

Physical activity patterns and its influencing factors among high school students of Izeh city: Application of some constructs of health belief model

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ABSTRACT

Purpose: This study has been conducted to identify the roles of self-efficacy, benefits of and barriers to physical activity, and its relationship with physical activity in male and female high school students in the city of Izeh, Iran. **Materials and Methods:** In this cross-sectional descriptive analytical study, 500 students (200 boys and 300 girls) from high schools of Izeh city during the period 2011-2012 were chosen using the multistage random sampling method. The data for this study was acquired through a multisectional questionnaire that included sections as follows: Demographic characteristics, self-efficacy, and perceived benefits and barriers. The gathered data was then studied and analyzed. Statistical tests such as independent *t*-tests, Spearman's correlation, Pearson's correlation coefficient and linear regression were used to interpret and analyze the data. **Results:** Data analysis showed that the mean age of male participants was 15.67 ± 0.95 years and females 15.86 ± 1.16 years. The average weekly time of physical activity in male students was 424.74 ± 158.48 min and in females 186.63 ± 90.59 min. The mean scores for self-efficacy and perceived benefits of physical activity were significantly higher in boys as compared to girls. There was a positive and significant correlation between the mean scores for perceived self-efficacy and the weekly time in male students spent on physical activity as well as the mean scores for perceived benefits and the weekly time spent on physical activity in both genders. **Conclusion:** The results of this study showed that many factors influence students' physical activity; however, the role of these factors is not identical in the two genders. An understanding of these factors helps educationalists and other health experts design appropriate interventions.

Key words: Perceived barriers, perceived benefits, perceived self-efficacy, physical activity, students

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INTRODUCTION

Physical activity reduces the risks of developing cardiovascular diseases^[1] and has direct and indirect (through affecting risk causing cardiovascular elements) role in reducing them.^[2] Research among different populations has indicated the lowness of the level of physical activity and the tendency to live inactively, particularly amongst adolescent girls.^[3,4] Based upon studies conducted in Markazi and Isfahan provinces, about 40% of high school and guidance students spent less than 2 h in a week on regular exercise.^[5] According to different researches, adolescents in different cities of Iran

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spend an average 8-9 h a day watching television and playing video games.^[6] Therefore, 14.6% of adolescents in different provinces in Iran suffer from obesity and are overweight due to inactivity.^[7] Undoubtedly, the physical activity pattern is a multifactorial phenomenon that is influenced by several factors. Acknowledging the influential factors that affect physical activity in teenagers would lead up to designing better and more effective educational strategies in this age group. Various studies have examined the role of factors motivating and inhibiting physical activity and different results have been obtained.

A review study by Park and Kim^[8] during 1998-2008 found that the level of physical activity was highly associated with age and sex. Boys were more physically active than girls and there was an inverse relationship between age and activity levels. According to Park and Kim,^[8] perceived self-efficacy was the most important predictive factor of physical activity in adolescents. Several studies in different countries have been done to show which factors can be related to physical activity level in adolescents. Perceived benefits and barriers,^[8] self-efficacy and motivation,^[9,10] lack of social support, cooperation, facilities, and sufficient time^[11] were the most important concerns for adolescents' physical activity. Time constraints, doing homework, and pleasure to engage in other activities were the most important barriers for high school students not to participate in physical activity and in girls these barriers were far more than boys.^[12] The effect of education on increasing self-efficacy, perceived benefits, and level of physical activity was also confirmed.^[13] Studies indicate a difference between girls and boys in following healthy behavior patterns, that is, physical activity.^[12] Although, mentioned and other studies have showed several influencing factors on adolescents' physical activity, those factors are affected by different sociocultural conditions too. Thus, for any intervention planning regarding increasing physical activity we need to know our country conditions. Besides, the studies and researches in our country in regards to physical activity patterns particularly in youngsters and adolescents and the factors associated with them based on their sex is insufficient and of poor quality. The scarcity of studies in this field in the country has necessitated this study. Thus, this study aimed to investigate the roles of self-efficacy, benefits of and barriers to physical activity, and its relationship with physical activity in male and female high school students.

MATERIALS AND METHODS

In this descriptive-analytical (cross-sectional) study, the samples were male and female high school students in Izeh city. The sample of 500 students, 300 girls and 200 boys were selected randomly. In this study, a multi-stage random sampling was used to select the samples.

First, based on the gender ratio of the students, among the high schools of entire city, six girls and four boys were selected. Then 50 persons were randomly selected from each high school (300 girls and 200 boys). Meanwhile, the samples

from three grade levels, various classes, and from the student's absence-presence of register codes were selected. Students who participated in this study were able to answer all the questions. Students who were unwilling and not cooperating to complete the questionnaires, besides those who filled the questionnaire incompletely were excluded from the study.

Data collection instrument was a questionnaire comprising 76 questions grouped into three sections which included demographic questions, questions related to physical activity patterns and questions regarding the health belief model (HBM). There were five questions on subject demographic data. Physical activity was assessed based on a questionnaire consisted of ten questions that was designed and recommended by the United States Centers for Disease Control and Prevention.^[14] In this questionnaire, in order to answer questions, definitions of moderate and vigorous exercise were given to the respondents and the time spent on each of the groups of moderate and vigorous physical activity were calculated in terms of minutes and days. To conclude, the total minutes spent on each activity per week were estimated through multiplying the days spent on exercise in every week and the minutes spent in every day.

Physical activity and self-efficacy was measured through Albert Bandura's questionnaire for exercise and self-efficacy.^[15] This questionnaire consisted of 18 questions and was scored using an 11 point Likert-type scale ranging from 0-100 that was divided in 10-unit intervals (0-10-20-30-40-50-60-70-80-90-100). Higher scores demonstrated higher perceived self-efficacy while lower scores showed lower perceived self-efficacy. The questionnaire related to the benefits and barriers to physical activity included 43 questions. The answers were scored on a four-point Likert scale ranging from: Completely disagree 0 point, disagree 1 point, agree 2 points, and completely agree 3 points. A higher score elicited higher perceived benefits and barriers while a lower score indicated lower perceived benefits and barriers. After the questionnaire was designed, a pilot study was conducted and the test-retest method was used to assess the test reliability in which the reliability coefficient for questions regarding exercise self-efficacy was 0.894 and for questions related to the benefits and barriers to physical activity, 0.785. While designing the questionnaire and scoring the questions, the views of health education specialists were taken into account and after a preliminary study, three ambiguous questions were deleted and replaced them with new questions and the validity of the questionnaire was approved.

The questionnaire was distributed amongst the target group and completed. The data from the questionnaire was then extracted and analyzed using SPSS version 18 and statistical tests consisting of the independent *t*-Test, Spearman's correlation, Pearson's correlation coefficient and linear regression. The criterion for statistical significance was $P < 0.05$.

RESULTS

The study was conducted on 500 high school students of whom 300 were girls and 200 were boys. The mean age of male participants was 15.67 ± 0.95 years and females 15.86 ± 1.16 .

The mean height, weight, and body mass index (BMI) in girls was less than boys in a manner that the independent *t*-test showed a significant difference ($P < 0.001$). Table 1 shows the mean height, weight, and body mass index (BMI) of the participants according to their sex.

A study on the relationship between BMI and the HBM constructs (perceived benefits, barriers, and self-efficacy) based on Spearman's test showed that an inverse meaningful relationship existed between perceived exercise self-efficacy and BMI in males only ($P = 0.021$ and $r = -0.163$). That is while in females, no significant relationship was observed between three constructs mentioned of the HBM constructs and BMI. This test also showed that the amount of family income in female students has an inverse and noteworthy relationship with the perceived barriers to physical activity ($P = 0.040$ and $r = -0.119$). Besides, a positive and important relationship was observed between the amount of family income in male students and their perceived exercise self-efficacy ($P = 0.046$ and $r = 0.141$). Based on Pearson's correlation test there was no significant relationship between the male and female students' age variable and the concepts of perceived benefits, perceived barriers, and perceived exercise self-efficacy [Table 2]. The average length of time that male students spent on exercising was 424.74 ± 158.48 min a week and in female students 186.63 ± 90.59 min per week. The independent *t*-test indicated that the difference is significant ($P < 0.001$). The results also showed a significant

statistical difference between the amount of time spent on moderate and vigorous physical activity (based on minutes per week) in both sexes. The amount of time males spent on exercising was more than females ($P < 0.001$) [Table 3].

Based on the findings, the mean scores for perceived barriers to physical activity in female students was higher than male students. The independent *t*-test did not show that the results significantly differ (36.97 and 39.97). Plus, the findings indicated that the mean scores for perceived benefits of physical activity in male students was significantly higher than in female students (73.81 and 67.51 and $P < 0.001$). On the other hand, the findings show that the mean score for perceived exercise self-efficacy in male students was profoundly higher than in female students in a way that the independent *t*-test confirmed this difference was notable (47.15 and 43.66 and $P = 0.037$) [Table 4].

In this regard, Pearson's correlation test demonstrated that there was a positive and significant relationship between the perceived self-efficacy and the minutes males and females spent on vigorous physical activity per week ($r = 0.230$ and $P = 0.001$, $r = 0.155$ and $P = 0.007$, respectively). There was also a positive and meaningful correlation between the perceived benefits and the minutes males and females spent on vigorous physical activity per week ($r = 0.240$ and $P = 0.001$, $r = 0.179$ and $P = 0.002$, respectively). Besides that, this test demonstrated an inverse and significant relationship between the perceived barriers and the minutes male students spent on vigorous physical activity per week ($r = -0.154$ and $P = 0.030$). Also an inverse relationship was seen between the perceived barriers and the minutes female students spent on vigorous physical activity per week but based on Pearson's correlation test, this relationship was not significant. In general, the results indicated a significant and positive correlation between the perceived benefits and the total minutes both males and females spent on physical activity per week ($r = 0.161$ and $P = 0.023$, $r = 0.159$ and $P = 0.006$, respectively). A significant and positive relationship was seen between the total minutes male students spent on physical activity per week and their perceived self-efficacy but in female students this relationship was not significant ($r = 0.207$ and $P = 0.003$, $r = 0.090$ and $P = 0.118$, respectively). Moreover, no significant relationship was observed between the total minutes both sexes spent on physical activity per week and their perceived

Table 1: Comparison of demographic variables in female and male students

Variable name	Total (n=500)		Male (n=200)		Female (n=300)		P values
	Mean	SD	Mean	SD	Mean	SD	
Height (cm)	164.07	8.17	167.25	9.48	161.95	6.34	<0.001
Weight (kg)	55.39	10.7	59.62	11.47	52.57	9.15	<0.001
BMI (kg/m ²)	20.53	3.37	21.25	3.35	20.04	3.3	<0.001

BMI = Body mass index, SD = Standard deviation

Table 2: Relationship between some components of health belief model and demographic variables in female and male students

	BMI		Family income		Age	
	Female	Male	Female	Male	Female	Male
Perceived self-efficacy	$r=0.038$ $P=0.514$	$r=-0.163$ $P=0.021$	$P=0.021$ $P=0.722$	$r=0.141$ $P=0.046$	$r=-0.050$ $P=0.390$	$r=-0.050$ $P=0.484$
Perceived benefits	$r=-0.029$ $P=0.649$	$r=-0.031$ $P=0.665$	$r=0.076$ $P=0.189$	$r=0.045$ $P=0.525$	$r=-0.020$ $P=0.736$	$r=0.014$ $P=0.844$
Perceived barriers	$r=0.081$ $P=0.161$	$r=-0.029$ $P=0.685$	$r=-0.119$ $P=0.040$	$r=-0.039$ $P=0.584$	$r=0.112$ $P=0.053$	$r=0.002$ $P=0.976$

BMI = Body mass index

barriers to exercise. Table 5 shows the relationship between the total minutes spent on physical activity per week and the HBM constructs.

DISCUSSION

The present study examined the factors that motivate and inhibit physical activity in male and female high school students in Izeh city based on some of the HBM constructs. In general, the results indicated the low levels of physical activity among female students compared with male students. The results also showed the positive role of self-efficacy and perceived benefits in increasing the time students spend on physical activity per week as well as the role of perceived barriers on decreasing physical activity levels in students.

Whilst examining the relationship between BMI and the HBM constructs, the findings of this study indicated that increasing perceived exercise self-efficacy is significantly correlated with the reduction of BMI in male students. A study by Davidson *et al.*, conducted on students in Canada with the purpose of identifying detriments of body weight found that self-efficacy has a negative effect on weight.^[10] Given that in this study like other studies,^[10,13] it has been proved that enhancing the self-efficacy in public increases their physical activity; besides,

the importance of exercise and physical activity in controlling and reducing body weight is not concealed from anyone; hence, paying attention to this subject can be considered in designing educational programs to develop physical activity habits in the public.

The results of the present study showed that the mean time spent on physical activity is significantly higher in male students compared with female students. The findings of most studies correspond with the results of this study.^[3,8,16]

Salis *et al.*, believe that participating in regular physical activity is associated with a wide range of psychological, social, and cultural variables. It is logical that interventions aimed at improving people's physical activity take these factors into account. Among these factors; self-efficacy, benefits, and barriers can be cited.^[17] In this regard, the findings of this study indicated that although the mean score for perceived benefits of physical activity in male students was higher than female students, both genders had reasonable exercise self-efficacy and there was a positive and meaningful relationship between the perceived benefits of the sample studied and the minutes they spent exercising per week. The main benefits cited by the sample male students in order of importance were enjoying sports, building muscular strength, increasing stamina, enhancing physical fitness, having fun and entertainment as well as improving mental health. The benefits mentioned by female students studied were as follows; improving mental health, enhancing physical fitness, building muscular strength, enjoying sports, attaining a better physical appearance, increasing stamina, and having fun and entertainment.

In a study conducted on adolescents in the province of Nova Scotia in Canada, the perceived benefits of exercising included benefits such as having a good feeling, having fun, helping sports professionals, revving up energy levels, and keeping fit.^[18] A study by Hohepa *et al.*,^[11] on students in New Zealand showed that an understanding of exercise benefits has a significant relationship with the level of physical activity students engage in. In this study, enjoying exercise and feeling successful were acknowledged as the key benefits perceived by adolescents while doing physical activity. In a study by Park and Kim,^[8] it has been demonstrated that there is a direct relationship between the kids and teenagers' understanding of exercise benefits and their physical activity

Table 3: Comparison of physical activity patterns in students based on sex

Physical activity pattern	Females (n=300)		Males (n=200)		Total (n=500)		P values
	Mean	SD	Mean	SD	Mean	SD	
Moderate	130.6	87.33	243.74	183.5	175.9	135.4	<0.001
Vigorous	56.04	22.26	180.99	121.6	106	71.93	<0.001
Total	186.6	90.59	424.74	158.5	281.9	124.5	<0.001

SD = Standard deviation

Table 4: Comparison of mean scores of perceived barriers, benefits, and self-efficacy of doing physical activity in participants

Variables	Females (n=300)		Male (n=200)		P values
	Mean	SD	Mean	SD	
Perceived self-efficacy	43.66	18.26	47.15	18.25	0.037
Perceived benefits	67.51	14.51	73.81	16.14	<0.001
Perceived barriers	39.79	16.95	36.97	17.21	0.071

SD = Standard deviation

Table 5: Relationship between physical activity (minutes per week) and some health belief model constructs in participants

Physical activity	Perceived self-efficacy		Perceived benefits		Perceived barriers	
	Females	Males	Females	Males	Females	Males
Moderate	$r=0.026$ $P=0.659$	$r=0.130$ $P=0.066$	$r=0.101$ $P=0.080$	$r=0.046$ $P=0.515$	$r=-0.230$ $P=0.649$	$r=-0.078$ $P=0.272$
Vigorous	$r=0.155$ $P=0.007$	$r=0.230$ $P=0.001$	$r=0.179$ $P=0.002$	$r=0.240$ $P=0.001$	$r=-0.027$ $P=0.643$	$r=-0.154$ $P=0.030$
Total	$r=0.090$ $P=0.118$	$r=0.207$ $P=0.003$	$r=0.159$ $P=0.006$	$r=0.161$ $P=0.023$	$r=-0.030$ $P=0.608$	$r=-0.133$ $P=0.061$

levels.^[8] Another study by Sullivan *et al.*,^[13] in 2008 in the US found that people whose perceived benefits of exercise had increased due to education and were more likely to participate in sports than the rest.^[13] Another study by Lovell *et al.*,^[19] in 2010 on 200 female students showed that the greatest perceived benefit of exercise and sports was better physical performance and after that psychological benefits, staying healthy, improving life, and social interactions.

The findings of this study indicated that perceived self-efficacy scores were higher in male students compared with female students and that there is a significant positive association between the minutes spent on vigorous physical activity per week in students of both genders and their perceived self-efficacy. Moreover, a significant positive relationship was observed in the total minutes spent on exercise per week and perceived self-efficacy in male students. In this regard, a study by Aghamolaei *et al.*,^[20] in 2008 on the students of Hormuzgan University of Medical Sciences showed that there was a significant positive relationship between the scores of perceived self-efficacy and regular physical activity. A study by Jaffari and colleagues^[21] also indicated that all descriptive studies (1990-2007) display a significant relationship between self-efficacy and sports activities. In a study conducted by Lim *et al.*,^[9] it was pointed out that increasing the public's self-efficacy and motivation will likely promote their participation in physical activity. Another study on students in Canada showed that self-efficacy has a positive effect on their physical activity.^[10] A study by Thrope *et al.*,^[22] on high school students in Australia indicated that students with better self-efficacy scores reported higher levels of physical activity compared with students with lower self-efficacy scores. In this regard, a study on Canadian adolescents aged between 11-13 years showed that those of them with higher self-efficacy had significantly spent more energy on physical activity and exercise.^[23] Other findings of this study showed that the mean score for perceived barriers of physical activity is higher in female students than in male students. Although the *t*-test did not prove this relationship to be significant, various studies suggest that the number of females that have noted perceived barriers as an important factor inhibiting physical activity is far more than boys.^[12,24]

The results of this study also found that a significant inverse relationship lies between the students' understanding of barriers and the minutes they spend on vigorous physical activity per week. The main barriers cited by male students in this study included: Lack of sports and fitness centers, inconvenient timetables offered by sports centers that do not meet individual's needs, lack of family support and encouragement, fatigue after exercising, and wasting time. The main barriers mentioned by female students were: The long distances to sports centers, inconvenient timetables offered by sports centers that do not meet individual's needs, high costs, lack of family support and encouragement, and the fatigue caused by exercise.

A study by Mohammadi Zeidi *et al.*,^[25] on students at Qazvin University of Medical Sciences in 2008 indicated that exercise

self-efficacy as well as perceived benefits and barriers were factors that significantly predicted changes in the students' levels of physical activity. A study conducted by Aghamolaei *et al.*,^[20] showed that there is a significant inverse relationship between the students' scores for perceived barriers and regular physical activity. In this study, the main barriers to exercising were: Lack of time, the long distance to sports centers, lack of sports centers, and lack of facilities. The study by Park *et al.*,^[8] indicated that kids and teenagers' understanding of barriers to physical activity is inversely related to their levels of exercise.

A study by Hohepa *et al.*,^[11] in New Zealand suggested that there was a significant relationship between the level of students' physical activity and their understanding of barriers. In this study, lack of social support, lack of company, lack of resources, and lack of sufficient time were identified as the main barriers to physical activity in adolescents. A study conducted in Toronto by Allison *et al.*,^[12] showed that lack of time, doing homework, a preference to engage in other activities, doing house chores, lack of energy, disorganization and lack of discipline, being sad, being judgmental, lack of joy, self-consciousness, lack of support from family and friends, illness, and injury were all barriers to engaging in physical activity.

In a study by Dambros,^[24] the main obstacle to exercise for students was long working hours; family obligations; poor weather; lack of facilities; daily activities (at home); no encouragement from family, friends, etc.; bad finances; bad mood; fear of injury; physical constraints (such as muscles); mild body aches; physical exhaustion; lack of knowledge and guidance; lack of interest; devoting time to study; lack of support from schools, teachers, and instructors were identified as the other barriers to physical activity.^[24] The results of this study indicated that the role of factors such as self-efficacy and perceived benefits and barriers in predicting the level of physical activity is different in male and female students, thus, considering these variables and their role differences in the two genders whilst designing interventional programs is necessary.

CONCLUSION

The findings of this study have indicated numerous factors influence the level of physical activity in students and undoubtedly the role of these factors are not the same in both genders. Understanding these factors can help educators and other health professionals to plan appropriate interventions. In order to design educational interventions to improve physical activity patterns; various psychological, social, and cultural factors have to be taken into account.

The limitation of this study is that all the students who participated in this study were from Izeh city. Sociocultural and economic profiles of the students in Izeh city may be different from students attending other high schools in Iran, thus the results cannot be generalized to all Iranian adolescents.

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