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RESEARCH ARTICLE

Sexual debut among college students in China: effects of family context

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Abstract

This study examines family context and sexual debut among young people in China. Using data from the 2018 Panel Study of Chinese University Students (PSCUS), it explores how the family is correlated with sexual debut among young people in China aged 18–24 years. The Kaplan–Meier method was adopted to detect a survival function for different family factors and related demographic variables. Cox proportional hazard regression analysis was adopted to calculate hazard ratios for the timing of sexual debut. The average age of sexual debut among the college students was 18.39 years. The Kaplan–Meier analysis showed that sexual intercourse initiation was earlier for female students who had no siblings, and those who had a mother with senior high school (including technical school) education or higher family income, but this correlation was insignificant among male students. The multivariate hazard regression analysis revealed that living in a family with a higher level of fathers' education, having a lower level of family income and having siblings had positive correlations with later sexual debut among the college students. Moreover, family factors showed gender differences in their associations with the timing of sexual debut, typically parent's education level, family income and left-behind experience. This study provides a comprehensive perspective on the role of family influences in timing of sexual debut among youth in China.

Keywords: Adolescent sexuality; Family context; China

Introduction

Young people, as an integral part of future society, receive high expectations from the public. This early stage in people's lives is not only essential for their physical and psychological development, but also drives early sexual experimentation (Akibu *et al.*, 2017). Actual sexual behaviours are concomitant with curiosity about sex. According to the World Health Organization (WHO, 2014), 16 million girls aged 15–19 get pregnant each year globally and 3 million of these pregnancies end up with unsafe abortions. In addition, there are many negative ramifications of sexual intercourse, including a tendency to smoke and drink (Chiao & Yi, 2011) and a higher possibility of adverse physical and psychological symptoms (Madkour *et al.*, 2010).

Sexual debut is a heated topic since it symbolizes the beginning of sexual intercourse, as well as the risks associated with sex (Pettifor *et al.*, 2004). Research into the sexual debut of young people has exposed the risky behaviours exhibited by young people (Kassahun *et al.*, 2019). Sexual activity can have risky health outcomes (e.g. HIV; see Anderson *et al.*, 2007), and can trigger depressive symptoms if initiated too early (Ekundayo, 2007; Spriggs & Halpern, 2008; Chiao & Ksobiech,

2015). Kim (2016) indicated that early sexual debut was correlated with an increase in aggressive behaviours and even suicide among youngsters in South Korea. It is therefore necessary to explore the predictors of early sexual behaviours, and sexual debut in particular, in order to explicate this issue and avoid risky outcomes for young people.

Young people's sexual behaviour is easily affected by family, peer and social pressure (e.g. Murray *et al.*, 1998; Babalola, 2004; Nnebue *et al.*, 2016). Many studies have been conducted in developed countries in North America and Europe, and in some developing countries in Africa, but few have been conducted in Asia. Given that the cultural background and social values of Asian countries can differ greatly from those in other regions, studies in Asia, and especially East Asia, are needed. Adolescents in East Asia tend to have more conservative attitudes towards sex and sexual behaviours owing to the influence of Confucianism (Guo *et al.*, 2020). The current study, set in China, investigating the potential predictors of sexual debut among youths, aimed to bridge this gap.

When it comes to the social milieu of China, the family plays a pivotal role in determining individuals' behaviours. Family is the place where support and education are provided, since family values are emphasized in Chinese culture – but can also be a source of stress (Choi, 2008; Hong & Liu, 2019). Significant correlations have been found between family characteristics and adolescent behaviours (e.g. problematic behaviours, Zhang *et al.*, 2018; addiction to games, Kuang *et al.*, 2021). Hence, priority should be given to the family when considering the possible factors affecting sexual debut among young people in China.

The present study used data from the 2018 Panel Study of Chinese University Students (PSCUS). The aim was to examine the factors associated with timing of sexual debut among college students in China with a focus on family characteristics. The study posed the following questions: Are familial factors correlated with the timing of sexual debut among Chinese college students? What is the relationship between parents' education, family income, number of siblings, left-behind experience and timing of sexual debut among Chinese college students? Are there any differences in the familial correlations with timing of sexual debut between China and Western countries?

Factors influencing timing of sexual debut

According to Davis and Friel (2001), studies of family environment fall into two typical dimensions: the effect of family structure/configuration and the effect of family context/involvement. The first, family structure, has primarily been measured from two aspects: the marital status of the parents (i.e. whether young people are in intact two-parent families) and the number of family members in the household (i.e. the presence/absence of parents and siblings). A plethora of research agrees that young people living in intact two-parent families, with their biological parents, have a later age at sexual debut than those living in single-parent households or blended families (Crockett *et al.*, 1996; Potdar & Mmari, 2011; Guo *et al.*, 2012). Conversely, those not living with both parents tend to have a higher risk of early sexual debut (Nnebue *et al.*, 2016; Adanikin *et al.*, 2017; Richardson *et al.*, 2018). Specifically, young people living with stepparents, grandparents or other relatives due to the marital disruption of their parents tend to be at greater risk of early sexual debut (Pilgrim *et al.*, 2014).

Having an intact family, without disruptions, also plays a significant role in the timing of sexual debut (e.g. parental presence or absence, Tenkorang & Adjei, 2015). A study investigating young women in Chile indicated the importance of father's presence in the family on age at sexual debut (Murray *et al.*, 1998). However, a recent study among young people in the US found that temporary father absence did not predict the experience of sexual debut in either gender (Richardson *et al.*, 2018). The focus on father presence or absence in many Western studies is understandable, partly because males are supposed to work outside the home to support their family in modern

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Western societies. However, in the context of China, there is a growing trend of the absence of both parents due to labour migration; that is, a large number of people move from rural areas to cities for work. Consequently, their offspring tend to be 'left behind' in the suburbs. Given that studies mentioning the 'left-behind' experience in the analysis of the timing of sexual debut are rare (Melesse *et al.*, 2020), the present study included this in the analyses.

Another source of influence and pressure on young people affecting their sexual debut are siblings. Haurin and Mott (1990) demonstrated the influence of an older sibling's age at the timing of the sexual debut of a younger sibling, and Barnett *et al.* (2010) revealed a small but significant association of sibling warmth/closeness, status and conflict with the timing of sexual debut.

Based on the significant impact of the family on sexual debut, parental educational background is an important factor to consider. Several researchers have analysed the direct association between parental knowledge and sexual debut initiation, demonstrating that a higher parental educational knowledge would reduce the risk of experiencing early sexual debut among youngsters (Guo *et al.*, 2012; Nnebue *et al.*, 2016). The mediating role of parental knowledge on the relationship between the sexual education and early sexual debut has also been borne out in a study of Dutch youths (de Looze *et al.*, 2012).

The basic condition of the family (i.e. family status) has been shown to be another significant predictor of the timing of sexual debut. There is a correlation between the economic and social condition of a young person's parents (e.g. poor/wealthy parents and living in rural/urban areas) and the timing of their sexual debut (Crockett *et al.*, 1996; Adanikin *et al.*, 2017). That is, young people from a poor family or living in an urban area are more likely to have an early sexual debut. Oljira and colleagues (2012) revealed that an early sexual debut was more common among adolescents in Ethiopia with a higher family income. Similarly, Lee *et al.* (2012) found that a higher family economic status engenders a higher risk of early sexual debut among young people in South Korea.

The family also provides young people with guidance and fundamental education, which socializes youths and moulds their values (Turtiainen *et al.*, 2007). Studies of the correlation between family relationships and sexual debut have two different choices of predictors depending on the study region and cultural background. Those conducted in the most developed countries, like those in North America and Europe, have focused on discussion and communication within the family (e.g. Lehr *et al.*, 2000; Grossman *et al.*, 2013), while for those carried out in developing countries in Asia and Africa, the focus has been on parental control and supervision (e.g. Dimbuene & Defo, 2011; Manlove *et al.*, 2012).

The predictive capacity of communication and discussion within the family is generally accepted. For instance, Davis and Friel (2001) indicated that levels of interaction and maternal attitudes towards, and discussion of, sex were associated with the timing of sexual debut. Family homework activities aimed at increasing family communication about sexual issues were found to postpone first intercourse among young people in eastern Massachusetts, US (Grossman *et al.*, 2013). Studies have found that parental control and monitoring are significantly related to the timing of youths' first sex (Dimbuene & Defo, 2011; Manlove *et al.*, 2012). Etzkin (2004) found that indifferent parenting resulted in the earliest timing of first sex. Furthermore, a higher level of control, such as adolescents' perception of maternal disapproval and experiencing violence in the home, has also been found to be correlated with the timing of sexual debut among youths (Sieving *et al.*, 2000; Potdar & Mmari, 2011). Many studies have emphasized the indispensable role mothers play in the family. Mother–child connectedness and mothers' attitude towards/approval of sex have been found to be significant predictors of the timing of sexual debut (Sieving *et al.*, 2000; Davis & Friel, 2001).

Generally, personal attributes are considered to be a fundamental and essential factor affecting timing of sexual debut, as sexual initiation is a personal choice based on rational decision-making. Studies have indicated gender differences in these factors (Bearman & Bruckner, 2001; Valle *et al.*, 2005; March & Serdar Atav, 2010). Fagbamigbe and Idemudia (2017) found that females in

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Nigeria tended to have an early sexual debut, and Fatusi and Blum (2008) and Spriggs and Halpern (2008) demonstrated significant gender differences in the factors affecting the timing of sexual debut. The present study therefore included gender stratification to further explicate the familial effects on timing of sexual debut among young people.

Other individual characteristics have been examined in studies of sexual debut, i.e. age (Bearman & Bruckner, 2001; Fatusi & Blum, 2008) and ethnicity, particularly in developed countries (Bearman & Bruckner, 2001; Valle *et al.*, 2005). Young people's social and economic status have also been related to early sexual debut. For instance, social class has been associated with early sexual debut (Crockett *et al.*, 1996; Valle *et al.*, 2005). Educational attainment is another predictor of sexual debut (Guo *et al.*, 2012; Fagbamigbe & Idemudia, 2017). Erkut *et al.* (2013) proposed that sex education in schools would reduce the possibility of early sexual initiation. In addition, conventional bonds, i.e. participation and performance in daily activities (e.g., school/church attendance, school grades, academic achievement) are crucial factors affecting the timing of sexual debut (Crockett *et al.*, 1996; Murray *et al.*, 1998).

Likewise, social environment will be correlated with the timing of sexual debut, particularly in schools or colleges/universities. Educational institutions will have certain cultural attitudes towards sex (i.e. permissive/liberal attitudes), and these can predict early sexual initiation (Akintola *et al.*, 2012), as can perceived school safety (March & Serdar Atav, 2010). There is a consensus that peer pressure, especially from those who are sexually experienced, is significantly correlated with an early sexual debut (Akintola *et al.*, 2012; Mulugeta & Berhane, 2014). Moreover, perception of peer behaviour (e.g. thinking that peers are sexually experienced) and peer sex education have both been shown to be associated with early sexual debut (Babalola, 2004; Olufemi *et al.*, 2018). Other factors affecting early sexual initiation have been found under certain circumstances or in specific cultural backgrounds (e.g. condom use, Fatusi & Blum, 2008; Guo *et al.*, 2014; disease perception, Anderson *et al.*, 2007; Tenkorang & Maticka-Tyndale, 2008; alcohol use, Sandfort *et al.*, 2008; Boamah-Kaali *et al.*, 2016; Olufemi *et al.*, 2018; drug use, Mulugeta & Berhane, Rosenthal *et al.*, 1999; 2014). Finally, the extensive use of mass media (e.g. watching movies) has been linked to early sexual debut (O'Hara, 2012; Mulugeta & Berhane, 2014).

Methods

Participants and procedure

Data for the study were drawn from the Panel Study of Chinese University Students (PSCUS), collected in 2018 by the Institute of Sociology in the Chinese Academy of Social Sciences. The survey included eighteen colleges and universities in mainland China. After excluding missing values for the postgraduate sample and analysis variables, data from 12,815 individuals were selected for analysis. Only institutions of higher learning recognized by the Ministry of Education of China were included in the general sampling frame. There were three levels of sampling unit – education institution, major subject studied and class – according to the principle of multi-stage, stratified and random sampling. The education institution was the primary sampling unit (PSU), and the sample was stratified by institution (top colleges, general colleges, higher vocational colleges), subject type (comprehensive, science and engineering, liberal arts) and area (North East, North, North West, South West, Central, East and South) then divided into three sampling layers (frames). Universities in each sampling frame were scattered in different sampling layers as far as possible to balance the diversity of the PSU and reduce sampling error. The major subject studied ('major') was the secondary sampling unit (SSU). For each institution eight majors were randomly selected. Class was the third sampling unit (TSU). For the selected majors, one class was randomly selected from each major for each grade.

The age range of the sample was 18–24 years, and the average age was 20.69 years. Of the 12,815 college students, 47.97% were male ($n = 6147$) and 52.03% were female ($n = 6668$).

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Specifically, 14.08% of the respondents reported that they had had sexual intercourse ($n = 1804$), and 23.24% had experienced being left-behind ($n = 2978$). The average education period of fathers was 10.623 years, and that of mothers was 9.690 years. The average monthly income of parents was 7458.889 yuan, and 46.96% of the college students reported being the only child in their family ($n = 6018$).

Measures

Table 1 lists the factors included in the study and their scales of measurement, including the coding schemes for dichotomous variables and anchors for the ordinal variables.

Timing of sexual debut was measured from the questions 'Have you ever had sexual intercourse?' and 'How old were you when you had sexual intercourse for the first time?'. The variable was right-censored for respondents who had not had sexual intercourse by the time of the survey (Guo *et al.*, 2012).

Father's and mother's education had four categories indicating the levels of completed education: elementary school or less, junior high school, senior high school/technical school, and college or higher (university). Father's education had four categories: ≤elementary school (19.22%); junior high school (34.40%); senior high school/technical school (23.85%) and ≥college (22.52%). Similarly, mother's education was also categorized: ≤elementary school (30.10%); junior high school (29.79%); senior high school/technical school (21.38%) and ≥college (18.73%).

Family income had three levels: 4000 yuan or less per month (38.94%), 4001–8000 yuan per month (37.27%) and more than 8000 yuan per month (23.79%).

Numbers of siblings had three categories: 0 (46.96%), 1 (40.14%) and ≥2 (12.90%).

Left-behind experience was based on the responses 'yes' or 'no' (1 = Yes; 0 = No), and was coded as dummy variables.

Control variables included in the study were household registration status (*hukou*), years of internet surfing, gender and religion. *Hukou* is the official residence classification and is not subject to biases arising from violations of distributional assumptions of the underlying hazard. *Year of internet surfing* was converted according to the respondent's birth year. The reason for using this as a control variable was that the use of the internet is very popular among Chinese youths, and most of their knowledge about sex comes from the internet. *Sex* (1 = Male; 0 = Female) and *Religion* (1 = Yes; 0 = No) were coded as dummy variables.

Data analysis

The Kaplan–Meier (KM) method was used to detect the relationship between age and survival rate, since it looks for the relationship between survival time and survival rate. This is a non-parametric method of estimating survival rate from the observed survival time. For the point t_n, the survival rate can be calculated as:

$$S(t_n) = S(t_{n-1})\left(1 - \frac{d_n}{r_n}\right)$$

where $S(t_{n-1})$ is the survival rate at point t_{n-1}, d_n is the number of individuals who had sexual intercourse at time point t_n and r_n is the number who still had no sexual intercourse at time point t_n. In this study, survival time was the student's age. A survival curve was drawn showing the survival rate of college students having sex at each age. The KM survival estimate is a univariate analysis model allowing the survival functions of family factors and demographic variables to be assessed without considering the impact of other variables. The method can be used to compare the differences in survival rates between different groups. Log-ranked tests for equality of function were used to determine whether the differences in the survival plots were statistically significant by

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Table 1. Descriptive statistics of selected characteristics of students, China, 2018

	Females		Males		Total	
Variable	*n*	%	*n*	%	*n*	%
Father's education						
≤Elementary school	1374	20.61	1089	17.72	2463	19.22
Junior high school	2355	35.32	2054	33.41	4409	34.40
Senior high school/technical school	1525	22.87	1532	24.92	3057	23.85
>College	1414	21.21	1472	23.95	2886	22.52
Mother's education						
≤Elementary school	2070	31.04	1787	29.07	3857	30.10
Junior high school	2030	30.44	1788	29.09	3818	29.79
Senior high school/technical school	1364	20.46	1376	22.38	2740	21.38
>College	1204	18.06	1196	19.46	2400	18.73
Family income (yuan)						
≤4000	2808	42.11	2182	35.50	4990	38.94
4001–8000	2362	35.42	2414	39.27	4776	37.27
>8000	1498	22.47	1551	25.23	3049	23.79
Numbers of siblings						
0	2672	40.07	3346	54.43	6018	46.96
1	2936	44.03	2208	35.92	5144	40.14
≥2	1060	15.90	593	9.65	1653	12.90
Left-behind experience						
No	5192	77.86	4645	75.57	9837	76.76
Yes	1476	22.14	1502	24.43	2978	23.24
Hukou						
Rural	3997	59.94	3622	58.92	7619	59.45
Urban	2671	40.06	2525	41.08	5196	40.55
Religion						
No	5752	86.26	5268	85.70	11,020	85.99
Yes	916	13.74	879	14.30	1795	14.01
Age (years) (mean)	6668	20.684	6147	20.696	12,815	20.690
Years of internet surfing (mean)	6668	9.690	6147	10.401	12,815	10.031

Father's and mother's education were measured on a 4-point scale (1–4). Income was measured on a 3-point scale (1–3).

father's education, mother's education, family income, number of siblings, left-behind experience and control variables.

In the multivariate survival analysis, Cox proportional hazard regression analysis (Cox, 1972) was employed to calculate hazard ratios for the timing of sexual debut. This was used because only 14.08% of the respondents had had sexual experiences. In order to include those without sexual experience, the proportional hazard model was used. The hazard function, or the sexual debut rate at a certain time, tells us how likely a respondent is to debut sexually, given that she or he is not yet

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sexually active by that time. The baseline hazard depends only on age, and the addition of each independent variable changes the baseline rate, indicating the average increase or decrease in annual 'risk' of sexual initiation (Davis & Friel, 2001). The model assumes that the explanatory variable and the benchmark risk function can be multiplied, and the sexual debut function of the observation i is:

$$h(t, X_i) = h_0(t) \times exp(X_i\beta)$$

where β is the coefficient to be estimated in the regression equation and X_i is the explanatory variable, including family context indicators and control variables. No special assumptions were made for the parameter form of the benchmark risk function $h_0(t)$ and no estimation was required. There is no special requirement for the relationship between the risk function and time t, and it can be in any form, as long as this is the same for all observation objects. Compared with the parametric survival analysis model, the advantage of the semi-parametric Cox model is that there is no need to make any parametric assumptions about the benchmark risk function $h_0(t)$, especially when it is difficult to make reasonable assumptions about the form of the risk function. Among them, $\exp(X_i\beta)$ is the relative risk, and $X_i\beta$ is the logarithm of the relative risk.

First, family context indicators were put into the model (i.e. father's education, mother's education, family income, number of siblings and left-behind experience) and then control variables were added (i.e. *hukou*, years of internet surfing and religion) to make a nested model stratified by gender. These two models also passed the PH hypothesis test, i.e. that the influence of covariates on sexual debut does not change over time). If gender was not added to stratify the model it could not pass the PH hypothesis test, so the male and female samples were separated and a Cox proportional hazard nested model was constructed based on the above model so that the final model passed the PH hypothesis test.

Results

Descriptive results

Of the 12,815 college students, 1804 (14.08%) reported that they had had sexual intercourse. The average age of sexual debut was 18.39 years (median age 18 years). Figures 1 to 8 show the gender differences in the effects of different family and demographic variables on the sexual debut (Kaplan–Meier) estimate of the survival function. Male students initiated sexual intercourse significantly earlier than female students, and the cumulative survival rate for males was lower than that of females (Figure 1). Father's education level was not significantly correlated with the survival distributions of the sexual debut for males or females ($p = 0.163$, $p = 0.081$; Figure 2). Mothers' education level was significantly correlated with the survival distributions of sexual debut among female students, but showed no correlation for male students ($p < 0.001$, $p = 0.360$; Figure 3). The curves for mother's education show that female students whose mothers graduated from a senior high school (including technical school) were more likely to experience an early sexual debut than their counterparts whose mothers graduated from elementary school education, junior high school or college (Figure 3). Also, timing of sexual debut was significantly related to female students' family income, but not males ($p < 0.001$, $p = 0.089$; Figure 4). There was a significant correlation between the survival distribution of sexual debut and number of siblings for female students ($p < 0.001$; Figure 5). Compared with those who had one or more sibling, female students with no siblings were more likely to have initiated sexual debut at the ages of 15–22 years. However, for male students, this relationship was not significant ($p = 0.088$; Figure 5). Experiencing being left-behind in the family did not have a significant correlation with the survival distribution of sexual debut ($p = 0.860$, $p = 0.176$; Figure 6). For the male students, urban–rural residence was not significantly correlated with the survival distribution of sexual debut ($p = 0.236$; Figure 7), but female college students in urban areas had an earlier debut than

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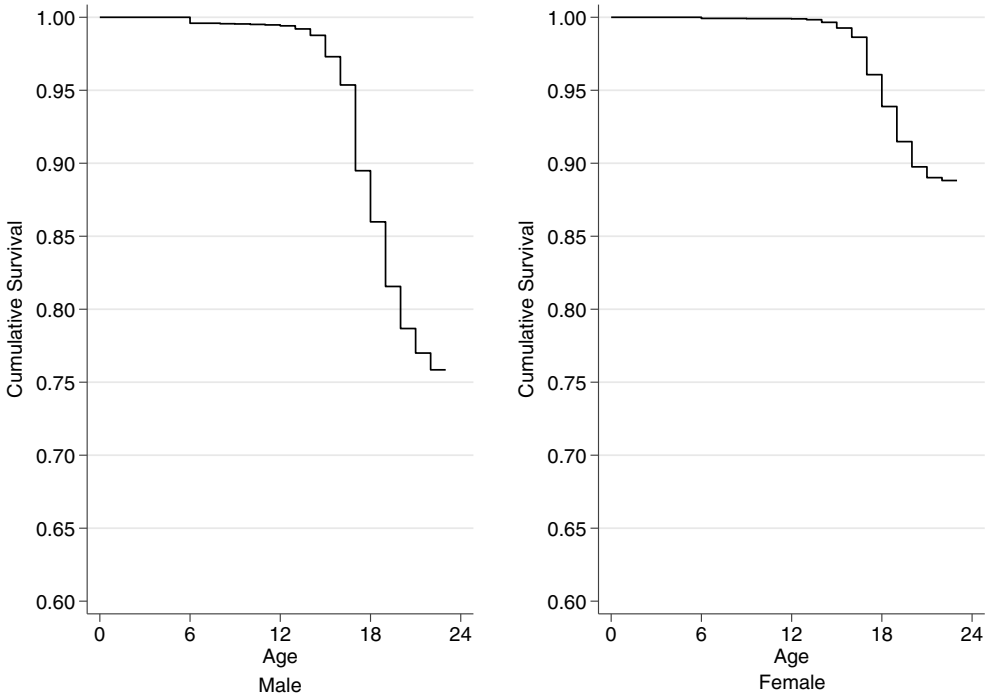

Figure 1. Survival distribution of sexual debut among college students in China by gender.

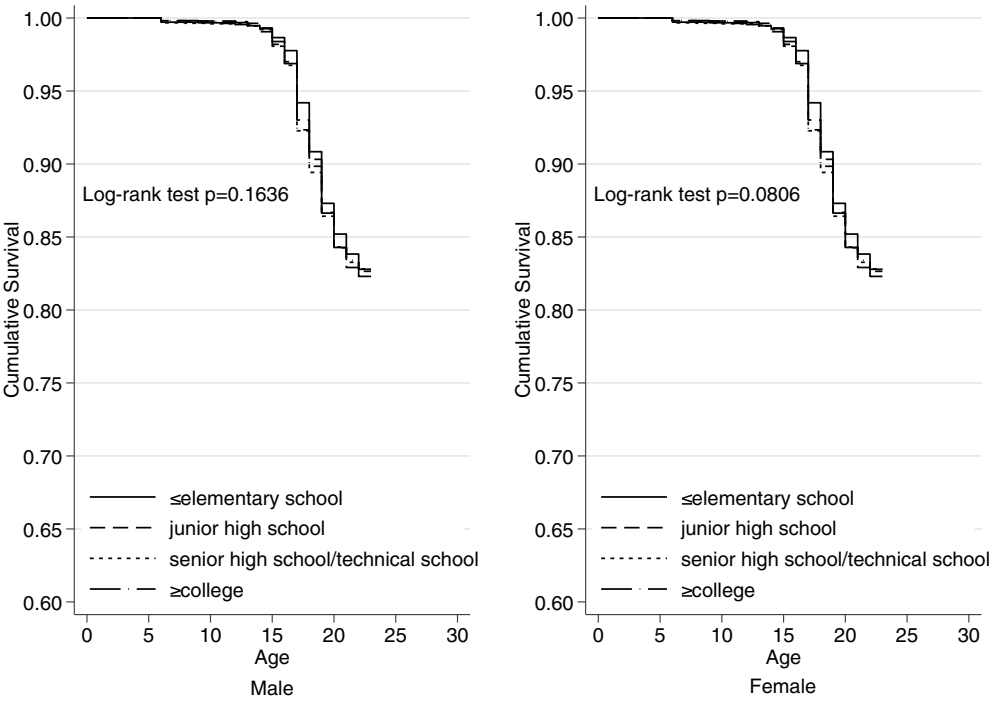

Figure 2. Survival distribution of sexual debut among college students in China by gender and father's education.

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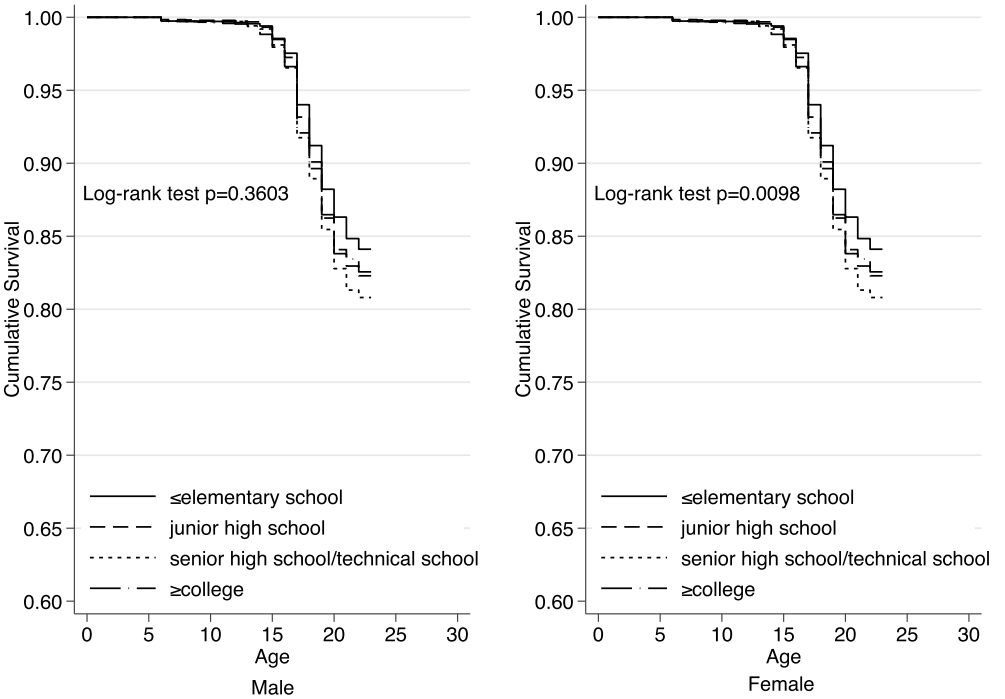

Figure 3. Survival distribution of sexual debut among college students in China by gender and mother's education.

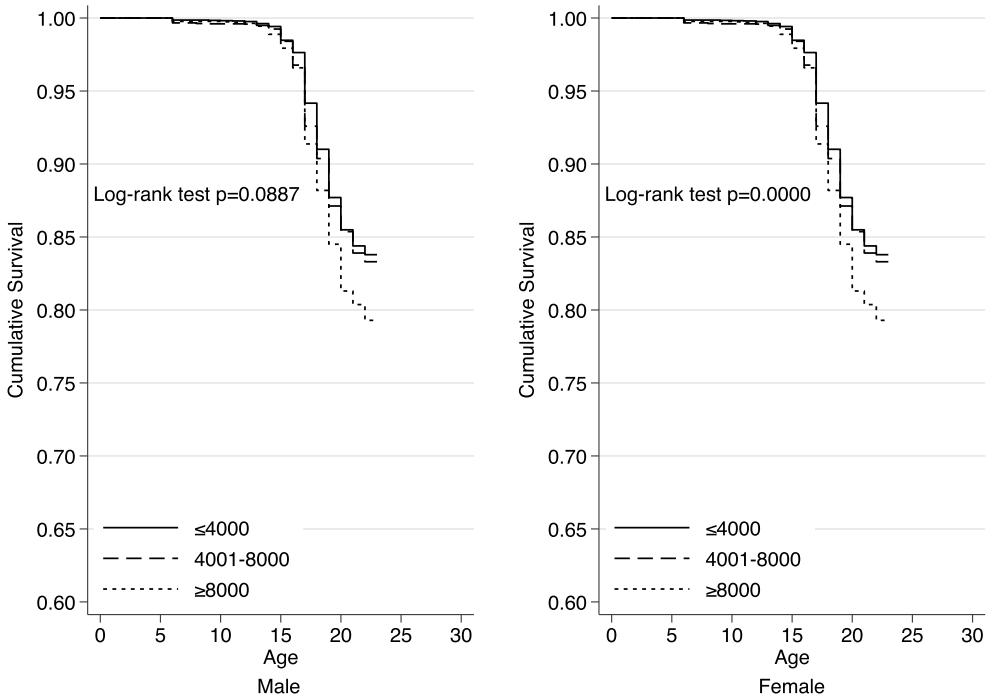

Figure 4. Survival distribution of sexual debut among college students in China by gender and family income (yuan).

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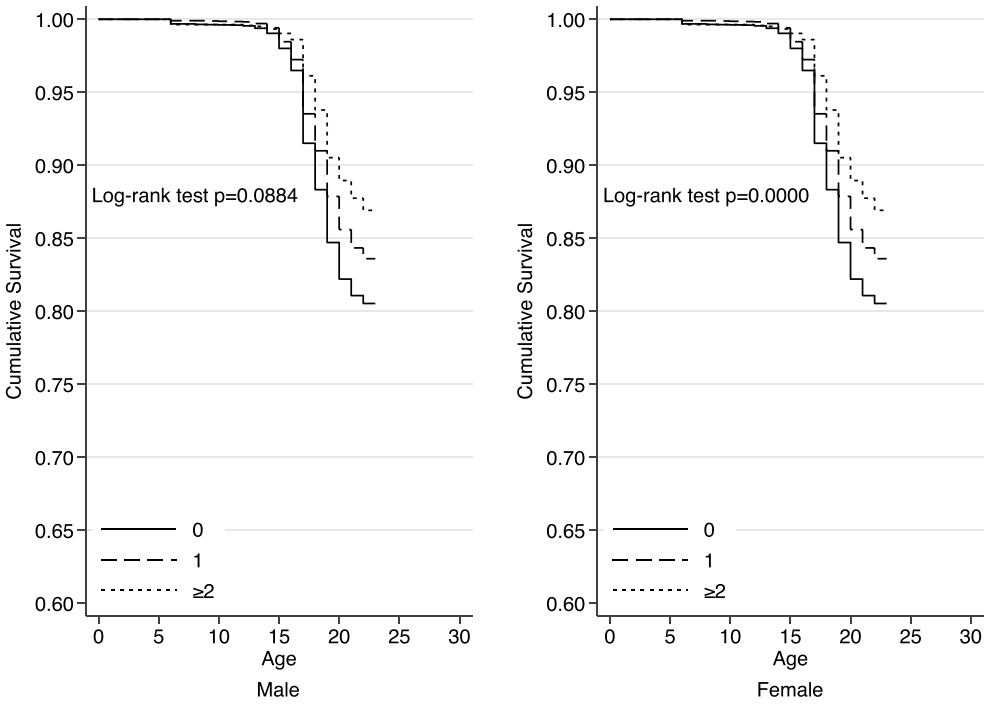

Figure 5. Survival distribution of sexual debut among college students in China by gender and number of siblings.

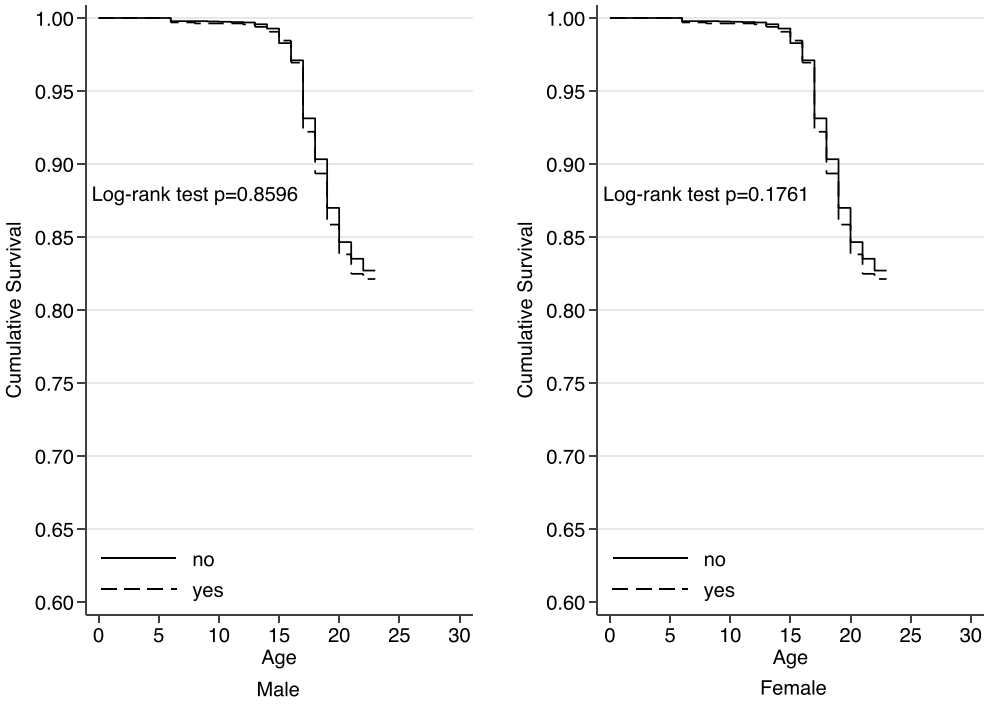

Figure 6. Survival distribution of sexual debut among college students in China by gender and left-behind experience.

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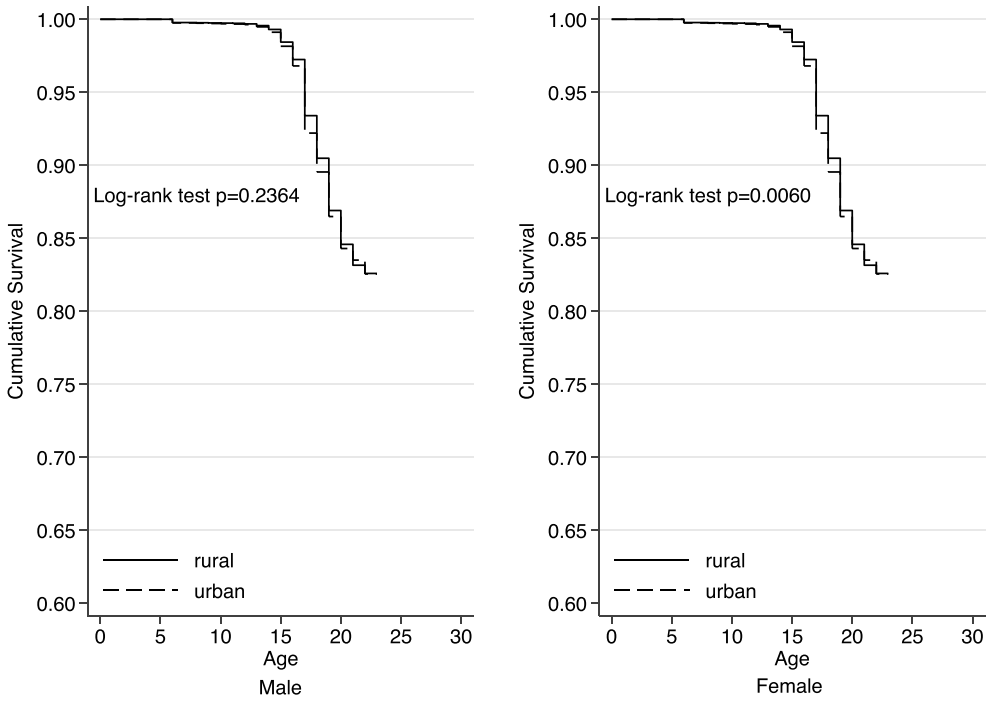

Figure 7. Survival distributions of sexual debut among college students in China by gender and *hukou*.

those in rural areas ($p < 0.01$; Figure 7). Religion was significantly correlated with the timing of sexual debut for male students but not for female students ($p < 0.001$, $p = 0.843$; Figure 8).

Family context and sexual debut

Cox proportional hazard regression was used to analyse the correlation between family context variables (father's education level, mother's education level, family income, number of siblings and left-behind experience) and sexual debut (Table 2). Model 1 included the five independent study variables, and three control variables (*hukou*, years of internet surfing and religion) were added to Model 2. Both Model 1 ($p = 0.085$) and Model 2 ($p = 0.090$) passed the PH hypothesis test, and both values were greater than 0.05.

Father's education and sexual debut

Generally, the higher the father's education, the lower the student's risk of sexual debut (see Model 2 in Table 2). Compared with students whose fathers' education level was elementary school or below, the risk of sexual debut among those whose fathers' education level was senior high school or technical school was reduced by around 16% ($\beta = 0.838$, SE $= 0.071$, $p < 0.05$), and for those whose father's education level was college or above, the risk of first sexual debut was reduced by around 36% ($\beta = 0.734$, SE $= 0.079$, $p < 0.01$). In China, fathers are traditionally responsible for disciplining their children. The differential attribution is implicit in the proverbs such as 'feed but do not teach kid, dad's misdeed indeed' (*yang bu jiao, fu zhi guo*) and 'child does not behave, father is to blame' (*zi bu jiao fu zhi guo*), whereas few old Chinese sayings hold mothers responsible for a child conduct (Chang *et al.*, 2011). Thus, the higher the education level of the father, the more frequent will be their communication with their children, and the higher the possibility of the children receiving sex education.

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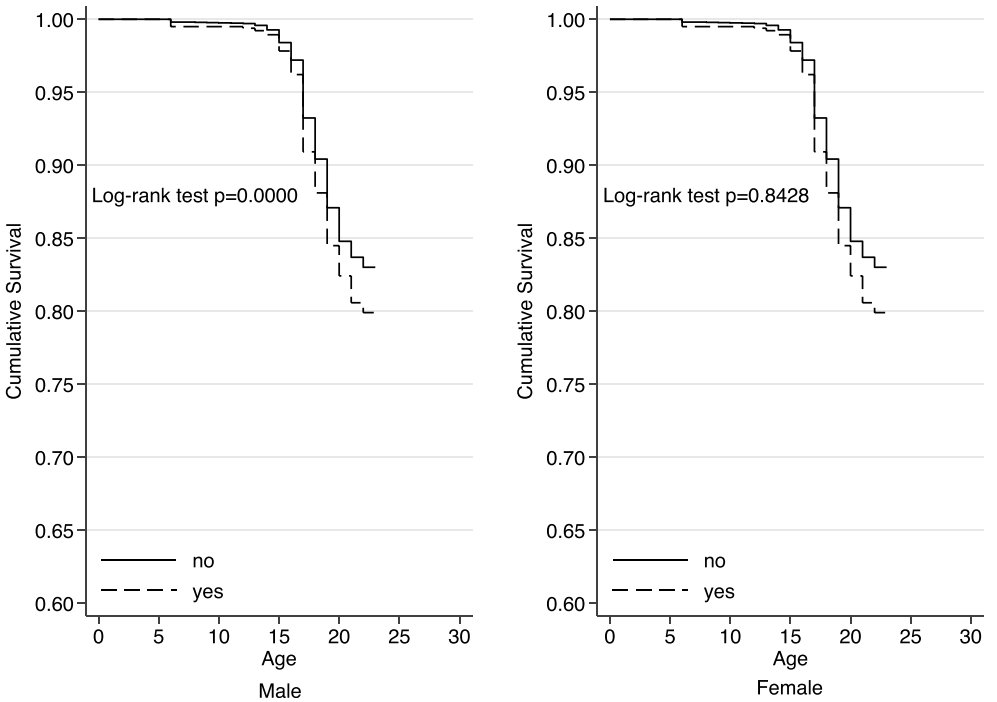

Figure 8. Survival distributions of sexual debut among college students in China by gender and religion.

Mother's education and sexual debut

Mother's education level did not present a significant correlation with student's risk of sexual debut (Model 2, Table 2). There was no significant difference in the risk of sexual debut between students whose mothers received elementary school, junior high school and college and university education ($\beta = 1.127$, SE $= 0.074$, $p = 0.070$; $\beta = 1.144$, SE $= 0.126$, $p = 0.222$). In general, it is more common for fathers to communicate with their children about sex in China.

Family income and sexual debut

Family income presented a significant correlation with the risk of student's sexual debut (Model 2, Table 2). Students whose monthly family income was higher than 8000 yuan had an around 17% higher hazard of having sex for the first time than their counterparts whose monthly family income was less than 4000 yuan ($\beta = 1.170$, SE $= 0.083$, $p < 0.05$). Higher income means a higher family socioeconomic status and a more open mindset, which can make students more likely to initiate sexual activity.

Numbers of siblings and sexual debut

Generally, the higher the number of siblings, the lower the probability of sexual debut among students (Model 2, Table 2). Specifically, when there was only one sibling in a family, the risk of sexual debut was reduced by around 13% ($\beta = 0.866$, SE $= 0.051$, $p < 0.05$). When there were more than two siblings in the family, the risk of sexual debut was around 30% lower than when students were only children ($\beta = 0.692$, SE $= 0.063$, $p < 0.001$). Siblings can influence the formation of gender roles, especially when they are of the opposite sex. When individuals have a better understanding of the opposite sex, the possibility of sexual debut might be reduced.

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Table 2. Adjusted hazard ratios (and robust standard errors) from Cox proportional hazard regression analysis assessing students' risk of experiencing sexual debut by selected characteristics

Variable	Model 1	Model 2
Independent variables		
Father's education (Ref.: ≤Elementary school)		
Junior high school	0.982	0.971
	(0.069)	(0.068)
Senior high school/technical school	0.865†	0.838*
	(0.073)	(0.071)
>College	0.760**	0.734**
	(0.080)	(0.079)
Mother's education (Ref.: ≤Elementary school)		
Junior high school	1.118†	1.127†
	(0.073)	(0.074)
Senior high school/technical school	1.184*	1.229*
	(0.097)	(0.104)
>College	1.058	1.144
	(0.113)	(0.126)
Family income (yuan) (Ref.: ≤4000)		
4001–8000	1.018	0.935
	(0.059)	(0.055)
>8000	1.287***	1.170*
	(0.091)	(0.083)
Numbers of siblings (Ref.: 0)		
1	0.768***	0.866*
	(0.044)	(0.051)
≥2	0.583***	0.692***
	(0.052)	(0.063)
Left-behind experience (Ref.: No)		
Yes	1.173**	1.110†
	(0.068)	(0.065)
Controlled variables		
Hukou (Ref.: Rural)		
Urban		0.875*
		(0.059)
Years of internet surfing		1.050***
		(0.008)
Religion (Ref.: No)		
Yes		1.264***
		(0.082)

(*Continued*)

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Table 2. (*Continued*)

Variable	Model 1	Model 2
N	12,815	12,815
Log-likelihood	−16,651.661	−15,346.075
Model (LR) χ^2	86.52***	110.52***
Global test	0.0847	0.0895
df	11	14

†$p<0.1$; *$p<0.05$; **$p<0.01$; ***$p<0.001$.
†Model 2 was stratified by gender.

Left-behind experience and sexual debut

Left-behind experience of students did not have a significant correlation with students' sexual debut ($\beta = 1.110$, SE $= 0.065$, $p = 0.075$) (Model 2, Table 2).

Family context and sexual debut by gender

Due to the fact that when gender was directly added to Model 2 in Table 2 the model did not satisfy the PH hypothesis test, the correlation between family context variables and the risk of male and female students' sexual debut was based on that model. Previous studies have separated males and females and presented significant results (e.g. Fatusi & Blum, 2008; Tenkorang & Maticka-Tyndale, 2008; Spriggs & Halpern, 2008; Peng *et al.*, 2009; Lee *et al.*, 2012). The results of the present analysis are shown in Models 1–4 in Table 3 (Models 1 and 2 for males, Model 3 and 4 for females); they all passed the PH hypothesis test.

Father's education and sexual debut by gender

Gender differences were observed in the relationship between the father's education level and risk of sexual debut among students (Models 2 and 4, Table 3). Specifically, father's education level presented a significant correlation with the sexual debut of male students. The risk of sexual debut for male students whose father's education was college and above was around 63% of that of their counterparts whose father's education was elementary school and below ($\beta = 0.634$, SE $= 0.084$, $p < 0.001$). However, father's education was not significantly related to sexual debut among female students (Model 4, Table 3). Thus, the education level of fathers appeared only to be related to the timing of sexual debut in males. In the Chinese context, there is a gender gap between father and daughter, and the fathers are generally ashamed of discussing sex with their daughters, so sex education is more likely to be targeted at sons.

Mother's education and sexual debut by gender

Gender differences existed in the relationship between mother's education level and the risk of sexual debut among students (Models 2 and 4, Table 3). Specifically, mother's education level presented a significant correlation with the sexual debut of male students. The risk of sexual debut among male students whose mother's education was senior high school or technical school was around 1.3 times higher than those whose mother's education level was elementary school or below ($\beta = 1.304$, SE $= 0.134$, $p < 0.01$). The risk of sexual debut for male students whose mother's education level was college or higher was around 1.4 times higher than that of those whose mother's education level was elementary school or below ($\beta = 1.403$, SE $= 0.188$, $p < 0.05$). There was no significant correlation between mother's education and sexual debut for female students

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Table 3. Adjusted hazard ratios (and robust standard errors) from Cox proportional hazard regression analysis assessing students' risk of experiencing sexual debut by selected characteristics and gender

	Males		Females	
Variable	Model 1	Model 2	Model 3	Model 4
Independent variables				
Father's education (Ref.: ≤Elementary school)				
Junior high school	0.974	0.986	0.949	0.934
	(0.084)	(0.085)	(0.114)	(0.113)
Senior high school/technical school	0.813*	0.826†	0.866	0.839
	(0.084)	(0.086)	(0.127)	(0.125)
>College	0.623***	0.634***	0.996	0.947
	(0.081)	(0.084)	(0.178)	(0.174)
Mother's education (Ref.: ≤Elementary school)				
Junior high school	1.097	1.092	1.233†	1.208†
	(0.089)	(0.088)	(0.140)	(0.138)
Senior high school/technical school	1.287*	1.304**	1.138	1.092
	(0.129)	(0.134)	(0.166)	(0.164)
>College	1.373*	1.403*	0.787	0.760
	(0.178)	(0.188)	(0.149)	(0.147)
Family income (yuan) (Ref.: ≤4000)				
4001–8000	0.917	0.882†	1.117	1.058
	(0.065)	(0.063)	(0.114)	(0.109)
>8000	1.103	1.044	1.611***	1.482**
	(0.095)	(0.091)	(0.195)	(0.183)
Numbers of siblings (Ref.: 0)				
1	0.946	0.940	0.720**	0.735**
	(0.065)	(0.066)	(0.073)	(0.077)
≥2	0.796*	0.781*	0.544***	0.558***
	(0.090)	(0.089)	(0.081)	(0.085)
Left-behind experience (Ref.: No)				
Yes	1.015	1.007	1.317**	1.332**
	(0.072)	(0.072)	(0.131)	(0.134)
Controlled variables				
Hukou (Ref.: Rural)				
Urban		0.827*		0.953
		(0.068)		(0.113)
Years of internet surfing		1.050***		1.045***
		(0.009)		(0.014)

(*Continued*)

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Table 3. (*Continued*)

Variable	Males		Females	
	Model 1	Model 2	Model 3	Model 4
Religion (Ref.: No)				
Yes		1.375***		1.032
		(0.106)		(0.126)
N	6147	6,147	6,668	6,668
Log-likelihood	−10,147.963	−10,123.494	−5209.4411	−5204.0391
Model (LR) χ^2	27.89***	76.83***	59.96***	70.77***
Global test	0.1535	0.0894	0.4181	0.5929
df	11	14	11	14

†$p<0.1$; *$p<0.05$; **$p<0.01$; ***$p<0.001$.

(Model 4, Table 3). This is probably because a higher level of mother's education signifies the more openness in the family and more tolerance of sexual intercourse of sons, but for daughters they are always protective.

Family income and sexual debut by gender

Gender differences were observed in the relationship between family income and the risk of sexual debut (Models 2 and 4, Table 3). Specifically, family income presented a significant correlation with sexual debut for female students. Female students with a monthly family income of more than 8000 yuan had around 1.5 times higher risk of sexual debut then those with a monthly income of less than 4,000 yuan ($\beta = 1.482$, SE $= 0.183$, $p < 0.01$). However, there was no significant correlation between family income and male students' sexual debut (Model 2, Table 3). A higher family income indicates higher economic conditions in a the family, higher awareness of female independence and a more open attitude towards sexual behaviour. Comparatively, the relationship between male's awareness of sexual independence and family economic conditions was weak.

Number of siblings and sexual debut by gender

The number of siblings had a significant correlation with the sexual debut of both male and female students, but especially females (Models 2 and 4, Table 3). The risk of sexual debut for male students with more than two siblings was around 78% of that of male students who were only children ($\beta = 0.781$, SE $= 0.089$, $p < 0.05$). The risk of sexual debut for female students with one sibling was around 74% of that of female students who were the only children ($\beta = 0.735$, SE $= 0.077$, $p < 0.01$). The risk of sexual debut for female students with more than two siblings was around 56% of that of female students who were the only children ($\beta = 0.558$, SE $= 0.085$, $p < 0.001$). In general, the number of siblings was significantly negatively correlated with the risk of sexual debut, which means siblings are important for the formation of gender roles of both males and females.

Left-behind experience and sexual debut by gender

Gender were observed in the relationship between left-behind experience and the risk of sexual debut (Models 2 and 4, Table 3). Left-behind experience was not significantly correlated with male students' sexual debut ($\beta = 1.007$, SE $= 0.072$, $p = 0.920$). However, the risk of sexual debut for female students with left-behind experience was around 33% greater compared with those with no

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left-behind experience ($\beta = 1.332$, SE = 0.134, $p < 0.01$). The correlation between left-behind experience and the sexual debut of female students was more significant than that of male students Due to a lack of family sex education among adolescents, the risk of sexual intercourse might be increased for females. However, for males, even if they have experienced being left behind, they are more likely to receive relevant sex education through other channels than females.

Discussion

The average age of sexual debut initiation among college and university students (18.39 years) found in this study is earlier than that reported in previous studies in China (Guo, 2012), indicating that values and attitudes around sexual intercourse among college students, as well as their families and in Chinese society, have changed over time. In China, the effects of family on young people cannot be avoided, since the family is where youngsters receive sexual awareness and education (Wang *et al.*, 1999; Choi, 2008; Jin *et al.*, 2017; Hong & Liu, 2019). In line with previous studies, this study confirmed that differences exist in the risk of college students' timing of sexual debut according to cultural and familial environment factors.

First, father's education level has a significant correlation with the risk of sexual debut among college students. Specifically, the higher the level of education the father receives, the lower the probability college students will initiate sexual debut, indicating that higher paternal educational background reduces the risk of experiencing sexual debut among youngsters aged 18–24. This conclusion is consistent with those of previous studies (Guo *et al.*, 2012; Nnebue *et al.*, 2016). However, the study also demonstrated that mother's education was not significantly correlated with the initiation of sexual debut among college students, which is different from the findings of studies in Western society (e.g. Gravel, 2016). One possible explanation for this is that, in the context of China, it is more common for fathers to communicate with their children about sex.

The study found that parental educational background was only significantly correlated with the sexual debut of male students, and not female students. This is also a different finding from studies in Western countries (e.g. Manlove *et al.*, 2012), where fathers have been shown to impact sexual debut in girls in two-parent families. Specifically, this study found that the influences of fathers and mothers on sexual debut among male students were different. A high education background of fathers might help reduce the risk of sexual initiation among male students, while a high education background of mothers might somehow promote sexual debut among male students. This indicates that fathers and mothers have different influence paths on their children's sexual behaviour, and this could be explained by fathers being more likely and more willing to communicate with their sons on sex-related issues, but intentionally avoid sex-related conversations with their daughters. As a result, sons might form a correct concept of sex from the process of communication with their fathers, especially when the fathers have receive higher education. In addition, the role played by mothers in family sex education in China is limited, so it does not have much influence on female students. A possible explanation for this might be related to the overall openness within the family. The higher the mother's level of education, the higher the openness in a family. Thus, the possibility of a son's exposure to sexual information will increase, thereby increasing their probability of sexual debut.

Secondly, this study found that family income was only significantly correlated with the sexual debut of female, and not male, students. This is also partly different from previous studies, which found a significant influence of family income on both genders (Lee *et al.*, 2012; Adanikin *et al.*, 2017). There are some possible explanations for this distinction. In the past, gender inequality in China was obvious, and resources for daughters were limited. However, currently, material conditions, as well as values, have been largely developed; therefore, daughters receive education and are more likely to form a more tolerant attitude towards sex. When family income increases, daughters become more open and are more likely to have sexual intercourse.

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The left-behind experience was found to have a significant correlation with the risk of sexual debut among female, but not male, students. This is understandable in the Chinese cultural context. For females, the left-behind experience signifies a lack of communication with their parents, and the resulting lack of family sex education when growing up increases their risk of having sexual intercourse. However, for males, even if they have experienced being left-behind, they are more likely to receive relevant sex education through other channels; thus this experience does not show significant influence on males.

In conclusion, this study examined the correlation between the family and timing of sexual debut among college students in China. The results confirm the findings of previous studies in Western contexts, and innovative results based on Chinese culture, i.e. the left-behind experience, are presented. The findings can inform the construction and revision of policies in China. First, parents should communicate with their children about sex, thereby guiding them towards healthy sexual behaviours. Secondly, the material and emotional support for girls should be strengthened. Family income and the left-behind experience were found to have a significant correlation with sexual debut among females, meaning that females are more susceptible to changes in the family cultural environment. Therefore, support will have positive effects on females. Finally, the study sheds light on the sexual behaviour among college students in China.

The study has several limitations. First, college students might have been ashamed to report their sexual behaviours, even though attempts were made to avoid it. However, the survey covered eighteen colleges and universities in China and involved 12,815 subjects, so the sample was relatively large. In addition, previous studies, especially those in Western societies, paid great attention to familial communication and relationships (e.g. Lehr *et al.*, 2000; Davis & Friel, 2001), and this study did not take these into consideration. Future studies in the Chinese context should include these.

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Conflicts of Interest. The authors have no conflicts of interest to declare.

Ethical Approval. This study was a secondary data analysis. All procedures performed in the Panel Study of Chinese University Students (PSCUS) involved human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the PSCUS.

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