

Exercise Behavior and Self-Efficacy of Medical Students Based on Stages of Change Model

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Abstract

Introduction: Despite the benefits of exercise many people in different countries specially students, have not enough physical activity. The aim of this research is to study exercise behavior of medical students in Rafsanjan University of Medical Sciences based on stages of change model and assess its relationship with students' self-efficacy.

Method: All of the 309 students of Rafsanjan University of Medical Sciences participated in this cross-sectional study. The data collection method was a questionnaire which consisted of four parts: demographic characteristics, the pattern of weekly physical activity, the level of exercise behavior which was based on stages of change model and finally the questions which assess exercises self-efficacy.

Results: A total of 309 students (46.6% male and 53.4% female) participated in this study. The mean (SD) of their age was 21.57 (2.20). Based on the stages of change model 117 (37.9%) students were on the pre-contemplation stage. 78 (25.2%), 45 (14.6%), 27 (8.7%) and 42 (13.6%) students were on the contemplation, readiness, action and maintenance stage, respectively. The results showed that there was a significant positive correlation between students' exercise self-efficacy and their stages of change ($p < 0.001$).

Conclusion: Based on the results of this study, exercise self-efficacy had an important role in students' exercise behavior. Therefore, it seems to be important for related institutions such as Physical Education Organization to focus a part of their activities on improving the level of exercise self-efficacy in students.

Declaration of Interest: None

Keywords: Exercise, Medical students, Stage of change, Self-efficacy.

Introduction

Nowadays, modern lifestyle has an important effect on human-health related behaviors. Researchers are concerned about disappointing reports of non-mobility and weight gain among different groups of community especially in students (1,2,3). Chronic diseases or non-communicable diseases (NCDs) such as cardiovascular disease, cancer and diabetes mellitus, become one of the most important health problems in developing and developed countries (4.). These diseases are the most important reasons for mortality in the world and their occurrence has a direct relationship with life style and the level of physical activities (6). Sufficient and regular physical activities can prevent or delay the incidence of chronic diseases (6). The rise of NCDs has been driven by primarily four major risk factors: tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets (7). Physical inactivity is the fourth-leading cause for premature mortality universally, and the health benefits of physical activity are surefire (8). Physical exercise has always been useful and is considered as a preventive measure for rising or the exacerbation of several chronic medical conditions, and disabilities (9).

The prevalence of participation in physical activity at the necessary level to acquire health benefits is low among adults so that world health organization (WHO) has reported that up to 60% of the adults and 80% of the adolescents have not enough physical and exercise activities (10,11,12,13). In many western countries, adolescents do not engage in enough physical activity or exercise, and girls' physical activity is lower than boys (13,14). A study on Iranian adolescents showed that 36% of girls and 61.5% of boys had enough physical activities (15). Another study on an Iranian population showed that only 31.3% of women and 43.4% of men devoted ten

minutes of their leisure time to exercise and physical activity (16). In Gholamnia et al. study, 94.5% of studied women placed in the lowest category of physical activity (17).

Some people who succeed with lifestyle changes may be due to the stage of change in a particular behavior (18). Too many models are available for determining the level of physical activity or exercise. However, among health Training Models, Transtheoretical Model (TTM) or Stages of Change (SOC), can be the most effective model for assessing the state of behavior change. It can be also useful for promoting physical activity behaviors. TTM or SOC provides a framework for understanding the state of behavior change. It also states that, change in behavior does not happen suddenly, but it is a transition from one stage to another. These transitions can be happened by gaining skill and experience. These stages are: (A) precontemplation stage, in which the person has no intention to change the behavior and getting health behavior at present and the future, (B) contemplation stage, in which he/she has no intention to change the behavior at present but he/she has intention to change the behavior in future, (C) preparation stage in which he / she has intention to change behavior soon in the future (generally 30 days), (D) actions stage, in which the person do considered behavior change regularly for lower than six months, and (E) maintenance stage, this stage lasts up to six months (1, 19, 20).

Many cognitive factors such as comprehended obstacles and self-efficacy can affect a person's desire to engage in physical activity. Self-efficacy is a person's confidence to his or her capabilities on facing with different positions (such as wake up early for exercise even on weekends or vacations). Higher scores of self-efficacy is suggested to be positively related with higher stages of the SOS model and higher readiness for change (21, 22). It is suggested that

adolescents with higher levels of self-efficacy, consume more energy on physical activity.

There is a strong emphasis on early prevention and adopting promoter behaviors of the health such as exercising for medical sciences students. However, insufficient physical activity is a serious health concern among university students. Which can lead to negative health outcomes. Regarding to the fact that these students are to be considered as future health service suppliers, therefore their health and behavior is important and has a special concern for the health system. Since, the sage of change model has been known as a well-known and complete model in behavioral change and self-efficacy is suggested to have an important effect on initiating and maintaining a behavioral change (6), therefore the aim of this study is to evaluate the relationship between students' self-efficacy scores with their physical activity behavior and their stages of change.

Materials and Methods

The current research is a cross-sectional study which was done in Rafsanjan University of Medical Sciences. Information collecting tool was a four-part questionnaire, which was completed by students after getting their informed consent form. The first part of the questionnaire included demographic information, the second part of the questionnaire assessed the student's physical activity level (self-reported questionnaire for weekly exercise activity). The weekly exercise activity score was calculated by the information which was obtained from the second part and the following formula (6,22):

Weekly physical activity score = $(9 \times \text{Strenuous exercise times per week}) + (5 \times \text{Moderate exercise times per week}) + (3 \times \text{Light exercise times per week})$ (22).

The stage of exercise change questionnaire (SECQ) was used in the third part and finally for the last part, the student's

exercise self-efficacy was evaluated by a questionnaire, which was used by Farmanbar et al (6). The Exercise self-efficacy scale was measured by six questions which were rated on four-point Likert scales, ranging from 1 = 'not at all confident' to 4 = 'completely confident'. The minimum score in this section is 6 and the maximum is 24. Validity and reliability of these questionnaires were confirmed in prior studies (6,18,19,20, 21, 22,23).

Statistical analyses were performed using SPSS version 21 (IBM Corp., Armonk, N.Y., USA). Quantitative and qualitative variables were analyzed and reported as mean (SD), median (IQR) and number (percentage), receptively. Due to non-normal distribution of response variables, in order to assess the relationship between the interested response variables (students' exercise behavior, self-efficacy and stage of change scores) with qualitative variables, Mann-Whitney U test and Kruskal Wallis test was performed. Spearman correlation coefficient was reported for assessing the relationship between quantitative variables.

Results

Out of 350 students who participated in this study, 309 students responded completely to the questionnaire (response rate was %88). A total of 309 students (46.6% male and 53.4% female) participated in this study. Out of the studied students 10.4% were married. Majority of the research samples (50.5%) were in Basic science course and the others were in stagery, internal and physiopathology section. 73.1% of the participants lived in dormitories, 21.4% with their families, 2.9% in rental house and %2.6 had chosen other choices. The mean (SD) age of the studied students were 21.57(2.2) years old and their BMI was 22.33 (3.06) (table 1).

183 (59.4%) of studied students reported that they had participated in some organized sports in past. 170 (55.2%) reported that their parents or siblings have

regular participation in organized sports, and 136 (44.9%) reported that an athlete live with them at their home or dormitory. Our results showed that majority of participated students, 195 cases (63.1%) were in pre-contemplation and contemplation stages.

Students' mean weekly physical activity score and self-efficacy score with the number of reported light, moderate and strenuous exercise activities per week were reported in Table 1.

Table 1: Characteristics of participated students

	Mean	SD	Min	Max
Age	21.57	2.2	18	27
BMI	22.33	3.06	14.5	29.98
No. strenuous activities per week	0.49	1.13	0	7
No. moderate activities per week	0.84	1.47	0	7
No. light activities per week	1.39	2.04	0	10
Weekly Physical activity score	12.75	17.79	0	100
Self efficacy score	103.8	4.17	6	24

The weekly physical activity score (exercise behavior) was significantly higher in boys compared with girls ($p < 0.001$). No significant association was found between weekly physical activity scores with students' marital status, living place or their educational section ($p > 0.05$). The score was significantly higher in students who had reported to have been involved in sports in past or having a parent or sibling who have regular participation in organized sports ($p < 0.001$, $p < 0.001$). Significantly higher physical activity scores were detected in students who have an athlete roommate ($p = 0.008$). The self-efficacy score was significantly higher in boys compared with girls ($p = 0.001$) and it was different between students in different educational sections ($p < 0.001$). The self-efficacy score was not significantly different between married and single students or students with different living places ($p > 0.05$). The self-

efficacy was significantly higher in students who had reported to have been involved in sports in past or having a parent or sibling who have regular participation in organized sports ($p = 0.003$, $p = 0.024$). The self-efficacy score was not different between students who had an athlete roommate or not ($p = 0.426$).

The relationship between stages of exercises behaviors change was significant due to gender ($p = 0.012$), students living place ($p = 0.017$). It was also significantly related with students, their family and also their roommates' sport activity background ($p < 0.001$, $p < 0.001$ and $p = 0.016$). It relation wasn't significant with students' marital state and their educational section ($p > 0.05$). Table 2 presents the details of students' Exercise behavior score, Self-efficacy score, and Stage of change model in the interested sub-groups.

Table 2: The relation between Exercise behavior, Self-efficacy and Stage of change with interested variables

Variable	N	(%)	Weekly physical activity score Median (IQR) ^s	P- value	Self-efficacy Median (IQR)	P- value	Stage of change Median (IQR)	P- value
Gender	Female	165	(53.4%)	6 (0,12.5)	< 0.001*	9 (6,12)	2 (1,3)	0.012*
	Male	144	(46.6%)	10 (0,25.75)		10.5 (7.25,14)		
Marital status	Single	277	(89.6%)	6 (0,18.5)	0.753*	9 (6,13)	2 (1,3)	0.255*
	Married	32	(10.4%)	7.5 (0,15)		9 (6,12.75)		

Living place	dormitory	225	(73.1%)	6 (0,18)	0.703 [#]	9 (6,13)	0.543 [#]	2 (1,3)	0.017 [#]
	With family	66	(21.4%)	7.5 (0,18)		10 (6,12.25)		3 (1,4)	
	Rented home	17	(5.5%)	11 (0,31.5)		10 (8,15.5)		3 (1,5)	
Educational section	Basic Science	156	(50.5%)	9 (0,22.75)	0.145 [#]	10.5 (8,14)	< 0.001 [#]	2 (1,3)	0.731 [#]
	Physiology	39	(12.6%)	6 (0,18)		8 (6,10)		1 (1,4)	
	Stager intern	65	(21%)	6 (0,15)		10 (7,13)		2 (1,3)	
		49	(15.9%)	0 (0,15)		6 (6,10.5)		2 (1,4)	
Had participated in some organized sports	yes	183	(59.4%)	10 (0,21)	< 0.001 [*]	10 (7,14)	0.003 [*]	3 (1,4)	< 0.001 [*]
	No	125	(40.6%)	0 (0,11.5)		9 (6,12)		1 (1,2)	
Did your parents or siblings have regular participation in organized sports	yes	170	(55.2%)	9 (0,22.25)	< 0.001 [*]	10 (7,13)	0.024 [*]	2 (1,4)	< 0.001 [*]
	No	138	(44.8%)	1.5 (0,12)		9 (6,12)		1 (1,3)	
Living with an athlete at home or dormitory	yes	136	(44.9%)	9 (0,18)	0.008 [*]	9 (6,13)	0.426 [*]	2 (1,4)	0.016 [*]
	No	167	(55.1%)	3 (0,17)		9 (6,13)		2 (1,3)	

\$ IQR=(Q1, Q3)

* Mann-Whitney test

Kruskal Wallis test

A positive association was detected between students self-efficacy and their physical activity scores ($r_s=0.42$, $p<0.001$). Self-efficacy was positively correlated with the state of change level ($r_s=0.47$, $p<0.001$). The results showed that higher levels of state of change model were positively related with higher physical activity scores in students ($r_s=0.59$, $p<0.001$).

A marginal significant positive correlation was detected between students' body mass indexes and their exercise behavior and their stages of change ($r_s=0.109$, $p=0.055$) ($r_s=0.109$, $p=0.056$), but its correlation was not significant with self-efficacy score ($r_s=0.091$, $p=0.12$).

Discussion

Student's lifestyle and their pattern of health behaviors have an important role on their health at older ages (24). Some

studies have shown that individuals usually will continue their exercise behavior in the next periods of their life so that 85% of the students with regular physical activity remained active after 6 years, and 81% of non-active students had remained non active (25). In order to discover that what causes an individual to change his/her behavior, it is necessary to understand the stages of change model.

Our sampled population showed that up to 60% of students were at passive stage of exercise behavior (contemplation and pre-contemplation) and only 13.6% were at final or maintenance stage. The mean numbers of light, moderate, and strenuous exercise times per week were 1.39, 0.84 and 0.49 respectively. Our results were similar with the results of Cardinal's et al. study on French students in which 56.8% were on contemplation and pre-contemplation stage. But our samples were somehow in lower stages of "change

model” compared with a study on American students in which 66.2% were at action and maintenance stages (26). Pirzadeh et al. showed that 64.5% of women classified in pre-contemplation, contemplation and preparation stage (27). Elezi et al. study showed that more than 67% of sampled students were classified as sedentary (pre-contemplation, contemplation, or preparation) stage (28). Nigg’s et al. study on high school students showed that 2.1%, 4.2%, 28.7%, 15.7% and 49.3% of students were at pre-contemplation, contemplation, preparation action and maintenance, respectively (29). In Mazloomi study, the majority of students were at contemplation stage (40%) but the minority of them placed on action stage (7.3%), which was almost similar to our study (23).

In Aga-Mollaei’s et al. study in Hormozgan Medical Sciences University, 26.5% had regular physical activity (41%) (30). In Abdullah’s et al study 69% of the students and in Grubbs’s et al. study, 68.8% of the students had regular physical activity (31, 32), which were much more active than our studied population. The physical activity of our studied samples were similar to Wakui’s et al. study, in which the most of Japanese young women have reported low levels of physical activity and 24.7%, 26.7%, 39.3%, 3.8% and 5.6% of samples were at pre-contemplation, contemplation, preparation, and action and maintenance stages, respectively (33).

In Kearney’s et al. study 29% and 30% of samples were at pre-contemplation and Maintenance stages, respectively, 10% of them had been entered to action stage, but they had relapsed, which have congruency with results of our study (34).

The results of this study are consistent with the results of Moattari (35), Dumith (36), Wallace (37) and Irwin (38). Irwin et al. studied the exercise activities of the students in 27 countries. Up to half of the American and European students had no participation in exercise activities (39).

The results of our study showed that there was a significant and direct correlation between self-efficacy and exercise behavior. The students, who had higher self-efficacy, were on higher stages of change and had more physical activity. Some other studies confirm our results (28, 30, 38-40).

In fact, self-efficacy was positively associated with stage of exercise behavior change (33), this finding demonstrated the importance of self-efficacy in tending, maintenance and promoting the exercise activities. It is necessary to have self-efficacy as motivational variable along with other required pre-conditions for continuing and achieving exercise participation. In despite of change in theoretical models for developing behavior change (such as theory of social learning and theory of logical action) self-efficacy model has remained as an integral part for all models.

In our study, the self-efficacy score and exercise behaviors were significantly lower in girls and girls were classified in lower stages of change model compared with boys.

In our study a marginal significant correlation was detected between students’ body mass index with the score of exercise behavior and stage of change. In Kearney’s et al. the proportion of obese or over-weight samples who were in pre-contemplation stage was higher than normal weight samples (34). The results of Al-Otaibi’s study showed that the proportion of obesity was higher in women compared with men (48% vs. 16.9%). Additionally, more than half of the women were inactive and 39% of the males were physically active. They reported a significant difference between the stages of change in men and women and also self-efficacy score was higher in men compared with women (41). Tamers’s et al. reported a lower level of physical activity in over-weight samples (42). In Al Nozha’s et al. study (2007) inactivity prevalence were higher in women (98.1%)

compared with men (93.9%) (43). Many studies reported higher prevalence of inactivity in women compared with men (41, 44-46). Higher scores of exercise self-efficacy was reported in men compared with women by Reickrt (47) Prochaska (2) Rodgers (48), Mozloomi (23). Factors such as having more freedom, more exercise possibilities, and the desire to be physically more strength can be the reasons for justifying lower exercise and physical activities in women compared with men.

Understanding the levels of student's physical activity and its relation to self-efficacy was a strong point of this study, which can be planned to promote it in future. This study has some limitations such as lack of causality of observed relations due to its cross sectional study design, the information were collected through self-reporting questionnaires and the studied sample were limited on medical students.

Conclusion

Appropriate and necessary procedures can be applied for reinforcing and increasing the student's self-efficacy, especially in girls, which had shown higher prevalence of inactivity. Due to the important role of medical students in society by providing health and therapy services, it is necessary to provide appropriate field for promoting stages of exercise behaviors change by preparing more exercise facilities, encouraging and increasing their self-efficacy.

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