

Effects of Physical Activity on Psychosocial Distress among Children during the COVID-19 Pandemic: the Mediating Role of Resilience

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Abstract

Background: The aim of this study was to investigate the effects of physical activity level on psychosocial distress among children during the COVID-19 pandemic, considering the mediating role of resilience.

Method: The participants included 384 children aged 10 to 12 years (mean age of 11.10±0.73 years). Data was collected using standard questionnaires. Spearman correlation test and structural equation method were employed for analyzing the data.

Results: Level of students' physical activity was lower than the average (1.90), and psychosocial distress of our sample was higher than normal (49.77). The results showed that physical activity had significant effects on psychosocial distress (8.25) and resilience (10.17). In addition, resilience had a significant effect on psychosocial distress (5.98). Finally, resilience acted as a significant mediator in the association between physical activity and psychosocial distress ($P<0.001$).

Conclusion: These findings propose that physical activity can be assumed as an essential variable in coping with severe conditions during the COVID-19 pandemic.

Key Words: Children, COVID-19, Physical Activity, Psychosocial Distress, Resilience, Structural Equation Modeling (SEM).

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1- INTRODUCTION

COVID-19 as a novel coronavirus emerged in December 2019 in Wuhan (China) and has since spread rapidly in almost all countries across the world. The World Health Organization (WHO) announced COVID-19 disease as a pandemic on March 11, 2020 (1).

With the spread of coronavirus, isolation and strict quarantine were essential as a comprehensive preventive strategy to reduce its prevalence. As a result, governments around the world decided to close schools, which in turn the school-students spent most of their time at home (1). Although quarantine resulted in positive outcomes such as reduction of spread of the virus and subsequent mortality, it also led to major health challenges for school-students due to limited opportunities for physical activity and social contacts (2-3).

As a result, evidence has demonstrated that social isolation significantly reduced the participation of children and youth in physical activities (4-9). In addition, research has found that social isolation enhances mental illnesses such as depression and anxiety in children and youth (4, 9). To cope with such negative effects, the WHO recommended that children and youth “be active and stay healthy at home” (3). Parents also attempted to provide conditions for their children to engage in physical and sport activities.

Several studies have demonstrated that engaging in regular physical activity results in enhanced wellbeing among children and youth (10-14). Nevertheless, there are various mental health-related variables that need to be addressed regarding the effects of engaging in regular physical activity on the mental health of children and youth during COVID-19-related social isolation. One of the variables that can be important in this time

is psychosocial distress. Psychosocial distress is an emotional state or mood characterized by the feeling of loneliness, sadness, anxiety, suicidal ideation, and self-consciousness (15-20). It has been shown that individual and socio-cultural factors such as gender, lower formal education and lower socio-economic status, lack of social support, and stressful life are associated with psychosocial distress among children (16-18). Therefore, it can be assumed that a challenging condition like COVID-19 pandemic which led to many stressful events such as parent death, lack of enough socioeconomic support, and lack of social support could lead to enhancing psychosocial distress among individuals, particularly children. Hence, the primary aim of this study was to investigate the effects of engaging in physical activity during the COVID-19 pandemic on psychosocial distress among children.

Moreover, an important variable that could potentially influence psychosocial distress is resilience, which by itself could be affected by physical activity. Resilience can be defined as the potential or ability to adapt effectively in the face of setbacks, which is crucial for mental and physical health (21-26). Resilient individuals are equipped with the ability to handle negative emotions and crises successfully and experience less psychological pain, thus exhibiting better mental health (26). There is scientific consensus that engaging in physical activity can improve one's level of resilience (22-23).

However, the effects of engaging in physical activity during the COVID-19 pandemic on resilience of children has rarely been investigated. Therefore, the second aim of this study was to investigate the mediating role of resilience in the effects of physical activity on psychosocial distress among children during the COVID-19 pandemic.

2- MATERIALS AND METHODS

2-1. Participants

The current study employed a descriptive-correlational approach and was performed according to the ethical Declaration of Helsinki. Parents and students gave written consent. The participants included 384 children aged 10 to 12 years (mean age of 11.10 ± 0.73 years) who voluntarily participated in this study. This study was conducted in Tehran, Iran, in 2021.

2-2. Instruments

Physical activity was measured using the scale of Physical Activity Behavior in Leisure-Time (27), including three questions scored based on an eight-point Likert scale from zero days (0) to seven days (7). Herein, Cronbach's alpha coefficient of this scale was 0.88. Moreover, the COVID-19- Related Psychological Distress Scale (CORPD) scale was used to measure psychosocial distress (28) among children during the COVID-19 pandemic. The CORPD consisted of 14 items scored on a 5-point Likert-scale ranging from 1 = strongly disagree to 5 = strongly agree. High scores obtained from the scale indicate high levels of psychological distress. In the present study, the Cronbach's alpha coefficient of this scale was calculated as 0.93. Finally, resilience was measured by the use of the Connor-Davidson Resilience Scale (29). This scale has 25 items rated on a 5-point Likert scale from 0 "never" to 4 "always". The higher the scores, the greater the resilience. The reliability of this

questionnaire was estimated in this study with a Cronbach's alpha coefficient of 0.91.

2-3. Data analysis

To analyze the data, we used SPSS-26 and Lisrel software. Means and standard deviations were used to describe the variables. Kolmogorov-Smirnov test was employed to calculate normal distribution of data. Spearman correlation test was employed to compute the associations between the variables. Finally, the structural equation method was used to examine the effects of physical activity on psychosocial distress with the mediating role of resilience. P-value was set at $P < 0.05$.

3- RESULTS

Descriptive data and correlation matrix of study variables are presented in **Table 1**. Descriptive results show that in general, during the COVID-19 pandemic, the level of students' physical activity and resilience was lower than the average, and psychosocial distress of our sample was higher than normal. The results of Kolmogorov-Smirnov tests revealed that none of the variables were normally distributed (all $P < 0.05$). Correlation matrix showed that there was a significant inverse association between physical activity and psychosocial distress ($P < 0.001$). In addition, physical activity was directly and significantly related to resilience ($P < 0.001$). Finally, resilience was indirectly and significantly associated with psychosocial distress ($P < 0.001$).

Table-1: Mean, SD and correlation matrix of the research variables

Variable	Mean	SD	1	2	3
1. Physical Activity	1.90	0.81	-		
2. Psychosocial Distress	46.77	14.08	$r=0.567 P<0.001 *$	-	
3. Resilience	54.65	16.33	$r=0.691 P<0.001*$	$r=0.482 P<0.001 *$	-

* $P < 0.001$

Table 2 and **Fig. 1** present the findings of structural equation modeling. It was found that physical activity had significant effects on psychosocial distress (T=8.251) and resilience (T=10.175). In addition, resilience had a significant effect on

psychosocial distress (T=5.984). Finally, resilience acted as a significant mediator in the association between physical activity and psychosocial distress (P<0.001). **Table 3** presents the results of model fit, indicating that our model has a good fit.

Table-2: Results of structural equation modeling

No.	Path	β	T-value
1	Physical Activity => Psychosocial Distress	0.495	8.251
2	Physical Activity => Resilience	0.618	10.175
3	Resilience => Psychosocial Distress	0.369	5.984
		Z	P-value
4	Physical Activity => Resilience => Psychosocial Distress	5.551	P<0.001

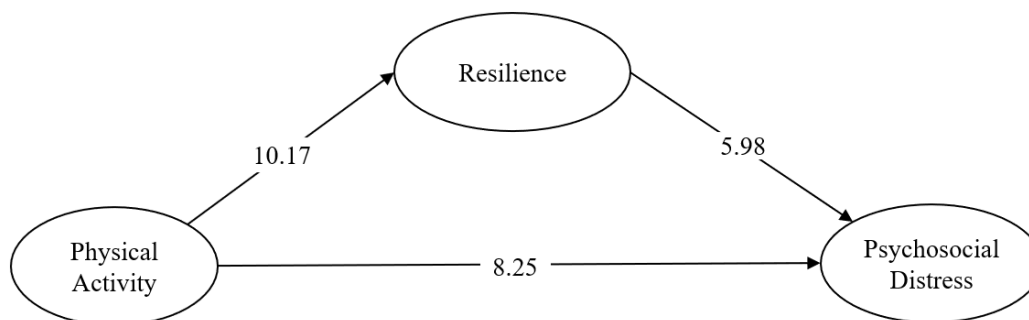


Fig. 1: Structural equation modeling in the form of T-values

Table-3: Results of model fit

Index	Optimal Range	Obtained Value	Conclusion
RMSEA	< 0.08	0.05	Good fit
X ² / df	< 3	2.10	Good fit
RMR	Closer to 0	0.03	Good fit
NFI	> 0.9	0.95	Good fit
CFI	> 0.9	0.95	Good fit

4- DISCUSSION

COVID-19 pandemic caused some serious and negative effects on lifestyle of children and youth including reduction of physical activity and mental health (4-6). Nevertheless, other mental health-related variables such as psychosocial distress need to be addressed regarding the effects of engagement in physical activity on the

mental health of children and youth during COVID-19-related social isolation. Thus, the purpose of the current study was to examine the effects of physical activity on psychosocial distress among children during the COVID-19 pandemic, considering resilience as a mediator. First of all, descriptive data revealed that in general, during the COVID-19 pandemic, the level of students' physical activity and

resilience was lower than the average, and psychosocial distress of our sample was higher than normal. Previous research has shown that the corona pandemic has decreased physical activity and increased mental illnesses such as depression, anxiety and stress (4-8). The findings of the present study also showed that psychosocial distress is negatively affected by the pandemic. This is quite understandable due to the fact that children (esp. school students) were exposed to difficult conditions during the pandemic such as limitations in regular social contacts with peers, loneliness, fear of relatives' death, lack of health services, and financial loss (5-9).

The findings of the current study demonstrate that children who had higher levels of physical activity had lower amounts of psychosocial distress as well as higher amounts of resilience during the COVID-19 pandemic. Previous studies have also shown that higher levels of physical activity could result in better mental health during the COVID-19 pandemic (8-9). Thus, our findings, in this regard, are in accordance with those of previous studies. To discuss our findings, it can be stated that regular exercise and physical activity, by making changes in the level of brain arousal and biochemical and psychological structure of the individual, strengthen and develop social processes such as self-esteem, independence, empathy, reducing aggression and anxiety. Accordingly, physical activity and exercise cause people to show a higher tolerance threshold in dealing with problems (24, 26). As this study has shown, increasing physical activity improves individuals' resilience during the COVID-19 pandemic. Therefore, physical activity may be one of the factors that affect some of the individual characteristics and virtues related to resilience in individuals and improve their resilience during the COVID-19 pandemic. Some researchers have suggested that resilience changes

over time and can be induced in individuals and be increased through protective agents. Based on the endogenous model of resilience, Wagnild (29) believes that people can maintain and improve endogenous resilience by strengthening resilience. Strengthening resilience includes social support, health care, balance in recreation and entertainment, rest and responsibility. Therefore, during the pandemic, children also need higher social support from parents and important people in order to develop their resilience.

4-1. Limitations of the study

There are some limitations in the present study that should be considered when interpreting the results. First, this study used a cross-sectional design which creates limitations for examining causal influence of physical activity and resilience on the psychosocial distress among children during the COVID-19 pandemic. Second, lack of measuring the social-economic status of the students might be another limitation of this study. Future studies should focus on longitudinal measurements with an emphasis on socio-economic status of students.

5- CONCLUSION

In summary, the current study found that physical activity has significant effects on psychosocial distress in children during the COVID-19 pandemic. Moreover, resilience significantly mediated the effects of physical activity on psychosocial distress in children during the COVID-19 pandemic. These findings propose that physical activity can be assumed as an essential variable in coping with severe conditions during the COVID-19 pandemic. Thus, during a pandemic, mental health of children can be enhanced or maintained through engagement in physical activities, which subsequently can increase resilience. It is, then, recommended that parents and

stakeholders design programs for encouraging children to engage in physical activities during the COVID-19 pandemic.

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7- CONFLICTS OF INTEREST

None.

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