

# Relationship Between Adverse Childhood Experiences and Age at Sexual Debut among Men Who Sex with Men in Shenzhen, China

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## Research article

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# Abstract

**Background** Early sexual debut (ESD) is considered an important public health issue. Previous studies have indicated age at sexual debut is affected by multiple factors, including adverse childhood experiences (ACEs). However, studies specifically exploring the relationship between ACEs and age at sexual debut among men who have sex with men (MSM) are lacking. This study aims to explore the relationship between ACEs and age at sexual debut among MSM in China. **Methods** From March 2013 to August 2015, MSM who came to the Sexually Transmitted Diseases Clinic of Shenzhen Center for Chronic Disease Control were recruited in our study. Using an anonymous questionnaire, we collected information about their social-demographics, age at sexual debut and ACEs. Logistic regression and linear regression were performed to acquire the estimates for the relationships between ACEs and early sexual debut (ESD). **Results** A total of 546 MSM were recruited. The median age at MSM sexual debut was 20.0 years, and 40.5% of the MSM were exposed to at least one ACEs. Multivariable logistic regression analysis indicated that MSM with a history of ACEs was approximately twice (aOR=2.15; 95%CI:1.32-3.48) as likely to report a history of ESD and tended to experience sexual debut approximately one year ( $\beta$ :-1.10; 95%CI: -1.70,-0.50) earlier than those without. **Conclusions** ACEs are associated with ESD, suggesting that sexual health education and public health programs aimed at delaying early sexual debut among young Chinese MSM should consider addressing ACEs.

## Background

Sexual debut, marked as a key milestone, is a normal part of human development. It is often considered as a significant life transition for adolescents, which can influence individual's behavior, well-being, sexual and reproductive health in adulthood[1-3]. However, with increasing globalization, urbanization as well as changes of social norms and attitudes towards sex, the past few decades have witnessed a decrease over time in median age at sexual debut, especially in men who have sex with men (MSM) [2, 4-6]. A recent survey in China presented that median age at sexual debut has fell considerably from 33 to 18 years of age between the 1940-1959 and 1990-1996 MSM cohorts[5].

Early sexual debut (ESD), defined as first sexual intercourse at 16 years or younger[7, 8], has become a prominent public health issue. Due to cognitive deficits and emotional immaturity, ESD frequently impacts on an individuals' development trajectory. A growing body of researches have reported that ESD, both in MSM and general populations, is associated with short- and long- term negative outcomes such as engagement in risky sexual behavior (condom non-use, exchange sex, multiple lifetime sexual partners and sex under the influence of drugs), substance abuse, an increased risk of contracting sexually transmitted infections, depression symptoms, as well as suicide attempts [2, 6, 9-11]. Previous studies have indicated that age at sexual debut is subject to multiple factors such as biological, psychological, and behavioral within individual system. Moreover, familial and extrafamilial system also play important roles on age at sexual debut[7, 12].

Adverse childhood experiences (ACEs), referred to as a risk factor for ESD[13, 14], is an array of multiple types of abuse, neglect and kinds of household dysfunction (e.g., familial mental illness, domestic violence) that children may suffer early in life[15]. A recent survey by Centers for Disease Control and Prevention (CDC) reported that 59.4% of respondents in the general populations have been exposed to at least one ACEs [15], whilst in MSM, the prevalence tended to be higher[16]. Several subsequent studies have found that individuals with ACEs have greater odds of experiencing ESD[13, 14, 17-19]. A prospective investigation showed that experiencing sexual abuse, physical abuse, emotional abuse, or neglect, before the age of 12 years predicts sexual intercourse by 14 and 16 years of age, with sexual initiation rates 21% and 51% respectively[13]. Monique J. Brown et al.[19] studied the associations between age at sexual debut  $\leq 14$  years and a wide range of ACEs by sexual orientation, and they found that the adjusted odds ratio for heterosexual populations ranged from 2.84-6.63, and that of MSM populations ranged from 13.4-122.2. Obviously, compared to the heterosexual populations, ACEs has a greater impact on ESD among MSM populations.

Although previous studies have demonstrated a relationships between ACEs and ESD, given differential social-cultural context and norms, these findings may not be generalizable to the Chinese population in China. There is a dearth of similar research conducted among MSM in China. This study, therefore, has mainly focused on the relationships between different domains (physical, emotional and sexual abuse) of ACEs and age at sexual debut among the Chinese MSM, in order to identify targets, for use by policy makers and caregivers of MSM, for mitigating early sexual debut among MSM.

## Methods

### *Participants and data collection*

This study was conducted from March 2013 to August 2015 in Shenzhen, China. Using convenience sampling, participants who came to the Sexually Transmitted Diseases Clinic of Shenzhen Center for Chronic Disease Control for treatment or consultation, and met the inclusion criteria were recruited. Eligible participants were age  $\geq 18$  years, born male, engaged in male-male sex in the past half year, and volunteered to participate and agreed with the publication by signing an informed consent form.

A face-to-face interview with an anonymous questionnaire was administered to each participant by trained medical research assistants to collect data. All the results were kept strictly confidential. The study protocol and informed consent were approved by the Ethics Committee of Shenzhen Center for Chronic Disease Control. The study methods were performed in accordance with the approved guidelines and regulations.

### *Social-demographics*

Social-demographics were assessed and coded as follows: age (continuous); ethnicity (Han, Minority); educational level (<high school, high school, >high school); socioeconomic disconnection which was defined as unemployed or out of school (yes, no)[20]; marital status (never married, married,

widow/divorce); monthly income (<¥2500, ¥2500~¥5000, ¥5000~¥7500, >¥7500); and residential status (sole living, others). Ten-year birth cohorts for the study were determined based on self-reported age (after 1990[age<24],1980-1990 [age 25~34],1970-1980 [age 35~44], before 1970 [age>45] ), which is endowed with a special meaning, for example, China's sexual revolution.

### *Age at sexual debut*

Age at sexual debut was measured with items such as "How old were you when you had first sexual intercourse with a female?" and "How old were you when you had first sexual intercourse with a male?" The age at sexual debut was ultimately defined as the minimum of the two self-reported ages. Early sexual debut here was operationally defined as first sexual intercourse at age 16 or younger, corresponding to a "normative sexual debut" after age 16. This dichotomy was based on the previous research[7, 8].

### *Adverse childhood experiences*

Participants were asked whether they had experienced any kind of physical, emotional or sexual abuse before age of 18. For each type of the ACEs was measured with a one-item question that was revised by Delphi method. Participant's experiences of physical abuse was assessed by the question "*Have you ever been tied up, hit, incarcerated, or cut by a male/female before age of 18?*". Emotional abuse experiences was assessed by the question "*Has any male/female ever yelled and screamed at you or said hurtful or insulting things to you before age of 18?*". For both of physical and emotional abuse, respondents answered with response options "never, rarely, sometimes, often, or very often". Sexual abuse experiences was assessed by the question "*Have you ever been molested, raped or seduced by a male/female before age of 18?*", with the response options "never, once, or more than once". Physical, emotional and sexual abuse were all analyzed in a binary format(yes vs no). Individuals were classified as having experienced physical and emotional abuse if they answered "sometimes", "often", or "very often", and individuals were categorized as experiencing sexual abuse if they answered "once" or "more than once".

### *Statistical analyses*

Data was analyzed using both descriptive and regression analytic techniques in a Statistical Package for the Social Sciences (SPSS) version 18.0. Frequency (%) was presented to summarize enumeration data, while median and corresponding range or mean and corresponding standard deviation ( $\bar{x}\pm s$ ) were presented to summarize measurement data. In addition, the chi-square test or univariable logistic regression was conducted to examine the differences on social-demographic variables by age at sexual debut ( $\leq 16$  vs  $>16$ ). Univariable logistic regression and univariable linear regression were conducted using ESD or age at sexual debut as independent variables and ACEs as dependent variable. Furthermore, adjusted for the demographic variables, multiple logistic regression analysis was performed to estimate the association of ACEs with ESD, which was calculated as an adjusted odds ratio (aOR) and corresponding 95% confidence interval (95%CI). Moreover, multiple linear regression model was used to

assess the linear relationship between age at sexual debut and cumulative exposure to ACEs. All statistical tests were two-tailed and statistical significance was defined by  $P < 0.05$ .

## Results

A total of 546 MSM were recruited and analyzed in this study. The age of the participants ranged from 18 to 67 years, with a median age of 32.2 years. A majority of the participants were aged 25~34 years, Han nationality, never married, had a monthly income of ¥2500~¥5000, and had no socioeconomic disconnection. Educational level and residence status in different groups were nearly consistent. The univariate analysis showed that ESD was associated with present age, education level, monthly income, residence status and ACEs ( $P < 0.05$ ). (See Table 1)

The median age at MSM sexual debut was 20.0 years, ranging from 7 years to 30 years. There were 293 (53.7%) participants who reported having a male first sexual partner, and 229 (41.9%) who reported having a female first sexual partner. However, 24 (4.4%) of all the participants could not identify whether their first sexual intercourse was with a male or female because they had forgotten.

The prevalence estimate of participants who were exposed to at least one ACEs was 40.5% (95%CI: 36.3%, 44.7%) whereas that of ESD was 15.8% (95%CI: 12.9%, 19.1%). By adjusting for social-demographic variables, MSM who were exposed to any ACE were 2.00 times likely to experience ESD compared to those without a history of ACEs (aOR=2.15; 95%CI: 1.32-3.48). Also, MSM who experienced emotional abuse (aOR=1.66; 95%CI: 1.02-2.71), and sexual abuse (aOR=2.07; 95%CI: 1.20-3.58) were more likely to report ESD. (See Table 2)

In the adjustment linear regression model, ACEs was inversely correlated with age at sexual debut. Namely, MSM who were exposed to ACEs were nearly 1 year earlier to have their sexual debut compared to those who were not exposed ( $\beta$ :-1.10; 95%CI: -1.70,-0.50). MSM with a history of emotional abuse ( $\beta$ :-0.85; 95%CI: -1.48,-0.21), and sexual abuse ( $\beta$ :-1.16; 95%CI: -1.92,-0.39) had also a significant decrease in age at sexual debut. (See Table 3)

## Discussion

In this study, the median age at sexual debut was 20.0 years, which was similar to prior findings in China [5, 21], but much older than that reported in other studies abroad [22, 23]. This difference may be related to Chinese culture contexts, within which most Chinese people still hold conservative attitudes toward premarital sex relative to developed countries. We also found that a high proportion of MSM had their sexual debuts with women (41.9%). Similarly, another study conducted in Beijing reported the figure at 41.3% [24]. An explanation of the phenomenon can be attributed to the influence of Chinese traditional norms and cultural pressure. MSM in China often endured homosexual-related stigma and fear of sexual orientation disclosure, which may lead them to conceal their sexual identity by reluctantly engaging in heterosexual relationships or entering a heterosexual marriage. [24, 25].

It was rather remarkable that an estimated 15.8% of MSM initiated sexual intercourse at age 16 or younger. We held that a lack of sex education was associated with ESD. The result suggested that the popularity of early sex education was urgently needed nowadays in China and should be considered for inclusion in conventional education programs. In addition, consistent with past researches[5, 19], this study also found that some social-demographics such as younger age, low education level, low monthly income, and sole living were determinants of ESD, implying that special attention should be paid to MSM with the foregoing characteristics in consideration of negative outcomes related to ESD, especially HIV infection.

According to problem behavior theory proposed by Jessor [26], early childhood risk of certain problem behaviors could result in occurrence of other problem behaviors in future. Furthermore, Black[13] argued that due to disconnection from families or institutions, abused adolescents are likely to alleviate feelings of isolation via early sexual intercourse. As stated above, the findings of this study provide empirical support of this fact. Specifically, both the logistic regression and linear regression analyses showed that there is a significant association between ACEs and ESD or age at sexual debut. In general, MSM with ACEs are nearly 2 times more likely to report a history of ESD and tended to experience sexual debut approximate 1 year earlier than those without. This study also found similar associations of ESD with emotional and sexual abuse.

However, different from previous studies[13, 14, 19], significant associations were not observed between physical abuse and ESD, regardless of whether or not adjustment for covariates were performed. This could be partly because of different study populations and social-cultural context. For example, the current study was conducted among adult MSM in China, while other studies have mostly focused on general adolescent MSM populations. In addition, the difference could be attributed to the different definitions of childhood physical abuse used by the various studies. To illustrate,, Eric[14] regarded physical injury, neglect, and emotional abuse as the three dimensions of childhood physical abuse, and Monique[19] integrated physical abuse with psychological abuse as a whole to carry out the investigation.

Several limitations are worth noting when using the results of this study. Firstly, the sample was recruited through non-probability sampling. Given that MSM population is hidden and hard to reach, the sampling method used in our study is widely used in this field, which limited the generalizability of our findings to other MSM populations. Secondly, data collection related to ACEs and age at sexual debut mainly relied on the recalls of participants, which could lead to potential information bias. However, given that ACEs and ESD may impress people deeply, the effect of this recall bias is likely to be weak. Thirdly, due to a lack of the information, we didn't know whether the ACEs came before or after first sex, and therefore, causal inference could not be drawn. Fourthly, participant's experiences of physical, emotional and sexual abuse were solely assessed by one-item questions, which could lead to measurement bias owing to the sensitivity of the subject-matter. Although the Delphi method was used, the influence of measurement bias couldn't be ignored. Meanwhile, operational definition of abuse was not definite enough. Take physical abuse, for example. We did not indicate to what degree and kind of being tied up, hit or

incarcerated would be considered as physical abuse. Participants might therefore overstate or understate their responses to these questions by using their own definitions. However, the situation tended to be random between the two groups. Finally, a number of studies have also suggested an association between ACEs and poor adult health and risky health behaviors among MSM[27, 28], further study is needed to explore whether ESD acted as a mediator.

Despite these limitations, to our knowledge, this was the first study to examine the relationships between different types of ACEs and age at sexual debut among MSM in China, which provided insight into potential determinants of sexual debut and had great guiding significance to that effect. Additionally, in China, MSM bear a disproportionate burden of HIV infection, with an average HIV prevalence of 9.9%[29]. The incidence of HIV among young MSM aged 18-25 varied from 3.9/100 to 18.9/100 person-years in 8 large cities of China[30]. Many newly diagnosed HIV infected MSM tended to be young, and early sexual debut was considered to be a proxy for HIV incidence in young people[31]. Therefore, given the relationship between ESD and negative outcomes including HIV infection among MSM, the association between ACEs and ESD in this study suggests that it would be imperative to provide effective services targeting the Chinese MSM with ACEs in order to reduce cases of ESD, and hence HIV infection.

## Conclusions

The current study found the association between ACEs and ESD among MSM, which should draw adequate attention of the policymakers, educators and health providers. School- or community-based sexual health education programs especially designed to delay early sexual debut for young MSM should incorporate addressing ACEs into the prevention intervention programs.

## Abbreviations

ESD: early sexual debut; ACEs: adverse childhood experiences; MSM: men who have sex with men; HIV: Human immunodeficiency virus; CI: confidence interval; OR: odds ratio; aOR: adjusted odds ratio; CDC, Centers for Disease Control and Prevention

## Declarations

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### Author contributions

Feng T was responsible for the study design and the article conceived. Fu H drafted the original manuscript. The article was revised by Yang T, and Atipatsa C.Kaminga. Fu H and Wang T completed the data analysis. All authors read and approved the final version.

## Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee of Shenzhen Center for Chronic Disease Control. Eligible participants volunteered to participate by signing an informed consent.

## Consent for publication

Not applicable.

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## Competing interests

The authors declared that they have no competing interests.

## Availability of data and materials

The datasets generated during and/or analyzed during the current study are not publicly available. This is because to do so would potentially reveal the participants' identities, their HIV status and their previous or current STD infection status. But it can be available from the corresponding author on reasonable request.

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## Tables

**Table 1** The sociodemographic characteristic and ACEs by age at sexual debut among MSM

exposure	total[n(%)]	≤16(%)	>16(%)	c <sup>2</sup> value	P-value
				12.910	0.005*
<24 years	93(17.0)	24(25.8)	69(74.2)		
25~34 years	261(47.8)	29(11.1)	232(88.9)		
35~44 years	149(27.3)	28(18.8)	121(81.2)		
>45 years	43(7.9)	5(11.6)	38(88.4)		
ethnicity				3.140	0.076
Han	512(93.8)	77(15.0)	435(85.0)		
Minority	34(6.2)	9(26.5)	25(73.5)		
educational level				8.578	0.014*
<High school	161(29.5)	36(22.4)	125(77.6)		
High school	213(39.0)	24(11.3)	189(88.7)		
>High school	172(31.5)	26(15.1)	146(84.9)		
economic disconnection				1.435	0.231
Yes	51(9.3)	11(21.6)	40(78.4)		
No	495(90.7)	75(15.2)	420(84.8)		
marital status				2.045	0.360
Never married	363(66.5)	55(15.2)	308(84.8)		
married	135(24.7)	18(14.8)	115(85.2)		
widow/divorce	48(8.8)	11(22.9)	37(77.1)		
yearly income				13.423	0.004*
<¥2500	74(13.6)	20(27.0)	53(73.0)		
¥2500~¥4999	231(42.3)	28(11.7)	199(88.3)		
¥5000~¥7499	143(26.2)	17(12.6)	124(87.4)		
≥¥7500	98(17.9)	21(21.4)	73(78.6)		
living status				5.297	0.021*
sole living	246(45.1)	29(11.8)	217(88.2)		
others	300(54.9)	57(19.0)	243(81.0)		
ACEs exposure				9.967	0.002*
Yes	221(40.5)	48(21.7)	173(78.3)		
No	325(59.5)	38(11.7)	287(88.3)		
Total		86(15.8)	460(84.2)		

Note: ACEs=adverse childhood experiences; MSM= men who have sex with men. \*  $p<0.05$

**Table 2** Relationship between ACEs and ESD using univariable and multivariable logistic regression among MSM

Category	Unadjusted		Adjusted <sup>a</sup>	
	OR	95%CI	OR	95%CI
Physical abuse	1.61	0.58-4.48	1.74	0.61-4.99
Emotional abuse	1.71	1.07-2.74*	1.66	1.02-2.71*
Sexual abuse	2.07	1.22-3.51*	2.07	1.20-3.58*
Any ACEs	2.10	1.32-3.34*	2.15	1.32-3.48*

*Note:* ACEs=adverse childhood experiences; ESD=early sexual debut; MSM= men who have sex with men; OR= odds ratio; CI= confidence interval. <sup>a</sup> Adjusted for age, ethnicity, educational level, socioeconomic disconnection, marital status, monthly income, and residential status.\*  $p<0.05$

**Table 3** Linearity between ACEs and age at sexual debut using univariable and multiple linear regression among MSM

Category	Unadjusted		Adjusted <sup>a</sup>	
		95%CI		95%CI
Physical abuse	-0.72	-2.30,0.87	-0.42	-1.93,1.09
Emotional abuse	-1.20	-1.86,-0.54*	-0.85	-1.48,-0.21*
Sexual abuse	-1.44	-2.24,-0.65*	-1.16	-1.92,-0.39*
Any ACEs	-1.38	-2.00,-0.75*	-1.10	-1.70,-0.50*

*Note:* ACEs=adverse childhood experiences; MSM= men who have sex with men; CI= confidence interval. <sup>a</sup> Adjusted for age, ethnicity, educational level, socioeconomic disconnection, marital status, monthly income, and residential status.\*  $p<0.05$