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Gender differences in the association between bullying victimization and depressive symptoms in Chinese children and adolescents

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Abstract

Background Bullying is a rising social concern and public health challenge, threatening the mental health of the youth. Existing evidence lacks comprehensive insight into the gender disparities in such association. This cross-sectional study aimed to elucidate the gender differences in the association between bullying victimization and depressive symptoms among children and adolescents.

Methods A total of 21,654 fourth-grade and above students were recruited from the annual school-based survey "China Common Disease and Risk Factor Surveillance among Students" in Zhejiang Province, China, conducted in 2021. Six forms of bullying victimization were assessed with a self-administered questionnaire and further categorized into three subtypes, including physical, verbal, and relational bullying victimization. Depressive symptoms were measured with the Center for Epidemiologic Studies Depression Scale. A multilevel generalized linear model was employed to analyze the gender-specific association of bullying victimization (in specific forms, subtypes, and cumulative measures) with depressive symptoms. Gender differences were tested by the girls-to-boys ratios of odds ratios (RORs) and the 95% confidential intervals (CIs).

Results The median age of recruited children and adolescents was 15.07 years. All specific forms of bullying victimization were significantly associated with increased odds of depressive symptoms. Girls who were mocked or teased (ROR = 1.27, 95% CI = 1.05–1.56), body-shamed (ROR = 1.39, 95% CI = 1.05–1.85) and experienced the subtype of verbal bullying (ROR = 1.22, 95% CI = 1.01–1.46) exhibited greater depressive symptoms than boys. Concerning cumulative effects, girls who experienced two or more forms of bullying victimization (ROR = 1.42, 95% CI = 1.09–1.84), all three subtypes of bullying victimization (ROR = 1.89, 95% CI = 1.10–3.24) had more prominently increased odds of depressive symptoms than boys.

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Conclusions Bullied girls exhibited a higher susceptibility to depressive symptoms than boys with the same experience, especially when exposed to multiple bullying incidents. These findings underscore the need for developing gender-specific strategies to protect children from bullying, with an emphasis on safeguarding girls.

Keywords Gender differences, Bullying victimization, Depressive symptoms, Children and adolescents

Introduction

Depression, an affective disorder characterized by various manifestations of low mood [1], has become a significant public health concern with substantial morbidity and mortality worldwide. It affects individuals across all ages and demographics, including children and adolescents [2]. According to population-based studies, the worldwide 1-year prevalence rate of depressive disorders in children and adolescents across 27 countries was 1.3% in 2015 [3]. The onset of depressive symptoms often begins during childhood and adolescence, a critical period characterized by profound developmental changes. In China, approximately 24.3% of junior and senior secondary students are affected by depressive symptoms, imposing a considerable burden on society and families [4].

Bullying, which refers to repeated and intentional aggressive actions targeting one or more individuals, is a significant global public health threat and a great social concern [5]. Bullying victimization, the experience of being bullied, is highly prevalent in China with rates ranging from 33.7 to 84.5% among adolescents in different regions in 2021 [6]. Existing studies suggest that boys and girls are likely to experience different forms of bullying victimization. Boys are more prone to physical victimization, while girls tend to be involved in verbal and relational bullying [7]. This difference has led to a growing interest in the gender differences in bullying victimization and the subsequent health consequences.

The correlation between bullying victimization and depression is complicated, involving various hypothesized pathways. The interpersonal risk model implicates the potential role of bullying victimization in facilitating internalizing psychological symptoms [8]. Conversely, the symptom-driven model proposes those depressed individuals are more susceptible to maladaptive interpersonal outcomes like peer victimization and social exclusion, indicating a bidirectional association [9, 10]. According to previous evidence, bullying victimization can lead to a range of physical and emotional health impairments [11, 12], including depressive symptoms [13]. Studies on children and adolescents in the Netherlands and Norway have shown that those who have suffered bullying victimization were more likely to have depressive symptoms [14]. Given the different patterns of bullying victimization in boys and girls, a study in America investigated the gender-specific association between bullying victimization and depressive symptoms. The findings indicated boys who experienced physical bullying were more likely to develop depressive symptoms compared to boys who were not victims, while girls experiencing cyberbullying exhibited higher risks of depressive symptoms than girls without such experiences [15]. Despite these findings, there remains a dearth of direct comparisons of gender differences in the association between bullying victimization and depressive symptoms in previous research. Moreover, the gender-specific association of cumulative bullying victimization with depressive symptoms was scarcely investigated.

To address these gaps, our study aimed to (1) investigate the association between different forms and subtypes of bullying victimization and depressive symptoms; (2) examine the association between cumulative forms and subtypes of bullying experiences and depressive symptoms; (3) explore the gender differences in the above associations among children and adolescents in Zhejiang Province.

Methods

Study participants

Participants were recruited from the annual school-based health survey "China Common Disease and Risk Factor Surveillance among Students" (CCDRFSS) conducted in Zhejiang Province in 2021 [16]. Stratified cluster sampling method was applied when recruiting students from grade one and above. First, an urban and a rural area were randomly selected from each of the eleven prefecture-level cities in Zhejiang Province. Then, within the urban area, seven schools (comprising two primary schools, two middle schools, two high schools, a vocational high school) were chosen, whereas in the rural area, five schools (two primary schools, two middle schools, and a high school) were selected. Finally, a minimum of 80 students from each grade of the school were selected using a random sampling method by class units.

Initially, a total of 21,737 children and adolescents studying in high-grade primary school, middle school, and high school from 83 schools participated in the study. Respondents were excluded from the present analysis if they had missing data on depressive symptoms ($n = 57$), bullying victimization ($n = 0$), and other covariates ($n = 26$), which yielded a final analytic sample of 21,654 (details can be found in Fig. 1). Informed consent was obtained from students' parents or guardians on behalf of the minors. The present study protocol was approved by the Ethics Committee of the Zhejiang Provincial Center for Disease Control and Prevention (2020-040-002).

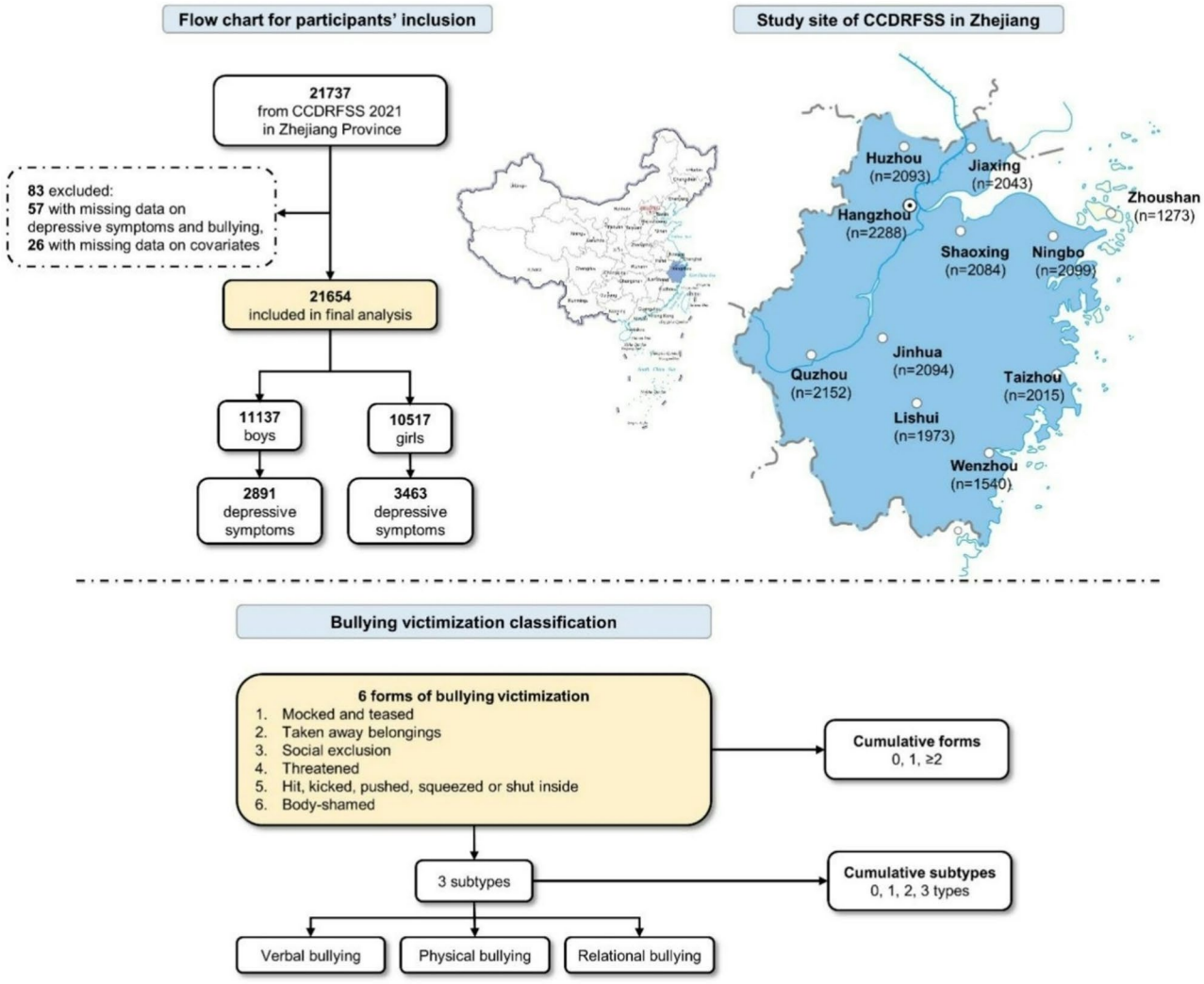

Fig. 1 Flow chart for inclusion of participants and bullying victimization classification
Notes: CCDRFSS, China Common Disease and Risk Factor Surveillance among Students

Measurements

Bullying victimization

Bullying victimization was assessed using a self-administered questionnaire, with a question of "have you experienced any of the following forms of bullying victimization in school or surroundings in the past 30 days?". There were six forms of bullying victimization queried: "mocked or teased", "taken away belongings", "socially excluded", "threatened", "hit, kicked, pushed, squeezed or shut inside", and "body-shamed". Responses were dichotomized as either no (never being bullied in the past 30 days) or yes (being bullied sometimes or always). Considering different dimensions of bullying victimization, these six forms of bullying victimization were further categorized into three subtypes, that is verbal bullying (3 forms: being mocked or teased, threatened, and body-shamed), physical bullying (2 forms: being taken away belongings and being hit, kicked, pushed, squeezed or shut inside), and relational bullying (1 form: being socially excluded) [17, 18].

To estimate the potential cumulative effects of bullying victimization, it was further grouped as 0, 1 and ≥ 2 forms based on the number of bullying victimization forms experienced. Similarly, the cumulative subtypes of bullying victimization were further categorized into 0, 1, 2 and 3 subtypes.

Depressive symptoms

Depressive symptoms were measured with the Chinese version of the Center for Epidemiologic Studies Depression Scale, which has been identified to have great reliability (Cronbach's alpha = 0.88). It contains 20 items rated on a four-level scale, ranging from 0 (practically never) to 3 (most or almost all the time). The total score ranges from 0 to 60, with a score of 16 or higher indicating depressive symptoms in our study [19].

Covariates

Demographic information was obtained using the questionnaire developed for the CCDRFSS, including age (year), gender (boy or girl), residence (urban or rural), nationality (Han or others), number of family members (≤ 2, 3, 4, or ≥ 5), grade (primary school, middle school, or high school), boarding status (yes or no), and experience of being hit by parents (yes or no). Anthropometric data were measured by trained health staff, including height (m) and weight (kg). Body mass index was then calculated by dividing weight by squared height (kg/m^2).

Statistical analysis

Continuous variables were all skewed in the tests of normality and reported as medians with interquartile ranges (IQRs). Categorical data were reported as frequencies and percentages. Differences between the genders were analyzed through the Wilcoxon test for continuous variables and the χ^2 tests for categorical variables. Combined with the characteristics of the data and the application conditions of the statistical models, multilevel mixed-effects generalized linear models were employed to calculate the odds ratios (ORs) and 95% confidential intervals (CIs) between bullying victimization (forms, subtypes, cumulative forms, and subtypes) and depressive symptoms, with students nested within schools. The multivariate model was developed, which was adjusted for age, gender, residence, nationality, grade, boarding status, number of family members, being hit by parents, and body mass index.

Based on the hypothesis that the association varied between sexes, an interaction effect between gender and bullying victimization was assessed by introducing a multiplicative term of gender and bullying victimization into the above Model. Gender-stratified analyses were further conducted separately for boys and girls to assess the associations of forms, subtypes, and cumulative forms/subtypes of bullying victimization with depressive symptoms with adjustment of covariates (except for gender) in the above Model. Gender differences in associations between bullying victimization and depressive symptoms were estimated with the girls-to-boys ratios of odds ratios (RORs) and 95% CIs [20].

A two-tailed p-value < 0.05 was statistically significant. Statistical analyses were performed using STATA 16.0 (StataCorp LLC).

Results

Participants' characteristics

Characteristics of the included boys and girls are described in Table 1. The median age of the students was 15.07 (IQR 13.62–16.64) years, with 50.9%, 38.7%, and 10.4% of primary school, middle school, and high school students. Boys reported a larger proportion of experiences of being hit by parents ($p = 0.011$) and higher body mass index ($p < 0.001$) compared to girls. However, girls were at a higher likelihood of depressive symptoms compared to boys (32.9% vs. 26.0%, $p < 0.001$). Overall, 86.3% of students never suffered from bullying victimization, and 6.0% reported experiencing two or more forms of bullying victimization. Variations were observed between boys and girls in their experiences of forms of bullying victimization. Generally, boys reported more bullying victimization compared to girls, including being mocked or teased (11.8% vs. 8.5%, $p < 0.001$), taken away belongings (2.2% vs. 1.4%, $p < 0.001$), threatened (2.6% vs. 1.6%, $p < 0.001$), and hit, kicked, pushed, squeezed or shut inside (2.7% vs. 1.4%, $p < 0.001$). In addition, boys reported more experiences of specific bullying subtypes than girls in verbal bullying (13.5% vs. 10.4%, $p < 0.001$) and physical bullying (3.6% vs. 2.0%, $p < 0.001$). Regarding cumulative bullying experiences, there were also significantly more accumulative forms and subtypes of bullying victimization in boys than girls (all $p < 0.001$).

Gender differences in the association between specific and cumulative forms of bullying victimization and depressive symptoms

In Table 2, all specific forms of bullying victimization were significantly associated with increased odds of depressive symptoms in the fully adjusted model (mocked or teased: OR = 3.92, 95% CI = 3.55–4.32; taken away belongings: OR = 3.19, 95% CI = 2.58–3.96; socially excluded: OR = 4.53, 95% CI = 3.95–5.20; threatened: OR = 3.48, 95% CI = 2.85–4.26; hit, kicked, pushed, squeezed or shut inside: OR = 2.91, 95% CI = 2.38–3.56; body-shamed: OR = 4.19, 95% CI = 3.65–4.82). Bullying victimization was correlated with the likelihood of depressive symptoms differently among boys and girls (Table 2; Fig. 2). Gender differences were found in the association between specific forms of bullying victimization and depressive symptoms including being mocked and teased (ROR = 1.27, 95% CI = 1.05–1.56, $p = 0.009$) and body-shamed (ROR = 1.39, 95% CI = 1.05–1.85, $p = 0.011$).

As shown in Table 2; Fig. 2, cumulative bullying victimization was associated with increased odds of depressive symptoms among children and adolescents (1 form of bullying victimization, OR = 2.92, 95% CI = 2.62–3.26; ≥2 forms of bullying victimization, OR = 5.65, 95% CI = 4.97–6.41). Gender differences were observed in the association of experiencing ≥ 2 forms of bullying victimization with depressive symptoms (ROR = 1.42, 95% CI = 1.09–1.84, $p = 0.005$), indicating that girls who experienced ≥ 2 forms of bullying victimization had almost 42% higher odds of depressive symptoms compared to boys under the same situation.

Table 1 Characteristics and experiences of bullying victimization of included participants by gender

	Total population (*N* = 21,654)	**Boys (*N* = 11,137)**	**Girls (*N* = 10,517)**	***P* value**
Demographics				
Age, year	15.07 (13.62, 16.64)	15.03 (13.60, 16.61)	15.12 (13.65, 16.67)	0.040
Residence				0.055
Urban	13,692 (63.2)	7110 (63.8)	6582 (62.6)	
Rural	7962 (36.8)	4027 (36.2)	3935 (37.4)	
Nationality				0.920
Han	21,102 (97.5)	10,852 (97.4)	10,250 (97.5)	
others	552 (2.5)	285 (2.6)	267 (2.5)	
Number of family members				0.240
≤ 2	4776 (22.1)	2495 (22.4)	2281 (21.7)	
3	6524 (30.1)	3380 (30.3)	3144 (29.9)	
4	5355 (24.7)	2747 (24.7)	2608 (24.8)	
≥ 5	4999 (23.1)	2515 (22.6)	2484 (23.6)	
Grade				0.008
Primary school	11,027 (50.9)	5772 (51.8)	5255 (50.0)	
Middle school	8370 (38.7)	4256 (38.2)	4114 (39.1)	
High school	2257 (10.4)	1109 (10.0)	1148 (10.9)	
Boarding status				0.099
No	12,245 (56.5)	6358 (57.1)	5887 (56.0)	
Yes	9409 (43.5)	4779 (42.9)	4630 (44.0)	
Hit by parents				0.011
Never	19,712 (91.0)	10,083 (90.6)	9629 (91.6)	
Being or ever	1938 (9.0)	1050 (9.4)	888 (8.4)	
Body mass index, kg/m^2	20.31 (18.35, 23.14)	20.68 (18.37, 24.03)	20.02 (18.33, 22.29)	< 0.001
Depressive symptoms				< 0.001
No	15,300 (70.7)	8246 (74.0)	7054 (67.1)	
Yes	6354 (29.3)	2891 (26.0)	3463 (32.9)	
Specific forms of bullying victimization				
Mocked and teased				< 0.001
No	19,443 (89.8)	9821 (88.2)	9622 (91.5)	
Yes	2211 (10.2)	1316 (11.8)	895 (8.5)	
Taken away belongings				< 0.001
No	21,262 (98.2)	10,888 (97.8)	10,374 (98.6)	
Yes	392 (1.8)	249 (2.2)	143 (1.4)	
Socially excluded				0.900
No	20,575 (95.0)	10,584 (95.0)	9991 (95.0)	
Yes	1079 (5.0)	553 (5.0)	526 (5.0)	
Threatened				< 0.001
No	21,196 (97.9)	10,851 (97.4)	10,345 (98.4)	
Yes	458 (2.1)	286 (2.6)	172 (1.6)	
Hit, kicked, pushed, squeezed or shut inside				< 0.001
No	21,207 (97.9)	10,834 (97.3)	10,373 (98.6)	
Yes	447 (2.1)	303 (2.7)	144 (1.4)	
Body-shamed				0.710
No	20,624 (95.2)	10,613 (95.3)	10,011 (95.2)	
Yes	1030 (4.8)	524 (4.7)	506 (4.8)	
Cumulative forms of bullying victimization				< 0.001
0	18,689 (86.3)	9458 (84.9)	9231 (87.8)	
1 form	1661 (7.7)	969 (8.7)	692 (6.6)	
≥ 2 forms	1304 (6.0)	710 (6.4)	594 (5.6)	
Specific subtypes of bullying victimization				
Verbal bullying				< 0.001

Table 1 (continued)

	Total population (*N* = 21,654)	Boys (*N* = 11,137)	Girls (*N* = 10,517)	*P* value
No	19,063 (88.0)	9637 (86.5)	9426 (89.6)	
Yes	2591 (12.0)	1500 (13.5)	1091 (10.4)	
Physical bullying				< 0.001
No	21,042 (97.2)	10,737 (96.4)	10,305 (98.0)	
Yes	612 (2.8)	400 (3.6)	212 (2.0)	
Relational bullying				0.900
No	20,575 (95.0)	10,584 (95.0)	9991 (95.0)	
Yes	1079 (5.0)	553 (5.0)	526 (5.0)	
Cumulative subtypes of bullying victimization				< 0.001
0	18,689 (86.3)	9458 (84.9)	9231 (87.8)	
1 subtype	1980 (9.1)	1120 (10.1)	860 (8.2)	
2 subtypes	653 (3.0)	344 (3.1)	309 (2.9)	
3 subtypes	332 (1.5)	215 (1.9)	117 (1.1)	

Notes: Values are presented as median with interquartile range for continuous variables and number with percentage for categorical variables

Table 2 Association between bullying victimization and depressive symptoms stratified by gender

	Total Population	Girls	Boys	Girls to boys	P_{ROR}
	OR (95% CI)			ROR (95% CI)	
Specific forms of bullying victimization					
Never being bullied	ref	ref	ref		
Mocked and teased	**3.92 (3.55, 4.32)**	**4.56 (3.90, 5.32)**	**3.60 (3.18, 4.09)**	**1.27 (1.05, 1.56)**	**0.009**
Taken away belongings	**3.19 (2.58, 3.96)**	**3.88 (2.68, 5.62)**	**2.94 (2.25, 3.83)**	1.35 (0.85, 2.12)	0.163
Socially excluded	**4.53 (3.95, 5.20)**	**5.01 (4.09, 6.13)**	**4.25 (3.52, 5.12)**	1.20 (0.91, 1.58)	0.163
Threatened	**3.48 (2.85, 4.26)**	**3.95 (2.81, 5.56)**	**3.31 (2.58, 4.25)**	1.22 (0.80, 1.85)	0.333
Hit, kicked, pushed, squeezed or shut inside	**2.91 (2.38, 3.56)**	**3.41 (2.36, 4.93)**	**2.83 (2.22, 3.61)**	1.23 (0.80, 1.91)	0.283
Body-shamed	**4.19 (3.65, 4.82)**	**5.05 (4.09, 6.23)**	**3.64 (3.01, 4.40)**	**1.39 (1.05, 1.85)**	**0.011**
Cumulative forms of bullying victimization					
0	ref	ref	ref		
1 form	**2.92 (2.62, 3.26)**	**2.89 (2.45, 3.41)**	**2.95 (2.56, 3.40)**	0.98 (0.79, 1.23)	0.998
≥ 2 forms	**5.65 (4.97, 6.41)**	**6.99 (5.71, 8.54)**	**4.98 (4.21, 5.89)**	**1.42 (1.09, 1.84)**	**0.005**
Specific subtypes of bullying victimization					
Physical bullying	**3.08 (2.59, 3.65)**	**3.53 (2.61, 4.78)**	**2.97 (2.40, 3.67)**	1.22 (0.84, 1.76)	0.269
Verbal bullying	**3.86 (3.52, 4.22)**	**4.35 (3.77, 5.01)**	**3.60 (3.19, 4.06)**	**1.22 (1.01, 1.46)**	**0.018**
Relational bullying	**4.53 (3.95, 5.20)**	**5.01 (4.09, 6.13)**	**4.25 (3.52, 5.12)**	1.20 (0.91, 1.58)	0.163
Cumulative subtypes of bullying victimization					
0	ref	ref	ref		
1 subtype	**3.28 (2.97, 3.63)**	**3.47 (2.98, 4.05)**	**3.15 (2.76, 3.61)**	1.11 (0.90, 1.35)	0.250
2 subtypes	**5.66 (4.75, 6.74)**	**5.99 (4.61, 7.79)**	**5.57 (4.39, 7.07)**	1.09 (0.77, 1.56)	0.506
3 subtypes	**5.01 (3.94, 6.36)**	**7.91 (5.00, 12.52)**	**4.26 (3.20, 5.68)**	**1.89 (1.10, 3.24)**	**0.018**

Notes: Ref, reference group. OR, odds ratio. CI, confidence interval. Model was adjusted for age, gender (except for gender-stratified analysis), residence, nationality, grade, boarding status, number of family members, history of being hit by parents, and body mass index. ROR, ratio of odds ratios

Gender differences in the association between specific and cumulative subtypes of bullying victimization and depressive symptoms

Also presented in Table 2; Fig. 3, as for different subtypes of bullying victimization, higher odds of depressive symptoms were found among children and adolescents exposed to physical (OR = 3.08, 95% CI = 2.59–3.65), verbal (OR = 3.86, 95% CI = 3.52–4.22), and relational (OR = 4.53, 95% CI = 3.95–5.20) bullying. Regarding gender differences, the risk of having depressive symptoms in girls who experienced verbal bullying were seen to increase by nearly 22% more than boys (girls-to-boys ROR = 1.22, 95% CI = 1.01–1.46, $p = 0.018$).

We found that students who reported being bullied in one subtype had significantly higher odds of depressive symptoms (OR = 3.28, 95% CI = 2.97–3.63) than those who had never been bullied. The significant associations were also observed among students who experienced two (OR = 5.66, 95% CI = 4.75–6.74) and three (OR = 5.01, 95% CI = 3.94–6.36) subtypes. Notably, we observed

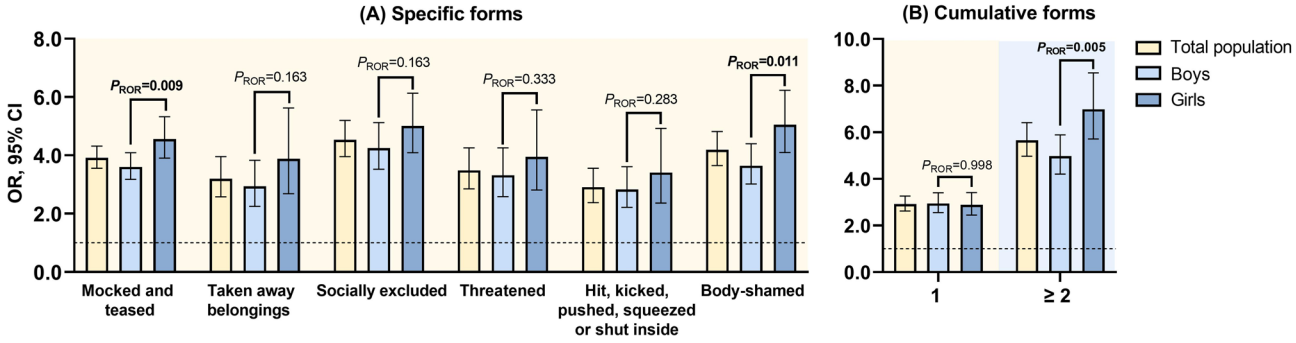

Fig. 2 Association between specific and cumulative forms of bullying victimization and depressive symptoms
Notes: OR, odds ratio. CI, confidence interval. ROR, ratio of odds ratios

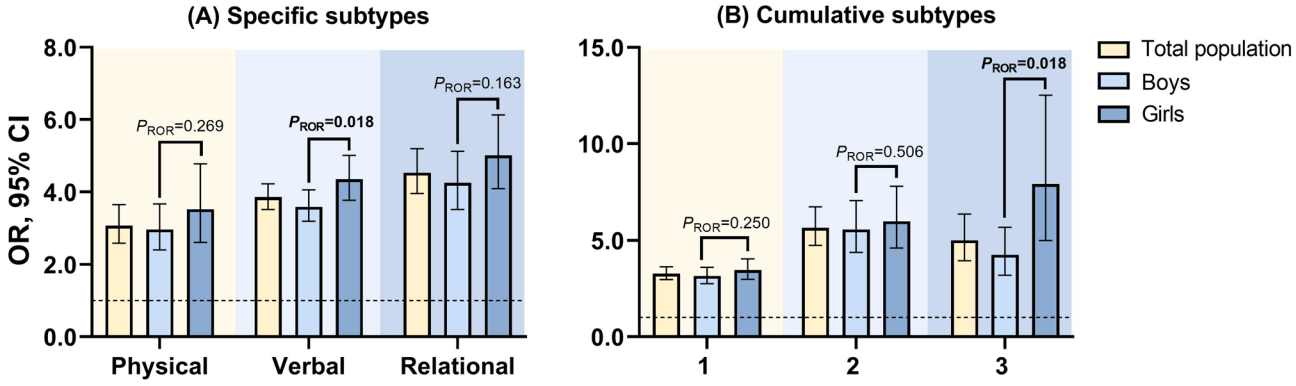

Fig. 3 Association between specific and cumulative subtypes of bullying victimization and depressive symptoms
Notes: OR, odds ratio. CI, confidence interval. ROR, ratio of odds ratios. P_{ROR} <0.05 means significance in the gender difference

significant gender differences in association between cumulative three subtypes of bullying victimization and the risk of depressive symptoms, with the girls-to-boys ROR of 1.89 (95% CI: 1.10–3.24, $p=0.018$), indicating girls who experienced three subtypes of bullying victimization had approximately 89% higher risks of depressive symptoms compared to boys (Table 2; Fig. 3).

Discussion

In this population-based study of children and adolescents, we confirmed a positive association of specific and cumulative bullying victimization with depressive symptoms. Moreover, girls being mocked or teased, body-shamed, or exposed to verbal bullying and cumulative bullying victimization have significantly higher odds of depressive symptoms than boys.

This positive association between bullying victimization and depressive symptoms among Chinese children and adolescents found in our study was consistent with findings from several previous studies. For instance, previous studies revealed a positive correlation between bullying victimization and depression in Chinese adolescents, mediated by factors such as internet addiction and sleep quality [21, 22]. Similarly, *Zhang H. et al.* reported an association between bullying victimization and depression among left-behind children in rural China [23]. Other studies have also linked different forms of bullying victimization, such as cyberbullying [24, 25], psychological abuse [22], peer bullying [26] and sibling bullying [27], to depression. Our study indicated that all specific forms of bullying, including being mocked or teased, taken away belongings, socially excluded, threatened, hit, kicked, pushed, squeezed or shut inside and body shamed, were positively associated with depressive symptoms in the population studied. These findings can be explained by the Diathesis-stress models, which propose that psychological problems occur due to an interaction between certain environmental stressors and individuals' vulnerability [28]. Bullying victimization, as a major stressful life event, may place vulnerable children and adolescents at risk of depressive symptoms when combined with specific cognitive, biological, and social vulnerabilities (also known as diatheses) [29, 30].

The present study extends the previous findings by uncovering the gender differences in the association between various forms of bullying and depressive symptoms. We found that girls are more sensitive to being mocked or teased and body-shamed compared with boys. This could be linked to higher sensitivity among females to stressful interpersonal events [31], which often

trigger depression [32]. This phenomenon is also supported by the higher prevalence of social anxiety disorders and depression among females [33]. Furthermore, body-shaming appears to impact girls more, possibly because females generally pay more attention to their body shape and appearance. Thus their adiposity-related depression is stronger than that in males [34], especially for adolescents with high body mass index [35].

Our study further classified bullying victimization into three subtypes and revealed gender differences in the association between these subtypes and depressive symptoms. Children who suffered from physical, verbal, and relational bullying showed a pronounced tendency to develop depressive symptoms. Moreover, girls suffering from verbal bullying were found to be at a higher risk of depressive symptoms than boys. This could be attributed to the fact that girls often have a significant advantage in verbal-episodic memory [36] which could lead to a more profound impact of verbal bullying [37] and finally result in a greater risk of developing depressive symptoms because of self-immersion in verbal bullying episodic memory. Instead, there were no significant gender differences in the association between having depressive symptoms and being physically or relationally bullied in our study.

Our findings also align with previous studies that reported the accumulative impact of bullying victimization on subsequent depressive symptoms [36, 38]. This could be because children who experienced victimization may be particularly likely to focus on internal blame but adaptive problem-solving, making them more vulnerable to depressive feelings [39]. Moreover, exposure to victimization may contribute to increased tendencies to evaluate themselves negatively in response to stressors, leading them to social avoidance which is related to increased levels of internalized distress [40]. Notably, we observed that girls exposed to all three subtypes of bullying or multiple forms of bullying victimization had a higher risk of developing depressive symptoms. It is possible that repeated but not intermittent bullying is associated with a significant reduction in self-esteem in girls, but not in boys [41]. Although there was a strong protective effect of advanced age among boys on bullying, girls did not seem to benefit in the same way. Furthermore, previous research also found that the use of indirect aggressive strategies towards bullying increases with age for girls but not for boys [41]. These negative coping and psychological attribute changes may ultimately lead to more severe depressive symptoms in girls subjected to repeated and multiple forms and subtypes of bullying [42]. Apart from that, cultural factors might also play a moderating role in explaining the differences. Influenced by traditional gender norms in China, boys are encouraged to exhibit resilience and emotional restraint, which may lead to an underreporting of depressive symptoms among those being bullied and hinder the observed association [43].

Strengths and limitations

To our best knowledge, this is the first study comparing gender differences in the association between bullying victimization and depressive symptoms. Furthermore, our study examines specific and cumulative bullying victimization simultaneously, revealing the consistently higher risk of depressive symptoms in girls under the influence of independent and cumulative bullying victimization. These findings may inform effective tailored interventions that account for the unique experiences and vulnerabilities of girls.

This study is subject to several limitations. Firstly, our sample population was drawn exclusively from Zhejiang Province-an economically developed province in China. Consequently, the results may not be universally applicable, and further research with more representative samples is needed to confirm the findings among children and adolescents in different regions. Secondly, the cross-sectional design of the study limits the establishment of a temporal sequence of variables, making it challenging to determine the causality of the association. Future longitudinal studies are necessary to better understand the gender disparities in correlations between bullying victimization and depressive symptoms. Finally, although self-reported data collection is a common and efficient method for large-scale surveys, it may have caused some recall biases in our study.

Conclusions

In conclusion, the above findings reaffirm a positive association between specific and cumulative bullying victimization and depressive symptoms, as well as elucidate the gender differences in the associations among Chinese children and adolescents. These findings underscore the importance of developing and implementing gender-specific strategies to protect children from various forms of bullying, with a particular emphasis on girls.

Author contributions

PS and RZ designed the study. FG organized the survey and FG, JM, YS, LG, and JL collected the data. WS analyzed the data. KT, ST, BT, and WS prepared the first draft. WX, WS, SS, SL, PS, and RZ revised the manuscript. All authors have read and given final approval of the submitted versions.

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Data availability

The datasets generated and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Informed consent was obtained from all participants involved in the study. The present study protocol was approved by the Ethics Committee of the Zhejiang Provincial Center for Disease Control and Prevention (2020-040-002). This study was conducted in accordance with the principles of the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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