



## Research paper

# Association between sexual minority status and suicidal behavior among Chinese adolescents: A moderated mediation model

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## ABSTRACT

**Background:** Evidence shows sexual minority adolescents have a higher risk of suicidality than their heterosexual peers due to minority stressors or lack of social support, but it remains unclear how the combined effects of these influence factors impact suicidality in this population. In this study, we examine whether school victimization mediates association between sexual minority status and suicidal behavior of adolescents and explore whether such mediation is moderated by interpersonal relationships.

**Methods:** We sampled a large nationally representative dataset comprising data collected from 7th to 12th graders (the 2015 School-based Chinese Adolescents Health Survey) using a multistage, stratified-cluster, random-sampling method. Our sample consisted of 123,459 students who completed questionnaires regarding their sexual minority status, suicidal ideation, suicide attempts, school victimization, classmate relations, and teacher–classmate relations.

**Results:** Using a moderated mediation model, we found that school victimization mediated the effects of sexual minority status on suicidal ideation (indirect effect = 0.0296, 95% confidence intervals (CI) = 0.0259–0.0333) and suicide attempts (indirect effect = 0.0086, 95% CI = 0.0074–0.0100). These indirect effects were moderated by interpersonal relationships, and a greater effect was seen among sexual minority students with poor classmate or teacher–classmate relations.

**Limitations:** Our study sample included only students attending school, and interpretation of the direction of the observed associations is limited due to the cross-sectional design.

**Conclusions:** Interpersonal relationships moderate the indirect effects of school victimization on association between sexual minority status and suicidal behavior. Early intervention addressing school violence combined with improving the quality of relationships with school peers would help prevent suicidality in sexual minority adolescents.

## 1. Introduction

In adolescents, sexual minority status (e.g., individuals who experience same-sex attraction, engage in same-sex sexual behavior, or self-identify as gay, lesbian, or bisexual) is a well-known risk factor for suicidal behavior (e.g., suicidal ideation, suicide attempts and completed suicides) (Ploderl and Tremblay, 2015; Russell, 2003). Several studies have shown that sexual minority adolescents are two to three times more likely to have suicidal ideation and suicide attempts than

their heterosexual peers (Remafedi et al., 1998; Russell and Joyner, 2001). Research in China indicates that 8.0–17.0% of sexual minority youths experience suicidal ideation, which is approximately twice the odds of their heterosexual peers (Lian et al., 2015). Thus, there is an urgent need for researchers to elucidate the causes of suicidality in sexual minority adolescents. However, most related studies in the literature mainly focus on identifying independent influential factors of suicidality, and little is known regarding the combined effects of the specific risk or protective factors associated with sexual minority

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adolescents.

According to the Meyer minority stress model (Meyer, 2003), sexual minority individuals may encounter both distal (e.g., prejudice and discrimination) and proximal (e.g., internalized homophobia) minority stressors. Negative attitudes toward sexual minorities create a hostile social environment, which leads to chronic stress and even mental health problems, such as depression and suicidal behavior, in sexual minority individuals. School victimization as a distal minority stressor has been reported to be associated with suicidal behavior. A prior meta-analysis demonstrated that bullying is associated with suicidal behavior among adolescents (Holt et al., 2015). Moreover, previous research discovered significant association between sexual minority status and school victimization in adolescents (O'Malley et al., 2014; Shields et al., 2012). Therefore, school victimization may play a mediating role in the relationship between sexual minority status and suicidal behavior in adolescents. Due to the challenges inherent in recruiting adequate samples of sexual minorities, the sample sizes of prior studies on these mediating effects were not large enough to have adequate statistical power.

Furthermore, the minority stress model proposes that effective social support can ameliorate the impact of minority stressors on the health outcomes of sexual minorities (Meyer, 2003). Interpersonal relationships in school (e.g., relationships with classmates or teachers) which are school-related modes of social support (Danielsen et al., 2009; Siddall et al., 2013), have been reported to be associated with psychological and behavioral problems in adolescents (Ahangar et al., 2012; Hughes et al., 1999). A previous longitudinal study demonstrated that teacher-student relationships have a moderating effect on adolescent depression and that positive teacher-student relationships protect adolescents against depression (Wang et al., 2013). However, it remains unknown whether interpersonal relationships have a moderating role in the impact of minority stressors on suicidality in sexual minorities.

Therefore, we conducted the present national large-scale study and used minority stress theory as an explanatory framework to explore the associations mentioned above. We hypothesized that school victimization mediates the certain association between sexual minority status and suicidal behavior. Furthermore, we hypothesized that these associations are moderated by interpersonal relationships such that indirect effects vary among sexual minority adolescents based on the nature of their interpersonal relationships.

## 2. Methods

### 2.1. Study design and participants

We utilized data from the 2015 School-Based Chinese Adolescents Health Survey (SCAHS) (Guo et al., 2015; Wang et al., 2014), an ongoing, large-scale health-related behavior survey of Chinese adolescents (grades 7–12). The SCAHS has been conducted every two years since 2007. The 2015 survey conducted in seven Chinese provinces is the most recent version of the SCAHS (Guo et al., 2017; Guo et al., 2018).

In the 2015 SCAHS, students were selected via a 4-stage, stratified-cluster, random-sampling method. In stage 1, all 34 province-level regions in China were divided into four regional strata (East China, West China, South China, and North China), and then two representative provinces from each regional strata were selected by simple randomization (only one province from East China was selected). In stage 2, the cities in each representative province were divided into three economic strata (high-level, middle-level, and low-level) according to per capita GDP (gross domestic product). Based on the proportions of these three types of cities, six cities were randomly selected from each representative province. In stage 3, schools were divided into the following three categories: junior high schools (i.e., grades 7–9), senior high schools (i.e., grades 10–12), and vocational high schools (i.e., grades 7–12). Based on the proportions of these three types of schools, four junior high schools, four senior high schools, and four vocational

high schools were randomly selected from each representative city (506 schools agreed to participate in the present study). In stage 4, two classes were randomly selected from each grade within the selected schools, and all the available students in the selected classes were invited to voluntarily participate in the present study. In total, 150,822 students completed our questionnaires (a response rate of 95.9%). Students belonging to the “unsure” category ( $n = 27,363$ ) were not included in the present analysis because we were mainly interested in the suicidality of students who acknowledged same-sex attraction. Therefore, a total of 123,459 students were included in the present analysis.

### 2.2. Data collection

On the day of the survey, all students in the selected classes received a standardized self-administered questionnaire to be completed in the classroom during a normal class period (40 or 45 min). To protect student privacy, the questionnaires were completed anonymously by each student participant without the presence of teachers or other school personnel (to avoid potential information bias). All data were collected from November 2014 to January 2015.

### 2.3. Ethical statement

This study was approved by the Sun Yat-sen University, School of Public Health Institutional Review Board. Written informed consent was obtained from each participating student who was at least 18 years old or from the parent or legal guardian of each participating student under 18 years old.

### 2.4. Measures

#### 2.3.1. Sexual minority status

The students' sexual minority status was measured by asking the following question regarding sexual attraction: “In a romantic relationship, which kind of person are you attracted to?” The response options included ‘opposite sex’, ‘same sex’, ‘equally opposite sex and same sex’, and ‘unsure’ (Lesbian, Gay, and Bisexual Youth Sexual Orientation Measurement Work Group, 2003; Russell et al., 2002). Students who reported ‘same sex’ or ‘equally opposite sex and same sex’ attraction were classified as sexual minorities.

#### 2.3.2. Suicidal ideation and suicide attempts

The students' suicidal ideation was assessed by the following question: “During the past 12 months, how many times did you seriously consider attempting suicide?” The students' suicide attempts were measured by asking the following question: “During the past 12 months, how many times did you actually attempt suicide?” (Guo et al., 2016; Woods et al., 1997) Students were asked to rate these two questions on a 4-point scale as follows: never = 1, one or two times = 2, three to six times = 3, and greater than six times = 4.

#### 2.3.3. School victimization

After reading a brief definition of bullying from the Olweus Bully/Victim Questionnaire, students were asked the following question: “How often have you been bullied (kicked, intentionally excluded from participating in activities, made fun of with sexual jokes, etc.) at school in the past 30 days?” (Olweus, 1996; Solberg and Olweus, 2003) The students' responses were given on a 4-point scale as follows: never = 1, one or two times = 2, three to five times = 3, and greater than five times = 4 (Burton et al., 2013).

#### 2.3.4. Interpersonal relationships

The students' interpersonal relationships were defined by their perceptions of their peer and teacher-student relationships (Li et al., 2017; Lynch and Cicchetti, 1997). These peer and teacher-student

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