


# BMJ Open Association among emotional and behavioural problems, sexual minority status and suicidal behaviours in adolescents: a cross-sectional study from Guangdong Province in China

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## ABSTRACT

**Objectives** This study was conducted to estimate whether emotional and behavioural problems mediate the association between sexual minority status and suicidal behaviour among Chinese adolescents. We also tested whether such mediation is moderated by the sex assigned at birth.

**Design** Cross-sectional observational study.

**Setting** A secondary analysis of the cross-sectional data collected from 7th-grade to 12th-grade students in junior high schools (n=36), senior high schools (n=24) and vocational high schools (n=12) in six cities of Guangdong Province, China. A multistage, stratified cluster, random sampling method was used in the 2019 School-based Chinese Adolescents Health Survey.

**Participants** A total of 16 663 students aged 11–20 years.

**Outcome measures** Two main psychological and mental health outcomes: (1) self-reported version of the Strengths and Difficulties Questionnaire to measure emotional and behavioural problems; and (2) presence of suicidal ideation and suicide attempts in the past 12 months.

**Results** Emotional and behavioural problems (peer problems, emotional problems, conduct problems and hyperactivity) partially mediated the effects of sexual minority status on suicidal ideation (indirect effect=0.020, 95% CI 0.015 to 0.025) and suicide attempts (indirect effect=0.012, 95% CI 0.009 to 0.016), accounting for 18.18% and 14.46% of the total effect, respectively. Further moderated mediation analyses revealed a greater risk of suicidality among sexual minority girls.

**Conclusions** Emotional and behavioural problems partially explained the increased risk of suicidality among sexual minority adolescents, and appreciably higher among sexual minority girls than boys. To prevent subsequent suicidality, the risks of emotional and behavioural problems in sexual minority adolescents should be identified at an early stage and reduced by means of preventive measures.

## INTRODUCTION

Suicide is a severe public health problem that leads to more than 700 000 deaths every year

## Strengths and limitations of this study

- This is a large-scale, representative study of Chinese adolescents' sexual attraction and mental health.
- Structural equation modelling was used to explore the mediating role of emotional and behavioural problems.
- This is a detailed analysis of sex differences in the association among sexual attraction, suicidal behaviours, and emotional and behavioural problems.
- Gender dysphoria/transgender status was not assessed in this study.
- Due to the cross-sectional design, causal inferences cannot be inferred.

in the world.<sup>1</sup> Adolescents are in a critical developmental vulnerability period, placing them at higher risk for suicidal behaviours.<sup>2</sup> In China, suicide is the fourth leading cause of death among adolescents aged 10–19, with a suicide rate of 2.53 per 100 000 individuals in 2016.<sup>3</sup> In recent decades, there has been unprecedented concern regarding the mental health of sexual minority adolescents (SMAs; ie, adolescents who experience same-sex attraction, engage in same-sex sexual behaviour, or self-identify as gay, lesbian or bisexual). SMAs are more likely to be exposed to violence, isolation, discrimination and stigmatisation, associated with an increased risk of suicidal behaviours, compared with their heterosexual peers.<sup>4 5</sup> On average, 28% of SMAs have a history of suicidality and they are two to three times more likely to have suicidal ideation and suicide attempts compared with heterosexual adolescents.<sup>6 7</sup> Thus, there is an urgent need to prevent the occurrence of suicidal behaviours in SMAs through more specific studies that assess their characteristics and elucidate the risk factors of suicidality.



A large number of studies have shown that SMAs suffer from a variety of mental and behavioural health issues.<sup>8–11</sup> According to the Meyer minority stress model,<sup>4</sup> sexual minority individuals face higher levels of social stressors that are both objective (prejudice and discrimination) and subjective (internalised homophobia), which result in more negative health outcomes, such as mental disorders (eg, mood and anxiety disorders) and emotional and behavioural problems (ie, internalising and externalising problems). Previous studies reported that SMAs suffered from more severe emotional and behavioural problems, including conduct, hyperactivity, depression and anxiety disorders.<sup>8,9</sup> Research also demonstrated that emotional and behavioural problems were associated with suicidal behaviours among adolescents.<sup>10</sup> Moreover, recent reports suggested that Chinese SMAs were at an increased risk of behavioural problems, such as smoking, frequent drinking<sup>12</sup> and drug abuse,<sup>13</sup> compared with heterosexual adolescents. Multiple studies have found that Chinese SMAs were anywhere from two to four times more likely to engage in emotional problems and suicidal behaviours, including anxiety and depressive symptoms, suicidal ideation, and suicide attempts, than heterosexuals.<sup>11,14</sup> However, a limited number of studies have examined the mediating role of emotional and behavioural problems with respect to sexual minority status and suicidality. In addition, due to the difficulties of recruiting adequate sexual minority volunteers, the sample sizes of prior studies were relatively small.

Furthermore, sex differences likely play a major role in mental health disparities among SMAs. Sex is the sex assigned at birth (boy or girl) by a physician, generally based on chromosomes, gonads and anatomy.<sup>15</sup> In this article, sex is used synonymously with the sex assigned at birth. The minority stress model proposes that minority stressors related to one's sexual identity are unique to sexual minority individuals.<sup>4</sup> Biobehavioural responses differ by sex when coping with stress, which shapes the risk of mental disorders.<sup>16</sup> A recent systematic review revealed that some studies reported elevated risks of depression, anxiety and suicidal behaviours in sexual minority men than in women, but some others conclude the opposite.<sup>17</sup> Research in Chinese SMAs showed that girls had greater tendency for emotional problems and suicidal ideation, while boys had greater tendency for suicide attempts.<sup>11</sup> However, it remains unclear whether sex assigned at birth plays a moderating role in the impact of emotional and behavioural problems on suicidality in sexual minorities.

Additionally, the Chinese cultural background is deeply influenced by Confucianism, in which people are expected to marry and have children.<sup>18</sup> It has been reported that external pressure to get married was significantly associated with poorer mental health via psychological functions among sexual minority individuals, which can be explained by the theory of psychological mediation framework.<sup>19</sup> Therefore, there might be differences in the associations of emotional and behavioural problems with suicidal behaviours among SMAs in China and other Western countries. Thus, we

conducted this large-scale study to examine the role of emotional and behavioural problems in the associations of sexual minority status and suicidal behaviours and whether these associations vary between sexes. Here, we outlined two primary hypotheses. The first hypothesis was that the associations between sexual minority status, suicidal ideation and suicide attempts were mediated by emotional and behavioural problems. The other was that these associations might be moderated by sex assigned at birth.

## METHODS

### Study design and participants

Data were drawn from the 2019 School-based Chinese Adolescents Health Survey (SCAHS),<sup>14,20</sup> an ongoing large-scale, cross-sectional study about health-related behaviours among Chinese adolescents (7th–12th grade), which has been conducted every 2 years since 2007. A multistage, stratified cluster, random sampling method was used in the 2019 SCAHS. The procedures for data collection were as follows. In stage 1, Guangdong Province was divided into three economic strata (high level, middle level and low level) by gross domestic product per capita, and then two cities were randomly selected as representatives from each stratum. In stage 2, six junior high schools (ie, grades 7–9), four senior high schools (ie, grades 10–12) and two vocational high schools (ie, grades 10–12, schools providing specific vocational training) were randomly selected from each representative city. In stage 3, two classes were randomly chosen from each grade within the selected schools, and all available students were invited to voluntarily participate in the study from the selected classes. All data were collected from November 2018 to January 2019. In total, 20 370 students completed our questionnaires (a response rate of 96.9%). Because we were primarily interested in the suicidality of students who acknowledged and reported their sex attraction, students belonging to the 'unsure' category (n=826) and 'refuse to answer' category (n=2881) were not included in the present analysis. Therefore, a total of 16 663 students were ultimately included in the present analysis.

### Procedure

A standardised self-reported questionnaire was completed in the classroom during a normal class period (40 or 45 min). To increase the response rate of stigmatised behaviours and minimise potential information bias, the questionnaires were anonymous and our research assistants organised the investigation instead of the teachers. Written informed consent was obtained from each student who was at least 18 years old and volunteered to participate in the study. If the student was under 18 years of age, written informed consent was obtained from the student's parents (or legal guardians).

### Patient and public involvement

Patients or the public were not involved in the development of the research question, study design or data interpretation in this study.

## Measures

### Sexual minority status

Sexual minority status was measured by asking the following question regarding sexual attraction: 'When in a romantic relationship to whom you are attracted?' The response options included 'a boy', 'a girl', 'both boy and girl', 'neither boy nor girl', 'unsure' and 'refuse to answer'. When a girl chose the option 'a girl' or 'both boy and girl' and a boy chose the option 'a boy' or 'both boy and girl', they were classified as sexual minorities. These questions were taken from Russell and Joyner,<sup>21</sup> and they have been confirmed to be more suitable for measuring same-sex orientation in adolescents than other methods and have been used in many relevant studies.<sup>22</sup>

### Suicidal ideation and suicide attempts

The following two questions were used to assess participants' suicidal ideation and suicide attempts, respectively: 'During the past 12 months, how many times did you think seriously about committing suicide?' and 'During the past 12 months, how many times did you actually attempt suicide deliberately?'.<sup>23</sup> Available responses were zero, once and at least two times, and the latter two were combined into an 'attempted' group in the moderated mediation models.

### Emotional and behavioural problems

Emotional and behavioural problems were measured by the self-reported version of the Strengths and Difficulties Questionnaire (SDQ),<sup>24 25</sup> the most widely used multidimensional mental health screening instrument for children and adolescents, which has good reliability and validity when used among Chinese adolescents.<sup>26 27</sup> The SDQ is composed of 25 items, divided into 5 scales: emotional problems, conduct problems, hyperactivity, peer problems and prosocial behaviour. In this study, 'total difficulties' is measured by the first four subscales, and the prosocial behaviour subscale scores separately from SDQ. Response options were given on a 3-point Likert scale (1=not true, 2=somewhat true, 3=certainly true). Higher scores in each subscale predict a greater level of emotional and behavioural problems, but the prosocial behaviour subscale is scored inversely by comparison. The Cronbach's alpha for the total difficulties score was 0.76 and for the prosocial behaviour was 0.75 in the present study, which indicated sufficient internal consistency.

### Covariates

The covariates in the present study included factors that have been previously reported to be associated with suicidal behaviours among SMAs.<sup>21 28 29</sup> First, the Center for Epidemiological Studies Scale (CES-D) was used to measure symptoms of depression.<sup>30</sup> The scale has been validated in Chinese and has been extensively used among Chinese populations of different ages.<sup>31 32</sup> The CES-D is a 20-item self-reported questionnaire, with each item rated on a scale from 'rarely or none of the time=1' to 'most or all of the time=4'. Higher scores indicate more

severe depressive symptomology, with total scores ranging from 0 to 60. A standard cut-off point of 16 or more for CES-D is used to identify participants with relevant clinical depressive symptoms.<sup>33</sup> In this study, the Cronbach's alpha was 0.89.

Second, demographic characteristics including sex assigned at birth (boy or girl), age, living arrangements (with both parents or not), family relationships (good relationships or not) and household socioeconomic status (HSS) were measured. HSS was measured by asking students about their perception of their family's economic status (categorised into 'excellent or very good'=1, 'good'=2 and 'fair or poor'=3). Those who self-reported smoking cigarettes (or drinking alcohol) on 1 or more days during the last month were considered current smokers (or current drinkers).<sup>34</sup>

### Statistical analysis

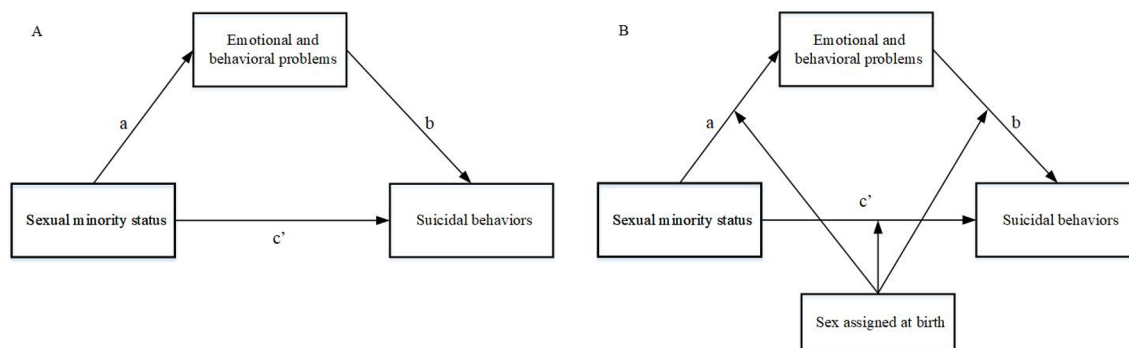
First, differences between sexual minority and heterosexual adolescents were examined using independent sample t-tests or, where data were in the form of proportions, using Rao-Scott  $\chi^2$  tests. Second, to investigate the variables contributing to suicidal behaviours, univariate and multivariate logistic regression models were generated. Third, the mediation and moderated mediation models were analysed using the structural equation modelling with a maximum likelihood estimator.<sup>35</sup> Path analysis was used for simultaneous testing of both direct and mediating effects, and the hypothesised model was tested in two ways.<sup>36</sup> First, we assessed the fit of a mediation model without the hypothesised interaction to validate whether the association between sexual minority status and suicidal behaviours was mediated by emotional and behavioural problems (figure 1A). Next, we tested the moderated mediational model with latent interaction, that is, whether sex assigned at birth moderated the effects of sexual minority status on suicidal behaviours (figure 1B).

Several commonly acknowledged model fit indices were recommended: comparative fit index (CFI), standardised root mean square residual (SRMR) and root mean square error of approximation (RMSEA), which indicated a satisfactory fit (if CFI >0.90, SRMR <0.08, RMSEA <0.05).<sup>37</sup> The bias-corrected 95% CI was estimated with 5000 bootstrapping resamples.<sup>38</sup> Statistical significance was defined as a two-tailed p value <0.05. Missing data in the analysis accounted for <3.0% for all relevant variables, so observations with missing data were eliminated. All statistical analyses were conducted using IBM SPSS V.25.0 and Mplus V.8.0 (Muthén and Muthén, Los Angeles, California, USA).

## RESULTS

### Demographic characteristics stratified by sexual minority status

The characteristics of the sample are shown in online supplemental table 1. Of the 16 663 students analysed, 90.1% and 9.9% self-reported as heterosexuals and sexual



**Figure 1** Schematic model of the association between sexual minority status, emotional and behavioural problems, and sex assigned at birth and suicidal behaviours. (A) Emotional and behavioural problems as the mediator. (B) Sex assigned at birth as a moderator of the mediation model. Path a, association between independent variable and mediator; path b, association between mediator and dependent variables; path c', direct effect of independent variable on dependent variable.

minorities, respectively. Students had a mean age of 15.1 (SD=1.8), ranging from 11 to 20, with 8475 boys (50.9%) and 8188 girls (49.1%). The mean (SD) SDQ scores for emotional problems, conduct problems, hyperactivity, peer problems, prosocial behaviour and the total difficulties were 2.3 (2.2), 1.9 (1.4), 3.4 (2.1), 2.9 (1.5), 7.4 (2.1) and 10.6 (5.2), respectively. The mean CES-D score of the students was 14.4 (SD=10.2). Sexual minority students reported a higher prevalence of depressive symptoms (a cut point of CES-D  $\geq 16$ ) and past-year suicidal ideation and suicide attempts ( $p < 0.001$ ). Additionally, the two groups also had significant differences in the distribution of sex assigned at birth, age, family structure, family relationship, alcohol consumption and each subscale of the SDQ ( $p < 0.05$ ).

### Association of sexual minority status, emotional and behavioural problems, and sex assigned at birth with suicidal behaviours

Without controlling for other variables, sexual minority status, sex assigned at birth, and emotional and behavioural problems were significantly associated with suicidal ideation and suicide attempts (model 1 in table 1).

Multivariable logistic regression models were conducted to adjust for all the covariates, including age, family structure, family relationship, HSS, smoking, drinking and depressive symptoms. The results demonstrated that sexual minority status was positively associated with suicidal ideation (adjusted OR (aOR)=2.37, 95% CI 2.09 to 2.68) and suicide attempts (aOR=2.40, 95% CI 1.97 to 2.92). The adjusted models also showed that, compared with boys, girls exhibited a higher risk of suicidal ideation (aOR=2.14, 95% CI 1.95 to 2.35) and suicide attempts (aOR=2.29, 95% CI 1.90 to 2.75). Moreover, emotional problems, conduct problems, hyperactivity and total difficulties were associated with an elevated risk of both suicidal ideation and suicide attempts, while peer problems were associated with suicide attempts only, and prosocial behaviour was not associated with suicidal ideation and suicide attempts (see aORs for model 2 in table 1).

Furthermore, to examine whether these associations still existed when the unadjusted multivariate logistic regression models simultaneously contained all five subscales of SDQ, sensitivity analyses were performed. The results showed that the associations of emotional problems, conduct problems and hyperactivity with suicidal ideation and suicide attempts were still statistically significant.

### The mediating effects of emotional and behavioural problems

Emotional and behavioural problems were divided into total difficulties and prosocial behaviour. Structural equation models were used to examine the potential mediating role of total difficulties and prosocial behaviour in the association of sexual minority status with suicidal ideation and suicide attempts. After controlling for depressive symptoms, smoking, drinking, age and other variables, the results showed that all simple path coefficients were statistically significant, when the total difficulties were considered as a mediator ( $p < 0.05$ ; figure 2). As shown in online supplemental table 2, in model 1, a significant indirect path from sexual minority status to suicidal ideation was observed via total difficulties (standardised  $\beta$  estimate=0.020, 95% CI 0.015 to 0.025,  $p < 0.001$ ), which accounted for 18.18% of the total effect. In model 2, the standardised indirect effects on suicide attempts were also statistically significant (standardised  $\beta$  estimate=0.012, 95% CI 0.009 to 0.016,  $p < 0.001$ ), which accounted for 14.46% of the total effect, suggesting that total difficulties were partial mediators of sexual minority status on suicidal ideation and suicide attempts. In addition, our results showed that when prosocial behaviour was considered as a mediator, none of the indirect effects was statistically significant, with the bootstrapping 95% CI including 0 (suicidal ideation model: 95% CI -0.002 to 0.000; suicide attempts model: 95% CI -0.001 to 0.000). Therefore, the model was not mediated by prosocial behaviour. In conclusion, total difficulties partly mediated the association between sexual minority status and suicidal behaviours, but prosocial behaviour did not mediate these associations.

**Table 1** Association of sexual minority status, emotional and behavioural problems, and sex assigned at birth with suicidal behaviours (N=16 663)

| Variables                              | Suicide attempts*   |         |                     |                   |                     |         |
|--|---------------------|---------|---------------------|-------------------|---------------------|---------|
|  | Suicidal ideation†  |         |                     | Suicide attempts‡ |                     |         |
|  | Model 1             |         | Model 2             |                   | Model 2             |         |
|  | OR (95% CI)         | p value | aOR (95% CI)        | p value           | OR (95% CI)         | p value |
| Sexual minority status                 |                     |         |                     |                   |                     |         |
| Heterosexual                           | 1.00 (reference)    |         | 1.00 (reference)    |                   | 1.00 (reference)    |         |
| Sexual minorities                      | 3.28 (2.94 to 3.65) | <0.001  | 2.37 (2.09 to 2.68) | <0.001            | 3.79 (3.15 to 4.57) | <0.001  |
| SDQ subscale†                          |                     |         |                     |                   |                     |         |
| Emotional problems (1-score increase)  | 1.54 (1.51 to 1.57) | <0.001  | 1.32 (1.30 to 1.35) | <0.001            | 1.48 (1.43 to 1.52) | <0.001  |
| Conduct problems (1-score increase)    | 1.51 (1.47 to 1.55) | <0.001  | 1.22 (1.18 to 1.26) | <0.001            | 1.60 (1.53 to 1.68) | <0.001  |
| Hyperactivity (1-score increase)       | 1.46 (1.44 to 1.49) | <0.001  | 1.21 (1.18 to 1.24) | <0.001            | 1.48 (1.43 to 1.54) | <0.001  |
| Peer problems (1-score increase)       | 1.18 (1.15 to 1.22) | <0.001  | 1.03 (1.00 to 1.06) | 0.050             | 1.31 (1.24 to 1.38) | <0.001  |
| Prosocial behaviour (1-score increase) | 0.92 (0.91 to 0.94) | <0.001  | 1.01 (0.99 to 1.03) | 0.565             | 0.90 (0.87 to 0.94) | <0.001  |
| Total difficulties (1-score increase)  | 1.22 (1.21 to 1.23) | <0.001  | 1.13 (1.11 to 1.14) | <0.001            | 1.21 (1.19 to 1.23) | <0.001  |
| Sex assigned at birth                  |                     |         |                     |                   |                     |         |
| Boy                                    | 1.00 (reference)    |         | 1.00 (reference)    |                   | 1.00 (reference)    |         |
| Girl                                   | 2.05 (1.89 to 2.22) | <0.001  | 2.14 (1.95 to 2.35) | <0.001            | 2.35 (1.98 to 2.80) | <0.001  |

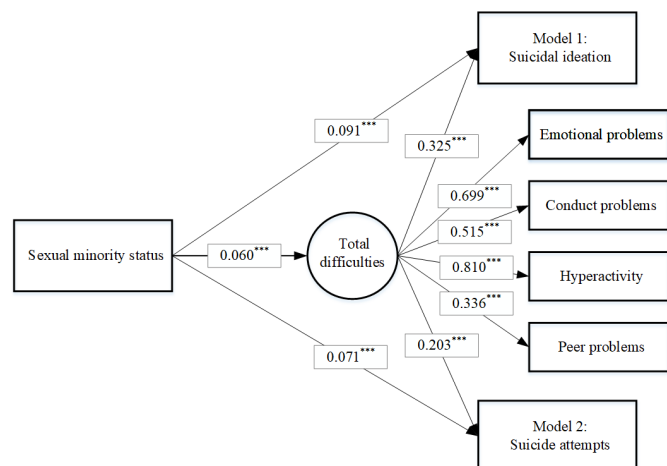
Model 1: univariable multinomial logistic regression models for suicidal ideation and suicide attempts were unadjusted models, and the Firth penalised likelihood approach was used for the low event rate.

Model 2: multivariable multinomial logistic regression models for suicidal ideation and suicide attempts were controlled for age, family structure, family relationship, household socioeconomic status, smoking, drinking and depressive symptoms.

\*The categories 'no suicide ideation' and 'no suicide attempt' were treated as reference groups in the univariable and multivariable logistic regression models.

†Each subscale of the SDQ was independently entered into the univariable and multivariable multinomial logistic regression models.

‡aOR, adjusted OR; SDQ, Strengths and Difficulties Questionnaire.



**Figure 2** Structural equation model of the relationship between sexual minority status, total difficulties and suicidal behaviours. Model 1 fit indices: CFI=0.947; RMSEA=0.053, 95% CI 0.051 to 0.056; SRMR=0.028. Model 2 fit indices: CFI=0.946; RMSEA=0.050, 95% CI 0.048 to 0.053; SRMR=0.027. Unstandardised  $\beta$  weights are reported. \*\*\* $p < 0.001$ . CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual.

### The moderated mediation effects of sex assigned at birth

Moderated mediation analyses were used to examine whether sex assigned at birth exerted moderating influences on the mediating effects of the total difficulties. The results showed that sex assigned at birth moderated the effects of sexual minority status on suicidal ideation ( $\beta = 0.013$ ,  $p < 0.001$ ; model 1 in table 2) and suicide attempts ( $\beta = 0.005$ ,  $p < 0.001$ ; model 2 in table 2) via total difficulties. The interaction pattern is visually depicted in online supplemental figure 1. The indirect effects between sexual minority status and suicidal ideation via the total difficulties were higher for girls ( $\beta = 0.029$ , 95% CI 0.023 to 0.034; model 1 in table 2 and online supplemental figure

1A) than for boys. Similar results were also found using suicide attempts as the dependent variable ( $\beta = 0.009$ , 95% CI 0.007 to 0.012; model 2 in table 2 and online supplemental figure 1B). The results indicated that sex assigned at birth had a moderating effect both on the direct path (path c') and indirect path (path a\*b) (table 2 and online supplemental figure 2). Online supplemental figure 2 shows the regulatory path of sex assigned at birth in moderated mediation models. Sex assigned at birth moderates the indirect effects through path b but not path a, so girls have an elevated risk of suicidality, likely because their emotional and behavioural problems exert a more negative influence than they do on boys.

### DISCUSSION

The present study found that after controlling for covariates, SMAs reported greater risks of suicidal ideation and suicide attempts compared with those who identify as heterosexual. This has been confirmed in the broader literature on suicide risk and SMAs.<sup>5-7</sup> In addition, adolescents with emotional problems, conduct problems and hyperactivity were also at higher risk of suicidal ideation and attempts, which can be appropriately explained by the Meyer minority stress model.<sup>4</sup> This model indicates that sexual minority individuals are at greater risk of poorer mental health outcomes and suicidality because they face chronic stress. These stressors are likely to also be associated with emotional and behavioural disorders, particularly affective disorders (including depression), hyperactivity and conduct disorders, which are key antecedents to suicidal behaviours.<sup>10 39</sup> Furthermore, more girls than boys reported a history of suicidal ideation and attempts during the past 12 months. These results are consistent with findings from previous research, suggesting that girls are at increased risk of attempted suicide.<sup>40</sup> However, it also differs from research that

**Table 2** Conditional direct and indirect effects of sexual minority status on suicidal behaviours through total difficulties in different sexes (N=16 663)

| Moderator variable    | Variables       | Model 1: suicidal ideation† | Model 2: suicide attempts† |
|-----------------------|-----------------|-----------------------------|----------------------------|
| Sex assigned at birth | Effect          |                             |                            |
| Girl                  | Direct effect   | 0.086 (0.072–0.101)***      | 0.032 (0.023–0.041)***     |
|                       | Indirect effect | 0.029 (0.023–0.034)***      | 0.009 (0.007–0.012)***     |
| Boy                   | Direct effect   | 0.052 (0.042–0.063)***      | 0.012 (0.007–0.017)***     |
|                       | Indirect effect | 0.015 (0.012–0.019)***      | 0.004 (0.003–0.006)***     |
| Difference            | Direct effect   | 0.034 (0.016–0.052)***      | 0.020 (0.010–0.030)***     |
|                       | Indirect effect | 0.013 (0.007–0.020)***      | 0.005 (0.002–0.008)*       |

Model 1 fit indices: CFI=0.951; RMSEA=0.046, 95% CI 0.044 to 0.048; SRMR=0.029.

Model 2 fit indices: CFI=0.947; RMSEA=0.044, 95% CI 0.042 to 0.047; SRMR=0.029.

$\beta$  weights are reported.

\* $p < 0.05$ , \*\*\* $p < 0.001$ .

†The moderated mediation models for suicidal ideation and suicide attempts were controlled for age, family structure, family relationship, household socioeconomic status, smoking, drinking and depressive symptoms.

CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual.

reported a higher 12-month risk of suicidal ideation in sexual minority girls and a similar 12-month risk of suicide attempts for both boys and girls.<sup>41</sup> Therefore, the interaction between sex and sexual orientation with regard to emotional/behavioural problems and suicidality was also examined in this study.

Our mediation analysis showed that emotional and behavioural problems independently mediated the relationship between sexual minority status and suicidal behaviours, while prosocial behaviour did not. When sex was included as a moderator of these relations, the indirect effect through emotional and behavioural problems was still significant in both boys and girls, and the indirect effect of the latter was greater. Thus, it appears that the mediating effect of emotional and behavioural problems and the moderating effect of sex may be one of the mechanisms of the relationship between sexual minority status and suicidal behaviours to some degree, even though the mechanism of suicidality among SMAs today is still complex and not entirely clear. Moreover, this pattern could be related to differences in the prevalence of emotional and behavioural problems (ie, internalising and externalising problems) between the two sexes. Prior studies indicated that girls reported more total and internalising problems than boys after exposure to adversity, whereas boys were more likely to develop attention-related or externalising behavioural problems.<sup>42 43</sup> Earlier studies showed that individuals with internalising problems appeared to report more negative cognitive disturbances or distortions than those with externalising problems.<sup>44</sup> It has been reported that internalising and externalising problems were predictors of suicidal behaviours in youth, and internalising problems may have a greater effect size for suicidality.<sup>45</sup> Thus, it is reasonable to infer that due to possible chronic stress caused by societal discrimination and internalised heterosexism, sexual minority individuals are at greater risk of emotional and behavioural problems, which were risk factors for suicidal behaviours, and girls with emotional and behavioural problems might have elevated risk of suicidality due to increased negative influence on their motivation and cognitive processes.

Therefore, detecting and managing these symptoms among SMAs could be a crucial strategy for preventing suicidality in different sexes. First, related government departments should coordinate with public health organisations to devise strategies for diminishing social discrimination against sexual minorities. Second, families and schools are recommended to identify adolescents with emotional and behavioural problems as early as possible, and provide SMAs who experience these problems with appropriate support (eg, inviting children's openly sexual minority friends to family activities; supporting student clubs and activities, including homosexuality alliances against defamation and multicultural clubs)<sup>46 47</sup> to help them achieve greater self-esteem and health status. Third, psychologists, psychiatrists and clinical workers should develop and apply more effective emotional interventions (eg, improving emotional regulation capacity)<sup>48</sup>

and behavioural interventions (eg, dialectical behaviour therapy)<sup>49</sup> targeting SMAs who have emotional and behavioural problems to promote their adaptive functioning and social interrelationships.

Indeed, some limitations should be considered when interpreting the results. First, we are only able to report adolescents' sexual minority status using a binary definition of sex (heterosexuals and sexual minorities), and gender dysphoria/transgender status was not assessed in this study, although the sexual minority status definition here is commonly used. A more detailed classification of sexual minority status should be included in future research. Second, due to the cross-sectional design, our approach to analysis cannot make causal inferences, despite allowing statistical prediction. A longitudinal study of the above relationships would be an optimal approach. Despite these limitations, the study presents the first known results on the mediating role of emotional and behavioural problems and the modulating role of sex in the associations of sexual minority status with suicidal behaviours using a large sample size of Chinese adolescents.

## CONCLUSIONS

Our study uncovered the mediating roles of emotional and behavioural problems in the relationship between sexual minority status and suicidal behaviours in Chinese youth. On the whole, emotional and behavioural problems significantly and partially mediated the association between sexual minority status and suicidal behaviours among Chinese adolescents. Moreover, sex assigned at birth moderated these mediating effects, with a more significant effect seen among sexual minority girls than boys. To help prevent suicidality in SMAs, policymakers, educators, families and the overall community should work collaboratively to establish a safe social environment that embraces diversity and rejects stigmatisation. Moreover, the risks of emotional and behavioural problems in SMAs should be identified at an early stage and reduced through preventive measures to avoid suicidal behaviours.

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