



## Research article

## Prevalence and associated factors of school bullying among adolescents in Inner Mongolia, China

Xi Zhang <sup>a,1</sup>, Liqiong Liu <sup>b,c,d,1</sup>, Zihang Zhou <sup>e</sup>, Ming Qi <sup>f</sup>, Ling Chen <sup>c,d,\*</sup><sup>a</sup> Humanities Research Institute, Medical College of Shihezi University, Shihezi, 832002, China<sup>b</sup> Department of Nursing, National Cancer Centre/National Clinical Research Centre for Cancer/Cancer Hospital & Shenzhen Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Shenzhen, 518116, China<sup>c</sup> Department of Nursing, Shenzhen Hospital, Southern Medical University, Shenzhen, 518101, China<sup>d</sup> School of Nursing, Southern Medical University, Guangzhou, 510515, China<sup>e</sup> School of Computer Science and Engineering, Beihang University, Beijing, 100191, China<sup>f</sup> Department of Rehabilitation and Psychology, The First Affiliated Hospital of Shihezi University, Shihezi, 832008, China

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## ABSTRACT

**Background:** Although studies in China have found that school bullying is prevalent among adolescents, most relevant research has focused on southern China, while research in northern China is limited. This study aimed to explore ethnic disparities in the socio-demographic determinants of school bullying in Inner Mongolia, a northern region of China.

**Methods:** A cross-sectional study was conducted among 2891 adolescents in Inner Mongolia, China, from September to December 2022. Data on participants' sociodemographic characteristics and school bullying experiences were collected through questionnaires. Multivariate logistic regression analyses, stratified by ethnicity, were employed to examine factors associated with school bullying. Furthermore, subgroup analyses and interaction tests were conducted to explore potential effect modifiers of the relationship between ethnicity and bullying.

**Results:** The prevalence of school bullying was 18.99 % (549/2891) overall, with 17.96 % (420/2339) among Han and 23.37 % (129/552) among ethnic minorities. Minority adolescents faced a higher risk of bullying compared to Han ( $OR = 1.35$ , 95 %  $CI$ : 1.08–1.69,  $P < 0.05$ ). Middle school students were more vulnerable to bullying than high school students ( $OR = 1.25$ , 95 %  $CI$ : 1.03–1.52,  $P < 0.05$ ). Among Han adolescents, having a mother with high school education was protective against bullying ( $OR = 0.71$ , 95 %  $CI$ : 0.54–0.93,  $P < 0.05$ ), while it was an associated factor for minorities ( $OR = 2.06$ , 95 %  $CI$ : 1.23–3.46,  $P < 0.05$ ). Good family economic status was an associated factor for bullying among Han ( $OR = 1.62$ , 95 %  $CI$ : 1.11–2.36,  $P < 0.05$ ), but not among minorities. Belonging to other family structures (remarriage/foster family, intergenerational families, live with relatives and elders) was an associated factor for minorities ( $OR = 2.60$ , 95 %  $CI$ : 1.37–4.92,  $P < 0.05$ ), but not for Han. Subgroup analyses revealed significant ethnic disparities in bullying experiences among middle school students, those from nuclear family, other family, and fair economic backgrounds (all  $P < 0.05$ ). Interaction effects between ethnicity and these variables were not significant (all  $P > 0.05$ ).

**Limitations:** This cross-sectional study has limitations in establishing causal relationships between identified associated factors and school bullying.

\* Corresponding author. Department of Nursing, Shenzhen Hospital, Southern Medical University, Shenzhen, 518101, China.

E-mail address: [dangdang601@smu.edu.cn](mailto:dangdang601@smu.edu.cn) (L. Chen).

<sup>1</sup> These authors contributed equally to this work and share first authorship.

**Conclusions:** Ethnic minority adolescents in Inner Mongolia, China, especially middle school students, face a higher risk of school bullying than their Han peers. The differential impact of maternal education, family economic status, and family structure on bullying risk between Han and minority adolescents underscores the need for culturally sensitive, targeted interventions that consider the unique challenges faced by ethnic minority students.

## 1. Introduction

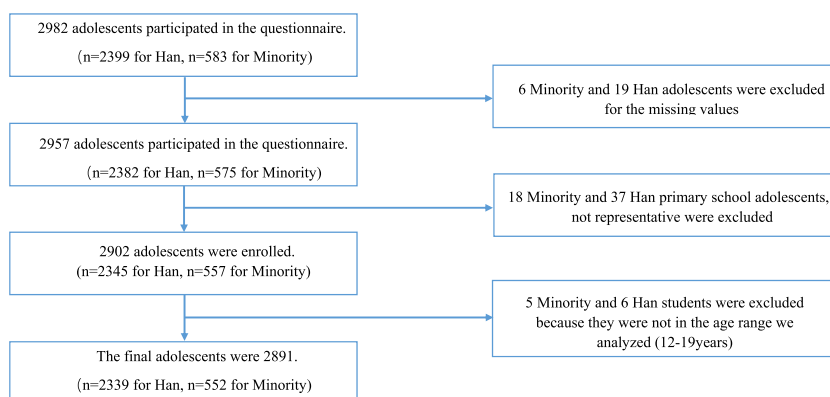
Adolescence is a critical developmental stage and the beginning of the transition to adulthood, and adolescents may be more vulnerable to bullies during this time due to shifting social relationships, intense emotional and physical changes [1,2]. School bullying refers to the intentional or repeated infliction of violence or harm by peers, which makes it difficult for the victim to stop the bullying or protect themselves [3]. School bullying is a significant public health issue affecting adolescents worldwide. A substantial body of research demonstrates that experiencing bullying is associated with numerous detrimental mental and physical health outcomes. A national cross-sectional study in China has shown that school bullying is associated with many mental health issues [4], such as depression [5], anxiety [6], psychological distress [7], physical symptoms [8], and even suicidal behavior [9]. These mental health issues can also increase the risk of being a target of bullying [10].

Previous studies have shown that nearly one-third of the world's adolescents have experienced bullying in the past 30 days, and the prevalence of bullying varies greatly between countries [11–13]. While prevalence has been well-documented in many Western contexts [14], less is understood about bullying in non-Western and Asian nations with ethnically diverse populations. Data from China are very limited and mostly from the southern region, such as Hunan, Hubei and Sichuan [15–18]. However, there are few studies in China that report the prevalence of bullying among minority ethnic groups separately [19]. The prevalence of school bullying is heterogeneous across regions, ranging from 11.59 % to 40 % [17,20].

China represents a uniquely important setting in this regard as a single-race but multi-ethnic country. According to the latest census, over 120 million of China's 1.4 billion citizens belong to officially recognized ethnic minority groups [21]. However, the majority of bullying studies in China has focused on the largest ethnic group in China—the Han—whereas studies devoted to other ethnic groups are limited. Geographically, studies conducted in China have focused on southern and urban areas. Various studies have shown that minority ethnic adolescents tend to be more vulnerable to school bullying [22]. Inner Mongolia is located in the north of China, which is one of the provinces with a large proportion of ethnic minorities. Inner Mongolia has a population of 24 million, of whom 4.25 million are of Mongolian ethnicity [23]. Besides, there is a relative lack of research on school bullying compared to other regions. Understanding these dynamics is an important task as ethnic diversity grows both in China and globally.

The prevention of bullying starts with identifying the associated factors for school bullying. School bullying is influenced by multiple social levels, including the individual, the family, and the school environment [24]. Previous studies have identified some factors associated with adolescent school bullying, such as gender, age, parental education, family income level, family type, and relationships between family members [25,26]. However, few studies have reported how these factors vary across ethnic groups. Researching the factors associated with school bullying can help us identify victims in order to prevent the negative effects of bullying.

The aim of this study was to investigate the prevalence and associated factors of school bullying among adolescents in Inner Mongolia, China. The specific research questions were as follows: 1) What is the prevalence of school bullying among adolescents in Inner Mongolia, China? 2) Is there a difference in prevalence of bullying among minority ethnic groups compared to Han? 3) What is the individual, family, and school factors associated with school bullying among adolescents in Inner Mongolia, China? 4) How do these factors differ by ethnicity? This study explored factors associated with school bullying. It contributes to filling a critical knowledge gap about bullying among Asian minorities as well as providing important implications for developing culturally responsive prevention and intervention efforts.



**Fig. 1.** The flowchart of recruitment of adolescents for this study.

## 2. Methods

### 2.1. Participants and procedure

A total of 2982 adolescents were recruited between September and December 2022 using cluster random sampling method and a cross-sectional design conducted in six schools in Inner Mongolia, China. The survey ultimately included 2891 adolescents, with a valid response rate of 96.94 % after excluding extreme or missing values. The age range of adolescents follows the United Nations Children’s Fund 10–19 years and further classifies adolescents into three stages:10–14 years as early adolescence, 15–17 years as middle adolescence, and 18–19 years as late adolescence. In this study, the 55 primary school students aged between 9 and 12 years were excluded to minimize potential bias and ensure a more robust analysis, given the limited sample size of this subgroup compared to the middle and high school students. The recruitment process is illustrated in Fig. 1. The participating schools were selected randomly from a list of all schools in Inner Mongolia, China that had adolescents enrolled in compulsory secondary education. Before the questionnaire was distributed, the headmaster and the counselling teacher of the surveyed schools were contacted by phone. Parents were notified by the teachers of each class, whose consent was obtained before the questionnaire was distributed to the appropriate students for filling in. For each class, a tutor and an investigator were responsible, and adolescents were required to complete a questionnaire following a standardized procedure. The questionnaire took approximately 10 min to complete, and adolescents provided informed consent before participating voluntarily and anonymously. To minimize missing data, each questionnaire was carefully reviewed by pre-trained quality control personnel after completion. The Ethics Review Committee of Shihezi University School of Medicine reviewed and approved the study protocol (NO: KJ2022-004-01).

### 2.2. Measures

#### 2.2.1. Demographic information

The following sociodemographic data of the participants were collected: grade (middle school or high school), gender (boys or girls), age (12~14years, 15~17years, 18~19years), ethnicity (Han or minority), area (urban, town, rural), single child (yes or no), parents’ education (middle or below, high school, college or above), and family economic status (poor, fair, good). The family type was divided into three groups: nuclear family (only father and mother), single-parent family (only mother or father), other family (remarriage/foster family, intergenerational families, live with relatives and elders). Among the subgroups of family type, the results of the study may be biased due to the small sample sizes of the three subgroups of remarriage/foster family, intergenerational families, and living with relatives and elders, which account for a low percentage of the overall population, limiting the generalizability of the results of the study. These three categories were thereby merged into other family.

#### 2.2.2. Measurement of bullying experience

The assessment of school bullying was carried out using the victimization of the Chinese version of the Olweus Bully/Victim Questionnaire (OBVQ), which has demonstrated good reliability among Chinese adolescents [27]. All questions utilized a consistent 5-point Likert scale response format (never, once or twice in total, two to three times a month, once a week, several times a week).

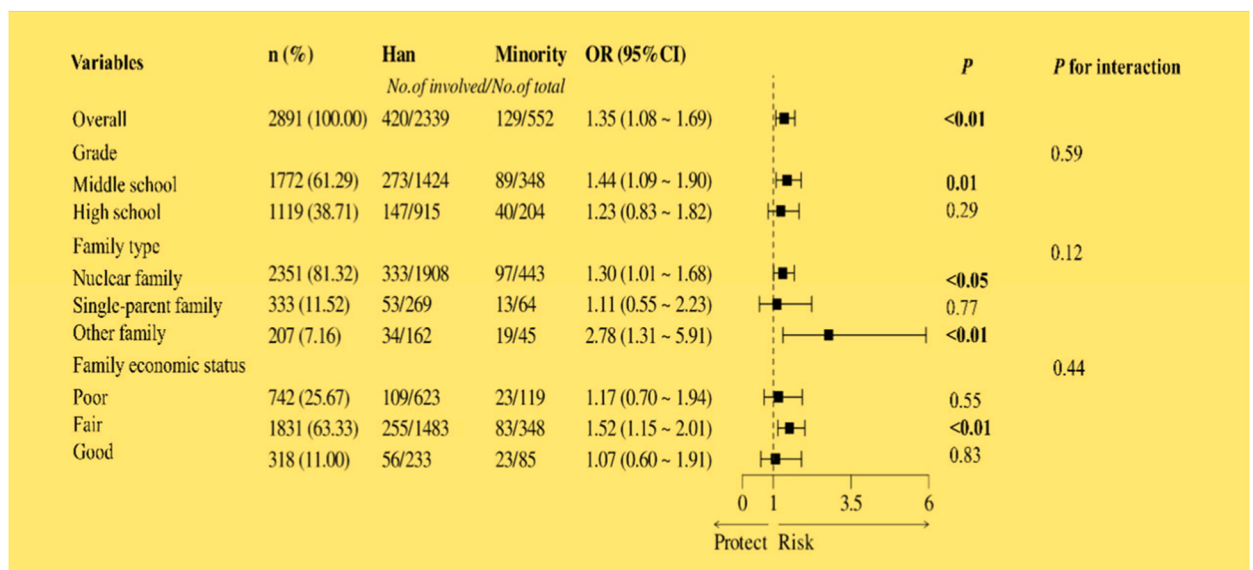


Fig. 2. Subgroup analyses of ethnicity and school bullying.

Notes: Statistically significant at  $P < 0.05$  are identified in boldface. OR: Odd’s ratio. CI: Confidence interval.

Based on their responses, adolescents were classified into four categories: simple victims, simple bullies, bully-victims, and non-involved. A simple victim was defined as an individual who experienced victimization but did not engage in perpetration, a simple bully was classified as an individual perpetrating bullying behavior but not being bullied, a bully-victim was defined as an individual experiencing both victimization and perpetration of bullying, and those who neither bullied nor were bullied were classified as “non-involved”. Adolescents were considered to be involved in any type of bullying if their answers about the frequency of bullying behavior mentioned above were more than two or three times a month [28]. For this study’s analysis, simple bullies, simple victims and bully-victims were considered as involved in bullying. The Cronbach’s  $\alpha$  value for this study was 0.974.

### 2.3. Statistical analysis

Initially, descriptive statistics [n (%)] were employed to outline demographic characteristics of the study participants and various bullying experiences. The prevalence of bullying was presented from multiple angles, including the total sample and stratified by ethnicity. Intergroup differences were assessed using the Chi-square test. Subsequently, to uncover associated factors associated with bullying, a multivariate logistic regression analysis was carried out on the entire sample to derive odds ratios (ORs) and their corresponding 95 % confidence intervals (CIs). To examine ethnic-specific factors influencing bullying experiences, we performed stratified multivariate logistic regression analyses by ethnicity to estimate the impact of these factors.

Based on the findings of the multivariate logistic regression analysis, we also identified key demographic variables for further investigation. To explore whether these variables modified the relationship between ethnicity and bullying, we conducted subgroup analyses. Specifically, we stratified the analyses by these key variables and incorporated interaction terms between ethnicity and these variables in the logistic regression models (Fig. 2). Two-sided  $p < 0.05$  were considered significant. Data processing and analysis were performed using IBM SPSS v.26.0 (Armonk, New York, USA) and R version 4.3.0.

## 3. Results

### 3.1. Characteristics of the participants

The characteristics are presented in Table 1. Of the 2891 adolescents, mostly were middle school adolescents (61.29 %,  $n = 1772$ ), girls (50.67 %,  $n = 1465$ ) and 49.53 % ( $n = 1432$ ) were 12~14 years old. The adolescents were comprised of 80.91 % ( $n = 2339$ ) Han ethnicity and 19.09 % ( $n = 552$ ) minority ethnicity. The proportions of uninvolved and bullying-involved were 81.01 % and 18.99 %.

**Table 1**  
Demographic characteristics of the participants ( $n = 2891$ ).

Variables	Categories	n (%)
Grade, n (%)	Middle school	1772 (61.29)
	High school	1119 (38.71)
Gender, n (%)	Boys	1426 (49.33)
	Girls	1465 (50.67)
Age, years, n (%)	12~14	1432 (49.53)
	15~17	1263 (43.69)
	18~19	196 (6.78)
Ethnicity, n (%)	Han	2339 (80.91)
	Minority	552 (19.09)
Area, n (%)	Urban	424 (14.67)
	Town	2189 (75.72)
	Rural	278 (9.62)
Single child, n (%)	Yes	1275 (44.10)
	No	1616 (55.90)
Family type, n (%)	Nuclear family	2351 (81.32)
	Single-parent family	333 (11.52)
	Other family	207 (7.16)
Father’s education, n (%)	Middle or below	1479 (51.16)
	High school	749 (25.91)
	College or above	663 (22.93)
Mother’s education, n (%)	Middle or below	1512 (52.30)
	High school	693 (23.97)
	College or above	686 (23.73)
Family economic status, n (%)	Poor	742 (25.67)
	Fair	1831 (63.33)
	Good	318 (11.00)
Bullying experiences, n (%)	Uninvolved	2342(81.01)
	Bullying-involved	549(18.99)

### 3.2. Prevalence and characteristics of school bullying among adolescents

The prevalence of school bullying was 18.99 % (549/2891) overall, with 17.96 % among Han and 23.37 % among ethnic minorities. Bullying was significantly associated with being in middle school ( $P = 0.01$ ), belonging to a minority ethnicity ( $P < 0.01$ ), coming from non-nuclear families ( $P = 0.03$ ), and having good family economic status ( $P = 0.02$ ). Among Han adolescents, mothers' education ( $P = 0.04$ ) and family economic status ( $P = 0.04$ ) were significantly different between bullying-involved and non-involved groups, while for ethnic minorities, significant differences were found in mothers' education ( $P = 0.02$ ) and family type ( $P < 0.01$ ) (Table 2).

### 3.3. Multivariable logistic regression analyses for variables associated with school bullying

The multivariable logistic regression analysis identified several factors that were significantly associated with school bullying. Minority ethnicity ( $OR = 1.35$ , 95%CI [1.08–1.69],  $P < 0.05$ ), middle school students ( $OR = 1.25$ , 95%CI [1.03–1.52],  $P < 0.05$ ), adolescents from other family (remarriage/foster family, intergenerational families, live with relatives and elders) ( $OR = 1.55$ , 95%CI [1.11–2.15],  $P < 0.05$ ), and those with good economic backgrounds ( $OR = 1.46$ , 95%CI [1.06–2.01],  $P < 0.05$ ) were more likely to be involved in bullying compared to their respective counterparts. However, associated factors varied between Han and minority ethnic groups. For Han adolescents, having a mother with high school education was protective against bullying ( $OR = 0.71$ , 95%CI [0.54–0.93],  $P < 0.05$ ), while good family economic status was an associated factor ( $OR = 1.62$ , 95%CI [1.11–2.36],  $P < 0.05$ ). Conversely, for minority adolescents, having a mother with high school education ( $OR = 2.06$ , 95%CI [1.23–3.46],  $P < 0.05$ ) and coming from other family (remarriage/foster family, intergenerational families, live with relatives and elders) ( $OR = 2.60$ , 95%CI [1.37–4.92],  $P < 0.05$ ) were associated with increased bullying risk (Table 3).

### 3.4. Subgroup analyses of ethnicity and school bullying

To explore potential modifiers of the relationship between ethnicity and bullying, subgroup analyses were conducted based on grade (middle school vs. high school), family type (nuclear family vs. single-parent family vs. other family), and family economic status

**Table 2**

Prevalence and characteristics of school bullying for the total sample and stratified by ethnicity.

Variables	Total sample(n=2891)			Han(n=2339)			Minority(n=552)		
	Bullying involved (n = 549)	Uninvolved (n = 2342)	Prevalence P	Bullying involved (n = 420)	Uninvolved (n = 1919)	Prevalence P	Bullying involved (n = 129)	Uninvolved (n = 423)	Prevalence P
Grade, n(%)			<b>0.01</b>			0.06			0.11
Middle school	362 (65.94)	1410 (60.20)	20.43%	273 (65.00)	1151 (59.98)	19.17%	89 (68.99)	259 (61.23)	25.57%
High school	187 (34.06)	932 (39.80)	16.71%	147 (35.00)	768 (40.02)	16.07%	40 (31.01)	164 (38.77)	19.61%
Gender, n(%)			0.06			0.15			0.18
Boys	291 (53.01)	1135 (48.46)	20.41%	220 (52.38)	931 (48.51)	19.11%	71 (55.04)	204 (48.23)	25.82%
Girls	258 (46.99)	1207 (51.54)	17.61%	200 (47.62)	988 (51.49)	16.84%	58 (44.96)	219 (51.77)	20.94%
Ethnicity, n(%)			<b>&lt;0.01</b>						
Han	420 (76.50)	1919 (81.94)	17.96%						
Minority	129 (23.50)	423 (18.06)	23.37%						
Age, years, n(%)			0.13			0.16			0.70
12-14	286 (52.09)	1146 (48.93)	19.97%	220 (52.38)	944 (49.19)	18.90%	66 (51.16)	202 (47.75)	24.63%
15-17	220 (40.07)	1043 (44.53)	17.42%	165 (39.29)	845 (44.03)	16.34%	55 (42.64)	198 (46.81)	21.74%
18-19	43 (7.83)	153 (6.53)	21.94%	35 (8.33)	130 (6.77)	21.21%	8 (6.20)	23 (5.44)	25.81%
Area, n(%)			0.69			0.49			0.62
Urban	78 (14.21)	346 (14.77)	18.40%	59 (14.05)	273 (14.23)	17.77%	19 (14.73)	73 (17.26)	20.65%
Town	413 (75.23)	1776 (75.83)	18.87%	317 (75.48)	1480 (77.12)	17.64%	96 (74.42)	296 (69.98)	24.49%
Rural	58 (10.56)	220 (9.39)	20.86%	44 (10.48)	166 (8.65)	20.95%	14 (10.85)	54 (12.77)	20.59%
Single child, n(%)			0.30			0.47			0.46
Yes	253 (46.08)	1022 (43.64)	19.84%	190 (45.24)	831 (43.30)	18.61%	63 (48.84)	191 (45.15)	24.80%
No	296 (53.92)	1320 (56.36)	18.32%	230 (54.76)	1088 (56.70)	17.43%	66 (51.16)	232 (54.85)	22.15%
Family type, n(%)			<b>0.03</b>			0.39			<b>&lt;0.01</b>
Nuclear family	430 (78.32)	1921 (82.02)	18.29%	333 (79.29)	1575 (82.07)	17.45%	97 (75.19)	346 (81.80)	21.90%
Single-parent family	66 (12.02)	267 (11.40)	19.82%	53 (12.62)	216 (11.26)	19.70%	13 (10.08)	51 (12.06)	20.31%
Other family	53 (9.65)	154 (6.58)	25.60%	34 (8.10)	128 (6.67)	20.99%	19 (14.73)	26 (6.15)	42.22%
Father's education, n(%)			0.34			0.12			0.79
Middle or below	294 (53.55)	1185 (50.60)	19.88%	239 (56.90)	998 (52.01)	19.32%	55 (42.64)	187 (44.21)	22.73%
High school	141 (25.68)	608 (25.96)	18.83%	108 (25.71)	512 (26.68)	17.42%	33 (25.58)	96 (22.70)	25.58%
College or above	114 (20.77)	549 (23.44)	17.19%	73 (17.38)	409 (21.31)	15.15%	41 (31.78)	140 (33.10)	22.65%
Mother's education, n(%)			0.62			0.04			0.02
Middle or below	295 (53.73)	1217 (51.96)	19.51%	250 (59.52)	1020 (53.15)	19.69%	45 (34.88)	197 (46.57)	18.60%
High school	123 (22.40)	570 (24.34)	17.75%	87 (20.71)	493 (25.69)	15.00%	36 (27.91)	77 (18.20)	31.86%
College or above	131 (23.86)	555 (23.70)	19.10%	83 (19.76)	406 (21.16)	16.97%	48 (37.21)	149 (35.22)	24.37%
Family economic status, n(%)			<b>0.02</b>			<b>0.04</b>			0.41
Poor	132 (24.04)	610 (26.05)	17.79%	109 (25.95)	514 (26.78)	17.50%	23 (17.83)	96 (22.70)	19.33%
Fair	338 (61.57)	1493 (63.75)	18.46%	255 (60.71)	1228 (63.99)	17.19%	83 (64.34)	265 (62.65)	23.85%
Good	79 (14.39)	239 (10.20)	24.84%	56 (13.33)	177 (9.22)	24.03%	23 (17.83)	62 (14.66)	27.06%

Notes: Statistically significant at  $P < 0.05$  are identified in boldface.

**Table 3**  
Multivariate logistic regression analyses of school bullying for the total sample and stratified by ethnicity.

Variables		Total sample	Han	Minority
		OR (95%CI)	OR (95%CI)	OR (95%CI)
Grade	High school	1 [ref]		
	Middle school	1.25*(1.03–1.52)		
Ethnicity	Han	1 [ref]		
	Minority	1.35*(1.08–1.69)		
Family type	Nuclear family	1 [ref]		1 [ref]
	Single-parent family	1.14 (0.85–1.52)		0.87(0.45–1.68)
	Other family	1.55*(1.11–2.15)		2.60*(1.37–4.92)
Family economic status	Poor	1 [ref]	1 [ref]	
	Fair	1.02 (0.81–1.27)	1.04(0.81–1.33)	
	Good	1.46* (1.06–2.01)	1.62*(1.11–2.36)	
Mother's education	Middle or below		1 [ref]	1 [ref]
	High school		0.71*(0.54–0.93)	2.06*(1.23–3.46)
	College or above		0.78(0.59–1.04)	1.42(0.89–2.25)

Notes: OR: Odd's ratio.

CI: Confidence interval.

#: All variables with  $P < 0.1$  was included in the multivariate.

\*: Statistically significant at  $P < 0.05$ .

(poor vs. fair vs. good). For the entire adolescent population studied, minority ethnic groups faced a 35 % increased risk of experiencing bullying compared to their Han counterparts ( $OR = 1.35$ , 95 %  $CI$ :1.08–1.69),  $P < 0.01$ . The interaction effects between ethnicity and these variables were not statistically significant (all  $P$  for interaction>0.05), indicating a consistent pattern of ethnic disparities in bullying across different subgroups.

When dissecting this data by grade: minority middle school students exhibited a heightened risk ( $OR = 1.44$ , 95% $CI$ : 1.09–1.90,  $P = 0.01$ ); among high school students, the disparity was not statistically significant ( $OR = 1.23$ , 95% $CI$ : 0.83–1.82,  $P = 0.29$ ). Examining family types revealed: minority adolescents from nuclear families had an increased likelihood of being bullied ( $OR = 1.30$ , 95% $CI$ : 1.01–1.68,  $P < 0.05$ ); in single-parent families, no significant ethnic disparity was observed ( $OR = 1.11$ ,95% $CI$ : 0.55–2.23,  $P = 0.77$ ); a pronounced vulnerability was noted among minority adolescents from other family (remarried/foster families, intergenerational families, and families living with relatives and elders) ( $OR = 2.78$ ,95% $CI$ :1.31–5.91,  $P < 0.01$ ). Regarding family economic status: notable vulnerability existed for minorities from fair economic backgrounds ( $OR = 1.52$ ,95% $CI$ : 1.15–2.01,  $P < 0.01$ ); however, those from good economic backgrounds did not exhibit significant disparities in bullying experiences between ethnicities.

#### 4. Discussion

The present study represents the first work to compare the prevalence and associated factors for bullying among Han and minority ethnic adolescents in Inner Mongolia, China. We found that nearly one out of five adolescents (18.99 %) experienced school bullying. The prevalence of bullying was significantly higher among ethnic minority adolescents (23.37 %) compared to their Han counterparts (17.96 %) in Inner Mongolia, China. This study provides alarming evidence regarding the high prevalence of bullying among adolescents in Inner Mongolia, exceeding rates reported in recent studies from other regions of China, such as Shandong (11.59 %) [20], and a national cross-sectional study (14.99 %) [4]. These differences may be attributed to variations in sample characteristics, bullying definitions, and socio-cultural contexts across studies.

Socio-demographic determinants such as the grade, family type and family economic status are associated factors for adolescents experiencing bullying. Consistent with earlier research [29–31], our study found that adolescents attending middle school and those from complex family types appear to be more vulnerable to bullying. These findings suggest that a stable home setting and the maturation that accompanies age may act as bulwarks against bullying. As adolescents progress through school, the prevalence of bullying tends to diminish [32], possibly due to increased maturity and adherence to societal norms [33]. The complexities surrounding family factors and their influence on bullying among adolescents remain to be fully deciphered. Moreover, our research indicates a heightened vulnerability to bullying among adolescents from varied family configurations, such as those in step or foster families, multigenerational homes, or those living with extended family. The increased risks associated with these familial backgrounds may be attributed to the stresses and strains of managing complex family relationships, especially when parents are separated or have entered new partnerships. The resultant stress can have a tangible effect on an adolescent's behavior and social interactions, emphasizing the urgent need for additional support and tailored resources for these individuals [34]. It is crucial to recognize and respond to these diverse family experiences to ensure a safer and more supportive educational climate. In general, adolescents from less affluent families may experience a dearth of social support, making them more vulnerable to bullying [35]. Interestingly, the study found that among Han adolescents, those from good family economic status were more likely to be involved in bullying. This finding challenges the conventional notion that children from low-income families are more likely to be victims or perpetrators of bullying [20]. That is primarily due to the lack of time and resources for parents of adolescents from families with low socio-economic status and resources to pay attention to their education and behavior, which increases the risk of being bullied [13,36]. Adolescents from better-off families may arouse envy and jealousy from other peers, and may be perceived as “misfits” or “snobs”, leading to exclusion

by others through bullying behaviors. Some research has reported that poor socio-economic status may be a protective factor for adolescents, but this is not yet widely accepted, with its credibility and generalizability still seriously compromised by the relative paucity of supporting research and a wide range of methodological limitations [29]. For ethnic minorities, however, there is no significant presence of this associated factor. Therefore, it also reflects the diversity and complexity of the bullying issues.

Another notable finding was the differential impact of maternal education on bullying risk across ethnic groups. For Han adolescents, a higher maternal education appears to offer a degree of immunity to bullying. In stark contrast, among minority ethnic groups, these same factors do not extend equivalent protection. Intriguingly, a higher level of maternal education within these communities may be associated with an elevated risk of bullying. This counterintuitive finding suggests that, normally, as maternal education rises, so does the involvement in a child's educational journey and emotional health, which typically decreases the likelihood of bullying [37]. However, a reduction in parental involvement could inadvertently heighten the risk of bullying for their offspring when maternal educational increases entail greater professional obligations [38,39]. These observations hint at the possibility that cultural variances or socioeconomic elements might distinctively shape these relationships within minority groups, necessitating additional research to unpack these complex dynamics.

Subgroup analyses revealed significant ethnic disparities in bullying among middle school students, those from nuclear families and other family structures, and those from fair economic backgrounds. Although the interaction effects between ethnicity and these variables (grade level, family structure, and economic status) were not statistically significant, the observed patterns underscore the importance of considering the unique socio-cultural contexts and experiences of minority adolescents when examining risk and protective factors associated with bullying. In other words, ethnic minority adolescents may face distinct challenges and difficulties, such as cultural differences, language barriers, and social exclusion, which could increase their vulnerability to bullying [22]. Moreover, family dynamics and support systems may vary among adolescents of different ethnicities, and these differences could influence their coping mechanisms and resilience in the face of bullying [14].

While our study offers valuable insights, we must consider its limitations. First, the cross-sectional design of our study allowed for the identification of associations but not the establishment of causal relationships. While some factors in our study (such as ethnicity, grade, and mother education) are less likely to be influenced by bullying experiences, we recognize that other factors like family structure or socioeconomic status could potentially be affected by bullying. Second, the study relied on self-reported data, which could be subject to recall bias. Third, our study did not include data on height and academic performance, which have been suggested by previous research [13,40,41] to potentially influence the dynamics of school bullying. This was primarily due to the focus of our study on exploring ethnic differences and the feasibility of data collection. Despite these limitations, our findings revealed complex interaction patterns between ethnicity and various sociodemographic factors in relation to bullying experiences. For instance, maternal education and family economic status showed differential impacts on bullying risk for Han and minority adolescents. These results suggest that the relationship between ethnicity and bullying may be moderated by sociodemographic factors, or conversely, that ethnicity may moderate the relationship between sociodemographic factors and bullying. To address these limitations, future studies should consider incorporating these variables, as well as using multiple sources of data and including a nationally representative sample, to provide more comprehensive and reliable findings. Moreover, future research should consider analyzing these variables to identify associated factors for different bullying experiences, which could provide a more nuanced understanding of the prevalence and associated factors for each bullying experience. Furthermore, longitudinal studies are needed to establish the directionality of these relationships more conclusively and disentangle potential bidirectional influences between bullying experiences and factors such as family dynamics or socioeconomic status. To fully capture the complex interplay between ethnicity, sociodemographic variables, and bullying, future research may benefit from employing more advanced statistical models. In spite of these limitations, our study highlights the need for targeted interventions to address the ethnic disparities in school bullying in Inner Mongolia, China. The complex relationships observed between ethnicity, sociodemographic factors, and bullying risk underscore the importance of developing culturally sensitive and context-specific strategies to combat school bullying effectively.

## 5. Conclusions

Our study reveals a significant prevalence of school bullying among adolescents in Inner Mongolia, China with notable differences between ethnic groups. The elevated risk observed in ethnic minority adolescents, particularly in middle school, underscores the urgency for targeted anti-bullying interventions. These interventions must be culturally sensitive and consider the distinct risk profiles identified across different ethnic groups. While the mother's educational level presents itself as a critical factor across all groups, the effect of family economic status appears to be exclusive to Han adolescents, suggesting that socioeconomic interventions may need to be tailored to the cultural context. The impact of family structure on school bullying especially pronounced among minority ethnic adolescents, highlights the necessity for support mechanisms that address the diverse familial environments. Our findings point towards the need for a nuanced approach in the development of bullying prevention programs, one that is informed by the intricate socio-cultural dynamics at play.

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## Data availability statement

Relevant data related to the study have not been deposited in publicly available repositories which will be made available on request, if required.

## Ethical statement

The Ethics Review Committee of Shihezi University School of Medicine reviewed and approved the study protocol (NO: KJ2022-004-01).

## Financial disclosure

There are no financial conflicts of interest to disclose.

## CRedit authorship contribution statement

**Xi Zhang:** Writing – original draft, Resources, Investigation, Conceptualization. **Liqiong Liu:** Writing – original draft, Formal analysis, Data curation, Conceptualization. **Zihang Zhou:** Investigation, Formal analysis, Data curation. **Ming Qi:** Resources, Methodology. **Ling Chen:** Writing – review & editing, Supervision, Project administration, Methodology.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e37201>.

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