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# Association of child maltreatment and school bullying among Chinese adolescents: the mediating role of peer relationships

Linlin Xie<sup>1</sup>, Pan Wen<sup>1,2</sup>, Jiajun Zhou<sup>1,2</sup>, Xiujuan Li<sup>1</sup>, Jiayu Huang<sup>1</sup> and Liping Li<sup>1,2\*</sup>

## Abstract

**Background** School bullying, a serious problem for the physical and mental health of adolescents, is presently a significant issue in China. It is essential to recognize and comprehend potential risk factors and establish efficient preventive strategies. The purpose of this study was to examine the association between childhood maltreatment and school bullying in adolescents and to assess the mediating role of peer relationships.

**Methods** Between March and April 2024, a cross-sectional survey was conducted among 2119 adolescents aged between 12 and 18 years in Guangdong Province, China. Self-report questionnaires were employed to collect data on childhood maltreatment, school bullying, and peer relationships. Subgroup analyses and mediating effects modeling were employed to analyze the data.

**Results** The results indicated that adolescents who had experienced maltreatment were more at risk of bullying victimization (*OR*: 2.92, 95% *CI*: 2.34–3.64,  $P < 0.001$ ), bullying perpetration (*OR*: 2.84, 95% *CI*: 1.99–4.05,  $P < 0.001$ ), and bully-victimization (*OR*: 2.93, 95% *CI*: 1.95–4.41,  $P < 0.001$ ), compared to adolescents who have not. Sexual abuse showed the most significant connection with all forms of bullying. The mediating effect of peer relationships was found to mediate the association between child maltreatment and bullying behaviour. The results indicated that worse peer relationships may exacerbate the adverse effects of maltreatment experiences and increase the risk of adolescents becoming bullies, either perpetrators or victims of bullying.

**Conclusions** Child maltreatment has been identified as one of the most significant influences on bullying behaviour in adolescents. The quality of peer relationships has been demonstrated to play an important role in preventing and reducing the occurrence of bullying. The results underscore the crucial role of early intervention in cases of child maltreatment and the fostering of positive peer relationships in schools.

**Keywords** Child maltreatment, Bullying behaviour, Peer relationships, Mediating effect, Adolescents development

## Introduction

School bullying is defined as students being bullied or victimized at school when they are consistently exposed to unfavorable acts by one or more other students, characterized by repeated victimization with an imbalance of power [1]. School bullying behaviour encompasses bullying victimization, bullying perpetration, and

\*Correspondence:

Liping Li  
lpli@stu.edu.cn

<sup>1</sup> School of Public Health, Shantou University, Shantou 515041, China

<sup>2</sup> Injury Prevention Research Center, Shantou University Medical College, Shantou 515041, China



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bully-victimization (where an individual both experiences victimization and engages in the act of bullying) [2]. Bullying not only brings about bodily damage and pain, such as skin bruising and fracture [3], but it also causes significant mental health problems, such as depression, anxiety, suicidal and self-harming behaviour [4]. Among adolescents, bullying represents the most common form of aggression, manifesting in numerous ways. The prevalence of bullying is widespread [5]. According to data provided by the World Health Organization, approximately 32% of children have encountered bullying in a survey conducted across 38 countries and districts [6]. A Chinese study revealed that a significant proportion of children and adolescents, up to 66%, have experienced bullying, while 37% have been involved in bullying perpetration [7]. The prevalence of bullying exhibits gender-based differences. Many studies have indicated a higher prevalence of school bullying among male students compared to their female counterparts [8]. A study on the incidence of school bullying in Southeast Asia showed that the bullying victimization rates for girls and boys were 19% and 28%, respectively [9]. Additionally, there appear to be differences in the occurrence of school bullying among adolescents of different ages. Younger boys are more likely to engage in bullying behaviour and to be bullying victims [10]. A longitudinal study investigating the incidence of bullying in secondary schools showed that the incidence of bullying behaviour among students significantly decreased by about half, from 32.5 to 17.8%, from 9th to 12th grade [11]. Due to the dramatic physical and psychological changes that occur during adolescence, middle school students in this developmental stage are more likely to exhibit rebellious attitudes and symptoms such as mania. Compared to other age groups, adolescents in this phase are more susceptible to incidents of school bullying [12]. The incidence rate of school bullying among students in adolescence is about 30%, while it is approximately 20% for students not in adolescence [13, 14]. In addition, school bullying is linked to family factors, race, and residence [15]. Currently, child maltreatment is the family factor most deserving of attention.

Child maltreatment (CM) refers to all types of physical and/or emotional ill-treatment, sexual abuse, neglect, negligence, and commercial or other exploitation that can result in actual or potential harm to the child's health, development, or dignity. It includes acts of commission such as physical and sexual abuse, and acts of omission such as neglect, and exploitation [16]. There are five main types of child maltreatment: physical abuse (PA), sexual abuse (SA), emotional abuse (EA), physical neglect (PN), and emotional neglect (EN) [17]. Child maltreatment is a widespread global public health concern. Annually, the prevalence of physical abuse among children ranges

from 4 to 16%, while approximately one in every ten children suffers from neglect or psychological maltreatment. Throughout their childhood, it is estimated that 5–10% of girls and as many as 5% of boys experience penetrative sexual abuse. Moreover, sexual abuse in any form affects up to three times as many children [18]. According to a survey by the China Women's Federation and the United Nations Children's Fund, about 74% of children in China have suffered child maltreatment while growing up [19]. Child maltreatment can affect children's psychology, physiology, and behaviour in the short and long term. Children who experience abuse can suffer physical injuries such as bruising and traumatic brain injury [20]; mental health problems such as depression, anxiety, low self-esteem, suicidality, and non-suicidal self-injury [21]; and risky behaviour such as tobacco use, alcoholism, substance abuse, and bullying [22].

One possible risk factor for bullying is exposure to child maltreatment [23]. In terms of bullying victimization, a large cross-sectional study in Yunnan Province, China, showed that middle school students who experienced EA or SA were more vulnerable to traditional school bullying [24]. Regarding bullying perpetration, a study in Shanxi Province, China, found that experiences of child maltreatment were associated with an increased risk of bullying perpetration [25]. The relationship between childhood maltreatment and school bullying has been widely confirmed, yet the precise path of its influence remains unclear. The relationship between the two has not been conclusively proven due to its complexity. This complexity arises partly because the connection between child maltreatment and school bullying is not always direct [26]. A significant consideration is peer relationships, which are posited as potential mediating factors [27].

Peer relationships refer to a kind of interpersonal relationship established and developed in the process of interaction between peers or individuals with similar psychological development levels. In contrast to the vertical relationship between an individual and their parents or other older individuals, peer relationships are parallel and equal [28]. According to Horney's theory of personality development, the development of each individual is affected by multiple developmental systems, such as peers, family, school, and society, to varying degrees [29]. This theory emphasizes the important role that peer relationships play in the development of adolescents. Unlike other systems, peers offer a unique form of social support that caters to the social needs of individuals and acts as a protective factor in their psychological and social adjustment [30]. Group socialization theory also posits that peer groups are the crucibles that shape children's behavior and

mold their personalities, determining the kind of individuals they will become as adults, often to a greater extent than even the influence of their families [31]. The absence of peers can have severe and long-lasting negative impacts on children, potentially more detrimental than the lack of parental presence [32]. Moreover, peer rejection can exert a profound and enduring effect on a child's development. Such impacts are often adverse, leading children to become self-effacing, introverted, and even antisocial [31]. Peer relationships can be divided into two types. One is group affiliation, which reflects an individual's social status in a peer group [33]. The other is the binary relationship, which reflects the emotional connection between an individual and an individual. At the level of group relationships, it is divided into the degree of acceptance and rejection among peers [33]. In the type of binary relationships, there have been many studies on children's friendship relationships, such as close peer relationships and children's friendship quality [34]. However, this study focuses on the perspective of group peers.

The establishment of peer relationships is influenced by family dynamics [35]. Unsurprisingly, research indicates that maltreated adolescents tend to exhibit deficiencies in social skills [36]. From the perspective of attachment theory, these adolescents may hold negative internalized representations of relationships, such as internal working models, which lead them to display suspicion, anger, and mistrust when dealing with relationships. Such attitudes may hinder them from establishing stable peer relationships and increase the risk of peer rejection [37]. Their longitudinal study by Bolger and Patterson further supports this. They investigated 107 maltreated children (including physical, emotional, sexual abuse, and neglect) and an equal number of non-maltreated children and found that the experience of maltreatment is associated with the risk of repeated peer rejection from childhood to early adolescence. Additionally, they found that maltreated children are more likely to display aggressive behavior [38].

Given the pervasiveness of peer relationships in the daily lives of middle school students, there is a growing body of research indicating a correlation between these relationships and school bullying [39]. Poor peer relationships often become a major cause of many school bullying incidents. Children with weaker social skills are easily marginalized in peer groups and become victims of school bullying. At the same time, some victims choose to endure in silence, while others may resort to extreme measures to fight back or retaliate, leading to tragic outcomes [40]. A recently published study reported peer relationships as a key factor in breaking the link between paternity and victimization. Negative relationships

between parents and children as well as peers could potentially increase the likelihood of experiencing bullying victimization [41].

The purpose of this study is to be divided into two sections. The present study will initially explore the relationship between different types of maltreatment and different bullying roles, as well as the association between maltreatment and bullying under different demographic characteristics. A secondary objective is to examine the mediating role of peer relationships in the association between abuse and school bullying. Specifically, the study seeks to determine if child maltreatment impacts school bullying behaviour through peer relationships in a specific manner. If this is indeed the case, it would be possible to reduce the incidence of bullying in schools by improving the quality of peer relationships among students. Therefore, it is crucial to comprehend the mediating role of peer relationships in this association in order to effectively prevent school bullying.

## Methods

### Participants

The study was a cross-sectional study conducted in Shantou city in Guangdong Province from March to April 2024. Using stratified whole cluster random sampling, we randomly selected two middle schools and two high schools in the central and non-central urban areas, respectively, for a total of four middle schools and four high schools. We adopted random cluster sampling to select 2 classes in grades 7–12 in each school, or the entire grade if there are fewer than 2 classes. All students in each selected class were included in the survey.

### Inclusion and exclusion criteria

The inclusion and exclusion criteria for this study were: (1) Inclusion criteria: (i) secondary school students aged 12–18 years old, the age range identified by Erikson's theory for adolescence, a critical period for school bullying studies [42]. (ii) signed informed consent. (2) Exclusion criteria: (i) Those with severe organic brain diseases; (ii) Those who did not cooperate with the investigation.

### Sample size

PASS 15 software was used to calculate the sample size. The study assumed that the maltreatment score and the bullying score did not satisfy the normality assumption. Consequently, Spearman correlation analysis was employed to analyze the correlation between abuse experiences and school bullying, with correlation coefficients indicating the degree and direction of the association between the two indicators. Based on the available literature, the correlation coefficient between child maltreatment and school bullying victimization was found to be

$r_s = 0.21$  [43]. The necessary sample size was determined through the adjustment of software parameters, with a significance level of  $\alpha = 0.05$  and a confidence interval width of 0.1,  $r_s = 0.21$ . The sample size was determined to be around 1,436 individuals based on the specified parameters. Considering a non-response rate of 20%, the total sample size was estimated to be approximately 1,795 participants. In this study, questionnaires were initially administered to 2,137 secondary school students, and 2,126 questionnaires were returned, resulting in a response rate of 99.49%. After applying the exclusion criteria, the sample was reduced to 2,124 students. Following a data quality check that excluded questionnaires with logical errors or omissions exceeding 30%, the final sample included 2,119 students.

### Procedure

Prior to the administration of the formal survey, investigators undergo uniform training to ensure a comprehensive understanding of the survey's purpose and to align the requirements for completing survey items. The investigator delineated the objective of the survey and the tenets of confidentiality for the student and guardian, after which the latter signed an informed consent form prior to the student completing the questionnaire. It was the responsibility of the investigator to respond to inquiries during the completion process. After the questionnaire has been filled out, the investigator will verify the completeness and logic of the questionnaire. If errors or omissions were identified, the questionnaire was promptly returned to the respondent for necessary additions. If it was not possible to return supplementary questionnaires, questionnaires with significant logical errors and omissions greater than 30% were excluded. During this stage of data quality screening, five questionnaires were excluded, with an exclusion rate of 0.24%. Finally, Epidata 3.1 was employed to perform a double-entry process with the objective of ensuring the quality of the data items. This study was approved by the Ethics Committee of Shantou University.

### Measurement

#### *Socio-demographic data*

We conducted the survey using a self-administered questionnaire to collect sociodemographic information from students, covering several domains such as sex, age, race and only-child status.

#### *The childhood trauma questionnaire (CTQ)*

The Childhood Trauma Questionnaire (CTQ), developed by Bernstein and Fink [44], identifies participants' maltreatment experiences before age 18. The questionnaire contained 28 items, which were designed to measure 5

types of CM (emotional neglect, EN; physical abuse, PA; sexual abuse, SA; emotional abuse, EA; physical neglect, PN). Each item was scored on a Likert 5-point scale from 1 point (never) to 5 points (always), resulting in a total questionnaire score ranging from 25 to 125. Three supplementary items were employed as indicators of validity, with elevated scores denoting increased instances of child maltreatment. Child maltreatment: emotional abuse dimension score > 13 points, physical abuse dimension score > 10 points, sexual abuse dimension score > 8 points, emotional neglect dimension score > 15 points, and physical neglect dimension score > 10 points indicate that they have suffered abuse in this aspect. The scale has good reliability and validity, with a Cronbach alpha coefficient of 0.743 and a KMO value of 0.902.

#### *School bullying questionnaires*

Participants' occurrence of school bullying in the past six months was measured using the Multidimensional Peer Victimization Scale (MPVS) and the Multidimensional Peer Bullying Scale (MPVS-RB) [45]. The MPVS scale consisted of 5 dimensions, including physical bullying, relational bullying, verbal bullying, and property bullying, with a total of 20 items. The MPVS-RB scale included 5 dimensions, including physical bullying perpetration, relational bullying perpetration, verbal bullying perpetration, and property bullying perpetration, with a total of 20 items. Each item on the MPVS scale and the MPVS-RB scale was scored using a Likert 5-point scale. The responses were coded as "0 = never, 1 = 1–2 times/month, 2 = 2–3 times/month, 3 = 1 time/week, and 4 = Several times/month". The total score for the 5 dimensions ranged from 0 to 20 points, with higher scores on each dimension indicating more severe school bullying. The criteria for identifying bullying victimization included a total score of  $\geq 1$  across the 5 dimensions. Similarly, the criteria for assessing bullying perpetration were aligned with those used for bullying victimization. When the total score on both scales is  $\geq 1$  point, it indicates both bullying victimization and bullying perpetration. The reliability and validity of the bullying victimization scale were acceptable (Cronbach's  $\alpha = 0.885$ , KMO = 0.890). The reliability and validity of the bullying perpetration scale were also acceptable (Cronbach's  $\alpha = 0.885$ , KMO = 0.890).

#### *Peer relationships questionnaire*

This study used a Chinese version of the peer relationships questionnaire adapted by Zou [46]. The survey questionnaire encompasses a total of 30 items, each scored on a 4-point Likert scale ranging from "completely disagree" to "completely agree". The scoring system is designed such that positively phrased statements



are reverse-scored, and negatively phrased statements are scored directly. For example, for the positively framed question “I find it easy to make friends at school”, a response indicating “completely disagree” is allocated 4 points, whereas “completely agree” receives 1 point. On the other hand, for the negatively framed question “No one talks to me in class”, the scoring is reversed, with “completely agree” earning 1 point and “completely disagree” receiving 4 points. Higher total scores on the scale indicated that the student had a lower self-evaluation of his or her peer relationships. The reliability and validity indices of the Peer Relationships Scale were all high, with a Cronbach alpha coefficient of 0.900; the KMO value was 0.967.

### Statistical analysis

The SPSS 28.0 and R 4.0.4 were used to analyze the data. There were few missing values in this study, and the missing values were randomly missing. Therefore, this study employed the imputation method (mode imputation), which utilizes the distribution characteristics of variables for imputing missing data. Descriptive statistics were performed to analyze the measurements and enumeration using means and standard deviations, frequencies, and component ratios, respectively. To investigate whether the relationship between CM and bullying behaviour varied by demographic factors, we performed subgroup analyses based on age, gender, etc. We included interaction terms in our logistic regression models to assess potential effect modification. Grouping different types of abuse and adjusting to control for the confounding factors with variables such as gender and age were used to explore the association between different types of abuse and different bullying behaviour. A mediating effects modeling approach was used to develop mediation models with child maltreatment scores as the independent variable, total scores on the MPVS scale and the MPVS-RB scale as the dependent variable, and total peer relationships scores as the mediating variable. Bootstrap tests (5000 repeated samples and 95% confidence intervals) were used to test the significance of the mediating effect, with a 95% CI that did not contain 0 indicating a significant mediating effect. A p-value of less than 0.05 was deemed to denote statistical significance for all analyses (two-tailed).

## Results

### Sample characteristics

There were 1 missing value for sex, 1 missing value for race, and 4 missing values for boarding status. Following mode imputation for these missing data, the study included a total of 2,119 research subjects with a median age of 15 years. The gender distribution was relatively

balanced, with 46.34% males and 53.66% females. The majority of participants were Han Chinese (98.44%), and the remaining 1.56% belonged to ethnic minorities. Boarding status was reported by 11.23% of students, while 88.77% were day students. Approximately 10.24% of the participants were only child, contrasting with the 89.76% who had siblings. The majority of students resided in urban (53.00%) or rural/town (46.67%) areas, with a negligible percentage (0.33%) living on islands. Experiencing any form of abuse was reported by 42.57% of the participants. Bullying involvement was observed, with 20.15% experiencing bullying victimization, 6.84% engaging in bullying perpetration, and an additional 5.19% identified as experiencing bully-victimization. The specific details are presented in Table 1.

### Subgroup analysis of different bullying behaviour and maltreatment

Subgroup analyses examining the relationship between maltreatment and various forms of bullying behaviour indicated that the p-values for the interaction terms within each subgroup were not statistically significant ( $P < 0.05$ ). This suggests that there is no indication of a significant alteration in the impact of demographic variables on the observed effects. For a visual representation of these data, refer to Figs. 1 and 2, and 3. However, the

**Table 1** Basic characteristics of the participants

Variables	Categories	Total (n = 2119)
Age, M (Q <sub>1</sub> , Q <sub>3</sub> )		15.00 (14.00, 17.00)
Sex, n(%)	Males	982 (46.34)
	Females	1137 (53.66)
Race, n(%)	Han	2086 (98.44)
	Minority	33 (1.56)
Boarding status, n(%)	Boarding students	238 (11.23)
	Day students	1881 (88.77)
Only-child status, n(%)	Only child	217 (10.24)
	Siblings	1902 (89.76)
Residence, n(%)	Rural/town	989 (46.67)
	Urban	1123 (53.00)
	Islands	7 (0.33)
Grade, n(%)	Junior	1175(55.45)
	Senior	944(44.55)
Any CM, n(%)	No	1217 (57.43)
	Yes	902 (42.57)
Bullying victimization, n(%)	No	1692(79.85)
	Yes	427(20.15)
Bullying perpetration, n(%)	No	1974(93.16)
	Yes	145(6.84)
Bully-victimization, n(%)	No	2009(94.81)
	Yes	110(5.19)

Variables	n (%)	Non-BV	BV	OR (95% CI)	P	P for interaction
		No. of events/ No. of total				
All patients	2119 (100.00)	156/1217	271/902	2.92 (2.34 ~ 3.64)		
Sex						0.563
Male	982 (46.34)	88/575	136/407	2.78 (2.04 ~ 3.77)	<.001	
Female	1137 (53.66)	68/642	135/495	3.17 (2.30 ~ 4.36)	<.001	
Race						0.561
Han	2086 (98.44)	153/1201	266/885	2.94 (2.36 ~ 3.68)	<.001	
Minority	33 (1.56)	3/16	5/17	1.81 (0.35 ~ 9.24)	0.478	
Board						0.956
Yes	238 (11.23)	30/157	34/81	3.06 (1.69 ~ 5.55)	<.001	
No	1881 (88.77)	126/1060	237/821	3.01 (2.37 ~ 3.82)	<.001	
Only Child						0.715
Yes	217 (10.24)	15/135	24/82	3.31 (1.62 ~ 6.78)	0.001	
No	1902 (89.76)	141/1082	247/820	2.88 (2.28 ~ 3.63)	<.001	
Residence						0.980
Rural	989 (46.67)	84/581	134/408	2.89 (2.12 ~ 3.95)	<.001	
Urban	1123 (53.00)	71/634	133/489	2.96 (2.16 ~ 4.07)	<.001	
island	7 (0.33)	1/2	4/5	4.00 (0.12 ~ 136.96)	0.442	
Grade						0.570
Junior	1175 (55.45)	98/699	149/476	2.79 (2.09 ~ 3.73)	<.001	
Senior	944 (44.55)	58/518	122/426	3.18 (2.26 ~ 4.49)	<.001	

**Fig. 1** Subgroup analysis of the association between CM and bullying victimization. Note: "Non-BV" denotes the group not identified as victims of bullying, while "BV" denotes the group identified as victims of bullying

results consistently indicated a significant correlation between child maltreatment and various forms of bullying, with the strongest association observed in bully-victimization (OR: 2.93, 95% CI: 1.95–4.41,  $P < 0.001$ ), followed by bullying victimization (OR: 2.92, 95% CI: 2.34–3.64,  $P < 0.001$ ), and finally bullying perpetration (OR: 2.84, 95% CI: 1.99–4.05,  $P < 0.001$ ).

**Association between different types of abuse and different bullying behaviour**

Considering that the association between abuse and bullying is multidimensional, we further analyzed the association between different types of childhood maltreatment and different bullying behaviour. The experience of emotional abuse, sexual abuse, emotional neglect, and physical neglect was associated with the risk of bullying victimization after controlling for other covariates, particularly emotional abuse and sexual abuse, with adjusted OR=2.32 (95% CI: 1.45–3.71) and adjusted OR=3.98 (95% CI: 2.04–7.77) (Fig. 4). Experiences of sexual abuse and physical neglect were associated with the occurrence of bullying perpetration risk, especially sexual abuse, with an adjusted OR=4.55 (95% CI: 2.17–9.55) (Fig. 5). All types of abuse were associated with the occurrence

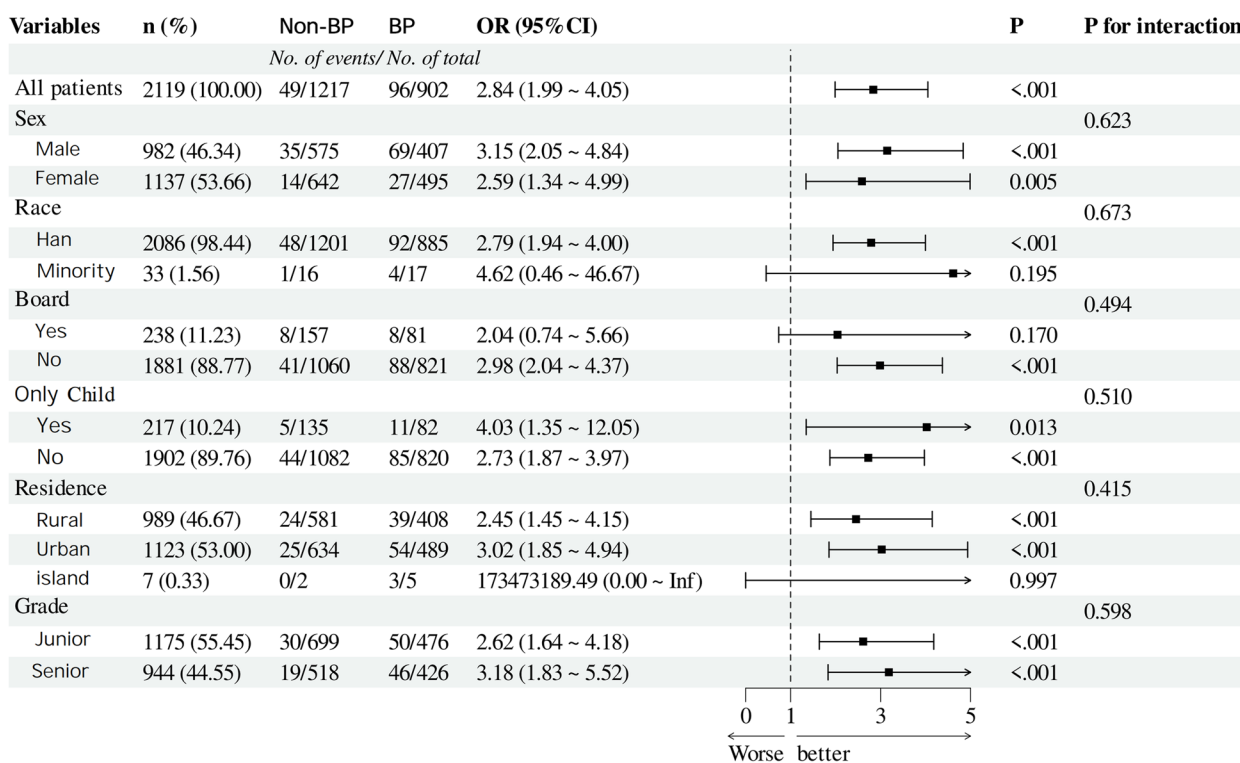
of bully-victimization, especially sexual abuse, with an adjusted OR=9.15 (95% CI: 4.61–18.16) (Fig. 6).

**Correlational analysis of abuse and bullying behaviour and peer relationships**

Means, standard deviations, and correlations for all variables are presented in Table 2. Childhood maltreatment was positively correlated with peer relationships and bullying behaviour. Peer relationships were positively correlated with bullying behaviour.

**The mediating role of peer relationships in child maltreatment and bullying behaviour**

Child maltreatment was used as an independent variable, bullying behaviour as a dependent variable, and peer relationships as mediating variables. As shown in Fig. 7, child maltreatment is positively associated with bullying behaviour ( $\beta = 0.273$ ,  $P < 0.01$ ) and also showed a positive association with peer relationships ( $\beta = 0.414$ ,  $P < 0.01$ ). Peer relationships are positively associated with bullying behaviour ( $\beta = 0.116$ ,  $P < 0.01$ ). The results of the Bootstrap mediation test are shown in Table 3. The mediating effects of peer relationships were significant with a 95% CI [0.021, 0.051], and the mediating effects accounted for 15.13% of the total effect.



**Fig. 2** Subgroup analysis of the association between CM and bullying perpetration. Note: “Non-BP” refers to the group without bullying perpetration, while “BP” denotes the group engaged in bullying perpetration

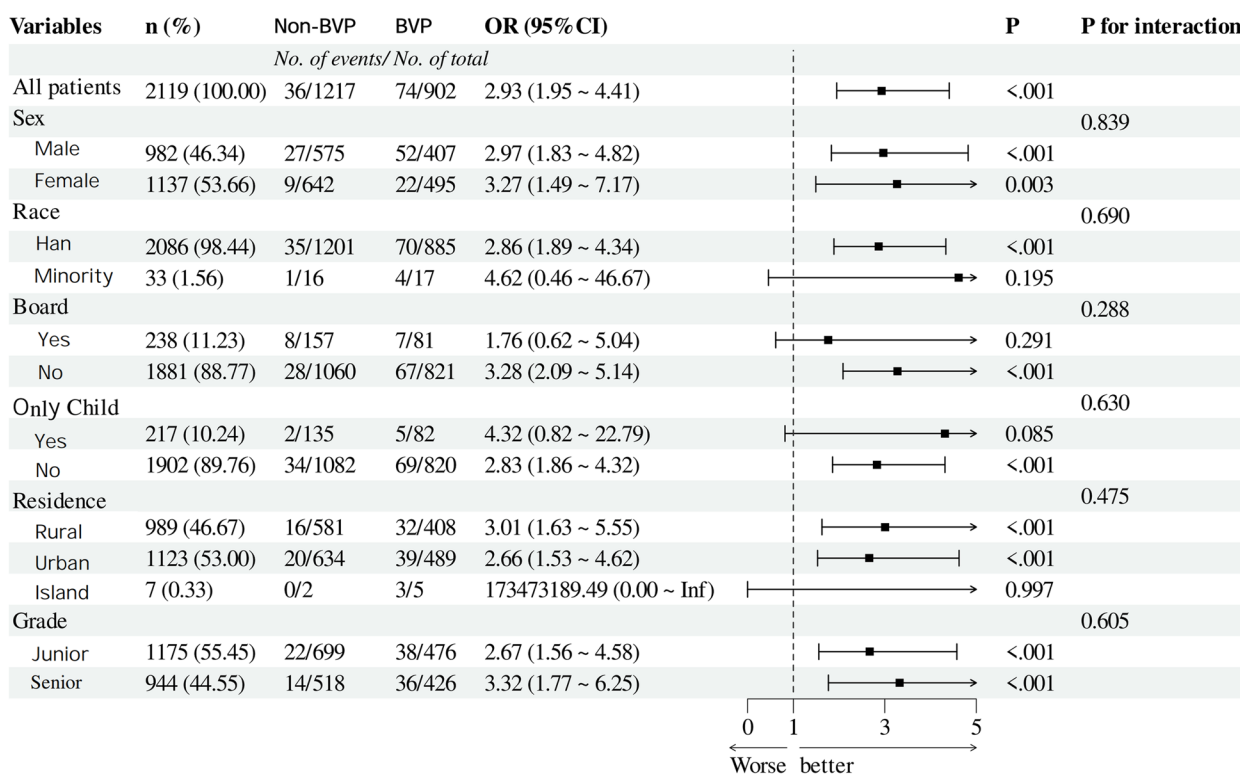
**Discussion**

This study explored the association between child maltreatment and various bullying behaviour in adolescents, focusing on the mediating role of peer relationships in this association. This study found that adolescents who had experienced maltreatment were more likely to experience school bullying than those who had not. This discovery aligns with worldwide research patterns that highlight the significant influence of early life experiences on the behavioural development of adolescents [47]. Considering the effects of various demographic characteristics on bullying behaviour, we further explored how these characteristics affect the connection between maltreatment and bullying through subgroup analyses. However, the lack of significant interaction effects across demographic subgroups implies that the impact of maltreatment on bullying behaviour is consistent across different populations, although the mechanisms underlying this relationship may vary.

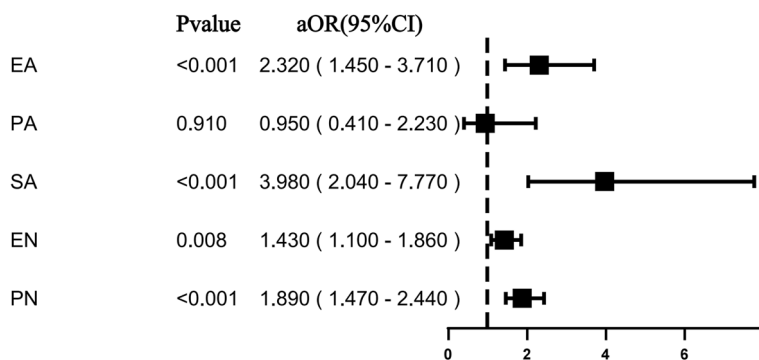
This study further analyzed the relationship between specific types of child maltreatment and different bullying behaviour, and found that all types of maltreatment are influential factors in the occurrence of bully-victimization. In addition to physical abuse, all other types of maltreatment are influential factors in the occurrence of

bullying victimization. Only sexual abuse and physical neglect were identified as influences on bullying perpetration. In concurrence with previous studies, this result indicates that sexual abuse had the most significant impact on all forms of bullying behaviour. In comparison to other forms of abuse, sexual abuse is often regarded as a particularly severe trauma that can have a profound impact on the psychological and physical well-being of the victim [48]. Individuals who have been sexually abused may encounter social stigmatization and misconceptions, which may result in their exclusion or misunderstanding among their peers. This can subsequently increase their risk of becoming a victim of bullying [49], as well as developing aggression, anti-social behaviour and emotional problems. Those who have experienced sexual abuse during childhood are more likely to become bullying perpetrators, a phenomenon known as the cycle of violence [50].

Another important finding of this study was the mediating role of peer relationships between child maltreatment and bullying behaviour in adolescents. The negative impact of child maltreatment increases the risk of bullying behaviour through poorer peer relationships. Conversely, positive peer relationships may buffer the impact of maltreatment. This may be due to



**Fig. 3** Subgroup analysis of the association between CM and bully-victimization. Note: “Non-BVP” refers to the group of individuals not identified as bully-victims, while “BVP” denotes the group identified as bully-victims

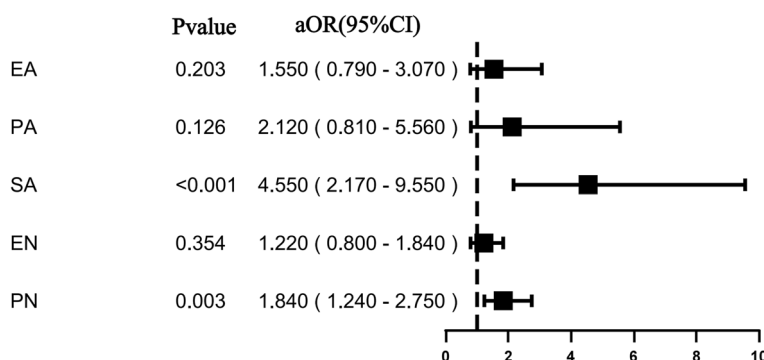


**Fig. 4** Association between different types of CM and bullying victimization. Note: CM, Child Maltreatment; EA, Emotional Abuse; PA, Physical Abuse; SA, Sexual Abuse; EN, Emotional Neglect; PN, Physical Neglect

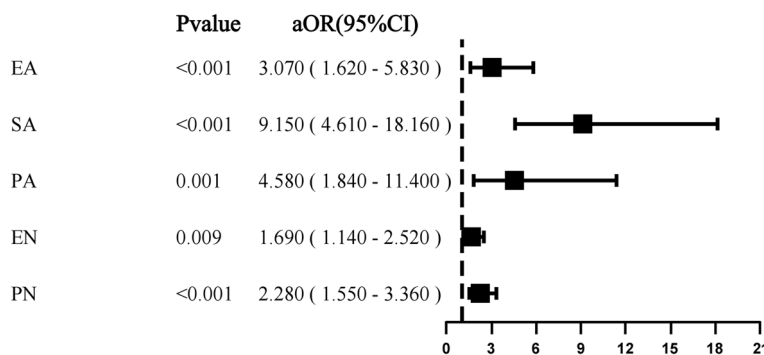
the fact that maltreated children often have difficulty in establishing good relationships with their peers, and they may face social exclusion or isolation due to factors such as emotional instability, low self-esteem, or lack of social competence [51]. Consistent with this, research by Hong et al. indicates that children who experience physical, emotional, or sexual abuse at home are more likely to become ‘loners’ [27]. This is particularly true in cases of sexual abuse, where adolescents who run away from

home and become homeless are at greater risk of associating with deviant peers and engaging in risky behaviors [52]. Meanwhile, abused children may also be at increased risk of bullying perpetration because of hostile or aggressive behaviour toward peers [53]. It is worth noting that more attention should be paid to children during adolescence—a period of rapid physical and mental development—when friendships and peer relationships are crucial [54]. Adolescents who do not establish





**Fig. 5** Association between different types of CM and bullying perpetration. Note: CM, Child Maltreatment; EA, Emotional Abuse; PA, Physical Abuse; SA, Sexual Abuse; EN, Emotional Neglect; PN, Physical Neglect



**Fig. 6** Association between different types of CM and bully-victimization. Note: CM, Child Maltreatment; EA, Emotional Abuse; PA, Physical Abuse; SA, Sexual Abuse; EN, Emotional Neglect; PN, Physical Neglect

**Table 2** Descriptive statistics and correlations between variables

	M	SD	1	2	3
1. Child maltreatment	37.06	9.63	1		
2. Peer relationships	52.91	17.17	0.408**	1	
3. Bullying behaviour	2.20	7.14	0.307**	0.287**	1

Note: (\*\*  $p < 0.01$ )

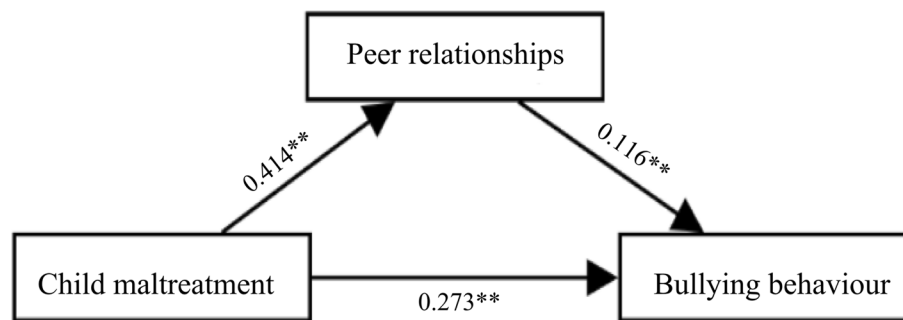
**Table 3** The mediating role of peer relationships in CM and bullying behaviour

	Effect	SE	LLCI	ULCI	Effect size
Total effect	0.238	0.015	0.208	0.268	
Direct effect	0.202	0.167	0.170	0.235	84.87%
Indirect effect	0.036	0.007	0.021	0.051	15.13%

strong peer relationships are likely to be more vulnerable to bullying [55]. This notion is supported by the study of Bollmer et al., which shows that positive friendships can

protect adolescents from bullying and reduce the likelihood of them becoming victims [56]. It is evident that peer relationships play a crucial role in mitigating the impact of child maltreatment on adolescent bullying behavior.

The strength of this study lies in the fact that to the best of our knowledge, it highlights for the first time the mediating role of peer relationships in the association between different types of child maltreatment and bullying behaviour. Additionally, it thoroughly considers the impact of demographic factors on this relationship. However, this study has a number of limitations that should be addressed. Firstly, due to the cross-sectional nature of the study design, it is not feasible to ascertain the causal relationships among the variables in question. Future studies should employ longitudinal designs to explore the causal relationship between child maltreatment, peer relationships, and adolescent bullying. Secondly, the data were collected via self-report questionnaires. As previously indicated, the potential for symptom over-reporting in self-reports may be influenced by reporter bias. Thus, future studies



**Fig. 7** Mediation of relationship between CM and bullying behaviour through peer relationships. Note: (\*\*  $p < 0.01$ )

could be conducted using alternative data collection approaches such as parent reports and teacher reports [57]. Thirdly, the study did not examine particular types of bullying. Consequently, it would be beneficial in the future to investigate the relationships between different types of abuse and different forms of bullying. Finally, there may be other unmeasured confounding variables that affect the results. Future research should control for more possible confounding variables, such as mental resilience and school climate [58].

In spite of the limitations mentioned above, the study made several theoretical and practical contributions. First, the study underscores the significance of early intervention in the context of child maltreatment. This is not only pivotal to the prevention of bullying among adolescents but also to the promotion of the overall well-being of adolescents. A secure environment conducive to the development of young individuals can be established by implementing educational programs and initiatives focused on preventing abuse within school and community settings. Second, it is recommended that educational institutions prioritize the cultivation of peer relationships and social competencies, given the mediating role that peer relationships play in mitigating the link between child maltreatment and school bullying. Adolescents can be supported in developing constructive social connections and mitigating instances of bullying by engaging in peer mentoring initiatives, participating in team-building exercises, and attending conflict resolution seminars. Moreover, the results indicate variations in the likelihood of experiencing different forms of bullying among adolescents from diverse demographic backgrounds, underscoring the necessity for public health interventions to be both comprehensive and specific in their approach. The evidence indicates that sexual abuse has a more pronounced impact on bullying behaviour than other forms of abuse. This suggests the necessity of allocating additional resources

to victims of sexual abuse in the context of intervention programs. The provision of professional mental health services and long-term support for this group can assist in their recovery from trauma and reduce the likelihood of future bullying.

## Conclusion

In general, this study revealed a notable link between child maltreatment and bullying behaviour in adolescents, particularly in relation to sexual abuse and bullying behaviour. Most importantly, the study demonstrated support for the mediating effects of peer relationships on the relationship between child maltreatment and bullying behaviour. These findings provide additional evidence that worse peer relationships may intensify the negative effects of maltreatment experiences and increase the risk of bullying behaviour in adolescents. In light of these findings, future studies should employ longitudinal designs to further elucidate the causal relationship between child maltreatment, peer relationships, and bullying. Concurrently, the implementation of school-based interventions to enhance adolescents' social skills and peer relationships is recommended as an effective strategy to prevent and reduce bullying.

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## Authors' contributions

L.L. designed the study. L.X. and J.H. collected the data. L.X. was involved in the analysis of the data. L.X. and P.W. drafted the paper, and L.X., J.Z., and X.L. provided iterative revisions and comments on the drafts. All authors have read and agreed to the final published version of the manuscript.

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## Availability of data and materials

The data sets generated and analyzed in the current study are not publicly available due to proprietary rights but are available from the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate

All methods were performed in accordance with the relevant guidelines and regulations. This research was approved by the ethics committee of Shantou University. All the participants and their guardians agreed and provided signed, informed assent or consent on a voluntary basis.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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