Sexual and reproductive health and attitudes towards sex of young adults in China

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ABSTRACT

Background The study aimed to discuss the importance of socioeconomic status (SES) and family sexual attitudes and investigate their association with sexual and reproductive health in a large sample of Chinese young adults.

Methods We analysed a large sample of 53 508 youth aged 15–24 years from an internet-based survey from November 2019 to February 2020. Multivariable logistic regression analyses were employed to examine the association between SES, family sexual attitudes, and sexual and reproductive health (SRH), stratified by sex and adjusting for potential confounders.

Results Individuals with the highest expenditure were more likely to engage in early sexual intercourse (female: OR 4.19, 95% CI 3.00 to 5.87; male: OR 3.82, 95% CI 2.84 to 5.12). For both sexes, the likelihood of young adult sexual risk-taking such as first intercourse without using a condom, acquiring sexually transmitted infections, and pregnancy was lower in those with higher maternal educational attainment, whereas it was higher in those with open family sexual attitudes.

Conclusions Lower SES and open family attitudes toward sex had a significant association with a range of adverse young adulthood SRH outcomes. Public health policies should focus on more deprived populations and advocate suitable parental participation to reduce risky sexual behaviours in youth.

Key messages

- Findings suggest that Chinese youth who possessed a higher socioeconomic status had a higher likelihood of initiating early sexual intercourse, but were less likely to have engaged in unsafe sex and adverse reproductive outcomes.
- Results suggest that open family attitudes were associated with an increased likelihood of early sexual intercourse, and frequent parent–adolescent sexual communication was associated with a lower likelihood of risky sexual behaviours.

INTRODUCTION

Premarital sex is gradually becoming very common among young people in the world.[1] Early sexual intercourse initiation (ie, before the age of 16 years) may be problematic, as it is often associated with other risky sexual behaviours.[2] In young adults aged 15–24 years, unsafe sex was an important contribution to Disability Adjusted Life Years (DALYs).[3]

According to the biosocial interactionist theory, both biological and social reasons (eg, family socioeconomic status (SES)) play a role in adolescents' sexual development.[4] Several studies in western countries indicated that lower SES may be associated with risky sexual behaviours,[5] such as early first sexual intercourse and unprotected sex. Significant demographic and social shifts are occurring throughout the world,[6] including increasing marriage age, improved school enrollment, and changing family structures.[7] Most of these studies were conducted before 2000, and in more recent studies, SES is less discussed and is often considered only as confounders. Therefore, the mechanisms explaining the relationship between SES and sexual and reproductive health (SRH) may not be entirely appropriate for today's society.

Simultaneously, Chinese traditional culture and rapid economic growth have shaped a unique background in which people tend to have relatively

conservative attitudes toward sexuality.[8] The topic of sex is not as openly expressed or discussed as it is in western countries.[9] Also, research conducted in different countries varied in terms of participants, methods and context. The majority of studies were conducted in the United States and sub-Saharan Africa,[10 11] making it difficult to draw general conclusions about effective interventions in China. Among known social variations that influence youth's SRH, family sexual attitudes differences are critical for planning necessary and appropriate interventions.[5] Some investigators have revealed that parental permissive sexual attitudes increased young people's intention to engage in premarital sex.[9] Therefore, it is of great significance to understand the relationship between individual and family variables and sexual risk behaviours in the Chinese population.

Our study aimed to consider the importance of SES and family sexual attitudes and explore their associations with early sexual behaviours and adverse reproductive health outcomes in a large sample of Chinese college students.

METHODS

Participants and procedures

We conducted a large web-based survey (sponsored by the China Family Planning Association (CFPA)) among approximately 0.19% of Chinese college students from November 2019 to February 2020. Using multistage sampling (online supplemental material), 241 higher education institutions were selected after balancing the population density and different levels of educational institutions in China. The unique web link for the electronic questionnaire was distributed to voluntary participants through contact persons in each institution where the survey was conducted. A total of 55 757 respondents completed questionnaires. Of those, 1177 (2%) responses were eliminated because the respondent either did not properly complete the Attention Check Questions (online supplemental material), endorse the Informed Consent, or was outside the age range of college students. Valid participants were 54 580 youth (65.5% female and 77.6% heterosexual) from Eastern (52.3%), Central (24.4%) and Western (23.3%) China. Before completing the survey, each participant provided informed consent.

In this article, we use the terms young adults, youth, and young people interchangeably referring to the group aged from 15 to 24 years (a standard definition by the World Health Organization (WHO).[3] Meanwhile, the effective participants were limited to undergraduate students aged 15–24 years, which excluded 995 participants. After excluding 77 respondents who were aged under 7 years at their first sexual debut, a total of 53 508 participants were included in the final analyses.

Measures

Socioeconomic status

SES was assessed by multiple socioeconomic factors, including personal expenditure and maternal education. Most of the students did not have a clear understanding of household income but were more familiar with personal expenditure. Thus, we asked for more adequate and reliable personal expenditure information. Monthly expenditure was measured by how much money on average participants had spent each month over the past 12 months. Expressed in both United States dollars (USD) and Chinese Yuan (CNY), the monthly expenditure was classified as "less than 150 USD (less than 1000 CNY)", "150–249 USD (1000–1499 CNY)", "250–300 USD (500–1999 CNY)" and "more than 300 USD (more than 2000 CNY)". Mothers are often the main caregivers and the primary providers of sexuality education in families. For this reason, it is more appropriate to use "maternal educational attainment" as a measure of SES. Maternal educational attainment was coded into a four-level classification: illiterate, primary school, middle or high school, or college and above. Higher monthly expenditure (250–300 USD (2500–1999 CNY) or more than 300 USD (more than 2000 CNY)) or higher maternal educational attainment (middle or high school, or college and above) represent higher SES.

Family sexual attitudes

Family sexual attitudes were assessed by asking the question: "What do you think of your family sexual attitudes? (If the attitudes of your mother and father are different, answer with reference to your perceived general sexual attitudes of your parents)". Furthermore, the answer was measured based on a five-point Likert-type scale from 1 (strongly closed) to 5 (strongly open), self-reported by the youth. Family sexual attitudes were coded into a three-level classification: closed (1–2), neutral (3) or open (4–5).

Frequency of parent–adolescent sexual communication

Parent–adolescent sexual communication is one of the most important ways for parents to influence and shape their children's SRH attitudes and behaviours as it is a means of educating while also transmitting the parents' sexual attitudes.[12] The frequency of parent–adolescent sexual communication was assessed by asking the question: "What is the frequency of parent–adolescent communication about any topics related to sex?". The answer was measured based on a five-point Likert-type scale from 1 (seldom) to 5 (frequent), self-reported by the young people. Parent–adolescent communication about sex was coded into a three-level classification: seldom (1–2), medium (3) or frequent (4–5).

Table 1 Distribution of sociodemographic characteristics and sexual and reproductive health outcomes among young adults aged 15–24 years

	Females		Males		Total	
Variable	**n**	**%**	**n**	**%**	**n**	**%**
Age (years)						
15–18	11442	32.5	5963	32.6	17405	32.5
19–20	16911	48.0	8873	48.5	25784	48.2
21–22	5470	15.5	2669	14.6	8139	15.2
23–24	1381	3.9	799	4.4	2180	4.1
Hometown						
Urban	7755	22.1	4067	22.2	11822	22.1
Suburban	12136	34.5	6019	32.9	18155	33.9
Rural	15313	43.5	8218	44.9	23531	44.0
Maternal educational attainment						
Illiterate	2703	7.8	1425	8.0	4128	7.9
Primary school	8096	23.4	4085	22.8	12181	23.2
Middle or high school	18412	53.1	9572	53.5	27984	53.3
College and above	5445	15.7	2810	15.7	8255	15.7
Paternal educational attainment						
Illiterate	1154	3.3	644	3.6	1798	3.4
Primary school	5736	16.6	2828	15.8	8564	16.3
Middle or high school	20906	60.5	10881	60.7	31787	60.5
College and above	6788	19.6	3585	20.0	10373	19.8
Monthly expenditure (USD)						
<150	5457	15.5	2582	14.1	8039	15.0
150–249	12126	34.4	6290	34.4	18416	34.4
250–300	7960	22.6	4278	23.4	12238	22.9
≥300	9661	27.4	5154	28.2	14815	27.7
Family attitudes towards sex						
Closed	20613	58.6	10454	57.1	31067	58.1
Neutral	11910	33.8	5349	29.2	17259	32.3
Open	2681	7.6	2501	13.7	5182	9.7
Parent–adolescent communication about sex						
Seldom	19504	55.4	11328	61.9	30832	57.6
Medium	14397	40.9	6363	34.8	20760	38.8
Frequent	1303	3.7	613	3.4	1916	3.6
Self-reported sexual orientation						
Heterosexual	26393	75.0	15205	83.1	41598	77.7
Homosexual	500	1.4	943	5.2	1443	2.7
Bisexual	4431	12.6	1047	5.7	5478	10.2
Other*	3880	11.0	1109	6.1	4989	9.3
Sexual intercourse						
No	28563	81.1	13398	73.2	41961	78.4
Yes	6641	18.9	4906	26.8	11547	21.6
Age at first intercourse (years) (mean: 18.55)						
≤15	324	4.9	337	6.9	661	5.7
16–18	2952	44.5	2643	54.0	5595	48.5
19–20	2279	34.3	1352	27.6	3631	31.5
21–22	881	13.3	477	9.8	1358	11.8
23–24	203	3.1	83	1.7	286	2.5

Continued

Table 1 Continued

Variable	Females		Males		Total	
	n	%	n	%	n	%
Condom use for first intercourse						
No	2408	36.3	1752	35.7	4160	36.0
Yes	4233	63.7	3154	64.3	7387	64.0
Sexually transmitted infection						
No	6312	95.1	4655	94.9	10967	95.0
Yes	329	5.0	251	5.1	580	5.0
Had pregnancy/got partner pregnant						
No	6361	96.1	4048	94.9	10409	95.6
Yes	261	3.9	219	5.1	480	4.4
Abortion†						
No	19	7.3	24	11.0	43	9.0
Yes	242	92.7	195	89.0	437	91.0

*Others included people who reported being asexual or unclear about their sexual orientation.
†Analysis was in people who had been pregnant (n=480).
USD, United States dollars.

Risky sexual behaviours

Participants' sexual behaviours were surveyed, including age at first sexual intercourse and no condom use at first intercourse.

Ever having had sexual intercourse was assessed by asking the question: "Have you ever had sexual intercourse? (By sexual intercourse we mean penile–vaginal intercourse or penile–anal intercourse)". Participants who answered "Yes" were asked "How old were you when you had your sexual debut?" and "Did you or your partner use a condom at that time?". Previous studies defined early sexual intercourse as participants who had their sexual debut at age 16 years or younger.[13] Each of these were dichotomous variables (0=never; 1=ever). Participants who reported having had their sexual debut above the age of 16 years or not having had initiated sexual intercourse were coded 0.

Adverse reproductive health outcomes

We examined two reproductive health outcomes: (1) ever had a sexually transmitted infection (STI) and (2) unintended pregnancy. Each of these were dichotomous variables (0=never; 1=ever).

Other covariates

Sociodemographic covariates included in the regression models were participant's age (ie, 15–18, 19–20, 21–22 and 23–24 years) and hometown (rural, suburban, urban). All variables were treated as categorical variables.

Statistical analyses

The types of SRH outcomes were presented using descriptive statistics. Analyses of no condom use at first intercourse, and having acquired an STI were limited to respondents who had been sexually active (having had sexual intercourse, n=11547). Unintended pregnancy was limited to respondents who had engaged in heterosexual intercourse (n=10889). Pearson's $\chi 2$-tests were used to describe the differences in sociodemographic characteristics (ie, age, sex, hometown, monthly expenditure, and maternal educational attainment) and family attitudes towards sex. Logistic regression was used to assess the independent association between SES, family sexual attitudes and SRH, and to control for background demographic factors. Since previous research[4 14] had shown substantial differences in sexual behaviour by sex, separate analyses were conducted for males and females. All statistical analyses were conducted using STATA 14.1 for Windows, with statistical significance set at $p<0.05$.

RESULTS

There is little difference in the sociodemographic characteristics between males and females (table 1). Males were somewhat more likely than females to report ever having had sexual intercourse (26.8% vs 18.9%). Among those who were sexually active, age 16–18 years was the most common time to have engaged in first intercourse (48.5%). The proportion ever pregnant was 3.9% among sexually experienced females, and 5.1% of sexually active males reported having impregnated their partner (table 1).

The groups differed by various aspects of baseline SES (table 2), for example, in our sample only 5.8% of girls whose expenditure was less than 150 USD reported early sexual intercourse, compared with 57.9% of those who reported expenditure greater than 300 USD ($p<0.001$).

As table 3 shows, in the model adjusted only for age, region and maternal educational attainment,

Table 2 Percentage of adolescents who had early sexual intercourse, by sex and sociodemographic characteristics (n=53 508)

	Early sexual intercourse					
	Females			Males		
Variable	n	%*	P value†	n	%*	P value†
Age (years)			<0.001			0.260
15–18	198	27.1		286	35.0	
19–20	322	44.1		372	45.5	
21–22	171	23.4		127	15.5	
23–24	40	5.5		32	3.9	
Hometown			<0.001			<0.001
Rural	72	9.9		106	13.0	
Suburban	195	26.7		224	27.4	
Urban	464	63.5		487	59.6	
Maternal educational attainment			<0.001			<0.001
Illiterate	41	5.7		35	4.4	
Primary school	91	12.6		133	16.6	
Middle or high school	406	56.0		457	57.0	
College and above	187	25.8		177	22.1	
Paternal educational attainment			<0.001			0.031
Illiterate	19	2.7		27	3.4	
Primary school	87	12.2		106	13.3	
Middle or high school	385	53.9		475	59.7	
College and above	224	31.3		188	23.6	
Monthly expenditure (USD)			<0.001			<0.001
<150	42	5.8		55	6.7	
150–249	114	15.6		134	16.4	
250–300	152	20.8		176	21.5	
≥300	423	57.9		452	55.3	
Family attitudes towards sex			<0.001			<0.001
Conventional	502	68.7		434	53.1	
Medium	142	19.4		343	42.0	
Open	87	11.9		40	4.9	
Parent–adolescent communication about sex			<0.001			<0.001
Seldom	336	46.0		439	53.7	
Medium	367	50.2		212	26.0	
Frequent	28	3.8		166	20.3	

*Row percentages compared with adolescents who did not have early sexual intercourse.
†Differences between categories within each variable. Chi-square test for 2×n tables.
USD, United States dollars.

compared with low level (<150 USD), moderate level (250–300 USD) of monthly expenditure was associated with higher odds for early sexual intercourse (Model 1: OR 2.20 (95% CI 1.55 to 3.12) for females and OR 1.80 (95% CI 1.32 to 2.46) for males). High level (>300 USD) of monthly expenditure was associated with the highest odds for early sexual intercourse (Model 1: OR 4.59 (95% CI 3.28 to 6.41) for females and OR 3.88 (95% CI 2.90 to 5.20) for males) (table 3). These associations were attenuated when family sexual attitudes and parent–adolescent communication were added into the model but remained significant (Model 2: OR 2.05 (195% CI .44 to 2.91) for females with 250–300 USD and OR 1.79 (95% CI 1.31 to 2.44) for males with 250–300 USD) (table 3).

Table 4 shows that for both genders, higher maternal educational attainment is a protective factor towards SRH. For instance, female youths with college-educated mothers were less likely to engage in risky sexual behaviours, including no condom use, STI acquisition, and unintended pregnancy (OR 0.54 (95% CI 0.42 to 0.68), OR 0.33 (95% CI 0.19 to 0.58) and OR 0.28 (95% CI 0.16 to 0.47), respectively) than those with

Table 3 Multivariable logistic regression analysis of the association between socioeconomic status, family attitudes, parent–adolescent communication and early sexual intercourse (n=53 508)

	Early sexual intercourse							
	Females				Males			
	Model 1		Model 2		Model 1		Model 2	
Variable	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Hometown								
Rural	Ref		Ref		Ref		Ref	
Suburban	1.32	1.00 to 1.74	1.29	0.97 to 1.70	1.19	0.93 to 1.52	1.19	0.93 to 1.52
Urban	1.87***	1.42 to 2.45	1.79***	1.37 to 2.36	1.54***	1.21 to 1.94	1.49***	1.17 to 1.88
Maternal educational attainment								
Illiterate	Ref		Ref		Ref		Ref	
Primary school	0.65*	0.44 to 0.94	0.65*	0.44 to 0.94	1.20	0.82 to 1.76	1.20	0.82 to 1.75
Middle or high school	0.91	0.65 to 1.28	0.91	0.65 to 1.27	1.42	0.99 to 2.02	1.38	0.97 to 1.97
College and above	0.86	0.59 to 1.23	0.84	0.58 to 1.21	1.28	0.87 to 1.88	1.20	0.81 to 1.77
Monthly expenditure (USD)								
<150	Ref		Ref		Ref		Ref	
150–249	1.17	0.81 to 1.67	1.12	0.78 to 1.60	0.95	0.69 to 1.31	0.95	0.69 to 1.31
250–300	2.20***	1.55 to 3.12	2.05***	1.44 to 2.91	1.80***	1.32 to 2.46	1.79***	1.31 to 2.44
≥300	4.59***	3.28 to 6.41	4.19***	3.00 to 5.87	3.88***	2.90 to 5.20	3.82***	2.84 to 5.12
Family attitudes towards sex								
Closed			Ref				Ref	
Neutral			0.59***	0.49 to 0.72			0.95	0.80 to 1.13
Open			1.11	0.87 to 1.43			1.31**	1.07 to 1.59
Parent–adolescent communication about sex								
Seldom			Ref				Ref	
Medium			1.10	0.94 to 1.29			1.13	0.97 to 1.32
Frequent			0.86	0.57 to 1.29			1.3	0.91 to 1.86
Observations (n)	35 204		35 204		18 304		18 304	

Model 1: Adjusted for age, region, maternal education and personal expenditure.
Model 2: Model 1 plus adjustment for family attitudes toward sex and parent–adolescent communication about sex.
Dependent variable: presence of early sexual intercourse (1=Yes; 0=No).
*p<0.05, **p<0.01, ***p<0.001.
aOR, adjusted odds ratio; CI, confidence interval; Ref, reference; USD, United States dollars.

mothers who had no formal school education. Having higher monthly expenditure was significantly associated with a lower likelihood of no condom use (eg, OR 0.76 (95% CI 0.59 to 0.97) for females with 250–300 USD and OR 0.74 (95% CI 0.56 to 0.96) for males with 250–300 USD) (table 4). When considering family attitudes and parent–adolescent communication about sex, there is a gender difference in the behaviours. For boys, open family attitudes were significantly associated with early sexual initiation (OR 1.31, 95% CI 1.07 to 1.59) and frequently parent–adolescent communication was linked to a higher likelihood of STI acquisition (OR 2.86, 95% CI 1.23 to 6.63). While among girls, moderate family sexual attitudes were significantly associated with a lower likelihood of early sexual intercourse initiation (OR 0.59, 95% CI 0.49 to 0.72).

DISCUSSION

In this study we assessed the association between family SES, family attitudes toward sex and SRH in a large sample of Chinese college students. Overall, our findings are in agreement with previous studies.[15] Males, lower maternal educational attainment, and lower monthly expenditure were factors independently associated with risky sexual behaviour. Nevertheless, our results also extend the existing research in several ways.

First, about a quarter of young people have had sex. The average age at sexual debut among Chinese youth is 18.55 years, higher than the average age in western countries (typically before 16 years).[16] However, it represents a decline in age at sexual intercourse compared with previous generations in China.[15] Trends towards earlier sexual experiences have occurred in the Chinese context of later marriage[17] and moderation of societal attitudes towards premarital sex.[18]

Second, lower SES shows a significant relationship with an increased probability of high-risk sexual behaviours for both males and females in our data. This finding is consistent with previous research on

Table 4 Multivariable logistic regression analysis of the association between socioeconomic status, family attitudes, parent–adolescent communication and risky sexual and reproductive health (no condom use at first intercourse, sexually transmitted infection acquisition, pregnancy)

Variable	No condom use at first intercourse†				STI acquisition†				Pregnancy/got partner pregnant‡			
	Females		Males		Females		Males		Females		Males	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Hometown												
Rural	Ref		Ref		Ref		Ref		Ref		Ref	
Suburban	0.86	0.73 to 1.03	1.05	0.87 to 1.28	0.87	0.55 to 1.39	0.66	0.36 to 1.21	0.75	0.51 to 1.09	0.59*	0.39 to 0.90
Urban	0.77**	0.65 to 0.91	0.89	0.74 to 1.08	0.85	0.53 to 1.36	0.64	0.35 to 1.15	0.83	0.57 to 1.20	0.61*	0.41 to 0.92
Maternal educational attainment												
Illiterate	Ref		Ref		Ref		Ref		Ref		Ref	
Primary school	0.67***	0.53 to 0.85	0.77	0.59 to 1.00	0.46**	0.28 to 0.77	0.65	0.29 to 1.43	0.66	0.43 to 1.02	0.72	0.43 to 1.19
Middle or high school	0.60***	0.49 to 0.75	0.70**	0.55 to 0.89	0.31***	0.19 to 0.50	0.64	0.31 to 1.31	0.45***	0.30 to 0.68	0.47**	0.29 to 0.77
College and above	0.54***	0.42 to 0.68	0.60***	0.45 to 0.79	0.33***	0.19 to 0.58	0.36*	0.15 to 0.88	0.28***	0.16 to 0.47	0.59	0.33 to 1.04
Monthly expenditure (USD)												
<150	Ref		Ref		Ref		Ref		Ref		Ref	
150–249	0.81	0.63 to 1.03	0.91	0.69 to 1.19	0.58	0.31 to 1.06	2.06	0.61 to 6.98	1.10	0.63 to 1.94	0.85	0.48 to 1.51
250–300	0.76*	0.59 to 0.97	0.74*	0.56 to 0.96	0.49*	0.26 to 0.91	1.78	0.52 to 6.10	0.71	0.39 to 1.28	0.58	0.31 to 1.06
≥300	0.88	0.70 to 1.11	0.74*	0.57 to 0.95	0.78	0.44 to 1.39	2.56	0.78 to 8.43	1.10	0.63 to 1.91	0.96	0.55 to 1.67
Family attitudes towards sex												
Closed	Ref		Ref		Ref		Ref		Ref		Ref	
Neutral	0.96	0.84 to 1.10	0.91	0.79 to 1.06	1.19	0.81 to 1.75	0.86	0.52 to 1.44	1.01	0.71 to 1.44	0.93	0.66 to 1.33
Open	1.06	0.87 to 1.28	1.07	0.90 to 1.27	1.34	0.80 to 2.23	0.76	0.40 to 1.43	1.32	0.83 to 2.10	1.10	0.75 to 1.62
Parent–adolescent communication about sex												
Seldom	Ref		Ref		Ref		Ref		Ref		Ref	
Medium	0.85**	0.76 to 0.95	0.91	0.80 to 1.04	1.03	0.75 to 1.42	1.30	0.83 to 2.03	0.78	0.59 to 1.02	1.03	0.76 to 1.40
Frequent	0.86	0.65 to 1.14	1.06	0.77 to 1.47	1.58	0.81 to 3.08	2.86*	1.23 to 6.63	0.87	0.43 to 1.74	1.78	0.96 to 3.32
Observations (n)	6641		4906		6641		4906		6622		4267	

Adjusted for age, region, maternal education, personal expenditure, family attitudes toward sex and parent–adolescent communication about sex.
*p<0.05, **p<0.01, ***p<0.001.
†Analysis was in adolescents who had been sexually active (had sexual intercourse) (n=11 547).
‡Analysis was in adolescents who had engaged in heterosexual intercourse (n=10 889).
aOR, adjusted odds ratio; CI, confidence interval; Ref, reference; STI, sexually transmitted infection; USD, United States dollars.

the influence of socioeconomic factors on age at sexual debut,[19] STI acquisition,[20] and the occurrence of unintended pregnancies.[21] SES appears to have a simultaneous causality on risky behaviours. SES might be the obstacle restricting educational opportunities and limiting access to health services for prevention and treatment.[22] Also the negative effects of STI acquisition and unintended pregnancy on healthcare expenditure may exacerbate poverty.[23] Additionally, providing a treatment service is an efficient approach for reducing the infection pools in the community and preventing secondary infection.[17] Consequently, interventions should address both the effects of poverty on risky sexual behaviours and, in turn, the impact of high-risk behaviours on health and economic productivity.

Our findings suggest that the higher education level of mothers is a protective factor against high-risk behaviours, including no condom use at first intercourse, STI acquisition, and unintended pregnancy, regardless of income bracket. Conversely, no significant differences by paternal educational level were found, before or after adjustment for social factors. This may be related to the fact that mothers are still the primary providers of sexual education within families.[24] Mothers, hoping to help their children avoid the problems associated with STI acquisition and unintended pregnancy, often teach them to be cautious and conservative about sex. So, the higher the mother's education level, the better she can teach her children.[25]

We are also concerned about the relationship between family sexual attitudes, parent–adolescent sexual communication, and adolescents' sexual behaviours.[9] For both males and females, open family attitudes are associated with an increased likelihood of early sexual intercourse. Our findings also showed that frequent parent–adolescent sexual communication was associated with a lower likelihood of risky sexual behaviours, which only applied to girls. Meanwhile, boys who discussed sex with their parents were more likely to have high-risk sexual behaviours, particularly STI acquisition.[26] Similarly, some studies found that adolescent males are more prone to report that their parents are accepting of premarital sexual activity. This parental acceptance can be a strong predictor of whether adolescents engage in intercourse.[4] Once family attitudes and communication frequency were controlled for, the relationship between early sexual intercourse and SES was diminished. This limited impact suggests the effect of economic factors is related to family attitudes and communication. With higher family economic level, parents have more open attitudes, and so the adolescents were more likely to have early sexual intercourse.[27]

Adolescents should be fully aware of the long-term consequences of unprotected sexual intercourse.[20] Among known social variations that influence youth's SRH, both rich and poor young adults are at risk for STI acquisition and pregnancy; thus, preventive endeavours such as universal health education are necessary. We highlight the need to develop health and educational intervention programmes that offer more options to young people. Every individual ought to have access to a high-quality SRH service without stigma and judgement, provided by well-trained healthcare professionals who have expertise in working with youths.[28]

Limitations

Several limitations to this study should be noted. First, the young adults' reports of SES and their sexual behaviours were self-reported data. Recall bias may exist and self-report of risky sexual behavioural data may underestimate true behaviour due to the traditional Chinese social norms on cultural sensitivity when talking about sexual issues and the emphasis on virginity. However, college students may tend to be more open-minded towards sex and may be more willing to report such cases in the confidential survey we employed. Second, family sexual attitudes and parent–adolescent communication about sex were obtained through simple questions and use of a more reliable assessment tool (validated scale) than the method we utilised should select for the measurement. Third, our cross-sectional survey is unable to determine causality; it is an explanatory study uncovering the association and filling the gaps. We expect future studies to examine each exposure–outcome relationship in the independent models.

Despite these limitations, this study generates several recommendations for future research by showing that family influences, including family SES, family sexual attitudes, and parent–adolescent communication about sex, might be an independent correlate of young adults' SRH. Given the context, more preventive strategies should be applied following the principle of proportionate universalism with a focus on more deprived populations, within a population-wide strategy, to prevent widening of social inequalities.[5]

CONCLUSIONS

Our findings highlight the important role of family SES and sexual attitudes in shaping youth's sexual behaviours. Higher maternal educational attainment is a protective factor, and adolescents who reported a more open family attitude towards sex were positively associated with early sexual intercourse. Researchers should pay close attention to SES and family sexual attitudes when studying adolescent SRH. We also highlight the need to develop health and educational intervention programmes that offer more options to young people. Eventually, endeavours on proper parental participation should be supported by Chinese policies aimed at reducing risky sexual behaviours among youth as this is a key protective factor, regardless of SES.

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Supplementary information: Appendix methods

Appendix method

Multi-stage sampling

Using multi-stage sampling, 241 institutions of higher learning were selected after balancing the population density, and different levels of educational institutions in China, according to the List of Institutions of Higher Learning released by China's Ministry of Education in 2018 [1].

In Stage 1, all of higher education institutions were classified into three categories (eastern, central and western regions) based on the administrative divisions provided by the National Bureau of Statistics of China. In Stage 2, select full-time universities and colleges (excluding adult colleges) from each region. Universities are divided into 4 levels: first-class universities, first-class disciplines universities, ordinary universities, and private universities. Colleges are divided into 3 levels: key colleges, ordinary colleges, and private colleges. In Stage 3, probability proportional to size (PPS) method was used to select universities and colleges from each level and a total of 241 higher education institutions were selected. In the final stage, by using the chain communication effect of social network, the questionnaire was sent out to select undergraduates. All the samples are volunteers recruited in the form of convenience sampling. Participation in the survey is decided by the students themselves and can be withdrawn at any time during the process.

Attention Check Questions

Using Attention Check Questions (ACQs) to screen out inattentive respondents. ACQs were included in different parts of the survey, asked participants “It’s important that you pay attention to this study. Please tick ‘Don’t know’” or “Make sure to select ‘Don’t know’ as an answer so that we know you are paying attention”.

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