

## EPIDEMIOLOGY

# Unmarried Youth Pregnancy, Outcomes, and Social Factors in China: Findings From a Nationwide Population-Based Survey



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## ABSTRACT

**Introduction:** Early pregnancies and their poor reproductive outcomes remain increasing concerns.

**Aim:** This study aims to investigate the pregnancy rate and outcomes and to identify social factors associated with pregnancy among Chinese unmarried youths aged 15–24 years.

**Methods:** Data were obtained from the Survey of Youth Access to Reproductive Health in China, and 11,076 unmarried female youths were analyzed. Prevalence of pregnancy by various demographic and socioeconomic characteristics was calculated. Univariate and multivariable logistic regression models were used to identify factors associated with pregnancy.

**Main Outcome Measure:** The main outcome is pregnancy among unmarried female youths during their lifetime.

**Results:** Among 11,076 female youths, 501 individuals reported 697 premarital pregnancies during their lifetime until the survey was conducted, approximately 62.9 (95% CI: 58.5–67.6) pregnancies per 1,000 female youths. Older age group (odds ratio [OR] = 4.49; 95% CI = 3.60–5.59), low education levels (primary school and below: OR = 1.78, 95% CI = 1.33–2.37; junior and senior high school: OR 1.44, 95% CI = 1.15–1.80), living in non-eastern regions (central: OR 1.34, 95% CI = 1.06–1.68; west: OR 1.62, 95% CI = 1.28–2.04), cigarette smoking (OR 3.60, 95% CI = 2.76–4.70), alcohol drinking (OR 1.59, 95% CI = 1.28–1.97), from family with mother's education of primary school and below (OR 1.65, 95% CI = 1.11–2.46), and the bottom economic status (OR 1.48, 95% CI = 1.14–1.91) were associated with higher risk of premarital pregnancy among female youths.

**Conclusion:** The findings justify the national concern for pregnancy among unmarried youth in China. Strategies to improve sexual education in school and family, to enhance the reproductive services for youth, and to increase public awareness of the reproductive health of young people were warranted. **Guo C, Pang L, Ding R, et al. Unmarried Youth Pregnancy, Outcomes, and Social Factors in China: Findings From a Nationwide Population-Based Survey. Sex Med 2019;7:396–402.**

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**Key Words:** Pregnancy Rate; Pregnancy Outcomes; Social Factors; Unmarried Youth; China

## INTRODUCTION

Early pregnancies and their poor reproductive outcomes remain increasing concerns in the international community, especially for low- and middle-income countries. According to the World

Health Organization (WHO), about 18.5 million girls under 19 years of age give birth every year—most in low- and middle-income countries,<sup>1</sup> and the number of pregnancies is much higher if all pregnancies, not only births, are included according to the United Nations Population Fund. Millions of girls are coerced into unwanted pregnancies, putting them at risk of unsafe abortions and dangerous childbirth. Indeed, pregnancy changes a girl's present and future radically, and rarely for the better.<sup>2</sup>

Most of the previous studies of early pregnancy focused on adolescents aged 10–19 years and indicated that the pregnancy rates across nations were from 8–57 pregnancies per 1,000 girls aged 15–19 years and from 0.09 to 2.64 pregnancies per 1,000 girls aged 10–14 years.<sup>3</sup> Some studies focused on young adults.

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**Table 1.** Characteristics of unmarried female youth and pregnancy rate

Characteristics	Participants		Pregnancy		P value
	No.	Proportion (%)	No.	Rate, 95% CI (per 1,000 female youths)	
Total female youths	11,076	100.0	697	62.9 (58.5–67.6)	
Age group, years					< .001
15–19	6,731	60.8	231	34.3 (30.1–38.9)	
20–24	4,345	39.2	466	107.2 (98.2–116.8)	
Education					< .001
Primary school and below	1,605	14.5	138	83.9 (72.7–100.8)	
Junior and senior high school	6,269	56.6	354	55.4 (50.9–62.5)	
College and above	3,202	28.9	205	63.3 (55.8–73.1)	
Residence location					.2828
Rural	4,837	43.7	318	65.7 (58.9–73.1)	
Urban	6,239	56.3	379	60.7 (54.9–67.0)	
Region					< .001
East	6,117	55.2	343	56.1 (50.4–62.1)	
Central	2,762	24.9	172	62.3 (53.5–71.9)	
West	2,197	19.8	182	82.8 (71.6–95.2)	
Cigarette smoking					< .001
Yes	679	6.1	192	282.8 (249.2–318.3)	
No	10,397	93.9	505	48.6 (44.5–52.9)	
Alcohol drinking					< .001
Yes	2,698	24.4	346	128.2 (115.8–141.4)	
No	8,378	75.6	351	41.9 (37.7–46.4)	
Mother's education					< .001
Primary school and below	2,587	23.4	229	88.5 (77.8–100.1)	
Junior and senior high school	7,239	65.4	405	55.9 (50.8–61.5)	
College and above	1,250	11.3	63	50.4 (38.9–64.0)	
Household economic status					.569
Top	3,836	34.6	235	61.3 (53.9–69.3)	
Medium	3,503	31.6	214	61.1 (53.4–69.5)	
Bottom	3,737	33.7	248	66.4 (58.6–74.8)	

Among female youths aged 18–24 years in South Africa, 19.2% had an adolescent pregnancy.<sup>4</sup> The unintended pregnancy rate among U.S. youths aged 20–24 years was 104 per 1,000 women.<sup>5</sup> Abortion was reported as the leading outcome of adolescent pregnancy.<sup>6</sup> Child marriage was considered driving early pregnancy directly,<sup>2</sup> and social factors, such as poor education, poor employment prospects, low socio-economic status, and poor psychological family support were described to be associated with adolescent pregnancy generally.<sup>7,8</sup>

Child marriage in China is not so common, with only 2.2% of those aged 15–24 years getting married under 18 according to the population census in 2010.<sup>9</sup> However, adolescent or youth pregnancy is still an important issue in China especially that these pregnancies are outside marriage. Unmarried pregnant youths face more social stress, which may cause rejection by their families, the end of their education, and the threat of violence, and even higher risk of unsafe abortion.<sup>2</sup> As the most populous nation, China has an estimated number of >175 million youths aged 15–24 years, accounting for 12.8% of the total population.<sup>10</sup> However, the sexual and reproductive health education

and consulting services are still less accessible in China than high-income countries. Studies on pregnancy rate, outcome, and social factors among youths using nationwide population-based data are relatively rare, and even the global research, which reviewed the pregnancy rate across 21 countries, did not include data of China.<sup>3</sup> A study conducted among never-married sexually active youths (15–24 years old) in Shanghai indicated that 13.8% of female youths had been involved in an unintended pregnancy, and 99.0% of such pregnancies were reported to have ended in abortion.<sup>11</sup> However, the study used data with small sample size and local population, and, thus, exploration of rate and social factors influencing pregnancy among Chinese youths was not attempted.

In this study, we aim to investigate the pregnancy rate and outcomes and to identify social demographic factors associated with pregnancy among Chinese unmarried youths using nationally representative data. The findings may provide future strategies to enhance sexual education and reproductive health care service for the young people and will contribute to the literature of international adolescent pregnancy research.

**Table 2.** The outcomes of pregnancies among unmarried female youths in China

Pregnancy outcomes	Number (persons)				Distribution (%)				Rate, 95% CI (per 1,000 female youths)				P value
	Total female youths		Total female youths		Total female youths		Total female youths		Total female youths		Total female youths		
	15–19 y	20–24 y	15–19 y	20–24 y	15–19 y	20–24 y	15–19 y	20–24 y	15–19 y	20–24 y	15–19 y	20–24 y	
Induced abortion	575	416	82.5	68.83	89.27	89.27	51.9 (47.9–56.2)	23.6 (20.1–27.5)	95.7 (87.2–10.5)	< .001	4.0 (2.9–5.3)	3.9 (2.3–6.3)	< .001
Spontaneous miscarriage	44	17	6.31	11.69	3.65	3.65	0.7 (0.3–1.4)	1.2 (0.5–2.3)	0.0 (0.0–0.8)	.023	0.5 (0.2–1.2)	0.2 (0.0–1.2)	.258
Live birth	8	0	1.15	3.46	0	0	5.8 (4.5–7.4)	4.8 (3.3–6.7)	7.4 (5.0–10.4)	.077	0.7 (0.3–1.4)	0.0 (0.0–0.8)	.023
Still birth	6	1	0.86	2.16	0.21	0.21	5.8 (4.5–7.4)	4.8 (3.3–6.7)	7.4 (5.0–10.4)	.077	0.5 (0.2–1.2)	0.2 (0.0–1.2)	.258
Still pregnant	64	32	9.18	13.85	6.87	6.87	5.8 (4.5–7.4)	4.8 (3.3–6.7)	7.4 (5.0–10.4)	.077	5.8 (4.5–7.4)	7.4 (5.0–10.4)	.077

## METHODS

### Data Source

Data were obtained from the Survey of Youth Access to Reproductive Health in China (YARHC), a nationally representative survey of unmarried youths aged 15–24 years in mainland China conducted in 2009.<sup>12</sup> The study protocol was reviewed and approved by the institutional review board of Peking University Health Science Centre. All respondents submitted their consent to participate in the survey; for those under 18 years of age, the consents were signed by their adult guardians.

The target population of this survey was Chinese unmarried youths aged 15–24 years living in mainland China, including school youths (youths in school, either living on campus or commuting), household youths (youths living at home with their family, either employed or unemployed), and collective household youths (employed young people living in a communal house). 579 interviewers, including health workers, students, community services staff, etc., received rigorous training according to the standard set by the survey expert committee; preliminary interviews were conducted in a pilot study in May 2009. The formal survey was conducted between October 20 and November 30, 2009. During the survey, necessary measures were taken to protect the privacy of the youths. All subjects were interviewed face-to-face in independent environments without any third-party present. The name and contact information of interviewees were not required and the sensitive questions related to sexual experiences and behaviors in the questionnaire were self-administered and completed by respondents themselves. All questionnaires were collected in ballot boxes after being completed. In addition, interviewees were interviewed by interviewers of the same sex.

The probabilistic samples were drawn via 4 stages stratified random cluster sampling with probability proportional to size. The 4 stages for school youths, household youths, and collective household youths were cities-schools-classes-students, cities-counties-communities-household youths, and cities-counties-map pieces (divided according to the streets, rivers, and so on in the map)-collective household youth, respectively. The final samples were distributed in total of 40 cities and counties from 25 provinces/autonomous regions/municipalities in China. Finally, we collected 22,465 questionnaires, among which 22,288 were valid (ie, a valid rate of 98.9%). In this study, only female respondents were considered. Thus, the samples for analysis were restricted to 11,076 female youths.

### Measures

In this study, pregnancy rate is the number of the event per 1,000 female subjects during their lifetime. The outcomes of pregnancy when participants were interviewed include induced abortion, miscarriage, live birth, still birth, and still pregnant. In the survey, induced abortion referred to an intentional termination of any pregnancy before a fetus has developed enough to live if born. Miscarriage was defined as the natural death of a fetus before it is fully developed and able to survive.

**Table 3.** The ORs and 95% CI for factors associated with pregnancy among unmarried female youths

Characteristics	Univariate analysis			Multivariable analysis		
	Unadjusted OR	95% CI	<i>P</i> value	Adjusted OR	95% CI	<i>P</i> value
Age group, years						
15–19	Reference			Reference		
20–24	4.44	3.64–5.44	< .001	4.49	3.60–5.59	< .001
Education						
College and above	Reference					
Junior and senior high school	0.72	0.59–0.88	.001	1.44	1.15–1.80	.001
Primary school and below	1.19	0.91–1.54	.186	1.78	1.33–2.37	
Residence location						
Urban	Reference			Reference		
Rural	1.17	0.97–1.40	.094	1.03	0.84–1.27	.77
Region						
East	Reference			Reference		
Central	1.23	0.99–1.53	.063	1.34	1.06–1.68	.014
West	1.63	1.31–2.03	< .001	1.62	1.28–2.04	< .001
Cigarette smoking						
No	Reference			Reference		
Yes	5.42	4.34–6.79	< .001	3.60	2.76–4.70	< .001
Alcohol drinking						
No	Reference			Reference		
Yes	2.86	2.39–3.43	< .001	1.59	1.28–1.97	< .001
Mother's education						
College and above	Reference			Reference		
Junior and senior high school	1.30	0.93–1.82	.127	1.24	0.87–1.77	.243
Primary school and below	2.03	1.43–2.89	< .001	1.65	1.11–2.46	.013
Household economic status						
Top	Reference			Reference		
Medium	1.21	0.97–1.51	.092	1.25	0.99–1.60	.065
Bottom	1.17	0.94–1.46	.155	1.48	1.14–1.91	.003

OR, odds ratio.

Live birth occurred when a fetus exits the maternal body and subsequently shows any sign of life, regardless of the gestational age. Still birth referred to any fetal death after 20 weeks of pregnancy, resulting in a baby born without signs of life. Still pregnant was defined if the individual was still pregnant during the time of the survey.

Age at the time of the survey was set as continuous and further categorized as 15–19 years of age and 20–24 years of age. Survey respondents were also categorized by residence location (rural areas or urban areas), education level (primary school and below, junior and senior high school, or college and above), region (east, central or west), cigarette smoking (yes or no, based on the response to the question “Have you ever smoked?”), alcohol drinking (yes or no, based on the response to the question “Have you ever drunk?”), mother's education level (primary school and below, junior and senior high school, or college and above), and household economic status (categorized by tertiles based on the annual family income per capita: “top” for above 15,000 yuan, “middle” for 7,500–15,000 yuan, and “bottom” for under 7,500 yuan).

## Data Analysis

Descriptive statistics were used to present the sample characteristics, population numbers, pregnancy rates, and proportion of pregnancy outcomes by various sociodemographic characteristics. Univariate and multivariable logistic regression models were used to calculate the unadjusted and adjusted odds ratios (ORs) and 95% CIs for factors associated with pregnancy among the unmarried female youths. The Taylor series linearization method was used to estimate variance and corresponding 95% CI. STATA version 13 (STATA Corp, College Station, TX, USA) was used to perform all the data analyses. We set *P* value < .05 as statistically significant.

## RESULTS

### Participants' Characteristics

The study population comprised 11,076 unmarried female youths aged 15–24 years. The average age of samples was  $18.9 \pm 2.5$  years. Urban youths accounted for 56.3% of the samples, and more than a half of the respondents were with an

education level of junior and senior high school. Other demographic and socioeconomic characteristics of samples are shown in Table 1.

### Pregnancies and Outcomes Among Unmarried Female Youths

Among 11,076 unmarried female youths, 501 individuals reported 697 pregnancies during their lifetime until the survey was conducted, approximately 62.9 (95% CI = 58.5–67.6) pregnancies per 1,000 female youths. The pregnancy rates for adolescents aged 15–19 years and youths aged 20–24 were 34.3 (95% CI = 30.1–38.9) and 107.2 (95% CI = 98.2–116.8) pregnancies per 1,000 females, respectively. Pregnancy rates were also found significantly different among youths with demographic and social economic characteristics (Table 1).

For the outcomes of these pregnancies, 82.5% ended as induced abortion. The rate of induced abortion, spontaneous miscarriage, live birth, still birth, and still pregnant among unmarried female youths were 51.9 (95% CI = 47.9–56.2), 4.0 (95% CI = 2.9–5.3), 0.7 (95% CI = 0.3–1.4), 0.5 (95% CI = 0.2–1.2), and 5.8 (95% CI = 4.5–7.4) per 1,000 female youths, respectively.

As shown in Table 2, induced abortion was the leading outcome for both adolescent girls aged 15–19 years and young adults aged 20–24 years. Adolescent girls were more likely to childbirth than young adults, with a higher live birth rate ( $P = .023$ ) as well as a higher still birth rate, although not significant ( $P = .258$ ).

### Factors Associated With Pregnancy Among Unmarried Female Youths

The associations between demographic and socioeconomic characteristics and pregnancy are presented in Table 3. The youths were 20–24 years of age (OR = 4.49; 95% CI = 3.60–5.59), lower education levels (primary school and below: OR = 1.78; 95% CI = 1.33–2.37; junior and senior high school OR = 1.44; 95% CI = 1.15–1.80), living in non-eastern regions (central: OR = 1.34; 95% CI = 1.06–1.68; west: OR = 1.62; 95% CI = 1.28–2.04), cigarette smoking (OR = 3.60; 95% CI = 2.76–4.70), alcohol drinking (OR = 1.59; 95% CI = 1.28–1.97), from family with mother's education of primary school and below (OR = 1.65; 95% CI = 1.11–2.46), and the bottom economic status (OR = 1.48; 95% CI = 1.14–1.91) were associated with higher risk of pregnancy among unmarried youths (Table 3).

## DISCUSSION

There is growing awareness that young girls are facing enormous challenges around the world. The themes of World Population Day in 2013 and 2016 are “Adolescent Pregnancy” and “Investing in teenage girls,” respectively. The results presented that the pregnancy rate among Chinese adolescents aged 15–19

years (34.3 pregnancies per 1,000 females) is similar with some European countries (ie, Iceland (30), Slovakia (33), Armenia (37), and Hungary (38)), but higher than another Asian country (ie, Japan (13)).<sup>3</sup> In addition, the pregnancy rate among Chinese unmarried youths aged 20–24 years (107.2) is almost consistent with the unintended pregnancy rate among U.S. youths aged 20–24 years (104).<sup>5</sup> That is a little unexpected for that in traditional opinion, Chinese usually have relatively conservative attitudes toward sex, especially premarital sex. This study justifies the national concern for the early pregnancy among unmarried youths in China as the development of society and economy as well as changes of people's behaviors and attitudes.

Consistent with previous studies,<sup>11</sup> abortion was the leading outcome of youth pregnancy because it was usually taken as a main remedial measure for an unintended pregnancy. However, unmarried pregnant young girls are more likely to resort to unsafe abortion due to the social costs and stigma that they face.<sup>2</sup> To make matters worse, our findings indicated the adolescents' (15–19 years) birth rate was significant higher than young adults (20–24 years). A previous study has pointed out that the babies born to adolescent mothers face a substantially higher risk of dying than those born to young women aged 20–24.<sup>13</sup> Given the large population of China, the situation in Chinese adolescent pregnancy and childbirth highlights the need of potential policy change focusing on young girls in China.

Several demographic and socioeconomic factors were associated with youth pregnancy. Low education level was associated with higher likelihood of pregnancy in this study, which was consistent with previous findings.<sup>7</sup> This could be explained by the fact that youths with higher education were more likely to be aware of sexual and reproductive health knowledge than those with lower education.<sup>14</sup> In addition, students could talk the sex-related issues, such as family planning methods, pregnant, or abortion, with their friends and schoolmates without reluctance and get more help from peers.<sup>15</sup> Non-eastern residency was associated with higher likelihood of youth pregnancy. This could be explained by the unbalanced economic and medical development across regions in China, where most of the central and west areas had fewer reproductive health services, including contraceptive services and sexual education for youths than the east areas.<sup>16</sup>

Individual behavior differences in youth pregnancy can be found in this study. Previous studies indicated that cigarette smoking and alcohol drinking were important causes of unprotected sex,<sup>17</sup> and associated with premarital pregnancies and abortion,<sup>18,19</sup> especially for youths who are still developing the knowledge and skills necessary to regulate their sexual behaviors in adaptive ways. Furthermore, consistent with previous reports,<sup>7,8</sup> findings from this study suggest that pregnant adolescents were more likely to come from families with low economic status and low mother's education. Previous studies indicated that support from the family relatives, particularly the mother, played a significant role in adolescents' reproductive well-being, because they might provide an important source of support for

adolescents' decision making, including pregnancy and induced abortion.<sup>20</sup> Currently, China is undergoing medical system reform and the Chinese government has developed the Healthy China Plan as a national strategy.<sup>21</sup> The plan is a document of general guideline for promoting people's health in the coming 15 years. Health promotions for the entire population and throughout the total life cycle are the 2 main themes, whereas youth and women are 2 of the key populations. Our findings will be beneficial for implementing more comprehensive reproductive health strategies for improving the well-being of youths, especially those with lower socioeconomic status.

The current study has several limitations. First, the cross-sectional design does not provide direct evidence of causality, so that our results should be interpreted with caution and further research is required. Second, the data we used focused on unmarried youths, and the sexual behaviors of youths after marriage could not be observed. Third, premarital pregnancy and related issues remain very sensitive sexual topics in China, especially among youths; worries about embarrassment and stigma may lead to under-reporting. Regardless of these limitations, given the fact that the study was based on a large, representative population-based sample covering all mainland areas of China, this study provides a new and broader understanding of pregnancy among unmarried youths in China.

This study presented the pregnancy rates and outcomes, and their relationships to various key socioeconomic conditions among Chinese unmarried youths. The findings highlight the need for reproductive health promotion programs in favor of unmarried girls in China. Strategies to improve the contraceptive education in school and family, to enhance sexual and reproductive education and services for youths, and to increase public awareness of the reproductive health of young people were warranted.

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Chao Guo; Lihua Pang; Ruoxi Ding; Xinming Song; Gong Chen; Xiaoying Zheng; All authors have made a substantial contribution to the manuscript. Chao Guo initiated the study, analyzed data and wrote the original article. Lihua Pang; Ruoxi Ding; Xinming Song provided advice on analyzing data and writing the article. Gong Chen participated in originating and conducting the study, and supervised data collection. Xiaoying Zheng originated the study, obtained the funding, supervised all aspects of its implementation and contributed to writing the article. All authors interpreted the findings, critically reviewed the manuscript and approved the final version of the manuscript. All authors agree with the authors list appeared on the manuscript.

## REFERENCES

1. World Health Organization (WHO). Adolescent Pregnancy Fact Sheet. 2018. Available at: <http://www.who.int/mediacentre/factsheets/fs364/en/>.
2. United Nations Fund for Population Activities (UNFPA). *Girlhood, Not Motherhood: Preventing Adolescent Pregnancy*. New York, NY: UNFPA; 2015.
3. Sedgh G, Finer LB, Bankole A, et al. Adolescent pregnancy, birth, and abortion rates across countries: Levels and recent trends. *J Adolesc Health* 2015;56:223-230.
4. Mchunu G, Peltzer K, Tutshana B, et al. Adolescent pregnancy and associated factors in South African youth. *Afr Health Sci* 2012;12:426-434.
5. Black AY, Fleming NA, Rome ES. Pregnancy in adolescents. *Adolesc Med State the Art Rev* 2012;23:123-138.
6. Menezes GM, Aquino EM, da Silva DO. Induced abortion during youth: Social inequalities in the outcome of the first pregnancy. *Cad Saude Publica* 2006;22:1431-1446.
7. Chedraui P. Pregnancy among young adolescents: Trends, risk factors and maternal-perinatal outcome. *J Perinat Med* 2008;36:256-259.
8. Wang RH, Wang HH, Hsu MT. Factors associated with adolescent pregnancy - A sample of Taiwanese female adolescents. *Public Health Nurs* 2003;20:33-41.
9. The Census Office of the State Council. *Tabulation of the 2010 population census of the People's Republic of China*. Beijing, China: China Statistics Press; 2012.
10. China National Bureau of Statistics (NBOS). *2016 China Statistical Yearbook* China Statistics Press. Beijing, China: China Statistics Press; 2016.
11. He H, Blum RW. Prevalence of unintended pregnancy and its associated factors among sexually active never-married youth in Shanghai. *J Paediatr Child Health* 2013;49:912-918.

12. Zheng X, Chen G, Han Y, et al. [Survey of youth access to reproductive health in China]. *Popul Dev Rev* 2010;16:2-16 [in Chinese].
13. Ganchimeg T, Ota E, Morisaki N, et al. Pregnancy and child-birth outcomes among adolescent mothers: A World Health Organization multicountry study. *BJOG* 2014;121-(Suppl 1):40-48.
14. Adhikari R. Knowledge on legislation of abortion and experience of abortion among female youth in Nepal: A cross sectional study. *Reprod Health* 2016;13:48-57.
15. Adhikari R. Factors affecting awareness of emergency contraception among college students in Kathmandu, Nepal. *BMC Womens Health* 2009;9:27.
16. Li C, Zeng L, Dibley MJ, et al. Evaluation of socio-economic inequalities in the use of maternal health services in rural western China. *Public Health* 2015;129:1251-1257.
17. Li S, Huang H, Xu G, et al. Substance use, risky sexual behaviors, and their associations in a Chinese sample of senior high school students. *BMC Public Health* 2013;13:295-305.
18. Mensch B, Kandel DB. Drug use as a risk factor for premarital teen pregnancy and abortion in a national sample of young white women. *Demography* 1992;29:409-429.
19. Makenzius M, Tydén T, Darj E, et al. Repeat induced abortion – a matter of individual behaviour or societal factors? A cross-sectional study among Swedish women. *Eur J Contracept Reprod Health Care* 2011;16:369-377.
20. Ralph L, Gould H, Baker A, et al. The role of parents and partners in minors' decisions to have an abortion and anticipated coping after abortion. *J Adolesc Health* 2014;54:428-434.
21. World Health Organization (WHO). Healthy China 2030 (from vision to action); Available at: <http://www.who.int/healthpromotion/conferences/9gchp/healthy-china/en/>. Accessed November 22, 2017.