, and the last two, post-adoption stages [6].

### IV. ETHICAL CONSIDERATION

Permission to use the original scales was obtained from the author. The approval for the use of human subjects was obtained from the Iranian Ministry of Education. The ethical committee of Tarbiat Modares University approved the study. The participants were told about the general nature of the study and were assured of the confidentiality of the data and informed consent for the study was obtained from the entire subject.

### V. RESULT

Demographic characteristics of the participating girls are shown in Table 1. Average age of the girls was 15.74 years (SD = 0.77) and the average BMI was 20.91 kg/m<sup>2</sup>. Household income was unfairly distributed across the four income categories. Some 62.8% of the participating girls' family had < \$320 household income, 48.5% (n = 248) of fathers had completed high school, with 16.8% (n = 86) completing a college or graduate degree, and 54% (n = 276)

of mothers had completed high school, with 9.0% (n = 46) completing a college or graduate degree.

The distribution of the stage of change for physical activity was as follow: 18.5% in precontemplation, 23.4% in contemplation, 38.2% in preparation, 4.6% in action and 15.3% in maintenance. They were in 80.1% pre-adoption stages (precontemplation stage, contemplation stage and preparation stage) and 19.9% post-adoption stages (action stage and maintenance stage) of physical activity. There was a significant relate between age and physical activity in adolescent girls (age-related decline of physical activity)  $p < 0.001$ . The distribution of adolescent girls across the stage of change for physical activity indicates that a large proportion of individuals are inactive and do not intend to engage in physical activity (18.5%). Among those who were not regularly active (23.4%), plans to begin physical activity, and only about 38.2% intends to do so in the near future (next 30 days). Among those who reported to be physically active 4.6%, almost 15.3% engaged in physical activity in the last six months (Figure 1). In current study, the distribution of individuals across "the days per week" for physical activity indicates that a large proportion of individuals are not any physical activity for at least 30-60 minutes each day (67.2%), and to perform moderate to vigorous physical activity on five or more days per week, for at least 30-60 minutes each day was in participants 14.8%.

### VI. DISCUSSION

The present study investigated the prevalence and factors associated with the stage of change for physical activity in a representative sample of high school students from Iran. Results have been shown a large proportion of individuals are inactive and low percent of individual have reached to post-adoption stages (action stage and maintenance stage) of physical activity. Another investigation verified the founding of percent study which that data from three national surveys among Iranian adults have shown that more than 80% of the Iranian population is physically inactive [15], [16]. There were several limitations may have affected the results of this study. First, the data relied on self-reports of physical activity and stage of change. Despite the use of validated questioners, some over-reporting of physical activity may be present. Second, validation of the instrument used which was translated and adapted to the adolescents. Moreover, the founding of the current study has shown that this stage algorithm is valid, because significant differences were found between individuals classified into different stages.

### VII. CONCLUSION

The findings of the present study can contribute to improve health behaviors and for administration of health promotion programs in the adolescent populations.

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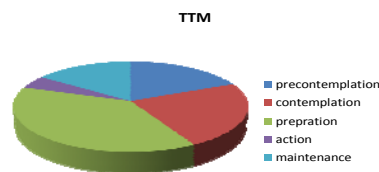


Fig. 1 the stage of change for physical activity in the adolescent girls

TABLE I  
 CHARACTERISTICS OF THE PARTICIPATING GIRLS

	Mean (SD)
Age (years)	15.74 (0.77)
Weight	54.22 (11.39)
Height	161.51 (10.88)
BMI	20.91
Father education (%)	
Some high school	31.5
High school graduate	48.5
College or graduate degree	16.8
Up BM	3.2
Mother education (%)	
Some high school	35.6
High school graduate	54.0
College or graduate degree	09.0
Up BM	1.4
Household income (%)	
< \$320	62.8
\$321-\$550	25.8
\$551-1100	9.6
>\$1100	1.8