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Original Article

The Correlation between Peer Support and Adherence to Physical Activity among Students: The Mediating Role of Self-Regulation

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Abstract

Background: Students' adherence to physical activity can increase the duration of their participation in such activities and promote their physical and mental health. So, examining the factors related to students' adherence to physical activity is particularly important. Therefore, the primary aim of this study was to examine the correlation between peer support and adherence to physical exercise with the mediating role of self-regulation among high school students.
Methods: This study employed a descriptive correlational approach. The statistical sample comprised 373 male and female high school students of Gonbad Kavous, Golestan Province, Iran in 2024. For data collection, standardized questionnaires on peer support, self-regulation, and adherence to physical activity were used. The data were analyzed employing SPSS version 25 and Smart PLS version 4, with a significance threshold set at $P<0.05$. Also, statistical techniques such as Spearman's rank correlation coefficient and structural equation modeling (SEM) were used to analyze the data.
Results: The study results demonstrated a statistically significant positive correlation between peer support and self-regulation ($\beta=0.57$, $T=15.40$). The findings further revealed a statistically significant and positive correlation between peer support and adherence to physical activity ($\beta=0.29$; $T=7.07$). Finally, the positive relationship between peer support and adherence to sports was empirically validated, with the mediating role of self-regulation ($\beta=0.31$, $T=7.46$).
Conclusions: The findings indicated that peer support has the potential to foster beneficial outcomes, including enhanced self-regulation and greater adherence to physical activity among students. Students spend a significant part of their time at school with their peers, and peer support can be used to keep their adherence to physical activity.

Keywords: Exercise, Health Behavior, Self-Control

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1. Introduction

In modern societies, many students experience high levels of stress and often do not maintain consistent physical activity routines (1). The World Health Organization in 2022 reported that students are one of the groups who are highly at risk of physical sedentary behavior and inactivity (2). Consequently, there is an increasing international concern regarding physical inactivity among students, as data from various studies indicated that approximately 81% of these populations fail to meet established physical activity (PA) guidelines (3, 4). Given the development of new technologies that involve students in a variety of ways, this issue is concerning in the modern era, turning into a warning for future generations (5). In fact, physical inactivity is identified as a primary contributing factor to mortality across diverse demographic groups globally (6). According to previous investigations in Iran, adolescents and young people comprise about 22% of the total population, and more than 72% of high school students are exposed to inactivity and its consequences (7). On the other hand, consistent PA helps students improve their health, especially while they are in school, and promotes a healthy lifestyle for their future. Therefore, providing students with continuous PA programs in various environments, including schools, has always been a major concern (8). Likewise, recent research has indicated that engaging students in PA can offer them amplified health advantages, both physically and mentally (9).

Adherence to PA is defined as consistent and regular participation in PA over a period of time (10, 11). As adolescents and young people are supposed to do more than one hour of moderate to

vigorous PA, adherence as a positive mental state can help them overcome existing challenges and voluntarily participate in regular PA for a long-term (12). Research demonstrated that individuals who demonstrate a commitment to physical activity tend to experience improved physical and mental health outcomes, as well as a higher overall quality of life, in comparison with those who do not engage in such activities (13). Students' adherence to PA is affected by various factors, including individual, social, and environmental factors (14). In addition to the aforementioned factors, some studies considered peer support as an effective factor on students' adherence to PA (15-17).

Peers significantly influence and facilitate the adoption of healthy lifestyle behaviors among students, particularly in dietary practices and physical activity. Therefore, interventions based on peer participation are recommended to improve healthy lifestyles among students (17). Hu and colleagues (15) indicated that adolescents who received peer support showed higher levels of adherence to PA. In another study conducted by Zhou and colleagues (16), the results showed that peer support increased the weekly PA levels among classmates. Various perspectives are explored regarding how peer support may influence students' adherence to physical activity. Findings from several existing studies suggested that factors such as training and commitment (18), along with self-efficacy (19), can enhance the effectiveness of peer support in promoting one's adherence to PA. It has also been found that improving self-regulation through peer support can be effective in increasing adherence to PA. Self-regulation is a process that enables individuals to employ effective techniques for managing their emotions across various circumstances (20). Peer support allows them to face new challenges together, fosters a greater sense of responsibility for one another, and encourages deeper engagement in learning new skills alongside their peers. These factors, in general, facilitate new self-regulation strategies (20). Self-regulation developed through relying on peers can help people employ strategies to overcome barriers of engagement in physical activities like time constraints or lack of motivation, develop a positive attitude towards PA, and use alternative solutions to modify their exercise programs instead of abandoning it entirely (12). Similarly, Yakushina and colleagues (21) reported that through developed self-regulation skills and peer support, young people experience more positive emotions and lower levels of negative experiences in their adherence to PA. Given the beneficial impact of physical activity on students' physical and mental well-being, researchers sought to determine factors that affect engagement in such activities among students (8). Nonetheless, it was observed that a number of students cease their involvement in physical activity shortly after beginning (12). Therefore, it is crucial to find ways to encourage students to adhere to physical activity, and there is a need to enhance research on students' adherence to exercise. While adherence to PA can facilitate students' access to its benefits, factors affecting students' adherence to PA have been less studied based on the literature search. It is noteworthy that no empirical investigations have examined the mediating role of self-regulation and adherence to physical activity among high school students of both genders. Therefore, the present study aimed to investigate the correlation between peer support and adherence to PA among students, with the mediating role of self-regulation (Figure 1).

2. Methods

2.1. Design

The correlations between the variables of

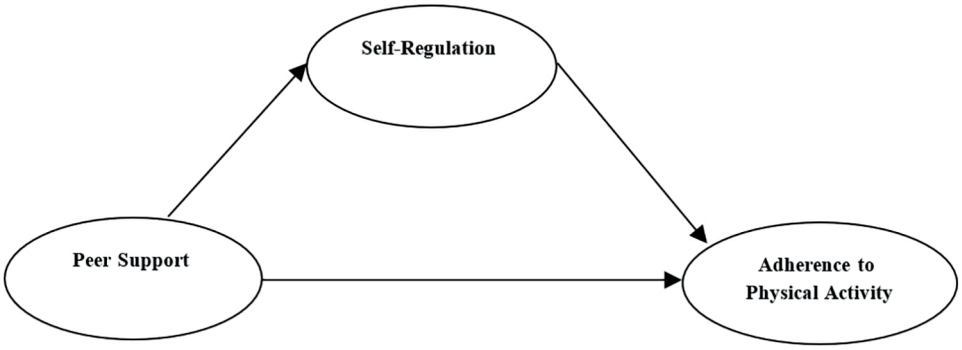

Figure 1: The figure shows the conceptual framework of the current research.

the study in the proposed model were analyzed through a descriptive correlational approach in structural equation modeling (SEM).

2.2. Selection and Description of Participants

The statistical population in this study included all male and female secondary school students in Gonbad Kavous, Golestan Province, Iran in 2024.

2.3. Sample Size Determination

This study employed a cluster random sampling technique to select a sample of 373 female students, who completed the questionnaires from October to November 2024. The sample size was determined through a multistage sampling procedure. Initially, one region within the Gonbad Kavous Education Region, Golestan Province, Iran was selected through simple random sampling method. Then, twelve high schools—comprising six girls' high schools and six boys' high schools—were randomly selected in this region. Finally, three classes from each high school were chosen using simple random sampling method to constitute the final sample.

2.4. Data Collection and Measurements

2.4.1. Peer Support: The peer support questionnaire has 3 items and was introduced by Verloigne and colleagues (22). Responses are recorded using a 5-point Likert scale, with numerical values ranging from 1 (strongly disagree) to 5 (strongly agree). The minimum possible aggregate score across items is 3, while the maximum attainable score is 15. The Persian version of this instrument was subjected to validation by a panel of eight experts, resulting in a CVI of 0.90 and CVR of 0.86. Also, in a preliminary study, the Cronbach's alpha coefficient for this questionnaire was calculated to be 0.84.

2.4.2. Self-Regulation: The Self-Regulation scale was initially developed by Gestsdóttir and Lerner (23). The items of this questionnaire are scored on a five-point Likert scale (1=strongly disagree to 5=strongly agree). The score of each item varies from 1 to 5, with a minimum score of 18 and a maximum score of 90. The Persian version of this scale was subjected to validation by a panel of eight experts, resulting in CVI of 0.88 and CVR of 0.84. Additionally, the Cronbach's alpha coefficient of this instrument was assessed in a preliminary investigation, yielding a reliability coefficient of 0.79.

2.4.3. Adherence to PA: The adherence to PA questionnaire was constructed by Wilson and Rodgers (24), and included 3 items. Each item is evaluated using a five-point Likert scale, ranging from 1 to 5; that is, the minimum possible score for each item is 3, and the maximum attainable score is 15. The Persian version of this instrument underwent validation by a panel of eight experts, resulting in CVI of 0.94 and CVR of 0.92. The Cronbach's alpha coefficient of this instrument was also reported to be 0.85 in a pilot study.

2.5. Procedure

For data collection, first, the students signed the written informed consent. It is worth mentioning that an important criterion for the respondents was that they had to answer all the questions in each of the questionnaires; otherwise they were excluded from the study. A total of 400 questionnaires were distributed to the study sample. Following the exclusion of incomplete responses, 373 completed questionnaires were incorporated into the final statistical analysis.

2.6. Data Analysis

Two descriptive and inferential methods were used to analyze the collected data. In the descriptive section, using SPSS version 25, items such as frequency, frequency percentage, mean, and standard deviation were calculated to describe the individual characteristics of the respondent sample and the variables of the study. In the inferential analysis, the validity and reliability of the structural model were initially determined by using Smart PLS version 4 software. Subsequently, the hypotheses were empirically tested. It is worth noting that the Sobel test was used to examine the mediating role of the classroom-related emotions variable.

3. Results

Table 1 shows the demographic data. The descriptive analysis indicated that the average age of the study participants was 16.26 years old. Additionally, the results revealed that the majority of the sample comprised students in the third year of secondary education (153 people). Table 2 shows the mean, standard deviation, data distribution status, and inter-variable correlations. The findings from the Kolmogorov-Smirnov test indicated that the data deviated from a normal distribution.

Table 1: Demographic characteristics of the participants

Grade	Frequency	Percent	Variable	Mean	SD
First grade	103	27.6	Age	16.26	1.41
Second grade	117	31.4			
Third grade	153	41			

SD: Standard Deviation

Table 2: Descriptive indicators and correlation between variables

Variables	Mean±SD	1	2	3	KS Z Value	P
1- Peer Support (PS)	10.79±2.79				2.88	<0.001
2- Self-Regulation (SR)	63.37±17.97	0.48**			1.86	<0.002
3- Adherence to Physical Activity (APA)	9.99±2.93	0.54**	0.50**		2.56	<0.001

**P <0.01; *P<0.05; SD: Standard Deviation; KS: Kolmogorov-Smirnov

Table 3: Paths in the model

Path	β	T
Peer Support -> Self-Regulation	0.57	15.40
Peer Support -> Adherence to Physical Activities	0.29	7.07
Peer Support -> Adherence to Physical Activities Through Self-Regulation	0.31	7.46

β: Path Coefficient; T: T Value

The Spearman correlation test was employed to assess the relationships between variables. The results indicated a positive and statistically significant correlation among the study variables.

In the inferential section, the quality of the model was first examined. According to the model fit results, the conceptual model fits well in this study (GOF=0.396; SRMR=0.073; R^2=0.324; VIF=1.483).

The inferential results are presented in Table 3. The β and T values for the relationships between variables can be seen in Figures 2 and 3. The results revealed a strong and positive relationship between peer support and self-regulation among high school students (β=0.57, T=15.40). Another part of the results showed that the correlation between peer support and adherence to PA among high school students is positive and significant (β=0.29, T=7.07). Finally, the results confirmed a positive and significant correlation between peer support and adherence to PA among high school students with the mediating role of self-regulation (β=0.31, T=7.46).

4. Discussion

The results of the present study revealed a positive and significant correlation between peer

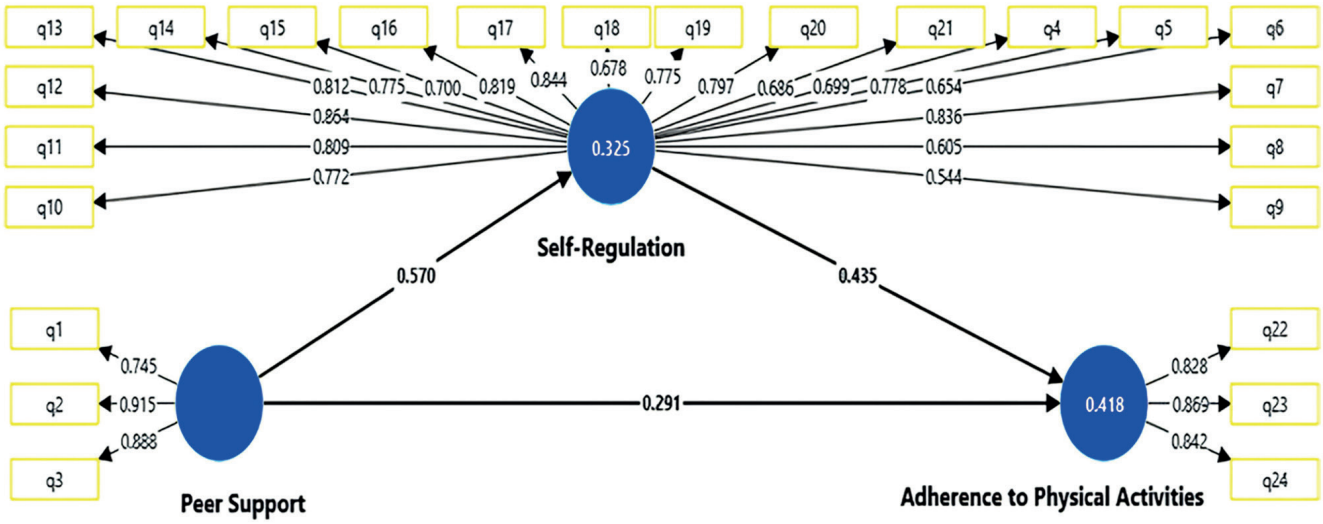

Figure 2: The figure shows the tested model in the standard estimation mode.

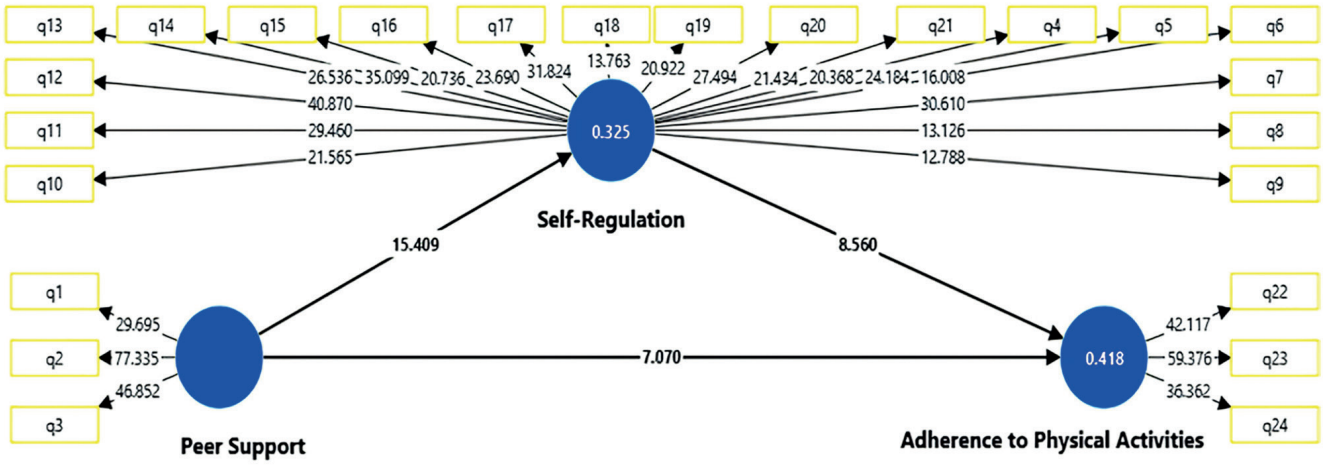

Figure 3: The figure shows the tested model in the T values mode.

support and adherence to PA among students. The findings of this study suggested that peers are influenced by each other in various ways during adolescence. This phenomenon is known as horizontal communication, since the connection between parents and adolescents starts to diminish while peer influence grows stronger throughout high school. One significant reason that students enjoy PA at this age is the sense of belonging they gain from their peers and teammates (16). In this regard, Zou and colleagues showed that parents can foster a sense of exclusive attachment between themselves and their children, but high school students can gain a sense of belonging, intimacy, and security from their peers in team sports. Students supported by their peers tend to engage in long-term sports together effortlessly after receiving encouraging feedback which in turn offers valuable insight into enhancing physical fitness (12). In the same vein, considering students' age, Kuzhelnyi and co-workers (25) stated that one of the influential ways to enhance adherence to PA among high school students can be the creation of peer support groups and encouraging them to participate in group activities of the physical education course in schools. Students often model their peers' behaviors; therefore, the motivation can be fostered by the presence of elite student athletes in various sports at high schools. At the same time, the emphasis can be put on the validation and adherence to physical activities (23). Additionally, a separate study focusing on American adolescents revealed that peer support stands out as the most significant predictor of students' physical activity (24). Similarly, Sember and colleagues (26) found that the influence of peer group on the level of participation in physical activities among high school students up to the age of 18 is 48%.

The study results indicated a strong significant correlation between peer support and students' ability to self-regulate. Mastering self-regulation as a vital competence demonstrates students' capacity to control their thoughts, emotions, and actions to achieve their goals (22). The effectiveness of peer support in promoting self-regulation varies depending on individual characteristics and peers' specific dynamics in a group. In other words, it suggests that peer support mechanisms may not have the same effects but can be influenced by individuals' specific cognitive, emotional, and behavioral needs and characteristics. Research showed that students with limited cognitive flexibility gain substantial advantages when surrounded by peers demonstrating high cognitive flexibility (27). Similarly, Kuzhelnyi and co-workers (25) pointed out that participation in peer support groups strengthens emotional validity among students, increases self-esteem and resilience, and equips them with the necessary coping strategies to deal with academic pressures and personal challenges.

Self-regulation is highly affected by social interactions and environmental factors (22). According to previous studies, peer social support has a positive and direct effect on students' health; that is, by increasing self-regulation skills, levels of PA can be promoted, regardless of stress levels (12, 17). In doing so, peer support has been considered as a critical factor in developing self-regulation skills among students, especially in early adolescence. The effect of peer support on the psychological factor of self-regulation is multidimensional,

encompassing cognitive, emotional, and behavioral dimensions (12). Students who are supported by peers with high levels of self-regulation tend to be able to manage their thoughts, emotions, and behaviors while learning skills and performing physical activities. This phenomenon can be related to observational learning, where students model and ultimately perform the athletic skills that they observe in their peers. Thus, it can be stated that in an environment where there is more interaction and shared goals among peers, self-regulation skills are potentially enhanced and this in turn leads to positive academic outcomes and social factors (28). Additionally, Zou and colleagues (12) demonstrated that peer support functions as a social factor and influences a number of facets of personal growth, including adolescents' self-regulation. However, peers' negative aspects may lead to feelings of inadequacy and prevent them from adherence to exercise among adolescents. In this regard, self-regulation, includes efforts to control or change an individual's internal state, which is not considered for adolescents (29). Annesi and Vaughn (30) believed that adolescents are not aware of the beneficial impact of PA, such as vital capacity, but as soon as they experience negative emotions caused by doing exercises, they will engage in negative behaviors.

Moreover, the study results indicated that the correlation between peer support and students' adherence to PA with the mediating role of self-regulation is positive and significant. This indicates that peer support positively influences students' adherence to physical activity via self-regulation, which is consistent with the findings of Zou and colleagues (12). Peer support is an influential factor on students' attitudes and behaviors in the school environment (12). Peer support refers to the assistance and encouragement that students provide to each other, often in a structured or informal way, to enhance academic, social, and emotional well-being. This type of support can take many forms and is increasingly recognized as a valuable component of a healthy school environment (17). In a supportive environment created by peers, students' sense of belonging and dependence on each other increases, which allows students to develop their personal and social skills with each other. Through the development of skills, students can increase their ability to adapt to different circumstances, which is a key component of self-regulation. Self-regulation is a process through which individuals psychologically manage to steer their goal-oriented pursuits across different times and situations, along with the capacity to modify their behaviors (30). Individuals who are confident in their emotional regulation can adopt effective strategies for regulating their emotions and strive to present themselves as key actors, which can increase their ability to meet personal needs (25). Self-regulation is an ability that can improve a person's perseverance to complete tasks. Self-regulation plays a significant role in forming constructive behaviors like taking part in PA. While some students may quit PA due to negative and unfortunate experiences or unforeseen circumstances (31), improving self-regulation can increase their duration and adherence to PA (12). For instance, self-regulation helps individuals maintain their motivation to continue PA by focusing on internal rewards (e.g., feeling energized, improving health) rather than external pressures. With the aim of fostering students' supportive relationships among peers through programs that encourage teamwork, shared challenges, and mutual encouragement, it is evident that administrators and educators/trainers can promote students' self-regulatory skills, and as a result increase their participation in physical activities and improve their overall health.

4.1. Limitations

In most previous studies, factors affecting students' participation in physical activities have been examined. However, in this study, adherence to PA was examined, which can be considered as the main strength of the study. Nevertheless, given the cross-sectional design of the study, the identified correlations should not be regarded as indicative of causation. Another limitation was that the study focused only on high school students. Future research should use experimental designs to study the effect of peer support on students' adherence to PA and whether improvements in self-regulation over time have an impact on PA adherence.

5. Conclusions

The present study indicated that peer support may foster beneficial outcomes, including enhanced self-regulation and increased adherence to PA among students. Students spend a significant part of their time at school with their peers, and peer support can be used to keep students' adherence to

PA. It is suggested that physical education teachers try to increase self-regulation and adherence to physical activities in schools by designing sports programs that require participation and cooperation between students.

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Authors' Contribution

Ali Chori: Contribution to the design of the work; drafting the work and reviewing it critically for important intellectual content. Nasser Bai: Acquisition, analysis, and interpretation of data for the work; reviewing the work critically for important intellectual content. Yazgaldi Nazari: Contribution to the design of the work; drafting the work and reviewing it critically for important intellectual content. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work, such as the questions related to the accuracy or integrity of any part of the work.

Conflict of Interests: None declared.

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Ethical Approval

The Ethics Review Board of Golestan University, Golestan Province, Iran approved the present study with the code of IR.GU.REC.1403.004. Also, written informed consent was obtained from the participants.

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