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The Determination of Physical Activity among Girl Adolescents based on Trans-theoretical model (TTM)

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Abstract

Background

It has been proved that physical activity has positive effects for all people. However, low activity is common among adolescents especially girl teenagers. The present study aimed to determine the condition of physical activity among girl adolescents by use of the stages of change derived from Trantheoretical model (TTM).

Materials and Methods: This descriptive- analytical investigation was done (in 2016 and 2017 school year) in the first – round girl high school among 324 students studying in state schools of Shahrekord city (Western Iran). They were selected through clustering method. The data were collected by researcher-made questionnaires including demographic characteristics, knowledge construct and the stages of change (pre-contemplation, contemplation, preparation, action and maintenance). The collected data were analyzed by SPSS (version 18.0).

Results

The mean age of participants was 13.69± 1.95 years old. The mean score of girls' knowledge about types of physical activity was 53.18± 21.82 (a total of 100 scores), which represents the average level of knowledge among them. The study of physical activity in students based on stages of change showed that 165 ones (43 %), 102 ones (26.6 %) and only 22 ones (5.7 %) of the studied students were in precontemplation, contemplation and maintenance stages, respectively. There was a significant relation between students' knowledge level and their mothers' age ($P<0.05$), their stages of change and also their fathers' education level ($P<0.05$). The time of student's physical activity was reported 298 minute per week.

Conclusion

Despite the importance of doing regular and consistent physical activity, it is obvious that this level of physical activity among studied students is not enough based on international standard; so, it is essential to focus on removing the barriers and providing suitable context for doing permanently physical activity.

Key Words: Adolescent, Behavior, Girl students, Physical Activity.

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1- INTRODUCTION

Chronic diseases are known as the main causes of inability and mortality in many of countries. They are the main factors of 60 percent of all deaths in the world (1). At the same time, inactivity is regarded as the main cause of these diseases (2). Strong evidence has been shown that within 30 recent years inactivity is the primary and independent cause of mortality. It has been reported that physical activity has decreased mortality and inabilities made by these sorts of diseases (4, 5). Different factors lead to reduce people's activity in recent decades, so that many diseases made by them have not found among the people in previous centuries. Housing welfare condition, automobile used and some kinds of jobs needed few activity have resulted in decrease of physical activity or even lead to stop it (6).

In today's machinery life, most of the people suffer from physical diseases such as osteoporosis, obesity, mental problems and tiredness (7). Although physical activity has many advantages, a lot of people in large number of countries such as Iran, do few regular physical activity. It is recommended to do average to high levels of physical activity at least 60 minutes every day among 5-18 year-old people (8.9). In fact, this is about 30 minutes with the same severity as noted, five times per week or 20 minutes of severe physical activity within three days every week among the people over 18 years old. It can support their physical, mental and social health (8).

According to World Health Organization, (WHO) report, lack of physical activity is known as the cause of death around the world (10). Globally, 31 percent of the adult people over 15 years old have few physical activity and 3.2 million deaths happen annually due to insufficient physical activity (10). Less than one third of young people in the world have enough physical activity in order to gain health related advantages in present and future. However, the level of physical activity has decreased unfortunately in all periods of youth duration (8, 11). On the other side, low level of activity is more common among some groups such as women, old people, non-white races and lower socio-economical classes of society (12, 13). In fact, youth is a period in which the context of occurring highly risky diseases, is provided in the following years (14).

Some barriers against young people participating in physical activities include time shortage, lack of motivation, insufficient support and guidance, incompetency feeling, the shortage of safety facilities, the limitation of physical activity facilities and also disregarding the harms of physical activities (4). In addition, these activities reduce the risk of disease progress or even death made by cardiovascular diseases, diabetes, colon cancer and hypertension (11, 14-17).

Trans-theoretical model (TTM) is one of the patterns modifying regularly physical activity as a behavior. It was introduced to the world by Proschaska et al. (18); this model regards people in different stages of readiness for behavior change including precontemplation, contemplation, preparation, action and maintenance. Considering the importance of doing physical activity among adolescents especially girl ones and also the importance of recognizing the stages of individuals behavior change, the present study was conducted to investigate the condition of physical activity among girl high school students living in Shahrekord city, Iran applying TTM.

2- MATERIALS AND METHODS

2-1. Study Design and Population

This descriptive- analytical study was done among girl students of the first grade in high schools and living in Shahrekord

city, Chaharmahal and Bakhtiari province-Iran, in 2016 and 2017 educational years.

2-2. Methods

The sample size was achieved 384 students based on the following formula and supposing Z confidence level 1.96, d accuracy rate (0.0.5), and alpha = 0.05.

$$n = \frac{Z^{2}_{1-\frac{\alpha}{2}}[P(1-P)]}{d^{2}} \approx 384$$

The participants were selected by cluster sampling method. After obtaining the needed permissions from the education organization**,** some of the high schools in the two sub- organizations were selected according to the number of students and socio-economic level of the schools. Then a number of students were selected randomly based on their number in the attendance list.

2-3. Definition the Stage of Change

2-3-1. Precontemplation (Not Ready yet)

The person in the Precontemplation phase is not assumed to take the action in the predictable future which is, typically supposed to continue in the next six months.

Being ignorant the action consequences of his/her performance may be of the unaware about reason an individual to be in the Precontemplation phase. Numerously insufficient for changing him/her may be efforts can lead to dicrease about his/her capacity to modification.

2-3-2. Contemplation (Getting Ready)

Contemplation is the phase in which persons propose to alteration in the next six months. They are more alert of the benefits of altering, but are too highly alert of the costs. This weighting between the cons and benefits of altering can produce thoughtful uncertainty that can cause persons to keep on in this phase for long periods of time.

2-3-3. Preparation (Readiness)

Preparation is the phase in which persons propose to take action in the instant future, typically measured as the next month. Normally, they have already taken some important act in the previous year. These persons have a strategy of act, such as linking a gym, conversation to their doctor.

2-3-4. Action

Action is the phase in which persons have made exact overt alterations in their lifestyles during the past six months. Since act is noticeable, the general process of performance alteration has often been compared with act.

2-3-5. Maintenance

Maintenance is the phase in which persons have made exact overt alterations in their lifestyles and are working to avoid deterioration; though, they do not apply alteration procedures as regularly as do persons in Action.

While in the Maintenance phase, persons are less tempted to relapse and grow progressively more confident that they can remain their variations. The process of changing is shown in **Figure.1** (19, 20).

2-4. Measuring tools

Researcher made questionnaire was used based on the knowledge and stages of change in three sections:

- General characteristics (7-question),
- Knowledge (6-question),
- Stages of Change (5-question).

The collected data characteristics included students' age, parental age, job and their educational level. The students' knowledge was assessed by six questions (for

example: how many times does an adolescent have to do exercise weekly?).

Correct answers of this construct were received score one and the wrong answers and those ones which were not replied were received score zero. On completion of the questionnaires the score of knowledge was calculated based on 100.
The third part of the questionnaire consisted of stages of change (based on TTM including pre contemplation, contemplation, preparation, action and maintenance) among girl adolescents about their physical activity situation. It should be noted that Precontemplation is the stage during which the person has not decided changing within six next months. In contemplation stage, he/she thinks of changing his/her behavior during next six months but has not been ready to act yet.
When he/she makes the decision seriously to change the behavior and tend to do it in near future (usually within the next month), he/she is supposed in preparation stage. In fact, the person prepares any needed prerequisites to take the behavior.

Action is the stage in which the person has changed his/her lifestyle during the last six months. Since the action can be observable, behavior change is the same as action. Maintenance is a stage which the behavior is keeping on permanently more than six months. However, its continuation needs active and wise endeavor (19, 20).

The stage of change was asked by five questions. The question of every one of five mentioned the stages are as followed respectively; pre- contemplation: " I'm not doing physical activity regularly now and I don't want to do it regularly in near future. Contemplation:" I'm doing physical activity regularly but I want to do it in the next six months". Preparation:" I'm not doing physical activity regularly but I want to do it up to the next month". Action: "I'm doing regularly physical activity for less than six months". Maintenance: "I'm doing physical activity regularly for more than six months". As it was supposed that every respondent should have answered to just one of the mentioned questions, the scores zero, 1, 2, 3 and 4 were given to the mentioned stages respectively.

2-4-1. Face validity determination of instrument:

The complete form of questionnaire was given to 30 girl students with the same characteristics of the studied cases. It should be noted that they were not involved in the main study. Their comments were regarded and then this questionnaire was given to five health education and health promotion specialists. They were asked to determine how far the questionnaire statements included the expected concept of every stage. At the same time, content validity relative (CVR) and content validity index (CVI) were also used in order to assess its validity content quantitatively. It should be noted that CVR was devised by Lawshe (21).

In this phase, the idea of every one of the mentioned specialists, were regarded by three following items: "it's necessary", "it's useful but not necessary ", and "it's not necessary". Then CVR is measured. Based on Lawshe's table, the statements with CVR values of more than 0.59 were kept to be included. Waltz and Bausell method was also used to determine CVI (22). It was used to make sure that if the questionnaire's statements were designed as best as possible to measure knowledge and stages of change constructs. So, three criteria including "simplicity", "transparency", and "specificity" were used for every statement by four-option Likert scale. CVI for knowledge and stages of change sections was achieved 0.5 and 0.78, respectively. Internal consistency was measured by Cronbach's alpha in present study. It was 0.83 and 0.80 for knowledge and stages of change sections, respectively.

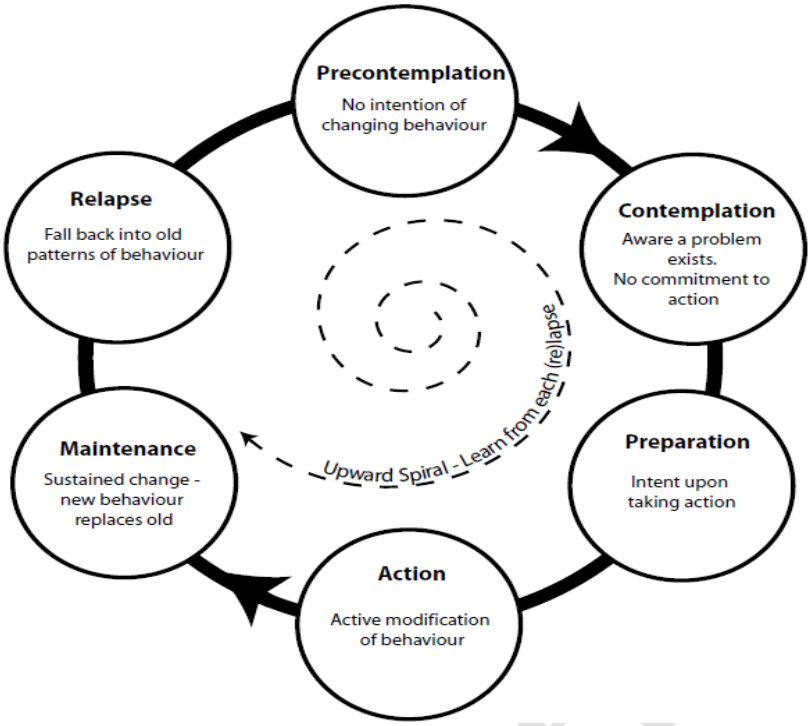

Fig1: Model of Stage of change, Prochaska, DiClemente, Norcross (1992) (18).

2-5. The inclusion criteria

The inclusion criteria consisted of being a girl student in the first grade of Sharekord's high schools, signing informed consent and having the tendency to participate in the study.

2-6.The exclusion criteria

The exclusion criteria included discouraging to participate in the study, their absence or moving to other schools during investigation processes.

2-7. Ethical considerations

Ethical code of this project was IR. BHN.REC.1395.16 permitted by Research Chancellor of Behbahan University of Medical Sciences. A formal letter was given to submit to Shahrekord Educational Department. Then, the researcher referred to two Educational sub-organizations to pass through the phases of school selection.

The next step was to get involved in the schools process. The collaboration of the staffs was established in order to conduct the study by presenting the goals of the research and its performance method. Signing the informed consent form by students for participating in the investigation and making them motivated to complete the questionnaire accurately was done. The studied cases were made sure that their data kept confidential.

2-8. Data analyses

The data were analyzed by SPSS (version 18.0) by using ANOVA for finding the relationship between fathers` and mothers` educational level, fathers` and mothers` job and parent`s age with knowledge and stages of change in the students, studied Pearson correlation coefficient was also used to find the correlation between knowledge and stages of change at 0.05 significant level.

3- RESULTS

The mean age of the studied students was 13.69± 1.95 years old. All students were in first grade of high school. The time of student's physical activity was reported 298 minute per week which is lower than global students. 292 ones (76 %) of their mothers were housekeepers and 167 ones (78.4 %) and 182 ones (47.4 %) of their fathers and mothers were diploma, respectively (**Table.1**).

The mean score of their knowledge types of physical activity was 53.18±21.82 which represents the moderate level (out of score 100), the assessment of stages of change showed that 165 ones (43 %) and 102 ones (26.6 %) of students were supposed in precontemplation and contemplation stages, respectively. In the way that 43 percent of students did not have any intention to change their behaviors at the moment of reporting and also in future. Among participating girls, 26.6 percent intended to change their behavior obviously and they were assessing the pros and cons of doing physical activity at the moment of reporting. Only 22 ones (5.7 %) of studied students were supposed to be in maintenance stage of physical activities. They did these activities regularly more than six months (P=0.021). In fact this stage emphasizes on continuity of a new sort of lifestyle. The individual take physical activity for a long period of time (**Table.2**).

On the other side, there was a significant relation between the students' stages of change and their father education level (P=0.000), so that most of the students whose fathers having academic education, have been in maintenance stage and done exercises regularly. Their mothers' job and stages of change were related to each other significantly in a way that most of the studied students passing maintenance stage, had the mothers who were housekeepers (P=0.037) (**Table.3**).

There was significant relation between the mother (P=0.014) and father job (P=0.05) and doing physical activity, so that those students whose mothers were housekeeper's they did physical activity for a longer period of time. In addition, the students whose fathers were self-employed did more physical activity (**Table.3**).

Table-1: Demographic characteristic of the studied girl adolescents

Variables	Sub groups	Number	Percent
Father age, year	Less than 40 years	34	8.9
	40-50 years	246	64.1
	Over 50 years	104	27.1
Mother age, year	Less than 30 years	112	29.2
	30-40 years	241	62.8
	Over 40 years	31	8.1
Fathers education level	Illiterate	12	3.1
	Primary school	15	3.9
	Junior high school	62	16.1
	Diploma	167	43.5
	University	128	33.3
Mothers education level	Illiterate	13	3.4
	Primary school	18	4.7
	Junior high school	71	18.5

	diploma	182	47.4
	University	100	26
Fathers job	Jobless	4	1
	Worker	35	9.1
	Self-employed	186	48.4
	Employee	137	35.7
	Others	22	5.7
Mothers job	Housewife	292	76
	Worker	7	1.8
	Self-employed	12	3.1
	Employee	69	18
	Others	4	1

Table-2: The Stage of Change related to girls adolescents physical activity

Variables	Frequency	Percent
Pre contemplation	165	43
Contemplation	102	26.6
Preparation	63	16.4
Action	32	8.3
Maintenance	22	5.7

Table-3: The Relation between Knowledge and stage of change of physical activity with demographic variables

Variables	Father age P- value	Mother age P- value	Fathers education level P- value	Mothers education level P- value	Fathers job P- value	Mothers job P- value
Knowledge	0.270	0.021*	0.366	0.091	0.501	0.296
Stage of Change	0.903	0.146	0.000*	0.136	0.202	0.030*
Physical activity	0.324	0.061	0.176	0.800	0.014*	0.050*

*P-value $\leq$ 0.05

4- DISCUSSION

Doing physical activities regularly is important for all the health and well- being of all people. There was significant relation between students' knowledge and their mothers' age, so that the studied adolescents that their mothers were 30 to 40 years old had higher level of knowledge about physical activity types, their duration and the methods of their performance. Younger mothers might have been patient more and must have communicated their daughters better in order to increase their knowledge about the importance of doing regularly physical activities, their duration, the steps of their performance and other points associated to them. On the other side, there was a significant relation between the students' stages of change and fathers' education level, in a way that most of the students whose fathers had academic education, were in maintenance stage and did exercises regularly. It is obvious that those adolescents having parents with more education level, gained more information about positive outcomes of physical activities. They naturally believed in this point that doing exercise causes to

be healthy and fresh and consequently, they try more frequently to do physical activities regularly for a longer period of time. On the other hand, their mothers' job and stages of change were related to each other significantly so that most of the studied students passing maintenance stage had the mothers who were housekeepers. There was significant relation between the mother (P=0.014) and father job (P=0.05) and doing physical activity, so that those students whose mothers were housekeepers they did physical activity for a longer period of time. In addition, the students whose fathers were self-employed did more physical activity; it may be due to this fact that their mothers and fathers had more time to spend with them and paid attention more to their activity.

In spite of the advantages of doing physical activity regularly, it has been decreased among girl adolescents. TTM is one of the models which have been used tremendously and successfully in health education interventions. Proschaska et al. (23) state that this model has key constructs of interrelated theories and focuses on the process of the people behavior change or accepting a healthy behavior. The philosophy of this model is to make proportionate psychological determinants with the individuals' preparathion for changing behavior. It also provides the policies for designing implementations making informed the peoples' supposed to be any stage and also can help to recognize the factors related to behaviors based on stages of change and also design suitable intervening processes.

It assists the client to go forward through the stages. The assessment of physical activity stages of change showed that 43, 26.6, and only 5.7 percent of the studied students were situated in Precontemplation, Contemplation and Maintenance stages respectively. Some barriers against young people participation in physical activities include time shortage, lack of motivation, insufficient support and guidance, incompetency feeling, the shortage of safety facilities, the limitation of physical activity facilities, and disregarding the disadvantages of physical activities (24). De Bourdehuij et al. studied sports activities of adolescents in Belgium. They found that 60 percent of the studied 12-13 years old adolescents were in maintenance level of sporting activities, whereas this figure was only 40 percent among the studied 17-18 year old adolescents (25). Hasani et al. (26) investigated 300 girl high school students in Lenjan city (2015); the results showed that most of them were in Precontemplation and Contemplation stages just the same as present study. Many girl students don’t think of doing physical activity or they do not do any measure to take physical activity within next six months even if they think about it.

There was a research conducted in Massachusetts, NewYork and Tennesi by Murielle et al. (27) in 2010 among high school students. They used Internet programs called "Health in Motion and the stages of TTM". They performed a comprehensive implementation for physical activity, because weight variable was important in order to manage it for a long time. It was illustrated that this factor was a modifying factor in predicting weight gain in adulthood. In the early phases, most of students were at risk (they were in Action stage or they did not reach to the recommended amount of behavior). This is consistent with the findings of present study.

Aghamolaie et al., conducted a study in Bandarabbas city, (Southern Iran) among the population over 15 years old about physical activity by use of stages of change. In this cross-sectional investigation, 1,600 adolescents were interviewed. Physical activity staging questionnaire was used to categorize them based on five stages of behavior change.

The results showed that according to behavior change towards physical activity, 59.9, 1.3, 3.2, 0.5 and 35.1 percent of the studied cases were in Pre-contemplation, Contemplation, Preparation, Action and Maintenance stages, respectively. The findings illustrated that the majority of the studied cases were in Precontemplation and Contemplation stages (28).

In Aghamolaie et al. s' investigation, 49.2 percent of the students had regular physical activity while 15, 15.8, 20, 15.8 and 33.4 percent of them were in Precontemplation, Contemplation, Preparation, Action and Maintenance levels, respectively (29). At the same time, the mean score of knowledge of the studied girl students were 53.18±21.82 which show moderate level of knowledge. The adolescents should recognize the behavior and achieve enough knowledge about it before being expected to take that behavior; so, providing the knowledge about behaviour is necessary before any behavior commitment.

On the other hand, informing people about regarding the healthy lifestyle is the first step in health education and doing effective interventions. Sanaienasab et al., studied the knowledge of the staffs in one of the University of Medical Sciences towards physical activity. They found that the mean score of their knowledge was 10.21. In addition, 21.7, 60.9 and 17.4 percent of them had weak, moderate and appropriate levels of knowledge, respectively (30). Ahmadi Tabatabei et al., reported that the mean knowledge score was very low at the first episodes of their study (31). In fact, regularly physical activity, as an important behavior for health promotion, causes to prevent or delay early death and happening chronic diseases. Some evidence shows that regularly physical activity leads to mental health promotion, depression and anxiety decrease, life satisfaction and life quality promotion (32). Health promotion programs of girls and women including regularly physical activity, is known as vital health necessities. However, their participation in the mentioned activity decreases after adolescence period (33). It may be one of the causes of low activity among students and their enormous presence in Precontemplation and Contemplation stages. Consistent moderate strength physical activity- such as walking, cycling, or contributing in sports – has important assistances for well-being. Children and adolescents aged 5–17 must collect at least 60 minutes of physical activity every day (34). In present study, the mean score of student's physical activity was 298 minutes per week which is lower than global standards. Doing exercise can lead to increase adolescents self-confidence, decrease their stress and also prevent them from addiction, juvenile delliquency and inappropriate entertainment.

It should be noted that the development of usefully healthy habits during puberty and the first steps of adolescence is very important. Because, establishing health behaviors are easier in these periods rather than the next phases of life. The mentioned habits can affect their health for a long time, because the behaviors conformed in adolescence are more prone to be stabilized in adulthood. Considering basically the causes of diseases change patterns and also understanding the importance of adolescence in providing health in the next life stages, the positive effects of physical activity has been proven in all age groups. Naturally, a descending age is seen for doing physical activity, one part of this reduction is happened in adolescence period. This decrease is started from adolescence and kept on up to youth period. Additionally, the studies show that this low physical activity is transmitted to adulthood period and stabilized especially among girls. Meanwhile, they are more exposed to the

dangers of low activity. It should be stated that the girls are less active than boys in all age groups and their physical activity level is lower than the opposite gender (35). Undoubtedly, the pattern of physical activity is multi-factor which is affected by the environment and body biological structure. The family and peers should be more considered in comparison with other environmental factors and the barriers associated with regularly physical activity should be removed or decreased (35).

It should be noted that inactive lifestyle is the main factor of different diseases. Furthermore, low physical activity among students is a warning matter for health officials. Therefore, the barriers against their activity should be recognized crystal clear, so that they can be handled efficiently. This recognition assists researchers and health planners to establish suitable strategies for increasing physical activity for adolescent.

Paying more attention to physical activity in school schedules especially for girl students making them interested schools, establishing sufficient theory-based interventions, in order to increase girls' knowledge about this issue and motivating them to do exercises permanently for more than six months, are some alternatives to promote this behavior among this population. It should be noted that providing supporting health environments for girl adolescents, bringing about suitable sport instruments and facilities for preventing the girls from relapsing into previous stages (pre-contemplation and contemplation), and using more reliable and accurate instruments for future studies are the other measures which seem to be effective in this field. Because it is probable that students fill the questionnaires incompletely due to be uninterested, having few commitment to the project process and being forced to complete it in their free time, all these factors can make bias in the study's results.

4-1. Limitations of the study

The results of this study cannot be generalized to other individuals. The use of self-report method was due to the deficiency of observation for the behaviors related based on stages to physical activity of change and descriptive procedure are the limitation of this study.

5- CONCLUSION

The time of student's physical activity was 298 minutes per week which is lower than global standards. The mean knowledge score of adolescents about type of physical activity and the time required for physical activity were 53.18± 21.82 (out of score 100), representing their moderate level of knowledge among them. Most of the students were at the precontemplation and contemplation levels and have no physical activity. Therefore, it is necessary to use health education and health promotion theories in order to recognize the individuals' stages of change and direct them through different stages.

The recognition of the individuals' changing levels and lead them from precontemplation and contemplation levels to the action and maintenance ones is critical. At the same time, removing the barriers and making the adolescents motivated, taking into consideration the role of family and other people and their role in his/her learning and continuity of the good behavior are important, holding sport classes consisted with girls students socio-economic situation, supporting of holding sport contests, walking and sport celebration for the girls should be considered they can promote to do physical activity regularly and permanently, is crucially significant.

6- CONFLICT OF INTEREST: None.

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