

Yu J (2012) Teenage sexual attitudes and behaviour in China: a literature review. *Health and Social Care in the Community*, 20(6), 561-582.

Contact:

Dr Juping Yu, Faculty of Life Sciences and Education, University of South Wales,
Glyntaf, Pontypridd, UK

juping.yu@southwales.ac.uk

Teenage sexual attitudes and behaviour in China: a literature review

ABSTRACT

China is the most populated of any country in the world. Social norms and values pertaining to love and marriage have changed considerably since the launch of its open-door policy and economic reforms of the 1980s. Attitudes to sex have become more open, while the negative consequences of early sexual intercourse have become issues of health and social concern. The aim of this paper was to provide an overview of the teenage sexual attitudes and behaviour in contemporary China. A literature review was conducted for the period of 2000 and 2010, using both English (Medline, CINAHL, PsycINFO, ASSIA) and Chinese language databases (China National Knowledge Infrastructure, Wanfang database). Thirty-six studies were included and reviewed. It was found that young people reported poor sexual knowledge, especially in relation to reproductive matters and sexually transmitted infections. The media, such as television, magazines and the Internet, were seen as their main sources of information on sex. Despite the frequently reported liberal attitudes to sexual behaviour, only a small number of young people have already lost their virginity or been involved in pregnancies. Young men were more likely than young women to report having had sex, while respondents at vocational high schools were less likely to remain virgins than those at common/key high schools. Although the prevalence of sexual intercourse among Chinese teenagers was still lower than that reported in studies conducted in most western countries, the findings do reflect some changes in sexual values and behaviour of young people within the country. They also suggest the need to develop more comprehensive sex education programmes in cooperation with young people, schools, health organisations, families and communities, and to make sexual and reproductive health services available to all regions and also accessible to teenagers and unmarried young people throughout China.

Keywords: attitudes, China, literature review, sexual behaviour, sex education, teenagers

What is known about the topic

- Social norms surrounding sex, love and marriage have changed among Chinese people.
- The negative consequences of early sexual intercourse have become issues of health and social concern in many countries.
- The prevalence of STIs/HIV has increased in recent years in China.

What this paper adds

- Young people reported poor sexual knowledge and the media became their main sources of information.
- Despite the reported liberal attitudes to sexual behaviour, only a small number of respondents had lost their virginity or been involved in pregnancies.
- There is a need to develop more comprehensive sex education programmes and make sexual and reproductive health services available to teenagers and unmarried young people.

INTRODUCTION

Situated in East Asia, China is the most populated of any country in the world, with an area of 9.6 million square kilometres and a population of 1.3 billion people made up of 56 ethnic groups (China Ethnic Museum 2005, Chinapop 2009). The Chinese mainland is administratively divided into 22 provinces, five autonomous regions and four municipalities (Beijing, Tianjin, Shanghai and Chongqing).

Since the launch of its open-door policy and economic reforms of the 1980s, China has experienced great changes under the multiple influences of rapid modernisation, economic development and exposure to western culture. Social norms surrounding love, marriage and family have changed considerably among Chinese people, with attitudes to sexual expression becoming more open (Zhang *et al.* 1999, Gao *et al.* 2001). Like many other countries, the adverse consequences of early sexual intercourse, such as unwanted pregnancies and sexually transmitted infections (STIs), have become the focus of health and social concerns.

In China, teenage births are still socially and culturally unacceptable with most teenage pregnancies being aborted (Gao *et al.* 2001, Hu 2009). The prevalence of STIs/HIV has also increased dramatically in recent years (WHO 2004, Zhang KL *et al.* 2004, Wang L *et al.* 2009a). There were an estimated 740,000 people living with HIV in 2009 and heterosexual transmission became the dominant route, accounting for 44% of all new infections that occurred during the same year (Ministry of Health of the People's Republic of China 2010). In 2007, 50,000 new cases were diagnosed in the country, of which 33% were people in their 20s and 40% in their 30s (Chinese State Council AIDS Working Committee Office & UNAIDS China 2007).

Although there is serious concern regarding the sexual health of young people in China, research in this area is still of very limited extent, most being conducted with university students with little attention being paid to teenagers and the rural poor (Higgins & Sun 2007, Ma *et al.* 2009, Yan *et al.* 2009). Drawing evidence from current literature, this paper aims to provide an overview of the teenage sexual values and behaviour in contemporary China, with discussions on the provision of sex education and sexual health services.

METHODS

The key principles of conducting systematic reviews were followed (Centre for Reviews and Dissemination 2008). A literature search was undertaken for the period of 2000 and 2010 to review the most current evidence. Keywords 'China', 'Chinese', 'sex*', 'sexual attitude*', 'sexual behaviour', 'sex education', 'teenage*', 'adolescen*' and 'young people' were used in various combinations to search English language databases (Medline, CINAHL, PsycINFO, ASSIA). Chinese language databases (China National Knowledge Infrastructure, Wanfang database) were searched using keywords in Chinese, including 'qing shao nian' (teenager, adolescent or young people), 'xing tai du' (sexual attitudes), 'xing xing wei' (sexual behaviour) and 'xing jiao yu' (sex education). The inclusion criteria were as follows:

- Sample: primarily 13-19 year olds in mainland China
- Language: Chinese or English
- Types of study: primary research

The review excluded studies conducted in Hong Kong and Taiwan, or studies where a separate breakdown of results for teenage group was unavailable.

A flow diagram of the selection process is shown in Figure 1. Thirty-six studies were included. Predetermined measures of methodological quality of these studies were not applied, because this review focused on providing an overview of research in this area; however, study characteristics were discussed. The data extracted included bibliographies,

study settings, samples, data collection and key findings. A narrative analysis was carried out because the studies included were too diverse to carry out meta-analysis or meta-ethnography (Centre for Reviews and Dissemination 2008).

RESULTS

Study characteristics

Most studies were carried out in large cities and more developed areas, such as Beijing, Shanghai, Guangzhou and Shenzhen. Seven studies were conducted with primarily 13-16 year olds at junior high schools (Table 1), 14 with mainly 16-19 year olds at senior/vocational high schools (Table 2), and 15 with mostly 13-19 year olds at both junior and senior high schools or other settings (Table 3).

In most cases, questionnaires were completed at school in presence of teachers/researchers, which might have increased self-response bias. There was little information on informed consent, while the response rates were generally high, ranging from 82.6% to 100%. It was reported in two studies that some respondents declined to answer some questions on their sexual behaviour (Gong *et al.* 2007, Xue *et al.* 2008), while such information was unavailable in others.

All but one study applied a quantitative method using questionnaires to collect data. In the only qualitative study, the data collected from in-depth interviews with 60 participants were presented in a quantitative format (Jia Y *et al.* 2007). Only a few studies used a large random sample of respondents across regions (e.g. Sun *et al.* 2001, Nie *et al.* 2007, Song *et al.* 2008), while most studies applied a convenience sample.

Sexual knowledge

Knowledge was assessed in terms of the individual's understanding of reproductive matters, contraception, HIV/AIDS and other STIs.

With regard to knowledge of reproductive matters, in a survey of 1846 first-year vocational high school pupils in Shanghai, 84% felt that they were lacking in such knowledge, with the mean score being 33.5 out of 100 (Chen *et al.* 2009). In a study of senior/vocational high school respondents in Beijing, 20% did not know when a woman's fertile period occurs (Zhou *et al.* 2005), while 39% of junior high school respondents in Wuhan, the capital city of Hubei province, were unable to answer any questions on the female reproductive system (Peng *et al.* 2004).

A poor understanding of contraception was reported repeatedly. Peng *et al.* (2004) found that only 2% of female junior high school respondents correctly answered all questions on contraception, while 46% were unable to answer any such questions (Peng *et al.* 2004). Similarly, in Shaanxi province, 59% of senior high school respondents were unaware of any contraceptive method (Wang L *et al.* 2009b), and in Shenzhen, a southern coastal city, out of the questions asked on condom use, 65% were answered correctly (Liang *et al.* 2006). In a study of 591 teenagers seeking abortions in Shanghai, 52% had never heard of emergency contraception (Xu & Cheng 2008).

Knowledge of STIs was also examined. In a small study of 192 high school pupils in Guangdong province, only 23% were able to correctly answer at least 70% of the questions on HIV/AIDS (Liu *et al.* 2004). Among junior high school respondents in Wuhan, between 22% and 55% were unable to correctly answer any STI questions (Peng *et al.* 2004, Wu *et al.* 2007). Conversely, out of the questions asked on basic knowledge of HIV/AIDS, between 55% and 76% were answered correctly by high school respondents in Shenzhen and Chongqing municipality (Jia X *et al.* 2007a,b, Tang *et al.* 2008). In some studies, respondents appeared to be more aware of HIV transmission routes (i.e. unsafe sex and

contaminated needles) than routes via which HIV is not transmitted (i.e. handshaking and sneezing) (Sun *et al.* 2001, Liu *et al.* 2007, Zhi 2008).

It is difficult to make direct comparison across these studies due to differing samples and measurement tools used to assess sexual knowledge. However, these findings do provide some evidence to suggest young people had insufficient sexual knowledge.

How teenagers learned about sex

Most teenagers reported having received information on sex from the media. Among senior high school respondents in Beijing, newspapers/magazines (56%) and television/radio (53%) were reported as their main sources of information on reproductive matters (Zhou *et al.* 2005). Similarly, films, television, the Internet, newspapers, medical magazines and pamphlets were seen by high school pupils as their main sources of information on STIs/AIDS throughout the regions of China (Liang *et al.* 2006, Liang & Jiang 2006, Zhi 2008, Wang L *et al.* 2009b).

The family was also regarded as a source of information by junior high school pupils in Wuhan and Shenzhen (Peng *et al.* 2004, Gong *et al.* 2007). Although it was still limited, young people, especially girls, did receive some sex education at home (Peng *et al.* 2004, Song *et al.* 2004, Zhao *et al.* 2005, Liang & Jiang 2006, Gong *et al.* 2007, Nie *et al.* 2007, Tang *et al.* 2008).

The role of schools varied. Among senior high school respondents in Xinjiang autonomous region, 67% reported having learnt about HIV/AIDS at school (Wang J *et al.* 2009). Schools (60%), books/television (51%), peers (42%), and the Internet (29%) were reported as the main sources by high school respondents in Chongqing (Tang *et al.* 2008). Schools, together with medical magazines and peers, were also referred to by young people from other areas of China (Li *et al.* 2002, Yu *et al.* 2003, Gong *et al.* 2007, Liu *et al.* 2007).

However, 76% of junior high school respondents in Wuhan reported that their schools had provided no information about reproductive matters (Peng *et al.* 2004). Among senior high school pupils in Henan province, 49% of city respondents and only 35% of rural respondents did report having received some sex education at school (Liang *et al.* 2008, 2009). The figures reported by others varied from 42% in Shaanxi province to 46% in Shanghai, and 75% in Guangdong province (Nie *et al.* 2007, Chen *et al.* 2009, Wang L *et al.* 2009b). In terms of HIV/AIDS education, among senior/vocational high school respondents, 40% in rural areas of Henan province and 67% in Xinjiang autonomous region said that this was provided by their schools (Wang J *et al.* 2009).

It is uncertain whether the observed differences across these studies reflected regional variations in sex education policy or were as a result of response bias. Among respondents who did have received sex education at school, only 12% in Shanghai and 23% in Chongqing thought it useful or satisfactory (Tang *et al.* 2008, Chen *et al.* 2009). However, the important role of school in providing education on this subject was highlighted by most respondents in some studies (Tang *et al.* 2008, Chen *et al.* 2009, Wang L *et al.* 2009b). Similar findings were reported in a qualitative study although most respondents were not sure about the need for advice on contraception (Jia Y *et al.* 2007). Even so, this need was clearly identified by 73% of respondents in Beijing and the main areas that respondents wanted schools to cover were psycho-sexual topics (62%), STI prevention (54%) and sexual morality (38%) (Zhou *et al.* 2005). Similar results were also reported by Zhao *et al.* (2005).

Sexual values and attitudes

The reported attitudes to premarital sex varied. In junior high school, respondents believing no sex before marriage ranged from 38% in Wuhan to 67% in Dalian (Peng *et al.* 2004, Yang & Yu 2000). The same view was expressed by 64% of senior high school

respondents in Shaanxi province (Wang L *et al.* 2009b), and by between 46% of high school respondents in Guangdong province (Liu *et al.* 2004) and 76% in rural areas of Zhejiang, Shanxi and Qinghai provinces (Zhao *et al.* 2005). Liberal attitudes were reported by some respondents. For example, 16% of junior high school respondents in Wuhan believed it was okay to have sex before marriage (Peng *et al.* 2004). This view was reported by 66% of senior/vocational high school respondents in Beijing and 35% believed premarital sex could make a relationship more stable (Song *et al.* 2006). However, only 9% of rural respondents were in favour of premarital sex (Zhao *et al.* 2005). A direct comparison of values between rural and city respondents is impossible as this topic was not examined in other studies of young people in rural areas.

With regard to attitudes to teenage sex, junior high school respondents who reported against it varied from 50% in Beijing to 74% in Wuhan (Xu *et al.* 2007, Wu *et al.* 2007), while among senior high school respondents, the figures were from 19% in Chengdu to 86% in Shaanxi province (Li *et al.* 2002, Sun *et al.* 2004). Respondents who reported in favour of teenage sex seemed generally low, ranging from 4% of junior to 34% of senior high school respondents (Zhou *et al.* 2005, Xu *et al.* 2007). The figure rose to 50% in Yu *et al.* (2003), which might have been resulted from variations in its sample, 75% of which were at school and the rest were either in employment or unemployed.

Attitudes to other behaviours were also reported. Dating while still at school was agreed by from 3% of junior respondents in Beijing to 54% of senior respondents in Shanghai, while some juniors in Shenzhen and Wuhan wished to go on a date (Gong *et al.* 2007, Wu *et al.* 2007, Chen *et al.* 2009). Respondents who agreed with one-night stands was 17% in Chongqing and 29% in Guangdong, while as high as 26% of respondents in Guangzhou also accepted extramarital sex (Liu *et al.* 2004, Liang & Jiang 2006, Tang *et al.* 2008).

Sexual behaviour

In most studies of junior high school pupils, only a small proportion reported having already lost their virginity. This was as low as 1%, as reported in two early studies carried out in northern cities, Dalian and Beijing (Yang & Yu 2000, Zhou & Ye 2000). Similarly, in Wuhan, 1% of females and 2% of males were found to have had sex and the figure was 2% in Beijing and Shenzhen (Gong *et al.* 2007, Wu *et al.* 2007, Xu *et al.* 2007).

Among respondents attending senior/vocational high schools, in Beijing 3% had lost their virginity and 4% in the rural areas of Henan province (Zhou *et al.* 2005, Liang *et al.* 2009). Similarly, in Shaanxi province, 5% of males and 2% of females had had sex (Li *et al.* 2002), while the prevalence was as high as 14% in Chengdu (Sun *et al.* 2004).

In studies of both junior and senior high school pupils, the prevalence of sexual intercourse varied from 1% in Henan to 2% in Beijing and 18% in Guangdong province (Liu *et al.* 2004, Zhang Y *et al.* 2004, Zhi 2008). The high proportion reported in Liu *et al.* (2004) and Sun *et al.* (2004) might, however, have been resulted from their samples, in terms of size and characters, response bias and respondents' age group, or have actually reflected the behavioural changes seen in teenagers.

Contraceptive use, pregnancies, abortions and multiple sexual partners were also reported. In rural areas across three provinces, only 29% of respondents who had lost their virginity had ever used contraception (Zhao *et al.* 2005). It is unclear whether accessibility to contraception in rural areas had affected their contraceptive choice, as their use seemed to be slightly higher among city respondents. For example, in Guangzhou, the capital of Guangdong province, although contraceptive use among high school pupils was still low, about half the respondents used a condom at their first sexual intercourse or had ever used a condom (Li 2000, Zhu *et al.* 2009). In some studies, between 13% and 21% of respondents

who had had sex reported having been pregnant or made a female pregnant (Zhu *et al.* 2009, Xue *et al.* 2008). Eleven respondents in Liang & Jiang (2006) reported having had an abortion. Also, the prevalence of multiple sexual partners among respondents who had already lost their virginity varied from 3% to 60% in Guangzhou and 6% in Wenzhou (Liang & Jiang 2006, Xue *et al.* 2008, Zhu *et al.* 2009). It is unclear whether the question was answered honestly and whether they had sex with multiple partners during the same time period or across different time periods. Three percent of respondents in Sun *et al.* (2001) confirmed diagnoses of STIs.

Only in two studies, information on respondents' age of first sexual intercourse was available, which was age 11 or younger (Yu *et al.* 2003, Zhu *et al.* 2009). In Guangzhou, Zhu *et al.* (2009) found that of respondents who had lost their virginity, 23% occurred before age 11 and this was more likely to be reported by juniors than by seniors (31% vs. 19%). These findings might have been caused by response bias, as 63 juniors (44%) and 38 seniors (23%) did not answer this question (Zhu *et al.* 2009), or have reflected that the juniors were not mature enough to take the questionnaire seriously.

Key factors associated with sexual knowledge, attitudes and behaviour

Age differences

As might be expected, older respondents appeared to have a better understanding of sexual matters than those younger than them. Song *et al.* (2004) surveyed pupils at primary and high schools in Dalian. Half of the respondents were unable to correctly answer the questions put to them on sexual matters, but even so, senior respondents did better than their younger counterparts ($P < 0.001$). In a study of high school pupils in Shanghai, seniors scored significantly higher than juniors (55 vs. 34, $P < 0.001$, Tu *et al.* 2007). Similar results were found in terms of HIV/AIDS knowledge (Liu *et al.* 2004, Zhao *et al.* 2005, Liang & Jiang 2006, Jia X *et al.* 2007a,b, Liu *et al.* 2007, Xue *et al.* 2008, Zhi 2008).

However, older respondents tended to report holding more permissive attitudes to sex (Liu *et al.* 2004, Sun *et al.* 2004, Tu *et al.* 2007, Wu *et al.* 2007). As might also be expected, older respondents were more likely to report having lost their virginity (Li 2000, Liu *et al.* 2004, Song *et al.* 2004, Sun *et al.* 2004, Jia X *et al.* 2007a,b, Wang J *et al.* 2009, Zhu *et al.* 2009).

Gender differences

Generally, young men were found to have better sex-related knowledge than young women, including knowledge of HIV/AIDS (Li *et al.* 2002, Yu *et al.* 2003, Jia X *et al.* 2007a,b, Wu *et al.* 2007, Zhi 2008). Even so, in Wenzhou, out of the HIV/AIDS questions asked, the percentage of correct answers from female respondents was significantly higher than that from male respondents (78% vs. 72%, $\chi^2 = 28.171$, $P < 0.01$, Xue *et al.* 2008). Such differences may indicate that females did have better knowledge, but its small sample size may also have influenced findings ($n=465$).

Males were more likely to report having liberal attitudes to premarital and uncommitted sex (Liu *et al.* 2004, Liang & Jiang 2006) and to have lost their virginity, as reported by respondents at junior high schools (Jia X *et al.* 2007a, Wu *et al.* 2007). Consistent results were reported in studies at senior/vocational high school (Sun *et al.* 2004, Jia X *et al.* 2007a,b, Nie *et al.* 2007, Liang *et al.* 2008, Song *et al.* 2008), and in studies of high school pupils (Li 2000, Zhao *et al.* 2005, Tang *et al.* 2008). Moreover, even among high school pupils in Guangzhou, more males than females reported having more than one sexual partner (63% vs. 45%, $\chi^2 = 4.087$, $P < 0.04$, Zhu *et al.* 2009).

Types of schools

When young people reach age 16, following secondary education at junior level, they follow one of three pathways. They can leave school, or attend a senior or a vocational high school. Senior high schools are divided into common or key schools. Only high achievers are eligible to attend key schools.

In some studies, comparisons were made between pupils attending a variety of different types of school. In Beijing, respondents at vocational high schools had a poorer knowledge of reproductive matters than those at common high schools, but they held more liberal attitudes to premarital sex and were more likely to have already lost their virginity ($P < 0.05$, Song *et al.* 2006). It was also reported in three other studies that respondents at key schools were significantly more likely to remain virgins than those at common and vocational schools ($P < 0.01$, Nie *et al.* 2007, Song *et al.* 2008, Wang J *et al.* 2009).

These variations may be explained as follows. Most of young people attending common and key high schools aim to go through competitive tests to get into university, and therefore might focus more on academic success than those attending vocational high schools. Some evidence supports the idea of academic inspirations being a positive influence on the sexual attitudes of higher performing students. Song *et al.* (2008) reported that commitment to doing well at school protected respondents from becoming sexually active. Variations may be also explained by other factors, such as family relationships, social economic status and levels of parental education (Sun *et al.* 2004, Nie *et al.* 2007, Song *et al.* 2008).

DISCUSSION

Teenage sexual attitudes and behaviour in China

These findings provide insight into teenage sexual attitudes and behaviour in contemporary China. Premarital/teenage sex was agreed by some teenagers although its prevalence is lower than that reported in studies conducted in most western countries. For example, only 4% of respondents in a UK national survey disapproved of premarital sex (Wellings *et al.* 1994). Chinese traditional sexual values are mainly based on Confucian and Taoist traditions, stressing reproduction and social stability (Ruan 1991). Sexual intercourse is solely endorsed within marriage for reproductive purposes, while premarital and extramarital relationships, homosexuality and masturbation are all disapproved of. The minimum legal age for marriage is 20 for women and 22 for men in China (National People's Congress 1980). Teenage sex, therefore, is deemed to occur before marriage and is thought culturally unacceptable.

With regard to sexual behaviour, in most studies, less than 5% of respondents reported having lost their virginity, although occasionally the prevalence was higher, especially among male respondents (Li 2000, Liu *et al.* 2004, Sun *et al.* 2004, Tang *et al.* 2008). This figure still seems low, when compared to countries such as the UK and the USA. Based on national surveys, over one-quarter of UK teenagers had become sexually active before age 16 (Wellings *et al.* 2001, Currie *et al.* 2008), and an estimated 31% of 15-17 year olds had lost their virginity at this age in the USA (Abma *et al.* 2004). These findings have been supported by a recent review on sexual behaviour of Chinese young people in western countries, who were found to be more likely than their white counterparts to disapprove of uncommitted sex, be virgins, have lost their virginity at a later age, and have fewer sexual partners (Yu 2010a).

This low prevalence of sexual intercourse may indicate that although many respondents tended to agree with premarital sex, most of them have not yet actually engaged in it. It may also be due to their reluctance to reveal sexual behaviour that may not match the norms of traditional Chinese culture. Sex is always a sensitive topic for people, but

especially for Chinese people (Ruan 1991). This has been reflected in sex-related research with Chinese young people both living in China and overseas, who often declined to reveal their sexual behaviour and were reluctant to take part in such research (Higgins *et al.* 2002, Gong *et al.* 2007, Xue *et al.* 2008, Yu 2009). Although it is always challenging to conduct research in this area with young people in any country due to this reticence, the fact that the reliability of the research reviewed has been influenced by response bias must be taken into account.

Contraceptive use among Chinese teenagers appeared to be low. This might be due to a lack of knowledge about contraception, limited access to contraceptive services, or unawareness of the risk of getting pregnant (e.g. Wu *et al.* 2002, Peng *et al.* 2004). Cases of pregnancies and abortions were also reported in some studies discussed (Li 2000, Liang & Jiang 2006, Xue *et al.* 2008, Zhu *et al.* 2009). These findings are consistent with studies of university students in China (e.g. Ma *et al.* 2008, 2009).

Sexual knowledge and sex education in China

Sexual knowledge was generally insufficient, especially in terms of reproductive health and STIs. Many of the teenagers in the studies reviewed did not seem to have received sufficient formal sex education at school, while the role of school in this regard was deemed crucial. The media, such as magazines, television and the Internet, were seen to be the main sources of information on sex. Consistent results have been reported in studies carried out in other countries (Lesta *et al.* 2008, Ngo *et al.* 2008) and suggest that in China schools have not yet played a key part.

The Chinese government began to support school sex education in 1985 after China's first case of HIV was identified. It became part of the curriculum offered to pupils in junior high schools in 1988 (Beijing Education Bureau 1988); however, in some areas the policy has still not been well implemented (Gao *et al.* 2001). It is common for sex education to be taught in biology classes but with a narrow focus on biology and psychological development (Gao *et al.* 2001, Aresu 2009). This may only consist of reading the reproduction section of textbooks in the classroom or be self learnt without any discussion. The reported cases of unwanted pregnancies and multiple sexual partners call for a more comprehensive sex education that discusses topics on safe sexual practice, sexual morality, negotiation skills and the psychological aspects of sex. Also, the reported differences in sexual attitudes and behaviour between the genders and between respondents attending different types of schools suggest that this education should particularly target adolescent males and young people in vocational and professional training.

School sex education has the scope to reach teenagers before they leave school at 16 at a time when most of them are still sexually inactive. This subject could be one of the most important tools to equip teenagers with the knowledge they need to make healthy and informed choices on their sexual behaviour. A positive impact of sex education at school on young people's sexual knowledge and prevalence of sexual intercourse has been reported in the USA and the UK (e.g. Wight *et al.* 2002, Stephenson *et al.* 2004, Tucker *et al.* 2007, Mueller *et al.* 2008). Moreover, in a UK national survey, school has become the most commonly cited source of information on sexual matters among 16-19 year olds and the prevalence of reported STIs was lower among respondents who cited school as their main source than those who reported parents and friends had taught them most (Wellings *et al.* 2001, Macdowall *et al.* 2006).

Review limitations

This is the first critical review concerning teenage sexual behaviour in China, but some limitations need to be acknowledged. Grey literature was not included, which may

have omitted some relevant work. The selected studies for inclusion may be subject to selective bias, mainly due to a lack of a quality assessment and subjective judgement of the sole reviewer. In future work, such a review could be strengthened by establishing a team comprising of members with different expertise, including bilingual reviewers. Despite these limitations, this review helps enhance the knowledge base of research in this field and lays valuable foundation for additional work.

Implications for practice and research

Government policy on school sex education needs to be implemented evenly across the country to ensure equality in education on this subject. However, on its own the school cannot sufficiently mitigate excesses in teenage sexual behaviour, as young people tend to shape their behaviour within a wide set of social and cultural contexts: those of school, family, peers, religion, neighbourhood and media (Yu 2010b). Parents may not have the specific knowledge and skills needed to deal with factual questions about reproduction and STIs that can adequately be taught by trained teachers and health professionals. However, a harmonious family environment, open parent-child discussions on values, and close monitoring of their children's behaviour can help teenagers develop positive values and a healthy sexual behaviour (Yu 2008, Wetherill *et al.* 2010).

The media, unsurprisingly enough, are regarded as the most popular source of information on sexual matters. In China, the Internet becomes increasingly used to facilitate sex education and has resulted in some positive effects on sexual knowledge and the attitudes of young people (Lou *et al.* 2006). However, how teenagers apply media content is crucial and the negative inputs, such as those of online pornography, may be mitigated through parental guidance, monitoring and communication (Collins *et al.* 2003). There is also some evidence to support the positive influence of comprehensive community-based programmes on young people's sexual knowledge and contraceptive use (Lou *et al.* 2004, Wang *et al.* 2006, Tu *et al.* 2008). Targeting teenagers both at school and beyond, these programmes could complement school-based education.

Sexual health services need to be universally accessible, but at present, government-sponsored services, such as free consultations, health checks and contraceptives, still focus mainly on married couples. Teenagers and single young people can find themselves excluded from such services, while health professionals are often uncertain about providing them with such services (Tu *et al.* 2004). If there are barriers stopping school-goers from using such services, increasing numbers of these who are sexually active will continue to be vulnerable to unsafe sex.

As with research in general, issues around sampling, response rate, response bias and confidentiality should be addressed to enhance research quality in this area. Quantitative research needs to be complemented by qualitative research to provide young people with the opportunity to express their views on their own sexual behaviour, the context and meaning of having sex, and reasons for sexual engagement or maintaining abstinence. Future research also needs to use national representative samples including teenagers across China both at school and beyond.

CONCLUSION

Rapid changes in the sexual values of Chinese teenagers call for a more comprehensive response to sex education policy and additional improved sexual and reproductive health services. It is challenging to develop and implement nationwide programmes that meet the needs of all young people in such a geographically and socio-economically diverse country. A relevant and inclusive policy framework is needed to enable young people, schools, health organisations, families and communities to get

involved in the development of future programmes and services that are available to all regions and also accessible to teenagers and unmarried young people in China.

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Table 1 Summary of studies conducted with junior high school pupils (n=7): information is provided where available

References and setting	Sample and response rate/valid responses	Data collection: method, location and year	Key findings		
			Sexual knowledge and main sources	Sexual attitudes	Sexual behaviour
Gong <i>et al.</i> (2007) Shenzhen city Guangdong province	N=1666 4 junior high schools Year 2 pupils 12-16 years Random cluster sample Valid responses: 94.1%	Questionnaire (self-completed, anonymous) 2006	Main sources of sexual knowledge: schools (63%), peers (53%), books/magazines (40%) and family (34 %)	59% of males and 38% females wished to have a date. Attitudes to teenage sex: <ul style="list-style-type: none"> 21% of males and 12% of females in favour, $P < 0.01$ 42% of males and 59% of females against, $P < 0.01$ 	Respondents who had had sex: <ul style="list-style-type: none"> 2.1% of males 0.9% of females $P < 0.01$ Respondents who did not want to answer this question: <ul style="list-style-type: none"> 55% of males 74% of females
Jia X <i>et al.</i> (2007a) Shenzhen city Guangdong province	N=3528 10 junior high schools Year 1-3 pupils 10-19 years (M=14.09±1.16) Random cluster sample Response rate: 99.4% Valid responses: 98.6%	Questionnaire (self-completed, anonymous) School 2005	Percentage of correct answers from all respondents to questions on: <ul style="list-style-type: none"> HIV/AIDS (55%) HIV transmission routes (e.g. unsafe sex, contaminated needles and breast milk) (77%) HIV non-transmission routes (e.g. handshaking and sneezing) (68%) HIV prevention (61%) 	Respondents in favour of teenage dating: 24% Attitudes to extra/premarital sex: <ul style="list-style-type: none"> 20% in favour 35% neutral 	17.5% had dated. 1.1% had had sex: <ul style="list-style-type: none"> 0.4% of Year-1 pupils 0.8% of Year-2 pupils 2.4% of Year-3 pupils $P < 0.001$

<p>Peng <i>et al.</i> (2004) Wuhan city Hubei province</p>	<p>N=1341 3 junior high schools Year 1-2 female pupils 11.9-13.8 years Random cluster sample</p>	<p>Questionnaire (self-completed, anonymous)</p>	<p>75.8% reported having received no education on reproductive matters at school. Sexual knowledge mean score (out of 100): 47 Respondents unable to correctly answer any questions on:</p> <ul style="list-style-type: none"> • female reproductive system (39%) • contraception and methods (46%) • STIs (55%) <p>Only 2% of respondents correctly answered all questions on contraception and contraceptive method. Main sources of information on sex: books/magazines (53%), schools (37%), family (34%), radio/TV (31%) and peers (30%)</p>	<p>Attitudes to premarital sex:</p> <ul style="list-style-type: none"> • 38% against • 38% not encouraging others to have sex before marriage • 8% neutral • 16% in favour 	
<p>Wu <i>et al.</i> (2007) Wuhan city Hubei province</p>	<p>N=2987 3 junior high schools Year 1-3 pupils Mean age: 13.1 Cluster sample Valid responses: 96.8%</p>	<p>Questionnaire (self-completed, anonymous) School 2005</p>	<p>Respondents unable to correctly answer any questions on:</p> <ul style="list-style-type: none"> • contraceptive methods (15%) • STIs (22%) <p>Main sources of sexual knowledge: teachers, peers/friends and parents</p>	<p>Attitudes to teenage dating:</p> <ul style="list-style-type: none"> • 47% against • 13% in favour <p>Respondents wishing to have a date: 66% Respondents in favour of teenage sex: 74%</p>	<p>14% had dated. 1.3% had had sex:</p> <ul style="list-style-type: none"> • 1.7% of males • 0.9% of females
<p>Xu <i>et al.</i> (2007) Beijing</p>	<p>N=647 3 junior high schools Mean age: 14.3 years</p>	<p>Questionnaire (self-completed,</p>	<p>Main sources of sexual knowledge: teachers (69%), newspapers/magazines (38%),</p>	<p>Attitudes to teenage sex:</p> <ul style="list-style-type: none"> • 50% against 	<p>2% (13/647) had had sex.</p>

municipality	Random cluster sample Valid responses: 99.2%	anonymous) School	family (34%) and TV (31%)	<ul style="list-style-type: none"> • 23% neutral • 4% in favour 	
Yang & Yu (2000) Dalian city Liaoning province	N=354 4 junior high schools Year 1-2 pupils Random cluster sample Valid responses: 97%	Questionnaire (self- completed, anonymous) School	Main sources of information on sex: books/magazines (65%), schools (20%) and family (15%) 78% reported sex education was insufficient at their school.	Respondents against: <ul style="list-style-type: none"> • teenage dating: 47% • premarital sex: 67% 	1.1% (4/354) had had sex.
Zhou & Ye (2000) A large undisclosed city	N=1036 10 junior high schools Year 1 pupils Random cluster sample Valid responses: 88.5%	Questionnaire (self- completed, anonymous) School 1998			1.1% (11/1036) had had sex.

Table 2 Summary of studies conducted with senior/vocational high school pupils (n=14): information is provided where available

References and setting	Sample and response rate/valid responses	Data collection: method, location and year	Key findings		
			Sexual knowledge and main sources	Sexual attitudes	Sexual behaviour
Chen <i>et al.</i> (2009) Shanghai municipality	N=1846 3 vocational high schools Year-1 pupils Cluster sample Valid responses: 99.5%	Questionnaire (self-completed, anonymous) 2005	<p>Sexual and reproductive health mean scores (out of 100):</p> <ul style="list-style-type: none"> • females (35) vs. males (32) • those having had sex education (39) vs. those having not had (30), $P < 0.001$ <p>Main sources of information: mass media (44%), schools (23%) and parents (11%)</p> <p>46% had had sex education at junior high school (60% of females vs. 37% of males, $P < 0.0001$)</p> <p>Respondents who considered school sex education:</p> <ul style="list-style-type: none"> • not useful (30%) • useful (12%) • average (58%) <p>84% reported they were lacking in sexual knowledge and 65% thought it important to provide sex education at school.</p>	<p>Respondents in favour of:</p> <ul style="list-style-type: none"> • teenage dating: 54% • male premarital sex: 53% (60% of males vs. 43% of females, $P < 0.0001$) • female premarital sex: 48% (53% of males vs. 40% of females, $P < 0.0001$) 	
Jia X <i>et al.</i> (2007b)	N=1115 5 senior high schools	Questionnaire (self-	Percentage of correct answers from all respondents to questions		46% had dated: 40% of Year 1 pupils vs. 51% of

Shenzhen city Guangdong province	Year 1-2 pupils 13-21 years (M=16.43±0.9) Response rate: 98.4% Valid responses: 98.5%	completed, anonymous) School 2005	on: <ul style="list-style-type: none"> • HIV/AIDS (70%) • HIV transmission routes (82%) • HIV non-transmission routes (81%) • HIV prevention (76%) 		Year 2 pupils, $\chi^2 = 12.88$, $P < 0.001$ 6% had had sex: <ul style="list-style-type: none"> • 8.5% of males vs. 3.1% of females, $\chi^2 = 13.86$, $P < 0.001$ • 3.7% of Year 1 pupils vs. 8.4% of Year 2 pupils, $\chi^2 = 10.65$, $P < 0.001$
Jia Y <i>et al.</i> (2007) Tangshan city Hebei province	N=60 1 senior high school Year 1-3 pupils 15-19 years Random sample	In-depth face-to-face interviews (anonymous, confidential)	35% had not received sex education at school. 75% believed it necessary to have sex education. 30% believed it necessary to provide education and services about contraception. Preferred sources of information on sex: schools (62%), hospitals (33%) and newspapers/magazines (30%)	Respondents against teenage sex: 70%	
Li <i>et al.</i> (2002) Xixiang county Shaanxi province	N=544 1 senior & 1 vocational high schools Year 1-2 pupils Mean age: 16.6±0.96 for males, 16.57±0.97 for females Cluster sample Response rate: 100% Valid responses: 99.6%	Questionnaire (self-completed, anonymous)	Mean scores on knowledge of reproductive health and STIs/AIDS (out of 30): <ul style="list-style-type: none"> • males: 12.96±4.40 • females: 9.91±4.40 $P < 0.001$ Main sources of information: medical books/magazines (77%), schools (70%) and TV/film (35%)	Respondents against: <ul style="list-style-type: none"> • premarital sex: 46% of males vs. 57% of females, $P < 0.001$ • teenage sex: 79% of males vs. 93% of females, $P < 0.001$ 	Respondents who had had sex: <ul style="list-style-type: none"> • 4.5% of males (n=15) • 2.4% of females (n=4)
Liang <i>et al.</i>	N=1070	Questionnaire	Percentage of correct answers		Respondents who had

(2006) Shenzhen city Guangdong province	1 senior & 1 vocational high schools Year 1-3 pupils 16-19 years Random cluster sample Valid responses: 96.2%	(self- completed, anonymous) & focus groups 2003	from all respondents to questions on: <ul style="list-style-type: none"> • HIV/AIDS (50%) • reproductive tract infections (18%-51%) • condom use (65%) Main sources of information on STIs: newspapers/ magazines/books (83%), pamphlets (63%), TV (40%) and friends (40%)		had sex: <ul style="list-style-type: none"> • 4.4% of males • 2% of females
Liang <i>et al.</i> (2008) 4 cities Hunan province	N=7623 Senior high schools Year 1-3 pupils 15-19 years Random cluster sample	Questionnaire (self- completed, anonymous) School 2005	49% reported having had sex education at school: 42% of males vs. 55% of females, $\chi^2 = 134.129$, $P < 0.01$ 47% had received HIV/AIDS education at school.		30% had dated: 33% of males vs. 27% of females, $\chi^2 = 24.639$, $P < 0.01$ 3.4% had had sex <ul style="list-style-type: none"> • 5.2% of males vs. 1.8% of females, $\chi^2 = 68.581$, $P < 0.01$ • 2.6% of Year 1 pupils, 3.1% of Year 2 pupils vs. 5% of Year 3 pupils, $\chi^2 = 20.43$, $P < 0.01$
Liang <i>et al.</i> (2009) Rural areas in Henan province	N=5011 Senior high schools Year 1-3 pupils 15-20 years Random cluster sample	Questionnaire (self- completed, anonymous) School 2006	35% had received sex education at school: 30% of males vs. 40% of females, $\chi^2 = 54.643$, $P < 0.01$ 40% had had HIV/AIDS education: 41% of males vs. 38% of females, $\chi^2 = 4.183$, $P < 0.05$		30% had dated: 32% of males vs. 27% of females, $\chi^2 = 12.008$, $P < 0.01$ 3.6% had had sex: 5.6% of males vs. 1.5% of females, $\chi^2 = 60.839$, $P <$

					0.01
Nie <i>et al.</i> (2007) 5 cities Guangdong province	N=10,016 Key/common senior & vocational high schools Random sample	Questionnaire (self-completed, anonymous) 2005	<p>Respondents who had had sex education: 75%</p> <ul style="list-style-type: none"> 84% of females vs. 67% of males, $\chi^2 = 389.12$, $P < 0.001$ 77% of key school pupils, 76% of common school pupils vs. 72% of vocational school pupils, $\chi^2 = 30.109$, $P < 0.001$ 		<p>36% had dated:</p> <ul style="list-style-type: none"> 38% of males vs. 35% of females, $\chi^2 = 8.586$, $P = 0.003$ 43% of vocational pupils, 35% of common school pupils and 32% of key school pupils, $\chi^2 = 87.249$, $P < 0.001$ <p>5.9% had had sex:</p> <ul style="list-style-type: none"> 8.7% of males vs. 3.3% of females, $\chi^2 = 128.176$, $P < 0.001$ 3.1% of key school pupils, 4.8% of common school pupils vs. 10.1% of vocational pupils, $\chi^2 = 158.833$, $P < 0.001$
Song <i>et al.</i> (2006) Beijing municipality	N=628 3 common & 1 vocational high schools Cluster sample	Questionnaire (self-completed, anonymous) School	<p>Out of the questions asked on reproductive matters, the percentage of correct answers from:</p> <ul style="list-style-type: none"> common high school pupils: 79% vocational pupils: 66% <p>$P < 0.05$</p> <p>Main sources of information on sex:</p>	<p>Respondents in favour of premarital sex:</p> <ul style="list-style-type: none"> common school pupils: 56% vocational pupils: 76% <p>Respondents believing premarital sex could strengthen</p>	<p>Respondents who had had sex:</p> <ul style="list-style-type: none"> 10.4% (21/202) of vocational pupils 4% (17/426) of common school pupils <p>$P < 0.01$</p>

			<ul style="list-style-type: none"> the Internet (52% for males vs. 24% for females, $P < 0.01$) videos (36% for males vs. 12% for females, $P < 0.01$) books/magazines (24% for males vs. 25% for females) 	<p>relationships:</p> <ul style="list-style-type: none"> common school pupils: 28% vocational pupils: 42% 	
Song <i>et al.</i> (2008) 18 provinces	N=110,954 Key/common senior & vocational high schools Year 1-3 pupils Mean age: 16.9±1.14 for males, 16.8±1.10 for females Random cluster sample Valid responses: 99.4%	Questionnaire (self-completed, anonymous) School			4.4% had had sex: <ul style="list-style-type: none"> 6.9% of males vs. 2.1% of females, $P < 0.01$ 3.8% of Year 1 pupils, 4.5% of Year 2 pupils vs. 5.3% of Year 3 pupils, $P < 0.01$ 4.6% of key school pupils, 6.1% of common school pupils vs. 10.7% of vocational pupils, $P < 0.01$
Sun <i>et al.</i> (2004) Chengdu city Sichuan province	N=526 1 vocational high school Year 2 pupils 16-19 years (M=17.07) Valid responses: 94.4%	Questionnaire (self-completed, anonymous) School 2001	Mean scores on knowledge of: <ul style="list-style-type: none"> reproductive matters: 4.38 (out of 7) STIs: 11.71 (out of 22) 	Attitudes to teenage dating: <ul style="list-style-type: none"> 5% against 71% neutral 25% in favour Attitudes to teenage sex <ul style="list-style-type: none"> 19% against 70% neutral 11% in favour 	13.9% had had sex: <ul style="list-style-type: none"> 22.9% of males 9.4% females $P < 0.001$

<p>Wang J <i>et al.</i> (2009) 14 cities Xinjiang autonomy region</p>	<p>N=9138 14 key, 9 common senior & 5 vocational high schools Year 1-3 pupils 15-19 years Random cluster sample Valid responses: 96.6%</p>	<p>Questionnaire 2008</p>	<p>67% reported having had HIV/AIDS education. Respondents who were aware of AIDS caused by HIV virus: 58%</p> <ul style="list-style-type: none"> Year 3 pupils scored better than Year 1 & 2 pupils (63%, 61% & 62%, $\chi^2 = 290.54$, $P < 0.01$) Key school pupils scored better than common and vocational school pupils (64%, 60% & 38%, $\chi^2 = 267.05$, $P < 0.01$). 		<p>4.8% had had sex:</p> <ul style="list-style-type: none"> 7.2% of males vs. 2.7% of females, $\chi^2 = 25.79$, $P < 0.01$ 6% of Year 3 pupils, 4.8% of Year 2 pupils vs. 3.8% of Year 1 pupils, $\chi^2 = 25.79$, $P < 0.01$ 8.7% of vocational pupils, 4.2% of key high school pupils vs. 3% of common high school pupils, $\chi^2 = 27.26$, $P < 0.01$
<p>Wang L <i>et al.</i> (2009b) 4 counties Shaanxi province</p>	<p>N=940 3 key and 2 common senior high schools Year 1-3 pupils Random cluster sample Median age: 17 years 41.8% from cities & towns; 58.2% from rural areas Valid response: 92.3%</p>	<p>Questionnaire (self-completed, anonymous) School 2008</p>	<p>Out of the questions asked on HIV transmission routes, 87% were answered correctly. 59% did not know of any contraceptive method. Main sources of information: books/magazines (51%), peers (40%) and schools (23%) 42% reported having received no sex education and 70% believed it necessary.</p>	<p>Respondents in favour of premarital sex: 64%</p>	<p>44% had dated:</p> <ul style="list-style-type: none"> 46% of males 40% of females $P < 0.05$
<p>Zhou <i>et al.</i> (2005) Beijing municipality</p>	<p>N=658 Key/common senior & vocational high schools Mean age: 16.8 years Random cluster sample Response rate: 100%</p>	<p>Questionnaire (self-completed, anonymous) School</p>	<p>20% did not know when a woman's fertile period occurs. 86% believed sex education necessary. Main sources of information on reproductive health:</p>	<p>Attitudes to teenage sex:</p> <ul style="list-style-type: none"> 54% against 34% in favour 9% not sure 	<p>3.2% had had sex:</p> <ul style="list-style-type: none"> 5.4% of males 0.9% of females $P < 0.05$

	Valid responses: 97.3%		newspapers/magazines (56%), radio/TV (53%), peers/friends (38%), teachers (33%) and the Internet (31%) Topics mostly wanted: psychological aspects of sex (62%), STI prevention (54%) and sexual morality (38%)		
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Table 3 Summary of studies conducted with both junior and senior high school pupils and others (n=15): information is provided where available

References and setting	Sample and response rate/valid responses	Data collection: method, location and year	Key findings		
			Sexual knowledge and main sources	Sexual attitudes	Sexual behaviour
Li (2000) Guangzhou city Guangdong province	N=4858 2 common & 2 key high schools 12-20 years Cluster sample Valid responses: 82.6%	Questionnaire (self-completed, anonymous) School 1994			16.6% had had sex: <ul style="list-style-type: none"> • 23.5% (475/2025) of males • 11.7% (330/2833) of females $P < 0.01$ 49% used a condom at first sex.
Liang & Jiang (2006) Guangzhou city Guangdong province	N=2562 3 high schools Year 2-3 juniors & Year 2-3 seniors Response rate: 100% Valid responses: 99.7%	Questionnaire (self-completed, anonymous) School 2005	Mean scores on knowledge of HIV/AIDS (out of 6): <ul style="list-style-type: none"> • Year 2 juniors (3.32±1.21) vs. Year 3 juniors (4.65±1.33), $P < 0.01$ • Year 2 seniors (4.10±1.28) vs. Year 3 seniors (4.98±2.61), $P < 0.01$ Main sources of information: schools (46%), mass media (43%) and family (8%)	Respondents in favour: <ul style="list-style-type: none"> • premarital sex: 48% of males vs. 29% of females, $\chi^2 = 99.98$, $P < 0.01$ • extra-marital sex: 26% of males vs. 8% of females, $\chi^2 = 91.88$, $P < 0.001$ 	4.9% had had sex. 11/1320 female had had an abortion. 2.6% had had multiple sexual partners.
Liu <i>et al.</i> (2004) 1 town Guangdong province	N=192 1 junior & 1 senior high schools Year 2 juniors & Year 2 seniors	Questionnaire (self-completed, anonymous) School	Respondents who correctly answered at least 70% of the questions on: <ul style="list-style-type: none"> • HIV/AIDS: 23% (32% of seniors vs. 15% of juniors) 	Respondents against early dating: 30% Attitudes to premarital sex: <ul style="list-style-type: none"> • 46% against 	17.7% had had sex: <ul style="list-style-type: none"> • 26.1% of seniors • 10% of juniors $\chi^2 = 8.51$, $P < 0.01$ 35% (12/34) used a condom

	13-19 years (M=14.24 for juniors, 16.83 for seniors) Random cluster sample	2003	$\chi^2 = 7.4, P < 0.05$; 32% of males vs. 14% of females, $\chi^2 = 8.61, P < 0.05$ <ul style="list-style-type: none"> HIV transmission routes: 43% HIV prevention: 25% Main sources of information: radio/TV (90%), schools (80%) and magazines (68%)	<ul style="list-style-type: none"> 40% of juniors vs. 70% of seniors in favour, $P < 0.05$ Attitudes to one night stands: <ul style="list-style-type: none"> 79% against 14% of juniors vs. 29% of seniors in favour, $P < 0.05$ 	in last sexual intercourse.
Liu <i>et al.</i> (2007) Xinzhou city Shanxi province	N=450 1 high school Year 1-2 juniors & Year 1-2 seniors Cluster sample Response rate & valid responses: 100%	Questionnaire (self-completed, anonymous) School 2005	Respondents who correctly answered more than 60% of questions on: <ul style="list-style-type: none"> HIV/AIDS: 66% (56% of juniors vs. 78% of seniors, $\chi^2 = 22.86, P < 0.01$) HIV transmission routes: 89% non-transmission routes: 30% Main sources of information: mass media/peers (70%), parents (16%) and teachers (10%)		
Song <i>et al.</i> (2004) Dalian city Liaoning province	N=920 Primary schools & high schools Year 6 primary pupils, Year 2 juniors & Year 2 seniors Mean age: 15.51	Questionnaire (self-completed, anonymous) School 2002	50% were unable to correctly answer all questions on sexual matters, with older respondents having better knowledge than younger ones ($P < 0.001$). Main sources of information: mass media (42%), schools (34%) and medical books	Respondents in favour of teenage sex: 8% <ul style="list-style-type: none"> 2% of primary pupils 5% of juniors 12% of seniors Respondents against teenage pregnancy:	86% had had hugs, kisses, cuddling or sexual intercourse: <ul style="list-style-type: none"> 97% of primary pupils 86% of juniors 84% of seniors

	years Random cluster sample Valid responses: 95.8%		(25%)	90%	
Sun <i>et al.</i> (2001) Beijing, Tianjin, Shenzhen, Shenyang cities & Yunnan province	N=16,580 40 common high schools Year 1 juniors & Year 1 seniors Random cluster sample	Questionnaire (self- completed, anonymous) School 1999	Percentage of correct answers from all respondents to questions on: <ul style="list-style-type: none"> HIV transmission routes: 73% (71% from juniors vs. 75% from seniors, $P < 0.01$) HIV non-transmission routes: 45% (42% from juniors vs. 47% from seniors, $P < 0.01$) HIV prevention: 77% (80% from juniors vs. 74% from seniors, $P < 0.01$) Respondents who had discussed HIV/AIDS with: <ul style="list-style-type: none"> family members: 45% friends: 65% 	Respondents against premarital sex: 61% <ul style="list-style-type: none"> 60% of juniors vs. 63% of seniors, $P < 0.01$ 53% of junior males vs. 66% of junior females, $P < 0.01$ 52% of senior males vs. 72% of senior females, $P < 0.01$ 	3% had diagnosed with a STI: <ul style="list-style-type: none"> 2.8% of juniors vs. 3.1% of seniors, $P < 0.01$ Among juniors: 3.7% of males vs. 1.9%, $P < 0.01$ Among seniors: 4.6% of males vs. 1.7% of females, $P < 0.01$
Tang <i>et al.</i> (2008) Chongqing municipality	N=665 2 high schools Year 1-3 juniors & Year 1-3 seniors 12-19 years ($M=15.5$) Cluster sample Valid responses:	Questionnaire (self- completed, anonymous) School 2007	Out of the STI/AIDS questions asked, 75% were answered correctly. Main sources of information on sex: schools (60%), magazines/TV (51%), peers (42%) and the Internet (29%) 69% believed it necessary to	Respondents in favour of: <ul style="list-style-type: none"> early dating: 47% teenage sex: 31% one night stands: 17% 	8.6% had had sex: <ul style="list-style-type: none"> 14.5% of males 3.1% of females $\chi^2 = 26.23, P < 0.0001$ 68.8% had used a condom.

	97.8%		<p>have sex education at school.</p> <p>Attitudes to current school sex education:</p> <ul style="list-style-type: none"> • satisfied (26%) • unsatisfied (35%) • uncertain (42%) 		
<p>Tu <i>et al.</i> (2007) Shanghai municipality</p>	<p>N=3069 7 junior & 4 senior high schools Year 1 juniors & Year 1 seniors Mean age: 14.66±0.41 for juniors, 17.6±0.38 for seniors</p>	<p>Questionnaire (self-completed, anonymous) School 2004</p>	<p>Mean scores on knowledge of reproductive matters and HIV/AIDS (out of 100):</p> <ul style="list-style-type: none"> • juniors (33.85) vs. seniors (55.08), $P < 0.001$ • male juniors (31.22) vs. female juniors (36.40), $P < 0.001$ • male seniors (55.24) vs. female seniors (54.97), $P < 0.001$ <p>Main sources of information:</p> <ul style="list-style-type: none"> • for juniors: teachers (63%), parents (54%) and TV/radio/newspapers (31%) • for seniors: TV/radio/newspapers (60%), teachers (44%) and magazines (41%) 	<p>Respondents against teenage dating:</p> <ul style="list-style-type: none"> • juniors: 80% • seniors: 51% <p>$P < 0.01$</p> <p>Respondents in favour of or with neutral attitudes to:</p> <ul style="list-style-type: none"> • male premarital sex: 56% of juniors vs. 82% of seniors, $P < 0.001$ • female premarital sex: 54% of juniors vs. 78% of seniors, $P < 0.001$ 	<p>Respondents who had dated:</p> <ul style="list-style-type: none"> • 5.2% of juniors • 21.9% of seniors <p>$P < 0.001$</p> <p>15 juniors and 3 seniors had had sex.</p>
<p>Xu & Cheng (2008) Shanghai municipality</p>	<p>N=591 6 hospitals Pregnant teenagers seeking abortions 13.5-19 years</p>	<p>Questionnaire (self-completed, anonymous) Hospital</p>	<p>48% had heard of emergency contraception.</p> <p>Main sources of information: peers/boyfriends (60%) and magazines/newspapers (21%)</p>		<p>All pregnancies were unintended. 49% had never used any contraception.</p>

	(M=17.86±0.99)	2005	Main reasons for not using contraception: <ul style="list-style-type: none"> not knowing (57%) thinking not at risk (35%) 		
Xue <i>et al.</i> (2008) Wenzhou city Zhejiang province	N=465 5 junior & 3 senior high schools Year 1-3 juniors & Year 1 seniors 11-18 years (M=15.40±1.28) Random cluster sample	Questionnaire (self-completed, anonymous) School 2007	Percentage of correct answers from all respondents to HIV/AIDS questions: 75% <ul style="list-style-type: none"> 78% from females vs. 72% from males, $\chi^2 = 19.514$, $P < 0.01$ 82% from seniors vs. 73% from juniors, $\chi^2 = 28.171$, $P < 0.01$ Main sources of information: teachers (66%), peers (48%) and parents/guardians (33%)		1.7% had had sex (6% of non-responses). 6.3% had had multiple sexual partners (25% of non-responses). 12.5% used no condom in their latest sexual intercourse (37.5% of non-responses). 12.5% had been pregnant or made someone pregnant (37.5% of non-responses).
Yu <i>et al.</i> (2003) Shanghai municipality	N=806 3 towns 75% at junior, senior and vocational high schools 15-18 years	Questionnaire (self-completed, anonymous) 2000	69% had never heard of anything about contraception. 73% had never asked parents for information on sex (93% of males vs. 54% of females, $P < 0.001$). Main sources of information on sex: schools, medical books/magazines and peers 62% had had sex education at school. 81% considered it necessary.	Respondents in favour of teenage sex: 50%	25.8% had dated: <ul style="list-style-type: none"> 34.1% of males 18.1% of females $P < 0.001$ 33 respondents had had sex: 24 males vs. 9 females, $P < 0.001$ 81.8% used no contraception at first sex. The youngest age at first sex was 11.
Zhang Y <i>et al.</i> (2004) Beijing	N=1361 1 key, 2 common & 1 vocational	Questionnaire (self-completed,	Mean scores on reproductive questions (out of 5): <ul style="list-style-type: none"> 2.37 for juniors 	Respondents against teenage dating: 71% Attitudes to teenage	2.1% had had sex: <ul style="list-style-type: none"> 0.9% (6/647) of juniors 3.2% (21/649) of seniors

municipality	high schools Year 2 juniors Year 1-3 seniors Mean age: 13.7 years for juniors, 16.8 years for seniors Random cluster sample Valid responses: 95.2%	anonymous) School	<ul style="list-style-type: none"> • 3.35 for seniors $P < 0.01$ 	sex: <ul style="list-style-type: none"> • 74% of juniors vs. 54% of seniors against, $P < 0.01$ • 15% of juniors vs. 34% of seniors in favour, $P < 0.01$ • 7% of juniors vs. 9% of seniors uncertain, $P > 0.05$ 	$\chi^2 = 8.46, P = 0.04$
Zhao <i>et al.</i> (2005) Rural areas in Zhejiang, Shanxi & Qinghai provinces	N=2944 4 high schools 15-19 years (M=16.88±1.19) Random cluster sample Valid responses: 90.6%	Questionnaire (self-completed, anonymous) School 2003	Mean scores on knowledge of STIs/AIDS and contraception (out of 10): <ul style="list-style-type: none"> • males: 4.46±3.04 • females: 3.77±30.1 $P < 0.05$ Information needs: relationships (59%), adolescent psychology (51%) and STI/AIDS prevention (49%) Preferred sources: schools (62%), hospitals (33%) and telephone counselling (24%)	Attitudes to premarital sex <ul style="list-style-type: none"> • 76% against • 16% neutral • 9% in favour 	4.6% (135/2944) had had sex: <ul style="list-style-type: none"> • 6% of males • 3.1% of females $P < 0.05$ 28.9% (39/135) had used contraception.
Zhi (2008) A county in Henan province	N=3611 2 junior & 2 senior high schools 10-25 years Valid responses: 99.8%	Questionnaire (self-completed, anonymous) School 2005	Percentage of correct answers from all respondents to questions on: <ul style="list-style-type: none"> • HIV/AIDS: 31% • HIV transmission routes: 77% • HIV non-transmission 	Respondents against premarital sex: 65% <ul style="list-style-type: none"> • 55% of males vs. 77% of females, $P < 0.05$ • 73% of juniors vs. 57% of seniors, $P <$ 	0.6% had had sex.

			<p>routes: 61%</p> <p>Main sources of information: TV (86%), magazines (75%), advertisements (70%) and teachers (43%)</p>	0.05	
<p>Zhu <i>et al.</i> (2009) Guangzhou city (urban & suburbs) Guangdong province</p>	<p>N=5966 9 high schools Year 1-3 juniors & Year 1-3 seniors 11-22 years (M=15.94±1.88) Cluster sample Valid responses: 99.4%</p>	<p>Questionnaire (self- completed, anonymous) School 2004</p>			<p>1.3% had had forced sex. 4.5% had had sex voluntarily:</p> <ul style="list-style-type: none"> • 6.7% of males vs. 2.4% of females, $\chi^2 = 53.294$, $P < 0.001$ • 3.7% of juniors vs. 5.3% of seniors, $\chi^2 = 7.581$, P < 0.006 <p>59.7% had had multiple sexual partners: 63.1% of males vs. 44.7% of females, $\chi^2 = 4.087$, $P < 0.04$ 51.2% had used a condom. 21.3% had been pregnant or made someone pregnant. 23.3% had sex before age 11: 31.3% (25/80) of juniors vs. 18.5% (24/130) of seniors, $P < 0.05$</p>