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"ASOCIACIÓN ENTRE TRAUMA INFANTIL Y TRASTORNOS DE SALUD MENTAL EN ADOLESCENTES DURANTE LA SEGUNDA OLA PANDÉMICA DE COVID-19 EN CHICLAYO, PERÚ"

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DEDICATORIA.

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RESUMEN

Introducción: Estudios previos han evaluado la salud mental de adolescentes, sin embargo existe evidencia no concluyente sobre la influencia del trauma infantil en el desarrollo de síntomas depresivos y ansiosos. El objetivo fue determinar la asociación entre el trauma infantil y problemas de salud mental en escolares de Chiclayo-Perú, durante la pandemia por COVID-19. **Métodos**: Estudio transversal analítico en 456 adolescentes escolares de nivel secundaria de tres colegios de Chiclayo, Perú. Se evaluó la asociación entre trauma infantil (Cuestionario de Trauma de Marshall) y la presencia de síntomas depresivos (PHQ-9) y síntomas ansiosos (GAD-7). Adicionalmente, se exploraron las siguientes covariables: alcohol (AUDIT), resiliencia (CD RISC Abreviado), disfuncionalidad familiar (APGAR Familiar) y datos socioeducativos. Se estimaron razones de prevalencia (RP) con regresión múltiple, usando modelos lineales generalizados (GLM). **Resultados:** El 76.3% (IC95%: 72.14-80.15) presentó síntomas depresivos y el 62.3% (IC95%: 57.65-66.75) síntomas ansiosos. Los adolescentes con trauma infantil tenían 23% (RP: 1.23) y 55% (RP: 1.55) mayor frecuencia de síntomas depresivos y ansiosos; respectivamente. Adicionalmente, se encontraron otros factores asociados a mayor frecuencia de síntomas depresivos:búsqueda de soporte mental (RP: 1.12) y la disfunción familiar severa (RP: 1.28). Tener disfunción familiar leve (RP: 1.30), moderada (RP: 1.47) y severa (RP: 1.37) incrementaron la frecuencia de síntomas ansiosos. **Conclusiones:** Estos resultados sugieren que los escolares expuestos a trauma infantil son vulnerables a depresión y ansiedad. Se encontró que 7 y 6 de cada 10 estudiantes presentaban sintomatología depresiva y ansiosa; respectivamente. Se requiere abordar la salud mental de los adolescentes

en situaciones de trauma con estrategias y programas educativos, así como intervenciones oportunas. Es esencial que los responsables de la toma de decisiones asignen suficientes recursos para abordar esta problemática en los adolescentes.

PALABRAS CLAVES

TRAUMA INFANTIL, DEPRESIÓN, ANSIEDAD, ADOLESCENTES, COVID-19 (DeCS/BIREME)

ABSTRACT

Introduction: Previous studies have assessed the mental health of adolescents; however, there is inconclusive evidence regarding the influence of childhood trauma on the development of depressive and anxious symptoms. The objective of this study was to determine the association between childhood trauma and mental health problems in schoolchildren from Chiclayo, Peru, during the COVID-19 pandemic. **Methods:** An analytical cross-sectional study was conducted among 456 secondary school adolescents from three schools in Chiclayo, Peru. The association between childhood trauma (Marshall Trauma Questionnaire) and the presence of depressive symptoms (PHQ-9) and anxious symptoms (GAD-7) was evaluated. Additionally, the following covariates were explored: alcohol (AUDIT), resilience (Abbreviated CD RISC), family dysfunction (Family APGAR), and socio-educational data. Prevalence ratios (PRs) were estimated using multiple regression analysis with generalized linear models (GLM). **Results:** 76.3% (95% CI: 72.14-80.15) presented depressive symptoms, and 62.3% (95% CI: 57.65-66.75) presented anxious symptoms. Adolescents with childhood trauma had a 23% (PR: 1.23) and 55% (PR: 1.55) higher frequency of depressive and anxious symptoms, respectively. Additionally, other factors associated with a higher frequency of depressive symptoms were mental support seeking (PR: 1.12), and severe family dysfunction (PR: 1.28). Having mild (PR: 1.30), moderate (PR: 1.47), and severe (PR: 1.37) family dysfunction increased the frequency of anxious symptoms. **Conclusions:**

These findings suggest that school-age children exposed to childhood trauma are vulnerable to depression and anxiety. It was found that 7 out of 10 students presented depressive symptoms, and 6 out of 10 students presented anxioussymptoms. Addressing the mental health of adolescents in trauma situations requires the implementation of educational strategies, programs, and timely interventions. Decision-makers need to allocate sufficient resources to address this issue in adolescents.

KEYWORDS

CHILDHOOD TRAUMA, DEPRESSION, ANXIETY, ADOLESCENTS, COVID-19 (MeSH/NLM)

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Association between childhood trauma and mental health disorders in adolescents during the second pandemic wave of COVID-19, Chiclayo-Peru

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Introduction: The COVID-19 pandemic has significantly affected mental health, with children and adolescents being particularly vulnerable. Evidenceon the association between childhood trauma and mental health outcomes in schoolchildren during the pandemic is limited. This study aimed to evaluate this relationship in Chiclayo city, northern Peru, during the second wave of COVID-19.

Methods: A cross-sectional secondary data study was conducted, measuring childhood trauma using the Marshall's Trauma Scale, depressive symptomatology (PHQ-9), and anxiety symptomatology (GAD-7). Additional variables assessed were alcohol use (AUDIT), resilience (abbreviated CD-RISC), and socio-educational data. Prevalence ratios were estimated using generalized linear models.

Results: Among 456 participants, 88.2% were female, with a mean age of 14.5years (SD: 1.33). Depressive symptomatology prevalence was 76.3% (95%CI: 72.14–80.15) and increased by 23% in schoolchildren with childhood trauma (PR: 1.23; 95%CI: 1.10–1.37). Factors positively associated with depressive symptomatology included increasing age, seeking mental health help during the pandemic, and severe family dysfunction. Anxiety symptomatology prevalence was 62.3% (95%CI: 57.65–66.75) and increased by 55% in schoolchildren with childhood trauma (PR: 1.55; 95%CI: 1.31–1.85). Anxiety symptomatology was positively associated with mild, moderate, and severe family dysfunction.

Conclusion: Schoolchildren exposed to childhood trauma are at increased risk for depressive and anxiety symptoms. Monitoring the impact of the COVID-19 pandemic on adolescent mental health is vital. These findings can assist schools in establishing effective measures to prevent mental health outcomes.

KEYWORDS

childhood trauma, mental health, depression, anxiety, adolescents, COVID-19, pandemic, Peru

Introduction

According to UNICEF, 1 in 7 children globally has experienced a minimum of 9 months of mandatory or recommended confinement since the beginning of the COVID-19 pandemic (1). Numerous studies have shown that the pandemic has led to a decline in mental health (2–6), with children and adolescents emerging as a particularly vulnerable group (7–10). This can be attributed to the adverse effects of enforced social isolation on young people (11). During the pandemic's first year, the prevalence of mental health issues in children and adolescents increased by 20%, with depressive and anxious symptoms estimated at 25.2 and 20%, respectively (12). In Peru, a study found that 45.6 and 36.8% of surveyed adolescents reported anxiety and depression symptoms during the first wave of COVID-19, respectively (13). Another study with a smaller sample size noted a greater increase in depressive symptoms among women (14). While multiple research studies have examined the influence of the COVID-19 pandemic on mental well-being during the initial wave (15–17), research on the second wave is limited, despite the increasing likelihood of developing mental illnesses with prolonged isolation (18).

Research has shown that the development of mental illnesses such as anxiety and post-traumatic stress disorder can be rooted in exposure to fear, like the fear of losing a loved one experienced during the COVID-19 pandemic (19, 20). Furthermore, having a family member infected with COVID-19, media overload, being in the final year of school, a history of mental illness, and a history of eating disorders prior to the pandemic (21) are factors influencing mental health outcomes in adolescents (22). The heightened prevalence of depressive, anxiety, and post-traumatic stress symptoms in children and adolescents (23) during the COVID-19 pandemic has been associated with factors such as sleep duration, hours dedicated to schoolwork (24), physical activity, having parents working in healthcare professions (25), and dependence on technology and the internet (26). However, there is limited evidence on the influence of childhood trauma on mental health during the pandemic, particularly among the adolescent population.

Childhood trauma has been identified as a significant risk factor for developing mental health disorders later in life and has been associated with increased vulnerability to the negative impacts of stress and adversity (27). Previous studies have indicated that childhood trauma plays a role in the development of an unfavorable mental state during the COVID-19 pandemic (28, 29). Trauma at an early age can cause an over-activation of the hypothalamus, releasing corticotropin-releasing hormone (CRF), which would lead to an increase in stress hormones such as cortisol and adrenaline (30–33). If these levels remain elevated, they can produce neurobiological changes in the cerebral cortex, predisposing the child to adult psychiatric illnesses (30–33).

Despite a growing body of research on the general impact of the pandemic on mental health (34), few studies have specifically explored the role of childhood trauma in this context. For instance, one study investigated the relationship between childhood trauma and mental health disorders during the pandemic but focused on a small sample size (35). Another study examined the association between childhood maltreatment and mental health outcomes in the context of COVID-19 but was limited to adult participants (36). Furthermore, a study conducted in China evaluated the relationship between adverse childhood experiences and mental health problems during the pandemic but did not specifically focus on adolescents (37). These studies, while informative, highlight a gap in the literature and indicate a critical need for further research in this area to better understand the impact of childhood trauma on mental health during the pandemic, particularly among the adolescent population.

Additionally, the available evidence predominantly originates from countries with strong economies, with limited studies developed in low- and middle-income countries (38, 39). This further underscores the necessity for more context-specific research, as the experiences and challenges faced by adolescents in different socio-cultural contexts may vary considerably.

Moreover, existing studies have primarily focused on the immediate psychological consequences of the pandemic, with a lack of longitudinal research investigating the long-term effects of childhood trauma on mental health outcomes in the context of COVID-19 (40–42). This points to the need for studies that not only examine the short-term consequences but also assess the enduring impact of childhood trauma during the pandemic on adolescent mental health.

The objective of this study is to evaluate whether childhood trauma is associated with mental health disorders in adolescents in the Chiclayo region of Peru during the second pandemic wave of COVID-19. This study aims to contribute to the limited existing literature on the influence of childhood trauma on mental health disorders in adolescents during the COVID-19 pandemic. The study will provide valuable insights into the mental health of adolescents during the pandemic, highlighting the need for appropriate strategies to mitigate the negative consequences of COVID-19 on the mental well-being of the most vulnerable groups.

In this study, the research framework is based on the relationship between childhood trauma, other factors (such as demographics, pandemic-related variables, mental health history, resilience, alcohol use, and family functioning), and the two mental health outcomes of depression and anxiety in schoolchildren. We hypothesized that childhood trauma, along with other factors, would be associated with an increased risk of depression and anxiety in schoolchildren. The study's research framework assumes that childhood trauma can have long-term impacts on mental health outcomes, and that certain factors can either exacerbate or mitigate these impacts. The framework is also grounded in the idea that mental health outcomes are complex and multifactorial, influenced by a variety of individual and environmental factors (43).

Methods

Study design

In this study, a cross-sectional analytic approach utilizing secondary data was employed to investigate the relationship between childhood trauma and mental health disorders amid the COVID-19 pandemic. "Secondary data" denotes information initially gathered for another research objective, which is then reanalyzed for the present study. Specifically, the primary research examined the association between family dysfunction and post-traumatic stress disorder (44) from March to April 2021, involving high school students from three schools in Chiclayo, Peru. The current investigation leverages this pre-existing dataset, repurposing it to analyze the connection between

childhood trauma and mental health disorders in the same study population, considering the backdrop of the pandemic.

Population and sample

The study population included 863 adolescent schoolchildren from three schools in Chiclayo, Peru. For the primary study, the sample size was estimated at 520 participants, considering a 43% prevalence of mental health disorders in unexposed individuals, 57% prevalence in exposed individuals, a 5% margin of error, 80% statistical power, and an additional 30% to account for refusals and incomplete registrations (44). Snowball sampling was employed as a recruitment strategy in the primary study (44).

Inclusion criteria for the primary study encompassed schoolchildren aged 11–18 years. The study population was selected because these children are at an age where they are particularly vulnerable to mental health problems, and schools are a key setting for identifying and addressing these problems (45). Additional inclusion criteria were those whose parents provided consent for their participation, and those who gave their assent to answer the questionnaire. Schoolchildren who did not adequately respond to the Child PTSD Symptom Scale and Family APGAR instrument were excluded, resulting in a dataset of 562 participants.

For this secondary analysis, 106 questionnaires with incomplete data for variables of interest (childhood trauma, depressive symptomatology, and anxiety symptomatology) were excluded, yielding a final analytic sample of 456 records.

Data collection procedures

First, approval was obtained from the heads of the secondary schools to carry out the study on schoolchildren enrolled in the 2021 academic year. Then, informed consent and online assent were requested from parents and students, respectively. Finally, the questionnaire was disseminated online using the REDCap data entry system, using the educational platform of the three schools and official social network groups of each academic year. The survey was disseminated during days when the students were not taking academic evaluations, and the average time for filling out the questionnaire was 15 min.

Instruments

The questionnaire used in this study aimed to measure various factors that could be associated with mental health disorders in schoolchildren. It includes questions about sociodemographic characteristics, compliance with isolation measures, severity rating of the COVID-19 pandemic, confidence in the government’s ability to manage the epidemic, history of mental health disorders, seeking mental health support, resilience, alcohol consumption, family APGAR, childhood trauma, and symptomatology related to depression and anxiety. Below, we describe the use of validates scales to measure complex variables included in the questionnaire.

Childhood trauma (Marshall’s Trauma Scale)

Childhood trauma was assessed using the Marshall’s Trauma Scale, a questionnaire specifically designed to measure childhood trauma in Peruvian populations. This instrument comprises seven questions (46), with a maximum score of seven points, and is categorized into two groups based on the results: The scoring system involves assigning a value of 1 or more points for the presence of trauma, and 0 points for the absence of trauma. The scale exhibits excellent external validity, with a correlation coefficient of 0.88 (47), and has been utilized and verified in research carried out in Latin America, including Peru (48, 49).

Depressive symptomatology (PHQ-9)

This questionnaire consists of 9 questions, each of which is evaluated on a Likert scale from 0 (never) to 1 (some days), 2 (more than half of the days) and 3 (almost every day), with a possible range of total scores from 0 to 27 (50, 51). It is categorized as minimal depression if it receives a score of 0 to 4, mild if it receives a score of 5 to 9, moderate if it receives a score of 10 to 14, moderate–severe if it receives a score of 15 to 19, and severe if it has a score of 20 to 27 (50). In addition, the questionnaire has high psychometric qualities, has been validated in primary care settings with a Latino population and exhibits optimal internal consistency ($\alpha = 0.87$), as well as adequate convergent and divergent validity and a score equal to or greater than the cut-off point of seven (52, 53). In a sizable sample of the Peruvian population, the study identified adequate invariance when comparing different groups (52).

Anxiety symptomatology (GAD-7)

It is an instrument that measures current levels of anxiety symptomatology (54), consisting of 7 questions with a Likert-type rating scale from 0 to 3 (55). The total score ranges from 0 to 21 (56). Scores from zero to four for no anxiety symptoms, five to nine for mild anxiety symptoms, 10 to 14 for moderate anxiety symptoms, and 15 to 21 for severe anxiety symptoms (57). The instrument demonstrates strong internal validity ($\alpha = 0.94$) when assessed in a Hispanic American sample (58). Employing a cutoff point above 10 points results in excellent sensitivity (97%), specificity (100%), positive predictive value (>97%), and negative predictive value (0.833) in the evaluation (59). The alpha coefficient of the study was 0.93.

Alcohol consumption (Alcohol Use Disorders Identification Test – AUDIT)

The World Health Organization (WHO) developed the Alcohol Use Disorders Identification Test (AUDIT) as a rapid screening tool to detect alcohol consumption and identify excessive alcohol intake (60). This ten-question questionnaire, originally created by Saunders (61, 62), was later translated into Spanish and validated by Rubio et al. for primary care patients (63). The instrument exhibited strong internal consistency ($\alpha = 0.86$). Additionally, when utilizing a specific cut-off point of 8, it achieved substantial sensitivity (90%) and specificity (90%) (63).

The AUDIT questionnaire uses a Likert scale to assess the frequency and severity of alcohol consumption and related problems. The response options for each item vary, but they all use a scale from 0 to 4, where 0 indicates “never,” and 4 indicates “daily or almost daily.” The questionnaire is composed of three sections: three questions about alcohol consumption (quantity and frequency), four questions

regarding addiction, and three questions examining the effects (60). The items in the AUDIT questionnaire are (60):

1. How often do you have a drink containing alcohol?
2. How many standard drinks containing alcohol do you have on a typical day when you are drinking?
3. How often do you have six or more drinks on one occasion?
4. How often during the last year have you found that you were not able to stop drinking once you had started?
5. How often during the last year have you failed to do what was normally expected of you because of drinking?
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?
7. How often during the last year have you had a feeling of guilt or remorse after drinking?
8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?
9. Have you or someone else been injured as a result of your drinking?
10. Has a relative, friend, or healthcare worker been concerned about your drinking or suggested you cut down?

Scores range from 0 to 40, and the questionnaire categorizes risk levels as low (0–7 points), moderate (8–15), high (16–19), and potentially addictive (20 points or more) (64).

Resilience (abbreviated CD-RISC)

This survey is made up of 10 questions, each with a Likert scale of 0 to 4 points (65, 66). The instrument has undergone validation in diverse populations, including Spanish-speaking youth, workers from different professions, and healthcare workers (65, 67). Using a cut-off score of 23 or less, the instrument exhibits outstanding psychometric characteristics for discriminating depression among healthcare professionals. It demonstrates strong internal consistency and effectively distinguishes individuals in this population with high sensitivity and specificity (68). The alpha coefficient of this study was 0.95.

Variables

To better understand the research framework and relationships between variables, we created a conceptual model (Figure 1). This model illustrates the main independent variable, childhood trauma, and its potential association with the dependent variables, depressive symptomatology, and anxiety symptomatology. Additionally, the model includes the secondary independent variables (e.g., sex, age, school year, family dysfunction, resilience, alcohol consumption, etc.) and shows how they may potentially affect or interact with the dependent variables.

Dependent variables: Depressive symptomatology (PHQ-9 score > 4) and anxiety symptomatology (GAD-7 score > 4).

Main independent variable: Childhood trauma (Marshall Scale score ≥ 1).

Secondary independent variables: Sex (female, male), age in years, school year (first, second, third, fourth, fifth), family dysfunction (normal, mild, moderate, severe), resilience, alcohol consumption (low, medium, high risk and probable addiction), acceptance of quarantine measures (no, yes), severity of the COVID-19 pandemic (very severe, severe, neutral, overestimated, very overestimated), confidence in government response to COVID-19 epidemic (fairly confident, low confidence, neither confident nor distrustful, low distrustful, fairly distrustful), report of having family member with recent COVID-19 (no, yes), report of having family member died from COVID-19 (no, yes), previous history of mental health problems (no, yes), report of having sought mental health help (no, yes).

Data analysis

For the purpose of descriptive analysis, categorical variables were summarized by displaying frequencies and percentages. Meanwhile, numerical variables were characterized by providing the mean and standard deviation values, after evaluating normal distribution.

We assessed the association between childhood trauma and depressive/anxiety symptoms through a bivariate analysis utilizing the chi-square test of independence; similarly, this was done for the other categorical independent variables. After assessing the assumption of normal distribution, Student's *t*-test was effective for the numerical variables.

In the simple and multiple regression analysis, we assessed the strength and magnitude of the association of interest (childhood trauma vs. depressive/anxiety symptoms), using generalized linear models (GLM), Poisson family, robust variance, and log link function. In the simple model, we estimated prevalence ratios (PR) and 95% confidence intervals (95%CI) for both the association of interest (childhood trauma vs. depressive/anxiety symptoms) and the confounding variables. In the multiple model, we controlled for the association of interest (childhood trauma and depressive/anxiety symptoms) with the confounding variables. We assessed collinearity of confounding variables included in the multiple model.

Data were examined with Stata 17.0 (StataCorp LP, College Station, TX, United States).

Ethical aspects

The Ethics and Research Committee of the Universidad San Martín de Porres, Lima, Peru, approved the study. Informed parental consent was required, and informed assent was obtained from each student. Data confidentiality was always guaranteed, and the database was anonymous.

Results

General characteristics

Table 1 presents the characteristics of 456 schoolchildren from three schools in Chiclayo, 2021. The mean age was 14.5 years (±1.33), with 88.2% being female. The academic year distribution was as follows: 11.2% in the first year, 10.8% in the second, 12.9% in the third, 26.8% in the fourth, and 38.4% in the fifth. Most participants (96.5%) complied with isolation measures, and 71.5% rated the COVID-19 pandemic as very serious. Regarding confidence in the government's management of the COVID-19 epidemic, 3.3% reported having a lot of confidence, 27.9% had some confidence, 32.9% were neutral, 20.6% had some distrust, and 15.4% had a lot of distrust.

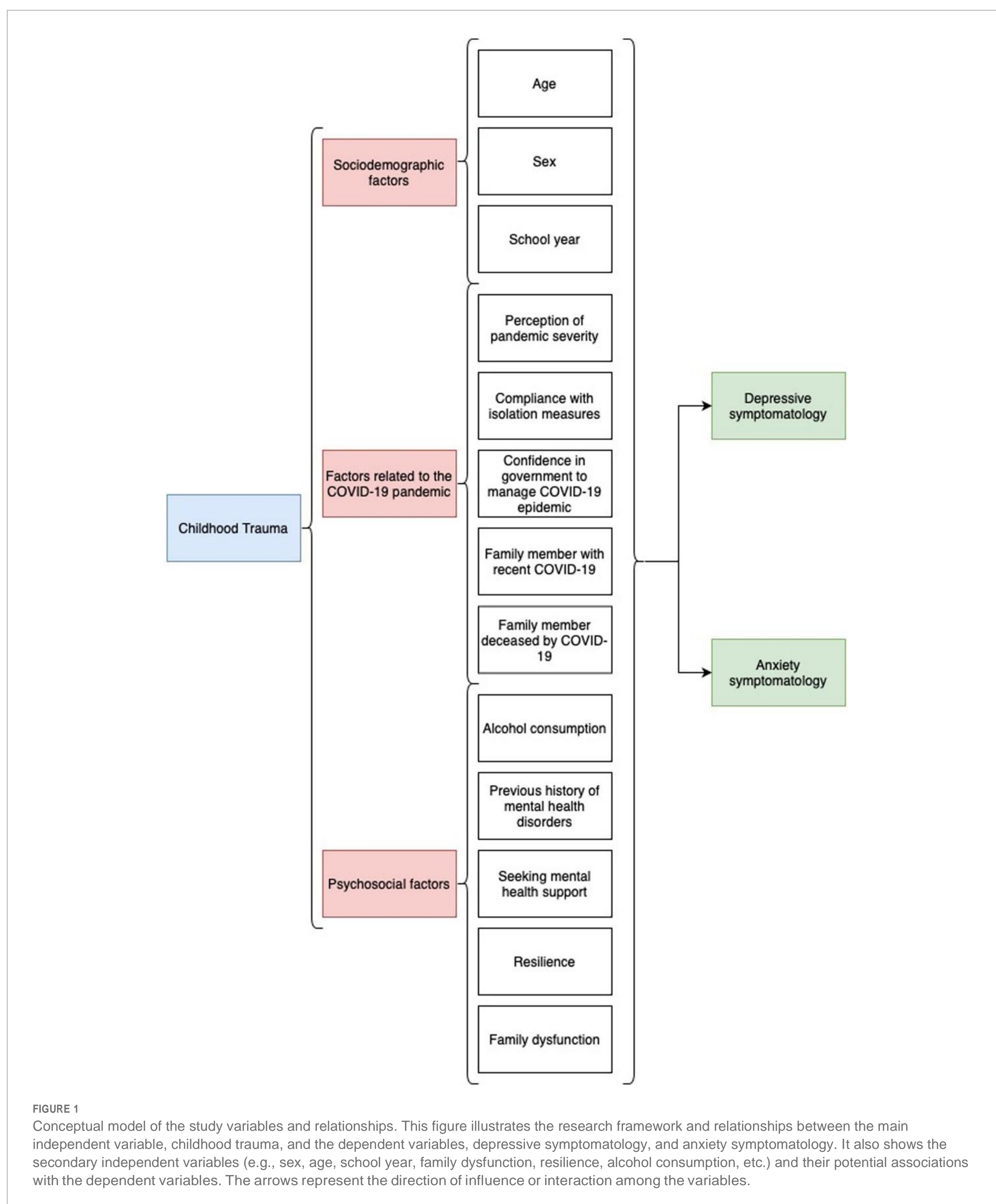

FIGURE 1
Conceptual model of the study variables and relationships. This figure illustrates the research framework and relationships between the main independent variable, childhood trauma, and the dependent variables, depressive symptomatology, and anxiety symptomatology. It also shows the secondary independent variables (e.g., sex, age, school year, family dysfunction, resilience, alcohol consumption, etc.) and their potential associations with the dependent variables. The arrows represent the direction of influence or interaction among the variables.

In the sample, 74.8% of the schoolchildren had a family member with recent COVID-19, and 48.7% had a family member who died from the disease. Among them, 12.9% had a history of mental health disorders, and 18.6% sought mental health support. The mean resilience score was 24.3 (±8.1). Alcohol consumption was low risk for 93.2% of the participants, medium risk for 5.5%, high risk for 0.9%, and probable addiction for 0.4%. Family dysfunction was reported as none by 33.1%, mild by 24.8%, moderate by 18.6%, and severe by 23.5% of the students.

Childhood trauma was reported by 42.3% of the schoolchildren. Depressive symptomatology was categorized as minimal for 23.7%, mild for 29.2%, moderate for 20.0%, moderately severe for 14.3%, and severe for 12.9% of the participants. Anxiety levels were reported as no anxiety by 37.7%, mild by 27.9%, moderate by 20.0%, and severe by 14.5% of the schoolchildren.

In Figure 2, we present the prevalence of various forms of childhood trauma among the schoolchildren. The most common trauma

experienced was significant physical punishment, reported by 21.3% of the participants. The second most frequent trauma was exposure to physical violence between parents or caregivers, which affected 20.4% of the students. Additionally, 13.4% of the schoolchildren faced traumatic separation from a father, mother, or caregiver for more than 1month, and 14.9% experienced physical harm following punishment. Substance abuse by a family member was reported by 9.7% of the participants. Less common traumas included forced sexual contact with a relative (4.0%) and forced sexual contact with a non-family member (5.3%).

Bivariate analysis of childhood trauma and mental health outcomes

Childhood trauma was reported by 173 out of 522 participants (33.1%) and was strongly associated with depressive symptomatology and anxiety symptomatology ($p < 0.001$ for both). Those reporting a history of childhood trauma had significantly higher rates of symptoms compared to those without such a history (Table 2).

Among other variables examined, sex was marginally associated with depressive symptomatology ($p = 0.076$) and significantly associated with anxiety symptomatology ($p = 0.001$), with females reporting higher rates of anxiety symptoms. Academic year was significantly associated with both depressive symptomatology ($p < 0.001$) and anxiety symptomatology ($p < 0.001$), with higher ratesof symptoms reported by students in the first and second years compared to those in the third, fourth, and fifth years.

Confidence in the government to manage the COVID-19 epidemic was significantly associated with depressive symptomatology ($p = 0.020$), with those having some or a lot of distrust reporting higher rates of symptoms. Seeking mental health support was significantly associated with both depressive symptomatology ($p = 0.004$) and anxiety symptomatology ($p = 0.001$).

Resilience was found to be significantly associated with both depressive symptomatology ($p = 0.001$) and anxiety symptomatology ($p < 0.001$), with lower levels of resilience associated with higher rates of symptoms.

Other variables examined, including age, compliance with isolation measures, COVID-19 pandemic severity rating, family member with recent COVID-19, family member deceased by COVID-19, previous history of mental health disorders, alcohol use, and family Apgar, did not show significant associations with depressive or anxiety symptomatology in bivariate analysis.

Simple and multiple regression analyses of childhood trauma and mental health outcomes

Table 3 presents the results of simple and multiple regression analyses examining the association between childhood trauma and mental health disorders in schoolchildren from three schools in Chiclayo, 2021. The factors investigated include age, sex, compliance with isolation measures, COVID-19 pandemic severity rating, confidence in government to manage the COVID-19 epidemic, family member with recent COVID-19, family member deceased by COVID-19, previous history of mental health disorders, seeking mental health support, resilience, alcohol consumption, family Apgar, and childhood trauma.

TABLE 1 Characteristics of schoolchildren in three schools in Chiclayo, 2021 (*n* =456).

Characteristics	*N* (%)
Age (years)*	14.5 ± 1.33
Sex	
Male	54 (11.8)
Female	402 (88.2)
Academic year	
First	51 (11.2)
Second	49 (10.8)
Third	59 (12.9)
Fourth	122 (26.8)
Fifth	175 (38.4)
Compliance with isolation measures	
No	16 (3.5)
Yes	440 (96.5)
COVID-19 pandemic severity rating	
Very serious	326 (71.5)
Serious	87 (19.1)
Neutral	21 (4.6)
Overvalued	9 (2.0)
Highly overvalued	13 (2.9)
Confidence in government to manage COVID-19 epidemic	
A lot of confidence	15 (3.3)
Some confidence	127 (27.9)
Neither trust nor distrust	150 (32.9)
Some distrust	94 (20.6)
A lot of distrust	70 (15.4)
Family member with recent COVID-19	
No	115 (25.2)
Yes	341 (74.8)
Family member deceased by COVID-19	
No	234 (51.3)
Yes	222 (48.7)
Previous history of mental health disorders	
No	397 (87.1)
Yes	59 (12.9)
Seeking mental health support	
No	371 (81.4)
Yes	85 (18.6)
Resilience	24.3 ± 8.1
Alcohol consumption	
Low risk	425 (93.2)
Medium risk	25 (5.5)
High risk	4 (0.9)
Probable addiction	2 (0.4)

(Continued)

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TABLE 1 (Continued)

Characteristics		*N* (%)
Family dysfunction		
	No	151 (33.1)
	Mild	113 (24.8)
	Moderate	85 (18.6)
	Severe	107 (23.5)
Childhood trauma		
	No	263 (57.7)
	Yes	193 (42.3)
Depressive symptomatology		
	Minimal	108 (23.7)
	Mild	133 (29.2)
	Moderate	91 (20.0)
	Moderately severe	65 (14.3)
	Severe	59 (12.9)
Anxiety symptomatology		
	No	172 (37.7)
	Mild	127 (27.9)
	Moderate	91 (20.0)
	Severe	66 (14.5)

*Mean and standard deviation.

In the multiple regression analysis, childhood trauma demonstrated a significant association with depressive symptomatology (PR = 1.23, 95% CI: 1.10–1.37, $p < 0.001$) and anxiety symptomatology (PR = 1.55, 95% CI: 1.31–1.85, $p < 0.001$). The table also reports results for other factors, such as age, which showed a significant association with depressive symptomatology (PR = 1.03, 95% CI: 1.01–1.06, $p = 0.012$) and anxiety symptomatology (PR = 1.09, 95% CI: 1.04–1.13, $p < 0.001$). Resilience displayed a significant association with depressive symptomatology (PR = 0.99, 95% CI: 0.99–1.00, $p = 0.056$) and anxiety symptomatology (PR = 0.99, 95% CI: 0.98–0.99, $p = 0.012$).

Furthermore, the Family APGAR score had different levels of association with mental health outcomes, with mild, moderate, and severe categories exhibiting significant associations with depressive and anxiety symptomatology compared to the normal category. Other factors, such as sex, alcohol consumption, and confidence in government to manage the COVID-19 epidemic, exhibited varying levels of association with the outcomes.

Discussion

The global outbreak of the COVID-19 pandemic has presented unparalleled difficulties to individuals, families, and communities worldwide. The prolonged and uncertain nature of the pandemic has disrupted the lives of adolescents in numerous ways, impacting their physical, emotional, and mental well-being. In this study, we aimed to investigate the prevalence of depressive and anxiety symptomatology among adolescents in the context of the COVID-19 pandemic, as well as identify factors associated with these mental health issues.

Our study's research framework, illustrated in Figure 1, demonstrates the complex interplay of factors contributing to the mental health outcomes of schoolchildren during the COVID-19 pandemic. The significant associations between childhood trauma, depressive symptomatology, and anxiety symptomatology emphasize the importance of addressing and mitigating the effects of trauma in this population.

Prevalence of depressive and anxiety symptomatology

Our findings indicate a high prevalence of depressive and anxiety symptomatology among adolescents during the COVID-19 pandemic. Specifically, 7 out of 10 adolescents reported symptoms of depression, with 12.9% experiencing severe symptomatology. Meanwhile, 6 out of 10 adolescents reported symptoms of anxiety, with 14.5% presenting severe symptomatology. Our data suggest a higher prevalence of depressive and anxiety symptomatology during the pandemic than reported in previous studies in Chile and the United States (69, 70). This increase could be due to the restrictions and social isolation caused by the COVID-19 pandemic, as adolescents were less motivated to participate in activities they normally enjoyed, such as physical activity (71). Additionally, the risk of exposure to domestic violence (72), child abuse (73), and the acute and persistent impact of COVID-19 (74) may have increased depressive and anxious symptoms in adolescents (11, 75).

Association between childhood trauma and mental health

In our study, we found a strong association between childhood trauma and mental health issues such as depressive and anxiety symptomatology in adolescents. This finding aligns with previous research, which has consistently shown that traumatic experiences during childhood can act as potent risk factors for the onset, symptomatic severity, and course of depression and anxiety disorders (76). Our results contribute to the growing body of evidence highlighting the critical need to address childhood trauma and its long-lasting consequences on mental health and overall well-being.

The relationship between childhood trauma and mental health issues can be understood through various theoretical frameworks. One such framework is the stress-diathesis model, which suggests that an individual's vulnerability to developing mental health disorders is determined by a combination of genetic predispositions and environmental stressors (77, 78). Childhood trauma may act as a significant environmental stressor, triggering the onset of mental health issues in individuals with a genetic predisposition.

Furthermore, childhood trauma can lead to maladaptive coping strategies and cognitive distortions, such as negative self-appraisal, a sense of helplessness, and difficulties in emotion regulation (79). These maladaptive patterns may persist into adolescence and adulthood, increasing the risk of developing depression and anxiety disorders. In addition, early traumatic experiences can disrupt the normal development of neural circuits, leading to alterations in brain structure and function that predispose individuals to mental health issues (79).

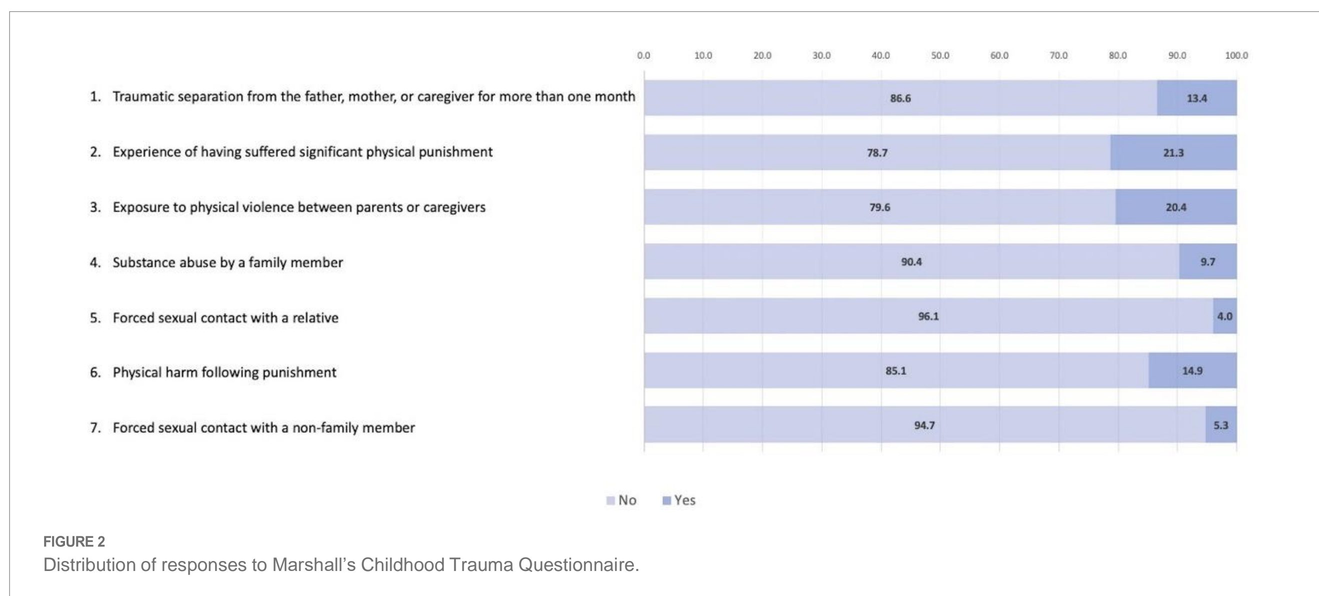

FIGURE 2
Distribution of responses to Marshall's Childhood Trauma Questionnaire.

Our findings emphasize the importance of early intervention and support for children exposed to traumatic experiences. Interventions such as trauma-focused cognitive-behavioral therapy (TF-CBT), eye movement desensitization and reprocessing (EMDR), and family-based interventions have shown promise in mitigating the adverse effects of childhood trauma on mental health (80–82). These therapeutic approaches aim to address trauma-related cognitive distortions, improve emotion regulation skills, and foster a supportive environment for healing.

Other factors associated with depressive symptoms

In addition to childhood trauma, our study identified several other factors associated with depressive symptoms among adolescents during the COVID-19 pandemic. For each additional year of age, the prevalence of depressive symptoms slightly increased. This may be since children and adolescents are in constant development, and they are particularly vulnerable to social exclusion, discrimination, educational difficulties, negative interpersonal relationships, and environmental factors that can affect their mental health (83). Additionally, adolescents who reported seeking mental health help had a higher prevalence of depressive symptomatology. This could be due to the stigma and negative beliefs that may exist toward mental health services and professionals (84). Therefore, it is essential to adopt effective intervention strategies to address adolescent mental health, such as self-directed cognitive-behavioral interventions that can be implemented in various settings, including schools, communities, health centers, and camps (85, 86).

Other factors associated with anxiety symptoms

Like depressive symptoms, several factors were associated with anxiety symptomatology among adolescents during the COVID-19 pandemic. For each additional year of age, the prevalence of anxiety symptoms slightly increased. This is consistent with previous studies that have found anxiety tends to increase with age and can persist into adulthood (87, 88). Adolescents who perceived the pandemic's severity neutrally had a lower prevalence of anxiety symptoms. This suggests that providing social support and mindfulness strategies to help adolescents cope with the pandemic can reduce anxiety symptoms (89). Additionally, adolescents from dysfunctional families had a higher prevalence of anxiety symptomatology. Family dysfunction can create conditions for adolescents to experience a greater sense of hopelessness, changes in their lifestyle, and mental health problems, with anxiety being the most prevalent (90). Finally, our study found that resilience was negatively associated with anxiety symptoms. Adolescents with higher resilience scores experienced lower prevalence of anxiety symptoms, suggesting that promoting resilience can have positive effects on adolescent mental health during the pandemic (91).

Limitations and strengths

Our study has limitations that must be acknowledged. First, the cross-sectional design cannot establish causality. Second, nonresponse bias may have affected the results, as levels of adolescents' motivation for voluntary participation in the study may have varied. Third, self-reported data could be subject to information bias. Fourth, certain variables, such as eating disorders (92), personality disorder (93), and post-traumatic stress disorder (94), could not be measured due to the secondary data analysis (95). Lastly, selection bias may be present, as all study subjects voluntarily participated in the questionnaire. However, our study has notable strengths. Firstly, we used a validated and reliable questionnaire to assess childhood trauma and mental health problems among adolescents. Secondly, we obtained a sufficient sample size to achieve adequate statistical power and reduce the risk of type II error. Thirdly, we used the snowball method, which is a cost-effective and convenient way to recruit study participants. Fourthly, we conducted the study during the second wave of the COVID-19 pandemic, which allowed us to capture the effects of a prolonged period of quarantine and social isolation on mental health outcomes. Lastly, our findings provide valuable insights into the association between childhood trauma and mental health problems in the context of the COVID-19 pandemic, which can inform the development of targeted interventions to support vulnerable adolescents.

TABLE 2 Childhood trauma and other factors associated with mental health disorders, in bivariate analysis.

Variables	*Depressive symptomatology*		*p**	*Anxiety symptomatology*		*p**
	No (*n* =108)	Yes (*n* =348)		No (*n* =172)	Yes (*n* =284)	
	n (%)	n (%)		n (%)	n (%)	
Age (years)¶**	14.27 ± 1.56	14.64 ± 1.24	0.026	14.29 ± 1.49	14.70 ± 1.20	0.003
Sex			0.076			0.001
Male	18 (33.3)	36 (66.7)		31 (57.4)	23 (42.6)	
Female	90 (22.4)	312 (77.6)		141 (35.1)	261 (64.9)	
Academic year			<0.001			<0.001
First	23 (45.1)	28 (54.9)		32 (62.8)	19 (37.3)	
Second	17 (34.7)	32 (65.3)		24 (49.0)	25 (51.0)	
Third	9 (15.3)	50 (84.8)		20 (33.9)	39 (66.1)	
Fourth	19 (15.6)	103 (84.4)		39 (32.0)	83 (68.0)	
Fifth	40 (22.9)	135 (77.1)		57 (32.6)	118 (67.4)	
Compliance with isolation measures			0.284			0.587
No	2 (12.5)	14 (87.5)		5 (31.3)	11 (68.8)	
Yes	106 (24.1)	334 (75.9)		167 (38.0)	273 (62.1)	
COVID-19 pandemic severity rating			0.222			0.271
Very serious	85 (26.1)	241 (73.9)		125 (38.3)	201 (61.7)	
Serious	16 (18.4)	71 (81.6)		27 (31.0)	60 (69.0)	
Neutral	3 (14.3)	18 (85.7)		12 (57.1)	9 (42.9)	
Overvalued	3 (33.3)	6 (66.7)		3 (33.3)	6 (66.7)	
Highly overvalued	1 (7.7)	12 (92.3)		5 (38.5)	8 (61.5)	
Confidence in government to manage COVID-19 epidemic			0.020			0.255
A lot of confidence	7 (46.7)	8 (53.3)		8 (53.3)	7 (46.7)	
Some confidence	39 (30.7)	88 (69.3)		55 (43.3)	72 (56.7)	
Neither trust nor distrust	33 (22.0)	117 (78.0)		56 (37.3)	94 (62.7)	
Some distrust	15 (16.0)	79 (84.0)		31 (33.0)	63 (67.0)	
A lot of distrust	14 (20.0)	56 (80.0)		22 (31.4)	48 (68.6)	
Family member with recent COVID-19			0.144			0.141
No	33 (28.7)	82 (71.3)		50 (43.5)	65 (56.5)	
Yes	75 (22.0)	266 (78.0)		122 (35.8)	219 (64.2)	
Family member deceased by COVID-19			0.570			0.597
No	58 (24.8)	176 (75.2)		91 (38.9)	143 (61.1)	
Yes	50 (22.5)	172 (77.5)		81 (36.5)	141 (63.5)	
Previous history of mental health disorders			<0.001			<0.001
No	105 (26.5)	292 (73.6)		166 (41.8)	231 (58.2)	
Yes	3 (5.1)	56 (94.9)		6 (10.2)	53 (89.8)	
Seeking mental health support			0.004			0.001
No	98 (26.4)	273 (73.6)		153 (41.2)	218 (58.8)	
Yes	10 (11.8)	75 (88.2)		19 (22.4)	66 (77.7)	
Resilience**	26.6 ± 9.58	23.6 ± 7.41	0.001	26.27 ± 8.88	23.11 ± 7.29	<0.001
Alcohol			0.144			0.072
Low risk	104 (24.5)	321 (75.5)		165 (38.8)	260 (61.2)	
Medium risk-probable addiction	4 (12.9)	27 (87.1)		7 (22.6)	24 (77.4)	

(Continued)

TABLE 2 (Continued)

Variables	Depressive symptomatology		p*	Anxiety symptomatology		p*
	No (*n* =108)	Yes (*n* =348)		No (*n* =172)	Yes (*n* =284)	
	n (%)	n (%)		n (%)	n (%)	
Family Apgar			<0.001			<0.001
Normal	67 (44.4)	84 (55.6)		85 (56.3)	66 (43.7)	
Mild	20 (17.7)	93 (82.3)		44 (38.9)	69 (61.1)	
Moderate	5 (5.9)	80 (94.1)		21 (24.7)	64 (75.3)	
Severe	16 (15.0)	91 (85.1)		22 (20.6)	85 (79.4)	
Childhood trauma			<0.001			<0.001
No	88 (33.5)	175 (66.5)		139 (52.9)	124 (47.2)	
Yes	20 (10.4)	173 (89.6)		33 (17.1)	160 (82.9)	

**p*-value calculated with the Chi-square test for independence.
**Mean and standard deviation.
¶*p*-value calculated with Student's *t*-test.

Relevance of findings in mental health

The COVID-19 pandemic has profoundly impacted the mental health of young people, posing urgent and potentially long-term challenges (96). To control the pandemic, global measures such as mass quarantine, confinement, social distancing, and school closures have been implemented, drastically altering the lives of children and adolescents. As a result, they have had to endure extended periods of isolation and restricted social interactions (97). These unprecedented circumstances have not only led to changes in adolescent behavior but also exacerbated mental health disorders, particularly for those with previous experiences of childhood trauma (98). While the adverse effects of the pandemic on adolescent health and well-being have lessened, mental health problems have seen a significant increase (99). Studies report a high prevalence of mental health conditions (83%), including depression (29%), anxiety (26%), sleep disorders (44%), and post-traumatic stress symptoms (48%) (12, 23, 100).

In the context of the COVID-19 pandemic, childhood trauma has been identified as a predictor of poor mental health outcomes, partly due to the increased psychological impact associated with the pandemic (e.g., intrusion, hyperarousal, avoidance, depressive symptoms, anxiety symptoms, and stress symptoms) (29). Consequently, it is crucial to monitor the mental health repercussions of the pandemic on adolescents, particularly those from vulnerable backgrounds. Factors that may exacerbate vulnerability include lower socioeconomic status, parents with higher levels of psychopathology, increased familial conflict, irregular routines, prior psychiatric diagnoses, and greater exposure to COVID-19 (101).

The results of the study can help schools in several practical ways. Firstly, the study found that childhood trauma was strongly associated with depression and anxiety in schoolchildren. Therefore, schools can use this information to identify students who have experienced childhood trauma and provide them with appropriate support and interventions to prevent the development of mental health disorders.

Secondly, the study found that previous history of mental health disorders was strongly associated with depression and anxiety. Schools can use this information to identify students who have a history of mental health disorders and provide them with appropriate support and interventions to prevent relapse or further deterioration of their mental health.

Thirdly, the study found that resilience was protective against depression and anxiety. Schools can use this information to implement programs and activities that promote resilience among their students, such as mindfulness training, social and emotional learning, and physical exercise.

By understanding and addressing these factors, we can better support the mental health and well-being of adolescents during and beyond the pandemic.

Conclusion

In conclusion, this study sheds light on the significant impact of the COVID-19 pandemic on adolescent mental health, particularly concerning depressive and anxiety symptoms. Our findings reveal a strong association between childhood trauma and mental health issues, emphasizing the importance of early intervention and support for affected adolescents. The pandemic has exacerbated pre-existing vulnerabilities, underscoring the need to closely monitor and address mental health challenges among at-risk adolescents.

Our findings hold clinical utility and can inform healthcare providers, policymakers, and educators about the importance of addressing the mental health needs of adolescents who have experienced childhood trauma, especially during challenging times such as the pandemic. This knowledge may be applied in developing school-based interventions aimed at preventing or treating depression and anxiety in students who have experienced childhood trauma and have been exposed to the COVID-19 pandemic. For example, schools could provide targeted mental health support to this vulnerable group, such as access to counseling services or group therapy sessions.

Additionally, our study highlights the importance of addressing childhood trauma as a risk factor for mental health problems, particularly during times of increased stress and uncertainty. Future research should build on this study by focusing on the originality and novelty of such interventions, exploring innovative approaches, utilizing cutting-edge technology, or fostering interdisciplinary collaborations to better understand the complex interplay of factors contributing to poor mental health outcomes. Longitudinal studies investigating the long-term effects of the pandemic on adolescent mental health and resilience would also provide invaluable insights for

TABLE 3 **Childhood trauma and other factors associated with mental health disorders in schoolchildren from three schools in Chiclayo, 2021, in simple and multiple regression analysis.**

Characteristics	*Depressive symptomatology*						*Anxiety symptomatology*					
	Simple regression			Multiple regression*			Simple regression			Multiple regression*		
	PR	95%CI	*p***	PR	95CI%	*p***	PR	95CI%	*p***	PR	95CI%	*p***
Age (years)	1.06	0.98–1.14	0.135	1.03	1.01–1.06	0.012	1.09	1.00–1.20	0.053	1.09	1.04–1.13	<0.001
Sex												
Male	Ref.			Ref.			Ref.			Ref.		
Female	1.20	0.90–1.60	0.216	1.11	0.92–1.34	0.255	1.55	1.16–2.09	0.003	1.27	0.98–1.65	0.069
Compliance with isolation measures												
No	Ref.			Ref.			Ref.			Ref.		
Yes	0.86	0.67–1.10	0.236	1.01	0.82–1.25	0.916	0.90	0.67–1.21	0.493	1.09	0.75–1.59	0.650
COVID-19 pandemic severity rating												
Very serious	Ref.			Ref.			Ref.			Ref.		
Serious	1.11	1.01–1.23	0.036	1.07	0.97–1.19	0.161	1.13	0.95–1.34	0.175	1.11	0.93–1.31	0.246
Neutral	1.17	1.00–1.37	0.056	1.08	0.97–1.20	0.148	0.70	0.66–0.73	<0.001	0.64	0.54–0.76	<0.001
Overvalued	0.90	0.60–1.36	0.625	0.79	0.46–1.36	0.399	1.08	0.84–1.40	0.540	0.93	0.66–1.31	0.677
Highly overvalued	1.25	1.11–1.41	<0.001	1.21	0.99–1.49	0.065	1.00	0.58–1.73	0.999	0.95	0.62–1.45	0.809
Confidence in government to manage COVID-19 epidemic												
A lot of confidence	Ref.			Ref.			Ref.			Ref.		
Some confidence	1.38	0.61–3.13	0.435	1.12	0.50–2.50	0.789	1.29	0.62–2.68	0.502	0.96	0.57–1.61	0.875
Neither trust nor distrust	1.56	0.67–3.64	0.302	1.15	0.53–2.50	0.721	1.44	0.68–3.01	0.343	0.95	0.61–1.48	0.806
Some distrust	1.69	0.67–4.23	0.264	1.26	0.55–2.90	0.586	1.54	0.71–3.36	0.278	1.00	0.63–1.60	0.984
A lot of distrust	1.62	0.79–3.32	0.192	1.14	0.56–2.32	0.724	1.57	0.87–2.83	0.136	0.98	0.63–1.53	0.934
Family member with recent COVID-19												
No	Ref.			Ref.			Ref.			Ref.		
Yes	1.12	1.01–1.24	0.029	1.05	0.96–1.15	0.270	1.14	1.06–1.22	<0.001	1.06	0.93–1.21	0.348
Family member deceased by COVID-19												
No	Ref.			Ref.			Ref.			Ref.		
Yes	1.04	0.97–1.11	0.259	1.00	0.96–1.04	0.943	1.04	0.86–1.26	0.679	0.97	0.81–1.16	0.730
Previous history of mental health disorders												
No	Ref.			Ref.			Ref.			Ref.		
Yes	1.29	1.22–1.37	<0.001	1.06	0.92–1.22	0.457	1.54	1.41–1.69	<0.001	1.12	0.91–1.39	0.292
Seeking mental health support												
No	Ref.			Ref.			Ref.			Ref.		
Yes	1.19	1.09–1.29	<0.001	1.12	1.02–1.22	0.016	1.33	1.06–1.66	0.012	1.15	0.88–1.50	0.304
Resilience	0.99	0.98–0.99	<0.001	0.99	0.99–1.00	0.056	0.98	0.97–0.99	<0.001	0.99	0.98–0.99	0.012
Alcohol												
Low risk	Ref.			Ref.			Ref.			Ref.		
Medium risk-probable addiction	1.16	1.03–1.31	0.013	1.01	0.80–1.26	0.957	1.28	1.04–1.58	0.021	1.03	0.80–1.33	0.793
Family Apgar												
Normal	Ref.			Ref.			Ref.			Ref.		
Mild	1.43	1.22–1.67	<0.001	1.42	1.23–1.64	<0.001	1.38	1.05–1.82	0.023	1.30	1.04–1.61	0.020
Moderate	1.65	1.43–1.90	<0.001	1.50	1.35–1.68	<0.001	1.70	1.25–2.32	0.001	1.47	1.16–1.86	0.002
Severe	1.48	1.17–1.87	0.001	1.28	1.01–1.64	0.044	1.80	1.33–2.42	<0.001	1.37	1.05–1.79	0.021
Childhood trauma												
No	Ref.			Ref.			Ref.			Ref.		
Yes	1.35	1.26–1.44	<0.001	1.23	1.10–1.37	<0.001	1.76	1.57–1.98	<0.001	1.55	1.31–1.85	<0.001

*Adjusted for covariates of interest.

***p*-values obtained with Generalized Linear Models (GLM), Poisson family, log-link function, robust variance.

designing targeted, evidence-based interventions. By committing to these research endeavors, we can ensure that essential resources and support are available to foster resilience and recovery in the face of adversity, ultimately improving the well-being of adolescents during and beyond these unprecedented times.

Data availability statement

The data analyzed in this study is subject to the following licenses/restrictions: The ethics committee restricts the public use of the dataset. However, they are available from authors on reasonable request. Requests to access these datasets should be directed to MV-G, josvg44@gmail.com.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics and Research Committee of the Universidad San Martín de Porres, Lima, Peru. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

MV-G, DL-F, FD, SB-C, MF-C and DV-G conceived and designed the study, collected and analyzed the data, and wrote the manuscript. MV-G, SB-C, MF-C, VF-R, and CP-V contributed to the analysis and interpretation of the data and critically revised the manuscript for important intellectual content. MV-G, VF-R DV-G, CP-V and FI-B provided valuable input and contributed to the writing and revision of the manuscript. MV-G, DL-F, and VF-R take responsibility for the integrity of the work as a whole, from inception to publication. All authors have read and approved the final version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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II. DISCUSIONES

Descripción de resultados bivariados

Encontramos una mayor frecuencia de síntomas depresivos en escolares con trauma infantil (89.6% vs. 66.5%; p<0.001). La frecuencia de síntomas ansiosos en escolares con trauma infantil fue 35.7% superior, respecto a aquellos que no presentaron este problema mental (82.9% vs. 47.2%; p<0.001).

La frecuencia de síntomas depresivos fue superior en los adolescentes con algo y mucha desconfianza percibida para gestionar la pandemia de COVID-19, comparado con aquellos que informaron tener mucha confianza (80% vs. 84% vs. 53.3%; p=0.020). Los adolescentes antecedentes previos de enfermedad mental tenían una frecuencia un 21.3% mayor de síntomas depresivos (94.9% vs. 73.6%; p<0.001) y un 31.6% mayor de síntomas ansiosos (89.8% vs. 58.2%). La búsqueda de apoyo de salud mental se asoció tanto con la sintomatología depresiva (p=0.004) como con la sintomatología de ansiedad (p=0.001). La resiliencia también mostró asociación tanto con la sintomatología depresiva (p=0.001) como con la sintomatología de ansiedad (p<0.001). Además, se observó una mayor frecuencia de síntomas depresivos en los adolescentes con disfuncionalidad familiar severa; comparado con aquellos con funcionalidad familiar (85.1% vs. 55.6%; p<0.001). De forma similar, los adolescentes con disfuncionalidad familiar severa presentaron 35.7% mayor frecuencia de síntomas ansiosos (79.4% vs. 43.7%; p<0.001).

Descripción de resultados de análisis de regresión simple y múltiple

El análisis de regresión múltiple confirmó lo observado en el análisis simple. La frecuencia de síntomas depresivos incrementó 23% en escolares con trauma infantil, respecto a aquellos que no presentaron dicho trauma (RP: 1.23; IC95%: 1.10-1.37). Reportar haber buscado ayuda en salud mental durante pandemia incrementó 12% la frecuencia de síntomas depresivos (RP: 1.12; IC95%: 1.02-1.22) y la disfunción familiar severa aumentó 28% la frecuencia de este trastorno mental (RP: 1.28; IC95%: 1.01-1.64).

Los escolares con trauma infantil tenían 55% mayor frecuencia de síntomas ansiosos, en comparación con aquellos que no tuvieron trauma en infancia (RP: 1.55; IC95%: 1.31-1.85). Adicionalmente, los factores asociados positivamente a síntomas ansiosos fueron tener disfunción familiar leve (RP: 1.30; IC95%: 1.04-1.61), moderada (RP: 1.47; IC95%: 1.16-1.86) y severa (RP: 1.37; IC95%: 1.05-1.79). Mientras que los escolares que percibieron de forma neutral la severidad de la pandemia reducían 36% la frecuencia de síntomas ansiosos (RP: 0.64; IC95%: 0.54-0.76).

Frecuencia de síntomas depresivos y ansiosos

Se observó que 7 de cada 10 adolescentes presentaron síntomas depresivos (76.3%). Además, se encontró que el 14.3% y 12.9% de estos adolescentes experimentaban síntomas depresivos moderados a graves y graves, respectivamente utilizando PHQ-9 con un punto de corte de 5 para depresión leve.

Esto es consistente con lo hallado en estudiantes de cinco escuelas de nivel secundario de China, en quienes se identificó que el 71.5% presentó síntomas de depresión (1), en el que se usó PHQ-9 con un punto de corte de 10 puntos. Además, concuerda con un estudio similar conducido en adolescentes de Perú, dado que el 68.7% presentó síntomas depresivos; entre ellos, el 34.3% reportó sintomatología severa (2), pero utilizó el instrumento de depresión de Beck con un punto de corte establecido en 7 puntos. La frecuencia encontrada es ligeramente inferior a lo reportado en adolescentes de Arabia Saudita, donde la frecuencia de síntomas depresivos fue del 69.7%, en el que se usó PHQ-9 con un punto de corte de 5 puntos (3).

Esta investigación presenta una frecuencia de síntomas depresivos que es superior a la encontrada en una investigación realiza en Estados Unidos durante el 2020, donde se reportó que el 55% de los adolescentes presentaron síntomas depresivos, utilizando PHQ-9 con un punto de corte de 10 puntos o más (4). También supera a lo reportado en adolescentes del

norte de India, donde la frecuencia de síntomas depresivos fue del 50%, en el que se usó PHQ-9 con un punto de corte de 5 puntos (5). Estos resultados difieren de los encontrados en adolescentes de China, donde frecuencia de síntomas depresivos fue de 43.7%%, en el que se usó PHQ-9 con un punto de corte de 5 puntos (6). De manera similar, en India, el 37% de los escolares adolescentes presentaron síntomas depresivos, según el Cuestionario de Salud del Paciente para Adolescentes (PHQ-A), el cual es una adaptación del PHQ-9, con un punto de corte de 5 puntos (7). Además, la frecuencia encontrada es superior a lo hallado en Beijing, donde se estimó que el 29.7% de adolescentes escolares presentaron depresión durante el 2020 (8), utilizando el cuestionario "*Center for Epidemiological Studies Depression Scale"* (CES-D, siglas en inglés) con un punto de corte de 16 puntos o más. Asimismo, supera a lo reportado en adolescentes de China durante el primer año de la pandemia por COVID-19, donde la frecuencia de síntomas depresivos fue de 27.5%, en el que se usó PHQ-9 con un punto de corte de 5 puntos (9). Difiere de una investigación realizada en China después de la pandemia por COVID-19, que encontró que el 25.6% de los adolescentes padecía síntomas depresivos, en el que se usó PHQ-9 con un punto de corte de 5 puntos (10). También, la frecuencia es superior a lo encontrado en adolescentes coreanos en 2020, en quienes se registró una frecuencia de 13.8% de síntomas depresivos (11), aunque se utilizó PHQ-9 con un punto de corte diferente (10 puntos o más). Por otro lado, es considerablemente inferior a lo reportado en adolescentes de Tanzania, donde la frecuencia de

depresión fue 15.9%, según el instrumento PHQ-A con punto de corte de 5 puntos (12).

Estos resultados podrían ser explicados por las restricciones y el aislamiento social que hubo durante el desarrollo del estudio debido a la pandemia del COVID-19. Es posible que durante este periodo, los adolescentes presentaran menor motivación para participar en actividades que realizaban anteriormente, como la actividad física (13). Además, según muestran otros estudios, el riesgo a la exposición a la violencia doméstica (14), el maltrato infantil (15), el impacto agudo y persistente de COVID-19 (16) podrían haber aportado al aumento de síntomas de depresión (17,18). Adicionalmente, los adolescentes han experimentado el aislamiento físico de sus compañeros de escuela, profesores, familiares y amistades cercanas de forma prolongada, las cuales -como señalan otros estudios- juegan un papel protector ante la depresión, al satisfacer sus necesidades básicas, como la asistencia emocional, adaptación conductual y tener al alcance los recursos materiales necesarios (18–20).

Encontramos que 6 de cada 10 adolescentes tenían síntomas ansiosos (62.3%), entre ellos el 14.5% presentó síntomas de ansiedad severos, utilizando GAD-7 con un punto de corte de 5 para ansiedad leve. Este hallazgo se asemeja a una investigación realizada en adolescentes de Arabia Saudita, donde la frecuencia de síntomas ansiosos fue del 68.4%, utilizando GAD-7 con un punto de corte de 5 puntos (3).

Esta investigación encuentra una frecuencia superior a la identificada en China (45.1%) en adolescentes evaluados durante el 2020, utilizando GAD-7 con un punto de corte de 5 puntos (21). También supera los resultados informados en Estados Unidos durante el 2020, Murata E, et al. reportaron que el 48 % de los adolescentes presentaron síntomas moderados a severos de ansiedad con el instrumento GAD-7, utilizando punto de corte de 10 o más para definir dichos síntomas (4), siendo estos resultados inferiores a los obtenidos en nuestra investigación. En México, se estimó que el 46.8% de escolares de nivel secundaria presentaron algún síntoma ansioso, según el instrumento DASS-21 con un punto de corte de 7 puntos, entre ellos el 12.5% de tipo severo (22); lo cual es consistente con nuestro estudio. Nuestro resultado también supera lo informado por el Fondo de las Naciones Unidas para la Infancia (UNICEF) durante la epidemia de COVID-19, que reportó que el 27% de los adolescentes de América Latina y el Caribe experimentaron síntomas de ansiedad durante el 2020, aunque en este informe no se proporciona información sobre el instrumento utilizado ni el punto de corte (23).

Este hallazgo es diferente de lo encontrado en adolescentes de China, donde la frecuencia de síntomas ansiosos durante la pandemia de COVID-19 fue del 37.4% (6) y del 21.3% durante el primer año de pandemia, utilizando GAD-7 con punto de corte de 5 puntos (9). También es contrario a una investigación en Corea, donde el 21% de adolescentes presentó síntomas de

ansiedad (11), aunque es importante señalar que se utilizó GAD-7 con un punto de corte diferente en dicha investigación (10 puntos o más). Adicionalmente, difiere de los resultados informados en China, donde el 20.6% de los adolescentes presentaron síntomas ansiosos, utilizando GAD-7 con un punto de corte de 5 puntos (10). Contrasta con lo descrito en una investigación desarrollada en China durante el primer año de la pandemia por COVID-19, donde el 19% de los adolescentes presentaron síntomas ansiosos, utilizando GAD-7 con un punto de corte de 5 puntos (24). Por otro lado, difiere de una investigación conducida en escolares adolescentes peruanos, en la cual se estimó una frecuencia de 9.3% de síntomas ansiosos severos (2); cabe señalar que esta investigación utilizó la escala de ansiedad de Beck con el punto de corte de 22 puntos.

La alta frecuencia de ansiedad en los adolescentes podría ser explicada por diversos factores que no fueron objeto de este estudio. La literatura muestra que la disrupción ocasionada por las medidas de confinamiento, distanciamiento social, cambios en la organización de su tiempo para actividades académicas, deportivas y sociales y suspensión de clases presenciales alteró significativamente la vida de los adolescentes, ocasionando preocupación por su rendimiento académico, aislamiento social y falta de apoyo emocional, lo cual puede contribuir al desarrollo de síntomas ansiosos (18,25–29). Además, la frecuencia de ansiedad en los adolescentes durante la pandemia puede estar relacionada con una falta de motivación para realizar actividades, sensación de fatiga, alteraciones en el

apetito, irritabilidad y una mayor susceptibilidad a experimentar nerviosismo (30,31). Otro factor contribuyente sería la preocupación excesiva y la incertidumbre por la salud personal y la de sus familiares, a causa de la posibilidad de contagio de SARS-CoV-2, lo cual originaría miedo al contagio y posterior aumento de ansiedad en el adolescente (32,33). Además, una explicación podría ser la ausencia de comunicación confiable y clara sobre la pandemia, lo cual conllevaría a incrementar la incertidumbre y posterior ansiedad en los escolares (34). Otros factores asociados incluyen las tensiones ocasionadas en el hogar, particularmente la inestabilidad financiera (35,36) y la inseguridad alimentaria (37–39), contribuyendo al desarrollo de síntomas ansiosos.

Asociación entre trauma infantil y salud mental (depresión y ansiedad)

Los adolescentes con trauma infantil tenían 23% mayor frecuencia de depresión. Un estudio conducido durante la pandemia por COVID en Brasil reportado por Zuccolo PF et al., evidenció que los adolescentes ante una exposición previa a eventos traumáticos o agresión psicológica tuvieron una mayor posibilidad de depresión (OR=1.10) (40). En dicho estudio, se utilizó la escala DASS-21 para medir la depresión y la *Conflict Tactics Scales: Parent–Child Version* (CTSPC, siglas en inglés) para evaluar el trauma infantil (40). Esto es similar a lo descrito por Pham TS. et al. en Vietnam, quien informó que los adolescentes que presentaron abuso emocional (OR: 2.17) y físico (OR:2.61) tenían mayor probabilidad de síntomas depresivos (41). En dicho estudio, se utilizaron el Child Trauma Questionnaire-Short

Form (CTQ-SF) para evaluar el trauma infantil y el CES-D para medir la depresión (41). Además en Corea, Huh HJ, et al. en 2017, reportó que los pacientes con trauma infantil se correlacionaron positivamente con los síntomas de depresión ($r=0.290$, $p<0.01$), utilizando el *Childhood Trauma Questionnaire* (CTQ, siglas en inglés) para medir el trauma infantil y la escala de depresión de Beck para evaluar los síntomas depresivos (42). Sin embargo, en China, Chang JJ, et al. en 2021, informó que no todos los adolescentes que han experimentado abuso y negligencia infantil se deprimirán o tendrán el mismo grado de depresión, esto se debe a la capacidad adaptativa de los adolescentes para mantener una vida activa a pesar de la adversidad y los eventos estresantes (resiliencia psicológica) (43). En dicho estudio, se utilizaron el CTQ-SF para evaluar el trauma infantil y la *Self-rating Depression Scale* (SDS, siglas en inglés) para medir la depresión. Esta asociación podría ser explicada debido a que experiencias traumáticas son un factor determinante para la aparición, la gravedad sintomática y el curso de la depresión, experimentar cualquier tipo de maltrato puede aumentar más del doble el riesgo de depresión en la edad adulta (44).

La asociación entre el trauma infantil y los síntomas depresivos en adolescentes puede estar relacionada con cambios neurobiológicos crónicos (45). El trauma infantil puede ocasionar alteraciones en el sistema de respuesta al estrés, lo cual podría ser un mecanismo de respuesta clave en el desarrollo de los síntomas depresivos (45–47). Adicionalmente, existe una

potencial relación entre los cambios epigenéticos y el desarrollo de estrés y depresión (48). La exposición a niveles elevados de estrés durante la infancia puede desencadenar respuestas excesivas del sistema neuroendocrino frente al estrés en la adolescencia o la edad adulta, lo cual incrementa el riesgo de depresión (49,50). Además, los trastornos del sueño y los desequilibrios en el ritmo circadiano, que están estrechamente relacionados con el sistema de respuesta al estrés, podrían servir como mecanismos fisiopatológicos que conectan el trauma infantil con la depresión (45,51).

Los adolescentes con trauma infantil tenían 55% mayor frecuencia de síntomas ansiosos. Esto es consistente a lo documentado por Pham TS. et al. en Vietnam en el 2021, quien reportó que los adolescentes de 12 a 18 años desarrollaron una correlación positiva entre el trauma infantil (abuso emocional y el abuso físico) ($\varphi c=0.20$, $p=0.02$ y $\varphi c=0.25$, $p<0.001$, respectivamente) y síntomas de ansiedad (41). En dicha investigación se utilizó el instrumento CTQ-SF para medir trauma infantil y la escala de ansiedad de Nguyen para evaluar ansiedad (41). Además, es similar a lo descrito por Tong J, et al. en China durante la pandemia por COVID-19, quien reportó una frecuencia general de trauma infantil y ansiedad entre los estudiantes de secundaria superior en familias de dos hijos fue del 46,70% y del 22.17% respectivamente, además hubo una relación significativa entre el trauma infantil y los síntomas de ansiedad en el grupo familiar de un solo hijo ($r=0.161$) (52). Es preciso mencionar que se utilizó el cuestionario

CTQ-SF para evaluar trauma infantil y la escala *Self-Rating Anxiety Scale* (SAS, siglas en inglés) para medir síntomas ansiosos (52). Esta asociación puede desencadenarse por eventos y/o experiencias traumáticas, que pueden conducir a tendencias de desesperanza, baja autoestima, disminución de los sentimientos de apoyo social y baja satisfacción vital en los adolescentes, todo lo cual puede dar lugar a síntomas de ansiedad; principalmente por abuso físico y sexual (53).

Otros factores asociados a depresión

Por cada año adicional de edad, incrementó ligeramente la frecuencia de depresión. Esto es similar a lo reportado por Uljarević M., et al. en 2020 en Austria, quienes observaron una tendencia leve al aumento de síntomas de depresión desde la adolescencia (24.3%) hasta la edad adulta media (31.3%) (54). Esto es similar con lo reportado por Mehler-Wex C, quien afirmó que la frecuencia de depresión en las naciones industrializadas occidentales aumenta con la edad, con tasas que oscilan entre el 3.2% y el 8.9% en adolescentes (55). Esta asociación puede explicarse por varios factores. Durante la infancia y la adolescencia, los individuos se encuentran en constante desarrollo y son vulnerables a situaciones de exclusión social, las dificultades educativas, relaciones interpersonales negativas y discriminación. Estos factores pueden aumentar la probabilidad de desarrollar problemas de salud mental, incluyendo la depresión, que puede persistir hasta la edad adulta (56).

Los adolescentes que reportaron haber buscado ayuda en salud mental incrementaban 12% la frecuencia de depresión. Esto es consistente con lo reportado por Zachrisson HD. et al. en Noruega antes de la pandemia, donde los adolescentes que tuvieron mayor contacto con los servicios generales de salud, como psicólogos o psiquiatras presentaban mayores síntomas depresivos comparado con aquellos que no habían solicitado asistencia para abordar su salud mental (OR: 1.98) (57). Además, Essau CA. et al. en Alemania también antes de la pandemia, informaron que los adolescentes con trastornos depresivos que utilizaban servicios de salud mental obtenían puntajes significativamente más altos en el índice de gravedad global (Media=7.74) en comparación con adolescentes deprimidos que no utilizaron servicios (58). Esta asociación podría ser explicada por diversos factores. El comportamiento de los adolescentes de buscar ayuda para afrontar problemas de salud mental frecuentes puede generar estigma y creencias negativas hacia los servicios y profesionales de salud mental, lo que genera un mayor aumento de estos trastornos depresivos. Además, las medidas de restricción implementadas durante la pandemia de COVID-19, podría haber generado un mayor desequilibrio en su salud mental de los adolescentes (59). Por ello se recomienda adoptar estrategias de intervención efectivas para abordar la salud mental de los adolescentes como la intervención cognitivo-conductual autoguiada, que puede aplicarse en diversos entornos, incluyendo escuelas, comunidades, centros de salud y campamentos (60,61). Estas intervenciones pueden ser fundamentales en la prevención y el tratamiento de la depresión en adolescentes.

La frecuencia de depresión incrementaba 42%, 50% y 28% en adolescentes con disfunción familiar leve, moderada y severa; respectivamente. Este hallazgo concuerda con lo descrito por Bustillos et al., donde se encontró que los adolescentes con disfunción familiar tenían mayor frecuencia de depresión (RP:3.096) (62). Además, en adolescentes de Indonesia en 2022 se informó que la disfunción familiar estaba correlacionada con la depresión en los adolescentes (r=0,626) (63). Esta asociación puede explicarse debido a los numerosos desafíos que los adolescentes enfrentan debido a la disfunción familiar. A medida que intentan lidiar con los problemas que surgen en un entorno familiar disfuncional, como la falta de apoyo emocional, la comunicación deficiente o las dinámicas negativas, los adolescentes pueden experimentar dificultades para desarrollar una autonomía saludable, establecer su propia identidad y lograr una maduración biopsicosocial adecuada. Estas condiciones pueden generar una mayor sensación de desesperanza y cambios en su estilo de vida, lo que contribuye a problemas de salud mental, siendo la depresión el trastorno más prevalente (64).

Tener un familiar con COVID-19, incrementó 12% la frecuencia de depresión en el modelo simple; no obstante, la asociación se diluyó en el modelo múltiple final. Sin embargo, según la Organización Mundial de la Salud (OMS), la depresión incrementó 25% durante la pandemia de COVID-19 a nivel mundial (65). Esto es similar con lo reportado en

Holanda por Heesakkers H, en 2022, quien informó que el 22.8% de los familiares de pacientes con COVID-19 experimentaron dos o más síntomas de salud mental, y el 38.3% de todos los familiares experimentaban al menos un síntoma de salud mental (66). Asimismo, un estudio realizado por Wang ZH, en China reportó que el 35% de los estudiantes tuvo una frecuencia de depresión al tener casos confirmados de COVID-19 en familiares o parientes (67). La asociación encontrada en el modelo simple entre tener un familiar con COVID-19 y la depresión podría explicarse debido a que las familias que tienen un miembro afectado por COVID-19 experimentan directamente las consecuencias de salud mental, como el miedo a la propagación del virus, el desempleo y la inseguridad alimentaria (68).

Otros factores asociados a ansiedad

Se observó un ligero incremento de la frecuencia de ansiedad por cada año adicional de edad. Esto es similar a lo reportado en España por Méndez FJ, et al. en 2022, donde se encontró que la ansiedad oscila entre el 7% y el 12% en niños y adolescentes y tiende a aumentar con la edad, persistiendo en la edad adulta (69,70). Además, se estima que el 75% de los trastornos de ansiedad en adultos tuvieron su primera aparición en la infancia, con un rango de edad de aparición entre los 8 y los 12 años (71). Durante la pandemia de COVID-19, Zuccolo PF et al. en Brasil informaron que los adolescentes de 10 a 13 años y de 14 a 17 años tenían 31% mayor (RP: 1.31) y 42% mayor (RP: 1.42) frecuencia de experimentar síntomas ansiosos,

respectivamente, en comparación con niños que tenían entre 5 y 9 años de edad (40). Esta asociación podría ser explicada debido a que la ansiedad puede desarrollarse en niños a cualquier edad, desde la etapa preescolar hasta la adolescencia (72). Una combinación de experiencias de vida, predisposición genética y otros factores pueden influir en el aumento de la ansiedad a lo largo del desarrollo de la vida (72).

Los adolescentes que percibían neutralmente la severidad de la pandemia tenían 36% menor frecuencia de ansiedad. Esto es similar a lo reportado en China por Sun S, et al. en 2021, donde se observó que los adolescentes que percibían neutralmente la pandemia de la COVID-19 a través del apoyo social (β = - 0.143) y atención plena (β = - 0.190) presentaron menos síntomas de ansiedad (73). Otro estudio realizado en China y reportado por Fu W et al. en 2021, mostró que aquellos adolescentes que informaron que COVID tuvo un impacto moderado, leve o nulo en su vida, en comparación con aquellos que informaron un impacto sustancial, presentaban una menor probabilidad de síntomas de ansiedad (OR: 0.562, IC95%: 0.544-0.579; OR:0.366; IC95%: 0.347-0.385, respectivamente) (74). Esta asociación puede explicarse porque los adolescentes que perciben neutralmente la severidad de la pandemia fueron apoyados para afrontar las implicaciones del confinamiento debido a la COVID-19, abordando el aumento de la soledad y la falta de apoyo social, que son factores que contribuyen a un rápido incremento en la ansiedad (75).

Se encontró que la frecuencia de ansiedad aumenta en un 30%, 47% y 37% en adolescentes con disfunción familiar leve, moderada y severa; respectivamente. Esto es similar a lo reportado por Guo L et al. en 2018 en adolescentes de China, donde se encontró una alta correlación entre la frecuencia de la ansiedad y la ruptura familiar ($\beta = 0.20$) (76). Además, en 2020 el estudio de Wang Y et al. en adolescentes de China informaron que la disfunción familiar se asoció con la ansiedad ($\beta=0.12$, $p<0.01$) (77). Esta asociación puede explicarse por los cambios bruscos y significativos que experimenta la familia como consecuencia de la pandemia, así como las medidas de restricción prolongada y reducción de empleo, que incrementan la probabilidad de violencia por parte de los padres, conflictos familiares, maltrato infantil y abuso sexual (78). Los adolescentes que provienen de familias disfuncionales desarrollan una variedad de comportamientos de ansiedad que afectan su salud mental (79).

Por cada puntaje adicional de resiliencia, disminuía 1% la frecuencia de ansiedad en los adolescentes. Esto es similar a lo reportado en China por Shi X et al. en 2021, donde se encontró que los adolescentes con mayor aumento de resiliencia presentaban una menor frecuencia de ansiedad (80). Además, en otro estudio realizado en China por Yu Y et al. en 2022, se reportó que adolescentes con mayor resiliencia pueden experimentar menos síntomas ansiosos (81). Esta asociación podría ser explicada por el impacto negativo que la pandemia de COVID-19 ha tenido en la salud mental de los adolescentes (82), como el aumento de los niveles de ansiedad, depresión y

trastorno de estrés postraumático (83). La resiliencia puede promover directamente o indirectamente el desarrollo de un crecimiento positivo en las personas que experimentaron eventos estresantes o traumáticos, lo que se manifiesta en mejores interacciones interpersonales, nuevas oportunidades, fortaleza personal, cambio espiritual y aprecio por la vida (81). Estos factores contribuyen a una disminución en la aparición de la ansiedad (81).

Tener un familiar con COVID-19, incrementó 14% la frecuencia de ansiedad en el modelo simple; aunque esta asociación se diluyó en el modelo múltiple final. Este resultado es similar a lo reportado en Etiopía por Kibret S, en 2020, quien reportó que tener familiares con COVID-19 incrementó 11.5 % la frecuencia de ansiedad en trabajadores de la salud (84). En India, Jeelani A, et al. en 2022, afirmó que tener familiares con COVID-19, aumentó 15.3% la frecuencia de ansiedad en adolescentes (85). Además, en China, el estudio de Cao W et al. reportó que los niveles de ansiedad de los estudiantes universitarios eran más elevados en 2020 cuando tenían familiares o amigos que padecían COVID-19 (OR:3.007; IC 95%:2.377-3.804) (75).

Esta asociación, al menos en el modelo simple, podría ser explicada por varios factores. Los adolescentes que tenían un familiar diagnosticado con COVID-19 eran más propensos a experimentar el aislamiento social y el ostracismo, ya que se ha confirmado la existencia de discriminación hacia los pacientes de COVID-19 y sus familiares en múltiples estudios (86,87).

Además, los tiempos de la pandemia han sido muy estresantes, y el confinamiento en el hogar y el cierre de las escuelas han contribuido a un aumento de problemas a la salud metal en los adolescentes (85).

Relevancia de hallazgos en salud mental

La pandemia de COVID-19 ha tenido un impacto profundo en la salud mental de los jóvenes, planteando desafíos urgentes y potencialmente a largo plazo (68). Para controlar la pandemia, se han implementado medidas globales como cuarentenas masivas, confinamientos, distanciamiento social y cierre de escuelas, alterando drásticamente la vida de niños y adolescentes. Como resultado, han tenido que soportar períodos prolongados de aislamiento y restricciones en las interacciones sociales (88). Estas circunstancias sin precedentes no solo han llevado a cambios en el comportamiento de los adolescentes, sino que también han exacerbado los trastornos de salud mental, especialmente para aquellos con experiencias previas de trauma infantil (89). Si bien las consecuencias adversas de la pandemia en la salud y el bienestar de los adolescentes han disminuido, los problemas de salud mental han aumentado significativamente (90). Estudios informan una alta frecuencia de trastornos de salud mental (83%), particularmente síntomas depresivos, ansiosos, problemas del sueño y estrés postraumático (91–93).

Durante la pandemia de COVID-19, se ha identificado el trauma infantil como un predictor de resultados pobres en salud mental, en parte debido al

impacto psicológico incrementado asociado con la pandemia (por ejemplo, intrusión, hiperactivación, evitación, síntomas depresivos, síntomas de ansiedad y síntomas de estrés) (94). En consecuencia, es crucial monitorear las consecuencias en la salud mental de la pandemia en los adolescentes, especialmente aquellos provenientes de entornos vulnerables. Factores que pueden agravar la vulnerabilidad incluyen un estatus socioeconómico más bajo, padres con niveles más altos de psicopatología, mayor conflicto familiar, rutinas irregulares, diagnósticos psiquiátricos previos y mayor exposición al COVID-19 (40).

Los hallazgos del estudio abren oportunidades significativas para mejorar la salud mental en entornos escolares. Aunque los objetivos del estudio no se centraban directamente en la identificación individual de estudiantes o en la implementación inmediata de intervenciones, los resultados sugieren la posibilidad de considerar estrategias en futuras evaluaciones en las escuelas participantes para identificar a estudiantes que hayan experimentado trauma infantil y aquellos con antecedentes de trastornos de salud mental.

Los resultados muestran, en primer lugar, que el trauma infantil está asociado con la depresión y la ansiedad en los escolares. En futuras evaluaciones, las escuelas podrían explorar la posibilidad de implementar medidas que permitan la identificación de estudiantes con estas experiencias, lo que facilitaría el diseño de intervenciones preventivas y de apoyo a la salud mental.

En segundo lugar, la asociación entre antecedentes previos de trastornos de salud mental y la depresión y ansiedad resalta la importancia de abordar estos antecedentes en el entorno escolar. En evaluaciones posteriores, las escuelas podrían considerar estrategias para identificar a estudiantes con antecedentes de salud mental y ofrecer intervenciones específicas para prevenir recaídas o deterioro adicional de su salud mental.

En tercer lugar, el estudio destaca que la resiliencia podría reducir los síntoma depresivos y ansiosos. En futuras evaluaciones, las escuelas podrían explorar la posibilidad de implementar programas que fomenten la resiliencia entre los estudiantes, como el entrenamiento en atención plena, aprendizaje social y emocional, y ejercicio físico, contribuyendo así a la promoción de la salud mental en la población estudiantil.

Al comprender y abordar estos factores, podemos mejorar la salud mental de los adolescentes durante y más allá de la pandemia.

Cuestionario de Trauma Infantil de Marshall

Este instrumento consta de siete preguntas que abordan diversas experiencias traumáticas durante la infancia, incluyendo la separación traumática de padres, experiencia de castigo físico significativo, violencia física entre padres, abuso de alcohol o drogas en la familia, contacto sexual forzado por familia, contacto sexual forzado por un no familiar y daño físico

después de haber sido castigado (95). Cada pregunta se puntúa, y la puntuación máxima posible es de siete puntos. Los resultados se dividen en dos categorías: presencia de trauma (1 o más puntos) y ausencia de trauma (0 puntos). Se establece que un puntaje de 3 puntos o más define la presencia de politrauma (96–98).

Este cuestionario, aunque originalmente utilizado en pacientes con trastorno de pánico en Estados Unidos (95), ha sido ampliamente empleado en estudios realizados en Chile, abarcando diferentes contextos clínicos y poblacionales. Weil et al. la utilizó en 505 pacientes hospitalizados en diferentes servicios clínicos de cuatro hospitales (99), Vitriol et al. en 130 mujeres con síntomas depresivos severos (100), Cancino et al. en 394 pacientes con depresión mayor atendidos en la Atención Primaria de Salud (APS) (101), Gloger et al. en 1001 pacientes ambulatorios adultos con episodios depresivos mayores atendidos en clínica de salud mental (102). Aunque ha sido utilizado en múltiples investigaciones, incluyendo Perú (97,98), no se dispone de datos precisos sobre su validez y confiabilidad en estudios publicados. En una investigación realizada en pacientes hospitalizados en un servicio de psiquiatría en Chile, se estimó una correlación de Pearson de 0.88 (96).

También ha sido utilizado como medida para la evaluación del abuso sexual y físico, dado que fue útil para evaluar la validez del cuestionario *Sexual and Physical Abuse Questionnaire* (SPAQ, siglas en inglés) en pacientes psiquiátricos ambulatorios, la cual obtuvo adecuadas propiedades

psicométricas (Sensibilidad: 71%; Especificadad: 94%, VPP: 80%; VPN: 90%) (103).

Abordaje de la variable Trauma Infantil en literatura

A continuación, se presenta una descripción consolidada de cómo se manejó la variable en la literatura revisada que empleó el instrumento de Marshall: En el estudio inicial de Marshall, se adoptó un enfoque descriptivo que clasificaba el trauma infantil de manera binaria mediante una puntuación de 1 o 0, indicando así la presencia o ausencia de eventos traumáticos específicos (95). Ballesteros et al. en Chile aplicó un punto de corte de tres o más puntos en la escala de Marshall para identificar la presencia de politrauma infantil, definiendo así a aquellos participantes con tres o más sucesos traumáticos (97). Cáceres-Taco et al. en Perú también incorporó la noción de politrauma en su análisis, categorizando a los participantes con tres o más eventos traumáticos (98).

En contraste, Weil et al. (99) en Chile y Vitriol (100) en otro estudio chileno adoptaron enfoques diferentes, ya sea mostrando frecuencias según rangos o analizando bivariadamente por el número de sucesos. Cancino et al. en Chile abordó descriptivamente la variable considerando el número total de eventos de trauma infantil (101), mientras que Gloger et al. examinó tanto descriptiva como analíticamente el trauma infantil, sin limitarse exclusivamente al politrauma (102).

Por todo lo anterior, se aprecia heterogeneidad en la definición operativa del trauma infantil, reflejada en las distintas aproximaciones utilizadas en los estudios revisados.

Justificación de punto de corte de 1 en Cuestionario de Marshall

La elección de definir operativamente trauma infantil con punto de corte de 1 punto a más, en lugar de politrauma (3 o más puntos) (96–98), se fundamenta a continuación. En primer lugar, la investigación se orientó a analizar la asociación específica entre el trauma infantil y los síntomas de depresión y ansiedad en adolescentes durante la pandemia de COVID-19. Esta decisión se sustenta en la necesidad de evaluar directamente los síntomas específicos de interés, evitando abarcar un concepto más amplio, como el politrauma. En segundo lugar, la elección de utilizar la variable trauma infantil refleja el interés en capturar la diversidad de experiencias traumáticas que los adolescentes podrían haber experimentado durante la pandemia. Esta aproximación permite una comprensión más completa de cómo incluso una única experiencia traumática puede tener un impacto significativo en la salud mental de los adolescentes (98–100,102), alineándose con la complejidad y diversidad de las respuestas a eventos traumáticos. En tercer lugar, la decisión también considera la complejidad de las respuestas individuales al trauma, dado que se reconoce que la respuesta a un trauma no siempre es proporcional a la cantidad de traumas experimentados. Incluso un solo evento traumático influye en el potencial desarrollo de problemas en la salud mental de un individuo (98–100,102).

Al utilizar el criterio de trauma infantil en vez de politrauma, se asegura la inclusión de aquellos que pueden haber sido afectados significativamente por una sola experiencia traumática, sin descartar su impacto. En cuarto lugar, esta elección se encuentra respaldada por la consistencia con investigaciones previas que han destacado cómo una sola experiencia traumática en la infancia puede tener efectos adversos en la salud mental (98–100,102). En consecuencia, la definición de trauma adoptada en este estudio se alinea con hallazgos anteriores, contribuyendo de manera coherente a la literatura existente sobre la relación entre trauma y salud mental en adolescentes.

Justificación de punto de Corte de 5 en PHQ-9

La elección de utilizar un punto de corte de 5 en lugar del estándar de 10 en el PHQ-9 se justifica, particularmente en el contexto de adolescentes escolares, con el objetivo de capturar un grupo más amplio que incluya probables casos de trastorno depresivo menor. Aunque la mayoría de estudios han adoptado un umbral de 10 para identificar síntomas depresivos, principalmente orientados a probables casos de trastorno depresivo mayor, nuestra investigación se centra en identificar el espectro completo de la depresión, abarcando tanto probables casos de depresión mayor (10 puntos o más) como de depresión menor (5 puntos o más, conocidos como "depresivos leves"). Es fundamental reconocer que esta detección no constituye un diagnóstico definitivo, ya que se requiere una evaluación más

exhaustiva y entrevistas clínicas realizadas por profesionales de la salud para confirmar el diagnóstico.

Adicionalmente, este enfoque se respalda con estudios que sugieren la utilidad de un puntaje de corte de 5 para identificar a los estudiantes con trastorno depresivo menor, utilizando el PHQ-9, con sensibilidad del 84.62% (104) y 89.7% (105), y especificidad del 70.18% (104) y 98.9% (105), respectivamente.

La relevancia de identificar trastornos depresivos menores en adolescentes escolares radica en que estos casos, que caen por debajo del umbral estándar (10 puntos), es probable que no sean reconocidos en entornos de atención primaria ni en encuestas comunitarias (106). Los adolescentes escolares atraviesan una etapa crucial en su desarrollo emocional y social (106), y la depresión, incluso en su forma menor, puede tener consecuencias significativas en su bienestar y rendimiento académico (107–110). La literatura científica respalda la idea de que la depresión subumbral (107–110) y depresión menor (111–114), a menudo pasa desapercibida en entornos escolares y comunitarios, lo que puede resultar en una falta de intervención temprana (107–110).

Identificar a estos posibles casos de depresión menor en adolescentes escolares es crucial, ya que pueden representar una población vulnerable que enfrenta desafíos emocionales y psicológicos (111–114). Al establecer un punto de corte más bajo, como el propuesto de 5, se amplía la capacidad de detectar signos tempranos de malestar emocional, permitiendo intervenciones oportunas y preventivas. La depresión, incluso en sus formas

menos graves, puede afectar el rendimiento académico, la participación social y la calidad de vida de los adolescentes (111–114). Abordar proactivamente las necesidades emocionales de los estudiantes mediante intervenciones oportunas puede brindar apoyo y recursos adicionales para mitigar el impacto negativo en su desarrollo.

Limitaciones y fortalezas

Esta investigación presenta ciertas limitaciones. Primero, el diseño transversal no permite inferir causalidad. Segundo, el sesgo de no respuesta, ya que los adolescentes pueden tener niveles diversos de motivación para participar en el estudio.Tercero, el sesgo de información, debido a que las variables fueron medidas por autoreporte de los participantes. Cuarto, algunas variables como trastornos alimentarios (115), trastorno de personalidad (116), inseguridad alimentaria (39), adicción a internet (2), nivel socioeconómico (117,118), entre otras, no han podido ser evaluadas y estarían asociadas a las variables de interés de esta investigación, esto debido a que es un análisis secundario de datos (119). Quinto, el instrumento de Marshall no ha sido validado específicamente en población adolescente (120–125), lo que podría introducir incertidumbres sobre su aplicabilidad y precisión en este grupo etario. Sexto, la elección de un punto de corte de cinco puntos para definir síntomas depresivos y ansiosos, aunque respaldada por investigaciones previas en adolescentes durante pandemia COVID-19 (6,9) y en periodos anteriores y posteriores a esta (3,5,10,12,126), presenta un desafío en términos de especificidad. Esta

decisión podría llevar a una identificación más sensible pero menos específica de los casos, lo que debe considerarse al interpretar los resultados y al extrapolar las conclusiones. Séptimo, la elección de la estrategia de recolección de datos en el estudio primario fue por conveniencia, lo que reduce la representatividad de los resultados y conlleva a sesgo de no participación; sin embargo, la investigación revela la situación en la población estudiada e indican la necesidad de realizar estudios adicionales. Octavo, a pesar de la detección de colinealidad con la variable edad en el modelo final (Anexo 02, figuras 03-05), se optó por mantenerla debido a su relevancia teórica y su posible papel como factor confusor. Noveno, la medición del trauma infantil no abordó el concepto de politrauma. El punto de corte de 1 o más, limita la capacidad de obtener resultados que reflejen la intensidad del trauma infantil.

Sin embargo, nuestro estudio tiene fortalezas destacables. En primer lugar, se utilizaron cuestionarios validados y confiables para evaluar los problemas de salud mental en los adolescentes. En segundo lugar, se obtuvo una potencia estadística del 100% tanto para ansiedad como para depresión (Figura 01 y 02-Anexo 01). En tercer lugar, se llevó a cabo el estudio durante la segunda ola de la pandemia de COVID-19, lo que nos permitió examinar los resultados luego de un período prolongado de cuarentena y aislamiento social en los desenlaces de salud mental. Por último, estos hallazgos proporcionan información valiosa sobre la asociación entre el trauma infantil y los problemas de salud mental en el contexto de la pandemia de COVID-19. Futuras investigaciones que confirmen la relación entre trauma

infantil y trastornos de salud mental podrían contribuir al desarrollo de intervenciones educativas dirigidas para apoyar a los adolescentes vulnerables.

Aporte al conocimiento e investigación epidemiológica

Los hallazgos de esta investigación aportan a la investigación epidemiológica al generar conocimiento sobre la potencial relación del trauma infantil en el desarrollo de desenlaces de salud mental en los adolescentes durante emergencias de salud pública como lo ocurrido durante la pandemia por COVID-19 en una región que fue gravemente afectada por la misma en el país. Estos hallazgos tienen implicancias relevantes para la identificación temprana y posterior intervención en adolescentes que han experimentado trauma infantil para reducir la severidad de síntomas depresivos y/o ansiosos, particularmente en escenarios de desastres y emergencias. Estos resultados orientan a futuras investigaciones y estrategias de intervención en población vulnerable. Esta investigación aporta a la investigación epidemiológica al aplicar métodos de esta disciplina en el campo de la salud mental para evaluar el rol del trauma infantil en la depresión y la ansiedad en adolescentes. La aplicación de conceptos de diseño de estudio transversal y factores asociados evaluados mediante métodos de regresión múltiple demuestra un enfoque riguroso y científico. Adicionalmente, la aplicación de conceptos epidemiológicos esenciales como los confusores en el riesgo de enfermedades permite comprender mejor la relación entre trauma infantil y los trastornos de salud

mental. Al considerar y controlar variables de confusión potencial en el análisis, se puede establecer una asociación más precisa y confiable de la potencial relación entre trauma infantil y síntomas de salud mental. Finalmente, el uso de instrumentos confiables y validados para medir depresión y ansiedad, y la inclusión de una amplia muestra garantiza la validez interna y precisión de los hallazgos de investigación.

Conclusiones

En conclusión, esta investigación revela una asociación entre el trauma infantil y los problemas de salud mental como ansiedad y depresión, que pueden manifestarse durante la adolescencia. Estos hallazgos subrayan la importancia de abordar proactivamente los antecedentes de salud mental infantil en el entorno escolar.

Recomendaciones

Resulta importante identificar casos de trauma infantil y realizar intervenciones tempranas para mitigar sus efectos sobre la salud mental durante la adolescencia.

La pandemia ha exacerbado las vulnerabilidades preexistentes, subrayando la necesidad de monitorear de cerca y abordar los desafíos de salud mental entre los adolescentes en riesgo. Es necesario realizar estudios adicionales que analicen la conexión entre trauma infantil y trastornos de salud mental para orientar a los responsables de formular políticas y los educadores sobre la importancia de abordar las necesidades de salud mental de los

adolescentes que han experimentado trauma infantil, especialmente durante momentos difíciles como la pandemia. Sería importante realizar estos estudios tanto en situaciones regulares, como durante emergencias (inundaciones, terremotos, epidemias, etc.).

Con los resultados obtenidos en dichos estudios, se podrían informar a los proveedores de atención médica, brindando una valiosa perspectiva para el diseño de futuras intervenciones escolares. Estas intervenciones estarían destinadas a prevenir o tratar la depresión y la ansiedad en estudiantes que han experimentado trauma infantil y han estado expuestos a la pandemia de COVID-19.

Se recomienda que en futuras investigaciones se utilice un punto de corte de 10 puntos o más para definir síntomas depresivos y síntomas ansiosos utilizando los instrumentos PHQ-9 y GAD-7; respectivamente. Dado que en nuestra investigación, se utilizó 5 puntos o más como punto de corte, respaldado por su adecuada sensibilidad tanto para depresión (87.4% en pacientes peruanos (127), como para la ansiedad (93.3% en mujeres gestantes(128), 84.4% en pacientes con migraña de Korea (129), 75.4% en entornos de atención primaria en salud (130). Sin embargo, es importante resaltar que presenta valores bajos de especificidad tanto para depresión (57.7% en pacientes peruanos(127), como para ansiedad (68.9% en entornos de atención primaria en salud (130), 67.5% en pacientes con migraña (129), 46.3% en mujeres gestantes(128). En contraste, el uso de un punto de corte de 10 o más en el instrumento PHQ-9 garantiza un rango de sensibilidad entre 86.2% y 93.3% (127,131–133) y especificidad que oscila entre 82.9%

y 99% (127,131–133). Del mismo modo, en el caso del instrumento GAD-7, el uso de un punto de corte de 10 o más proporciona valores de sensibilidad del 97% y especificidad del 100% (134).

Se sugiere que en futuras investigaciones se utilicen instrumentos con validez y confiabilidad para medir el trauma infantil en población adolescente peruana, como el uso del CTQ-SF (135,136). Este instrumento ofrece una exploración más detallada y específica para identificar abuso emocional, físico, sexual, negligencia física y negligencia emocional a través de sus 28 ítems, siendo aplicable en el contexto de la pandemia por COVID-19 en adolescentes (137–139).

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IV. ANEXOS

Anexo 01. Cálculo de potencia estadística del estudio secundario

```
. power twoprop 0.665 0.896, n1(263) n2(193)

Estimated power for a two-sample proportions test
Pearson's chi-squared test
H0: p2 = p1  versus  Ha: p2 != p1

Study parameters:

        alpha =    0.0500
            N =       456
           N1 =       263
           N2 =       193
        N2/N1 =    0.7338
        delta =    0.2310  (difference)
           p1 =    0.6650
           p2 =    0.8960

Estimated power:

        power =    1.0000
```

Figura 01. Cálculo de potencia estadística para síntomas depresivos

```
. power twoprop 0.471 0.829, n1(263) n2(193)

Estimated power for a two-sample proportions test
Pearson's chi-squared test
H0: p2 = p1  versus  Ha: p2 != p1

Study parameters:

        alpha =    0.0500
            N =       456
           N1 =       263
           N2 =       193
        N2/N1 =    0.7338
        delta =    0.3580  (difference)
           p1 =    0.4710
           p2 =    0.8290

Estimated power:

        power =    1.0000
```

Figura 02. Cálculo de potencia estadística para síntomas ansiosos

Anexo 02. Evaluación de colinealidad

```
. coldiag2   trauma sex edad cumplimiento_medidas severidad_pandemia confianza_gobierno familiar_covid192 familiar_muerto_covid2 antec_salud_mental2 ayuda_salud_mental2 apgar_cat resiliencia alcohol_cat2

Condition number using scaled variables =        50.75

Condition Indexes and Variance-Decomposition Proportions
```

condition index		_cons	trauma	sex	edad	cumplimiento_medidas	severidad_pandemia	confianza_gobierno	familiar_covid192	familiar_muerto_covid2	antec_salud_mental2
1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.80	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
3	3.28	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
4	3.83	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.14
5	4.28	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.61	0.11
6	4.48	0.00	0.50	0.00	0.00	0.00	0.03	0.00	0.00	0.07	0.31
7	5.36	0.00	0.15	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.10
8	6.09	0.00	0.05	0.03	0.00	0.00	0.78	0.00	0.02	0.05	0.00
9	6.91	0.00	0.00	0.03	0.00	0.00	0.02	0.00	0.88	0.20	0.00
10	8.99	0.00	0.00	0.51	0.00	0.00	0.08	0.26	0.01	0.00	0.00
11	10.01	0.00	0.01	0.08	0.00	0.00	0.01	0.48	0.00	0.00	0.03
12	13.42	0.01	0.01	0.31	0.01	0.30	0.02	0.12	0.00	0.00	0.00
13	22.19	0.06	0.00	0.04	0.17	0.56	0.03	0.12	0.05	0.01	0.00
14	50.75	0.94	0.00	0.00	0.82	0.13	0.00	0.01	0.00	0.00	0.00

condition index		ayuda_salud_mental2	apgar_cat	resiliencia	alcohol_cat2
1	1.00	0.00	0.00	0.00	0.00
2	2.80	0.13	0.00	0.00	0.17
3	3.28	0.18	0.00	0.00	0.65
4	3.83	0.34	0.06	0.00	0.13
5	4.28	0.09	0.01	0.00	0.00
6	4.48	0.21	0.00	0.00	0.01
7	5.36	0.03	0.72	0.01	0.02
8	6.09	0.00	0.07	0.01	0.01
9	6.91	0.00	0.00	0.01	0.00
10	8.99	0.00	0.00	0.07	0.00
11	10.01	0.00	0.10	0.39	0.01
12	13.42	0.00	0.01	0.34	0.00
13	22.19	0.00	0.02	0.15	0.00
14	50.75	0.00	0.00	0.00	0.00

Figura 03. Evaluación de colinealidad (i)

```
prnt_cx, force w(8)

Condition Indexes and Variance-Decomposition Proportions
```

condition index		_cons	trauma	sex	edad	cumpli~s	severi~a	confia~o	fami~192	famil~d2	antec_~2	ayuda_~2	apgar_~t	resili~a	alcoho~2
1	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	2.80	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	3.28	.	.	.	.	.	.	.	.	.	.	.	.	.	0.65
4	3.83	.	.	.	.	.	.	.	.	.	.	0.34	.	.	.
5	4.28	.	.	.	.	.	.	.	.	0.61	.	.	.	.	.
6	4.48	.	0.50	.	.	.	.	.	.	.	0.31	.	.	.	.
7	5.36	.	.	.	.	.	.	.	.	.	.	.	0.72	.	.
8	6.09	.	.	.	.	.	0.78	.	.	.	.	.	.	.	.
9	6.91	.	.	.	.	.	.	.	0.88	.	.	.	.	.	.
10	8.99	.	.	0.51	.	.	.	.	.	.	.	.	.	.	.
11	10.01	.	.	.	.	.	.	0.48	.	.	.	.	.	0.39	.
12	13.42	.	.	0.31	.	0.30	.	.	.	.	.	.	.	0.34	.
13	22.19	.	.	.	.	0.56	.	.	.	.	.	.	.	.	.
14	50.75	0.94	.	.	0.82	.	.	.	.	.	.	.	.	.	.

Variance-Decomposition Proportions less than .3 have been printed as "."

Figura 04. Evaluación de colinealidad (ii)

```
. coldiag2   trauma sex cumplimiento_medidas severidad_pandemia confianza_gobierno familiar_covid192 familiar_muerto_covid2 antec_salud_mental2 ayuda_salud_mental2 apgar_cat resiliencia alcohol_cat2

Condition number using scaled variables =        27.64

Condition Indexes and Variance-Decomposition Proportions
```

condition index		_cons	trauma	sex	cumplimiento_medidas	severidad_pandemia	confianza_gobierno	familiar_covid192	familiar_muerto_covid2	antec_salud_mental2	ayuda_salud_mental2
1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.67	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.23	0.13
3	3.11	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.18
4	3.63	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.02	0.15	0.34
5	4.07	0.00	0.04	0.00	0.00	0.02	0.00	0.02	0.55	0.16	0.13
6	4.26	0.00	0.50	0.00	0.00	0.05	0.00	0.00	0.11	0.25	0.17
7	5.09	0.00	0.15	0.00	0.00	0.01	0.00	0.00	0.05	0.10	0.03
8	5.80	0.00	0.05	0.04	0.00	0.76	0.00	0.03	0.06	0.00	0.00
9	6.55	0.00	0.00	0.03	0.00	0.02	0.00	0.88	0.19	0.00	0.00
10	8.53	0.00	0.00	0.50	0.00	0.08	0.28	0.01	0.00	0.00	0.00
11	9.48	0.00	0.01	0.08	0.00	0.01	0.47	0.00	0.00	0.03	0.00
12	12.92	0.02	0.01	0.29	0.39	0.02	0.10	0.00	0.00	0.00	0.00
13	27.64	0.98	0.00	0.06	0.60	0.04	0.14	0.04	0.00	0.00	0.00

condition index		apgar_cat	resiliencia	alcohol_cat2
1	1.00	0.00	0.00	0.00
2	2.67	0.00	0.00	0.17
3	3.11	0.00	0.00	0.65
4	3.63	0.06	0.00	0.13
5	4.07	0.01	0.00	0.00
6	4.26	0.00	0.00	0.00
7	5.09	0.73	0.02	0.02
8	5.80	0.06	0.01	0.01
9	6.55	0.00	0.01	0.00
10	8.53	0.00	0.08	0.00
11	9.48	0.10	0.42	0.01
12	12.92	0.00	0.29	0.00
13	27.64	0.01	0.17	0.00

Figura 05. Evaluación de colinealidad (iii)

```
. prnt_cx, force w(8)
```

Condition Indexes and Variance-Decomposition Proportions

	condition index	_cons	trauma	sex	cumpli~s	severi~a	confia~o	fami~192	famil~d2	antec_~2	ayuda_~2	apgar_~t	resili~a	alcoho~2
1	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.
2	2.67	.	.	.	.	.	.	.	.	.	.	.	.	.
3	3.11	.	.	.	.	.	.	.	.	.	.	.	.	0.65
4	3.63	.	.	.	.	.	.	.	.	.	0.34	.	.	.
5	4.07	.	.	.	.	.	.	.	0.55	.	.	.	.	.
6	4.26	.	0.50	.	.	.	.	.	.	.	.	.	.	.
7	5.09	.	.	.	.	.	.	.	.	.	.	0.73	.	.
8	5.80	.	.	.	.	0.76	.	.	.	.	.	.	.	.
9	6.55	.	.	.	.	.	.	0.88	.	.	.	.	.	.
10	8.53	.	.	0.50	.	.	.	.	.	.	.	.	.	.
11	9.48	.	.	.	.	.	0.47	.	.	.	.	.	0.42	.
12	12.92	.	.	.	0.39	.	.	.	.	.	.	.	.	.
13	27.64	0.98	.	.	0.60	.	.	.	.	.	.	.	.	.

Variance-Decomposition Proportions less than .3 have been printed as "."

Figura 06. Evaluación de colinealidad (iv)