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Survey and Analysis of Adolescent Reproductive Health Education for High School Students on a Global Scale

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Abstract: *To improve adolescent reproductive health education, the main goal of this survey was to evaluate the knowledge level of high school students regarding reproductive health. A random sampling questionnaire survey method was used and high school students in urban areas were selected as the research participants on a global scale. The results showed that the Internet was the main source of related knowledge for high school students in China. The rate of sexual activity during high school in Europe was significantly higher than that in China. In terms of education from parents, there was a significant difference between the proportion of high school students that had sexual knowledge-related conversations with their parents in mainland China and those in other countries. It should be advocated to gather resources and power from the whole society to care about comprehensive adolescent sexuality education.*

Keywords: *Puberty Sex Education, Fertility Protection, Reproductive Health*

1. Background Information

Adolescence is a crucial stage in every individual's development from childhood to adulthood. The increasing demand for reproductive health knowledge by high school students and their lack of understanding of relevant information has led to the threat of many health and social problems such as unplanned pregnancies and sexually transmitted disease infections (STI). Therefor, unlike cultural courses, the objective of adolescent reproductive health education should not be restricted to the delivery of written knowledge but should also help adolescents grow in a more confident, positive, safe, and healthy manner. The effect of such education is not only manifested in the adolescence stage but also influences many aspects such as future romance, marriage, childbirth, parent-child, and social relationships. With social and economic development, adolescents' altitudes and perspectives toward sex have become more liberal and open.

Currently, reproductive health education in China is still in an early stage. School-based education lacks an assessment system. There is randomness, with no clear requirements for credit hours or structure and content for adolescent reproductive health education; there is a lack of expert lecturers; the course content is limited and conservative; most of the educational content only touches on physical development and psychological changes during puberty; parents tend to only care about their children's grades and pay insufficient attention to the level of adolescent sexual health education, and parents also tend to neglect communication with their children and their mental health demands in terms of reproductive health.

Therefore, it is imperative to promote adolescent reproductive health education. In this survey, we used high school as a starting point and assessed the knowledge level of sexual health among high school students, laying the foundation for promoting and improving adolescent reproductive health education.

2. Methods

2.1. Sample

This survey used a questionnaire random sampling strategy and selected high school students from

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five cities of Shanghai, Hangzhou, Ningbo, Vienna, and Vancouver worldwide as the study subjects. The inclusion criteria included: (1) voluntary participation in the study and (2) middle school students aged 15 to 18 years. The exclusion criteria included: (1) incomplete questionnaire responses, (2) simple repetitive responses, (3) students older than 18 or younger than 15 years, who were not recruited to the survey.

A promise was made that information obtained from the student participants would be used only for this survey and the survey was conducted anonymously.

2.2. Survey Instrument

(1) Basic Information Questionnaire. A self-designed Basic Information Questionnaire was used in this study to collect basic information on the students and their families. There were eight items on the questionnaire, including the basic demographic characteristics of age, gender, religion, parents' occupations, and monthly household income.

(2) The adolescent sexual knowledge questionnaire was researcher-made. It included seven true or false questions, where the respondents chose whether the multiple-choice statements were true or false, and six multiple-choice questions, among which five questions had only one correct answer and one question had one or more correct answers.

(3) The questionnaires were translated into three languages, Chinese, English, and German.

2.3. Data Collection Methods

During this survey research, questionnaires were either sent electronically via quick response code on Wechat or printed and handed out to high school students to recruit them to the survey. Invalid questionnaires were deleted according to the exclusion criteria. A total of 408 questionnaires were received, among which 225 were from Wechat, and 183 were hardcopies, with an effective questionnaire return rate of 95%.

2.4. Statistical Analysis Methods

Statistical analyses were performed using the Statistical Package for the Social Sciences, version 20.0 (SPSS Inc., Chicago, IL, USA). Countable data are presented as rates and chi-squared tests were performed for pairwise comparisons. A P-value of < 0.05 indicated a statistically significant difference.

3. Results

3.1. Survey on the Sexual Knowledge Level of Males and Females during Adolescent Development

A total of 388 individuals participated in the survey, among which 183 were males and 105 were females. Each participant was recruited according to the exclusion criteria. The average age of the participants was 17 years old. They were all from high schools from regions such as China, Austria and Canada.

3.2. Sexual Knowledge Level

Of the participants, 84.70% of the males and 81.95% of the females considered themselves to have sexual knowledge, showing a difference between genders (Table 1). However, 2.19% of the males and 0.98% of the females reported "No understanding," showing no significant difference. This shows that, in terms of knowledge on adolescent development, both males and females had similar knowledge levels but males were more confident than females that they had a better understanding of relevant knowledge (p=0.368).

Table 1: Sexual knowledge levels of males and females

Gender	Understanding	No understanding	A little understanding	Total	t / C2	P
Males	155 (84.70%)	4 (2.19%)	24 (13.11%)	183		0.368
Females	168 (81.95%)	2 (0.98%)	35 (17.07%)	205		
Total	323 (83.25%)	6 (1.55%)	59 (15.20%)	388	1.96	

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3.3. Knowledge of Contraception Methods

Regarding knowledge on contraception methods, the majority of high school students had some understanding of contraception methods, among which the proportion of students knowing the methods of condom use was the highest while the proportion of them knowing about safe period contraception was the lowest (Table 2).

Table 2: Knowledge of contraception methods of males and females

Gender	Contraceptive drug	Condom	Safety period
Males	90.5%	98.7%	68.9%
Females	98.1%	99.0%	57.8%

3.4. Sexual Behaviors

Regarding the survey questions on past sexual intercourse, 10.90% of the participants from mainland China reported past sexual intercourse experience, with a higher rate in males than in females (Table 3). As shown in Table 3 ($p<0.001$), the frequency of sexual intercourse experience was significantly higher among high school students in countries other than China compared to China, with almost half of the high school students in countries other than China reporting ever having sexual intercourse experiences.

Table 3: Proportion of high school students with sexual intercourse experience in China and other countries

Region	With sexual intercourse experience	With no sexual intercourse experience	Total	t / C^2	P
Other Countries except China	107 (51.20%)	102 (48.80%)	209		<0.001
China	12 (6.70%)	167 (93.30%)	179		
Total	119 (30.67%)	269 (69.33%)	388	89.30	

3.5. Whether the Participants Understood that Unprotected Sexual Intercourse Could Cause STDs and Pregnancy

Table 4 demonstrates that females better understood that unprotected sexual intercourse could lead to the spread of STDs and pregnancy compared to males. In addition, the proportion of males who had no understanding of that was significantly higher than that of females ($p=0.029$).

Table 4: Proportion of high school students who understood the consequences of failure to use contraception between males and females

Gender	Understood the consequences of failure to use contraception	Did not understand the consequences of failing to use contraception	Total	t / C^2	P
Males	173 (94.54%)	10 (5.46%)	183		0.029
Females	202 (98.54%)	3 (61.46 %)	205		
Toutal	375 (96.65%)	13 (3.35%)	388	4.78	

3.6. Sexual Knowledge-related Communication with Parents

As shown in Table 5, almost half of the high school students in foreign countries talked about sexual knowledge-related issues with their parents while only a very small proportion of Chinese high school students had related conversations with their parents. The proportion of high school students that had related parent-child conversations in foreign countries was significantly higher than that in China ($p<0.001$).

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Table 5: Proportion of high school students who could talk about sexual knowledge-related issues with their parents between China and other coutries

Region	Talked about sexual knowledge-related issues with parents	Did not talk about sexual knowledge-related issues with parents	Total	t / C2	P
China	52 (29.55%)	124 (70.45%)	176		<0.001
Other countries	103 (48.58%)	109 (51.42%)	212		
Total	155 (39.95%)	233 (60.05%)	388	14.53	

3.7. Sources of Students' Sexual Knowledge

Most of the students obtained their sexual knowledge through mass media including the Internet, books, and magazines, while only a small number of students obtained their sexual knowledge from their parents. Different genders have different ways of acquiring sexual knowledge, which is statistically significant (p=0.003).

Table 6: Sources of students' sexual knowledge

Gender	Parents	School-based education	Mass media including the Internet, books and magazines	Peer	Total	t / C^2	P
Males	2 (1.11%)	42 (23.46%)	97 (54.19%)	44 (24.58%)	179		0.003
Females	10 (4.93%)	38 (18.72%)	119 (39.95%)	36 (58.62%)	203		
Total	12 (3.09%)	80 (20.62%)	216 (55.67%)	80 (20.62%)	388	13.96	

4. Discussion

With the development and application of network technology and electronic products, it has become very easy to access various kinds of information on the Internet. The survey showed that more than half of the high school students in mainland China obtained their sexual knowledge mainly through the Internet and media (p=0.003). The proportion of high school students that obtained sexual knowledge from school was significantly lower in mainland China than that in Europe. The convenience of accessing knowledge from the Internet is one of the important reasons why adolescents preferred this approach. However, the reliability and accuracy of resources on the Internet need to be improved. The massive amount of information might mislead adolescents because high school students do not yet have the judgment to distinguish accurate and practical information, which can lead to incorrect behaviors that are caused by incorrect information. In contrast, more than 70% of adolescents in foreign countries obtained relevant information from school-based education. Systematic school education can effectively address the problem of information inaccuracy. The approach of Chinese high school students to accessing reproductive information was somewhat associated with the problematic setting of the school-based sexuality education curriculum. It fails to draw students to obtain relevant information through formal courses. Thus, promoting school-based education to become the main source of sexual knowledge for adolescents is necessary to ensure the dissemination of reliable and scientific reproductive health information and help adolescents better protect themselves. This can further reduce the rates of unplanned pregnancies[1].

There was also a significant difference between the rates of sexual behaviors among high school students in mainland China and that in foreign countries (p<0.001). Investigations indicated that the probability of high school students engaging in sexual behaviors in Europe was higher than that in mainland China. In recent years, the initiation of sexual activity has been earlier than previously among Chinese adolescents, along with higher rates of abortion. A previous study [3] reported the rate of sexual behavior increased annually among high school students in mainland China and most adolescent pregnancies lead to abortion, which has a large impact on female adolescents' physical and mental health. The Report on Accessibility of Adolescents' reproductive health in China indicated that 51.2% of the adolescents aged 15 to 24 years who engaged in sexual behavior did not use any contraception during their first sexual intercourse experience. This indicates that most adolescents aged 15 to 24 years

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were not able to effectively apply contraception or did not use any contraception method. A foreign study [2] showed that the rate of unplanned pregnancies among adolescents aged 15 to 19 years accounted for 13% of the total rate of unplanned pregnancies in the United States while the rate of unplanned pregnancies among adolescents worldwide accounted was 25%. This overly high proportion demonstrates that adolescents did not have the ability to apply the sexual knowledge they acquired to protect themselves, highlighting the importance of promoting reproductive health education and implementing contraception methods. Furthermore, the survey results from a Chinese research study showed [4] that 28.5% of the randomly selected 80,000 abortion cases were in females younger than 24 years old. Most of the abortion patients were young women who had an inadequate awareness of self-protection, failed to use any contraception method, and had a fluke mentality, directly causing the relatively high rates of unplanned pregnancies and abortions. Analysis of the Trend and Characteristics of Syphilis in China from 2014 to 2019 [5] reported that the incidence of syphilis in the age groups of 10 to 14 and 15 to 19 years old had increased significantly, with growth rates reaching 18.56% and 13.54%, respectively. In addition, the paper reported that a high incidence of syphilis occurred among students. According to the new report "Analysis of the Basic Characteristics and Trends of HIV/AIDS Among Adolescents in China from 2010 to 2019 [6], although the rising rate of HIV and AIDS infections among adolescents had declined, the incidence in the group aged 15 to 17 years still showed a rising trend. From the perspective of physiology, sexual behavior is a normal physiological need. High school students are still in the confused adolescence period with immature physiological and mental development. Acting recklessly with a lack of sexual knowledge and self-protection awareness will cause undesirable consequences such as unplanned pregnancies and infections with STDs [7].This further shows the necessity to provide positive guidance and disseminate accurate sexual information. Unprotected sexual behavior easily spreads STDs such as syphilis, hepatitis B, and AIDS [8]. Furthermore, it is also not advisable to engage in sexual behavior in an unrestrained manner when there are protective measures that can be used. Both of these behaviors are unsuitable.8Numerous data have demonstrated that it is imperative to emphasize the implementation of adolescent sexual education at the high school stage. This includes actively implementing education by the school, parents, and peers, which can help to improve the awareness and slow the spread of adolescent sexual diseases to ensure the reproductive health of adolescents [9, 10].

Regarding sexual knowledge-related education from parents, Chinese high school students had significantly less communication with their parents than foreign high school students, and many parents had no idea of how to start a conversation on related topics ($p<0.001$). This might be attributed to the influence of traditional thoughts, causing the students and their families in mainland China to believe that sexuality is a shameful matter to discuss [11]. We should change the traditional view toward sexuality and show a scientific attitude toward sexuality education. During sexuality education, parents should initiate the communication of relevant information and high school students should use a scientific altitude to understand and discuss the topic. Many consider sexuality education the equivalent of teaching children about their bodies, sexual organs, and sexual safety. However, comprehensive sexuality education covers far more than this. The "Comprehensive Education" that the United Nations Educational, Scientific, and Cultural Organization promotes covers a diverse content including values, rights and cultures, gender, violence and security, health and welfare, the human body and its development, sexuality and sexual behavior, and sexuality and reproductive health [12]. It should be advocated to gather resources and power from the whole society to care about adolescent sexuality education. Peer education should be carried out in high school for the more effective acquisition of sexual information [13].

The essence of adolescent reproductive health education is education on physical emotions and values. School-based education in classroom settings often fails to achieve the optimal teaching objective of positive emotion transmission. We can introduce peer education in high school, conduct various public welfare activities and lectures, adopt interactive teaching, and combine education with entertainment so that education can truly get to the essence of adolescents to help them establish positive physical emotions and ultimately, achieve self-confidence, self-esteem, and self-love.

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