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ORIGINAL RESEARCH

Analysis of Influencing Factors and Construction of Nomogram of School Bullying Suffered by Middle School Students in Beijing in 2022

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Purpose: School bullying has become increasingly serious among children, causing serious damage to their physical and mental health. Previous studies lacked data on bullying of middle school students in Beijing and rarely visualized the risks of bullying. This study investigated the situation and related risk factors of school bullying of middle school students in Beijing in 2022 and established a Nomogram prediction model to visualize the risk of school bullying for its prevention.

Methods: This study is a cross-sectional survey conducted from September 2022 to November 2022 to investigate the bullying situation and related risk factors of the 17729 middle school students in 16 districts of Beijing. Logistic regression is used to analyze the influencing factors of bullying, and then a Nomogram prediction model is established to quantitatively analyze the risk of bullying.

Results: In 2022, 2.69% of middle school students in Beijing reported being bullied. Multivariate analysis results showed that in the past 30 days, being beaten by parents, abnormal families, poor diet, depression, and internet addiction were risk factors for school bullying. Being female, non-residents, moderate-to-high-intensity exercise 3 to 4 days per week, and 2 to 3 physical education classes per week were protective factors against bullying.

Conclusion: Parents, schools, and society should form a joint force, pay attention to parent–child relationships and mental health, encourage students to go outside, strengthen physical exercise, and prevent the occurrence of school bullying.

Keywords: school bullying, children, adolescents, influencing factor, prevention

Introduction

School bullying is the persistent and repeated negative behavior of an individual or group toward another individual or group in a school setting, including verbal teasing, name-calling, spreading rumors to isolate others, and physical contact, such as hitting, kicking, and pushing.[1] Bullying at school is becoming increasingly serious among children and adolescents, with around a third (32%) of students worldwide reporting having experienced bullying by their peers,[2] and a survey of 11 provinces in China showed that around 11% of secondary school students surveyed had experienced bullying,[3] according to a Chinese study. 57.29% of middle school students have experienced at least one type of bullying in the past year.[4] School bullying will have different degrees of negative impact on a student's physical and mental health, including injuries, bruises, anxiety, depression, sleep difficulties, mental disorders, chronic bullying victimization can also lead to a cumulative decrease in life satisfaction, and even suicidal ideations or behaviors in severe cases.[5–9] The damage is not limited to children, a study shows that children's bullying victimization is associated with an increased likelihood of suicidal ideation among marriage migrant mothers.[10] Therefore, it is urgent to take effective measures to intervene the influencing factors of school bullying.

There is a series of social and family problems underlying the school bullying problem, and family and personal factors are important predictors of school bullying. Previous studies have found that many factors are associated with school bullying. Boys are more likely to be bullied in school than girls,[11–13] low socioeconomic status is associated with being a victim of bullying,[14] depressive symptoms that mediate between intentional self-harm and bullying victimization.[15] Changes in family structure, parent–child relationships, and peer relationships are also important factors influencing bullying.[16–18] Parents can also help children and adolescents recover from the adversity of bullying.[19] So it is necessary to study the impact of personal and family factors on bullying. This study fills the gap in the data on school bullying among middle school students in Beijing and visualizes the risk of school bullying by using a nomogram model. This study analyzed the influencing factors of school bullying, which showed that inadequate family support, poor diet, depression, and internet use were associated with having been bullied. To identify and intervene in the high-risk group of school bullying early and then reduce the risk of school bullying, a novel nomogram can be used to identify students who need extra support from families, schools, and society.

Methods

Study Population and Design

This study was based on the "Monitoring and Intervention of Common Diseases and Health Influencing Factors among Students in Beijing in 2022" project, which was a cross-sectional survey. From September 2022 to November 2022, a multistage stratified cluster random sampling was used to select research participants among middle school students in 16 districts of Beijing (five urban and four suburban). Cluster sampling was done by class unit, in which each grade must have had at least 80 students; if the number was insufficient, it was supplemented by other nearby schools of the same type.

Data Collection

The health impact factor items of the "2022 Beijing Students' Common Diseases and Health Impact Factors Monitoring and Intervention Work Project" included basic personal information on smoking, alcohol consumption, diet, internet addiction, family atmosphere (family type, whether they were beaten and scolded by parents in the past 30 days), physical exercise (days of medium-to-high-intensity exercise/week, number of physical education classes/week), sleep status, depression, and school bullying. Before the investigation was conducted, the national ethical review was passed, and informed consent was obtained from the participants. The questionnaire survey was conducted in the school, and the questionnaire response method was filled in by the students. The presence of school teachers was avoided during the whole survey process. In the process of investigation, retesting and verification were organized in a random way at a 5% ratio, and quality control works such as coding requirements, logic verification, data verification, and outlier verification were strengthened in the process of questionnaire investigation. A total of 17750 questionnaires were sent out, 17735 questionnaires were recovered, and 6 questionnaires with incomplete information were deleted. Finally, 17729 middle school students were selected as research objects, with an effective recovery rate of 98.2%.

Definition of Some Concepts

School bullying was defined as "frequent" if one of the following behaviors occurred in the previous 30 days: being teased maliciously, asked for property, intentionally excluded or isolated from group activities, threatened and intimidated, hit, kicked, pushed, jostled or locked in a room, and being teased because of physical deficiencies or looks.[20]

The Internet addiction scale compiled by Young was used to evaluate students' Internet addiction.[21] Internet addiction was defined as internet use ≥4 hours/day in the past 7 days and ≥4 of the following conditions: frequent internet use, including thinking about internet-related things; feeling uncomfortable or unwilling to do other things if you cannot access the internet; increased time spent online for satisfaction; losing interest in other recreational activities because of the internet; inability to stop surfing the internet; unable to complete homework or skip school because of the internet; hiding internet access from parents, teachers, and classmates; continuing to use the internet despite the negative

consequences (lack of sleep, being late for class, and arguing with parents); and to escape from reality, banish difficulties, depression, helplessness, and anxious feelings.

Depression was measured using the Center for Epidemiologic Studies Depression Scale, which includes 20 items on depression, positive emotions, and somatic and interpersonal symptoms. The options for each item are "no or occasionally", "sometimes", "often or half of the time", and "most of the time or continuously", scored on a scale of 0–3. A total score of ≤15 points indicates no depressive emotions, 16–19 points indicate possible depressive emotions, and ≥20 points indicate depression.[22]

In the past 7 days, drinking sugary drinks ≥1 times a day, eating fried food ≥1 times a day, eating fresh fruit ≤1 times a day, eating fresh vegetables ≤1 times a day, one of the above behaviors is defined as poor diet.[22]

The normal family includes the nuclear family and the extended family. The nuclear family refers to living only with the father and mother. Extended family means living with grandparents, father, and mother. Abnormal families include single-parent families, reorganized families, and intergenerational families. A single-parent family is one living with one's mother or father; Reorganized family means living with a father and stepmother or a mother and stepfather; A generational family is one living with grandparents without a father/mother/stepparent.[20]

Data Analysis

SPSS (version 26.0, IBM Corp) and R (version 4.3.3, www.R-project.org/) were used for statistical analysis. The chi-squared test was used for attribute data, and a binary logistic regression model was used to screen risk factors. Statistical significance was considered at $P < 0.05$. The nomogram prediction model was established, and the AUC was calculated using the rms package; the receiver operating characteristic (ROC) curve was drawn using the ROCR and rms packages, and bootstrapping was verified using the caret package.

Results

Single Factor Analysis of School Bullying in Middle School Students

As shown in Table 1, among the 17,729 middle school students in Beijing in 2022, 477 (2.69%) were victims of school bullying. Single-factor analysis showed that sex, boarding, family type, whether parents beat and scolded them in the past 30 days, smoking status, alcohol use, days of medium-to-high-intensity exercise/week, number of physical education classes/week, poor diet, depression, and internet addiction were all associated with school bullying ($P < 0.05$).

Multivariate Logistic Regression Analysis of School Bullying in Middle School Students

As shown in Table 2, variables with statistical significance in the single-factor analysis were included in the binary logistic regression analysis, which showed that being beaten and scolded by parents in the past 30 days, family abnormalities, poor diet, depression (possibly depressed, depressed), and internet addiction were risk factors for school bullying (odds ratio [OR]=1.61, OR = 1.31, OR = 1.73, OR = 2.16, OR = 6.85, and OR = 1.47, respectively), while female sex, non-boarders, 3–4 days/week of moderate to high-intensity exercise, and 2–3 physical education classes/week were protective factors for bullying (OR = 0.47, OR = 0.76, OR = 0.67, and OR = 0.58, respectively) ($P < 0.05$).

Establishment and Verification of the Nomogram Model

A nomogram was established to visualize the risk of school bullying using variables screened by multivariate logistic regression to predict the risk of having been bullied. First, the value of each risk factor for an individual, corresponding to a single score, was entered in the first line of the column diagram, and then the score of the nine risk factors was added to obtain the total score. Finally, the probability of an individual experiencing school bullying was predicted based on the total score. The higher the total score, the greater the risk of bullying. Most students scored 200–350 points (Figure 1).

Figure 1 shows an example of a nomogram prediction model used to predict an individual's risk of bullying. A female student without internet addiction, not depressed, with a normal family, who does not board, has not been beaten and scolded by her parents in the past 30 days, engages in moderate to high-intensity exercise 5–7 days/week, has ≥4 physical education classes/week, and a poor diet has a total score of 263. The risk of school bullying was 2.16%.

Table I Single-Factor Analysis of School Bullying Among Middle School Students in Beijing [n(%)]

Variable	Options	Number of People	Number of Victims of School Bullying	χ^2	P
Sex	Male	9234	320 (3.47)	44.20	<0.01
	Female	8495	157 (1.85)		
Boarding	Yes	3831	129 (3.37)	8.55	<0.01
	No	13,898	348 (2.50)		
Grade	Junior high school	8221	208 (2.53)	1.51	0.22
	Senior high school	9508	269 (2.83)		
Family type	Normality	14,272	348 (2.44)	17.78	<0.01
	Non-normality	3457	129 (3.73)		
Being beaten and scolded by parents	No	16,026	365 (2.28)	108.67	<0.01
	Yes	1703	112 (6.58)		
Smoke	Yes	603	43 (7.13)	47.01	<0.01
	No	17,126	434 (2.53)		
Alcohol use	Yes	2542	119 (4.68)	44.92	<0.01
	No	15,187	358 (2.36)		
Moderate to high-intensity exercise days per week	0–2	6188	205 (3.31)	19.13	<0.01
	3–4	4281	82 (1.92)		
	5–7	7260	190 (2.62)		
Number of physical education classes per week	0–1	1255	63 (5.02)	37.02	<0.01
	2–3	9581	210 (2.19)		
	≥4	6893	204 (2.96)		
Poor diet	No	10,417	183 (1.76)	84.12	<0.01
	Yes	7312	294 (4.02)		
Depression	No	11,703	129 (1.10)	518.56	<0.01
	Maybe	2447	57 (2.33)		
	Yes	3679	291 (7.91)		
Sleep time	Insufficiency	12,773	348 (2.72)	0.20	0.65
	Sufficiency	4956	129 (2.60)		
Internet addiction	No	16,363	379 (2.32)	113.65	<0.01
	Yes	1366	98 (7.17)		

Notes: n represents the number of detections, the figures in parentheses are the detection rate /(%).

The nomogram's AUC was 0.801 (95% confidence interval [CI]: 0.782–0.821), indicating good discrimination (Figure 2). The Hosmer–Lemeshow test results (χ^2=6.65 and P = 0.57) indicated an acceptable goodness of fit. After 1000 re-samplings using bootstrap internal verification, the corrected AUC was 0.797, and the calibration curve showed good prediction (Figure 3).

Table 2 Multivariate Logistic Regression Analysis of School Bullying Among Middle School Students in Beijing

Variable	β	OR	95% CI		P
			Lower Limit	Upper Limit	
Sex					
Male		1.00			
Female	−0.76	0.47	0.38	0.57	<0.01
Boarding					
Yes		1.00			
No	−0.28	0.76	0.61	0.95	0.02
Being beaten and scolded by parents					
No		1.00			
Yes	0.48	1.61	1.27	2.05	<0.01
Family type					
Normality		1.00			
Non-normality	0.27	1.31	1.06	1.62	0.01
Moderate to high-intensity exercise days per week					
0–2		1.00			
3–4	−0.40	0.67	0.51	0.88	<0.01
5–7	−0.11	0.89	0.72	1.11	0.31
Number of physical education classes per week					
0–1		1.00			
2–3	−0.55	0.58	0.43	0.78	<0.01
≥4	0.05	1.05	0.76	1.44	0.77
Poor diet					
No		1.00			
Yes	0.55	1.73	1.41	2.12	<0.01
Depression					
No		1.00			
Maybe	0.77	2.16	1.57	2.97	<0.01
Yes	1.93	6.85	5.47	8.59	<0.01
Internet addiction					
No		1.00			
Yes	0.39	1.47	1.15	1.89	<0.01

Discussion

The rate of middle school students being bullied in this study was 2.69%, similar to survey results in Jiangsu Province.[20] This study found that males were at a higher risk of bullying than females, which is consistent with previous research,
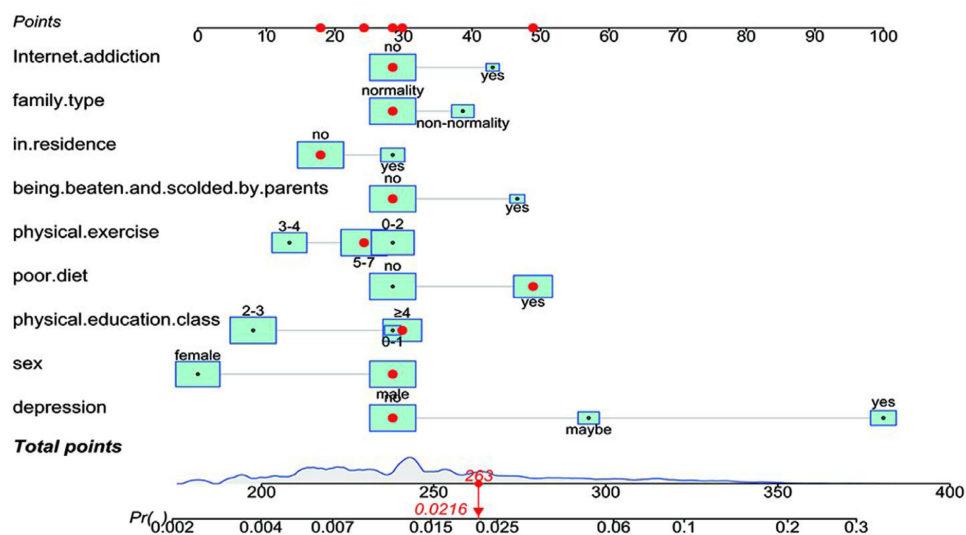
Figure 1 Nomogram prediction model of school bullying risk for middle school students.
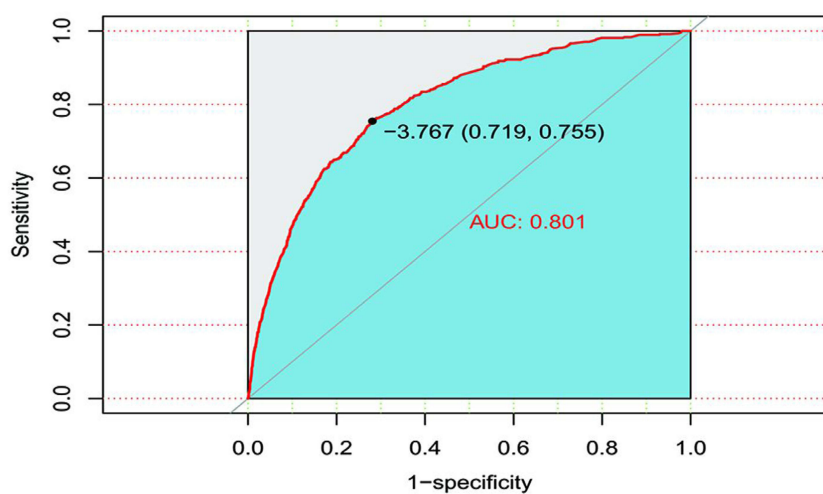

Figure 2 The ROC curve of secondary school bullying risk predicted using the nomogram model.
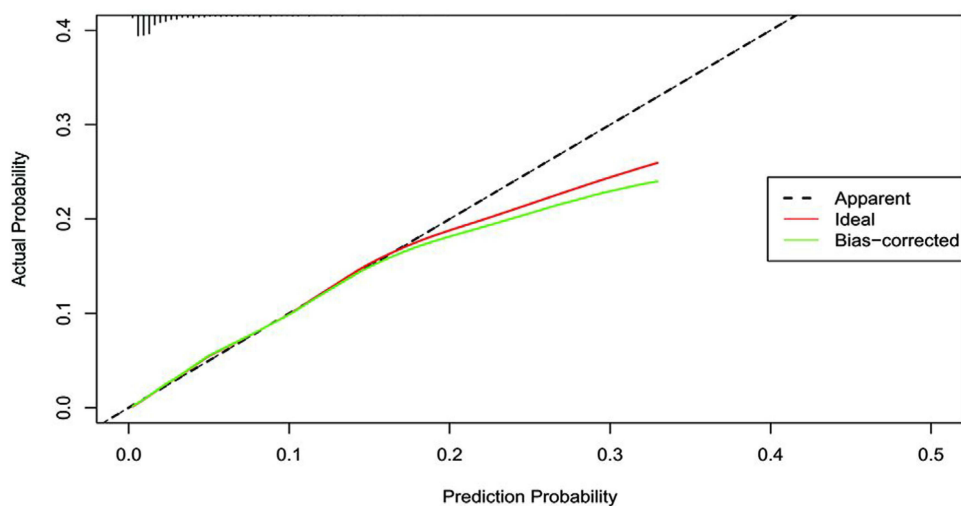

Figure 3 Calibration curve of secondary school bullying risk predicted using the nomogram model.

considering that Chinese parents are more protective of girls than boys, and girls spend more time at home, which may be the reason why girls are less likely to be victims of bullying.[23,24] Students engaging in moderate to high-intensity exercise 0–2 days/week are more likely to experience school bullying than students who exercise 3–4 days/week. This may be because physically strong people seem "hard to bully", suggesting that strengthening physical exercise and physical fitness can help prevent school bullying.[25,26] Students having 0–1 physical education classes/week are more likely to experience school bullying than students who have 2–3 physical education classes/week, suggesting that school policies and measures play an important role in preventing campus bullying.[27] In the next step, schools should increase the length of physical education classes, encourage students to go outside, pay attention to students' psychology, and promote students' physical and mental health and comprehensive development.

Family factors have an important predictive role on whether one suffers from school bullying, which was higher among students living in families with abnormalities. An incomplete family structure may lead to a lack of close familial relationships, a lack of parental care and guidance, and increased vulnerability to bullying. Students who have been beaten and scolded by their parents in the past 30 days are more likely to suffer from insecurity, mood swings, and personality traits associated with low self-esteem and cowardice, and are more likely to suffer school bullying.[28] At the same time, parents' rejection parenting style may lead students to adopt negative coping styles to deal with problems, resulting in more pain of non-physical bullying at school.[29–31] Students who board have a chronic lack of communication and emotional support with their parents, which may result in a higher risk of school bullying.

Finally, individual-level factors such as internet addiction, poor dietary behaviors, and depressive symptoms were also important predictors of school bullying. Students with internet addiction are usually more solitary, lack the care of parents and peers, place their hopes on the internet world, and lack social skills and social adaptability; such students who escape from reality are more likely to suffer from school bullying.[32,33] Students with depressive symptoms tend to have low emotional performance, resist communication, and lack a sense of collective identity and are more likely to suffer from school bullying.[34,35] Consistent with relevant studies, this study found that poor dietary behaviors are associated with school bullying, possibly because poor eating behaviors are positively correlated with depressive symptoms.[36]

Previous studies have used Nomogram models to analyze the risk of bullying. This study uses individual and family variables screened by multivariate logistic regression as predictive variables to establish a Nomogram prediction model. It can visualize the risk of school bullying and provide the basis for preventing school bullying in the future. According to the results of this study, at the individual level, middle school students who are male, have less medium to high-intensity exercise and physical education class, have Internet addiction, depressive symptoms, and poor diet are more likely to suffer school bullying. At the family level, middle school students with incomplete family structure, lack of emotional support from parents, and lack of close contact with parents are more likely to suffer school bullying. Parents should pay attention to students' mental health, provide them with emotional support, oppose violent parenting, and get along with children equally; Schools should offer physical education courses on a regular basis, strengthen publicity and education, set up anti-bullying courses, and provide psychological counseling for students; Students themselves should also establish a "zero tolerance" attitude toward campus bullying, improve their physical fitness and mental toughness, regulate eating behaviors, try more to interact with others, avoid indulging in the online world, and dare to say "no" to campus bullying. Parents, schools, and society should unite, pay attention to students' mental health, oppose bullying in schools, and provide appropriate support for high-risk students to prevent bullying in schools.

Limitations of This Study

First, it had a cross-sectional design, which limits the inference of causality. Second, moreover, individual-level and family-level heterogeneity not observed in this study may have an impact on the study results, and more comprehensive individual and family factors should be studied to explain their association with school bullying. Finally, the model lacked external verification. Thus, large multicenter longitudinal studies with follow-up are needed for verification in order to provide a more accurate model where diverse groups can be effectively included in the prevention of school bullying.

Conclusion

In conclusion, parents should focus on students' mental health, provide them with emotional support, oppose violent parenting, and interact with children equally. Schools should offer physical education courses regularly, strengthen awareness and education, initiate anti-bullying courses, and provide psychological counseling for students. Students should establish a "zero tolerance" attitude toward school bullying, improve their physical fitness and mental toughness, and dare to say "no" to school bullying. Parents, schools, and society should unite, focus on students' mental health, oppose bullying in schools, and provide appropriate support to high-risk students to prevent bullying.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. Volk AA, Camilleri JA, Dane AV, et al. Is adolescent bullying an evolutionary adaptation? *Aggress Behav*. 2012;38(3):222–238. doi:10.1002/ab.21418
2. United Nations Educational, Scientific and Cultural Organization. *School Violence and Bullying: Global Status and Trends, Drivers and Consequences [R/OL]*. United Nations Educational, Scientific and Cultural Organization; 2018.
3. Luo X, Zheng R, Xiao P, et al. Relationship between school bullying and mental health status of adolescent students in China: a nationwide cross-sectional study. *Asian J Psychiatr*. 2022;70:103043. doi:10.1016/j.ajp.2022.103043
4. Song YP, Han X, Zhang JW. Analysis of the situation of school bullying and related factors in junior high school students in China 2016. *Chin J Prev Med*. 2019;53:1032–1037. doi:10.3760/cma.j.issn.0253-9624.2019.10.015
5. Lereya ST, Copeland WE, Costello EJ, et al. Adult mental health consequences of peer bullying and maltreatment in childhood: two cohorts in two countries. *Lancet Psychiatry*. 2015;2(6):524–531. doi:10.1016/S2215-0366(15)00165-0
6. Espelage DL, Holt MK. Suicidal ideation and school bullying experiences after controlling for depression and delinquency. *J Adolesc Health*. 2013;53(1):S27–31. doi:10.1016/j.jadohealth.2012.09.017
7. Ferrara P, Franceschini G, Villani A, et al. Physical, psychological and social impact of school violence on children. *Ital J Pediatr*. 2019;45(1):76. doi:10.1186/s13052-019-0669-z
8. Su PY, Wang GF, He H, et al. Is involvement in school bullying associated with increased risk of murderous ideation and behaviours among adolescent students in China? *BMC Psychiatry*. 2019;19(1):121. doi:10.1186/s12888-019-2108-5
9. Park H, Son H, Jang H, et al. Chronic bullying victimization and life satisfaction among children from multicultural families in South Korea: heterogeneity by immigrant mothers' country of origin. *Child Abuse Negl*. 2024;151:106718. doi:10.1016/j.chiabu.2024.106718
10. Son H, Jang H, Park H, et al. Children's bullying victimization and the acculturative stress of immigrant mothers in Korea: exploring heterogeneity by mother's country of origin. *Cultur Divers Ethnic Minor Psychol*. 2024;30(3):415–424. doi:10.1037/cdp0000655
11. Zhang H, Zhou H, Tao T. Bullying behaviors and psychosocial adjustment among school-aged children in China. *J Interpers Violence*. 2019;34 (11):2363–2375. doi:10.1177/0886260518780777
12. Zhu Y, Chan KL. Prevalence and correlates of school bullying victimization in Xi'an, China. *Violence Vict*. 2015;30(4):714–732. doi:10.1891/0886-6708.VV-D-14-00006
13. Weng X, Chui WH, Liu L. Bullying behaviors among Macanese adolescents-association with psychosocial variables. *Int J Environ Res Public Health*. 2017;14(8):887. doi:10.3390/ijerph14080887
14. Tippett N, Wolke D. Socioeconomic status and bullying: a meta-analysis. *Am J Public Health*. 2014;104(6):e48–59. doi:10.2105/AJPH.2014.301960
15. Karanikola MNK, Lyberg A, Holm AL, et al. The association between deliberate self-harm and school bullying victimization and the mediating effect of depressive symptoms and self-stigma: a systematic review. *Biomed Res Int*. 2018;2018:4745791. doi:10.1155/2018/4745791
16. Wang J, Iannotti RJ, Nansel TR. School bullying among adolescents in the United States: physical, verbal, relational, and cyber. *J Adolesc Health*. 2009;45(4):368–375. doi:10.1016/j.jadohealth.2009.03.021
17. Wang H, Zhou X, Lu C, et al. Adolescent bullying involvement and psychosocial aspects of family and school life: a cross-sectional study from Guangdong Province in China. *PLoS One*. 2012;7(7):e38619. doi:10.1371/journal.pone.0038619
18. Wang H, Wang Y, Wang G, et al. Structural family factors and bullying at school: a large scale investigation based on a Chinese adolescent sample. *BMC Public Health*. 2021;21(1):2249. doi:10.1186/s12889-021-12367-3
19. Jang H, Park H, Son H, et al. The asymmetric effects of the transitions into and out of bullying victimization on depressive symptoms: the protective role of parental education. *J Adolesc Health*. 2024;74(4):828–836. doi:10.1016/j.jadohealth.2023.11.007

20. Yang WY, Wang Y, Zhang XY, et al. Analysis of factors influencing campus bullying among junior and senior school students and construction of a nomogram model from Jiangsu Province. *Chin J Sch Health*. 2023;44:1788–92, 98. In Chinese. doi:10.16835/j.cnki.1000-9817.2023.12.007

21. Young KS. Internet addiction: the emergence of a new clinical disorder. *Cyberpsychol Behav*. 2009;1(3):237–244. doi:10.1089/cpb.1998.1.237

22. Luo HJ, Sun BJ, Zhao H, et al. Analysis of the prevalence and related factors for comorbidity of myopia, obesity, and depression symptoms among middle school students in Beijing. *Chin J Sch Health*. 2024;45:1045–1049. In Chinese. doi:10.16835/j.cnki.1000-9817.2023.10.010

23. Wang YJ, Chen IH. A multilevel analysis of factors influencing school bullying in 15-year-old students. *Children*. 2023;10(4):653. doi:10.3390/children10040653

24. Rigby K, Slee PT. Bullying among Australian school children: reported behavior and attitudes toward victims. *J Soc Psychol*. 1991;131(5):615–627. doi:10.1080/00224545.1991.9924646

25. Merrill RM, Hanson CL. Risk and protective factors associated with being bullied on school property compared with cyberbullied. *BMC Public Health*. 2016;16(1):145. doi:10.1186/s12889-016-2833-3

26. Li J, Sha S, Luo W, et al. Prevalence and associated factors of bullying victimization among Chinese high school students in Shandong, China. *J Affect Disord*. 2023;323:667–674. doi:10.1016/j.jad.2022.12.016

27. Bevilacqua L, Shackleton N, Hale D, et al. The role of family and school-level factors in bullying and cyberbullying: a cross-sectional study. *BMC Pediatr*. 2017;17(1):160. doi:10.1186/s12887-017-0907-8

28. Jansen PW, Verlinden M, Dommisse-van Berkel A, et al. Prevalence of bullying and victimization among children in early elementary school: do family and school neighbourhood socioeconomic status matter? *BMC Public Health*. 2012;12(1):494. doi:10.1186/1471-2458-12-494

29. Zhou H, Wang Q, Yu S, et al. Negative parenting style and perceived non-physical bullying at school: the mediating role of negative affect experiences and coping styles. *Int J Environ Res Public Health*. 2022;19(10):6206. doi:10.3390/ijerph19106206

30. Rauschenberg C, van Os J, Goedhart M, et al. Bullying victimization and stress sensitivity in help-seeking youth: findings from an experience sampling study. *Eur Child Adolesc Psychiatry*. 2021;30(4):591–605. doi:10.1007/s00787-020-01540-5

31. Choi B, Park S. Bullying perpetration, victimization, and low self-esteem: examining their relationship over time. *J Youth Adolesc*. 2021;50(4):739–752. doi:10.1007/s10964-020-01379-8

32. Li X, Luo X, Zheng R, et al. The role of depressive symptoms, anxiety symptoms, and school functioning in the association between peer victimization and internet addiction: a moderated mediation model. *J Affect Disord*. 2019;256:125–131. doi:10.1016/j.jad.2019.05.080

33. Rodríguez-álvarez JM, Yubero S, Navarro R, et al. Relationship between socio-emotional competencies and the overlap of bullying and cyberbullying behaviors in primary school students. *Eur J Investig Health Psychol Educ*. 2021;11(3):686–696. doi:10.3390/ejihpe11030049

34. Chen H, Guo H, Chen H, et al. Influence of academic stress and school bullying on self-harm behaviors among Chinese middle school students: the mediation effect of depression and anxiety. *Front Public Health*. 2023;10:1049051. doi:10.3389/fpubh.2022.1049051

35. McQuade JD, Achufusi AK, Shoulberg EK, et al. Biased self-perceptions of social competence and engagement in physical and relational aggression: the moderating role of peer status and sex. *Aggress Behav*. 2014;40(6):512–525. doi:10.1002/ab.21552

36. Zhang XH, Song Y, Dong YH, et al. Co-occurrence trend of school bullying and depression and its correlation with dietary patterns among middle school students from Inner Mongolia Autonomous Region in 2021. *Chin J Sch Health*. 2023;44:1304–1307. In Chinese. doi:10.16835/j.cnki.1000-9817.2023.09.006