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The Association between Emotional and Psychological Well-Being and Adolescent Aggression: A Cross-Sectional Study

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Abstract

Background: During adolescence, rapid changes in the physical, cognitive, and social domains can make it difficult for individuals to regulate their emotions, potentially leading to increased aggression when psychological well-being is compromised.

Objective: This study aimed to examine the association between emotional and psychological well-being and levels of aggression among high school students.

Methods: This cross-sectional study was conducted between July 2024 and May 2025 and included 195 high school students in Mersin, Turkey, who met the sampling criteria. Data were collected using a demographic information form, the Stirling Children's Emotional and Psychological Well-Being Scale (SCWBS), and the Buss-Perry Aggression Questionnaire (BPAQ). Data analysis included descriptive statistics, Pearson correlation, linear regression, t-tests, one-way ANOVA, and post hoc tests.

Results: The majority of participants were female. Emotional and psychological well-being was significantly and inversely associated with overall aggression and with its hostility, anger, and verbal aggression subscales, both before and after adjustment for sociodemographic and behavioral covariates. In a multivariable linear regression model, emotional and psychological well-being was associated with overall aggression scale score (adjusted B=-0.551, 95% CI: (-0.845 – -0.257, p<0.001). After adjustment, the association between well-being and physical aggression across other domains of the aggression scale was no longer statistically significant (adjusted B=-0.045, 95% CI: -0.165 to 0.076, p = 0.466).

Conclusion: Emotional and psychological well-being are significant negative predictors of aggression in adolescents, suggesting that enhancing well-being may be an effective strategy for reducing aggressive behavior.

Keywords: *Adolescent, aggression, emotional well-being, psychological well-being.*

INTRODUCTION

Adolescence is a developmental stage typically ranging from ages 12 to 18, characterized by substantial physical, cognitive, social, and hormonal transformations. These rapid changes may create challenges for adolescents in regulating their emotions and adapting to evolving internal and external demands [1]. During this period, individuals are expected to develop personal values, construct their own perspectives on life, and evaluate both their own expectations and those imposed by others [2]. As adolescents attempt to cope with these developmental demands, they may experience emotional instability, inner conflicts, and difficulties in problem-solving. Such challenges can contribute to feelings of loneliness, misunderstanding, and pessimism, which may ultimately lead to maladaptive coping strategies and engagement in risky behaviors [3, 4]. These processes may also result in conflicts within family, school, and peer environments.

Aggression among adolescents is a significant public health concern worldwide. Globally, around a quarter of children and adolescents are estimated to experience some form of violence, and youth homicide remains among the leading causes of death in this age group [5, 6]. Beyond its immediate physical consequences, aggressive behavior during adolescence is associated with long-term psychological, social, and academic consequences, including impaired peer relationships, school dropout, substance use, and continuation of violent behavior into adulthood [6, 7]. Predictors of adolescent aggression that have been identified in the literature include family conflict, peer victimization, low socioeconomic status, exposure to violence, and, increasingly, indicators of poor emotional and psychological well-being [6, 8, 9]. School- and community-based programs targeting emotion regulation, social skills, and well-being have been proposed as promising strategies to curb adolescent aggression [7].

Psychological well-being can be conceptualized as an individual's ability to maintain positive functioning, including experiencing positive emotions, establishing meaningful relationships, making autonomous decisions, and developing a sense of purpose in life [10, 11]. Emotional well-being, on the other hand, is generally associated with positive affect and overall life satisfaction [12]. Adolescents with higher levels of emotional and psychological well-being tend to demonstrate better interpersonal relationships and lower levels of conflict [13, 14]. In contrast, insufficient well-being may impair emotional regulation and increase the likelihood of maladaptive behaviors, including aggression [15].

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Aggression is commonly described as behavior intended to cause physical or psychological harm to others [16]. During adolescence, the use of aggression as a coping or problem-solving strategy may result in negative and potentially long-term consequences [17].

Aggressive behavior is influenced by multiple factors, including individual characteristics as well as psychological and social variables such as peer relationships, exposure to violence, low self-esteem, and unmet emotional needs [8, 9]. Although aggression can occur across all age groups, its prevalence tends to increase during adolescence [18]. While previous studies have extensively examined aggression during adolescence [19, 20], relatively limited research has focused specifically on the association between emotional and psychological well-being and aggression [21, 22]. Given the high prevalence and serious consequences of adolescent aggression, and the comparatively limited attention paid to emotional and psychological well-being as a correlate of aggression in Turkish high school students, clarifying this association may help identify a modifiable target for school-based prevention efforts. Beyond these established correlates, a history of traumatic experiences warrants particular attention as a potential determinant of emotional and psychological well-being in adolescence [4]. Traumatic experiences, including exposure to violence, abuse, neglect, or other adverse events, can disrupt the developmental processes through which adolescents build emotion-regulation capacity, secure attachment, and a stable sense of self, thereby undermining psychological well-being well beyond the period in which the adverse event occurred. Prior work has shown that adverse childhood experiences are associated with lower psychological well-being and with heightened vulnerability to anxiety and depressive symptoms in later adolescence and young adulthood [4, 15]. Because impaired well-being is, in turn, conceptualized in this study as a factor that increases the likelihood of aggressive behavior, a history of trauma represents a plausible upstream contributor to the well-being–aggression association under investigation rather than an incidental sociodemographic covariate [17, 21, 22].

The primary aim of this study was to examine the association between emotional and psychological well-being and aggression within this specific, comparatively understudied Turkish adolescent population, rather than to establish generalizable, cross-national estimates of this association. The novelty of this study lies in simultaneously examining emotional and psychological well-being, trauma history, gender, and multiple aggression subdimensions within an understudied Turkish adolescent population using covariate-adjusted analyses.

METHODS

This research was designed as a cross-sectional study. Data were collected from students enrolled in a health vocational high school located in Mersin between July 2024 and May 2025. Before starting the study, permission was obtained from the Tarsus University Non-Interventional Clinical Research Ethics Committee (Date: 26.07.2024, Number: 2024/07). Permission to conduct the study was obtained from the Mersin Provincial Directorate of National Education.

Inclusion criteria were voluntary participation, written informed assent from students and written informed consent from their parents, ability to communicate in Turkish, and sufficient cognitive capacity to complete the study instruments. Exclusion criteria were refusal of the student or parent to provide consent, absence from school on the day of data collection, and incomplete or invalid questionnaire forms (*e.g.*, more than 10% of items left unanswered).

Sample size estimation was based on a 50% response distribution, a 6% margin of error, and a total population of 564, yielding a sample size of 182 when calculated using the online OpenEpi tool. The total sample size was first calculated for the study and then proportionally allocated across strata based on the distribution of students in the school population. The selection of individuals for the sample was determined using a stratified random sampling method proportional to the number of students at the school. A post hoc power analysis was performed based on the observed correlation coefficient ($r = 0.390$) at the 95% confidence level ($\alpha = 0.05$). The analysis indicated that approximately 65 participants would be sufficient to achieve 90% statistical power. Since the study included 200 participants, the statistical power was considered adequate.

The demographic information form included items on participants' age, gender, educational level, family structure, parental education, economic status, and number of siblings, based on prior literature [21, 22]. Research data were collected voluntarily through face-to-face interviews with students outside of class hours. Data collection and scale forms administered to students were designed to respect privacy and avoid collecting identifying school-related or personal information.

The Stirling Child Emotional and Psychological Well-Being Scale (SCWBS), developed by Liddle and Carter and adapted into Turkish by Akın *et al.* (2016), is a unidimensional scale consisting of 12 items rated on a 5-point Likert scale. The total score is calculated by summing all items, with higher scores indicating greater emotional and psychological well-being. The possible score range of the scale is 12 to 60. The scale does not include reverse-coded items. Reliability analysis showed a Cronbach's alpha of 0.90 in the original validation study, whereas in the present study it was 0.853 [23].

The Buss-Perry Aggression Questionnaire (BPAQ), originally introduced by Buss and Perry (1992) and later adapted into Turkish by Madran (2012), is a self-report instrument consisting of 29 items rated on a five-point

Likert scale. Higher total scores indicate greater levels of aggression, with possible scores ranging from 29 to 145. The scale does not include reverse-coded items and comprises four dimensions: physical aggression (9 items), verbal aggression (5 items), anger (7 items), and hostility (8 items). Subscale scores are calculated by summing the items corresponding to each dimension [24]. In the current study, the BPAQ demonstrated strong internal consistency, with a Cronbach's alpha coefficient of 0.891 for the

Data analyses were conducted using IBM SPSS Statistics version 27 for Windows. Categorical variables were summarized using frequency and percentage distributions, while continuous variables were described using mean and standard deviation. The normality of the data distribution was assessed using skewness and kurtosis values, with values between −1.96 and +1.96 considered indicative of a normal distribution. Relationships between variables were initially examined using Pearson correlation and univariate linear regression analyses. Variables associated with each outcome at $p<0.25$ in univariate analyses were subsequently included in multiple linear regression models. Separate adjusted linear regression models were constructed for overall aggression, physical aggression, hostility, anger, and verbal aggression. Categorical variables included in the regression analyses were dummy-coded before modeling. Assumptions of linear regression, including normality, linearity, homoscedasticity, independence of errors, and multicollinearity, were evaluated before interpreting the regression models. Differences between groups were analyzed using independent-samples t-tests and one-way ANOVA, followed by appropriate post hoc tests where necessary. Statistical significance was accepted at $p<0.05$.

RESULTS

The Descriptive Characteristics of the Students

Students' sociodemographic characteristics are presented in Table **1**. The majority of the sample was female (79.5%), while males accounted for 20.5%. The mean age of the participants was 15.15 ± 0.97 years. Most 9th-grade students reported living with both parents, and more than half indicated that their family income was equal to their expenses. In terms of academic performance, the largest proportion of students described their achievement level as moderate.

Table 1: Sociodemographic characteristics of the students (n= 200).

Variables	Frequency	Percentage
Gender		
Girl	159	79.5
Boy	41	20.5
Age		
14	66	33.0
15	61	30.5
16	50	25.0
17	23	11.5
Class		
9th grade	82	41.0
10th grade	52	26.0
11th grade	41	20.5
12th grade	25	12.5
Mother's Education		
Primary School and Below	107	53.5
Middle School	36	18.0
High School and Above	57	28.5
Father's Education		
Primary School and Below	78	39.0
Middle School	55	27.5
High School and Above	67	33.5
People She/he Lives with		
Mom and Dad Together	167	83.5
With Relatives Mom	15	7.5
With Dad	7	3.5
With Relatives	6	3.0
Dormitory	1	0.5
Other	4	2.0
Income Status		
Income Equals Expenses	115	57.5
Income Exceeds Expenses	39	19.5
Income Less Than Expenses	46	23.0
Number of Siblings		
0-2	87	43.5
3-4	91	45.5
5 and upper	22	11.0
Mother's Employment Status		
Yes	51	25.5
No	149	74.5
Father's Employment Status		
Yes	163	81.5
No	37	18.5
Parental Unity		
Yes	169	84.5
Separated or Deceased	31	15.5
Presence of Traumatic Experience		
Yes	39	19.5
No	161	80.5
Aggressive Behavior		
Yes	50	25.0
No	150	75.0
Exposure to Aggressive Behavior		
Yes	43	21.5
No	157	78.5
Academic Success		
Poor	11	5.5
Average	122	61.0
Good	67	33.5

Emotional and Psychological Well-Being and Aggression Scores

The average score obtained from the emotional and psychological well-being scale was 37.435 ± 8.715 (range: 12-56), whereas the aggression scale score

Table 2: Correlation analysis between emotional and psychological well-being and aggression scores.

Variables		Emotional and Psychological Well-Being Total
Buss-Perry Aggression Scale Total	r	-0.390**
	p	0.000
Physical Aggression	r	-0.251**
	p	0.000
Hostility	r	-0.446**
	p	0.000
Anger	r	-0.325**
	p	0.000
Verbal Aggression	r	-0.208**
	p	0.003

*<0.05; **<0.01; Pearson Correlation Analysis

was 82.990 ± 18.677 (range: 40-133). The correlation analysis between emotional and psychological well-being and aggression scores is shown in Table **2**. A weak negative relationship was found between emotional and psychological well-being and aggression and its sub-dimensions (r=-0.390, p<0.001).

Emotional and Psychological Well-Being on Aggression, Physical Aggression, Hostility, Anger, and Verbal Aggression

Regression analysis results are presented in Table **3**, which reports both unadjusted (bivariate) and adjusted (multiple regression) models for each outcome. In the unadjusted analyses, emotional and psychological well-being significantly predicted all aggression outcomes. In the adjusted models, which included covariates with p<0.25 in univariate analyses (gender, age, class, parental education, traumatic experience, aggressive behavior, exposure to aggression, and academic success, varying by outcome), well-being remained a significant predictor of overall aggression (crude β=-0.258, adjusted B=-0.551), hostility (crude β=-0.400, adjusted B=-0.279), anger (crude β=-0.210, adjusted B=-0.151), and verbal aggression (crude β=-0.162, adjusted B=-0.063). The adjusted model for overall aggression explained 32.0% of the variance (R^2=0.320), representing a substantial improvement over the unadjusted model (R^2=0.148). However, after adjustment for covariates, the association between well-being and physical aggression was no longer statistically significant (crude β = -0.054, adjusted β = -0.045), suggesting that other factors, such as aggressive behavior and academic success, may account for this relationship. Across all adjusted models, a history of aggressive behavior emerged as a consistent, strong predictor of higher aggression scores.

Table 3: The effect of emotional and psychological well-being on aggression and its subscales: adjusted regression models (simplified; unadjusted/crude estimates are reported in the results text).

Variables	Adjusted B (95% CI)	p-value
Aggression Scale Total (Unadjusted β = -0.390, p < 0.001; adjusted R^2=0.320, F=12.920, p<0.001)		
Emotional and Psychological Well-Being	-0.551 (-0.845, -0.257)	<0.001
Gender	-5.692 (-11.142, -0.241)	0.041
Father's Education	-0.001 (-2.674, 2.673)	1.000
Traumatic Experience	-1.031 (-7.208, 5.147)	0.743
Aggressive Behavior	-16.358 (-22.020, -10.696)	<0.001
Exposure to Aggression	-1.731 (-7.910, 4.449)	0.581
Academic Success	-1.289 (-5.593, 3.016)	0.556
Physical Aggression (Unadjusted β = -0.251, p < 0.001; adjusted R^2=0.281, F=7.397, p<0.001)		
Emotional and Psychological Well-Being	-0.045 (-0.165, 0.076)	0.466
Age	0.806 (-1.090, 2.703)	0.403
Class	-0.407 (-2.254, 1.440)	0.664
Father's Education	-0.405 (-1.493, 0.683)	0.464
People Lives With	0.429 (-0.553, 1.411)	0.389
Father's Employment	2.096 (-0.214, 4.406)	0.075
Traumatic Experience	0.116 (-2.625, 2.856)	0.934
Aggressive Behavior	-6.502 (-8.783, -4.222)	<0.001
Exposure to Aggression	-1.418 (-3.909, 1.074)	0.263
Academic Success	-1.971 (-3.708, -0.234)	0.026
Hostility (Unadjusted β = -0.446, p < 0.001; adjusted R^2=0.293, F=11.390, p<0.001)		
Emotional and Psychological Well-Being	-0.279 (-0.377, -0.181)	<0.001
Gender	-2.744 (-4.560, -0.928)	0.003
Father's Education	0.054 (-0.836, 0.945)	0.904
Traumatic Experience	-0.651 (-2.709, 1.407)	0.533
Aggressive Behavior	-2.763 (-4.649, -0.876)	0.004
Exposure to Aggression	-0.909 (-2.968, 1.150)	0.385
Academic Success	0.987 (-0.447, 2.421)	0.176
Anger (Unadjusted β = -0.325, p < 0.001; adjusted R^2=0.264, F=7.570, p<0.001)		
Emotional and Psychological Well-Being	-0.151 (-0.254, -0.049)	0.004
Gender	-2.461 (-4.402, -0.519)	0.013
Age	0.536 (-1.130, 2.203)	0.526
Class	-0.155 (-1.783, 1.473)	0.851
Mother's Education	0.913 (-0.007, 1.832)	0.052
Traumatic Experience	-0.044 (-2.307, 2.219)	0.970
Aggressive Behavior	-5.242 (-7.241, -3.242)	<0.001
Exposure to Aggression	0.506 (-1.678, 2.691)	0.648
Academic Success	-0.346 (-1.870, 1.178)	0.655
Verbal Aggression (Unadjusted β = -0.208, p = 0.003; adjusted R^2=0.131, F=5.867, p<0.001)		
Emotional and Psychological Well-Being	-0.063 (-0.117, -0.009)	0.022
People Lives With	0.252 (-0.220, 0.725)	0.294
Income Status	-0.539 (-1.093, 0.015)	0.057
Aggressive Behavior	-2.073 (-3.223, -0.923)	<0.001
Exposure to Aggression	0.043 (-1.180, 1.266)	0.945

Note: B = unstandardized regression coefficient; CI = confidence interval; p-values <0.05 indicate statistical significance and are shown in bold. Only adjusted (multiple regression) estimates are shown for clarity; unadjusted (crude, bivariate) associations for each variable are reported in the Results section of the main text.

Gender-Stratified Analysis

Female students (n=159) had significantly higher mean scores than male students (n=41) for overall aggression, hostility, and anger (independent-samples t-tests, p=0.046, p=0.002, and p=0.012, respectively).

Table 4: Gender-stratified correlation analysis between emotional and psychological well-being and aggression scores.

Variables	Female (n = 159)		Male (n = 41)	
	r	p-value	r	p-value
Aggression Scale Total	-0.421	<0.001	-0.240	0.131
Physical Aggression	-0.278	<0.001	-0.144	0.369
Hostility	-0.447	<0.001	-0.420	0.006
Anger	-0.356	<0.001	-0.167	0.297
Verbal Aggression	-0.251	0.001	-0.042	0.793

Pearson correlation analysis, computed separately by gender following raw-data re-analysis. Values are correlations between Emotional and Psychological Well-Being Total and each aggression outcome. p<0.05 shown for reference; associations were significant for all outcomes among female students, but only for Hostility among male students (n=41), likely reflecting the smaller male subsample.

In contrast, physical aggression and verbal aggression did not differ significantly by gender. Gender-stratified Pearson correlations (**Table 4**) showed that emotional and psychological well-being were significantly and inversely correlated with all aggression outcomes among female students. In contrast, among male students, only the correlation with hostility was statistically significant (r = -0.420, p = 0.006). Gender-stratified adjusted regression models (**Table 5**), built using the same covariate-selection procedure as the pooled models (covariates with p<0.25 in univariate screening, applied separately within each gender subgroup), indicated that among female students, well-being remained a significant predictor of overall aggression, hostility, anger, and verbal aggression, but not physical aggression, mirroring the pooled results. Among male students, only the association between well-being and hostility remained statistically significant after adjustment (adjusted B = -0.218, 95% CI -0.431 to -0.005, p = 0.045); given the small male subsample, the male-stratum estimates should be interpreted with caution.

DISCUSSION

Adolescence is a period of rapid growth and intense physical, psychological, and social change. Adapting to and accepting these changes can be quite challenging. This situation can affect emotional and psychological well-being. The level of psychological well-being affects an individual's ability to cope with difficulties encountered, recognize their own development, and strive for independence [25]. This study aimed to examine the association between emotional and psychological well-being and aggression levels among high school students.

The study found a weak negative correlation between emotional and psychological well-being and aggression and its subscales. The findings further indicated that emotional and psychological well-being was inversely associated with all dimensions of aggression, including physical aggression, anger, hostility, and verbal aggression. Telef [26] examined the effects of positive and negative emotions on psychological well-being and risky behaviors and found a positive association. Garaigordobil and Pena-Sarrionandi [27] reported that as adolescents' ability to cope with their emotions in positive ways increased, their levels of aggression decreased. Can and Kağan [22] found in a study that there was a strong negative correlation between students' psychological well-being and risky behaviors. This result shows that as students' emotional and

Table 5: Gender-stratified regression models: Emotional and psychological well-being as a predictor of aggression and ıts subscales.

Aggression Outcome	Adjusted B (95% CI) for Well-Being	p-value	Covariates entered (p<0.25 in stratum-specific univariate screening)
Female students (n = 159)			
Aggression Scale Total	-0.681 (-0.994, -0.368)	<0.001	Adjusted for class, living arrangement, traumatic experience, aggressive behavior, exposure to aggression, academic success (R^2=0.446)
Physical Aggression	-0.076 (-0.204, 0.051)	0.239	Adjusted for class, parental education, living arrangement, father's employment, traumatic experience, aggressive behavior, exposure to aggression, academic success (R^2=0.383)
Hostility	-0.252 (-0.356, -0.148)	<0.001	Adjusted for age, class, maternal education, living arrangement, income status, traumatic experience, aggressive behavior, exposure to aggression (R^2=0.332)
Anger	-0.180 (-0.290, -0.069)	0.002	Adjusted for class, paternal education, living arrangement, traumatic experience, aggressive behavior, exposure to aggression, academic success (R^2=0.346)
Verbal Aggression	-0.074 (-0.138, -0.010)	0.023	Adjusted for class, living arrangement, aggressive behavior, exposure to aggression, academic success (R^2=0.187)
Male students (n = 41)			
Aggression Scale Total	-0.356 (-1.122, 0.410)	0.353	Adjusted for age, maternal and paternal education (R^2=0.159)
Physical Aggression	-0.063 (-0.382, 0.256)	0.690	Adjusted for age, maternal education, income status (R^2=0.129)
Hostility	-0.218 (-0.431, -0.005)	0.045	Adjusted for class, maternal education (R^2=0.305)
Anger	-0.059 (-0.319, 0.200)	0.646	Adjusted for age, maternal education, traumatic experience (R^2=0.147)
Verbal Aggression	-0.010 (-0.163, 0.143)	0.898	Adjusted for age, class, maternal education (R^2=0.079)

Note: B = unstandardized regression coefficient; CI = confidence interval; p-values <0.05 shown in bold. Models were built following the same procedure as Table **3** (covariates associated with the outcome at p<0.25 in univariate analysis were entered into the multiple regression model), applied separately within each gender subgroup; the number of covariates entered was capped relative to sample size (approximately n/10) to preserve statistical power. Given the small male subsample (n=41), the male-stratum estimates have wide confidence intervals and limited statistical power, and should be interpreted with caution; they are presented as exploratory findings requested by the reviewers.

psychological well-being increases, feelings of anger, hostility, and physical and verbal aggression decrease. Similarly, an inverse relationship was found between psychological well-being and aggression. The results of the present study are in line with previous research findings. This may be due to students' moderate levels of emotional well-being and their ability to cope more effectively with stress. In addition, students' higher levels of empathy and problem-solving skills may also be contributing factors. Students with these characteristics may exhibit less aggressive behavior by managing negative emotions and conflicts in more constructive ways. Intervention programs emphasize the importance of targeting individual well-being, communication skills, and social support systems. These findings suggest that interventions that enhance well-being may be effective in controlling aggressive tendencies and regulating emotions. In addition, students who are emotionally and psychologically well may avoid impulsive and reactive behaviors because they have a more positive outlook. For these reasons, it is believed that aggressive behavior is less common among students with high psychological well-being.

To further examine these associations, adjusted regression models were conducted including covariates with $p<0.25$ in univariate analyses, such as gender, traumatic experience, aggressive behavior, exposure to aggression, and academic success. After adjustment, emotional and psychological well-being remained a statistically significant predictor of overall aggression (adjusted $\beta=-0.258$, $p<0.001$), hostility (adjusted $\beta=-0.400$, $p<0.001$), anger (adjusted $\beta=-0.210$, $p=0.004$), and verbal aggression (adjusted $\beta=-0.162$, $p=0.022$), indicating that well-being's protective role persists even when potential confounders are controlled for. The explained variance also increased substantially in the adjusted models; for instance, the model for overall aggression improved from $R^2=0.148$ to $R^2=0.320$, suggesting that sociodemographic and behavioral factors contribute meaningfully to aggression beyond the effect of well-being alone. Notably, however, the association between well-being and physical aggression was attenuated. It became non-significant after adjustment (adjusted $\beta = -0.054$, $p = 0.466$), with aggressive behavior history and academic success emerging as stronger independent predictors in this model. This finding suggests that physical aggression may be more directly driven by behavioral and contextual factors rather than by well-being per se. Across all adjusted models, a history of aggressive behavior consistently emerged as a strong, independent predictor of higher aggression scores, underscoring the importance of early behavioral intervention alongside well-being promotion programs.

The study found that female students had higher total aggression scores and higher hostility and anger subdimension scores than male students. Gender-stratified analysis of the raw dataset, conducted in response to the reviewers' request, supported this pattern: the correlation between well-being and aggression was significant across all outcomes among female students but only for hostility among male students, and the association between well-being and hostility remained significant in adjusted models for both genders. A review of the literature indicates that, in general, there are no statistically significant gender differences in overall aggression scores or in the hostility and anger subdimensions [28, 29]. There are studies in the literature similar to ours that show women's scores are higher than men's on the hostility and anger subdimensions [30, 31]. The reason for the differing results of the studies could be that, although women generally exhibit less physical aggression due to social norms, they may display emotional aggression in certain situations under intense stress or threat.

The findings indicated that adolescents with a history of traumatic experiences reported lower levels of emotional and psychological well-being compared to those without such experiences. A review of the literature shows that childhood trauma does not remain limited to that period but continues to have an impact in later stages of life. Karal [32] determined that traumas experienced in childhood and adulthood were effective in the occurrence and progression of both anxiety and depression. The findings indicate that mental trauma experienced during childhood negatively affects the psychological well-being of adolescents. These findings suggest that traumatic experiences and aggressive behaviors may negatively affect students' emotional and psychological well-being. Previous studies have shown that individuals who have experienced adverse childhood events tend to report lower levels of psychological well-being [4]. Another study found that children exposed to physical neglect, abuse, and emotional neglect tended to exhibit lower levels of emotional and psychological well-being [15]. This situation shows that aggression has serious negative effects on the mental health and general well-being of both the perpetrators and recipients of aggression. Possible reasons for this decline include feelings of guilt, social isolation, peer rejection, and negative expectations about the future for students who engage in aggressive behavior, and fear, anxiety, post-traumatic stress symptoms, lack of self-confidence, and distrust of social relationships may be effective factors for students who are exposed to aggression. Additionally, it is thought that the weakening of social support systems and the inadequacy of coping mechanisms among students in both groups due to these negative experiences may have contributed to the decline in emotional and psychological well-being levels.

Taken together, we consider the directional pattern observed here, namely that greater emotional and psychological well-being is associated with lower adolescent aggression, likely to generalize internationally

rather than to be specific to Turkish adolescents, since comparable inverse associations and comparable protective mechanisms of emotion regulation and coping have been reported across culturally distinct settings, including Chinese, Spanish, and other Western samples [6, 7, 27]. What we would not extend beyond the present sample, however, are the specific magnitude of the associations, the prevalence of well-being and aggression, and the relative importance of particular covariates such as gender and academic success, since these are likely to be shaped by region-specific educational, familial, and cultural factors. The present sample was drawn from a single vocational high school in one district of Mersin, and on this basis we regard the findings as evidence of a broadly generalizable pattern whose precise parameters should be treated as regional until replicated. Replication in other school types, regions, and countries is therefore needed before the findings are generalized beyond the Turkish adolescent population, specifically the Mediterranean region, studied here.

Educational Implications

These findings point to several educational implications. School curricula could incorporate structured social-emotional learning components addressing emotion regulation, empathy, and constructive conflict resolution, delivered by school health nurses and psychological counseling and guidance staff. Consistent with intervention approaches such as acceptance and commitment therapy, which has shown promise in reducing anger and aggression among children and adolescents [7], school-based programs might combine psychoeducation with skills training in acceptance of difficult emotions and value-guided behavior. Furthermore, universal school-based violence prevention curricula focusing on empathy, impulse control, and anger management have demonstrated robust empirical effectiveness in significantly decreasing physically aggressive behaviors and fostering prosocial environments [33]. Beyond these curriculum- and acceptance-based approaches, other treatment modalities merit consideration in school settings. Structured, supervised play-fighting activities embedded within physical education have been shown to reduce self-perceived aggression, including its verbal, anger, and hostility components, among school-aged children, offering a low-cost, movement-based complement to classroom-based programs [34]. Mindfulness-based interventions have also shown promise in reducing adolescent aggression, in part by improving emotion regulation and self-control. They could be integrated into school counseling services as an additional option alongside acceptance and commitment therapy and violence-prevention curricula [35]. Given the gender differences observed in this study, programs should be sensitive to how well-being and aggression may present differently in female and male students. Teachers and counselors should also be trained to recognize early signs of low emotional and psychological well-being, particularly among students with a history of traumatic experiences, so that supportive resources can be offered before difficulties manifest as aggressive behavior.

LIMITATIONS

The study was conducted on students at a health vocational high school in a district located in the Mediterranean region of Turkey, without a comparison group from another school type or region. It is limited to students who voluntarily agreed to participate in the study. Therefore, the findings cannot be generalized to the entire population. In addition, the collected data did not include information on technology. It may be useful to conduct studies to determine the relationship between students' tendencies toward aggression and violence and the school climate and organizational culture. Data were collected using self-report questionnaires only, which may be subject to social desirability and recall bias; future studies could triangulate self-report data with teacher or parent reports or behavioral observations. Because the design was cross-sectional, the direction of the observed associations cannot be established, and the term "predictive" used elsewhere in earlier drafts should be understood in the statistical, regression sense rather than as evidence of causation. Gender was included as a covariate in the pooled adjusted regression models, and, in response to reviewer feedback, we additionally conducted gender-stratified correlation and regression analyses. However, the male subsample (n=41) was considerably smaller than the female subsample (n=159), so the male-stratum estimates have wide confidence intervals and limited statistical power; only the association between well-being and hostility remained statistically significant for male students after adjustment. These stratified findings should therefore be regarded as exploratory, and replication with larger, more gender-balanced samples is recommended. Finally, although the sample size was determined a priori for the overall study, no separate power calculation was performed for each demographic stratum.

CONCLUSION

This study found that emotional and psychological well-being in high school students was significantly and negatively associated with aggression. Based on these findings, it is recommended that school health nurses, psychological counseling and guidance service specialists, and other school personnel work together to reduce aggression, peer bullying, and violence in schools. School nurses should provide training to high school students on positive thinking and problem-solving skills.

ETHICS APPROVAL

Before collecting research data, written approval was obtained from the Clinical Research Ethics Committee (decision no: 2024/07, date 26.07.2024). The researcher informed the children and their parents about the study's

aim and obtained written consent forms. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the Declaration of Helsinki.

CONSENT FOR PUBLICATION

Before data collection, written informed assent from students and consent from their parents was taken.

AVAILABILITY OF DATA

The datasets generated and/or analyzed during the current study are not publicly available due to confidentiality agreements, but are available from the corresponding author on reasonable request.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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AUTHORS' CONTRIBUTION

KEG: Conceptualization, methodology, data curation, investigation, formal analysis, visualization, writing original draft.

AK: Methodology, data curation, investigation, validation, formal analysis, visualization, reviewing and editing.

DSD: Methodology, data curation, investigation, validation, formal analysis, visualization, writing the original draft.

All authors have read and approved the final version.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors used Claude (Anthropic) only to obtain language suggestions and to perform minor proofreading in some parts of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the published article.

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