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Original Article

Cognitive factors related to regular physical activity in college students

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ABSTRACT

Background & Aim: Despite the well evidenced health benefits of regular physical activity, many Iranian college students do not engage in physical activity sufficiently. The aim of this study was to assess cognitive factors related to regular physical activity in college students in Hormozgan University of Medical Sciences, Bandar Abbass, Iran.

Methods & Materials: A total of 314 students from three schools of the Hormozgan University of Medical Sciences were selected randomly. Of the total number of students, 249 students filled out the questionnaires completely (response rate = 79.3%). Exercise Benefits/Barriers scale, Self-efficacy scale, Exercise norms scale, and Planning for exercise scale were used to assess cognitive factors regarding physical activity; the Cronbach's alpha of these scales were 0.87, 0.83, 0.73, and 0.82, respectively.

Results: The mean age of participants was 21.7 ± 2.7. Of all the participants, 46.2% were male. Only 26.5% (n = 66) were engaged in regular physical activity. Perceived barriers to exercise, self-efficacy to exercise, planning for exercise, and exercise norms had a significant relationship with physical activity ($P < 0.05$). However, there was no significant relationship between perceived benefits to exercise and physical activity.

Conclusion: For increasing physical activity in college students, self-efficacy and social support improvement is suggested.

Introduction

Despite the huge health benefits of regular physical activity, inactivity is a major health problem in developed and developing countries (1). Existing evidences show that only about 50% of American people and 40% of adults in western countries engage in regular physical activity (2, 3). A relevant study performed among Iranian students revealed that physical inactivity with a prevalence rate of 66.6% was the most important risk factor accounting for cardiovascular disease in this age group (4). On the other hand, the data from previous national surveys conducted in Iran have reported that the majority of Iranian adult population is living without the recommended physical activity (5).

To explore the factors influencing physical inactivity among different populations, various researchers have assessed the correlations of physical activity with variables such as demographic characteristics, cognition factors, psychosocial factors, and behavioral factors (1, 3, 6-8). Among cognition factors, like knowledge, attitudes, and beliefs regarding physical activity, perceived benefits and perceived barriers are two particularly cognitive variables; many evidences have shown them to be as predicting factors for physical activity engagement (1, 9).

Furthermore, self-efficacy as a persons' belief regarding his/her ability to form a behavior and social norms as most common group reason, have been numbered as effective psychosocial

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factors for improving regular physical activity (2, 10, 11). Behavioral factors like sedentary behaviors have been found to be correlates of physical activity by previous researchers (6, 12).

Results from the third national surveillance of risk factors of non-communicable diseases in Iran revealed that inactivity is common in Iran. This study suggested that preventing the rapid growth of conditions, such as diabetes and cardiovascular diseases, requires health programs with greater focus on physical activity.[13] However, the designing of an interventional study for improving physical activity in the community requires the exploring of the factors related to and the main determinants influencing inactivity among target populations of that community. Recent reviews have indicated that physical activity is a multifactorial behavior that social and/or cultural factors can affect and also the cultural norms and barriers to physical activity vary among different societies (1, 3, 14). There is the question of whether there are different determinants influencing physical activity of college students of Bandar Abbass - as a small city in the south of Iran - that would be different from those which exist in literature. To answer this question, this study was designed to assess perceived benefits/barriers, self-efficacy, exercise norms, and planning for exercise as some of the cognitive factors regarding physical activity among students in Hormozgan University of Medical Sciences in Bandar Abbas, Iran.

Methods

Participants: This cross-sectional study was conducted in Hormozgan University of Medical Sciences in Bandar Abbas, in the south of Iran, from February to May 2008. The target population consisted of students who were studying in this university. At the time of the study, there were 3 faculties of medicine, health, and nursing and midwifery in the university. Of all the students, a total of 314 students entered the study. The number of samples in each faculty was calculated proportionally. Of all recruited students, 249 individuals filled out the questionnaires completely (response rate = 79.3%). Therefore, the final sample included 51 (20.5%) students from the Faculty of Medicine, 61 (24.5%) students from the Faculty of Health, and 137 (55%) students from the Faculty of Nursing and Midwifery.

Perceived benefits and perceived barriers to exercise: The perceived benefits and perceived barriers to exercise were assessed by the Exercise Benefits/Barriers Scale (EBBS) (15). EBBS consisted of 43 items in total. The subjects were asked to rate their agreement to perceived benefits and perceived barriers on a 4-point Likert scale (each item rated from strongly agree = 4 to strongly disagree = 1). The instrument may be scored and used in its entirety or as two separate scales (16). In this study, the scores of perceived benefits and perceived barriers were calculated separately. The overall perceived benefits score was calculated by summing the scores of 29 benefit items, with higher values indicating greater perceived benefits. Therefore, scores on the benefits scale could range from 29 to 116. The overall perceived barriers score was calculated by summing the 14 barriers items, with higher values indicating greater perceived barriers. Scores on the barriers scale could range from 14 to 56. To provide an Iranian version of the EBBS instrument, forward/backward translation was done. Then, in an expert panel, minor changes were made in some of its items. Cronbach's alpha for Persian version of the 43-item EBBS instrument, the 29-item benefits scale, and the 14-item barriers scale were 0.87, 0.94, and 0.78, respectively.

Self-efficacy: Self-efficacy was measured by an 8-item scale.[15] The subjects were asked to rate their confidence regarding their ability to exercise on a 5-point Likert scale (from not at all true = 1 to very true = 5). Scores on the self-efficacy scale could range from 8 to 40; the higher the score the greater their self-efficacy. To provide the Iranian version of the instrument, forward/backward translation was done. Then, in an expert panel, minor changes were made in it. Internal consistency of this scale after translation was excellent (Cronbach's alpha = 0.83).

Exercise Norms: Exercise norms were measured by a 5-item scale.[15] Each item indicates how much each person expect him/herself to do exercise (each item rated from not at all = 1 to a lot = 3). Therefore, scores on the exercise norms scale could range from 5 to 15; the higher scores

indicated greater exercise norms. To provide the Iranian version of the exercise norms instrument, forward/backward translation was done. Then, in an expert panel, minor changes were made in it. Internal consistency of this scale after translation was good (Cronbach's alpha = 0.73).

Planning for exercise: Planning for exercise was assessed by an 11-item scale.[15] Each statement of this scale indicates how often each person does special activities related to exercise (each item rated from never = 1 to often = 3). Scores on the planning for exercise scale could range from 11 to 33; the higher the score, the better the planning for exercise. Internal consistency of this scale was excellent (Cronbach's alpha = 0.82).

Physical activity: In this study, regular physical activity was defined as being engaged in moderate activities for 30 minutes a day, 4 or more days a week. Examples of activities could include brisk walking, leisure biking, swimming, line dancing, and aerobics classes, or any other activity with a similar intensity level. The subjects were asked if they were currently engaging in regular physical activity.

Based on the Kolmogorov-Smirnov test the distribution of perceived benefits ($Z = 1.15$, $P = 0.14$), perceived barriers ($Z = 1.37$, $P = 0.06$), self-efficacy ($Z = 0.88$, $p = 0.42$), planning for exercise ($Z = 1.05$, $P = 0.22$), and exercise norms ($Z = 1.32$, $P = 0.07$) was normal. Student's independent t-test was applied to compare cognitive factors regarding physical activity in male and female students. Chi-square test was applied to compare the percentage of regular physical activity among male and female students. Spearman's correlation was applied to determine correlations between cognitive factors regarding physical activity. Data were analyzed using SPSS for Windows (version 16; SPSS Inc., Chicago, IL, USA).

Results

The mean age of participants was 21.7 ± 2.7) years. Moreover, 46.2% of them (n = 115) were male and 53.8% (n = 134) were female. Only 26.5% of participants (n = 66) were engaged in regular physical activity.

The results showed that 26.1% (n = 30) of male and 26.9% (n = 36) of female students had regular physical activity and there was no significant difference between them ($X^2 = 0.02$, $P = 0.89$).

Table 1 shows the mean score of perceived benefits/barriers, self-efficacy, social norms, and planning for exercise among total students and each gender. There were significant differences between male and female students regarding perceived barriers to exercise and planning for exercise ($P < 0.05$), but there was no significant difference between them regarding perceived benefits, self-efficacy, and exercise norms.

As table 2 indicates, perceived barriers to exercise, self-efficacy to exercise, planning for exercise, and exercise norms had a significant relationship with physical activity ($P < 0.05$), but there was no significant relationship between perceived benefits to exercise and physical activity. Students who did not engage in regular physical activity perceived greater barriers, but students who engaged in regular physical activity perceived greater self-efficacy, more exercise norms and had better planning for exercise.

The results of this study showed there was a negative correlation between perceived benefits and perceived barriers to exercise, as well as a negative correlation between perceived barriers and self-efficacy to exercise. Furthermore, there was a positive correlation between perceived benefits and self-efficacy to exercise (Table 3).

Table 1. Comparison of cognitive factors regarding physical activity in male and female college students

Variables	Male (n = 115) Mean ± SD	Female (n = 134) Mean ± SD	Total (n = 249) Mean±SD	P-value*
Perceived benefits	96.7 ± 11.2	95.3 ± 13.5	96.0 ± 12.5	0.372
Perceived barriers	33.1 ± 6.3	30.9 ± 5.8	31.9 ± 6.1	0.008
Self-efficacy	23.5 ± 6.5	22.5 ± 7.4	23.0 ± 7.1	0.251
Planning for exercise	20.3 ± 4.6	18.6 ± 4.5	19.4 ± 4.6	0.004
Exercise norms	10.8 ± 2.7	10.3 ± 2.4	10.5 ± 2.6	0.110

* Student's independent t-test

Table 2. Comparison of cognitive factors based on physical activity in college students

Physical activity Variables	Yes (n = 66) Mean±SD)	No (n = 183) Mean(SD)	P-value*
Perceived benefits	97.7 ± 13.1	95.3 ± 12.3	0.182
Perceived barriers	29.8 ± 6.4	32.6 ± 5.8	0.001
Self-efficacy	24.8 ± 6.6	22.3 ± 7.1	0.010
Planning for exercise	21.3 ± 3.8	18.7 ± 4.7	0.001
Exercise norms	11.2 ± 2.7	10.3 ± 2.5	0.031

* Student's independent t-test

Table 3. Correlation between cognitive factors regarding physical activity in college students (Spearman's correlation)

Variables	Perceived benefits r (P)	Perceived barriers r (P)	Self-efficacy r (P)	Planning for exercise r (P)	Exercise norms r (P)
Perceived benefits					
Perceived barriers	-0.21 (0.001)*				
Self-efficacy	0.35 (0.001)*	-0.28 (0.001)*			
Planning for exercise	0.30 (0.001)*	-0.19 (0.002)*	0.44 (0.001)*		
Exercise norms	0.18 (0.005)*	-0.19 (0.003)*	0.05 (0.407)	0.29 (0.001)*	

* significant

Discussion

Previous researches in Iran have reported that the majority of Iranian adults are physically inactive.4 In this study, we determined some factors which might influence physical activity. The results of this study showed that inactive participants, compared to active participants, were significantly different in terms of some barriers to exercise, including lack of time, lack of energy, being tired and fatigue due to exercise, and lack of facilities for exercise. The present study revealed external barriers to exercise such as lack of time and facilities, as well as internal barriers like lack of energy. These findings are inconsistent with previous studies that reported lack of time and energy as two important barriers to exercise (1, 17). However, our study showed that lack of facilities and their high cost were significant barriers to exercise. It is important to mention that in Iran there are not efficient facilities and appropriate possibilities for exercise. These limitations are also observed in universities, especially in Hormozgan University that is a small university and is not well equipped. These results are consistent with recent research findings that indicate restricted access and low proximity to fitness facilities were associated with lower levels of physical activity (9). However, this result has not been reported by many other studies that have been conducted among college students (1, 9, 18). Brown did not mention this barrier in his research; instead, he argued that most college students have access and proximity to sufficient fitness facilities included in their tuitions or student fees (9).

While the males in our study simply had significantly higher scores in two scales of barriers to exercise and exercise planning, it is also possible that males and females may interpret requirements of exercise differently. According to the present study, male students perceived more barriers to exercise, while it was expected that female students might express more barriers to exercise. Thus, culturally appropriate studies may need to differentiate between males and females and design additional promotion efforts for individuals based on their needs. Although, in our study there were no gender differences regarding physical activity, further research regarding any probable gender relationships should be done in future research among the Iranian population.

In this study, psychosocial factors, like self-efficacy and social norms, were assessed. According to the results of this study, active participants had significantly higher scores of self-efficacy compared to inactive participants. Furthermore, self-efficacy had a negative correlation with perceived barriers to exercise. Other researchers revealed the relationship between self-efficacy and overcoming common barriers to physical activity (10, 19, 20). This result is con-

sistent with previous research that revealed participants who had a high level of confidence to do physical activities, despite obstacles, were more likely to actually engage in this behavior than participants with a low level of confidence (21).

In this study, the participants who were engaged in physical activity obtained higher scores of exercise norms compared to those who were physically inactive. This finding is consistent with previous studies (22, 23). Social marketing campaign would be one important way to address social norms through focusing on establishing physical activity in societies, although changing social norms is much harder and takes longer (24). Furthermore, during physical activity interventions, individuals should be introduced to other active people and possibly complete the intervention with a friend or family member to improve their immediate social norms for exercise. Additionally, future research should focus on issues regarding methods to improve social norms for moderate and vigorous physical activity through designing appropriate interventions. In conclusion, both exercise self-efficacy and social norms for exercise play a role in adult physical activity levels. Effective physical activity interventions should include both of these psychosocial variables.

We think this study with a relatively small sample, has its own potential to be a pilot for more related studies in order to verify its results in the general population in Iran. However, there are some limitations in this study. The generality of this study is limited, because only the students of Hormozgan University of Medical Sciences took part in the study. Therefore, this sample could not be a representative of all students in Iran. Moreover, there is no data regarding the severity and type of physical activity in this study. Therefore, further researches among different students studying in all universities as well as using precise scales to measure different physical activity are strongly recommended.

In conclusion, the results of the study indicated that being more confident regarding the ability to do physical activity and living in positive social norms about physical activity could improve this healthy behavior. For increasing physical activity in students, self-efficacy and social support improvement is suggested.

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