

# Assessing Stages of Exercise Behavior Change, Self Efficacy and Decisional Balance in Iranian Nursing and Midwifery Students

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**Abstract**—Regular physical activity contributes positively to physiological and psychological health. This study aimed to identify exercise behavior changes, self efficacy and decisional balance in nursing and midwifery students. This was a cross-sectional study carried out in Iran. 300 undergraduate nursing and midwifery students participated in this study. Data were collected using a questionnaire including demographic information, exercise stages of change, exercise self efficacy and pros and cons exercise decisional balance. The analysis was performed using the SPSS. A p-value of less than 0.05 was considered as statistically significant.

**Keywords**—Exercise, Behavior, Student, Self efficacy.

## I. INTRODUCTION

NOWADAYS, changes in life-style and decreasing physical activity are the risk of cardiovascular diseases, non-insulin-dependent diabetes mellitus, osteoporosis, psychological disorder, malignancy, hypertension, colon cancer and obesity [1, 2]. Regular physical activity contributes positively to physiological and psychological health [3]. Several studies have shown that 80% of Iranian people have no physical activity [4]. The greatest deterioration in physical activity has been observed between adolescents and young adults due to life-style change that predispose them to become less physically active [5]. Although there are different chances in universities for physical exercise, more than 50% of the students are inactive [6]. No doubt initiating exercise in adolescence can have more benefits for overall healthy lifespan. Disappointing statistics concerning the prevalence of smoking, inactivity and overweight in various social groups, especially students, are the issues that have occupied the minds of the researchers [7]. Therefore, adolescents seem to be an important group to promote the maintenance of adequate physical activity level or encourage inactive adolescents to become more active. So, colleges and universities are potentially crucial settings where interventions can be made to help promote exercise throughout lifespan.

Regarding the importance of healthy behavior different

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models have been developed to explain why and how people change their life style behavior, comply or adhere to screening programs or their treatment plans. In these models the person are viewed differently and the behavior changing process are affected by different influencing factors based on the perspective adopted by the theorist. One model that has been applied to exercise behavior successfully is the Transtheoretical model (TTM) developed by Prochaska and colleagues [8, 9]. This model (TTM) has increasingly been used as the theoretical basis for the development of life style behavior intervention strategies. The TTM assumes that individuals vary in their motivation and readiness to change their behavior. The TTM has shown promise as an effective framework for understanding exercise behavior among various populations [2, 3, 6, 10-14]. This model regards behavior changes as a process that involves progression through a series of stages: 1) pre-contemplation (individuals are inactive and do not intend to begin exercise within the next 6 months); 2) contemplation (individuals are inactive and are considering initiating exercise within the next 6 months); 3) preparation (individuals exercise on an irregular basis but intend to become more active within the next month); 4) action (individuals have engaged in regular exercise for less than six months); and 5) maintenance (individuals have engaged in regular exercise for six months or more) [3, 8, 14-17]. Movement through the five stages of change is not in a straight line so, that people may relapse to earlier stages several times before they reach the maintenance stage [8]. Different psycho-behavioral patterns are typical of each of the five stages. These differences help to explore how and why persons move through these stages. Furthermore, it was suggested that stage specific interventions are more successful than nonspecific interventions [3].

Two important components within the Transtheoretical Model are self-efficacy and decisional balance [3]. These two key components could explain why health behavior changes occur [14]. Self-efficacy is one's perceived confidence in the ability to carry out a specific behavior successfully. An individual's self-efficacy is situation specific and may vary in relation to personal circumstances, i.e., sickness, or change in schedule. Self-efficacy steadily increases across the stages of change for exercise. Decisional balance relates to the pros (benefits) and cons (costs) of the behavior as it relates to oneself and significant others. For exercise behavior, the pros increase and the cons decrease across the stages of exercise behavior change [3, 8, 15-17].

Although changes in exercise behavior based on this model is considered by many researchers [1, 3, 10-23], little is known about exercise stages of change, individual efficacy and decisional balance in nursing student. Understanding these behaviors among nursing students is very important because they have a key role in changing behavior of people in society. Besides the exposure of students in various stages of exercise behavior change could reflect the level of their knowledge and

attitude in behavior change of exercise as the one of the important healthy life-styles.

So, this study aimed to identify exercise behavior changes in nursing students at various stages according to socio-demographic variables (age, sex, marital status, and years of education and BMI) and determined the efficacy and decisional balance toward exercise behavior in them.

TABLE I  
PSYCHOMETRIC PROPERTIES OF TRANSLATED QUESTIONNAIRES COMPARED WITH WAKUI ONES

Measures	Wakui questionnaire		Translated questionnaire	
	Validity	Test-retest correlation	Validity	Test-retest correlation
<b>Stages of exercise behavior change</b>	Correlation with physical activity questionnaire	**0.81	Content validity (panel of expert)	**0.98
<b>Self-efficacy</b>	*0.82	***0.83	*0.81	***0.86
<b>Decisional balance</b>				
<b>Pros</b>	*0.77	***0.83	*0.79	***0.82
<b>Cons</b>	*0.76	***0.78	*0.78	***0.79

\* Internal consistency method was used for validity of self efficacy and decisional balance (cronbach alpha)

\*\*Spearman's correlation coefficients was used for reliability of Stages of exercise behavior change.

\*\*\*Pearson correlation coefficients was used for reliability of self efficacy and decisional balance.

## II. METHODS

This was a cross-sectional study carried out during August-December 2011 in Shiraz University of Medical Sciences, Iran. All undergraduate nursing and midwifery students (n=300) participated in this study. Students' participation was voluntary and anonymity was assured. Data were collected using a questionnaire including demographic information (age, sex, marital status, academic year and BMI), exercise stages of change, exercise self efficacy and pros and cons exercise decisional balance. Students were guided by a trained individual to complete the questionnaire. It was developed by Wakui et al (2002) that included the measures described below. Stages of exercise behavior change were assessed using a 5-item, dichotomous (Yes/No) scale. It was translated into Persian and back translation to English by professional translator and validated by an expert panel. A five item scale was used for assessing self-efficacy and Likert scale was used to rate each item, from "completely agree" to "don't agree at all". The 12-item decisional balance (6 pros and 6 cons) was used in this study rated on a 5-point Likert-type scale. Psychometric properties of translated questionnaires compared with Wakui ones are summarized in Table I.

Body weight was measured (in light clothing and with bare feet) to the nearest 0.1 kg, and height was measured in bare feet and without hair ornaments to the nearest 0.5 cm. Measurements were performed by the same trained individual. BMI was calculated by dividing weight (kg) by height squared (cm<sup>2</sup>).

This study was approved by the research and ethics committee of Shiraz University of Medical Sciences. Data

were summarized as mean (standard deviation), or frequency and percentage. Exercise efficacy score, and pros and cons of

TABLE II  
DEMOGRAPHIC INFORMATION OF STUDENTS

Variables	Frequency	percent	
<b>Sex</b>	Female	259	86.3
	Male	41	13.7
<b>Age(y)</b>	≤20	117	39
	>20	183	61
<b>Marital status</b>	Single	266	88.7
	Married	31	10.3
	divorced/widow	3	1
<b>Academic Year</b>	First	71	23.7
	Second	77	25.7
	Third	85	28.3
	Forth	67	22.3
<b>BMI(kg/m<sup>2</sup>)</b>	≤ 18.5	39	13
	18.5-24.9	234	78
	>25	27	9
<b>Field study</b>	Nursing	222	74
	Midwifery	78	26
	Total	300	100

exercise decisional balance were compared using one way ANOVA. Post hoc test was used for Tukey comparison. Self-efficacy and pros and cons of decisional balance among nursing and midwifery students and academic year were compared consequently using independent t-test and one-way ANOVA. Correlation of Measure of SECQ with field study (Nursing and Midwifery) and different academic years (first to fourth) were assessed through Chi-square test. The analysis was performed using SPSS statistical software, version 13 (SPSS Inc, Chicago USA). A p-value of less than 0.05 was considered as statistically significant.

### III. RESULTS

The results showed that mean age of students was 21.5 years (SD = 2.1). The other demographic information of students were summarized and presented on Table II. Detailed demographic data according to stages of change in exercise behaviors are reported in Table III.

According to the results 23.3% of the students were in pre-contemplation, 29% in contemplation, 32.6 % in preparation, 7.3% in action and 7.3% in maintenance stages of changes in exercise behaviors.

Significant differences were found in the individual efficacy scores, and pros and cons of decisional balance in different stages of changes of exercise behavior. Total sample's scoring on each scale and the results of the one-way ANOVA are shown in Table IV. Post-hoc follow up testing showed significant differences between the precontemplation and other groups (contemplation, preparation, action and maintenance). No significant differences were found between nursing and midwifery students in SECQ scores and also between academic year, and self efficacy and pros and cons of decisional balance scores ( $P > 0.05$ ). Chi-square test result showed that there were no difference between the field of study and SECQ, and also between academic year and SECQ.

### IV. DISCUSSION

This study showed that a large number of nursing and midwifery students were in the inactive stage (precontemplation, contemplation and preparation). These findings are consistent with Irwin et al's study (2004). This study reviewed and analyzed the prevalence of university students' participation in physical activity at the level necessary to acquire health benefits in a total of 27 countries (Australia, Canada, China, Germany, Nigeria, United States, and 21 European countries). With respect to College of Sports Medicine's (ACSM) guidelines, more than one-half of university students in the United States and Canada are not active enough to gain health benefits [6]. Healthy lifestyle is very important during adolescence and early adulthood especially in nursing and midwifery students. In addition, they have a key role in changing behavior of people in society. So, improving these exercise behaviors is a priority.

In this study, approximately 86.3% of the students were females, being in contemplation and preparation stages of exercise behavior change. Irwin et al (2004) found that

women, and especially African-American women, are among the least active students [6]. Furthermore, Emdadi et al (2007) found that 73.2% of the female students were in precontemplation and contemplation and preparation stages [24]. Whereas female students were not sufficiently active, it is crucial to find factors that influence their decision about choosing to be active. This is more important when we consider their future roles in promoting healthy behaviors in the community as well as in their personal life.

In addition, the study showed that single students were in preparation stage and married ones were in precontemplation and contemplation stages of exercise behavior change. The finding that most of the married students were in inactive stage is consistent with the result of the study by Lee et al (2005) [14]. It can be inferred that single students were trying to have a good body image for finding appropriate partner. Another point worth mentioning is the possibility of weight control of the subjects by just adherence to diet regimen without complying exercise as most of students' BMI are in an acceptable range.

An outstanding result of this study is that even overweight students (BMI > 25 kg/m<sup>2</sup>) were in the preparation stage (51.9%). It can be deduced that these individual were aware of benefits and cost of changing of behavior and had a plan of action, but they probably didn't have sufficient will power, time, place, money, etc. to do physical activity. This awareness could be the result of their education in nursing and midwifery during which they pass different courses in health sciences. However there are some evidence in support of the effectiveness of providing specific courses such as health-related physical fitness in addition to the traditional course in the improvement of exercise stages and perceived exercise benefit [25].

According to our results more than 50% of students were in the inactive stage (precontemplation 23.3%, contemplation 29% and preparation 32.6%). According to Prochaska and Velicer people in precontemplation stage do not intend to take action in the foreseeable future and they are uninformed or under informed about the pros and cons of current behavior change. These people don't have the ability to understand or analyze benefits and costs for progressing to advance stages; therefore, they stay in this stage for a long time and even, don't think about changing current behavior [8].

However, people in contemplation stage intend to change in the next 6 months. They are more aware of the pros and cons of changing and others who are in preparation stage have a plan of action [8]. Although 61.6 % of the students were in contemplation and preparation stages, they may relapse to previous stages because of lack of time, will power, support, motivation, place, money [26]. Considering that only totally 14.6% of the students are in action and maintenance stages, it is warning for university officials to intervene promptly. Furthermore large prospective longitudinal studies are needed to find the characteristic of people in the active stage while controlling confounding variables, in order to be used in interventional program.

The result of comparison of stages of exercise behavior

change showed that self efficacy significantly increased as it progressed from precontemplation through the stages of contemplation, preparation, action and maintenance. In addition for decisional balance, subjects in the precontemplation stage had significantly lower perceived benefits involved in exercise compared to those in contemplation, preparation, action and maintenance stages. Also, the mean score of cons was the highest at precontemplation and the lowest at maintenance. Significant differences were found across stages of change and it was contrary to the result reported by Wakui et al (2002) and Lee et al (2006). This difference could be due to higher education of the participants in our study compared to Lee et al study in which only 16.1% were educated [3, 14]. Therefore, we concluded that improving change strategies as social support system, having exercise action plan and commitment to do it, improving self efficacy, receiving reinforcement and reward and understanding benefits of exercise especially early benefits such as happiness and positive psychological effects and removing physical barriers such as distance of exercise places, limited places, costs of exercise activity, can progress students in the stages of exercise behavior and psychological factors, and improve the stability of these results in them.

Although it was expected that increasing in academic year from first to forth in nursing and midwifery students improved their knowledge, attitude, motivation and life-style but there was no significant difference between the field of study and stages of exercise behavior change and also between academic year and stages of exercise behavior change ( $P > 0.05$ ). Also

no significant differences were found between nursing and midwifery students in SECQ scores and also between academic year and self efficacy and pros and cons of decisional balance scores ( $P > 0.05$ ). In one study conducted by Mann et al model was tested to determine the effect of informed-choice invitation on diabetes screening knowledge, attitude and intention. All the subjects were randomly assigned to receive the informed choice or a standard invitation for diabetes screening. After 2 weeks their knowledge of the invitation, attitude towards diabetes screening, and intention to attend for diabetes screening were measured. The researchers concluded that although the invitation type can predict knowledge but are not able to predict attitudes towards screening [27].

Also a variant predictors of intention to screen and screening behaviour have been determined previously and the possible influence of social ecological factors on screening behaviour have been highlighted [28].

Therefore we can infer that the intention to healthy behaviours such as exercise in our students may need a more comprehensive approach in our education program.

Emdadi et al (2007) in their study on medical, nursing, midwifery, dentistry, health community students found that most of the students in each educational level were in contemplation stage [24].

The main limitations of the present study were lack of a sample size that did not permit the meaningful evaluation of the large number of variables that can influence exercise behavior.

TABLE III  
DISTRIBUTION OF CHARACTERISTICS OF STUDENTS ON STAGES OF EXERCISE BEHAVIOR CHANGE

Stages of exercise behavior change											
AC	Variables MT	PC		C		PR					
		Fr	%	Fr	%	Fr	%	Fr	%	Fr	%
Sex		65	25.1	74	28.6	83	32	17	6.6	20	7.7
		5	12.2	13	31.7	15	36.6	5	12.2	3	7.3
Age(y)	Female										
	Male										
	≤20	26	22.2	33	28.2	42	36	8	6.8	8	6.8
	>20	44	24	54	29.5	56	30.6	13	7.1	16	8.8
Marital status	Single	57	21.4	74	27.8	92	34.6	21	7.9	22	8.3
	Married	13	41.9	11	35.5	5	16.1	2	6.5	0	0
	divorced/ wido	0	0	2	66.7	1	33.3	0	0	0	0
	First	14	19.7	26	36.7	23	32.4	5	7	3	4.2
Academic Year	Second	14	19.7	26	36.7	23	32.4	5	7	3	4.2
	Third	20	23.5	29	34.1	23	27.1	9	10.6	4	4.7
	Forth	14	20.9	15	22.4	28	41.8	2	3	8	11.9
	≤ 18.5	9	23.1	12	30.8	13	33.3	1	2.5	4	10.3
BMI(kg/m <sup>2</sup> )	18.5- 24.9	58	24.8	67	28.6	73	31.2	18	7.7	18	7.7
	>25	3	11.1	8	29.6	14	51.9	2	7.4	0	0
Field study	ursing	52	23.4	67	30.2	72	32.4	15	6.8	16	7.2
	Midwifery	18	23.1	20	25.6	28	35.9	6	7.7	6	7.7
	Total	70	23/3	87	29	98	32.6	22	7.3	22	7.3

Stages of change for exercise behaviors PC= Precontemplation; C= Contemplation; PR= Preparation; AC= Action; MT= Maintenance

## V. CONCLUSION

The results show that most of nursing and midwifery students were in the inactive stages of exercise behavior change (precontemplation, contemplation and preparation). Whereas these students in future are service providers and role models for clients, it is necessary to design and implement appropriate interventions based on behavior change model to improve to higher stages of behavior change and stabilize their exercise behavior. Determining the status of the

individuals in stages of exercise behavior change is a good reflection of the thinking and practice of individuals in exercise. So, further research should focus on identifying stages of exercise behavior change in other treatment groups and patients because the obtained results could provide contextual information for educational programs on healthy life-style. These investigations could help prevent different diseases related to inactivity and creation of health in community.

TABLE IV  
COMPARISON OF STUDENTS' SELF-EFFICACY, DECISIONAL BALANCE (PROS & CONS) MEAN SCORES IN STAGES OF EXERCISE BEHAVIOR CHANGE

Variables	Stages of exercise behavior change										F	P	Tukeys HSD  (P<0.05)
	PC(n= 70)		C(n= 87)		PR(n= 98)		AC(n= 21)		MT(n= 22)				
	M	SD	M	SD	M	SD	M	SD	M	SD			
<b>Exercise self-efficacy</b>	1.78	1.02	2.43	0.99	2.71	1.06	3.28	1.03	3.78	0.81	17.36	0.000	PC<C<PR <AC<MT
Decisional balance													PC<C<PR <AC<MT
Pros	3.83	0.62	4.28	0.48	4.37	0.60	4.45	0.58	4.54	0.39	7.68	0.000	PC<C<PR <AC<MT
cons	3.25	0.75	2.80	0.69	2.71	0.73	2.27	0.81	2.21	0.66	10.78	0.000	

Stages of change for exercise behaviors PC = Precontemplation; C= Contemplation; PR= Preparation; AC= Action; MT= Maintenance. Comparisons were made using analyses of variance. Posthoc comparisons were made using the Tukey procedure. Tukey comparisons that were significant are indicated by the "<"

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