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ORIGINAL ARTICLE

Self-esteem and Depression Symptoms among late Adolescents: A Parallel Mediation Model

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Abstract
Researchers have explored the direct association between self-esteem and depression as well as the factors that mediate it. The parallel mediating roles of life satisfaction and anxiety symptoms in the aforementioned direct link are, however, poorly understood, particularly in the Vietnamese context. This study investigated whether life satisfaction and anxiety symptoms mediate the association between self-esteem and depression symptoms among late adolescents in Vietnam. Using a cross-sectional survey, Vietnamese late adolescents ($N = 408$, 83.6% female; $M_{age} = 19.95$ years) completed questionnaires related to anxiety symptoms, depressive symptoms, life satisfaction, and self-esteem. The results indicated that in the parallel mediation model, both direct and indirect effects were significant ($\beta = -0.080$, $p < 0.05$, and $\beta = -0.391$, $p < 0.01$). The association between self-esteem and depression symptoms was mediated by life satisfaction and anxiety symptoms. These findings suggest that to reduce the adverse impact of self-esteem on depression symptoms, effective measures should prioritize reducing anxiety symptoms and increasing life satisfaction among late adolescents.

Keywords Anxiety · Depression · Life Satisfaction · Self-esteem · Vietnam

Introduction

Adolescence is a critical phase of development, marked by considerable educational pressures and significant adjustments in both physical and mental aspects (Zhao et al., 2021). Therefore, self-esteem (SE) during adolescence often exhibits fluctuations as adolescents undergo significant changes in their roles and responsibilities. Typically, SE experiences a decline in the early years of adolescence but shows signs of recovery by the middle and later years (Trzesniewski et al., 2003; Zhao et al., 2021). SE refers to one's perception of their own worth, competence, and importance (Kalliopuska, 1990). According to Rosenberg (1965), SE represents an individual's overall assessment of their own thoughts and feelings about themselves, as well as their attitude toward themselves. SE significantly influences key life outcomes, including social and health outcomes, during both adolescence and adulthood (Nguyen et al., 2019). The implications of low SE at this stage can be profound, potentially affecting academic performance (Booth & Gerard, 2011), social interactions, and physical health (Lu et al., 2018), and mental health (Henriksen et al., 2017; Ho, 2024). Understanding these dynamics is essential for developing targeted interventions to support adolescent mental health.

Depression is a mood disorder characterized by a persistent feeling of sadness and a loss of interest. According to the DSM-5, depression symptoms (DS) include a depressed, empty, or irritable mood, which, when combined with specific physical and cognitive symptoms, results in significant suffering or functional impairment (Bernaras et al., 2019). Previous studies have established an association between low SE and DS (Chai et al., 2020; Johnson et al., 2016; Keane & Loades, 2017; Shahar & Davidson, 2003; Steiger et al., 2015); however, the exact causal relationship between these variables remains a subject of interest for researchers. Both the vulnerability model (Chai et al., 2020; Keane & Loades, 2017; Orth et al., 2016) and the scar model (Shahar & Davidson, 2003; Steiger et al., 2015) address the relationship between SE and DS. According to the vulnerability model, low SE predicts the emergence of DS (Chai et al., 2020; Keane & Loades, 2017; Orth et al., 2016), whereas

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the scar model suggests that DS leave individuals with lasting scars that impair their SE (Shahar & Davidson, 2003; Steiger et al., 2015). This study aims to examine the link between SE and DS in late adolescents, as well as the role of AS and LS in this relationship. SE was identified as a primary factor associated with depression in a sample of 182 Italian late adolescents (Fiorilli et al., 2019). Similar findings were observed in a longitudinal study, which found that low SE may adversely affect DS over 1- to 1.5-year intervals among late adolescents (Masselink et al., 2018). A positive correlation between low SE and increased DS was also reported in a sample of Chinese late adolescents (Gao et al., 2022; Li et al., 2019). Thus, evidence from both longitudinal and cross-sectional studies in recent years supports the vulnerability model.

DS are common mental health-related symptoms in adolescents. DS in adolescents is a problem that needs more attention because the proportion of late adolescents with depression tends to increase (Klaufus et al., 2022; Wilson & Dumornay, 2022) and has serious consequences. Adolescent depression can be influenced by many factors, such as anxiety symptoms (AS), SE and life satisfaction (LS). Understanding how SE, AS, and LS simultaneously impact DS in adolescence is important for future development. Researchers have looked into the direct link between SE and depression, as well as the factors that mediate it. However, the parallel mediating roles of LS and AS in the aforementioned direct link are poorly understood, particularly in the Vietnamese context.

The Association between SE, LS, and DS

Self-evaluation of one's quality of life based on one's own standards is known as LS (Shin & Johnson, 1978). It is recognized as a crucial determinant of life quality and a key component of positive psychology (Yu et al., 2020). In previous studies, SE was identified as a factor related to LS. The key finding of prior research is that LS is strongly predicted by one's level of SE (Moksnes & Espnes, 2013; Ye et al., 2012). While LS is an individual's evaluation of their life as a whole, encompassing numerous aspects like school, family, friends, and self-perception, SE is an individual's perception and appraisal of themselves (Çivitci & Çivitci, 2009). Therefore, it is logical to anticipate that adolescents' confident thoughts and feelings about their values (SE) may have a stronger impact on their positive judgment of life (LS), since LS depends on several crucial factors like self-perception and interpersonal interactions (Szcześniak et al., 2022). Indeed, a direct link between SE and LS has been demonstrated in samples of late adolescents in Turkey (Çivitci & Çivitci, 2009), Norway (Moksnes et al., 2022; Moksnes & Espnes, 2013), and China (Kong et al., 2013). Recently, a study of 429 high school students in Poland showed that SE is positively correlated with LS in adolescents, with peer communication serving as a mediating mechanism regulating this direct relationship (Szcześniak et al., 2022). Additionally, LS has been found to be related to DS (Gigantesco et al., 2019; Moksnes et al., 2016). According to Gigantesco et al. (2019), using LS as a health indicator may be useful for identifying those at risk for DS. A study of 1,239 adolescents (13–18 years old) in Central Norway showed that LS was significantly negatively associated with DS and, moreover, that LS mediates the link between school-related stress and DS (Moksnes et al., 2016). Similarly, a study of 2,338 students in Korea revealed that happiness and LS were associated with a lower risk of DS, indicating that improving LS and happiness will be important in preventing and controlling depression (Seo et al., 2018). Recently, a study on a sample of 428 late adolescents in Brazil also showed that LS can decrease DS in adolescents through effects at school (Dias-Viana & Noronha, 2022).

The Association between SE, AS and DS

Anxiety is an uncontrollable, broad, unpleasant, and enduring state of negative affect marked by an apprehensive expectation of unforeseen and unavoidable future danger, as well as physiological symptoms of tension and a continuous state of increased vigilance (Barlow, 2002). It has long been known that AS and SE are related, and this relationship appears to be bidirectional. Available evidence suggests that AS decrease SE (Fernandes et al., 2022; Mustafa et al., 2015; Spielberger, 2018), and that low SE may also increase AS (Nguyen et al., 2019; Rosenberg, 1962). It seems that the effect of AS on subsequent SE is weaker than the effect of SE on AS (Manna et al., 2016). However, according to one longitudinal study, the effects between AS and SE were relatively balanced (Sowislo & Orth, 2013). This indicates that the predicted effect of AS on SE is similar to the predicted effect of SE on AS.

In a sample of 409 adolescents between the ages of 14 and 18, it was found that adolescents with low SE exhibited more symptoms of psychological distress (including AS and DS) (Duchesne et al., 2017). In Vietnam, Nguyen et al. (2019) also found a negative correlation between SE and AS in 1,149 late adolescents. Similar results were found in a sample of first-year students in Sweden (Nima et al., 2013) and a sample of adults in Spain (de la Torre-Cruz et al., 2021). In addition, many studies have found a positive correlation between symptoms of AS and DS (Havnen et al., 2020; Jacobson et al., 2017; Li et al., 2018). A person's DS may worsen as a result of their AS (Havnen et al., 2020; Jacobson et al., 2017; Li et al., 2018). For instance, Li et al. (2018) found that the connection between AS and DS

among adolescents was considerably mediated by unrestful sleep and insomnia. Recently, Havnen et al. (2020) found that AS mediated the association between stress symptoms and DS in the adult population, which in turn was moderated by resilience. As such, there are many factors that can explain the path from AS to DS. More importantly, AS mediated the link between low SE and DS (de la Torre-Cruz et al., 2021; Nima et al., 2013) among college students and adult samples.

Purpose and Hypothesis of this Study

This study aims to explore the parallel mediating roles of LS and AS in the association between SE and DS among late adolescents in Vietnam. Based on previous studies, we hypothesize the parallel mediating roles of LS and AS in the association of SE with DS. We want to investigate the following direct and indirect effect hypotheses:

H1: SE would be negatively related to DS.

H2: LS and AS would mediate the association between SE and DS.

Methods

Sample

Our study obtained informed consent from the participants and adhered to ethical standards for research involving human subjects. Prior to starting the survey, we used Slovin's formula to determine the sample size required for the study. According to this formula, the sample size should exceed 396 ($N = 40{,}000$ and $e = 0.05$). We employed a convenience sampling method to select participants from an economics university between May 2021 and June 2021. A total of 408 participants completed all scales and questionnaires, of whom 341 (83.6%) were female. The mean age of the participants was 19.95 (SD = 1.636).

Measures

Participants provided information on their age, gender, and school level. Additionally, they completed the following measures:

Table 1 Mean, standard deviations and Pearson correlations among study variables

Variables	M ± SD	AS	DS	LS
AS	11.803 ± 7.899	1		
DS	9.275 ± 8.448	0.750**	1	
LS	20.831 ± 5.835	-0.184**	-0.280**	1
SE	17.814 ± 3.967	-0.319**	-0.467**	0.263**

Vietnamese version of the Depression Anxiety Stress Scales − 21 (V-DASS 21): The DASS 21 was developed to assess symptoms of stress, anxiety, and depression (Lovibond & Lovibond, 1995). The V-DASS 21 had been previously used in research (Nguyen et al., 2020; Trần Kim Trang, 2012). In this study, we used the Anxiety and Depression subscales to measure participants' symptoms of anxiety and depression. Each subscale consisted of 7 items, rated on a 4-point Likert scale from 0 (never) to 3 (very often). Scores for each subscale were calculated by summing the scores of the relevant items and multiplying by two. Both subscales demonstrated good internal consistency in this study (anxiety: $\alpha = 0.77$; depression: $\alpha = 0.87$).

Vietnamese version of the Satisfaction with Life Scale (V-SWLS): The 5-item SWLS (Diener et al., 1985) was used to measure participants' overall LS. The V-SWLS had been employed in previous studies (Tran & Van Vu, 2018). Responses were recorded on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicated higher levels of LS. The internal consistency in this study was satisfactory ($\alpha = 0.79$).

Vietnamese version of the Rosenberg Self-Esteem Scale (V-RSES): The RSES is a self-reported questionnaire that assesses individuals' global SE (Rosenberg, 1965). The V-RSES had been used in prior research (Nguyen et al., 2019). The scale included ten items with a Likert range of 0–3 (strongly agree to strongly disagree). Higher scores represented higher levels of SE. The internal consistency in this study was satisfactory ($\alpha = 0.70$).

Data Analysis

We used SPSS 20.0 and AMOS 20.0 for data management and analysis. AMOS was used for model fitting and path analysis, while SPSS handled descriptive statistics. In the first phase, we examined the internal consistency of all scales. In the subsequent phase, we calculated the mean scores and standard deviations for age, AS, DS, SE, and LS, as well as the gender ratio in the sample. In the third phase, Pearson correlation analysis was conducted to determine the linear relationships between the main variables. In the final phase, structural equation modeling (SEM) was performed to evaluate the path and fit coefficients of the hypothesized model.

Results

Preliminary Analysis

Table 1 indicated that AS were positively related to DS ($r = 0.750$, $p < 0.01$) and negatively related to LS and SE

Table 2 Model fit statistics

	χ^2/df	GFI	CFI	TLI	RMSEA
Reference standard [suffering]	[2; 5]	[0.80; 0.90]	[0.80; 0.90]	[0.80; 0.90]	[0.08; 0.10]
Parallel mediation model	3.619	0.800	0.805	0.800	0.080

Table 3 Bias-corrected bootstrap test on mediating effects

The effects	β	Sig (*p*)	CI
SE ⇨ LS	0.246	0.002	0.144; 0.353
LS ⇨ DS	-0.120	0.002	-0.186; -0.061
SE ⇨ AS	-0.392	0.001	-0.499; -0.298
AS ⇨ DS	0.924	0.004	0.856; 0.973
SE ⇨ DS	-0.080	0.031	-0.153; -0,019
Total indirect effects	-0.391	0.001	-0.495; -0.304
Total effect (SE ⇨ DS)	-0.471	0.001	-0.568; -0.389

(r = -0.184 and r = -0.319, $p < 0.01$). DS were negatively related to LS and SE (r = -0.280 and r = -0.467, $p < 0.01$). LS was positively related to SE ($r = 0.263$, $p < 0.01$).

Parallel Mediation Model Analysis

The parallel mediation model showed an acceptable fit for the data, as presented in Table 2: $\chi^2/df = 3.619$, $RMSEA = 0.080$; TLI = 0.800; CFI = 0.805; GFI = 0.800.

Table 3; Fig. 1 presented the results of the parallel mediation analysis of LS and AS in the link between SE and DS. Table 3; Fig. 1 demonstrated that the single paths in the parallel mediator model were statistically significant. SE positively predicted LS (β = 0.246, $p < 0.01$), and LS negatively predicted DS (β = -0.120, $p < 0.01$). SE negatively predicted AS (β = -0.392, $p < 0.01$), and AS positively predicted DS (β = 0.924, $p < 0.01$). In addition, both direct and indirect effects of SE on DS were significant (β = -0.080, $p < 0.05$ and β = -0.391, $p < 0.01$). Furthermore, the data from Table 3 also showed that the indirect effect was higher than the direct effect from AS to DS. The indirect

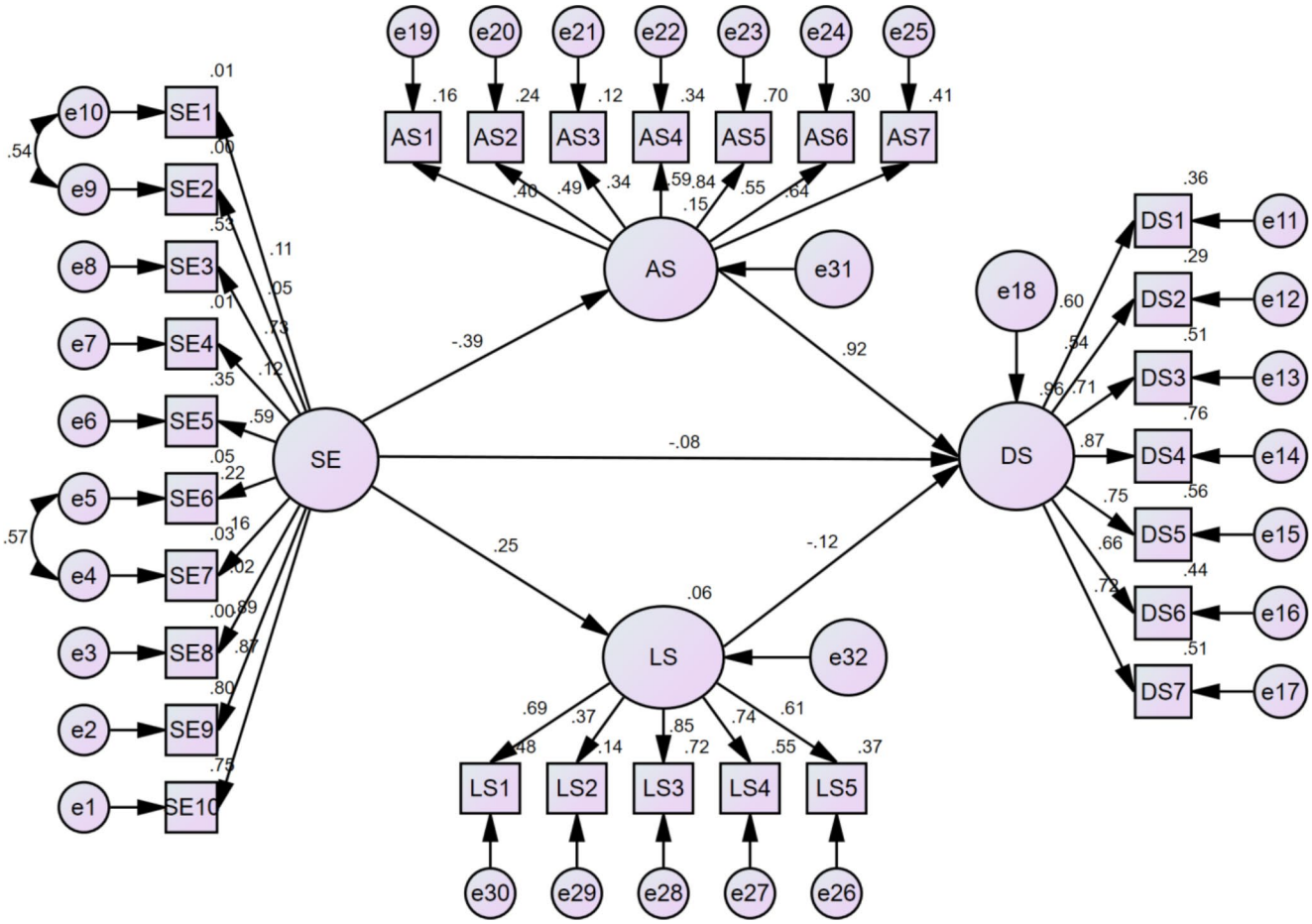

Fig. 1 Parallel mediation model of LS and AS in the association between SE and DS

effect from SE to DS through LS (β = 0.246 x -0.120) was lower than the indirect effect from SE to DS through AS (β = -0.392 × 0.924). These data demonstrated the existence of a parallel mediating model of LS and AS in the relationship between SE and DS.

Discussion

This study contributes to our understanding of the association between SE and DS in Vietnamese late adolescents. It also raises questions about the potential parallel mediating effects of LS and AS on this association. The majority of research on the association between SE and DS has been conducted abroad. To evaluate interventions aimed at reducing symptoms of depression, it is crucial to have a better understanding of this particular association among Vietnamese late adolescents, as well as the role of LS and AS in this relationship.

The results of this study supported our first hypothesis: there was a positive association between SE and DS among late adolescents. This finding is consistent with previous studies that have suggested low SE is associated with an increase in DS (Fiorilli et al., 2019; Gao et al., 2022; Li et al., 2019; Masselink et al., 2018; Orth et al., 2016). Loneliness, social exclusion, social avoidance, and a lack of social support are all consequences of low SE and can contribute to the development of DS (Ottenbreit & Dobson, 2004). Additionally, a negative self-evaluation is one of the ten symptoms listed in the diagnostic criteria for depression in adolescents (Hards et al., 2020). It is therefore important to elucidate the negative effects of SE on the development of depression in Vietnamese late adolescents so that appropriate interventions can be developed to reduce their DS.

According to the parallel multiple mediation analysis, the association between SE and DS was partially mediated by LS and AS. Late adolescents' DS should be reduced by addressing both LS as a protective factor and AS as a risk factor. First, the impact of SE on DS among Vietnamese late adolescents was mediated by LS. Our findings therefore support previous studies that have found that people with low SE may have lower levels of LS (Çivitci & Çivitci, 2009; Kong et al., 2013; Moksnes et al., 2022; Moksnes & Espnes, 2013; Szcześniak et al., 2022; Ye et al., 2012) and that low LS increases DS (Dias-Viana & Noronha, 2022; Gigantesco et al., 2019; Moksnes et al., 2016; Seo et al., 2018). According to previous studies, higher SE is thought to lead to better coping and adjustment skills when faced with difficult life circumstances, which may further safeguard the person's health and well-being (Çivitci & Çivitci, 2009; Huo & Kong, 2014; Moksnes et al., 2022). LS is an index of subjective well-being and one of the key aspects of positive mental health (Gigantesco et al., 2019; Vaillant, 2003). Therefore, a person's positive assessment of their life can increase positive health outcomes (Diener et al., 2018) and decrease DS (Dias-Viana & Noronha, 2022; Gigantesco et al., 2019; Moksnes et al., 2016; Seo et al., 2018).

Second, the impact of SE on DS was mediated by AS among late adolescents. This finding implies that low SE may increase the experience of AS and thus increase DS. The results of our study are in agreement with previous studies conducted on samples of college students in Sweden (Nima et al., 2013) and a sample of adults in Spain (de la Torre-Cruz et al., 2021). According to previous literature, people with low SE frequently state that they don't think they deserve positive emotions, and as a result, they are less likely to use emotion control techniques to enhance their emotional experience (Fernandes et al., 2022). Therefore, late adolescents with low SE exhibited more symptoms of anxiety and depression (de la Torre-Cruz et al., 2021; Duchesne et al., 2017; Nguyen et al., 2019; Nima et al., 2013). In addition, DS may appear simultaneously with or following AS (Hirschfeld, 2001). It can therefore be said that AS can develop and worsen DS (Havnen et al., 2020; Jacobson et al., 2017; Li et al., 2018).

Third, we found that the direct effect of SE on DS is smaller than the indirect effect of SE on DS through LS and AS. This demonstrates the important role of LS and AS in the link between SE and depression in Vietnamese late adolescents. LS has been identified as a personal protective factor against negative emotions and enhanced mental health (Veronese et al., 2012), while AS may become a risk factor for depression (Havnen et al., 2020; Jacobson et al., 2017; Li et al., 2018).

Fourth, we found that the indirect effect from SE to DS through AS was higher than the indirect effect from SE to DS through LS. This result implies that, compared with LS, AS contributed more significantly to the association between SE and depression. From the findings of this study, we can see the need for appropriate depression prevention programs for at-risk late adolescents in the Vietnamese context. According to our results, depression prevention measures should simultaneously focus on reducing AS and enhancing LS for late adolescents. In addition, improving late adolescents' SE also needs to be taken into account when developing depression prevention programs.

The significant finding of this study was the parallel mediating role of LS and AS in the relationship between SE and DS among late adolescents in Vietnam. The connection between SE and DS has been the subject of past investigations (Fiorilli et al., 2019; Gao et al., 2022; Li et al., 2019; Masselink et al., 2018; Orth et al., 2016). Nevertheless, very few studies have looked at LS and AS as parallel mediators in this association.

Thus, the findings of this study offer valuable insights into the complex relationship between SE, LS, AS, and DS, highlighting both theoretical and practical implications. In particular, the finding regarding the parallel mediating role of LS and AS in the association between SE and DS sheds light on a complex psychological model that has not been fully explored in previous research. While current theories often examine the direct relationship between SE and DS (Fiorilli et al., 2019; Gao et al., 2022; Li et al., 2019; Masselink et al., 2018), this finding suggests that SE can affect DS not only directly but also indirectly through changes in LS and AS. Specifically, improving LS can protect against DS, while AS may increase the risk of depression. Therefore, this understanding adds to psychological theory by clarifying the mechanisms through which SE influences DS, expanding theoretical models of the interaction between psychological factors and mental health. From a theoretical perspective, this advances the development of new research models to examine the role of mediating factors in complex psychological relationships.

On a practical level, this finding has important implications for developing intervention and support programs for adolescents. To effectively reduce DS, intervention strategies should not only focus on enhancing SE but also on improving LS and reducing AS. In addition, depression prevention programs should include activities that boost LS, manage anxiety, and develop emotional regulation skills. For example, counselors, educators, and parents can use this information as a basis for designing appropriate psychological support to help adolescents maintain positive SE and develop necessary coping skills. Moreover, government and educational organizations can also use these results to adjust policies and educational programs, aiming to strengthen protective factors and reduce the risk of depression among adolescents.

The limitations of this study should be considered for future research. A randomized controlled trial or longitudinal study is needed to investigate causality and further aspects of SE's impact on DS among late adolescents, as the cross-sectional approach used in this study can only reveal, at best, significant relationships between the variables of interest. Additionally, longitudinal data should ideally be employed to analyze mediating interactions, given its relevance to understanding the sequence of causality. Finally, caution should be exercised when interpreting the mediation results, given that the current study used a cross-sectional approach.

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Data Availability Research data are not shared.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee.

Competing Interests The authors report no conflicts of interest.

Informed Consent Informed consent was obtained from parents and participants.

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