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Vulnerabilities and opportunities for improving sexual and reproductive health and rights for adolescent female sex workers in Kunming, China

Xu-Dong Zhang

Doctoral Thesis submitted to obtain the degree of Doctor in Medical-Social Sciences,Faculty of Medicine and Health Sciences, Ghent University

PhD Promoter: Prof. Dr. Stanley Luchters

PhD Co-Promoter: Prof. Dr. Marleen Temmerman

Dept of Obstetrics and Gynaecology, Ghent University

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Xu-Dong Zhang

PhD Promoter: Prof. Dr. Stanley Luchters
International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium
Centre for International Health, Burnet Institute, Victoria, Australia
Department of Epidemiology and Preventive Medicine, Monash University, Australia
School of Public Health, University of the Witwatersrand, Johannesburg, South Africa

PhD Co-Promoter: Prof. Dr. Marleen Temmerman
International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

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International Centre for Reproductive Health (ICRH)
Ghent University
De Pintelaan 185 P3
B-9000 Ghent (Belgium)
www.icrh.org

Preface

Adolescents are one of the groups that existing health services serve least well globally. None of Millennium development Goals 4, 5, 6 can be achieved without appropriate and adequate investment in this population. Emerging evidence suggests taking into account those vulnerable adolescents at greater risk of adverse sexual and reproductive health and social development. Risk factors identified cluster among adolescent female sex workers, some are specific to them, while others are also important to general adolescent population in China. The structural factors and social-political environment have long-term impacts on their health and development across the life course, ultimately influencing the next generation. When considering these girls' age, a critical moment transiting to adulthood, health problems should not be the only concern for a society however. Thus, it is urgent to ensure adolescent female sex workers have a right to receive comprehensive sexual reproductive health information and services, and other social and legal support to secure their future. Their needs, own perspectives must be heard and adopted to the policy making process, and most importantly, "policies are only as effective as their implementation" (WHO: Health for the world's adolescents, 2014).

CONTENTS

List of Abbreviations

ATS	Amphetamine-type stimulants
AIC	Akaike information criterion
CDC	Chinese Center for Disease Prevention and Control
CI	Confidence interval
CT	*Chlamydia trachomatis*
DHS	Demographic and Health Survey
FP	Family planning
FGD	Focus group discussion
FSW	Female sex worker
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HSS	HIV surveillance system
HSV-2	Herpes simplex virus-2
IDU	Injecting drug user
IUD	Intrauterine device
KCDDC	Kunming Compulsory Drug Detoxification Center
KII	Key informants interview
LARCs	Long-acting reversible contraceptives
MMT	Methadone maintenance treatment
NG	*Neisseria gonorrhoeae*
NSP	Needle syringe programme
PLHIV	People living with HIV/AIDS
RTI	Reproductive tract infection
SRH	Sexual and reproductive health
SRHR	Sexual and reproductive health and rights
STI	Sexual transmitted infection
VCT	Voluntary HIV counselling and testing

CHAPTER 1: INTRODUCTION

1.1 Sex work in China

1.1.1 Definitions

There is a large quantity of slang to the popular vocabulary of prostitutes in China society for a long history, for example, “qing-lou-nu” (brothel girl), “san-pei-nu” (escort girl), “xiao-jie” (miss), “Ji” (chook, same pronunciation as the prostitute in Chinese), “er-nai” (mistress or girl for rent), internet/call/ massage/street/factory “nu” (girl), “ya-zi” (money boy); however, the term of “sex worker” has been initially introduced to China by international HIV/STI intervention programmes in the early 2000s. This terminology is the subject of controversy in the Chinese context. The law enforcement departments are strongly arguing that the “sex work and sex worker” imply legally recognizing the sex industry and having the same entitlements as all other informal workers; nevertheless, non-governmental organizations or public health programs in China tend to use “sex worker” instead of prostitute, they contend that the policy of banning prostitution is problematic and unrealistic because it hinders the task of developing measures to prevent the spread of HIV and curtails those women’s human rights due to long-term detention through labour centres.[1-3]

Prostitution usually refers to as female sex worker in Chinese society and in legal documents, however it is also made up of male sex worker although little is known about this population due to the legal status of sex work and cultural restrictions. Their population size remains largely unknown and their existence has been ignored by the public, but estimates range from 4.9% to 24% of all men who have sex with men and most of them are mainly living in the

big cities in China.[4] This PhD research did not explore challenges encountered male sex workers, although this is clearly a sub-population requiring more attention.

For the purpose of this thesis, the term female sex workers (FSWs) is adopted from the UNAIDS 2001 definition in Cote d'lvoire[5] workshop and the 2009 guidance[6], which is defined as "women who receive money or goods in exchange for sexual services, exclusively limited to and ends with sex act, either regularly or occasionally, regardless of whether or not they have a personal or social identity associated with that behaviour ". Thus adolescent FSW is defined as a woman aged 15-20 years and currently working as a sex worker, and this population forms the basis of this work.

1.1.2 The cultural and legislative context

In China, sexuality and sexual freedom are affected fundamentally by cultural and moral conservatism that marriage is the only legitimate site of sexual expression against a background of disapproval of pre- and extramarital sex, which is particularly strict for women as a traditional virtue.

The institutionalized sex industry has a long and complex history of more than 2000 years in China. For a long time in ancient China, prostitution was completely legal and flourishing before 1949. Commercial sex-related activities are characterized by diverse types, venues and prices,[7,8] with societal attitudes towards sex workers shaped by political and cultural norms. Generally, there were three different layers of social class structures in traditional China: shang-jiu-liu (upper class), zhong-jiu-liu (middle class) and xia-jiu-liu (lower class). Entertainers, tramps, beggars, slaves, robbers/thieves,and prostitutes together comprised the lowest social hierarchy.[9]

Women in imperial China were subordinate to men and had five classes in the social scale: "wife, concubine, servant, nun, and prostitute".[7] Society in imperial China was essentially based on a patriarchal social system, in which wives and concubines did not necessarily have to be beautiful or educated, their main function in life was to ensure the continuation of the family lineage,

to be obedient to her husband, dutiful to her children, mind her domestic affairs, and be virtuously ignorant on all other matters.[7,10] On the other hand, prostitutes were exceptions to this rule. Prostitutes themselves come from a broad range of social backgrounds and were almost all female. These registered prostitutes usually worked at brothels, and needed to have at least one excellent quality to establish their fame that transcends the simple and tawdry exchange of sex for money; dancing, singing, or literary talent.

Figure 1: Female sex worker meet a client at her room in the brothel (Qing Dynasty 1644-1911)

For Chinese men, marriages were matters of social hierarchy, leaving endless scholars and aristocrats with marriages that lacked both the affection and communication that can be found on a deeper, more spiritual level. In short, Chinese men were in need of intellectual counterparts of the opposite sex for social life, or escape the dull atmosphere of their homes.[11] Unlike the girls brought up in ordinary families who were deprived of education, prostitutes were taught to become—not merely entertaining performers—but the mental equals to aristocrats, scholars, government officials, and all manner of high society. These women did not just offer sex but rather the pleasure of their company through music, singing, dancing, literature, calligraphy, chess and literary drinking games or even poetry. As a famous scholar Lin Yutang (1895－1976) wrote: “One can never overstate the important roles Chinese prostitutes played in romantic relationships, literature,

music, and politics."

Immediately after the founding of the People's Republic in 1949, the institutionalized prostitution was eliminated through national campaign promoting 'moral values' and empowering women with rights in the political, economic and social life.[12,13] Brothels were closed and FSWs were incarcerated for compulsory re-education programmes and subsequently transformed to normal workers.[8,12] In accordance with the communist' ideology, women who sold sex were viewed as being forced or tricked into prostitution in order to survive. As such, the sex industry is often considered as a 'social evil' and is associated with a series of problems such as organized crime, oppression against women, government corruption, and sexually transmitted diseases transmission. The eradication of sex work was thus vaunted as one of the major measures to "save" those women who slipped down, and to "clean" the society.[7,8,12] In turn, FSWs were and remain thoroughly stigmatized and discriminated in Chinese society.[7] However, some studies have shown that the "invisible prostitution" still survived in Maoist China.[7]

During the same period, a successful nationwide campaign against sexually transmitted infections (STI) was conducted. Thousands of health workers were trained to recognise the signs and symptoms of STI, screening and antibiotics were freely and universally accessible. By 1964, syphilis has been eliminated in mainland China according to governmental proclamation.[12,14-17] China remained syphilis-free for around two decades, and witnessed subsequent resurgence of syphilis prevalence.[15]

Since 1978, reform of economical policies (open-door) in China, a large scale rural-urban migration including both young females and disproportionately unmarried male migrants (surplus men[1]) result in widening income gaps. In addition, more tolerant sexual attitudes, the expansion of a consumer society and increased tourism are all contributing to the

[1]Surplus men: young, single poor men or "bare branches" due to imbalance gender ratio which fostered by traditional son-preference though the de-collectivization of agriculture, the one child family planning policy, and the disparity of pension system between urban and rural areas. The sex ratio (the number of males for each female in a population) at birth was 117.78 boys to every 100 girls in 2011.[18]

development of the commercial sex industry over the past two decades. It was initially confined in the eastern and southern parts of the country and gradually became a nationwide phenomenon. Sex work remains a full-time job for many Chinese women, although the commercial sex industry in China is less commonly based in brothels in comparison to most of their Asian counterparts.[13,14]

Women who earn a living by selling sex only are known as direct sex workers, usually as freelance recruiting their clients in the streets or by other methods (e.g. mobile phone, the
Internet or pimps); while those women employed in entertainment establishments and who occasionally or regularly sell sex are known as the indirect sex workers.[19] Of them, the majority encounter their clients in entertainment establishments (e.g., karaoke, night club, dancing hall, disco, bar) or personal service sectors (hair washing rooms, hair salons, massage parlour, sauna, restaurant, and hotel).[7,8,13,14,16,18,20] There is great heterogeneity among FSWs in terms of how much they charge for sex, working conditions and type of clients. Local authorities and programmes often separate sex work localities into lower-class workplaces including streets, bars, small road-side guesthouses/hotels with manager or pimp, foot massage parlours, small sauna/bath rooms, barbershops, karaoke clubs, dancing halls, while higher-class workplaces includes VIP clubs or big night clubs.[14,21-24]

Recent years, new types of sex services have emerged, including call girls, girls who solicit through the internet, mobile phone or through a pimp. These women could either manage themselves or are free to choose/change their own managers. Their workplace and work time are more flexible, complicating the public health response.[13]

In China, the estimated number of FSWs was 25,000 in 1985 and 4-6 million in 2000.[13] Although more recent size estimations of the FSWs in 2007 by National Centre for Disease Prevention and Control (CDC) were 1.8-3.8 million.[25]

There are no accurate global estimates of the number of sexually exploited children and adolescents, nor of the subset of those who sell sex.[26] In recent years, some studies show that the number of adolescent FSWs under 18

years or young FSWs in their early 20s is rising in large cities or in tourist attractions of China.[8,14,22,27,28] Exact statistics are difficult to obtain, but from HIV/STI programs and health workers' estimation, FSWs under 20 years range from 15-40 per cent of the FSW population. This phenomenon has been driven by socio-economic pressure for girls who drop out of school, large income disparities among rural and urban areas, limited employment opportunities, surplus men and changing notions of sexuality.[8,18,29] In addition, the highly valued virginity in China's traditional culture compounded with rapid spreading of HIV/STI initially fuelled the demand of underage FSWs. As a result, young girls are often catered by entertainment owners and pimps for much higher prices than older FSWs.[30,31] However, owners or managers of entertainment venues are careful to avoid attracting the attention of governmental authorities on underage FSWs, because it endangers the operation of entertainment business.[14]

Many young women resort to the sex trade because of limited employment opportunities in an increasingly competitive work market and economic hardship. Others are forced into the sex trade, and for some young women the lure of fast and easy earnings for better life or financial independence, acquiring more experience of attractive life styles and gaining social contacts also result in entering sex work.[7,8,32]

Figure 2: Adolescent FSWs working at the broad areas between Yunnan Province and Vietnam (Photo credit: Brent Stirton)

Currently, all forms of sex work are illegal in China. Brothels are illegal under the Criminal Law. The periodic "strike-hard" campaigns which are

intensified crackdowns on sex work are often mounted before major holidays or national events with political motivations.[16,17,20]

Figure 3: The legality of sex work in China (Source: UNAIDS "sex work and the law in Asia and the Pacific", 2012)

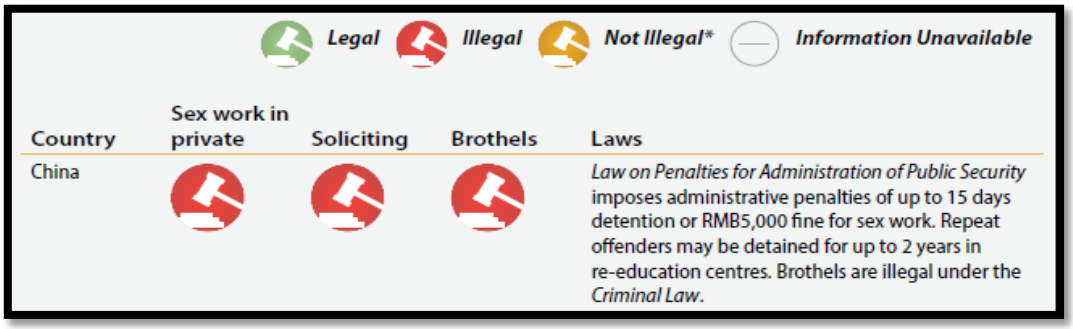


Figure 4: A severe police crackdown on sex work during 2014 New Year Holiday in Southern China (Source: Nandu Daily)

The legal basis is the 1981 public security regulation against

pornography, the 1987 "Security administration punishment regulations", the 1991 law “Decision of the Standing Committee of the National People’s Congress on Strict Prohibition Against Prostitution and Whoring,” as well as a more recent 2006 law on prostitution. These regulations make it an offence to "having sexual intercourse with unspecific persons of opposite sex or other licentious activities on the purpose of seeking profits" (definition of prostitute) and to "have illicit relations with a prostitute" (definition of client). Women who sell sex are treated as quasi-criminals and imposed administrative penalties of up to 15 days detention or fined RMB 5,000 (approximately 600 Euro). Repeat offenders may be detained for up to 2 years in re-education centres - the “Re-education Through Labour” policy is an extra judiciary administrative system operated by public security organisations where they are facing mandatory test of HIV/STI.[18,33] However, the definition of “sex worker” is unclear, and does not take gender, age or workplace into account, resulting in uncertainty and the flexibility for law enforcement. Street-based workers are more likely to be arrested and detained than those who work from establishments. Condom possession is often used as evidence of prostitution in arrests by police.[17] Arrests are usually of sex workers rather than clients who are subject to fines normally.

For underage girls who are older than 14, there is a legal loophole which appeared in the 1997 revision to the criminal law. It is differentiated from and parallel to rape crime, so called “whoring an underage girl crime”: if the underage victim is “identified” as a prostitute, the offender will receive a much lighter punishment following the crime type of whoring an underage girl rather than a child rape. This law has been highly debated that it actually plays the role of a shield for criminals who sexually assault young girls, and encourages prostitution rings to lure and coerce underage girls into prostitution; in addition, other point of controversy indicates that this law does not protect the marginalized population-young sex workers from sexual crime, in fact, the punitive law strengthens the stigmatization and structural inequities of prostitutes, law enforcement crackdowns drives sex workers further underground, affecting both safety and access to outreach services.[13,17,34]

In recent years, several high profile legal cases led to heated public

discussions about the “Re-education Through Labour” policy. This punitive measure had fallen into disrepute because of its arbitrary arrest, lack of judicial process, forced labor and infringement of human rights. On December 28, 2013, the Chinese government announced the abolishment of the system. However, other similar administrative penalties known as the “Custody and Education” system remain in effect and continue to greatly impact on female sex workers. There are no accurate national estimates of the number of detained female sex workers and their clients, but according to the Asia Catalyst and Nandu Daily’s research into the system, the number is large, and about 90 “Custody and Education” centers are currently functioning over 26 provinces of China. However, this system remains largely unknown to the general public.[34] Arguments for legalising or decriminalising prostitution in China have arisen repeatedly over the past decade, but are merely limited to academic discussion and remain far from legislative proposals.[14]

However, the policies focusing on HIV/STI prevention also have a direct bearing on sex work in China. This is reflected by the reality that period police crackdowns on sex work are implemented by governmental public security departments in parallel with condom promotions and health services for sex workers implemented by public health departments. We will discuss further in next section.

1.1.3 HIV and other STI

1.1.3.1 Overview of the HIV/STI epidemic among female sex workers

In 1989, the initial 146 HIV cases identified in China were among intravenous injecting drug users geographically concentrated in Yunnan province neighbouring the “Golden Triangle”, a major international drug trafficking route.[35,36] By the end of 2011, it is estimated that 780,000 (range 620,000 –

940,000) people are living with HIV/AIDS in China, of whom 64% contracted HIV through sexual contact and 28% through injecting drug use, and 28% were female.[37] Heterosexual sex has replaced drug injecting as the dominant route of transmission, with increasing numbers of people reporting HIV infection through this route since 2007.[38] In 2011, heterosexual transmission represented over half (52%) of all new infections, and groups particularly at risk of heterosexual transmission in China are migrant workers and FSWs with their sexual partners.[39]

Data from the national HIV sentinel surveillance system in 2011 suggested that the HIV prevalence among FSWs was consistently low in most regions (range: 0%-1%).[39,40] Another recent systematic review and meta-analysis based on 11 cited studies indicated the prevalence of 0%-1% might be underestimated with the limitations of the current sentinel surveillance system, masking the variation of risk status. This analysis showed a pooled prevalence of 3% (95% Confidence interval [CI]: 2.8-3.3) among FSWs which is about a 50-fold increased risk for HIV infection compared with other women of reproductive age. Sex workers bear an estimated 50% of the burden of HIV infections in women in China.[41]

A literature review based on 15 studies showed the highest prevalence in Yunnan Province (8.3%-10.3%) among FSWs[29].

Figure 5: Geographic distribution of the estimated 780,000 PLHIV in China in 2011 (Source: China Ministry of Health, 2012)

Current STI surveillance is primarily from sentinel surveillance conducted by CDC, and database of national or provincial level prevalence and trends is not open to public access; moreover, data collected by spot-specific government agencies or nongovernmental organizations were difficult to give the most representative sample in China context.[29] Despite limitation of studies and official data, existing studies revealed rapid increase of and high STI prevalence among FSWs in China, especially within specific regions such as the South and Southwest.[15,42-44] The median STI prevalence for FSWs was at 42% (diagnosed or tested positive for at least one STI) and the median self-reported lifetime prevalence of STI history was about 17%. Notably, syphilis prevalence among FSW appears high and co-infections with *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG), *Trichomona vaginalis*, and herpes simplex virus type 2 (HSV-2) were also high. Table 1 summarizes HIV/STI prevalence data from a 2011 systematic review[29].

Table 1: Summary of HIV and STI prevalence data among FSW in China. (Poon AN, Li Z,

Wang N, 2011)

Type of STI	Number of studies	Sample size	Range	Median
HIV	N =15	353	0-10.3%	0.6%
Active syphilis	N =15	482	0.8-12.5%	6.9%
History of syphilis	N =3	655	4.5-15.7%	13.9%
HSV-2	N =6	310	29.7-70.8%	56.2%
CT	N =11	410	3.9-58.6%	25.7%
NG	N =13	505	2.0-85.4%	16.4%
Trichomonasvaginalis	N =7	505	7.1-43.2%	12.5%
Self-reported history of STI	N =11	512	4.8-53.2%	17.0%
Positive for at least one STI	N =11	410	13-90.6%	41.5%
Positive for two STI	N =2	621	23.9-48.3%	36.1%
Positive for three STI	N =2	621	8.4-15.2%	11.8%

1.1.3.2 Drug use among female sex workers and the risk of HIV/STI

Opiates were the primary drug of concern and heroin remains the most commonly used drug in China, but access to and demand for synthetic drugs has expanded rapidly in the past ten years.[45] Amphetamine-type stimulants (ATS) have become popular among urban youth and are mostly consumed in entertainment facilities, with use of heroin having decreased over time.[46,47] Most of opiates and the methamphetamine are trafficked overland from Shan State in Myanmar into Yunnan province in China. Throughout China, the drug market has and continues to significantly challenge both national and provincial law enforcement agencies as well as pose a notable concern for the public health sector.[48]

China has taken a punitive and hard-line strategy towards drug use and drug trafficking since 1949. Compulsory actions taken against persons using illicit drugs to achieve the goal of abstinence primarily includes treatment at compulsory rehabilitation centres.[45-47,49,50] By the end of 2012, China reported nearly 2.1 million registered drug users who are mainly heroin injecting drug users (IDUs); of these, over a third (38%) were identified as poly drug users (mainly heroin, ATS and ketamine).[51] Of concern is the surge of younger ATS users which is reflected by the substantial and increasing number among newly registered methamphetamine users in 2011, 18% of whom were below the age of 20 years.[51] Also, of all illicit drug users in China, almost three quarters (73%) were between the ages of 16 and 25 years.[45] As these data only reflects the situation of ATS users who have engaged in drug-related criminal activities and been caught, it is hard to estimate the general situation of young people, nor are we able to ascertain more critical information about sub-populations of ATS users, such as young female sex workers.

Numerous studies have now identified that a strong interrelationship exists between sex workers and substance abuse accompanying their lifestyles and behavioural characteristics throughout China and other regions.[21,46,52-57] There are various reasons why sex workers might be particularly vulnerable to drug use or abuse, which include:many entertainment venues often provide easy access to illicit drugs in big cities;[47,58] to cope with their accelerated life circles (irregular or late hours); to control weight; to relax inhibitions for multiple or disagreeable clients; to enhance performance during their work; to increase the sexual excitement and energy for sexual activities, or they just simply perceive ATS as being less harmful than other drugs to embody modern and fashionable lifestyles.[55,59-61] However, some people are motivated to sell sex for generating money to buy drugs, which is most likely associated with drug dependence, in this context, and could be viewed as a subgroup of problematic drug users.[59] In 2010, the prevalence of having ever using any type of ATS among FSWs in Viet Nam, the neighbouring country of Yunnan were 21% for methamphetamine pills, 54% for ecstasy and 58% for crystalline methamphetamine.[62] During 2006 to 2007, two cross-sectional studies among FSWs (sample size: 1642 and 737 respectively) in Yunnan revealed that 16%

of participants reported having ever used drugs. Of these, about 7-9% were IDUs,[21,57] which is similar as other southern Chinese cities;[22] in other inner cities of China, about 2% of FSWs reported using drugs and 0.3% were IDUs;[8,27] However, there was no specific drug types reported in these studies, only a 2007 study in Guangdong province identified that ecstasy prevalence was about 8% among FSWs.[63]

A number of public health consequences have been well documented including STI and HIV, hepatitis B and C (HBV and HCV), tuberculosis and mental health problems among FSWs who use drugs.[52,54,56,57,60,64] The 2011 national sentinel surveillance data showed that the high HIV prevalence rates (more than 1%) among FSWs were province-specific and clustered in Yunnan, Xinjiang, Guangxi, Sichuan, and Guizhou provinces, where injection drug use behaviours is common.[40] Studies among Chinese FSWs who use drugs described high HIV prevalence rates (25%-39%).[57] HCV (32%) and syphilis (range: 12%-35%),[29] *Trichomonas vaginalis* (10%), NG (6%), CT (20%) and HSV-2 (87%)[57]; in addition, methamphetamine use has been found to be associated with syphilis infections (AOR=2.5).[65]

There is further evidence from surrounding countries in the Mekong region to suggest that women who sell sex and use ATS face increased risk of health harms, including HIV/STIs.[55,59,62] In Vietnam, ATS use among FSWs has been found to be associated with heightening sexual libido and unprotected sex;[62] studies in Cambodia have showed ATS use to be independently associated with incident STI among young FSWs, (Adjusted Hazard Ratio: 4.3; 95% CI: 1.7–11.0) and associated increased numbers of sexual partners among women working in entertainment establishments (RR: 2.5; 95% CI: 1.6–3.7).[60,61]

1.1.3.3 Public health policy response to HIV/STI

An effective and comprehensive response aimed at reducing vulnerability to HIV requires a wide array of activities including individual-level, and community- and policy-level interventions. China is among the countries that

have committed to achieve the Millennium Development Goals by 2015.[52] However policies around stigmatized infectious diseases, such as HIV, are politically sensitive in China. The political regime and weak public health system had an implication in delaying the effective national HIV/AIDS response at an early HIV epidemic stage.[13,66] The situation was changed soon after the 2003 SARS crisis which forced the government to restructure public health institutions to address infectious disease challenges at national, provincial and county levels.[67] In early 2006, the first legislation directly aimed at controlling HIV/AIDS-the *AIDS Prevention and Control Regulations*-was initiated by the Chinese government which defines the rights and responsibilities of government, civil society and people living with HIV/AIDS. This regulation has laid a legal base for effective but sensitive prevention measures, such as condom promotion, methadone maintenance treatment (MMT) and needle syringe programs (NSP).

Given the elevating risk of HIV/STI among FSWs, this subpopulation have therefore become the focus of China public health authorities' HIV prevention strategy which has aimed to strengthen HIV surveillance system including syphilis, HBV and behavioural surveillance system, thus to increase the data accuracy. So far, a network of national HIV surveillance system including more than 500 sentinel sites targeting FSWs in areas with known high rates of STI has been established and expanded across 31 provinces.[15] The HSS comprises routine survey and sero-testing of HIV, syphilis and HBV aiming to monitor HIV/syphilis prevalence and related risk behaviours among FSWs.[68] On the other hand, government-led intervention programs providing free HIV/syphilis counselling and testing services and condom promotion has been implemented through all levels of CDC to reduce risk behaviours and prevent HIV/STIs among FSWs.[29,68-71]

Despite 81% of FSWs had been covered by any form of intervention service nationwide in 2012, up from 74.3% in 2009,[37] much debate between public health and law enforcement sectors impedes the effectiveness of these public health initiatives. Some local governments showed reluctance in scaling up prevention programmes targeting FSWs as they feel that these programmes could lead to the abandonment of sexual morality, encourage or admit the

existing of sex industry. Furthermore, the attitude in controlling HIV/STIs and capacity of implementation of national strategies are varied among local governments.[13,18]

Figure 6: Free HIV counselling and testing provided by local CDC/peer education services in drop-in center/IECs distribution in entertainment venues provided by outreach workers of NGOs for female sex workers in Kunming (Photo credit: Xu-Dong Zhang)

Globally, successful control of the epidemic of HIV requires strong international collaborations. International health agencies and programmes have been playing an important role in facilitating China's national HIV/AIDS response. By 2010, the Chinese government received USD$ 526 million from over 40 international organizations, and there were 267 bilateral- or multilateral-cooperation projects launched to fight the spread of HIV/AIDS in China. As a result, international best practices have been introduced, and have

accelerated the formulation of AIDS policies, subsequently integrated into the overall national HIV/AIDS responses for FSWs, men having sex with men and IDUs, including: outreach for health promotion, drop-in centre-based counselling and testing services, as well as referral of HIV/STI treatment and peer education. Moreover, these international efforts provide technical support including: surveillance, training, advocacy, awareness raising towards politically sensitive populations, such as FSWs and IDUs.[66] Particularly, international cooperation has initially created an opportunity to mobilize the civil society among targeting populations which had been almost absent since 1949.[13,23] The emerging grass-roots and community-based organizations have played a significant role in providing a platform for communication, specialized prevention and health care services to marginalized groups, yet these organizations are far from robust because of the global budget crisis and limited space of for development in the political regime context in China. For example, the policy of registration and political space for NGOs working with sex workers and drug users are more restricted than for other types of NGOs, and the civil society for sex workers is generally fragmented and poorly coordinated with government efforts.[17,72] The government rarely "contracts out" to community-based NGOs for service provision resulting fairly weak representation and voice of these local NGOs' in policy and programming.[17,72] Moreover, after 2012, as many NGOs were working on HIV prevention in other regions, the withdrawal of international donors funding and technical support has created a critical challenge in building the long-term sustainability of programmes for local FSWs organizations which are vastly reliant on external funding sources.[17,73]

Alongside public health response to HIV/STI prevention, periodical police crackdowns on sex work lead to increase FSWs' mobility and impede their stability to access the healthcare and HIV/STI prevention programmes, which inhibits efforts from public health sectors and civil society.[1,13]

Although law enforcement agencies focus on supply reduction of illegal drugs, the poor health outcomes associated with drug use, particularly those due to sharing needles and syringes among heroin drug users, is of greatest concern for public health service providers in China. To confront the dual

epidemics of injecting drug use and HIV, particularly where they coalesce, the Chinese public health sector initiated a pilot harm reduction programme in 2004. This programme however, is largely confined to methadone maintenance treatment (MMT). With the coverage expanded nationwide, China's MMT programme now reportedly includes more than 738 clinics across 28 provinces and it is reported to be servicing 344,000 heroin-users by the end of 2011.[37,74-76] However, MMT is only designed to treat and support opioid-type drug users, not ATS.[2] Since 2004 multilateral needle and syringes programmes have been also piloted in selected parts of the country, but the withdrawal of international donor development investments in 2012 has resulted in a significant reduction both in size and number of the programmes and further caused low overall coverage.[80] As with neighbouring countries, the harm reduction approach currently used in China fails to cater for the adverse health issues related to ATS use among young people.[46,62,81]

1.1.4 Family planning and reproductive choice

Nationwide, family planning (FP) facilities are government funded and authorised by the National Family Planning Commission. However, FP facilities are almost an independent health care system outside the public health sector in China, although integration is being aimed for since 2013.[82-86] Government funded FP clinics provide full-scale services including counselling, physical examination, birth control, prenatal care, pregnancy test and abortion care for married couples or migrant adults. Most commonly available/used forms of contraception are male condom, intrauterine device (IUD; mainly Copper T220 and T380A), Levonorgestrel-releasing IUD (Mirena®); in addition to above products, implants (Norplant and Jadelle

[2] Because of the diversity of ATS users and their varying drug-using patterns associated with a wide range of substances, to date, the evidence about the treatment for ATS withdrawal, dependence and abuse remain limited. This suggests that no evidence-base pharmacological treatment has been demonstrated to be effective for ATS users. Furthermore, there is a lack of professional expertise and counselling training, and an absence of treatment services in the Asia-Pacific region.[77-79]

which are manufactured and marketed in China as Sino-implant Domestic No. 1 and No. 2 respectively) and contraceptive ring are also available but less used by clients.[87,88] Male condoms are free of charge for married couples, but other FP methods are only free for residents of rural areas. In urban areas the fee for each insertion of an IUD, implant or contraceptive ring ranges from US$30 to US$80. However, these costs are still much lower than public hospital and commercial sectors.[89] Abortion has been legal in China since the early 1950s and safe abortion services are available through government-funded public hospitals and FP clinics. In addition to above public services, a large commercial sector provides abortion services in China. These are generally operated by self-employed, private medical practitioners resulting in considerable variation in the quality and safety of services.

Contraceptive prevalence rate among married women in China was 89%, which is the highest in the world; in contrast policy responses for unmarried young people are largely lagging behind. China's young people are growing up in a rapidly changing society. Increasing access to media, urbanisation and globalisation are contributing to changing sexual attitudes and behaviours, more young people are engaging in premarital sexual activity with a widening gap between sexual debut and age of marriage [3] .[83,85,90,91] Traditional socio-cultural taboos regarding premarital sex and pregnancy result in judgemental, ambivalent and conservative attitudes among health service providers about the provision of FP services to young unmarried people.[84,85] The governmental subsidised FP services are generally only accessible to married couples of reproductive age which results in a lack of provision of contraceptive knowledge and services to unmarried youth. Moreover the associated costs of long-acting reversible contraceptive methods (LARCs) can be a deterrent to use.[88,92] All above factors contribute to potentially unmet needs for FP among young unmarried people including sexually active adolescents, particularly women in China.

A review of contraceptive practices among Chinese women brought to light that 12%-54% of sexually-active unmarried women relied on less effective contraceptive methods, including rhythm and withdrawal; notably,

[3] The minimum legal age for marriage is 20 for women 22 for men nationwide.

those women do not have access to contraceptive counselling, nor free contraceptives in contrast to their married counterparts. This has led to an annual induced abortion rate of approximately 20% among those women.[87]

A 2010 nationally representative survey of 10,966 unmarried women aged 15 to 24 years reported that 19% were sexually active, but only 4% had adequate knowledge about SRH, with the lowest levels of knowledge recorded among girls aged 15-19 years. Overall, 17% of sexually-active young women aged 15-19 years had experienced a premarital pregnancy, 91% ending in abortion. Of young women who had ever had an abortion, 19% reported multiple abortions.[91] In China, an estimated ten million induced abortions occur in registered health facilities annually which exclude self-induced abortion by oral mifepristone and/or misoprostol which are easy to obtain in pharmacies or commercial health facilities.[82,93] Some 25% of induced abortions are carried out on women younger than 18 years of age: an estimated two-thirds result from contraceptive failure and one-third are due to non-use of contraception. [82,83,94]

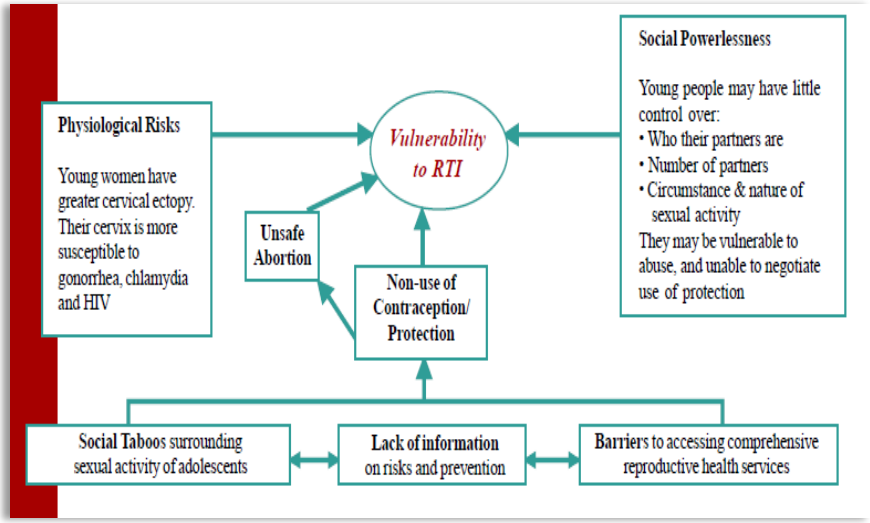
Previous studies indicate that adolescents are more likely to seek abortion services from these unregulated commercial providers due to concerns about judgmental attitudes of public sector health workers, fear of disclosure, inconvenience and lack of health insurance associated with public hospitals.[84,92] The 2010 study[91] indicated that unmarried females aged 15-19 years were significantly more likely than those aged 20-24 years to seek abortion services in commercial health facilities rather than government-recommended public health facilities (49% vs. 34%, p=0.021). Consequently, adolescents are more likely to encounter unskilled providers, to submit to unsafe methods, and to delay seeking care for abortion-related complications.[95-97] As a result, poor health outcomes associated with early pregnancy and unsafe abortion are being increasingly reported among unmarried young women.[98,99]

In summary, considerable stigma surrounds sexual activity of Chinese adolescents, and social, cultural and political obstacles restrict large numbers of sexually active adolescents receiving FP and SRH services. The punitive laws and discrimination against sex work could further impede adolescent

FSWs to seek timely and effective treatment and care.

Globally there has been an increasing recognition of the SRHR needs faced by young adults and adolescents regardless their age, gender or marital and legal status. [102,103] Adolescence is a key phase of human development and adolescents' SRH differs from other groups in the population.[100,101] The Population Council employs the concept of social and medical determinants to clearly describe the particular risk for reproductive tract infections among adolescent women as below.[102] The poor SRH outcomes have serious impacts on the health of these adolescents today and devastating effects on their development as adults in the future. Few programmes or policies specifically target adolescents, leaving a gap in the public health service system in China.[84,91,102,103].

Figure 7: Conceptual framework of Population Council on social and medical determinants of adolescent women's vulnerabilities to reproductive tract infections.



1.2 Knowledge Gaps

First of all, much of the identified needs for this research were grown from

observations in the field. Grass-root FSW supporting organizations and international HIV/STI prevention projects in local settings raised the concern that a substantial percentage of adolescent FSWs were overlooked in current policies and programmes.

The prominent knowledge gap identified in the literature regarding FSWs, is the lack of data addressing the age group of 15-19 specifically. Adolescent FSWs have mostly been neglected in the focus of research of FSWs in China, partly due to the traditional assumption that adolescents should attend school, remain under supervision of family support and abstain from sexual intercourse; another important reason is the concern of political sensitivity and pressure in China; while, restrictive policy on development of NGOs working with FSWs limits their voice being heard. As a result, adolescent FSWs' situation remains largely unknown to the general public, including the heterogeneity of work context, the HIV/STI epidemic, behavioural characteristics, health needs and access.

Despite available data revealing low use of contraception, high unmet need, and high rates of unintended pregnancy and abortion among FSWs,[104,105] FSWs' contraceptive practices and SRH needs are still under-researched worldwide. Furthermore, few studies have specifically addressed adolescent FSWs, with limited data describing unmet need for contraceptives, pregnancy and outcomes, as well as access to services.[102,103] Similarly, the existing research and programmatic attention to FSWs in China has primarily focused on vulnerability to STI including HIV.

Finally, despite the widespread prevalence of ATS use among youth in South-East Asia,the overlap between sex work and ATS use or poly-drug use among youth is often overlooked within literature, harm reduction policy and programmatic responses,[21,46,52-57,59,80] which leaves a gap in the knowledge on patterns of ATS use and risk-taking behaviour associated with ATS use amongst young FSWs.

This thesis therefore endeavoured to address these research gaps, and the next chapter will describe objectives of the research, and the methods employed.

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Chapter 2: Objectives & Methods

2.1 General Objective

The general objective of this work is to identify vulnerabilities and assess opportunities for improving sexual and reproductive health and rights for adolescent FSWs in Kunming, China.

2.2 Specific Objectives

i. To describe socio-demographic characteristics, HIV/STI prevalence and health–seeking behaviours; to assess social and behavioural predictors for unprotected sex and STI among adolescent FSWs in Kunming, China.
   Methodology: A cross-sectional survey among 201 adolescent FSWs conducted between July 2010 and February 2011
   Article 1: Vulnerabilities, health needs and predictors of high-risk sexual behaviour among female adolescent sex workers in Kunming, China.

ii. To describe knowledge, attitudes, contraceptive practices and reproductive health needs, and assess predictors of unmet need and reproductive health outcomes among adolescent FSWs in Kunming, China.
   A– To describe contraceptive practices and assess factors associated with prior abortion and use of modern contraception among adolescent FSWs in Kunming, China.
   Methodology: A cross-sectional survey among 201 adolescent FSWs conducted between July 2010 and February 2011
   Article 2: High rates of abortion and low levels of contraceptive use among adolescent female sex workers in Kunming, China: a

cross-sectional analysis.

B – To describe use of contraception and SRH services, assess FP and SRH knowledge, and to determine factors associated with unmet need for modern contraception among adolescent FSWs in Kunming, China.
Methodology: A cross-sectional survey among 310 adolescents FSWs conducted between July and September 2012.
Article 3: Sexual and reproductive health knowledge, family planning uptake, and factors associated with unmet need for modern contraception among adolescent female sex workers in Kunming, China.

iii. To obtain a better understanding of the culture of ATS use in order to inform comprehensive harm reduction and sexual and reproductive health programming among female adolescents with a multitude of risk practices including ATS use and commercial sex.
Methodology: A qualitative research using repeated focus group discussions (four sessions in total) was undertaken in 2011 amongst adolescent girls aged 19 years or younger who reported a history of selling or exchanging sex and ATS use.
Article 4: Sexual and reproductive health risks amongst female adolescents who use amphetamine-type stimulants and sell sex: a qualitative inquiry in Yunnan, China.

2.3 Methods

2.3.1 Study period

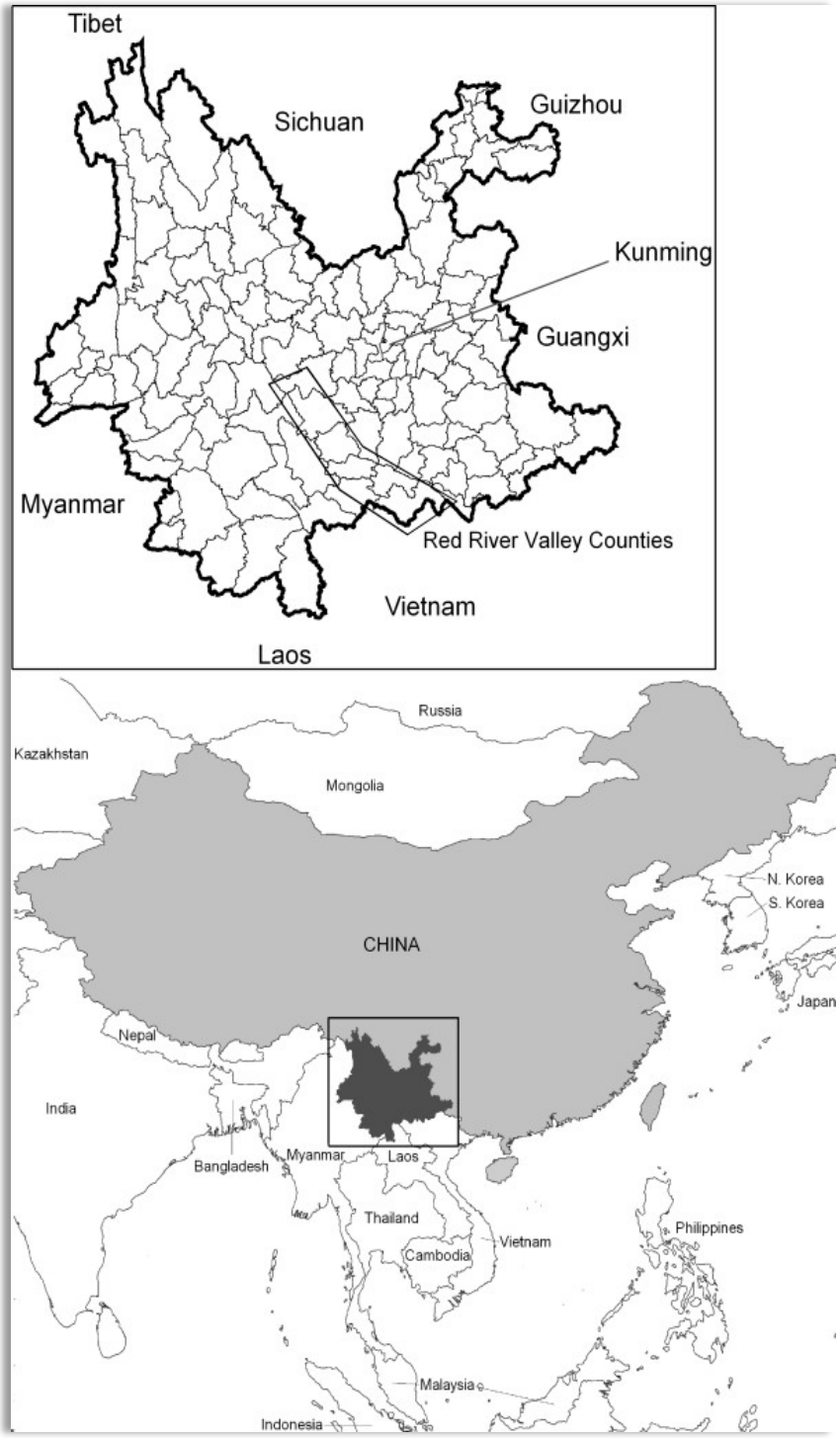
The thesis is a compilation of three studies. A cross-sectional survey among adolescent FSWs was conducted between July 2010 and February 2011; a separate cross-sectional survey among adolescent FSWs was implemented between July and September 2012; and a qualitative research using repeated focus group discussions was undertaken in 2011 amongst adolescent girls aged

19 years or younger who reported a history of selling or exchanging sex and ATS use.

2.3.2 Description of the study sites and population

Studies were conducted in urban areas of Kunming city in Yunnan province. Yunnan province, in the southwest of China, is a multi-ethnic area home to 26 different ethnic groups and with a total population of 45.7 million (2009).[1] Yunnan Province is one of the "hotspot" areas earliest and hardest hit by HIV epidemic in China due to impact of prevalence of drug injection. The cumulative number of HIV positives reported at the end of 201 was 93,567, including 25,698 AIDS cases and 14,340 recorded deaths.[2] Yunnan accounted for 22% of new HIV/AIDS cases in the country identified annually despite only making up 3% of the national population.[2,3] HIV is mainly concentrated within two key affected populations: IDUs (28.4%) and FSWs(1.9%).[4] Kunming is the largest economic centre and the provincial capital with important tourism and has an estimated population of 7.2 million (2012). Rapid economic growth resulted in large-scale rural-to-urban migration with widening income gaps, which is an important driver of entry into sex work. Around 3.3 million live in the four urban areas with rural-urban migrants accounting for 58% of the total urban population.

Figure 8: Yunnan province in P.R. China and the location of Kunming City.

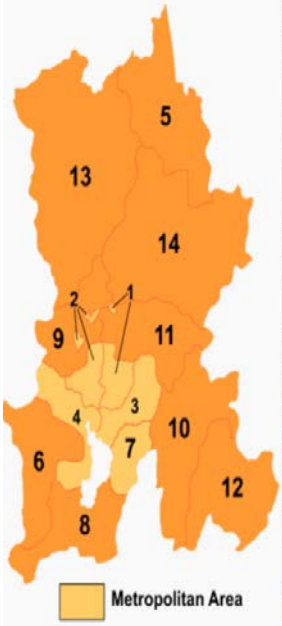


The study populations involved in the studies included adolescent FSWs (aged 15-19 years old in 2010 cross-sectional survey and aged 15-20 years in 2012 cross-sectional survey), and female adolescents with overlapping ATS use and selling sex behaviours (aged 17-19 years in 2011 qualitative study).

Adolescent female sex workers

Precise and systematic figures on the number of adolescent female sex workers remain limited and vary depending on the source and year. This variation results partly from the high mobility of this population, difference of economic development in urban areas and periodic police crackdown on sex workers. In 2008, the Kunming Centre for Disease Control estimated that about 10,200 FSWs were active in Kunming, with about 7,900 (77%) concentrated in all urban areas (all urban areas including number 1-7 divisions in Figure 9).[5] Another source of estimates is data from local health providers, including HIV and STI prevention, which put the proportion of FSWs under age 20 in 2011 between 15% to 25% and between 20-40% in 2013.

Figure 9: Administrative divisions of Kunming City.

Map	#	Name	Simplified Chinese	Hanyu Pinyin	Population (2010 Census)	Area (km²)	Density (/km²)
							
				City Proper			
	1	Panlong District	盘龙区	Pánlóng Qū	809,881	340	2,382.002
	2	Wuhua District	五华区	Wǔhuá Qū	855,521	398	2,149.550
	3	Guandu District	官渡区	Guāndù Qū	853,371	552	1,545.961
	4	Xishan District	西山区	Xīshān Qū	753,813	791	952.987
				Suburban			
	7	Chenggong District	呈贡区	Chénggòng Qū	310,843	541	574.571
				Satellite cities and district			
	5	Dongchuan District	东川区	Dōngchuān Qū	271,917	1,674	162.435
	6	Anning City	安宁市	Ānníng Shì	341,341	1,313	259.970
				Rural			
	8	Jinning County	晋宁县	Jìnníng Xiàn	283,784	1,391	204.014
	9	Fumin County	富民县	Fùmín Xiàn	145,554	1,030	141.314
	10	Yiliang County	宜良县	Yíliáng Xiàn	419,400	1,880	223.085
	11	Songming County	嵩明县	Sōngmíng Xiàn	287,095	1,442	199.095
	12	Shilin Yi Autonomous County	石林彝族自治县	Shílín Yízú Zìzhìxiàn	246,220	1,777	138.559
	13	Luquan Yi and Miao Autonomous County	禄劝彝族苗族自治县	Lùquàn Yízú Miáozú Zìzhìxiàn	396,404	4,378	90.544
	14	Xundian Hui and Yi Autonomous County	寻甸回族彝族自治县	Xúndiàn Huízú Yízú Zìzhìxiàn	457,068	3,966	115.246

In light of this data scarcity, we conducted a mapping exercise in early 2010 to obtain a magnitude of the population that our study team could possibly approach. Together with community-based peer groups/non-governmental organizations supporting FSWs who have been there since 2002, we obtained an initial geographical mapping of work venues (116 locations identified in four of the seven urban areas of Kunming, i.e. numbers 1-4 in Figure 9) and estimated the number of adolescent FSWs active in above places before police crackdowns on sex work at 493 (Table 2). We estimate that this corresponds to 5-10% of the total FSWs active those areas.

Table 2: Size estimation from 2010 geographical mapping (N=493)

Stie (urban district)	Adolescent female sex workers n (%)

1	269 (55)
2	70 (14)
3	82 (16)
4	72 (15)
Total	493 (100)

The original estimates of adolescent FSWs from the mapping were not adopted for subsequent sampling after police crackdown in our 2010 study.

Amphetamine-type stimulants use among Young female sex workers

Yunnan is estimated to have over 80,000 heroin IDUs,[6] while there are no official numbers which estimate or report the number of ATS or poly-drug users. As of the end of 2009, this province had over 70 compulsory drug detoxification centers in the jurisdiction of Department of Public Security. According to *The Anti-drug Law of the People's Republic of China* (2007), this figure is likely to change as the province's small scaled detoxification centres have been shut down and all "inmates" transferred and concentrated in the larger centres administrated by the Department of Justice. The Kunming Compulsory Drug Detoxification Center (KCDDC) was the largest centre in all of China. There are however no official number of "inmates" but it was estimated that there were anywhere between 3,000-5,000 male and female in KCDDC alone in 2010.[6-9] A person who uses drugs and is arrested is usually detained and ordered to undergo compulsory drug testing using urine at a police station where they are then transferred to MMT clinics, or supervised at community-based detoxification centres (for at least 3 years), or incarcerated in KCDDC (for at least 2 years).[10] The Kunming Rehabilitation Center is managed by the Department of Public Security and serves as a transition place for released ex-drug users from the KCDDC to their homes. Given the unstable situation of and withdrawal symptoms of drug users at KCDDC, and more administrative restrictions in KCDDC, our research was consequently undertaken at KRC. During our research period, the observed monthly number of individuals including male and female in KRC was around 50 (the ratio

between male and female was roughly around 1:1 in 2010) , individuals were subject to the strict rules including curfews, random drug testing and behaviour change programs and activities under administration of police.

In 2013, based on their observation at entertainment settings and FSWs' communities through outreach work, and information from key informants (managers/pimps/foremen in entertainment settings), local FSWs' support organizations have estimated that of around half (40%-50%) of young FSWs under the age of 20 years have ever experimented with any type of ATS. This prevalence of ATS use among FSWs is similar to Viet Nam, the neighbouring county of Yunnan (21% for Methamphetamine pills, 54% for Ecstasy and 58% for Crystalline methamphetamine in Viet Nam FSW population).[11]

2.3.3 Study design and sampling procedures

Three studies were conducted to reach the defined objectives. Quantitative and qualitative research methods were used as applicable. Quantitative research data was obtained through two independent cross-sectional studies, while qualitative method used focus group discussion (FGD).

Quantitative studies

i. A cross-sectional study among adolescent FSWs was conducted between July 2010 and February 2011 in four urban areas of Kunming.

A two-stage sample with mapping of sex work venues (116 locations identified in four urban areas) and size estimation made by a preliminary count at each predicting 493 adolescents (aged 15-19 years) currently working as sex workers (selling sex for money or goods) currently living in the four urban study sites (Table 2). Stratified random sampling was planned; however, a nationwide police crackdown on the sex industry during the study period meant that this was no longer possible. Therefore, second stage snowball and convenience sampling were used to recruit adolescent FSWs from their living quarters and/or guesthouses or workplaces in all four urban areas within Kunming city. The numbers of enrolled participants from each chain per site was reported in Table 3 to

help clarify the extent of clustering. Women consenting to participate were administered a semi-structured questionnaire by well-trained interviewers identified from peer educators and outreach workers of local peer-support organisations. Peer educators and outreach workers recruited participants either from their existing networks or from their routine outreach work.

Some extension methods were adopted to minimize bias inherent in chain-referral sampling, including: i) introduction of a dual-incentive mechanism that provided participants and their peer recruiters with a bonus to increase enrolment[14]; ii) Kunming CDC also verified the participants' eligibility during pre- and post-test HIV counselling; iii) defining the recruitment area for each peer group with a fixed recruitment number to avoid under-or oversampling as well as repeated recruitment in each area.

After the interview, a free clinical gynaecological examination, STI screening and voluntary HIV counselling and testing (VCT) were followed by referral of participants to Kunming CDC. Investigations for HIV, syphilis, NG and CT were performed in the Reference Laboratory of the Kunming CDC. A unique code was assigned to each participants to match their questionnaire with clinical and laboratory results and to prevent having names in any of the datasets.

Table 3. Enrolled participants from chains per site through snowball sampling (N=201)

Site (urban district)	Chain	Enrolled participants (completed interview and testing)	All enrolled participants per site n (%)
1	1	7	101 (50)
	2	7	
	3	10	
	4	11	
	5	7	
	6	4	
	7	6	
	8	7	

	9	7	
	10	8	
	11	8	
	12	9	
	13	10	
2	14	3	33 (17)
	15	8	
	16	12	
	17	8	
	18	1	
	19	1	
3	20	4	37 (18)
	21	3	
	22	5	
	23	3	
	24	1	
	25	3	
	26	5	
	27	5	
	28	8	
4	29	2	30 (15)
	30	1	
	31	2	
	32	1	
	33	2	
	34	2	
	35	2	
	36	4	
	37	3	
	38	7	
	39	4	
Total			201(100)

ii. A second cross-sectional study was conducted among adolescent FSWs between July and September 2012 in four urban areas of Kunming.

The study population was defined as women (aged 15-20 years) currently working as sex workers (selling sex for money or goods) and currently living in the four urban study sites.

The number of interview locations/clusters randomly selected in each district was determined by the number of total locations identified at each district through an early 2012 mapping study by local CDCs, the

size estimation yielded 101 map locations within four urban areas of Kunming where young FSWs were usually active to provide sex services, and the peak hours present were recorded. A single-stage cluster sampling methods was employed to recruit study participants. The initial stage of sampling involved 27 clusters (locations) which were randomly-selected from 101 locations, proportionate to the total number of locations in each urban district. After determining the adequate number of clusters, each cluster becomes a sampling unit. Potentially eligible subjects in a selected cluster were approached for recruitment.

Table 4. Proportional allocation of sample for cluster sampling

Site (urban district)	Number of Locations/Clusters (identified) (A)	Sampling weight (B=A/101)	Locations/Clusters Sampled (A*B)
1	35	0.35	12
2	21	0.21	5
3	25	0.25	6
4	20	0.20	4
Total	101		27

A total of six peer educators (former FSWs from local FSW's organizations) and six health workers (doctors/nurses selected from health facilities) were trained as interviewers on the study procedures and questionnaire administration in a two-day workshop in Kunming. This training focused on i) understanding background and objectives of the study; ii) sampling strategy and recruitment process; iii) field monitoring process and job description; iv) interviewing skills with sensitive issues including ethical aspects and confidentiality; v) data collection and management. Four sub-teams were teamed up working at four districts after the training.

Qualitative study

Between March and July 2011, a qualitative study was conducted using a repeated focus groups methodology. Four focus groups were conducted with the same participants over a four-month period anticipating increased yield on these highly sensitive topics with repeated exposures. The preconditions for using this approach were participants of same gender who already knew each other outside of the research situation. The repeated groups were found to be conducive for gradually developing rapport and trusting relationships between the participants and researcher(s); and participants were more comfortable with the progressive approach to sensitive topics to share feelings and experiences. Importantly, this method reduced recall bias through comparing or re-discussing relevant topics in different sessions therefore enhancing validity of data in comparison to one-to-one interviews or once-off focus group discussions. In addition, this approach can stimulate and elicit new important topics further refining the initial interview guide before the fieldwork had been completed.

During the research period, it was not possible to recruit female adolescents who are selling sex and using drugs through existing female sex workers' or IDUs' support groups/programs because of the difficulty in contacting eligible candidates through existing networks. Instead, our study participants were recruited at Kunming Rehabilitation Center from 20 young female inmates. Eligible participants were: (1) aged 19 years or younger; (2) reporting ATS use and involved in sex work before entering KCDDC; (3) willing and able to participate and provide informed consent for this qualitative research; and (4) had no obvious mental or other medical illness that would impede participation (as judged by the medical department of Kunming Rehabilitation Center).

2.3.4 Data collection, management and analysis

Depending on study design, different methods were applied for data collection, management and analysis.

i. Cross-sectional study among adolescent FSWs conducted between July

2010 and February 2011 in four urban areas of Kunming.

A face-to-face semi-structured questionnaire developed in Chinese language was adapted from FSWs and drug user behavioural surveillance developed by the Chinese National CDC[16] and previous research from Kenya.[17,18] The questionnaire was pretested among 24 women to determine that the content and language were appropriate for the study population and took about 50 minutes to complete. Information was collected on socio-demographic characteristics, entry into sex work, sexual behaviours, prevention knowledge and practices, substance use, reported STI symptoms, family planning and reproductive history, and health service utilization.

Double data entry was undertaken using SPSS (version 10.0) and following data checking and cleaning.

For Article 1, statistical tests were performed using Stata version 10.0 (StataCorp, College Station, Texas, U.S.A). Socio-demographic and economic characteristics of adolescent FSWs were initially presented using descriptive techniques. Chi-square tests, Wilcoxon rank sum test, fisher's exact test and *t* test were used to detect differences regarding these characteristics between lower-risk and higher-risk workplaces respectively. Logistic regression was employed to investigate the extent of the association between the dependent variables and exploratory variables.

For Article 2, descriptive analysis was employed to characterise the participants. By means of the Wilcoxon rank sum test and t test we assessed associations between socio-demographic variables and the use of modern contraceptives. Logistic regression analysis was applied to determine the socio-demographic and behavioural characteristics most strongly associated with induced abortion.

Correlation of the dependent variable (prior abortion) with hypothesised factors was expressed as odds ratios (ORs) and assessed by binary logistic regression. Factors significant at the $p<0.1$ level in bivariate analysis were selected for inclusion in the initial multivariate logistic regression model. Stepwise forward logistic regression then

added variables starting from the variable with the lowest *p* value. Variables were considered significant with $p<0.05$. The Akaike information criterion (AIC) has been used as a measure of goodness-of-fit during the model-section procedure, the multivariate model with the smaller value of AIC was considered as the final model. To adjust for clustering due to the sampling procedures, the Stata survey option (svy) was used with 39 chains as primary sampling units. Survey-adjusted odds ratios are presented for the initial bivariate model and the final multivariate model, respectively.

ii. Cross-sectional study among adolescent FSWs conducted between July and September 2012 in four urban areas of Kunming.

A semi-structured questionnaire in Chinese was adapted from a WHO survey questionnaire for young people, the Demographic and Health Survey (DHS) youth questionnaire and a FSWs cohort study from Kenya.[17,18] Key informants including leaders of FSWs' support organizations, senior peer educators and health workers were invited to review each revision of the questionnaire. The questionnaire was pretested among 14 young FSWs to ensure the content and language were appropriate for the study population. The questionnaire covered five domains: socio-demographic information; sources of family planning information, knowledge of and experience with contraception; experience of violence; substance use; self-reported symptoms of RTI; previous pregnancy and outcomes; and health seeking behaviour.

Interviews were administrated face-to-face at different entertainment venues (e.g., karaoke, night club, dancing hall, disco, bar or personal service sectors (e.g., hair washing rooms, hair salons, massage parlour, sauna, restaurant and hotel) where young FSWs were working. Where possible, initial permission was sought from managers or owners of entertainment establishments, and an appointment arranged for a visiting time for the purposes of recruitment, while these gatekeepers also introduced the team to potentially eligible women. When requested by participants, some interviews were performed in drop-in centres within

FSWs' support organizations. Interviews took between 40 and 50 minutes to complete.

The paper-based data was double entered using EpiData (version 3.1) by trained staff. Following data checking and cleaning, the final dataset was available for analysis. The electronic data was password protected and can only be accessed by research team.

Statistical analysis for Article 3 was conducted in Stata version 11. Univariable logistic regression was conducted to determine correlates of low SRH knowledge, unmet need for modern contraception and experience of physical and/or sexual violence. All independent variables associated with outcome variables at $p<0.10$ in univariable analysis were subsequently included in a multivariable logistic regression model; associations were considered significant in the multivariable model at $p<0.05$. The AIC has been used as a measure of goodness-of-fit during the model-section procedure, and the multivariate model with the smaller value of AIC was considered as the final model.

iii. A qualitative research project amongst adolescent girls aged 19 years or younger who reported a history of selling or exchanging sex and ATS use between March and July 2011.

The group discussions were facilitated by a semi-structured interview guide, in which participants were encouraged to discuss the relevant events and emotions, behaviours and knowledge. Core topics discussed included: participants' background, perspectives and practices of drug use; sexual and contraceptive practices and health outcomes; health seeking behaviours; self-perception and future aspirations. Discussions started with broad personal topics then evolved to more sensitive topics in a permissive and non-judgemental way.

A typical session lasted around 1.5 hours. All discussion sessions were moderated by the lead author together with one of two trained note-takers, depending on their availability. All focus groups were digitally audio-recorded, transcribed in Chinese Mandarin, and proofread by note takers. Chinese transcripts were read through multiple times,

summarised and then thematically coded. Twelve primary themes and 26 sub-themes were identified. Coding was cross-checked by other authors fluent in Chinese.

2.3.5 Clinical and laboratory procedures

Clinical procedures including clinical examination and sample collection were performed by trained and qualified nurses and medical doctors in the Reference Laboratory of the Kunming CDC.

Blood was collected and tested for HIV-1 antibodies (ELISA, Beijing BGI-GBI Biotech Co., Ltd., China), and syphilis (rapid plasma reagin (RPR) test, Xinjiang Xindi Co., China). Positive HIV-1 ELISAs were confirmed by Western blot (Diagnostics HIV Blot 2.2, Genelabs, USA) and positive RPR tests for syphilis were confirmed by the *Treponema Pallidum Particle Assay* (TPPA) test (Serodia TP-PA Fujirebio, Fuji, Japan). Endocervical swabs were collected and tested for NG and *CT* by PCR (AMPLICOR, Roche, USA). *Condyloma Acuminatum* and Genital HSV-2 infections were clinically diagnosed based on Chinese STDs Diagnosis Protocol.[19]

2.3.6 Ethical consideration

Informed consent was obtained for each of the respondents. Ethics approval and permission to the study protocol, informed consent forms, information sheet and other requested documents, or any subsequent modifications — were obtained from the ethics committees of Kunming Public Health Bureau.

The cross-sectional study among adolescent FSWs between July 2010 and February 2011, and the qualitative research among female adolescents who use ATS and sell sex between March to July 2011 (Approval document No. KM-FSW-10-06 for both studies).

The cross-sectional study among adolescent FSWs between July and September 2012 (Approval document No. KM-FSW-12-01).

In all three studies, interviewers received training in research ethics,

including non-judgemental interview skills and confidentiality. All information was provided in an easily understood format and adapted to their age and life circumstances. Participants were clearly informed of the study objectives, the confidential nature of information collected, their rights of voluntary involvement, refusing to answer questions and withdrawing. Participants were free to provide either their real names or made-up names.

For those who were under the age of 18 and were living apart from their parents without current connection or self-supporting for their day-to day lives as de facto adults, an assessment of "best interests" had been made in a pre-interview counselling to determine whether it is in the best interests of minors to participate in our studies. The written informed consent was obtained from a trusted adult indicated by the underage participant in line with the WHO's ethical considerations in conducting research among adolescents in developing countries,[20] as well as the acknowledgement on the evolving capacities of children outlined in the Convention on the Rights of the Child.[21] Peer support services including outreach and care are provided to accompany their participation and follow-up contact.

In the 2010 and 2012 quantitative studies, participants were compensated 50 RMB (approximately US$7) for their time and return transportation. Following the interview, free male condoms, pamphlets about SRH, and information sheets providing details about FSWs support groups, STI clinics and antenatal care clinics were offered to the respondents. In addition, a counselling session on SRH and family planning was provided to participants. Moreover, subsidised STI treatment, government-funded CD4 testing and antiretroviral treatment were also available if indicated.

In the qualitative study undertaken at Kunming Rehabilitation Center in 2011, confidentiality and privacy were of the most concern. The venue, schedule, length and form of sessions were determined in consultation with six participants. The informed consent of participants was obtained before each session, and both oral and paper statements had been given to each participant to assure the confidentiality of collected materials and the understanding of the study. All discussion sessions were taken place in a private meeting room within the Kunming Rehabilitation Center, with refreshments, nearby toilets,

and comfortable seating; in addition, none of staff from Kunming Rehabilitation Center was present during the FGD nor were conversations and issues raised shared with them by the research team at the time of the study. Participants were not allowed to receive money for their involvement in the study as per rules from the Kunming Rehabilitation Center, so at the end of each session, each participant received a toiletry bag with personal hygiene products equivalent to the value of RMB30 (US$5) to appreciate their time and participation. Furthermore, participants received an HIV/STI/contraception counselling session and as requested, as well as an information sheet of local FSW and IDU support organizations.

2.4 Data dissemination

The following articles have been submitted, accepted or published and form the basis of this thesis.

1. Zhang X-D, Temmerman M, Li Y, Luo W, Luchters S. Vulnerabilities, health needs and predictors of high-risk sexual behaviour among female adolescent sex workers in Kunming, China. *Sex Transm Infect;* 2013 89(3):237-244. (A1, IF: 3.078)

2. Zhang X-D, Kennedy E, Temmerman M, Li Y, Zhang W-H, Luchters S. High rates of abortion and low levels of contraceptive use among adolescent female sex workers in Kunming, China: a cross-sectional analysis. *Eur J Contracept Reprod Health Care 2014; Early Online 1-11*, 1 Jul 2014. (A1, IF: 1.835)

3. Lim M[#], Zhang X-D[#], Kennedy E, Yang Y, Li L, Li Y-X, Temmerman M and Luchters S. Reproductive health knowledge, family planning uptake, and factors associated with unmet need for modern contraception among adolescent female sex workers in Kunming, China. *PLOS ONE*. Accepted on 5 January 2015. (A1, IF: 3.534) ([#]both authors share the first

authorship)

4. Zhang X-D, Kelly-Hanku A, Chai J-J, Zhang J-P, Temmerman M and Luchters S. Sexual and reproductive health risks amongst female adolescents who use amphetamine-type stimulants and sell sex: a qualitative inquiry in Yunnan, China. *Harm Reduction Journal*. Submitted on Novermber 29, 2014 (the manuscript is currently under review) (IF: 1.59)

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CHAPTER 3: RESULTS

3.1 Vulnerabilities, health needs and predictors of high-risk sexual behaviour among female adolescent sex workers in Kunming, China.

Xu-Dong Zhang[1†], Marleen Temmerman[1], Yan Li[2], Wei Luo[3], Stanley Luchters[1,4,5]

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[1]International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Ghent University, Ghent, Belgium.

[2]School of Public Health, Kunming Medical University, Kunming, Yunnan, China.

[3]STI Unit, Kunming Center for Disease Control, Kunming, Yunnan, China.

[4]Centre for International Health, Burnet Institute, Melbourne, Victoria. Australia.

[5]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Australia.

† Corresponding author

Abstract

Objectives This study assessed social and behavioural predictors for sexual risk taking and sexually transmitted infections (STIs) including HIV among adolescent female sex workers (FSWs) from Kunming, China. Additionally, health services needs and use were assessed.

Methods A cross-sectional survey was conducted in 2010. Using snowball and convenience sampling, self-identified FSWs were recruited from four urban areas in Kunming. Women consenting to participate were administered a semi-structured questionnaire by trained interviewers identified from local peer-support organisations. Following interview, a gynaecological examination and biological sampling to identify potential STIs were undertaken. Descriptive and multivariable logistic regression analyses were performed.

Results Adolescent FSWs had a mean age of 18.2 years and reported numerous non-paying sexual partners with very low rate of consistent condom use (22.2%). Half (50.3%) the respondents had sex while feeling drunk at least once in the past week, of whom 56.4% did not use condom protection. STI prevalence was high overall (30.4%) among this group. Younger age, early sexual debut, being isolated from schools and family, short duration in sex work, and use of illicit drugs were found to be strong predictors for unprotected sex and presence of an STI. Conversely, having access to condom promotion, free HIV counselling and testing, and peer education were associated with less unprotected sex. The majority reported a need for health knowledge, free condoms and low-cost STI diagnosis and treatment.

Conclusions There is an urgent need to improve coverage, accessibility and efficiency of existing interventions targeting adolescent FSWs.

Background

Young people aged 15–24 years, predominantly young women, account for 41% of all new HIV infections globally.[1] A nationwide study in China assessing sexual and reproductive health services among youth indicated that women aged 15–19 years with low education and those who are mobile are most at risk of sexual and reproductive health problems, including unplanned pregnancies and sexually transmitted infections (STIs) such as HIV.[2]In particular, girls involved in sex work and those who use illegal substances and alcohol are at increased risk and are the new face of the HIV/STI pandemic.[3, 4] Importantly, adolescent female sex workers (FSWs) have often been neglected by HIV/STI strategies and service providers, partly due to the traditional assumption that adolescents should attend school with family support and abstain from sexual intercourse despite being legally old enough (the legal age for sex in China is 14 years).

Yunnan Province is a multiethnic area[5] located in the 'Golden Triangle', a major international business and drug trafficking route, with relatively high HIV prevalence.[6, 7] By 2010, Yunnan accounted for 26% of China's reported cases, though it only makes up 3% of China's population. Kunming, the capital city of Yunnan province, has over 6 million inhabitants including 3.1 million women.[5] Rapid economic growth resulted in large-scale rural-to-urban migration with widening income gaps, which is an important driver of entry into sex work. In addition, more tolerant sexual attitudes and increased tourism boost the development of the commercial sex industry.[8] A 2008 size estimation exercise in Kunming estimated there were 10 196 (95% CI 9488 to 10 903) FSWs (approximately 0.33% of Kunming's female population).[9] However, this might be an underestimate due to a police crackdown likely impacting on the census method.[10, 11] Despite sex work being criminalised by law in China, many entertainment establishments (eg, karaoke clubs, night clubs, dancing halls, discos, bars) or personal service sectors (eg, hair washing rooms, hair salons, massage parlours, saunas, restaurants, hotels) are to some extent involved in facilitating sex services.[12] Mainstream entertainment venues often also provide easy access to illicit drugs, including amphetamine-type stimulants, heroin and cannabis.[13,14] Existing studies reveal a great

heterogeneity among FSWs in China in terms of their working environment; yet, interventions do not sufficiently consider the diversity of contextual and social factors that influence the sexual behaviours of FSWs.[12,15,16] Limited data exist on young FSWs aged 15–19 years regarding their socio-demographic characteristics, working context, sexual and drug-using risk behaviour, HIV/STI prevalence and health-seeking behaviour. This study aims to increase knowledge and understanding of the specific working contexts and vulnerabilities of adolescent FSWs in China, and understanding the predictors for unsafe sexual behaviour which will contribute to inform future targeted interventions.

Methods

A cross-sectional survey of adolescent FSWs was conducted in collaboration with local academic institutes, the health department, community-based peer groups and Kunming Center for Disease Control (CDC). In addition, there are more than six peer groups/non-governmental orgainsations supporting FSWs since 2002. Twenty-two outreach workers or peer educators from these support groups were trained as interviewers for this study.

The study recruited women aged 15–19 years who are self-reported FSWs who sell sex for money or goods at sex work venues in the past six months. The study targeted FSWs who use any sort of drugs such as alcohol and tobacco, and also those who have used heroin, cocaine, opium, marijuana, morphine, yaba/amphetamines, pethidine, ketamine and ecstasy for non-therapeutic purposes at least once weekly in the last month. Sampling was done in two stages, with initial geographical mapping of work venues (116 locations identified) and size estimation predicting 493 adolescent FSWs as a sampling frame. A subsequent stratified random sampling encountered difficulties in enrolling study participants because of a nationwide police crackdown on the sex industry. As random sampling was shown not to be feasible, snowball and convenience sampling was applied aiming to recruit about half the target population. Some extension methods were adopted to minimise bias inherent in chain-referral sampling, including introduction of a dual-incentive mechanism that provided participants and their peer recruiters with a bonus to

increase enrolment[17]; verification by Kunming CDC of participants' eligibility during pre-test and post-test HIV counselling; and definition of the recruitment area for each peer group with a fixed recruitment number to avoid undersampling or oversampling, and repeated recruitment in each area.

A face-to-face semi-structured questionnaire developed in Chinese was adapted from FSW and drug user behavioural surveillance developed by the Chinese National CDC[18] and previous research from Kenya.[19,20] The questionnaire, which took about 50 min to complete, was tested among 24 women to determine whether the content and language were appropriate for the study population. Information was collected on socio-demographic characteristics, entry into sex work, sexual behaviours, prevention knowledge and practices, substance use, reported STI symptoms, family planning and reproductive history, and health service use. Thereafter, a free clinical gynaecological examination, STI screening and voluntary HIV counselling and testing (HCT) were followed by referral of participants to Kunming CDC. A unique code was assigned to each participant to match their questionnaire with clinical and laboratory results and to avoid using names in any of the datasets.

Ethical considerations

The study protocol was approved by Yunnan institutional review board and the ethical committee of the Kunming Public Health Bureau. Women provided voluntary written informed consent separately for participation in the behavioural survey and HIV/STI testing. Willing participants were offered free HCT and STI testing services at Kunming CDC which were carried out following the national regulations regarding HIV prevention and management.[21,22] Confidentiality was maintained during the recruitment process, questionnaire administration, data storage, and linking of laboratory and clinical data from test results. Prior to STI testing, healthcare staff asked participants for the best way to give test results to a parent or responsible person, and obtained their written consent. A reimbursement fee of RMB 50 (about US$8) was given to the participants to compensate for their time and transport investment. Furthermore, participants could receive free health services through collaborating organisations, including outreach and peer

education, standardised STI treatment, CD4 testing and antiretroviral treatment if indicated.

Study measures

Chinese public health and social science research suggests that there are distinct typologies for FSWs according to workplace and sexual risk,[10,16,23–28] with FSWs at 'low-end' establishments (eg, karaoke clubs, barbershops, dancing halls) having increased risks of HIV and STIs. Moreover, since 2005, China's HIV prevention strategy has aimed to strengthen intervention programmes to better address FSWs' internal diversity, and to promote behavioural change effectively.[29]In this study, which is based on previous research of sex work in Yunnan and China as a whole,[10,23–26] we classified participants as 'higher risk' or 'lower risk' depending on their primary work setting. Participants at higher risk were those who walked the streets, worked in bars, small roadside guesthouses/hotels with managers or pimps, foot massage parlours, small saunas/bath rooms, barbershops, karaoke clubs, dancing halls and those who were self-employed (soliciting from the internet, a mobile phone or through a pimp). However, those at lower risk included those who worked at VIP clubs or big night clubs. Sexual partners were categorised as 'emotional partners', including non-paying sexual acts with boyfriends, fiancés and husbands in contrast with paying clients (regular or casual clients). To explore the strength of associations between unsafe sex and sex worker characteristics, three dependent variables were a priori selected, namely presence of any STI (participant had at least one infection of Neisseria gonorrhoeae (NG), Chlamydia trachomatis (CT), syphilis, Condylomaacuminatum, genital herpes simplex virus 2 (HSV-2) based on clinical diagnosis or laboratory screening depending on the STI); inconsistent or no condom use in the past month with any sexual partner (self-reported condom use in all sex acts (clients and emotional partners) over the past month); and no condom used during their last sex act with clients.

Laboratory investigations

Blood was collected and tested for HIV-1 antibodies (ELISA, Beijing BGI-GBI Biotech Co, China) and syphilis (rapid plasma reagin (RPR) test,

Xinjiang Xindi Co, China). Positive HIV-1 ELISAs were confirmed by Western blot (Diagnostics HIV Blot 2.2, Genelabs, Redwood City, California, USA) and positive RPR tests for syphilis were confirmed by the *Treponema pallidum* particle assay test (Serodia TP-PA Fujirebio, Fuji, Japan). Endocervical swabs were collected and tested for NG and CT by PCR (AMPLICOR, Roche, Indianapolis, Indiana, USA). Investigations for HIV, syphilis, NG and CT were performed in the Reference Laboratory of the Kunming CDC. C *acuminatum* and genital HSV-2 infections were clinically diagnosed based on the Chinese STDs Diagnosis Protocol.[30]

Statistical analysis

Statistical tests were performed using Stata V.10.0. Variables from the data were initially presented using descriptive techniques. χ^2 tests, Wilcoxon rank sum test, fisher's exact test and t test were used to detect associations among categorical variables, non-symmetrically and symmetrically distributed continuous variables, respectively. Logistic regression was used to investigate the extent of the association between the dependent variables and exploratory variables, including socio-demographic, sex work characteristics, behavioural characteristics and status of health service use. Multivariable logistic regression models were adjusted for the exploratory variables found to be significantly associated ($p<0.1$) in the binary logistic regression analysis, and those hypothesised a priori to be associated using a stepwise forward-fitting approach beginning with the covariate with the lowest p value. Variables that did not markedly alter the model fit were removed from the model.

Results

Socio-demographic and economic characteristics

Between July 2010 and February 2011, a total of 231 eligible and consenting women were recruited, with 201 (87%) completing their interview and accepting STI and HIV testing. Women had a mean age of 18.2 years (SD=1.0) and were predominantly of Han ethnicity (75.1%; table 1). Approximately one-third of women were illiterate or only completed primary level schooling. The majority of respondents were single or never married (71.6%) and 10%

reported currently living with their parents. Sex work was the main source of income for most women (91%). More than half of women (57%) reported their recent monthly income to be between US$150 and 500. No significant differences in age, education level, marital status, residential status, ethnicity and living arrangements were identified between women who worked in higher-risk or lower-risk workplaces (table 1). Respondents working at higher-risk venues were less likely to be full-time sex workers (83.3% vs 98.1%, $p<0.001$); they were more likely to have lower monthly income (<US$150; 14.6% vs 3.8%, $p=0.018$); and earned less from their last clients (median US$48 vs US$128, $p<0.001$).

Table 1 Socio-demographic characteristics of adolescent female sex workers aged 15–19 years enrolled in a cross-sectional survey in Yunnan, China (n=201)

Variable	All women n/N (%)†	Characteristics by FSW workplace, n/N (%)†		p Value*
		Lower-risk workplace‡	Higher-risk workplace§	
Age, mean years (SD)	18.2 (1.0)	18.1 (1.0)	18.3 (1.0)	0.86**
Education level				0.29
Illiterate or primary school	59/201 (29.4)	26/105 (24.8)	33/96 (34.4)	
Middle school	78/201 (38.8)	42/105 (40.0)	36/96 (37.5)	
High school	64/201 (31.8)	37/105 (35.2)	27/96 (28.1)	
Current marital status				0.94
Never married or single	144/201 (71.6)	75/105 (71.4)	69/96 (71.9)	
Married or cohabiting¶	57/201 (28.4)	30/105 (28.6)	27/96 (28.1)	
Residential status				0.22
Yunnan	166/201 (82.6)	90/105 (85.7)	76/96 (79.2)	
Other province	35/201 (17.4)	15/105 (14.3)	20/96 (20.8)	
Ethnicity				0.71
Han	151/201 (75.1)	80/105 (76.2)	71/96 (74.0)	
Other ethnic group	50/201 (24.9)	25/105 (23.8)	25/96 (26.0)	
Currently living with				0.11
Parents	10/201 (5.0)	3/105 (2.9)	7/96 (7.3)	
Emotional partners	69/201 (34.3)	38/105 (36.2)	31/96 (32.3)	
Friends	67/201 (33.3)	34/105 (32.4)	33/96 (34.4)	
Alone	51/201 (25.4)	30/105 (28.5)	21/96 (21.8)	
Coercion-based site with handlers	4/201 (2.0)	0	4/96 (4.2)	
Source of income††				
Sex work is main source	182/200 (91.0)	102/104 (98.1)	80/96 (83.3)	<0.001
Other sources of income				
Parental/familial support	30/201 (14.9)	12/105 (11.4)	18/96 (18.8)	0.14
Emotional partner's support	29/201 (14.4)	16/105 (15.2)	13/96 (13.5)	0.73
Other sources of income	18/201 (9.0)	7/105 (6.7)	11/96 (11.5)	0.23
Monthly income in past 6 months (in US$)				0.018
<150	18/201 (9.0)	4/105 (3.8)	14/96 (14.6)	
150–500	114/201 (57.0)	66/105 (62.9)	48/96 (50.0)	
>500	69/201 (34.0)	35/105 (33.3)	34/96 (35.4)	
Amount received from last client, median US$ (IQR)	80 (48–160)	128 (80–160)	48 (32–136)	<0.001***
Age at first sexual intercourse, mean years (SD)	16.3 (1.2)	16.1 (1.1)	16.4 (1.3)	0.91**
Duration in sex work				0.001
≤6 months	107/201 (53.2)	43/105 (41.0)	64/96 (66.7)	
7–12 months	66/201 (33.8)	45/105 (42.9)	21/96 (21.9)	
>1 year	28/201 (13.9)	17/105 (16.1)	11/96 (11.4)	

*p Value comparing women working at higher-risk versus lower-risk places using χ^2 test unless indicated.
†Unless otherwise indicated.
‡Workplaces at lower risk for adolescent FSWs. Division is based on previous research and interview of key informants within local context and includes VIP clubs, night clubs.
§Workplaces at higher risk for adolescent FSWs. Division is based on previous research and interview of key informants within local context and includes street walking, small roadside guesthouses with manager or pimp, foot massage parlours, saunas/bath rooms, barbershops, inns/hotels, karaoke clubs, dancing halls.
¶The minimum legal age for marriage is generally 20 for women 22 for men; in many rural areas, there is no restrictive social-cultural taboo for young people under the legal age of marriage to get engaged and cohabit without registration, so called 'de facto marriage'; in this case, some participants (1%) self-reported to be married.
**Student's t test.
***Wilcoxon rank sum test.
††Multiple-response question.
FSW, female sex worker.

Substance use

In the past 6 months, most women reported using tobacco (67.7%) and/or alcohol (74.1%), and 67.5% reported using substances everyday or almost everyday. Eight percent of respondents reported using illicit drugs. Respondents who were working at higher-risk venues were less likely to use tobacco (56.2% vs 78.1%, p=0.001) or alcohol (59.4% vs 87.6%; p<0.001) than those at lower-risk venues (table 2).

Table 2 Sexual behaviour, drug use and HIV/STIs among adolescent female sex workers

Variable	All women, n/N (%)†	Characteristics by FSW workplace, n/N (%)†		
		Lower-risk workplace	Higher-risk workplace	p Value*
Sexual behaviour				
Number of emotional partners (past 3 months)				0.24
Only 1	24/192 (12.5)	17/102 (16.7)	7/90 (7.8)	
2–4	75/192 (39.1)	35/102 (34.3)	40/90 (44.5)	
5–10	67/192 (34.9)	35/102 (34.3)	32/90 (35.5)	
>10	26/192 (13.5)	15/102 (14.7)	11/90 (12.2)	
Number of clients (past week), median (IQR)	2 (1–3)	1 (1–2)	2 (1–4.5)	0.001**
Condom used during last paid sex act	146/194 (75.3)	76/105 (72.4)	70/89 (78.7)	0.31
Consistent condom use (last month)				
With paying client	105/191 (55.0)	57/99 (57.6)	48/92 (52.2)	0.13
With emotional partner	42/189 (22.2)	27/103 (26.2)	15/83 (18.1)	0.41
At least one sex act while feeling drunk (past week)	78/155 (50.3)	48/90 (53.3)	30/65 (46.2)	0.38
At least one sex act without a condom while feeling drunk (past week)	48/78 (56.4)	27/48 (56.3)	17/30 (56.7)	0.16
Substance using behaviour				
Any substance used (past 6 months)‡				
Illicit drugs§	16/201 (8.0)	8/105 (7.6)	8/96 (8.3)	0.85
Tobacco	136/201 (67.7)	82/105 (78.1)	54/96 (56.2)	0.001
Alcohol	149/201 (74.1)	92/105 (87.6)	57/96 (59.4)	<0.001
Frequency of substance use (past 6 months)				0.03
Everyday or almost everyday	112/166 (67.5)	69/95 (72.6)	43/71 (60.6)	
1 or 2 days weekly	7/166 (4.2)	1/95 (1.1)	6/71 (8.0)	
Occasionally	47/166 (28.3)	25/95 (26.3)	22/71 (31.0)	
Emotional partners involved in substance use				0.44
Never used	52/139 (37.4)	35/85 (41.2)	19/54 (31.5)	
Previously used	31/139 (22.3)	19/85 (22.4)	12/54 (22.2)	
Currently using	56/139 (40.3)	31/85 (36.4)	25/54 (46.3)	
HIV and STIs				
HIV positive	2/201 (1.0)	0	2/96 (2.1)	0.22***
Self-reported symptoms of STI (past year)	148/200 (74.0)	73/104 (70.2)	75/96 (78.1)	0.20
Any STI (based on clinical or laboratory screening)	61/201 (30.4)	24/105 (22.9)	37/96 (38.5)	0.016
STI prevalence based on clinical diagnosis or laboratory screening				
Neisseria gonorrhoeae	25/191 (13.1)	4/100 (4.0)	21/91 (23.1)	<0.001***
Chlamydia trachomatis	28/191 (14.7)	17/100 (17.0)	11/91 (12.1)	0.33
Syphilis	3/201 (1.5)	1/105 (0.9)	2/96 (2.1)	0.47***
Condyloma acuminatum	13/189 (6.9)	4/100 (4.0)	9/89 (10.1)	0.09***
Genital HSV-2	1/189 (0.5)	1/100 (1.0)	0	0.52***

*p Value comparing women working at higher-risk versus lower-risk workplaces using χ^2 test unless indicated.
†Unless otherwise indicated.
‡Multiple-response question.
§Illicit drugs used include heroin, marijuana, morphine, amphetamines, ketamine, ecstasy.
**Wilcoxon rank sum test.
***Fisher's exact test.
FSW, female sex worker; STI, sexually transmitted infection.

Sexual behaviour

A total of 75.3% of women reported using a condom with their last male client. Consistent condom use during the last month with clients was reported by 55%, whereas only 22.2% reported practising consistent condom use with their emotional partners. About half (50.3%) of respondents reported having sex while feeling drunk at least once in the past week, of whom 56.4% reported this act was unprotected. Respondents who were working at higher-risk venues were more likely to report having a shorter duration of sex work, for example,

less than 6 months (66.7% vs 41%, p=0.003), and having more clients in the past week (p=0.001) compared with women working at lower-risk venues.

HIV and sexually transmitted infections

Nearly three-quarters of young women (74.0%) reported having STI symptoms in the past year, including vaginal itching or irritation, burning urination, lower abdominal pain, unusual leucorrhoea, or rashes, lumps or blisters around the genitals or anus (table 2). One-third (30.4%) of women had one or more STI during study screening based on clinical or laboratory evaluation. STI prevalence was particularly high among women working at higher-risk venues (38.5%) compared with lower-risk venues (22.9%; p=0.016). The prevalence of syphilis, NG, CT, *C acuminatum* and genital HSV-2 infection detected during laboratory screening was 1.5%, 13.1%, 14.7%, 6.9% and 0.5%, respectively. Participants who were working at higher-risk venues were significantly more likely to have NG (23.1% vs 4.0%, p<0.001), and more likely to have *C acuminatum* infection (10.1% vs 4.0%, p=0.09; table 2). Of 201 participants, two women (1%) tested HIV positive and both were working at higher-risk venues.

Health-seeking behaviour and service use

The majority of women reported a need for additional health knowledge (77.1%), free condom distribution (50.8%) and low-cost STI diagnosis and treatment services (53.7%; table 3). Of women who reported STI symptoms in the past year (n=148), about half reported having taken self-treatment for STI symptoms (52.4%), and only 25.5% reported seeking care at public health facilities, similarly between those working at higher-risk and lower-risk venues. Compared with the lower-risk group, those working at higher-risk workplaces were significantly less likely to have received peer education and outreach services (62.5% vs 87.5%, p<0.001), and free condoms (59.3% vs 93.3%, p<0.001); and were more likely to have received HIV testing (43.8% vs 17.1%, p<0.001). At the same time, they were less likely aware of test results (35.7% vs 72.2%, p=0.009).

Table 3 Health-seeking behaviour and access to health services among Chinese female sex workers

Variable	All women, n/N (%)†	Characteristics by FSW workplace, n/N (%)†		
		Lower-risk workplace	Higher-risk workplace	p Value
Need for health services				
Free condom distribution	102/201 (50.8)	55/105 (52.3)	47/96 (47.8)	0.63
Service to increase health knowledge	155/201 (77.1)	75/105 (71.4)	80/96 (83.3)	0.045
Low-cost STI diagnosis and treatment	108/201 (53.7)	51/105 (48.6)	57/96 (59.4)	0.13
Low-cost reproductive health service	83/201 (41.3)	46/105 (43.8)	37/96 (38.5)	0.45
Free clean needle and syringe distribution	23/201 (11.4)	19/105 (18.1)	4/96 (4.1)	0.002
Detoxification treatment	7/201 (3.5)	4/105 (3.8)	3/96 (3.1)	0.55**
Health-seeking behaviour				
Sought care for STI symptoms (past year)‡				
At private clinic or hospital	55/146 (37.7)	22/70 (31.4)	33/76 (43.4)	0.14
At public clinic or hospital	37/145 (25.5)	16/70 (22.9)	21/75 (28.0)	0.48
Self-treatment for STI	76/145 (52.4)	41/70 (58.8)	35/75 (46.7)	0.15
Health services use				
Received peer education/outreach (past year)‡	151/200 (75.5)	91/104 (87.5)	60/96 (62.5)	<0.001
Received free condoms (past year)‡	155/201 (77.1)	98/105 (93.3)	57/96 (59.4)	<0.001
Received methadone/clean needles‡	13/199 (6.5)	9/105 (8.6)	4/94 (4.3)	0.17**
Received HIV testing(past year)	60/201 (29.9)	18/105 (17.1)	42/96 (43.8)	<0.001
Aware of HIV testing results	28/60 (46.7)	13/18 (72.2)	15/42 (35.7)	0.009

*p Value comparing women working at higher-risk versus lower-risk places using χ^2 test unless indicated.
**Fisher's exact test.
†Unless otherwise indicated.
‡Multiple-response question.
FSW, female sex worker; STI, sexually transmitted infection.

Factors associated with unprotected sex and STIs

Among adolescent FSWs, the main predictor independently associated with having any STI was access to free condoms in the past year (table 4). Adolescent FSWs who did not receive services of condom provision were 2.5 times more likely to have at least one STI (95% CI 1.1 to 5.7; p=0.028) than those with service exposure. There seemed to be a trend for women working at higher-risk venues to be at increased risk for having any STI (38.5% and 22.9%, respectively), although this was no longer statistically significant after adjustment of other factors.

Table 4 Predictors of sexual risk behaviour defined as presence of any sexually transmitted infection at screening, inconsistent condom use in the past month and no condom used during last sex act among 201 adolescent female sex workers

Variable	Risk factor	% (n/N)	Crude OR (95% CI)	p Value	Adjusted OR (95% CI)	p Value
Any STI	Age					
	19 years	28.0 (27/97)	1.0	0.56		
	15–18 years	33.0 (34/104)	1.26 (0.69 to 2.31)			
	Workplace characteristics					
	Lower risk	22.9 (24/105)	1.0	0.016		
	Higher risk	38.5 (37/96)	2.12 (1.13 to 3.95)			
	Sex work as main source of income					
	No	56.0 (10/18)	1.0	0.016		
	Yes	28.0 (51/182)	0.31 (0.11 to 0.85)			
	Amount received from last client					
	US$4–75	37.0 (34/92)	1.0	0.051		
	US$76–150	20.8 (10/48)	0.45 (0.20 to 1.03)			
	>US$150	19.4 (6/31)	0.41 (0.15 to 1.12)	0.07		
	Received free condoms (past year)					
	Yes	25.2 (39/155)	1.0	0.003	1.0	0.028
	No	47.8 (22/46)	2.72 (1.35 to 5.47)		2.51 (1.11 to 5.70)	
Inconsistent or no condom use in past month with any sexual partners	Age					
	19 years	75.3 (73/97)	1.0	0.66		
	15–18 years	77.9 (81/104)	1.16 (0.60 to 2.26)			
	Education level					
	High school	71.9 (46/64)	1.0		1.0	
	Middle school	73.0 (57/78)	1.00 (0.47 to 2.13)	0.99	0.90 (0.41 to 1.99)	0.79
	Illiterate or primary school	86.4 (51/59)	2.69 (1.00 to 7.23)	0.04	3.07 (1.09 to 8.62)	0.033
	Choose sex work for earning money					
	No	82.0 (73/89)	1.0	0.05		
	Yes	72.3 (81/112)	0.50 (0.25 to 1.07)			
	Duration in sex work					
	>1 year	64.3 (18/28)	1.0		1.0	
	7–12 months	80.3 (53/66)	2.27 (0.83 to 6.17)	0.10	2.91 (0.098 to 8.60)	0.044
	<6 months	79.0 (83/107)	2.10 (0.84 to 5.25)	0.10	2.90 (1.02 to 8.19)	0.054
	Illicit drug use (past 6 months)					
	No	75.7 (140/185)	1.0		1.0	
	Yes	87.5 (14/16)	4.40 (0.55 to 35.02)	0.12	8.54 (1.04 to 70.41)	0.048
	Received HIV testing (past year)					
	Yes	71.7 (43/60)	1.0		1.0	
	No	78.7 (111/141)	1.57 (0.78 to 3.16)	0.38	2.35 (1.08 to 5.13)	0.032
No condom used during last sex act with client	Age					
	19 years	19.6 (19/97)	1.0		1.0	
	15–18 years	27.9 (29/104)	1.61 (0.83 to 3.15)	0.15	1.81 (0.88 to 3.72)	
	Age at sex debut					
	>16 years	27.7 (23/83)	1.0		1.0	
	≤16 years	21.4 (25/117)	1.78 (0.92 to 3.46)	0.08	2.0 (0.99 to 4.06)	
	Current marital status					
	Never married, separated or single	27.8 (40/144)	1.0		1.0	
	Married or cohabiting	14.0 (8/57)	0.42 (0.18 to 0.98)	0.038	0.37 (0.15 to 0.92)	0.033
	Duration of living with current partner					
	≤6 months	31.5 (28/89)	1.0		1.0	
	>6 months	18.0 (20/111)	0.50 (0.26 to 0.99)	0.041	0.40 (0.19 to 0.82)	0.014
	Received HIV testing (past year)					
	Yes	10.0 (6/60)	1.0		1.0	
	No	29.8 (42/141)	3.87 (1.50 to 9.96)	0.002	2.88 (1.11 to 7.50)	0.030

Any STI, reported at least one STI based on clinical diagnosis or laboratory screening from *Neisseria gonorrhoeae*/*Chlamydia trachomatis*/syphilis/*Condyloma acuminatum*/genital herpes simplex virus 2 infections.
STI, sexually transmitted infection.

Adolescent FSWs who reported illicit drug use (adjusted OR 8.54, 95% CI 1.04 to 70.41; p=0.048) and received primary education or less (adjusted OR 3.07, 95% CI 1.09 to 8.62; p=0.033) were more likely to report unprotected sex in the past month with any partner compared with women with higher education. In addition, shorter duration in sex work was independently associated with unprotected sex, with less risky behaviour over time.

Four factors were significantly associated with no condom used during last paid sex act, including earlier age at sex debut, currently married or cohabiting, living with current partner for less than 6 months, and not having received HIV testing in the last year.

Discussion

To our knowledge, these results are the first to document sexual risk behaviour, clinical and laboratory based HIV/STI screening rates, and health-seeking behaviour of this vulnerable and marginalised group of adolescent FSWs in China. Compared with previous FSW studies (mainly focusing on adult FSWs) in China,[10] ,[23–26] our study did not show many significant differences in demographic, social and sexual behavioural characteristics between women working at the higher-risk and lower-risk venues based on the traditionally divided risk groups in China. Although respondents working at higher-risk workplaces were earning less despite having more clients in the past week, both groups were found to report high numbers of sexual partners and low condom use. Half the young women reported five or more emotional partners in the past 3 months, with whom the rate of consistent condom use was very low (22.2%). Even among sex acts with clients, consistent condom use over the last month was relatively low (55.0%) compared with reports from other studies.[12] ,[23] ,[31] ,[32] The homogeneity of adolescent FSWs regarding risk-taking behaviour suggests that intervention activities need to focus on adolescent FSWs working at any workplace. Furthermore, governments and policymakers need to consider the influence of legal crackdowns of FSWs, which leads to marginalisation and migration and impedes health workers from providing continuous intervention services.

This study noted that adolescent FSWs who recently started sex work more often reported unprotected sex, which concurs with our finding that they received less frequent free condom service (68.2% vs 89.3%, p=0.006) and less frequent outreach or peer education services (67.3% vs 82.1%, p=0.014) compared with women who had worked longer in the sex trade (more than 1 year). Additionally, level of education was significantly associated with inconsistent condom use, highlighting the need for integration of sex education

into existing primary and secondary schooling. For illiterate adolescent FSWs, existing 'youth centres' or 'drop-in centres' could be reoriented or reprioritised to serve this specific population with appropriate information.

Previous studies, largely among adult FSWs, show similar HIV and syphilis prevalence rates to our study.[26] ,[28] ,[33–35] Nearly a third of participants had at least one STI, and particularly adolescents working at higher-risk venues were at increased risk, potentially due to the lower reported access to STI prevention and treatment services. Moreover, women who reported having accessed HCT services were less likely to report unprotected sex. This highlights the need for universal access to youth-friendly counselling, testing and treatment services. Overall, this information justifies intensified targeted programmes to increase HIV and STI prevention, treatment and care activities, particularly at higher-risk venues and among newcomers.

Eight percent of respondents reported using illicit drugs and related increasing sexual risk behaviour, consistent with other studies of FSWs.[23] Various studies have shown associations between alcohol use and sexual risk behaviour, and HIV and STIs among sex workers.[19] ,[36] This poses a significant risk, with nearly three-quarters of these adolescents using alcohol.

There are several potential limitations to this study. During the survey period, illegal drug use and sex work were facing police crackdown nationwide, which made random sampling strategies impossible. Additionally, resulting difficulties in disclosure of illegal drug use may have resulted in an underestimation of the prevalence of drug use.

In summary, current health services, social development and livelihood interventions, and youth programmes are failing to substantially reach these most vulnerable girls in society. Innovative and sustainable approaches to extend existing services are needed to improve the health and wellbeing of these young women. Existing sex worker drop-in centres need reorientation to improve services relevant and accessible to young people. Future studies should assess the effectiveness and impact of such interventions and could include recruitment and training of adolescent sex worker peer educators to

generate new innovative and targeted strategies, and to improve confidential, non-judgmental counselling and testing for HIV and affordable STI treatment.

Key messages

Adolescent female sex workers (FSWs) in China aged15–19 years report frequent unprotected sex and were diagnosed with high rates of sexually transmitted infections (STIs), confirming their vulnerability.

Unprotected sex was more often reported by adolescent FSWs who only recently entered into sex work, requiring particular attention.

Adolescent FSWs who accessed STI prevention services, including peer education based health promotion and condom access, reported improved sexual behaviour.

Scaling up of sexual and reproductive health interventions targeting adolescent FSWs at all work venues, including those perceived as low risk, is needed.

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Footnotes

Contributors: XZ designed and implemented the study, conducted data collection and analysis, and wrote the first draft of the manuscript. SL participated in the design of the study, and supervised the analysis and manuscript writing. MT and YL participated in the design of the study and critically appraised the project protocol; WL coordinated the laboratory testing of HIV/STIs and assisted in the interpretation of the findings. All authors critically reviewed the manuscript, contributed to its revision and approved the final version.

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3.2 High rates of abortion and low levels of contraceptive use among adolescent female sex workers in Kunming, China: a cross-sectional analysis.

Short title: Contraception and abortion among adolescent FSWs

Xu-Dong Zhang [1†], Elissa Kennedy [2,3], MarleenTemmerman[1], Yan Li [4], Wei-Hong Zhang [1,5], Stanley Luchters[1,2,3]

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[1] International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Ghent University, Ghent, Belgium
[2]Centre for International Health, Burnet Institute, Victoria, Australia
[3]School of Public Health and Preventive Medicine, Monash University, Victoria, Australia
[4]School of Public Health, Kunming Medical University, Kunming, China
[5] School of Public Health, UniversitéLibre de Bruxelles, Brussels, Belgium

†Corresponding author

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ABSTRACT

Objectives In China, considerable stigma surrounds sexual activity, contraception use and abortion among young unmarried women, and sex work remains illegal. This study examines characteristics of adolescent female sex workers (FSWs) associated with contraceptive use and abortion in Kunming, China.

Methods This cross-sectional study was conducted between July 2010 and February 2011. Adolescent FSWs were recruited using snowball and convenience sampling. We present descriptive statistics, comparative analyses of socio-demographic and reproductive characteristics of respondents who had or had not used modern contraceptives, and assessed factors associated with prior abortion using simple odds rations (ORs) and multivariate logistic regression adjustments.

Results Twenty-seven percent of adolescent FSWs had never used any modern contraceptive. Condoms (69%) and oral contraceptives (38%) were most commonly reported, and less than 3% had ever relied on an intrauterine device. We found low rates of dual protection (34%). About half of the respondents reported one or more lifetime abortions. Inconsistent condom use, frequent alcohol use and longer-term cohabitation were associated with prior
abortion.

Conclusions Low consistent utilisation of modern contraceptives and of dual protection, and high rates of abortion, highlight the urgent need for early contact and continuous provision of comprehensive reproductive health services for adolescent FSWs.

INTRODUCTION

China's young people are growing up in a rapidly changing society. Increasing access to media, urbanisation and globalisation are contributing to changing sexual attitudes and behaviours, with more young people engaging in premarital sex.[1-4] However, policy responses are lagging behind: access to comprehensive sex education remains limited and governmental subsidised family planning (FP) services are generally only accessible to married couples.[2,3,5,6] Additionally, traditional socio-cultural taboos regarding premarital sex and pregnancy, judgemental attitudes of health service providers, and a lack of privacy at health facilities contribute to low uptake of sexual and reproductive health (SRH) services and high levels of unmet needs among young unmarried people.[2,6]

A 2010 nationally representative survey of 10,966 unmarried Chinese women aged 15 to 24 years reported that 19% were sexually active, but only 4% had adequate knowledge about SRH, with the lowest levels of knowledge recorded among girls aged 15-19 years. Overall, 17% of sexually-active young women aged 15-19 years had experienced a premarital pregnancy, 91% of which ended in an abortion. Of young women who had ever had an abortion, 19% reported multiple abortions.[4]

Abortion has been legal in China since the early 1950s. An estimated ten million induced abortions occur in registered health facilities annually. About two-thirds result from contraceptive failure and one-third from non-use of contraception.[3,5,7] The ten-million figure excludes self-induced abortion by means of oral mifepristone and/or misoprostol. Women under age 18 constitute about 25% of all women having abortions at regulated facilities.

Safe abortion services are available through government-funded public hospitals and FP clinics. In addition to regulated public services, a large commercial sector provides abortion services in China. These are generally operated by self-employed, private medical practitioners resulting in considerable variation in the safety and quality of services. Previous studies indicate that adolescents are more likely to seek abortion services from these unregulated commercial providers due to concerns about judgemental attitudes of public sector health workers, fear of disclosure, inconvenience, and lack of

health insurance associated with public hospitals.[6,7] The 2010 national survey[4] indicated that unmarried females aged 15-19 years were significantly more likely than those aged 20-24 years to seek abortion services in commercial health facilities rather than government-recommended public health facilities (49% vs. 34%, p=0.021). Consequently, adolescents are more likely to encounter unskilled providers, to submit to unsafe methods, and to delay seeking care for abortion-related complications.[8-10] As a result, poor health outcomes associated with early pregnancy and unsafe abortion are being increasingly reported among unmarried young women.[11,12]

Reproductive health problems confronting adolescent female sex workers

In China, sex work is illegal and highly stigmatised, which further augments adolescent female sex workers' (FSWs) vulnerability and reduces access to government-provided contraceptive and reproductive health services.[4,13,14]

Research and programmatic attention to FSWs in China have primarily focused on vulnerability to sexually transmitted infections (STIs), including HIV. Available data clearly show FSWs' low use of contraception, high unmet need, and high rates of unintended pregnancy and abortion.[15,16] To date, few studies have specifically addressed the SRH needs and outcomes among adolescent FSWs, with limited data describing contraceptive use and access to services that could inform policy and programmes.[13,14]

In response to these research gaps, the main objectives of this paper are to describe contraceptive use and to assess the factors associated with ever use of modern contraception and prior abortion among adolescent FSWs in Kunming, China.

METHODS

Study setting

Yunnan Province, in the southwest of China, is a multi-ethnic area home to 26 different ethnic groups and with a total population of 45.7 million (2009). Kunming, which is the largest economic centre and the capital city of Yunnan

province, has an estimated population of 7.2 million (2012). Around 3.3 million live in the four urban areas, with rural-urban migrants accounting for 58% of the total urban population. Despite sex work being illegal, the sex industry has flourished in the past two decades, fostered by rapid urban development and a thriving tourism industry.[17] Underlying driving forces include changes in sexual attitudes and behaviours, migration of youths from rural areas, and a large population of men of reproductive age relative to females.[17,18] Numerous entertainment establishments (e.g., karaoke, night club, dancing hall, disco, bar) or personal service sectors (e.g., hair washing room, hair salon, massage parlour, sauna, restaurant, hotel) are involved in providing sex services.[17] It is estimated that about 10,200 FSWs are active in Kunming (approximately 0.33% of Kunming's female population), with about 7,900 (77%) concentrated in urban areas.[19] While few adolescent workers or FSWs are reported by owners or managers of entertainment venues for fear of arrest or harassment by authorities, an emerging population of adolescent FSWs has been noted. Based on data from local services, including HIV and STI prevention, estimates of the proportion of FSWs who are under age 20 range from 15% to 25%.

Study design, participants and sampling procedures

This cross-sectional study was conducted between July 2010 and February 2011. The study design and methods are detailed elsewhere.[20] In brief, a two-stage sample with mapping of sex work venues (116 locations identified in four urban areas) and size estimation made by a preliminary count at each predicting 493 adolescents (aged 15-19 years) currently working as sex workers (selling sex for money or goods). Stratified random sampling was planned; however, a nationwide police crackdown on the sex industry during the study period meant that this was no longer possible. Therefore, second stage snowball- and convenience sampling were used to recruit adolescent FSWs from their living quarters and/or guesthouses or workplaces in all four urban areas within Kunming city. Women consenting to participate were administered a semi-structured questionnaire by trained peer educators and outreach workers of local peer-support organisations who had located the

respondents.

Following the interview, a gynaecological examination and biological sampling to identify HIV/STIs were done among consenting participants at the Kunming Centre for Disease Prevention and Control (CDC).

The study protocol was reviewed and approved by the ethical committee of the Kunming Public Health Bureau. A total reimbursement fee of RMB 50 (about US$ 8) was given to the participants to compensate for their time, expenses and inconvenience.

Measures

The questionnaire collected information on socio-demographic characteristics, sexual and drug use practices, HIV prevention knowledge, self-reported history of symptoms of STIs, contraceptive practices, lifetime abortion, and health service utilisation.

The term ‘workplace’ describes places where sex workers solicit. Participants were classified as ‘higher-class’ or ‘lower-class’ depending on how much they charged for sex, working conditions, and type of clients. Lower-class workplaces included street walking, bars, small road-side guesthouses/hotels with manager or pimp, foot massage parlours, small sauna/bath rooms, barbershops, karaoke clubs, dancing halls, self-employed (women who solicit through the internet, mobile phone) or through a pimp, while higher-class workplaces included VIP clubs, big night clubs and karaoke clubs, and fancy hotels.[22-26]

Sexual partners were categorised as ‘non-paying’, including boyfriends, fiancés and husbands, or as ‘paying’, referring to regular or casual partners who had exchanged money or goods for sex. Adolescent FSWs were considered to be ‘sexually active’ if they reported sexual intercourse in the past week, regardless of whether this was with a paying or non-paying partner. Evidence of a STI was defined as at least one episode of gonorrhoea (caused by *Neisseria gonorrhoeae*, NG), *Chlamydia trachomatis* (CT) infection, syphilis, condylomataacuminata (genital warts), genital herpes (caused by HSV-2) based on clinical diagnosis or laboratory screening, depending on the STI.

Two outcome variables were constructed to assess adolescent FSWs’

exposure to risk of unintended pregnancy: (i) 'ever use of modern contraceptives' was defined as self-reported current or previous use of any modern method of contraception including female sterilisation (tubal occlusion), male condom, intrauterine device (IUD), injectables, implants, oral contraceptives (OCs) and the levonorgestrel-only emergency contraceptive pill (LNG-ECP), regardless of whether it was used alone or in combination with other methods; (ii) 'prior abortion' was defined as self-reported lifetime medically or surgically induced abortion, but excluded spontaneous abortion (miscarriage). To evaluate the medical safety of pathways that participating adolescent FSWs followed in case of unintended pregnancy, we asked them whether the service accessed for the participants' first abortion was public or commercial.

Statistical analysis

For statistical tests we resorted to the Stata version 10.0 (StataCorp, College Station, Texas, USA). Descriptive analysis was employed to characterise the participants. By means of the Wilcoxon rank sum test and t test we assessed associations between socio-demographic variables and the use of modern contraceptives. Logistic regression analysis was applied to determine the socio-demographic and behavioural characteristics most strongly associated with induced abortion.

Correlation of the dependent variable (prior abortion) with hypothesised factors was expressed as odds ratios (ORs) and assessed by binary logistic regression. Factors significant at the $p<0.1$ level in bivariate analysis were selected for inclusion in the initial multivariate logistic regression model. Stepwise forward logistic regression then added variables starting from the variable with the lowest p value. Variables were considered significant with $p<0.05$. The Akaike information criterion has been used as a measure of goodness-of-fit during the model-selection procedure, and the multivariate model with the smaller value of Akaike information criterion was considered as the final model. To adjust for clustering due to the sampling procedures, the Stata survey option (svy) was used with 39 chains as primary sampling units. Survey-adjusted odds ratios are presented for the initial bivariate model and

the final multivariate model, respectively.

RESULTS

A total of 295 eligible adolescent FSWs were approached throughout all four urban areas of Kunming, of whom 231 (78%) from 39 different networks consented to participate. Of these consenting subjects, 201 (87%) completed the interview and submitted to the STI and HIV testing procedures; the overall non-response rate was 32%. The median age was 18 years (interquartile range [IQR]: 18-19) (Table 1). Nearly all respondents were unmarried (99%) as the legal age of marriage for women is 20 years in China. Approximately one-third of these adolescents were illiterate or had completed only primary level schooling (Table 1). Sex work was the main source of income for 91% of the respondents.

Table 1 Socio-demographic and reproductive characteristics of adolescent female sex workers, stratified by ever use of any modern contraceptives.

Characteristics	*All women (N = 201)*	*Ever used modern contraceptives (n = 147)*	*Never used modern contraceptives (n = 54)*	*p-value*[a]
Socio-demographic variables				
Age, median yrs (IQR)	18 (18–19)	19 (18–19)	18 (17–19)	0.006[b]
Current marital status				
Never married or single, *n* (%)	144 (72)	98 (67)	46 (85)	
Married or cohabiting, *n* (%)	57 (28)	49 (33)	8 (15)	0.004
Duration of involvement in sex work				
≤6 months, *n* (%)	107 (53)	73 (50)	34 (63)	
7–12 months, *n* (%)	67 (33)	51 (34)	16 (30)	
>12 months, *n* (%)	27 (13)	23 (16)	4 (7)	0.044
Monthly income in past 6 months (in USD)				
<US$ 150, *n* (%)	18 (9)	14 (10)	4 (8)	
US$ 150–500, *n* (%)	114 (57)	75 (51)	39 (72)	
>US$ 500, *n* (%)	69 (34)	58 (39)	11 (20)	0.06
Reproductive variables				
No. of clients (past week), median (IQR)	2 (1–3)	2 (1–3)	2 (1–3.5)	0.76[b]
No. of non-paying partners (past 3 months)				
<2, *n* (%)	33 (17)	21 (14)	12 (22)	
2–4, *n* (%)	75 (37)	49 (33)	26 (48)	
≥5, *n* (%)	93 (46)	77 (53)	16 (30)	0.009
Cohabiting duration with current or latest non-paying partners[#]				
≤6 months, *n* (%)	111 (55)	82 (56)	29 (55)	
7–12 months, *n* (%)	43 (22)	28 (19)	15 (28)	
>12 months, n (%)	46 (23)	37 (25)	9 (17)	0.57
Evidence of any STI (based on clinical or laboratory screening)*, *n* (%)	61 (30)	45 (31)	16 (30)	0.89
Prior abortion, *n* (%)	102 (51)	89 (61)	13 (24)	<0.001
Repeat abortion, *n* (%)	42 (41)	36 (40)	6 (46)	0.71
Age at first abortion, median yrs (IQR)	17 (16–18)	17 (16–18)	17 (16–18)	0.82[b]

STI, sexually transmitted infection; IQR, interquartile range.
[a]*p*-value compares ever use of modern contraception versus no modern contraception with Student's t test, unless otherwise indicated; [b]Wilcoxon rank sum test.
[#]One response is missing in the group that never used modern contraceptives.
*Participant had at least one episode of gonorrhoea, Chlamydia infection, syphilis, condylomata acuminata or genital herpes based on clinical diagnosis or laboratory screening, depending on the STI.

Contraceptive practices

Of the 201 respondents, 160 (80%) reported that they had ever used a FP method, alone or in combination with one or more other methods. Thirteen (6%) of these had relied on traditional methods (i.e., douching, herbal mixtures, withdrawal or rhythm). Condoms (139/201; 69%) and OCs (76/201; 38%)

were the most commonly reported modern methods of contraception, whereas IUDs (5/201; 2%) and LNG-ECPs (10/201; 5%) had been infrequently employed (Table 2). No adolescent FSW had undergone sterilisation or used an injectable, an implant, a diaphragm or a spermicide. Of women who had ever used condoms, 44% (61/139) relied solely on this barrier method with 16 (26%) of these 61 women reporting consistent utilisation of condoms with sexual partners in the past month. When asked about reasons for no condom use at last paid sex, 79% (38/48) of women responded that they were already resorting to another method of contraception. Two-thirds (66%) of the girls reported they never used dual protection (condom plus another modern method).

Table 2 Contraceptive methods used by adolescent female sex workers ($N = 201$).

*Contraceptive methods**	*Women n (%)*
Intrauterine device	5 (2)
Oral contraceptive	76 (38)
Condom (any use)	139 (69)
Emergency contraceptive pill	10 (5)
Traditional methods (douching/withdrawal/ rhythm)	13 (6)
Dual protection (condom plus one other modern method)	68 (34)
No method	41 (20)

*Multiple-response question.

Approximately a quarter (54/201) of adolescent FSWs had never used any modern method of contraception (Table 1). Those who had ever employed modern contraceptives were more likely to be older (median age 19 vs. 18 years, p=0.006), to have been involved in sex work for a longer time, (p=0.044), to be married or cohabiting (p=0.004), or to have had more than five non-paying partners in the past three months (p=0.009) (Table1).

No statistically significant differences in the type of contraception used were

identified by monthly income, number of clients, duration of cohabitation with the current/latest non-paying partner, evidence of any STI, repeat abortion or age at first abortion (Table 1).

Abortion

Half of the adolescent FSWs (51%) stated they had had an induced abortion, with 42 (41%) reporting repeat abortions. Women who had had an abortion were more likely to mention ever use of modern contraception (61% vs. 24%, $p<0.001$; Table 1). In binary logistic regression model (Table 3), those who had one or more STIs during study screening (OR=0.47; $p=0.027$) were less likely to have declared a prior abortion. Respondents who reported frequent alcohol use, having been involved for a longer duration in sex work, inconsistent condom use with sexual partner, or having a stable non-paying partner (cohabiting since more than 12 months) had significantly increased odds of prior abortion (Table 3) .

After adjusting for confounding in the final multivariate logistic regression model, inconsistent use of condoms with sexual partner, having been involved for a longer duration in sex work and a stable relationship with a non-paying partner were associated with reporting a prior abortion (Table 3).

Table 3: Demographic and reproductive characteristics associated with prior abortion among adolescent female sex workers (N=200)

Variables	Prior abortion				
	n/N (%)	Crude OR (95% CI)	*p*-value	Adjusted OR[※] (95% CI)	*p*-value
Age					
19 years	52/97 (54)	1.0			
18 years	34/67 (51)	0.89(0.48-1.67)	0.71		
≤17 years	16/37 (43)	0.66(0.25-1.73)	0.38		
Workplace characteristics					
Higher-class[¥]	60/105 (57)	1.0			
Lower-class[‡]	42/96 (44)	0.58(0.33-1.03)	0.061		
Duration of involvement in sex work					
≤6 months	45/107 (42)	1.0		1.0	
7-12 months	38/67 (57)	1.81(1.03-3.17)	0.040	1.36(0.70-2.67)	0.37
>12 months	19/27 (70)	3.27(1.29-8.31)	0.014	3.26(1.16-9.16)	0.025
Current marital status					
Never married or single	70/144 (49)	1.0			
Married or cohabiting	32/57 (56)	1.35(0.58-3.19)	0.48		
Number of non-paying partners (past 3 months)					
<2	15/33 (46)	1.0			
2-4	31/75 (41)	0.85(0.34-2.08)	0.70		
≥5	56/93 (60)	1.82(0.66-5.03)	0.24		
Cohabiting duration with current or latest non-paying partners[#]					
≤6 month	44/111 (40)	1.0		1.0	
7-12 months	26/43 (61)	2.33(0.88-6.20)	0.088	2.55(1.18-5.55)	0.018
>12 months	32/46 (70)	3.48(1.64-7.40)	0.002	3.67(1.68-8.04)	0.001
Alcohol use (past 6 months)					
Abstainer or casual drinker	43/98 (44)	1.0		1.0	
Drinks daily or frequently	59/103 (57)	1.72(1.07-2.75)	0.026	1.82(0.97-3.39)	0.061

Evidence of any STI (based on clinical or laboratory screening) [@]					
No	79/140 (56)	1.0		1.0	
Yes	23/61 (38)	0.47(0.24-0.92)	0.027	0.57(0.29-1.11)	0.099
Condom use with any sexual partners (past month)					
Consistent used	19/45 (42)	1.0		1.0	
Inconsistent used	57/94 (61)	2.11(1.01-4.40)	0.042	2.49(1.10-5.62)	0.028
Never used	26/62 (42)	0.99(0.45-2.16)	0.976	0.99(0.42-2.37)	0.991

OR, odds ratio; CI, confidence interval; STI, sexually transmitted infection.

[※] Adjusted odds ratio in the final multivariate model

[¥] VIP clubs, night clubs, big night clubs and karaoke clubs, and fancy hotels.

[‡] Street walking, small road-side guesthouses with manager or pimp, foot massage parlours, sauna/bath rooms, barbershops, inns/hotels, karaoke clubs, dancing halls.

[#] One response is missing.

[@] Participant had at least one episode of gonorrhoea, Chlamydia infection, syphilis, condylomata acuminata or genital herpes, based on clinical diagnosis or laboratory screening, depending on the STI.

Access to reproductive health services

Ninety-nine of the 101 adolescent FSWs who had ever had an abortion provided details concerning their care. Only 39% had sought care for their first abortion at a public hospital or government-funded clinic. Six of the 99 women who provided details, self-administered a medical abortion, for which the mifepristone and misoprostol they utilised were obtained through commercial channels without a prescription or backup surgical services (Table 4).

In addition to low utilisation of government-provided abortion services, 51% of adolescent FSWs reported a need for affordable and accessible FP services, and 87% stated that more reproductive/or obstetric health services were required. In contrast, three-quarters of the respondents (77%) mentioned having received free condoms from health workers through HIV/STIs prevention programmes in the past year (Table 4).

Table 4 Access to reproductive health services among adolescent female sex workers ($N = 201$).

	n/N	*%*
*Free condoms accessed**		
Received free condoms from health workers of HIV/STI programmes (past year)	155/201	77
Healthcare services accessed for first abortion ($N = 99$)#		
At public general hospital	15/99	15
At public hospital for maternal and child health	23/99	23
At public family planning clinic	1/99	1
At private hospital	13/99	13
At private or unofficial small clinic	41/99	41
None, self-administered use oral mifepristone-misoprostol	6/99	6

*Multiple-response question.

#A total of 102 adolescent FSWs had had an induced abortion, but only 99 of them reported the circumstances.

DISCUSSION

Findings and interpretation

No adolescent FSWs in our study reported having ever used injectables or implants, and only 2% reported the use of an IUD. This is consistent with previous studies which demonstrated low uptake of IUD and implants (0%-3%) among unmarried women in China due to low-awareness of long-acting reversible contraceptive

methods (LARCs), poor access to skilled providers, costs, and concerns about side effects;[27-31] this phenomenon may also reflect the strong socio-cultural pressures in China to preserve fertility among young women who have yet to have a child.

Programmes to increase awareness which address misconceptions and improve access to LARCs need to be incorporated into future interventions aiming to reduce the high abortion rate of young FSWs and to expand their access to comprehensive SRH and FP services.

Our study shows, as was expected, that the risks of pregnancy and of abortion are time-dependent in this population: the longer the involvement in sex work or the cohabitation with non-paying partners, the greater the risks of pregnancy and abortion. Early contact and continuous provision of FP information and services to FSWs are needed.

Despite criminalisation of sex work, the increasing prevalence of HIV and STIs among female sex workers has become a focus of China's public health strategy.[34] Free HIV counselling and testing services, and condom promotion have been provided to FSWs through local CDC and peer-led organisations nationwide. The Ministry of Health's *2012 China Country Progress Report* showed that 81% of FSWs had been covered by some form of intervention service, up from 74% in 2009. Similarly, as reported previously, our study shows a high level of coverage of services for HIV/STIs among this FSW sample.[20] However, consistent use of condoms was low, and few practised dual protection despite being at risk of both HIV/STIs and unwanted pregnancy. This finding has two implications: the first is the need to address the barriers to consistent condom use among adolescent FSWs; secondly, the high coverage of HIV/STI programmes may represent an important entry point to reach this vulnerable population with broader SRH interventions (including prevention of unwanted pregnancy) through integrated projects.

Strengths and weaknesses of the study

To our knowledge, this is the first study to examine contraceptive practices, and lifetime abortion among adolescent FSWs in China. The sensitive nature of the topic and the hidden and mobile nature of this population in China presented the study with considerable challenges. There were significant limitations due to ongoing police crackdowns, which prevented random sampling. The snowball and

convenience sampling strategy used does not allow generalisation of our findings to the entire Kunming population of adolescent FSWs. Moreover, the study relied on self-reported sexual behaviours, practices related to sex work, contraceptive use and history of abortion, which may have introduced a social desirability bias, particularly given the highly sensitive and stigmatising nature of these behaviours. While we have identified some important factors associated with contraceptive use and abortion, the cross-sectional study design does not allow to determine causality. Our study found a positive correlation between ever use of modern contraception and the prevalence of prior abortion, a correlation confounded by duration of sex work and of cohabitation with a partner. We did not collect data regarding the timing and duration of modern contraceptive use, nor on the timing of abortion, which makes interpretation of this finding difficult.

Differences from results of other studies

In comparison with national data, our findings suggest that the prevalence of lifetime abortion among adolescent FSWs is much higher than for all sexually active adolescent Chinese women (51% vs. 16%), as is repeat abortion (20% vs. 5%).[4] Other studies in Asia have also found a high prevalence of lifetime abortion among adult FSWs in the context of low contraceptive use (other than condoms). Cross-sectional surveys in Cambodia showed that only 3% of FSWs currently used hormonal contraception, and 28% had had an abortion in the past year. A cross-sectional study of FSWs in Goa, India brought to light that 39% did not use contraception, and 26% had experienced abortion.[15]

Previous studies have revealed a high rate of contraceptive failure among nulliparous Chinese women, contributing to high rates of induced abortion.[3,5,32] A significant proportion of our study participants reported inconsistent use of condoms, so that inconsistent or incorrect use of modern methods, or use of less effective traditional methods, may have contributed to the high prevalence of lifetime abortion.

In low- and middle-income countries, complications of pregnancy and childbirth are the leading cause of death in young women aged 15–19 years.[35]An estimated 9% of unsafe abortions occur among adolescents in Asia.[36] More than half of adolescent FSWs who had an abortion (61%) in our study had their first abortion at a

commercial health setting; this was higher than rates reported by sexually active Chinese women of the same age (49%).[4] Some (6%) abortions occurred through self-administration of oral mifepristone-misoprostol, putting these adolescents at risk of adverse health outcomes. Stigma associated with premarital pregnancy, lack of adequate information, high service costs, negative attitudes of service providers, fear of disclosure of sexual activity and the illegal status of sex work are all likely to deter adolescent FSWs from seeking abortion care from qualified providers in the public sector.[27,33]

Relevance of the findings: implications for clinicians and policymakers

Previous studies have demonstrated an increase in contraceptive use and a reduction in the incidence of unintended pregnancies and repeat abortions where FP services have been integrated within public health interventions (including prenatal and gynaecological services) in China.[34] WHO's Global reproductive health strategy emphasises the importance of political, legal and regulatory environments that support and facilitate universal and equitable access to SRH services for adolescents. Removing the restriction on unmarried young people's access to government subsidised FP services in China is a key priority to improve the sexual and reproductive health (SRH) of adolescents, including those engaged in sex work. In addition, greater attention is required to the provision of adolescent-friendly SRH services, particularly for those most marginalised, which includes addressing the skills and attitudes of health providers. The criminalisation of sex work remains a significant barrier to improving the SRH of adolescent FSWs. However, outreach programmes targeting HIV and STIs have achieved high coverage despite this difficult context. Such programmes present an important opportunity to access this hard to reach population with more comprehensive SRH information and services, including contraception, through more integrated approaches. In particular, the increasing risk of pregnancy and abortion in relation to duration of sex work and cohabiting with a non-paying partner reinforces the need for the earlier provision of comprehensive SRH services which will target this population.

The very low use of LARCs (3% for IUDs and 0% for implants) among our participants must be addressed in health programmes. As the most effective and reliable reversible methods, LARCs should be promoted for adolescents at

high risk of unintended pregnancy, such as those engaged in sex work. Integrating contraceptive counselling and services into HIV/STI prevention, maternal health and gynaecological settings is an important strategy to make these methods more accessible to sexually active adolescents. Improving the counselling skills of health providers is also key to increasing acceptance and uptake of LARCs among this group.

Unanswered questions and future research

Future research is warranted to better understand the contraceptive practices and experiences of unintended pregnancy among adolescent FSWs, also taking into account the temporality of events. In particular, information about FP knowledge, attitudes, reasons for non-use and discontinuation, and barriers that limit access to FP information and services would guide efforts to improve awareness and uptake of modern methods of contraception among this vulnerable population. A better understanding is also needed on how to increase uptake of dual protection methods, and how adolescent sex workers can be more empowered to negotiate consistent condom use in this setting.

CONCLUSIONS

The high prevalence of abortion and repeat abortion among adolescent FSWs in Kunming highlights the need to greatly improve their access to comprehensive contraceptive services and supplies.

Adolescent FSWs have poor access to- and utilisation of low-cost public health facilities, and a high need for affordable and accessible reproductive services. The current practice of making subsidised FP and SRH services accessible only to married couples in China is a particular barrier. Given their stigmatised legal status, adolescent FSWs face considerable hurdles, even where services are available, and so require targeted interventions to meet their needs and rights to SRH.

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3.3 Knowledge and unmet need for family planning among adolescent female sex worker in Kunming, China

Sexual and reproductive health knowledge, contraception uptake, and factors associated with unmet need for modern contraception among adolescent female sex workers in China

Megan S C Lim[1,4※], Xu-Dong Zhang[2※], Elissa Kennedy[3,4], Yan Li[5], Yin Yang[6], Lin Li[7], Yun-Xia Li[8], Marleen Temmerman[1] and Stanley Luchters[1,3,4]

※ Both authors contributed equally to the manuscript.

1. Centre for Population Health, Burnet Institute, Victoria, Australia
2. International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Ghent University, Ghent, Belgium
3. Centre for International Health, Burnet Institute, Victoria, Australia
4. Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Victoria, Australia
5. School of Public Health, Kunming Medical University, Kunming, China
6. Department of AIDS Management, Kunming the Third People's Hospital, Kunming, China
7. Department of Primary Health Care, Kunming Maternal and Child Health Care Centre, Kunming, China
8. Department of AIDS Prevention, Kunming Maternal and Child Health Care Centre, Kunming, China

Megan Lim: lim@burnet.edu.au
Xu-Dong Zhang: Xudong.Zhang@UGent.be (corresponding author)
Elissa Kennedy: elissa@burnet.edu.au
Yan Li: yan.li@lycos.com
Yin Yang: 907181447@qq.com
Lin Li: kmaids_li@163.com
Yun-Xia Li: lyxhw987675@163.com
Marleen Temmerman: Marleen.Temmerman@UGent.be
Stanley Luchters: sluchters@burnet.edu.au

Short title: knowledge, practice of contraception in adolescent FSWs

Abstract

Objective: In China, policy and social taboo prevent unmarried adolescents from accessing sexual and reproductive health (SRH) services. Research is needed to determine the SRH needs of highly disadvantaged groups, such as adolescent female sex workers (FSWs). This study describes SRH knowledge, contraception use, pregnancy, and factors associated with unmet need for modern contraception among adolescent FSWs in Kunming, China.

Methods: A cross-sectional study using a one-stage cluster sampling method was employed to recruit adolescents aged 15 to 20 years, and who self-reported having received money or gifts in exchange for sex in the past 6 months. A semi-structured questionnaire was administered by trained peer educators or health workers. Multivariable logistic regression was conducted to determine correlates of low knowledge and unmet need for modern contraception.

Results: SRH knowledge was poor among the 310 adolescents surveyed; only 39% had heard of any long-acting reversible contraception (implant, injection or IUD). Despite 98% reporting not wanting to get pregnant, just 43% reported consistent condom use and 28% currently used another form of modern contraception. Unmet need for modern contraception was found in 35% of adolescents, and was associated with having a current non-paying partner, regular alcohol use, and having poorer SRH knowledge. Past abortion was common (136, 44%). In the past year, 76% had reported a contraception consultation but only 27% reported ever receiving SRH information from a health service.

Conclusions: This study demonstrated a low level of SRH knowledge, a high unmet need for modern contraception and a high prevalence of unintended pregnancy among adolescent FSWs in Kunming. Most girls relied on condoms, emergency contraception, or traditional methods, putting them at risk of unwanted pregnancy. This study identifies an urgent need for Chinese adolescent FSWs to be able to access quality SRH information and effective modern contraception.

Keywords: female sex workers, adolescents, unmet need for modern contraception, unintended pregnancy, China

Introduction

Adolescents constitute a large and important target population for sexual and reproductive health (SRH) interventions. Onset of sexual activity during adolescence is common, however, young people experience significant barriers that limit their access to essential SRH information and services[1]. Consequently, adolescents suffer a disproportionate burden of poor SRH outcomes, including early and unintended pregnancy. Globally, adolescent girls aged 15-19 years have among the lowest knowledge and use of contraception and the highest unmet need of any age group[2,3]. An estimated 16 million adolescent girls give birth each year, which contributes to morbidity and mortality, low educational attainment and socio-economic disadvantage of girls and their families[4,5]. Preventing adolescent pregnancy and increasing use of modern contraception is therefore an important public health strategy [5].

Adolescents represented almost 14% of the population in China in 2009[6]. China's young generation is growing up in a rapidly changing society and in the past two decades increasingly engaging in premarital sex[7-10]. However, complex challenges exist in adequately and effectively meeting the SRH information and service needs of unmarried young people[11,12]. Government subsidised family planning (FP) services are generally only accessible to married couples[8,12,13]. Moreover, traditional socio-cultural taboos regarding premarital sex and pregnancy impede access to SRH services and limits the provision of comprehensive SRH education through schools and other sources[11]. Each year, an estimated ten million induced abortions occur in registered health facilities, excluding self-induced abortion by oral mifepristone and/or misoprostol, with approximately 25% among unmarried women younger than 18 years[12,14]. A 2010 nationally representative survey of nearly 11,000 unmarried women aged 15-24 years[10] and a 2009 study of over 5,000 unmarried women with a mean age of 20 years (SD=2.2)[15] both showed very low levels of comprehensive SRH knowledge despite 19% and 17% of participants reporting to be sexually-active, respectively. Of those who were sexually-active, 21% and 26% reported premarital pregnancy of which the majority (91%) ended in induced abortion. Young women aged 15-19 years who are out-of school had the lowest level of SRH knowledge. Among sexually-active 15-19 year olds, the prevalence of unprotected sex, multiple abortions, and unsafe abortions exceeded that of women

aged 20-24 years[10].

Adolescents are a diverse group whose capacities and needs differ by developmental stage, schooling, social capital and legislative status[16,17]. Despite growing efforts to improve the SRH of unmarried young people in China[7-9,11,15,18], certain disadvantaged groups of adolescents with high need have been neglected, including those engaged in sex work. In China, sex work is illegal and highly stigmatised. The sex industry has been driven by socio-economic pressure for girls who drop out of school, large income disparities among rural and urban areas, limited employment opportunities, sex ratio imbalance (sex ratio at birth was 117.8 boys to every 100 girls in China in 2011), and relaxation of attitudes about sexuality[19-21]. The estimated number of female sex workers (FSW) was 25,000 in 1985, and an estimated 2.8-4.5 million in 2005[22]. In recent years, the number of young FSWs in their teens or early 20s has also risen in large cities and tourist areas of China. Reliable data are difficult to obtain, but experts estimate that between 15 to 40 per cent of the FSWs population is aged under 20 years, similar to other Asian countries[23,24]. There is limited understanding of the unique SRH challenges that young FSWs face in China. These disparities must be addressed when attempting to improve and identify the programmatic implications of SRH among this population.

The aims of this study were to assess sexual and reproductive health knowledge and determine factors associated with low knowledge; to describe use of contraception and condoms; to determine factors associated with unmet need for contraception; to describe pregnancies and their outcomes, and the use of and need for SRH services; and to determine factors associated with experience of violence among adolescent female sex workers in Kunming, China.

Methods

Study setting

Yunnan Province, in the southwest of China, is a multi-ethnic area and the largest economic centre and capital of Yunnan province with an estimated population of 6.4 million. Despite sex work being criminalized in China, it is estimated over 10,000 FSWs are active in Kunming, excluding street-based and freelance FSWs [25]. Within all four urban districts of Kunming, most entertainment establishments (e.g., karaoke, night club, dancing hall, disco, bar) or personal service sectors (e.g., hair

washing rooms, hair salons, massage parlour, sauna, restaurant, hotel) also provide sex services[26]. Recently, HIV/STIs intervention programs and local FSW community-based organizations have reported an increase in the number of teenage women engaged in sex work, the majority being rural-to-urban migrants[26].

Study design, participants and sampling procedures

This cross-sectional study was conducted between July and September 2012 in all four urban areas of Kunming. The study population were eligible to participate in the study if they were women aged 15 to 20 years old, currently living in one of the four urban study sites, and who self-reported having received money or gifts in exchange for sex from a paying partner in the past 6 months. No additional exclusion criteria were used.

In collaboration with local Kunming FSW support organizations and the district level Centres of Disease Control (CDC), 101 locations were identified and mapped where young FSWs sell sex in the four urban districts of Kunming. In addition, the peak working hours for these locations were recorded. A one-stage cluster sampling method was employed to recruit study participants. The initial stage of sampling involved 27 clusters (locations) which were randomly selected from the 101 identified locations, proportionate to the total number of locations in each district. Potentially eligible women were recruited from these 27 clusters.

A semi-structured questionnaire in Chinese was adapted from a WHO survey questionnaire for young people, the Demographic and Health Survey (DHS) youth questionnaire, and a previously used cohort study among sex workers[27,28]. Key informants including leaders of FSWs' support organizations, senior peer educators and health workers were invited to review each revision of the questionnaire. The questionnaire was pre-tested among 14 young FSWs to ensure the content and language was appropriate for the study population. The questionnaire covered eight domains: socio-demographic information; knowledge and sources of SRH information; ever and current contraceptive use; experience of intimate partner violence (paying and non-paying partners); alcohol and other drug use; self-reported history of sexually transmitted infections (STI) and symptoms; previous pregnancy, pregnancy intentions and outcomes; and health seeking behaviour.

A total of six peer educators (former FSWs from local FSW organizations) and six health workers (doctors/nurses selected from district level CDCs and hospitals) were trained as interviewers on the study procedures and questionnaire administration in a two-day workshop in Kunming. The training focused on i) understanding the background and objectives of the study; ii) sampling strategy and recruitment process; iii) field monitoring process; iv) interviewing skills with sensitive issues including ethical aspects and confidentiality; v) data collection and management. Four teams of three interviewers were established and allocated to each of the four districts.

Interviews were administrated face-to-face at different entertainment venues including at karaoke clubs, nightclubs, dancing halls, discos, bars or personal service sectors (e.g., hair washing room, hair salon, massage parlour, sauna, restaurant, hotel), where young FSWs were working. Where possible, initial permission was sought from managers or owners of entertainment establishments, and an appointment arranged for a visiting time for the purposes of recruitment, while these gatekeepers also introduced the team to potentially eligible women. When requested by participants, some interviews were performed in drop-in centres within FSW support organizations. Interviews took between 40 and 50 minutes to complete.

The paper-based data were double entered using EpiData (version 3.1) by trained staff. Following data checking and cleaning, the final dataset was available for analysis.

Ethical consideration

Ethics approval and permission to the study protocol, informed consent forms and procedures, information sheet and other requested documents, or any subsequent modifications — were obtained from the ethics committee of Kunming Public Health Bureau (study No. KM-FSW-12-01). All interviewers received training in research ethics, including non-judgemental interview skills and confidentiality.

All participants were clearly informed about the study objectives, the confidential nature of information collected, their rights of voluntary involvement, refusing to answer question and withdrawing; and all participants provided their written

informed consent before the interview. For those who were under the age of 18 and were living apart from their parents and self-supporting, staff asked participants for the best way to get a written informed consent; and based on the WHO' suggestion on SRH research among young adolescents in developing countries [29], a formal written informed consent was obtained from an adult peer if indicated by the participant younger than 18 years of age.

Participants were compensated 50RMB (approximately 6EUR) for their time and return transportation. Following the interview, free male condoms, pamphlets about SRH, and information sheets providing details about FSWs support groups, STI clinics and antenatal care clinics were offered to the respondents. In addition, a counselling session on SRH and contraception was provided to participants.

Measures

Modern contraception was defined as sterilisation, oral contraceptive pill, intra-uterine device (IUD), diaphragm, injection, emergency contraception, or implant. Because almost all adolescents reported using condoms, these were excluded from the definition of modern contraception. This allowed for differentiation between those with higher and lower levels of knowledge. Long-acting reversible contraceptive methods (LARCs) were defined as intra-uterine device (IUD), hormonal injections, or implants. Knowledge of SRH was derived from a set of seven true/false questions (Table 1) regarding methods for preventing pregnancy (one point for each correct answer) plus one point for having heard of each of eight methods of contraception (seven modern methods plus condom) when prompted with a list of methods. All contraception methods were verbalized, and interviewers described the method in detail.The maximum score was 15. Scores were split at the median (seven or less vs eight or more) to create a dichotomous low/high knowledge score.

To assess consistent condom use, adolescents were asked whether they always, most of the time, sometimes, or never used condoms in the past month. This was followed with asking whether they had ever not used a condom while drunk in the past month. Consistent condom use was defined as always using condoms in the past month, including when drunk, and was determined separately for paying and non-paying partners. Dual method protection was defined as current use of any

modern contraception plus consistent condom use with all sex partners in the past month. Unmet need for modern contraception was defined as not wanting to get pregnant and not currently using either modern contraception or condoms consistently in the past month. Adolescents were asked how many times they had been pregnant in their lifetime and how many of those pregnancies were unintended (mistimed or unwanted).

In this study, sexual partners were categorised as 'non-paying', including boyfriends, fiancés and husbands, or as 'paying', referring to regular or casual partners who had exchanged money or goods for sex. Alcohol use was dichotomised as daily or usual-drinker (more than twice a week) versus casual or non-drinker (once per week or less).

Analysis

Analysis was conducted in Stata version 11. Univariable logistic regression was conducted to determine correlates of low knowledge, unmet need for modern contraception and experience of violence. All independent variables associated with outcome variables at $p<0.10$ in univariable analysis were subsequently included in a multivariable logistic regression model; associations were considered significant in the multivariable model at $p<0.05$. The Akaike information criterion has been used as a measure of goodness-of-fit during the model-selection procedure, and the multivariate model with the smaller value of Akaike information criterion was considered as the final model.

Results

A total 378 adolescent FSWs were approached throughout all four urban areas of Kunming. Of these 342 (90%) were eligible and consented to participate. Of these consenting participants, 310 (91%) completed the interview.

Socio-demographic characteristics

Young female sex workers reported a mean age of 18.7 years (standard deviation 1.2 years). Most (93%) relied on sex work as their main source of income, with a mean monthly income from sex work of RMB 5000 (EUR 633), which is almost triple the average monthly income of urban dweller in 2011 (RMB 1779; EUR 215).

Eighty-three percent (257/310) were internal migrants born outside Kunming. Most adolescents (86%) entered sex work in the past year. The median age of first sexual intercourse was 17 years (interquartile range [IQR]: 16-18) (Table 2).

Knowledge

SRH knowledge was poor in this group of adolescents (Table 1). The median number of correctly answered SRH questions was 4 (IQR: 3-6) out of 7. The median number of modern contraception methods participants had ever heard of was 3 (IQR: 2-4) out of 8 (Table 3). All adolescents had heard of condoms and 86% had heard of any other modern contraceptive method (most commonly emergency contraception [64%] or oral contraception [55%]). Adolescents reported accessing SRH information from peers (70%), traditional media (62%), the internet (37%), school classes (29%), health providers (27%), and parents (9%).

Table 1: Proportion correctly answering knowledge questions (N=310).

Questions	**Correct response**	**Responding correctly (%)**
It is not easy for a young women (under 20 years) to get pregnant	False	80
Douching/cleaning vagina after sex intercourse can prevent pregnancy	False	67
If the man pulls his penis out of my vagina before ejaculation, I will have no risk of getting pregnant	False	37
Using heroin or opioids can prevent pregnancy	False	37
If my partner is using heroin or opioids this can prevent pregnancy	False	36
Consistently and correctly using condoms is an effective method to prevent pregnancy	True	87
Consistently and correctly using condoms is an effective method to prevent HIV and other STIs	True	87

Table 2: Socio-demographic characteristics and sex work characteristics of 310 adolescent sex workers in Kunming, China.

Variables	**% (n) or mean(SD) if stated N=310**
Age	
Mean years (SD)	18.7 (1.2)
Education level	
No school or primary school only	9% (27)
Middle school	74% (228)

High school	18% (55)
Current marital status	
Married or cohabitating	53% (165)
Current non-paying partner, not cohabitating	15% (46)
No current non-paying partner	32% (99)
Place of birth	
Kunming	18% (55)
Elsewhere	82% (255)
Currently living with	
Parents or relatives	6% (17)
Partner	24% (75)
Other sex workers or friends	39% (122)
Alone	31% (96)
Relationship duration with most recent (including current) non-paying partner	
⩽1 years	65% (202)
>1 years	19% (59)
Never had a non-paying partner	15% (45)
Number of non-paying partners in past year	
None	18% (55)
One	51% (159)
Two or more	31% (96)
Experienced physical and/or sexual violence from any sexual partner in past year	
Yes	38% (118)
No	62% (192)
Average weekly number of paying partners in past month	
⩽2	61% (189)
3 or more	39% (121)
Duration involved in sex work	
<1 month	12% (37)
1-6 months	50% (154)
7-12 months	25% (76)
>12 months	14% (43)
Any illicit drug use in the past year	
Yes	9% (27)
No	91% (283)

Table 3: Awareness and use of different types of contraception among young female sex workers (N=310)

Contraceptive methods	**Heard of** (%)n	**Ever used**[2] (%)n	**Currently using**[2] (%)n
Any modern contraception(including condoms)	100% (310)	99% (307)	93% (287)
Any modern contraception	86% (267)	57% (176)	28% (88)

(excluding condoms)			
Any LARC[1]	39% (120)	3% (9)	2% (5)
Female sterilization[#]	30% (92)	0.3% (1)	0.3% (1)
Male sterilization[#]	19% (58)	0% (0)	0% (0)
Oral Contraceptive Pill[#]	55% (172)	17% (53)	7% (21)
Injectable[#]	12% (38)	1% (4)	0.7% (2)
Implant[#]	6% (20)	0.3% (1)	0% (0)
IUD[#]	35% (107)	1% (4)	1% (3)
Diaphragm[#]	2% (6)	0% (0)	0% (0)
Emergency contraception	64% (198)	44% (135)	21% (64)
Condom	100% (310)	97% (302)	91% (281)
Condom use; Consistent	-	-	43% (132)
Dual method protection[+]	-	-	7% (23)
Any traditional method	67% (209)	54% (167)	40% (124)
Lactational amenorrhea	2% (6)	0.7% (2)	0.3% (1)
Rhythm	36% (111)	17% (52)	9% (28)
Withdrawal	44% (135)	29% (91)	20% (61)
Douching/cleaning after intercourse	35% (108)	26% (81)	6% (17)
Squat and push sperm out after intercourse	33% (101)	21% (64)	11% (34)

[#] included in 'modern contraception'

+ Dual method protection defined as current use of any modern contraception plus consistent condom use with all partners in the past month

[1] LARC (long acting reversible contraception) includes implant, injection, and IUD.

[2] Women could report using multiple methods

Correlates of low SRH knowledge (scores below 8/15) in multivariable analysis were inconsistent condom use with paying partners, and not obtaining SRH information from traditional media (Table 4).

Table 4:Factors associated with lower knowledge of sexual reproductive health among adolescent female sex workers (N=310).

Factors	% (n/N) with low knowledge (score ≤7/15)	Crude OR (95%CI)	*p value*	Adjusted OR (95%CI)	*p value*
All women	51 (158/310)				
Age, years					
15-17	45 (24/53)	1.0	*0.36*		
18-20	52 (134/257)	1.32 (0.73-2.38)			
Education level			*0.31*		
No school or primary school only	56 (15/27)	1.74 (0.69-4.40)			
Middle school	53 (120/228)	1.55 (0.85-2.80)			
High school	42 (23/55)	1.0			
Current non-paying partner			*0.038*		*0.11*
No	60 (59/99)	1.0		1.0	
Yes	47 (99/211)	0.60 (0.37-0.97)		0.65(0.39-1.10)	
Experienced physical or sexual violence from any sexual partner (past year)			*0.17*		
No	48 (92/192)	1.0			
Yes	56 (66/118)	1.38 (0.87-2.19)			
Average monthly income from sex work (Euro)			*0.10*		
<633EUR	56 (79/141)	1.0			
≥633EUR	47 (79/169)	0.69 (0.44-1.08)			
Time in sex work			*0.27*		
<1 month	62 (23/37)	1.0			
1-6 months	47 (72/154)	0.53 (0.26-1.12)			
7-12 months	50 (38/76)	0.61 (0.27-1.36)			
>12 months	58 (25/43)	0.85 (0.34-2.08)			
Alcohol use, past year			*0.36*		
Abstainer or casual-drinker	45 (24/53)	1.0			
Daily or usual-drinker (more than twice a week)	52 (134/257)	1.32 (0.73-2.38)			
Abortion ever			*0.08*		
No	47 (81/174)	1.0			
Yes	57 (77/136)	1.50 (0.95-2.35)			

Any self-reported symptom of STI (past year)			*0.19*		
No	56 (59/105)	1.0			
Yes	48 (99/205)	0.73 (0.45-1.17)			
Received any SRH services[1] in the past year			*0.05*		
No	77 (10/13)	1.0			
Yes	50 (148/297)	3.36 (0.91-12.4)			
Ever used any modern method of contraception (excluding condoms)[2]			*0.05*		
No	57 (77/134)	1.0			
Yes	46 (81/176)	0.63 (0.40-0.99)			
Currently using dual protection (modern contraception and condoms)[2]			*0.041*		*0.075*
No	53 (151/287)	1.0		1.0	
Yes	30 (7/23)	0.39 (0.16-0.99)		0.41 (0.15-1.10)	
Consistent use of condoms with non-paying partners (past month)[3]			*0.002*		
Inconsistent	54 (74/137)	1.0			
Consistent	34 (25/74)	0.43 (0.24-0.78)			
Consistent use of condoms with paying partners (past month) [3]			*0.005*		*0.010*
Inconsistent	65 (51/79)	1.0		1.0	
Consistent	46 (107/231)	0.47 (0.28-0.80)		0.48 (0.27-0.84)	
Obtained SRH information from health providers			*0.84*		
No	51 (116/226)	1.0			
Yes	50 (42/84)	0.95 (0.57-1.56)			
Obtained SRH information from traditional media(TV/movie/newspaper/magazine/book)			*<0.001*		*<0.001*
No	68 (80/118)	1.0		1.0	
Yes	41 (78/192)	0.33 (0.20-0.53)		0.32 (0.19-0.53)	
Obtained SRH information from Peers(classmate/colleague/friend/sexual partner)			*0.033*		*0.057*
No	60 (56/93)	1.0		1.0	
Yes	47 (102/217)	0.59 (0.36-0.96)		0.61 (0.36-1.02)	
Obtained SRH information from school			*0.09*		
No	54 (119/220)	1.0			

Yes	43 (39/90)	0.65 (0.40-1.06)	
Obtained SRH information from the internet			*0.46*
No	53 (102/194)	1.0	
Yes	48 (56/116)	0.84 (0.53-1.33)	
Obtained SRH information from parents/relatives			*0.26*
No	52 (147/283)	1.0	
Yes	41 (11/27)	0.64 (0.29-1.42)	

1 SRH services including contraception, HIV/STI testing, free condoms.

2 Dual protection defined as current use of any modern contraception plus consistent condom use with all partners in the past month. Modern contraception includes sterilisation, oral contraceptive pill, IUD, diaphragm, injection, emergency contraception, implant.

3 Consistent condom use was defined as always using condoms, including when drunk

Contraception and condom use

Only 28% of respondents reported currently using a modern method of contraception, other than condoms, compared with 40% who were currently using a traditional method. Awareness and use of traditional methods was higher than awareness and use of LARCs (Table 3). Only 9 adolescents (3%) had ever used any form of LARCs. The most common current contraception used was condoms (91%), followed by emergency contraception (21%), and withdrawal (20%). Only 23 adolescents (7%) were currently using dual methods for contraception and prevention of sexually transmitted infections. Consistent condom use with all partners in the past month was reported by 43% (132/310).

Ninety-six (31%) participants reported more than one non-paying partner in the past year (Table 2). Of the 211 (68%) with a current non-paying partner, 74 (35%) reported consistent condom use with non-paying partners in the past month. However, when questioned further, 10 of these adolescents reported not using a condom in the past month while drunk. The most common justifications for inconsistent condom use with non-paying partners among the 147 adolescents who did so were use of other contraception (n=39, 27%), partner refused to use condom (n=39, 27%), forgot to use (n=15, 10%), or did not use condom to show trust or not harm the relationship (n=17,12%). Most (119/211, 56%) participants with a current non-paying partner reported that he was supportive of contraception, however, this did not seem to be associated with contraceptive use.

In the past month, median number of average weekly paying partners was 2 (IQR:1-6). Most (n=231, 75%) reported consistent condom use with paying partners in the past month. Commonly reported reasons for inconsistent condom use with paying partners among the 79 adolescents who did so were use of other contraception (n=24, 30%), never using condoms with regular paying partners (n=20, 25%), client refused (n=15,19%), or condoms were not available (n=11, 14%).

At their first sexual intercourse, only 51 (16%) adolescents used either condoms or another modern contraceptive (47 used condoms and 4 used emergency contraception).

Unmet need for modern contraception

Nearly all adolescents (n=305, 98%) reported not currently wanting to get pregnant. Of these 23 (8%) were currently using dual protection, 109 (36%) reported consistent condom use with no other contraception, and 63(21%) used another form of modern contraception without consistent condom use. Therefore, unmet need for modern contraception was identified in 110 (35%) adolescents. In multivariable analysis unmet need was associated with having a current non-paying partner (adjusted odds ratio [AOR]=3.41; 95%CI: 1.87-6.24), regular alcohol use (AOR=3.19; 95%CI: 1.44-7.06), and having poorer SRH knowledge (AOR=1.89; 95%CI: 1.13-3.15). (Table 5)

Table 5: Factors associated with current unmet need for modern contraception[1] among young female sex workers.

Factors	% (n/N) with unmet need[1]	Crude OR (95%CI)	*p value*	Adjusted OR(95%CI)	*p value*
TOTAL	35 (110)				
Age, years					
15-17	38 (20/53)	1.0	*0.71*		
18-20	35 (90/257)	0.89 (0.48-1.64)			
Education level					
No school or primary school only	33 (9/27)	0.95 (0.36-2.51)	*0.95*		
Middle school	36 (82/228)	1.06 (0.57-1.97)			
High school	35 (19/55)	1.0			
Current non-paying partner					
No	19 (19/99)	1.0	*<0.001*	1.0	*<0.001*
Yes	43 (91/211)	3.19 (1.81-5.64)		3.41 (1.87-6.24)	
Experienced physical or sexual violence from any sexual partner (past year)					
No	33 (64/192)	1.0	*0.31*		
Yes	39 (46/118)	1.28 (0.79-2.06)			
Average monthly income from sex work					
<633 Euro	37 (52/141)	1.0	*0.63*		
>=633 Euro	34 (58/169)	0.89 (0.56-1.42)			
Average number of paying partners per week (past month)					
1-2	34 (65/189)	1.0	*0.62*		
3 or more	37 (45/121)	1.13 (0.70-1.82)			
Time in sex work					
<1 month	35 (13/37)	1.12 (0.44-2.84)	*0.97*		
1-6 months	36 (56/154)	1.18 (0.58-2.43)			
7-12 months	36 (27/76)	1.41 (0.52-2.52)			
>12 months	33 (14/43)	1.0			
Alcohol use, past year					
Abstainer or casual-drinker	17 (9/53)	1.0	*<0.001*	1.0	*0.004*
Daily or usual-drinker (more than twice a week)	39 (101/257)	3.17 (1.48-6.76)		3.19 (1.44-7.06)	

Factors	% (n/N) with unmet need[1]	Crude OR (95%CI)	*p value*	Adjusted OR(95%CI)	*p value*
Abortion ever			*0.86*		
No	35 (61/174)	1.0			
Yes	36 (49/136)	1.04 (0.65-1.67)			
Any self-reported STI symptom of (past year)			*0.02*		*0.30*
No	27 (28/105)	1.0		1.0	
Yes	40 (82/205)	1.83 (1.10-3.07)		1.34 (0.76-2.35)	
Received any SRH services[2] in the past year			*0.10*		*0.08*
No	15 (2/13)	0.32 (0.07-1.46)		0.24 (0.49-1.20)	
Yes	36 (108/297)	1.0		1.0	
Non-paying partners' attitude towards contraception			*0.93*		
Non supportive	42 (35/83)	1.0			
Supportive	43 (53/124)	0.98 (0.56-1.71)			
SRH knowledge[3]			*0.09*		*0.02*
Low score	40 (67/169)	1.50 (0.93-2.40)		1.89 (1.13-3.15)	
High score	30 (43/141)	1.0		1.0	

1 Unmet need for modern contraception was defined as not currently intending to get pregnant and not using any modern contraception (sterilisation, oral contraceptive pill, intra-uterine device (IUD), diaphragm, injection, emergency contraception, or implant)

2 SRH services including family planning, HIV/STI testing, free condoms

3 Knowledge of sexual reproductive health was derived from a set of seven true/false questions plus one point for having heard of each of eight modern methods of contraception. Scores were split at the median (<=7/15 vs>7/15)

Pregnancy, abortion, and service utilisation

In total, 203 pregnancies among 144 adolescents were reported; the large majority (95%; 192) of these were unintended and 189 (93%) resulted in induced abortion. Of the remaining pregnancies, four were miscarriages, nine live births, and one stillbirth. Forty-one (13%) adolescents had more than one induced abortion in their lifetime (including 10 adolescents with 3 abortions and 1 adolescent with 4 abortions). Half (50%) of induced abortions were performed at a public hospital; the remainder were private hospitals/clinics (30%), family planning clinics (17%), or using take-home medication (3%). Of the 136 (44%) adolescents who had ever had an abortion, 74 (54%) reported ever experiencing complications, including menstrual disturbances (39; 29%), discharge (32; 24%), pain (29; 21%), fever and vaginal bleeding (5; 4%) and uterine perforations (1; 0.7%).

Two thirds (204; 66%) said they had received free condoms in the past year. Most (244/310, 79%) reported having received a medical consultation for HIV/STI in the past year, but only 140 (45%) reported an HIV test and 100 (71%) of these received their HIV test result. When asked what services and information they most wanted (multiple responses allowed), the most common responses were condoms (n=189, 61%), HIV/STI information (n=214, 69%), contraception information (42%), STI treatment (n=129, 42%), reproductive health care (n=139, 45%), free contraceptives (n=65, 21%), and drug information (n=40, 16%).

Physical and sexual violence

Thirty-eight percent of adolescents (118/310) reported experiencing physical or sexual violence in the past year (Table 2). This included 98 adolescents experiencing physical violence and 75 experiencing sexual violence. Of these, eighty-eight (75%) had experienced violence perpetrated by non-paying partners and 72 (61%) by paying partners.

In the past year, those who had experienced violence were more likely to have had any STI symptoms (Odds ratio (OR)=4.2; 95%CI: 2.4-7.5) and less likely to have received a consultation related to either HIV/STI (OR=0.44; 95%CI 0.25-0.77) or contraception (OR=0.47; 95%CI: 0.28-0.80).

Discussion

This study is the first in China to describe SRH knowledge, unintended pregnancy and unmet need for modern contraception in a very marginalised and vulnerable group of adolescent female sex workers. We found that levels of SRH knowledge were low, use of contraception other than condoms was rare, that nearly half of the FSW had had an unintended pregnancy, and that 38% had experienced violence. Correlates of low level of SRH knowledge included inconsistent condom use with paying partners, and not obtaining SRH information from traditional media; correlates of unmet need for modern contraception included having a current non-paying partner, regular alcohol use, and having poorer SRH knowledge; and correlates of violence included a history of STI symptoms and less service utilisation.

Despite the majority of adolescent FSWs wanting to avoid pregnancy, the study demonstrated a high unmet need for effective contraception and a high prevalence of unintended pregnancy. Almost half of these adolescents reported a history of abortion, with 30% of those reporting multiple abortions which are slightly decreased in comparison with our 2010 study in same population (51% experiencing lifetime abortion and 41% of them reporting repeat abortions)[30], but still much higher than the prevalence of lifetime abortions among Chinese sexually-active girls aged 15-19 years in the general population (16% experiencing lifetime abortion and 5% of them reporting repeat abortions) [10].

With the exception of condoms and emergency contraception, current use of modern contraception was very low (<10%). None used reliable contraception at first intercourse. Similarly, our 2010 study showed reliance on inconsistent condom use and puts this population at risk of unwanted pregnancy, particularly with their non-paying partners (22% in both studies). While condoms are necessary to prevent HIV/STI, they are less effective at preventing pregnancy - particularly when used inconsistently as is the case in this sample. Almost half of all adolescent FSWs reported having ever used emergency contraception, and one in five reported current use. Access to emergency contraception in this population at high risk of unintended pregnancy is essential, particularly in the context of inconsistent condom use and sexual violence. However, emergency contraception has a high failure rate compared with other modern methods and is not a form of regular contraception, so the reliance on emergency contraception instead of use of more

reliable methods is of concern[31]. Furthermore, 40% reported current use of less effective traditional methods to prevent pregnancy. Dual protection is the most effective way to prevent both unwanted pregnancy and HIV/STI, but reported current use of dual protection was very low in this group of young women (7%).

LARCs are highly effective and reliable contraceptive methods and are not dependent on individual compliance[32-34]. However, we found that just 39% had ever heard of any LARC method and only 2% were currently using one (1% for injectable, 0% for implant and 1% for IUD respectively). Our 2010 cross-sectional survey with a similar population showed similarly low uptake of LARC methods (2% for IUD and 0% for implants) [30].This is also consistent with research among unmarried Chinese women which demonstrated low uptake of IUD and implants (0%-3%) [18]. Previous research has shown that increasing awareness of LARCs among both providers and young women may lead to initiating and using LARCs correctly and consistently over time [33,35]. This would include improving providers' counselling skills to address fears and misinformation and promotion of LARCs and dual protection at all service delivery points including HIV and STI services, maternal health, and gynaecological clinics, as well as integrated into peer education and outreach programs targeting this population.

We found that SRH knowledge was poor in adolescent FSWs and misconceptions were prevalent; in addition a lower level of SRH knowledge was associated with inconsistently using condoms with paying partners, and not receiving SRH knowledge from traditional media. Our finding is consistent with a 2010 national representative survey, which showed only 3.2% migrant girls aged 15-19 years could answer five of five SRH knowledge questions correctly[10,11]. Previous research has revealed a very low level of SRH knowledge among unmarried migrant women (mean age=20.2 years) due to poor SRH education provided for Chinese unmarried youth [15]. Despite our participants reporting having received SRH information from a range of sources, including school, traditional media, peers, family, and public or private SRH services. The majority of adolescent FSWs reported receiving some SRH services in the past year and almost half had attended a medical clinic for abortion. Interestingly, just 27% reported ever having received any information about contraception and SRH from health providers. Furthermore, those reporting receipt of information from health providers had the poorest level of knowledge,

relative to those receiving information from other sources. These findings highlight a critical missed opportunity to provide essential SRH education in school and improve SRH services provision to this hard to reach population, and also suggests a need to improve the knowledge, attitudes and counselling skills of health providers.

Our study identified alcohol use as a risk factor for unmet need for modern contraception. Alcohol use is common in many sex work venues and in this sample was more common than other substance use. Sex workers are often pressured to promote the alcohol assumption for clients, or for them too as a potential source of income[36]. Previous studies show associations between alcohol use and HIV/STI, sexual risk behaviour and sexual violence among FSWs [26,27,36,37], and intoxication in both FSWs and their clients can increase the difficulty of negotiating condom use. Clustering of risk factors is common in adolescence[38], and our findings have emphasised the need to address the complex determinants of risky sexual behaviour, rather than relying on single-focused interventions. In South Africa and Kenya, interventions to provide skills training to mitigate alcohol-related risk and better coping with intoxication at work among FSWs were associated with increased condom use[36,39].

There is strong evidence that SRH and inconsistent condom use are affected by gender-based violence[24,40,41]. We found that 38% adolescent FSWs had experienced recent physical or sexual violence from sexual partners. This was associated with lower SRH knowledge and poorer service utilisation. Research with other Chinese FSWs has found the proportion ever experiencing violence to range from 16% to 58%[42-44].Sexual and gender-based violence against FSWs is a pervasive and complex issue, and addressing this requires input from multiple sectors including the community, health, police and legal sectors. Interventions to prevent and protect from violence may include empowering FSW with knowledge about their rights and skills for negotiation, self-protection and strategizing responses training, peer support and information sharing, promoting workplace security, provision of legal support, public advocacy, and supportive legislation[36,45-47]. In addition, health care providers and others working with FSW should be trained to refer victims of violence to appropriate health, psychosocial, and legal support. There is also a need for training in skills for condom/contraception negotiation among these adolescent

FSWs, as partner refusal to use condoms was common.

Stigma and the illegal status of sex work, judgemental provider attitudes, and inadequate counselling skills all hinder comprehensive SRH information provision from public health sectors [10,11,13,48,49]. Furthermore, discriminatory policy and regulations can present significant barriers to this population, many of whom face the triple stigma of being unmarried, engaged in sex work, and of migrant status. Government-funded family planning clinics in China provide a full-range of contraceptives at a very low cost. However, current policies require parental consent and ascertainment of marital status and residency, and prevent unmarried women or adolescent girls' access to these services. Additionally, most adolescents surveyed were internal migrants; current policy requires identification for medical insurance and social security, and places some limitations on these services for migrants. Given their criminalised and highly mobile status, adolescent FSWs may be reluctant or have more difficulties to obtain the medical insurance, and therefore have limited access to public health care. Targeted outreach services may help overcome some of these considerable challenges and can also provide a link between marginalised young people and mainstream services. Peer support, mobile clinics and other outreach programs in Lao PDR, Thailand and the Philippines have successfully reached young marginalised people, include sex workers, with information, counselling and services and demonstrated improved knowledge, self-esteem and use of contraception and condoms[50-52]. The Ministry of Health's 2012 China Country Progress Report and our previous research[26] demonstrated high coverage (more than three quarters) of HIV/STI outreach programs in this population, therefore integrating contraception information and services into this existing platform may help address adolescent FSWs' unmet needs.

In this study, adequate pre-communication between the study team and the gatekeepers of entertainment establishments facilitated the recruitment procedure. In comparison to our 2010 study[26] with a similar population in Kunming, the number of eligible subjects identified increased (295 vs 342) and the refusal rate was reduced (22% vs 10%). The random sampling method increased representativeness to the study population. However, our study has several limitations. The major limitation of the study was its cross-sectional design, meaning that causality cannot be attributed. Secondly, data were self-reported and

may have been subject to recall or social desirability bias. Thirdly, reasons for non-use and discontinuation of contraceptives, preferred methods of contraception, and reproductive outcomes (including pregnancy) before and after entering sex work require further investigation. Further, our study is limited to Kunming city, similar research is urgently needed in other regions of China among similar populations. Lastly, the different measures of SRH knowledge used in different studies with adolescents in diverse populations raised the difficulty to compare levels of knowledge. The findings of this study could inform selection and standardization of key indicators of knowledge of sexual and reproductive for female adolescents in the future.

In conclusion, the high level of unmet need for modern contraception, high prevalence of unintended pregnancy and abortion, and low levels of SRH knowledge among FSWs in this study demonstrate the urgent need for comprehensive and accessible SRH services for adolescent sex workers in Kunming, China.

Competing interest

The authors declare that they have no conflicts of interest.

Authors' contributions

X-D Zhang, E Kennedy, S Luchters conceptualized and designed the study; X-D Zhang, L Lin, Y Yang and Y-X Li collected the data; M Lim undertook data analysis, and wrote the first draft of the manuscript together with X-D Zhang. All authors critically appraised and made substantial comments to drafts. All authors approved the final manuscript.

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3.4 Sexual and reproductive health risks amongst female adolescents who use amphetamine-type stimulants and sell sex: a qualitative inquiry in Yunnan, China

Title: Sexual and reproductive health risks amongst female adolescents who use amphetamine-type stimulants and sell sex: a qualitative inquiry in Yunnan, China

Xu-Dong Zhang[1,6]*, Angela Kelly-Hanku [2,3], Jia-Jia Chai[4], Jian Luo[5], Marleen Temmerman[1] and Stanley Luchters[1,6,7]

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Affiliation:

[1] International Centre for Reproductive Health, Department of Obstetrics and Gynaecology, Ghent University, Ghent, Belgium (ICRH, De Pintelaan 185, UZP114, 9000 Ghent, Belgium.)

[2] International HIV Research Group, School of Public Health and Community Medicine, UNSW, (Sydney 2052, Australia)

[3] Sexual & Reproductive Health Unit, Papua New Guinea Institute of Medical Research, (PO Box 60, Goroka, EHP, Papua New Guinea)

[4] City College, Kunming University of Science and Technology, Kunming, China (East Ring Road 50, 650051 Kunming, China)

[5] Department of Prevention and Education, Yunnan Institute for Drug Abuse (Xi Hu Lu 300, 650228 Kunming, China)

[6] Centre for International Health, Burnet Institute (85 Commercial Road, Melbourne, Victoria 3004, Australia)

[7] Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University (Alfred Hospital, Commercial Rd, Melbourne, Victoria 3004, Australia)

*Corresponding author

Author's contributions

XZ designed the study, managed fieldwork, analysed data and wrote the first draft of the manuscript; SL and AKH assisted in data analysis, conceptualized and edited the manuscript;

JJC helped with data coding, translation data into English and revising the manuscript. JL and MT provide comments on the revisions. All authors read and approved the final manuscript.

Abbreviation

ATS: amphetamine-type stimulants
KCDDC: Kunming Compulsory Drug Detoxification Center
IDUs: injecting drug users

ABSTRACT

Background: China, as in other South-East Asian countries, has witnessed an increased use in amphetamine-type stimulants (ATS) among urban youth in the past decade. Among female adolescents who both sell sex and use ATS, risk behaviours are compounded resulting in even poorer health outcomes, but limited knowledge exists on ATS use patterns and ATS-related risk behaviours, particularly in this context. This research aimed to improve understanding of the culture of ATS use among female adolescents who use ATS and sell sex, and to inform potential future programming.

Method: Conducted in 2011, this study used repeated focus group discussions (four in total) with the same group members in Yunnan Province. Participants were recruited from female adolescents who reported a history of drug use and selling sex.

Results: Participating adolescent females, aged 17-19 years, were internal-migrants with low literacy. Participants were polydrug users (mainly methamphetamine in pill or crystalline forms and heroin, whereas, ecstasy and Ketamine has been infrequently employed). Less informed risks of drug use and lack of sexual and reproductive health knowledge seemed to contribute to problematic drug use, rough and prolonged sexual intercourses, inconsistent condom use and ineffective contraceptive practice. Despite participants largely relied on income from selling sex, which was frequently coupled with drug sharing services to clients, participants did not perceive themselves as sex workers, and therefore didn't think that existing intervention services targeting female sex workers are relevant to them. Moreover, the criminalization and stigmatization of drug use and selling sex impeded their access to public healthcare services.

Conclusion: Current harm reduction and HIV/STIs prevention services are unlikely to address the demand of female adolescents engaged in drug use and commercial sex. Our findings highlight that a comprehensive and coordinated harm reduction and

sexual and reproductive health response should be conducted involving these most vulnerable adolescents.

Keywords: Amphetamine-type stimulants; female adolescents; commercial sex, sexual and reproductive health; harm reduction; China.

Background

In the past two decades, there has been a significant increase globally in the availability and use of amphetamine-type stimulants (ATS). Regions with the greatest increase include North America, Europe, South-East Asia and Australia. Of an estimated 200 million people worldwide who used drugs in 2009 and 2010, around 35 million used ATS. This is more than those reported to have used cocaine (13 million) and heroin (16 million) combined.[1] ATS use in South-East Asia has been particularly severe with more than 60% of global ATS use taking place in the region.[2] ATS use can cause a range of immediate and long-term health consequences to individuals through increasing high-risk sexual behaviours or other risky behaviours, such as problematic injecting, intensive or poly-drug abuse. These health consequences have been well documented, including increased risks of HIV and other sexually transmitted infections (STIs), hepatitis B and C, tuberculosis and mental health problems.[1,3-6]

The People's Republic of China has a long and evolving history of drug use.[7,8] Historically, opiates were the primary drug used, but as China began to open up its previously closed borders in the past ten years, access to and demand for synthetic drugs have expanded exponentially. While use of heroin has decreased among urban Chinese youth,[6,9] use of ATS in particular have become increasingly popular, and been mostly consumed in entertainment venues.[6,9] According to police surveillance systems, by the end of 2012, China reported nearly 2.1 million registered drug users.[10] Of these, over a third (38%) were identified as polydrug users (mainly methamphetamine and ketamine).[10] The

proportion of registered ATS drug users in increasing, from around 9% in 2008 to 14% in 2009, and more recently (and concerning) 19% in 2010.[11] Among newly registered methamphetamine users in 2011, slightly less than one in five (18%) were below the age of 20 years.[10] Also, of all illicit drug users in China in 2011, almost three quarters (73%) were between the ages of 16 to 25 years.[8] As these data only reflects the situation of ATS users who have engaged in drug-related criminal activities and been caught, it is hard to estimate the general situation of young people, nor are we able to ascertain more critical information about sub-populations of ATS users, such as young female sex workers.

Throughout China, the drug market has been, and continues to be, a significant challenge to both national and provincial law enforcement agencies. It also poses a notable concern for the public health sector. China has taken a punitive and hard-line strategy towards drug use and drug trafficking. This is best exemplified in its 'zero-tolerance' law enforcement approach on drug control. Compulsory actions against people using illicit drugs have primarily included medical treatment at compulsory rehabilitation centres.[6,12-14] Since 2010, police reported catching more people using crystal methamphetamine than those using heroin in 16 of China's 31 provinces. Importantly, around half of these seizures occurred in Yunnan, a south-western province of mainland China, which borders with Myanmar, Vietnam and Laos.[8,11] Traditionally famous for its ethnical diversity, Yunnan is now notorious as the epicentre of China's drug trade, as it is geographically positioned along the major drug trafficking routes of the infamous "Golden Triangle".[15]

By the end of 2011, approximately 780,000 people were reported to live with HIV in China, of whom 28% were reported to be exposed through injecting drug use and 64% through sexual contact including both heterosexual and homosexual modes.[16] To confront the dual epidemics of injecting drug use and HIV, especially where they coalesce, China initiated a pilot harm reduction programme in 2004. This program, however, is largely confined to methadone maintenance treatment. With the coverage expanded nationwide, China's methadone maintenance treatment programme now reportedly includes more

than 738 clinics across 28 provinces and had served 344,000 heroin-users by the end of 2011.[15-18] However, methadone maintenance treatment is designed only to treat and support opioid-type drug users, not ATS. Since 2004 multilateral needle and syringes programmes have been piloted in selected parts of the country, but the withdrawal of international development investments in 2012 has resulted in a significant reduction both in size and number of the programmes and further caused low overall coverage.[19] As with neighbouring countries, the harm reduction approach currently used in China fails to cater for the adverse health issue related to ATS use among young people.[2,6,7]

There is no definitive profile of a "typical" ATS user. However, there is growing evidence to suggest that female sex workers and other employees in the entertainment industry, young people frequent entertainment venues as well as sexually-active and youth on-street have been viewed as groups most commonly associated to ATS use.[1,4,5] Throughout China and other regions, numerous studies have now identified a strong interrelationship between sex work and substance use.[4,6,20-26] There were various reasons for sex workers' vulnerability to ATS abuse, which include: to cope with their accelerated life circles (irregular or late hours), to control weight, to ease inhibitions for multiple or disagreeable clients, to enhance their work performance, to increase sexual excitement and energy for sexual activities, or they just simply perceived ATS as being less harmful than other drugs to embody modern and fashionable lifestyles.[3,4,27,28] Some reported selling sex in order to buy drugs.[27]

There was evidence from surrounding countries in the Mekong region to suggest that women who sell sex and use ATS faced increasing health risks, including HIV/STIs.[2,4,27] In Vietnam, ATS use among female sex workers was found to be associated with hyper-sexuality and unprotected sex;[2] studies in Cambodia among young female sex workers working in entertainment establishments showed ATS use to be independently associated with high incidence of sexually transmitted infections, (adjusted hazard ratio=4.3; 95%CI: 1.7–11.0) and associated with increased numbers of sexual partners (risk ratio=2.5; 95%CI: 1.6–3.7).[3,28]

Despite the widespread prevalence of ATS use among youth in South-East Asia, the overlap of sex work and ATS use or polydrug use among youth is often overlooked within harm reduction policy and programmatic responses.[6,19,27] Existing literatures provide sufficient evidence that action is needed but intervention initiatives to reach the population remain far below the estimated need.[6,27,29,30] In China, attempts to address unmarried youth's sexual and reproductive health issue confront with resistance as these are deemed socially sensitive topics.[31] There is a paucity of research on the sexual and reproductive health issues faced by Chinese youth, let alone research on adolescent females who sell sex and who use drugs. To date, there is a knowledge gap in understanding drug use and selling of sex among young people in China, which significantly impedes programmatic and policy response to promote their sexual and reproductive health and rights.

A small qualitative study was undertaken amongst female adolescents aged 19 years or below who were undergoing compulsory detox for drug use and who also reported selling or exchanging sex. This research aimed to better understand the culture of ATS use in order to inform to inform evidence-based programming for female adolescents with a multitude of risk practices including ATS use and commercial sex.

Method

Study setting

There are 45.7 million people (2009) living in Yunnan Province with 6.4 million in Kunming, the largest economic centre, and the provincial capital. Despite only making up 3.5% of the national population, Yunnan Province accounts for 22% of new HIV cases in the country.[16,32] In Yunnan Province HIV prevalence is mainly concentrated within two key populations with 28.4% in injecting drug users (IDUs)and 2% in female sex workers.[33]

It is estimated that there are more than 80,000 people in Yunnan Province who inject heroin,[34] however, there are no official numbers which estimate or report the number of ATS or polydrug users. As of the end of 2009, Yunnan had over 70 compulsory drug detoxification centres administrated by the Public

security. According to *The Anti-drug Law of the People's Republic of China* (2007), this figure is likely to change as the province's small scaled detoxification centres closed and all "inmates" transferred and concentrated in the larger centres administrated by the Department of Justice. The Kunming Compulsory Drug Detoxification Center (KCDDC) was the largest centre in all of China by the 2010.While there are no official number of "inmates" in the country, it was estimated that there were anywhere between 3,000-5,000 men and women in KCDDC alone in 2010.[34-37] A person who uses drugs and is arrested is usually detained and ordered to undergo compulsory drug testing using urine at a police station where they are then transferred to methadone maintenance therapy clinics, or supervised at community-based detoxification centres (for at least 3 years), or incarcerated in KCDDC (for at least 2 years).[7,38] The Kunming Rehabilitation Center is managed by the Department of Public Security and serves as a transition place for released ex-drug users from the KCDDC to their residence. Individuals remain voluntary at Kunming Rehabilitation Center, and are subject to strict rules including curfews, random drug testing, behaviour change programs and physical exercise. During our research, the observed monthly number of individuals in Kunming Rehabilitation Center was around 50 (equal ratio between men and women).

Despite female sex workers are widespread in China, all forms of commercial sex remain illegal.[39-42] It is conservatively estimated that over 10,000 female sex workers are active in the urban areas of Kunming.[43] In 2013, based on their observation, local female sex workers' support organizations have estimated that at least 30% of the women reached are under the age of 20 years, and of these young female sex workers around half (40%-50%) have ever experimented with any type of ATS by consulting with key informants (managers/pimps/foremen in entertainment settings), which is similar to the 2010 prevalence of having ever used any type of ATS among female sex workers in Viet Nam, the neighbouring country of Yunnan (21% for methamphetamine pills, 54% for ecstasy and 58% for crystalline methamphetamine).[2]

Study design and date collection

During the research period, it was not possible to recruit female adolescents who

are selling sex and using drugs through existing female sex workers' or IDUs' support groups/programs because the difficulty to contact eligible candidates through existing networks. Thus, our study participants were recruited at Kunming Rehabilitation Center from 20 young female inmates. Eligible participants were: (1) aged 19 years or younger; (2) reporting ATS use and involved in sex work before entering KCDDC; (3) willing and able to participate and provide informed consent for this qualitative research; and (4) had no obvious mental or other medical illness that would impede participation (as judged by the medical department of Kunming Rehabilitation Center).

Between March and July 2011, a small qualitative study was conducted by using repeated focus group discussions (four sessions in total), anticipating increased yield on these highly sensitive topics with repeated exposures. The preconditions for using this approach were participants of same gender who already knew each other outside of the research situation. The repeated groups were found to be conducive for gradually developing rapport and trust relationships between the participants and researcher(s) and; participants were more comfortable with the progressive approach to sensitive topics to share feelings and experiences. Importantly, this method reduced recall bias through comparing or re-discussing relevant topics in different sessions therefore enhancing validity of data in comparison to one-to-one interviews or once-off focus group discussions. In addition, this approach can stimulate and elicit new important topics further refining the initial interview guide before the fieldwork had been completed.

The group discussions were facilitated by a semi-structured interview guide, in which participants were encouraged to discuss the relevant events and emotions, behaviours and knowledge. Core topics discussed included: participants' background, perspectives and practices of drug use; sexual and contraceptive practices and health outcomes; health seeking behaviours; self-perception and future aspirations. Discussions started with broad personal topics then evolved to more sensitive topics in a permissive and non-judgemental way.

A typical session lasted around 1.5 hours. All discussion sessions were moderated by the lead author together with one of two trained note-takers,

depending on their availability. All focus groups were digitally audio-recorded, transcribed in Chinese Mandarin, and proofread by note takers. Chinese transcripts were read through multiple times, summarised and then thematically coded. Twelve primary themes and 26 sub-themes were identified. Coding was cross-checked by other authors fluent in Chinese.

Ethical consideration

Ethics approval was obtained by the research ethics committee of the Kunming Public Health Bureau, Yunnan Province, China (No. KM-FSW-10-06).

A brief introduction and ethical materials about the study were provided to Kunming Rehabilitation Center for review and permission. A pre-discussion was held between the research team and Kunming Rehabilitation Center staff on how to meet administrative requirements while protecting participants' confidentiality; the procedure of recruitment and interview were also discussed. Kunming Rehabilitation Center staff contacted all eligible inmates and asked if they were willing to participate in this study voluntarily.

The venue, schedule, length and form of sessions were determined in consultation with six candidates. Written informed consent of participants was obtained before each session; there were three candidates who were under the age of 18, given the fact that they were living apart from their parents for years without current connection with family, the written informed consent was obtained from a trusted adult indicated by the participant in line with the WHO's ethical considerations in conducting research among adolescents in developing countries [44], as well as the acknowledgement on the evolving capacities of children outlined in the Convention on the Rights of the Child.[45]

Confidentiality and privacy were of the most concern in this study. Both oral and paper statements were given to each participant to assure the confidentiality of collected materials and the understanding of the study. All questions were conveyed in plain local language in relation to their age and life circumstances. Participants were clearly informed their rights of voluntary involvement, refusing to answer question and withdrawing. All discussion sessions were taken place in a private meeting room within the Kunming Rehabilitation Center, with refreshments, nearby toilets, and comfortable seating.

None of staff from Kunming Rehabilitation Center was present during the discussions nor were conversations and issues raised shared with them by the research team.

Participants were not allowed to receive money for their involvement in the study as per rules from the Kunming Rehabilitation Center, so at the end of each session, participants received a toiletry bag with personal hygiene products equivalent to the value of RMB30 (US$5) to appreciate their time and participation. Furthermore, participants received an HIV/STI counselling and contraception knowledge session as requested, as well as an information sheet of local female sex worker and IDUs support organizations.

Results

Characteristics of participants

Based on selected criteria, six female adolescents were eligible and consented to participate in the study and as is expected, all self-reported behaviours regarding drug use and sex trade was prior to entering. All participants in this study had been arrested and incarcerated at KCDDC. The durations in Kunming Rehabilitation Center were varying from six months to one year. The six female adolescents who participated in the study were Han rural-urban migrants aged 17 to 19 years, the majority of them had not completed middle school (Table 1). None of the adolescents reported to have a connection with family before arrested for fear of disclosing their situation of selling sex and drug use. Prior to detention their main source of income was from selling sex or/and drug sharing services to clients if clients desired. Another reported source of income was playing the role of pimp to introduce girls with sex and drug sharing services to patrons; sometimes, in the absence of income from above sources, all participants reported being involved in other occasionally criminal activities: selling drugs, stealing and extortion. The reported monthly income varied from US$1,200 to US$4,800). [4]

Table1: Key characteristics among adolescent female sex workers who ever used ATS

[4] In 2011, the average monthly wage was RMB 4672 (US$ 780) in Beijing and RMB 3470 (US$ 580) in Kunming respectively. (Source: Beijing Bureau of Statistics, Yunnan Bureau of Statistics)

Key characteristics	n/N
Age	
17 years	3/6
18 years	2/6
19 years	1/6
Education	
Completed primary school	1/6
Not completed middle school	4/6
Completed middle school	1/6
Residential status	
Rural areas in Kunming	3/6
Other rural areas in Yunnan	3/6
Current connection with family	0/6
Ethnicity	
Han	6/6
Social insurance (medical care, social relief)	0/6
Type of drug used	
Methamphetamine pill	6/6
Crystal methamphetamine	2/6
Ecstasy	6/6
Ketamine power	3/6
Heroin	6/6
Drug use history	
Less than 1 year	2/6
1-2 years	2/6
More than 2 years	2/6

Use of amphetamine and other drugs

Type, effects and conception of drug used

All participants were polydrug users, and the most frequently used ATS was methamphetamine. Known locally as *xiao-ma* ('little horse' or 'little horse medicine'), the pill containing the methamphetamine was usually opened and the content deposited put onto a piece of foil and smoked. The second most common ATS used was crystal methamphetamine—called *bing* or *bing-du* ('ice'). The women referred to high purity crystal methamphetamine as *shui-guo-bing or write-bing* ('fruity ice', more transparent ice with a little sweet taste) and the impure as *hua-xue-bing* or *yellow-bing* ('chemically synthesized ice' with a light yellow colour). A plastic drink bottle with two straws was usually used to smoke ice after it had become gaseous and had been filtrated through water. In colloquial Chinese this is called *liu-bing* ('feeling like skating').

The entry point to ATS use reported was that peers introduced them to all-night 'horse parties' where methamphetamine pills and crystal methamphetamine were provided in abundance. The most common reasons given for experimenting with ATS use included expecting the experience of euphoria and less sexual inhibitions and; increased excitement, energy and sexual desire. Typically, the girls reported that they would smoke anywhere between four and ten methamphetamine pills at any one time. Sometimes they would use methamphetamine pills and crystal methamphetamine simultaneously. The frequency with which they took ATS was largely dependent upon two issues: a girls' access to the financial means to afford ATS and; if a sexual client desired that she takes it with him, in such circumstances, the client would purchase the drugs.

The girls described in detail the short-term effects that methamphetamine use had on their physical and mental health. Typically, these effects included increased bodily temperature, excessive sweating, dizziness, insomnia and hallucinations. These effects of methamphetamine experienced were different depending on their purity. Women reported that the low-grade methamphetamine was seen as less potent and posing quite uncomfortable symptoms including itchiness, redness of the body and numbness of the throat. In contrast, high purity methamphetamine was reported made them feel euphoric and invigorated, while less or without negative symptoms as the low-grade methamphetamine caused.

Apart from using ATS, all girls reported a history of frequent heroin use. Usually, heroin was introduced by peers or a boyfriend in order to combat the euphoric "*high*" from ATS, particularly when they wanted the ATS side-effects to be ended and be able to sleep, as expressed in the following quote:

> "I use heroin after horse parties [methamphetamine parties] or after sharing little horse [methamphetamine] with clients to help me sleep well."

Despite access to heroin for over 2 years in some cases, there were no reports of drug-injecting behaviour nor did any of the participants report an

overdose. The reasons for not injecting heroin included feeling troubled to prepare a venous injection, and fear of needles or pain. Participants did however report two cases of their closest girlfriends injecting heroin, in which one collapsed and another died as they recalled: "*thoroughly scared and, don't know how to help her*".

Ecstasy (in colloquial Chinese, *yao-tou-wan*) was less often reported, as well as Ketamine (so called *K-fen,* in pure powder form) are occasionally used by all participants when they hang out "*in some night entertainment venues for fun with other club-hoppers*".

The participants contrasted the addictive and harmful nature of heroin with ATS, whereby heroin was interpreted as a "*hard drug*" and therefore more serious in its effects and its addictive nature. In contrast, they perceived ATS as fashionable, fancy and cool; sometimes described as drugs that *"belong to new generation like us"*. ATS were perceived as largely harm free.

Economic costs and venue of drug use

The cost of different drugs varied greatly. Methamphetamine costs between RMB 40 and 50 (around US$ 6- 8) per tablet. The cheapest low-grade methamphetamine, is available for around RMB 25 and 40 (around US$ 4-6) per tablet. Cost of drugs was not always the burden of an individual young woman. Purchasing drugs was often seen as the responsibility of the girls' boyfriends as one young girl shared:

> "We always share the cost of drugs with our girlfriends; but with boyfriends, usually they pay for this [drug cost], if he didn't want to pay, I shall refuse to use drugs with him."

Similarly, drug-taking peers or clients of sex services often supplied the participants with drugs.

> "You know, sometimes my friends will bring me some 'new arrivals' or 'finest goods'. We could try some and buy some more from them; but actually, many clients usually bring drugs to share. We don't need to pay."

Few participants in the study reported that they had taken crystal methamphetamine, methamphetamine tablets or heroin in their home; most sort out other venues including hotel rooms rented out by the hour and small road-side guesthouses to take drugs. These venues were chosen for their secrecy, of being able to avoid the gaze of law enforcements officials and prying neighbours. Another important venue for drug taking were entertainment-settings, as one girl described and was reinforced by others:

> "There were some private suites, each suite with a lobby, and a separate backroom with a toilet typically, the lobby for dancing and karaoke, well, also for 'liu-bing' [smoking methamphetamine pills] together; the small backroom for 'fast food' [a quick sexual intercourse for 15-20 minutes]."

For ecstasy-type tablets, it was most often consumed in nightclubs, dance clubs or rave scenes as participants' said:

> "..these pills are colourful things with very cute and attractive patterns, ah, exuding a pleasant aroma. You could buy it either from drug dealers peddling around in these club scenes, or from your familiar peers; well, the first way is unusual during police crackdown".

Drug use related sexual and reproductive health risk

There was an identified relationship between the methamphetamine use and the participants' sex behaviours. All reported, using methamphetamine or crystal methamphetamine meant they experienced heightened sexual libido and increased sexual energy. Sexual intercourse was prolonged, and multiple sex acts could occur in one episode.

> "..we think having sex is a good relaxant to [complement] effects of 'little horse' or 'ice', you know, we call this way as 'jie-ma' or 'san-bing' [soften the euphoric high coming from methamphetamine

> or crystal methamphetamine]. I felt my body is very hot with intensive desire for it [sex] after I used ice or little horse, ..well, they [sexual partners] said my behaviour showed very crazy and impulsive if they did take the 'ice' or 'little horse'; so we often take drug together then we could have longer sex, for example, two to four hours or usually over five sex acts during the night."

Obviously, there were adverse health consequences related to above sexual activities after methamphetamine use. Some girls reported:

> "I had sexual excitement but could not easily get a 'high' feeling [orgasm], so we want the long-lasting sexual intercourse, oh, sometimes, I feel burning pain on my labia after drug effects."

> "Myself and some of my girlfriends, we have had experience of abrasions and tearing around my 'below areas' [vulva or perineum] with prolonged sexual intercourse."

Another problem regarding their sexual practices was the inconsistent condom use with sex clients and the rare condom use with boyfriends (the majority of them were also drug users). Condoms were mainly perceived as a method for the prevention on an unwanted pregnancy. Interestingly, a number of the participants described that male drug users have lower fertility, so traditional methods (i.e., douching, herbal mixtures, withdrawal or rhythm) were perceived to be "*enough*" to prevent conception. The level of contraceptive practice was poor. Participants reported to not use the oral pill because of the concerns about reduced future fertility, the resulting '*acne*' and '*ugly chloasma*' as heard from other peers, as well as the potential difficulties in compliance. None of girls reported hearing of or using an intrauterine device or implant.

Despite the fact that none of these girls have asked or knew the HIV/STIs status of their boyfriends, participants believed that their boyfriends "looked healthy", thereby not needing to worry about HIV and other STIs. As a result, unwanted pregnancies and induced abortions were reported by half participants.

Nearly four out of five of their female peers[5] had had at least one unwanted pregnancy which often ended in an induced abortion, though a few gave birth. One participant described a girlfriend even experiencing 12 induced abortions.

Self perception

Girls discussed how they saw themselves within the Chinese cultural context in which considerable stigma surrounds female sex workers, even in drug users' communities. It was evident that participants were more likely to perceive themselves as drug users rather than sex workers, and assert their social hierarchical status to be higher than the general female sex worker population. Participating girls described themselves as "horse girls", someone who provides combined services of having sex and sharing drugs. Girls perceived their "professional" skills, their specific client networks, and their high income and financial independence to allow them to have more control and flexibility on client selection contributing to their improved status:

> "This [sold sex] was for fun, and I mean I don't think of it as my occupation for making a living; I think we are different from those professional female sex workers who have to provide low-price sex with clients, no matter if they like or dislike. They seem to have 'no taste', and are 'humble' without choice, it is a pity. I can decide and select the clients I like, so I don't think it could be called 'work'."

> "Well, we all know, if you meet the clients who bring "ice" or "little horse" along or already used them, you have to take them [ice or little horse] too; if not, you could not bear the sexual intercourse for hours. They [clients] call us 'ma-mei' [horse girls], ..well, only girls like us can handle this, I mean our skill in providing clients with drug-related services is a special profession compared with providing sex services alone, we called this business as 'pei-hi [accompany with 'high']."

[5]This figure came from each participant reporting having roughly 10 closed female friends, and about "7-8" or "majority" of those friends had had one unwanted pregnancy.

> "In some entertainment places, girls like us [horse girls] have our own lounge to wait for special clients [drug using], other ordinary female sex workers [without drug related services] are not allowed to stay in the room, even we all were working at same entertainment place. The managers or owners try to keep us away from strangers, or not so trusting persons to protect us, you know, they don't want get trouble from police."

Healthcare seeking behaviour

With the fear to be exposed for their illegal behaviours, both drug use and selling sex, safety remains the number-one priority among these girls. Participants instinctively avoided contact with government-led health services. Furthermore, judgemental attitudes of health providers, inconvenience and lack of medical insurance were reported to result in poor uptake of public health care services. In this regard, girls described:

> "Actually, I never heard any place can provide free HIV counselling and testing services, nor sexual transmitted infections testing and treatment. Well, I heard of something about methadone program from my friends. I don't know when health workers will come to our working venue because I have taken few chances to meet them for 'security' reasons. Only once, I heard they were distributing condoms to female sex workers, so I quickly went downstairs to get some free condoms from a woman [outreach worker] without talking to her."

> "We are familiar [with small private clinics], we are comfortable with the doctors' attitude and patients, well sometimes we can even bargain against the cost. Unlike those big hospitals [public], too many patients, too many procedures with too many questions about my occupation, my address, my contact number, and my marital status or partners. I would not bear such eyes and tones. And, we

have no medical insurance; I pay all the cost, so why do I have to go to these big hospitals?"

When asked how they deal with these negative consequences, one girl reported:

> "It is not necessary to suffer from this [seeking health services in public hospitals]..and I don't want to tell the doctor about my experience about the injuries. I feel unsafe to do so..and if very painful [injuries], I would go to the pharmacy to buy some jie-er-yin [a kind of over-the-counter vaginal douches for bacterial vaginosis treatment]; if mild, I would not care."

All participants reported that they received compulsory testing for HIV while entering KCDDC like other inmates. However, the test results had not been communicated to the participants, and they were left not knowing their HIV status.

Self-detoxification experience was common reported by all participants, as many as 8 times. The main reasons regarding this way included difficulty in find any reliable facilities (government-funded or private) that provide ATS-specific treatment and information, or confidentiality concern about these services.

Discussion

There is good evidence that the use of methamphetamine is associated with a number of sexual and reproductive harms in study participants. Other studies have suggested that effects of ATS lengthen the time to ejaculate or orgasm, dry the mucosa and reduces the sensitivity of the rectal and genital areas, and contribute to increased likelihood of bruising and tearing in the region thus of increasing opportunities for sexually transmission of infections.[46,47] Our findings also showed that the effects of methamphetamines upon libido and sexual desire were commonly reported, which facilitated longer and rougher sexual episodes, as a result, genital injuries, unwanted pregnancy and related abortion were frequently occurred in this group, which is compounded with less utilization of

public healthcare services, putting them on risk of reproductive transmitted infections including HIV.

Available data suggest the crystalline form of methamphetamine poses a high dependence potential. In some South-East Asia countries, the "smoking" crystal methamphetamine users are in the risk of more harmful use routes, for example, transition to injecting.[47] For these adolescents who are not involved in injecting routes, preventing the uptake of injecting should become the primary aim of harm reduction strategies. The strong self-motivation to withdraw drug dependence and reported overdose cases in our study participants highlight the urgent need on comprehensive harm reduction services including voluntary drug treatment and route of administration.

The findings also identified several key elements for toiled programmes to make a difference for this population.

Self identification-the key factor for intervention initiatives

Studies indicated that sex workers self-identifying as sex workers is an important factor to access public health services targeting sex worker. However, in contexts where sex work carries a potent stigma and is illegal, people engaged in sex work may be more likely to distance themselves from sex workers.[48] Participants in our study, these "horse girls" refused themselves as sex workers and didn't perceive existing targeted public health services for female sex workers are relevant to them, consequently are not captured by these services. On the other hand, "smoking" ATS was predominantly used in this group, similar with previous study, [5,19] they rarely use harm reduction services, largely because the existing harm reduction services have been designed targeting opioid and IDUs in China; while they have different networks and do not identify themselves with opioid users or IDUs. Obviously, mainstream interventions which narrowly either focus on IDUs or focus on adults female sex workers only failed to reach this population. This situation could further fuel their marginalization and enhance vulnerabilities to HIV/STIs.

Our study suggests that it is important for intervention initiatives to address their isolate status, own perspectives, overlapping risks and unique needs. As early as possible, a comprehensive integrated response should be conducted to

the “horse girls” population. It is necessary to review and integrate multi-component harm reduction intervention into existing HIV/STI prevention programmes to reinforce each other, hence improving accessibility and acceptability of health services for those girls. For example, creating safe space for these female adolescents-our study experience shows a relatively private and female peer-only space might be an important means of encouraging female adolescents to communicate their own circumstances and perspectives, where such place can play a role of platform for female adolescents to get professional support and care in a non-discriminatory manner; providing addition of safe sex work-specific items (information of HIV/STI, list of service source of counselling/treatment/drop-in centers/law, skill of condom negotiation/coping intoxication/identifying gender-based violence) to basic harm reduction kits; vice versa, addition of harm reduction items to basic sex work kits. [27]

Given the nature of adolescent psychological and physical development, underscore this, age-appropriate information and services of gynaecology, contraception should be included in both service kits and settings.

Misconceptions, scant knowledge and less informed risks -a major cause of risky behaviour

Our study found, multiple risk behaviours, for example, simultaneously polydrug abuse, unprotected sex or largely relying on less effective contraceptives, were rooted from misconceptions on drug use and scant knowledge about sexual and reproductive health.

Consistent with other research among adolescents [31,49-53], our study shows female adolescents relied on emotional feeling or observation to judge the health status of their sexual partners. This, in combination with the realities that a number of their sexual partners were drug users, show increased potential risk to HIV/STIs.

When taking an insight on drug use behaviour of “horse girls”, there were an impact from and interaction with their sexual partners, including their boyfriends or clients. These young women had been invited or hired to share sexual partners’ drugs, in this case, they may lose control over dose, use pattern and venue, and more likely be involved in problematic drug use, which in turn

inhibits their ability to negotiate safe sex. “horse girls” with this special “occupation” carries co-occured risks, while they were less informed about harm associated with drugs use, are be exposed to elevating risks of sexual and reproductive. Much more attention is needed to address these pushing factors existing in their living and working environment to build the self-protective awareness in “horse girls” group.

Research indicates that for younger ATS users, adequate information and counselling provision could enable them to appreciate the potential risks associated with ATS use and take measures to mitigate these harms and prevent more harmful or intensive drug use.[1,54] In view of vulnerabilities to health harm and the knowledge gaps identified in this group, we contend that adolescents have rights to access to age-appropriate harm reduction and sexual and reproductive health information, education and services regardless their legal and social status under the Convention on Rights of the Child.

Community-led coordinated response to improve service relevance and accessibility

Government-led health programmes in China continue to act as the primary HIV prevention service provider rather than community-led organizations.[39] Nevertheless, institutionalised discrimination and criminalization interfere the safe and confidential access for this group. Previous studies revealed that peer networks and support is important to children or youth away from family and school [1,55], while the community-based and peer-led programmes and their outreach/peer education approach can play an unique role for delivering comprehensive harm reduction services, as well as reducing both risks of sex and injecting for drug users.[47,56-59] When attempt to reduce the harm associated with drug use and sexual risk behaviours, key population’ networks and wider civil society are crucial for trying to reach, and to successfully deliver services for them, and must be invested in. Combined governmental and civil society’s force should ensure that those adolescents-“horse girls” are involved in development, implementation and evaluation of intervention initiatives in accordance with their best interests.

There is a need for a distinct approach to people under the age of 18 in core packages of interventions, and special training on ethical consideration and timely referrals in relation to children protection should be provided for service providers.

Moreover, given the hidden and isolate nature of this population under legal repression, for peer-led interventions, it might be valuable to explore the new technical connection through mobile to deliver instance support and information to this population.

Limitations

Caution is needed in generalizing the findings from this study to adolescents who use drugs and sell sex in other regions. The study was limited to Kunming and a detention centre; and the recruitment used the convenience sampling with small sample size may resulting in the selection bias. Further this qualitative research relied on self-reported behaviours from participants, which may subject to recall bias or be desirability bias introduced by social stigma or their incarcerated status.

Conclusion

Female adolescents involved in drug use and commercial sex are driven underground by stigma and criminalization, as well as remain underserved by the conventional health or youth programmes. This population is not minority and they account for percentages of migrant youth, female sex workers and drug users. Evidence shows that a law enforcement approach on drug users, for example compulsory incarceration of drug users and detoxification alone is not an effective method to address drug use which is entwined with a number of social and health problem. Harm reduction, a public health and rights-based approach to mitigate long-term harm should supersede a punitive approach. The tailored programmes are urgent needed to cater their unique circumstances, overlapping vulnerabilities and comprehensive health needs to mitigate them from adverse health and social consequences.

Conflict of interest

The authors have no conflict of interest to declare

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CHAPTER 4: DISCUSSION &

CONCLUSIONS

4.1 Key findings and interpretation

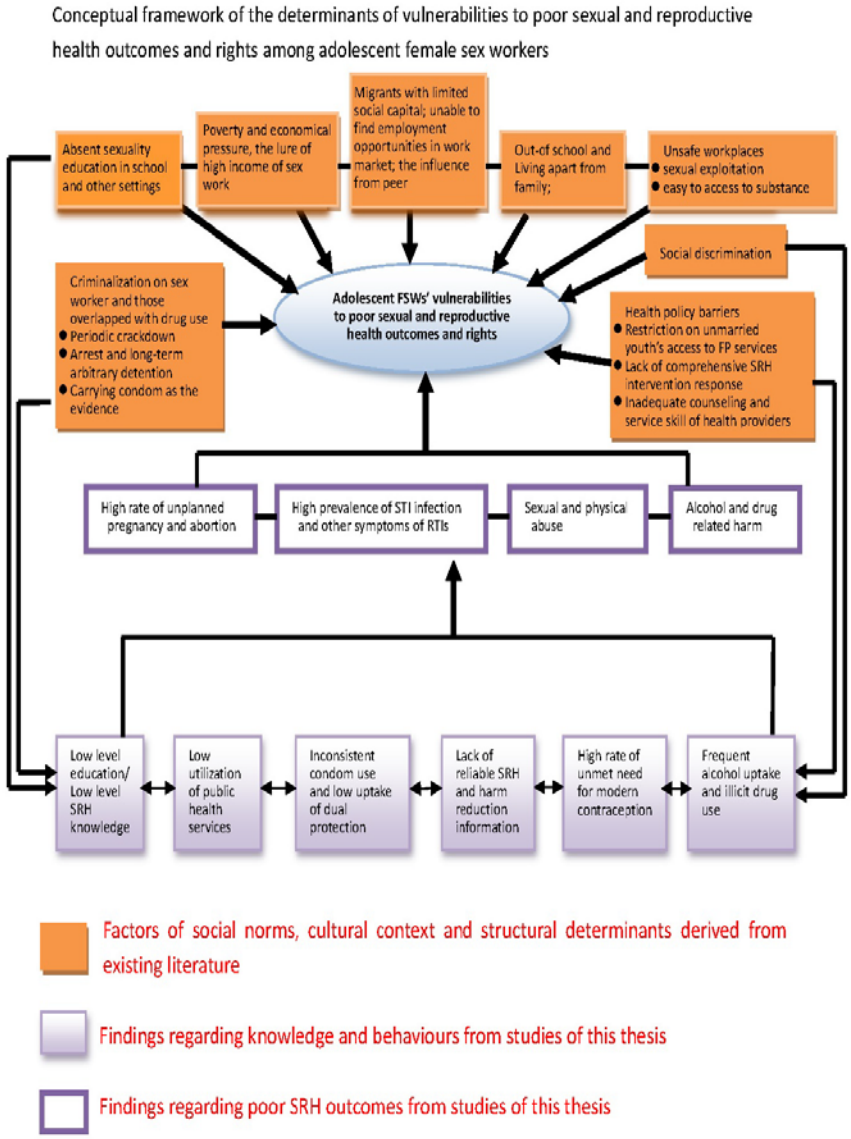
Over the past two decades, as in many other Asian countries, China has seen an increase in the size of the FSWs population at a younger age than previously.[1-4] Most of the young or adolescent FSWs are untouched or underserved from existing public health, livelihoods and youth development programs, as well as very few channels or opportunities to have their voices heard. Studies among young or adolescent women in sub-Saharan Africa and Asia revealed that the vulnerability of adolescent girls to HIV/STI is rooted in poor social support and opportunity structures,[1,3,5-7] WHO's *Health for the world's adolescents* show that these factors and conditions have a serious impact on their health-related behaviours and development.

Our studies presented here investigate specific vulnerabilities to SRH risks confronting adolescent FSWs in Kunming China, while some elements, for example, low level of SRH knowledge and lack of reliable information sources, low utilization of public health services and high rate of unmet need for modern contraception (IUDs and implants) also have important implications for the general adolescent female population. Moreover, drawing on what we have learned from findings of this research and results from existing literature, there are recommendations provided for program and policy priorities to pick up these vulnerable girls, to assist them in mitigating SRH risk and preventing poor health outcomes and development.

Conceptually, an ecological model derived from existing literature and the findings of our studies visually describes the structural, environmental, and

individual determinants and their interaction contributing to adolescent FSWs' vulnerabilities.

Figure 10: Conceptual framework of the determinants of vulnerabilities to poor sexual and reproductive health outcomes and rights among adolescent female sex workers



4.1.1 Structural factors and the socio-political environment shapes the vulnerability to adverse sexual and reproductive health and rights

Existing literature revealed the links between migration and sex work.[2,8] Migrant girls without social capital or economic assets are at increased risk of being pressured into sex work as a livelihoods strategy.[7] Moreover, the lao-xiang (hometown social connections) social network has an influence on migrant women's choice to sex work, clients referral and information sharing in China.[9] Our findings showed that the majority of adolescent FSWs are rural-urban migrants with low education level; the majority living apart from family and are out of formal schooling. Therefore, the presumptively protective factors-family and school -are withdrawn from these adolescent girls. Most participants in our studies were self-supporting and the sex work was their sole source of income (Article 1, 2, 3, 4). In contrast to the wages earned from potential low-skilled jobs which they could likely access in urban areas, income from sex work is much higher (Article 1, 3, 4), which could be a potential factor resulting in these adolescent females entering entertainment settings. Our findings also show entertainment settings are unsafe workplaces for adolescents because of easy access to substances (Article 4). The economic pressure, negative influence of peers and coercive sex,[10] drug use/dependence (Article 4) could further contribute to the risk of involvement in selling sex in a direct or indirect way.

In China, traditional social-cultural taboos regarding sexuality deter the provision of SRH education at schools and at home; and limit FP services provided by the public health sector for adolescents and youth.[11-14] As a result, adolescents are unlikely to be prepared to protect themselves from unplanned pregnancy or adverse SRH consequences.[12] Compared to other sexually-active adolescent women in China, adolescent FSWs are more likely to encounter substance abuse including alcohol, unprotected sex and physical or sexual violence when partly or entirely involved in sex work (Article 1, 2, 3, 4). Most

adolescents (87% in Article 1, 2 and 86% in Article 3) entered sex work in the past year. Given the velocity of their lives and the threats in their environment, they face both life-changing and life-threatening situations.[7] Our findings show that short duration in sex work was independently associated with unprotected sex, which concurs with our finding that they received less frequent free condom service (68% vs. 89%, p=0.006) and less frequent outreach or peer education services (67% vs. 82%, p=0.014) compared with women who had worked longer than one year in the sex trade (Article 1).

In China, most HIV/STI prevention projects for FSWs have been led by government disease control authorities and lack of specific strategy to address their internal diversity, where challenges in coverage and effectiveness of services remain.[15,16] Our finding shows that adolescent FSWs who reported having accessed HIV test services were less likely to report unprotected sex (Article 1). Despite around 70% of adolescent FSWs had received free condoms in the past year, less than half reported an HIV test and only 70% of these received their HIV test results (Article1, 3). For those who were detained in rehabilitation centres, all had experienced a compulsory HIV test, but none received the result (Article 4). This highlights the need to improve FSWs' right to universal access to VCT and treatment in both the public health sector and the law enforcement sector.

Our studies also show that, in addition to low utilisation of government-provided abortion care and STI treatment services, the majority of adolescent FSWs reported a need for comprehensive SRH services including FP (Article 1, 2, 3, 4). Consistent with previous studies,[1,4,17,18] our findings show that criminalization and the frequent policing on the sex industry marginalizes sex workers and creates barriers for obtaining peer support and accessing full-range of SRH care services including harm reduction (Article 4). Moreover, the judgemental attitudes and inadequate counselling skills of public health providers (Article 4), the policy requiring parental consent for abortion services, and the married couples-only restriction of government-funded FP services[2,11,12,19,20], are all likely to hinder adolescent FSWs' universal access to public SRH services. In addition, given their criminalised and highly mobile status, adolescents FSWs are reluctant or find it more difficult to obtain health insurance, and therefore have

limited access to public health care (Article 4).

Existing literature revealed a great heterogeneity among adult FSWs based on the traditionally divided risk groups in China;[8,17,21-23] our study did not show many significant differences in demographic, social and sexual behavioural characteristics in terms of workplace among adolescent FSWs. Adolescent FSWs working at the traditionally described "higher-risk (lower-class) " or working at "lower-risk (higher-class)" venues were both found to report high numbers of sexual partners and low condom use. Yet, since 2005 China's HIV prevention strategy has emphasized the importance of appropriate intervention programmes to better address FSWs' internal diversity[24] -but neither guidelines for age-appropriate interventions, nor age-disaggregated surveillance data of behavioural or HIV/STI prevalence is available. The homogeneity of adolescent FSWs regarding risk-taking behaviour in our study suggests that intervention initiatives need to focus on adolescent FSWs working at any workplace (Article 1). Moreover, there is a need of national-level strategy to elicit more age-specific evidence within each workplace context and support the development of intervention programmes specifically addressing adolescent FSWs on a large scale.

4.1.2 The most-at risk adolescent girls who use drugs and sell sex are in urgent need for harm reduction

There is evidence to suggest that some people who sell sex and use drugs (including alcohol) face increased risk of health harms, including HIV/STI.[25,26] However, the overlap between sex work and drug use is often overlooked within harm reduction responses. Legal and moral repercussions of offering services to adolescents create considerable obstacles to programmatic initiatives at both drug users' and FSWs' support organizations/fertilities, as well as government departments in China. To date, the majority of harm reduction services in the Asia-Pacific region have been designed targeting opioid and IDUs.[27,28] ATS users

rarely use harm reduction services, largely because they have different networks and do not identify themselves with opioid users or IDUs.[28] Our findings showed that 8%-9% of participants reported using illicit drugs in the past years (Article 1, 3).

Studies indicated that sex workers self-identifying as sex workers is an important factor to access public health services targeting sex worker. However, in contexts where sex work carries a potent stigma and is illegal, people engaged in sex work may be more likely to distance themselves from sex workers.[29] In our study, clustering of risk factors is common in adolescent girls who sell sex and use drugs-the so-called "horse girls" (Article 4). Participants did not regard their behaviour of selling sex as "sex work" nor did they see themselves as 'sex workers'. As such, they are reluctant to approach traditional HIV/STI services targeting FSWs, which highlights an important service gap in both FSWs and drug users targeted health programmes. On the other hand, "smoking" ATS was predominantly used in this group, similar with previous study, [27,28] they rarely use harm reduction services, largely because the existing harm reduction services have been designed targeting opioid and IDUs in China; while they have different networks and do not identify themselves with IDUs. Obviously, mainstream interventions which narrowly either focus on IDUs or focus on adults female sex workers failed to reach this population. This situation could further fuel their marginalization and enhance vulnerabilities to HIV/STIs. In addition, "horse girls" assert their social and economic hierarchical status to be higher than the general FSW population because of their "professional skill" (offering combined sexual and drug sharing services to clients), specific client networks (drug users) and high income (reported monthly income: US$1,200-4,800 of horse girls vs. US$150-500 across adolescent FSWs working at high-end or low end venues in 2010) and financial independence, which might make them more difficult to separate from this business in the future without other livelihood approaches instead.

Previous studies have suggested that effects of ATS lengthen the time to ejaculate or orgasm, dry the mucosa and reduces the sensitivity of the rectal and genital areas, and contribute to increased likelihood of bruising and tearing in the region thus increasing opportunities for sexual transmission of infections.[30,31]

Our findings (Article 4) also showed that the effects of methamphetamines upon libido and sexual desire were commonly reported, which facilitated longer and rougher sexual episodes, as a result, genital lesions, unwanted pregnancy and related abortion were frequently occurred in this group; above behaviours compounded with less utilization of public healthcare services, putting them on unacceptable health risks (Article 4).

There was an interaction between "horse girls" and their sexual partners (boyfriends or clients) regarding drug use behaviour (Article 4). These young women had been invited or hired to share sexual partners' drugs, in this case, they may lose control over dose, use pattern and venue, and are more likely to be involved in problematic drug use, which in turn inhibits their ability to negotiate safe sex. In addition, consistent with other research among adolescents,[5,7,32-35] our study shows "horse girls" relied on emotional feeling or observation to judge the health status of their sexual partners. "Horse girls" with this special "occupation" carried additional risks: while they were less informed about the harms associated with drugs use, they were exposed to elevated SRH risks. Much more attention is needed to address these risk factors in their living and working environments to build the self-awareness and increase protection of this vulnerable "horse girls" group.

Previous studies showed associations between alcohol use and HIV/STI, sexual risk behaviour and sexual violence among FSWs [25,36-38], and intoxication in both FSWs and their clients can increase the difficulty of negotiating condom use. Our study also identified alcohol use as a risk factor for unmet need for modern contraception (Article 3), which required integrating alcohol intervention into comprehensive SRH promotion programmes for adolescent FSWs.

4.1.3 Low level of FP knowledge, unmet need for modern contraception and gender-based violence

Consistent with studies in Chinese adolescents[11] and unmarried youth[39], SRH/FP knowledge was poor in our study population, and misconceptions were prevalent (Article 3, 4). Moreover, a lower level of SRH knowledge was associated with

inconsistently using condoms with paying partners, and not receiving SRH knowledge from traditional media. (Article 3). Despite participants reporting having received SRH/FP information from a range of sources, including school, traditional media, peers, family, and public or private SRH services, just 27% reported ever receiving any SRH/FP information from health providers. Furthermore, those reporting receipt of information from health providers seemed to report the poorest level of knowledge, relative to those receiving information from other sources, reflecting either limited access/weak SRH service delivery, or incomplete SRH knowledge of health providers/lack of effective SRH counselling (Article 3). In line with SRH studies among general adolescent population,[11,12] our findings highlight a critical missed opportunity to provide essential services to this hard to reach population, and also suggest a need to improve the knowledge, attitudes and counselling skills of health providers which are also associated with low utilization of public health care services.

Nearly all adolescents (98%) reported not currently wanting to get pregnant. The majority of participants (91%) reported currently using condom, however only 40% of them consistently used condom with their sexual partners in the past month; with the exception of condoms and emergency contraception, current use of other modern contraception was very low (<10%); only 7% of adolescent FSWs were currently using dual protection (any modern contraception plus consistent condom use) with their sexual partners (Article 3). Our study show the inconsistent condom use with non-paying partners was significantly higher than with paying clients (88% vs. 45%). This is similar to reports from a previous study (ranging 78%-95% with stable non-paying partners) across street-based and establishment-based FSWs.[22] Existing studies in south Asian countries indicate that ineffective contraceptive use, rather than non-use, contribute to unintended pregnancy: as many as two-thirds of abortions are due to contraceptive failure, mostly from traditional method use, and one-third are due to unmet need for contraception.[40] It is clear that reliance on condoms with questionable compliance or emergency contraception, as well as the low level of uptake dual protection, significantly increased the risk of unplanned pregnancy and HIV/STI acquisition among adolescent FSWs

(Article 1, 2, 3).

Qualitative studies among young women in developing countries revealed that preserving future fertility is as important as preventing pregnancy, and condoms and traditional methods, which do not threaten fertility, are often relied on.[35] Chinese literature revealed that douching remained the most used contraceptive method between FSWs and their stable non-paying partners (62%), followed by female condom.[8] In our studies, the current use of traditional methods was common (40%) (Article 3), predominately for those who use drugs (Article 4). Comparing with previous studies in adolescents in developing counties or unmarried women in China,[35,41-44] our studies demonstrated very low uptake of IUD and implants among adolescent FSWs: ever used (0% for IUD and 3% for implants) (Article 2); currently using (1% for IUD and 0% for implants) (Article 3). This phenomenon is due to low awareness and knowledge of LARCs (Article 3), and may also reflect the strong socio-cultural pressures to prove fertility among young women who have not yet to had a child but have concerns about potential side effects and health risks of the LARCs.[35,44] In addition, younger adolescents were more likely to be non-users of modern contraception than older adolescent FSWs (Article 2). Previous studies suggest that discontinuation and poor compliance are particularly important reasons for higher failure rates and unintended pregnancy in adolescent women who use short-acting contraception including condoms and oral pills.[45-47] Given the adolescents' nature of lower sense of self-efficacy and confidentiality concern, as well as the occupational risk of sex work-unpredictable and irregular sexual activity, sexual coercion and violence, alcohol and other substance influence, the greater effects should be made to promote the uptake of LARCs, particularly couple with condom use among adolescent FSWs.

In addition, there is strong evidence that SRH and inconsistent condom use are affected by gender-based violence. In studies across India, Nepal and Thailand, young age at entry to sex work has been found to heighten vulnerability to physical and sexual violence victimisation in the context of prostitution, and relates to a two to four-fold increase in HIV infection.[48,49] A cohort study with 367 FSWs in Kenya revealed that sexual and/or physical

violence by an emotional partner (boyfriend or husband) was experienced by over half (55.0%) of FSWs over the past year, and associated with higher number of sexual partners and inconsistent condom use.[50] Research with other Chinese FSW has found the proportion ever experiencing violence to range from 16% to 58%.[13,51,52] We also found that 38% of adolescent FSWs had experienced recent physical or sexual violence from sexual partners, this was associated with poorer assess to HIV/STI or FP consultation services (Article 3). Sexual and gender-based violence against FSWs is a pervasive and complex issue, and addressing this requires input from multiple sectors including the community, health, police and legal sectors. Interventions to prevent and protect from violence may include empowering FSW with knowledge about their rights and skills for negotiation, self-protection and strategizing responses training, peer support and information sharing, promoting workplace security, provision of legal support, public advocacy, and supportive legislation.[16,25,53,54] In addition, health care providers and others working with FSW should be trained to refer victims of violence to appropriate health, psychosocial, and legal support. There is also a need for training in skills for condom/contraception negotiation among these adolescent FSW, as partner refusal to use condoms was common (Article 3).

4.1.4 Poor sexual and reproductive health outcomes among adolescent female sex workers

In comparison with national data, our studies (Article 2, 3) demonstrate that the prevalence of lifetime abortion (51%, 47% vs. 16%) and repeat abortion (20%, 15% vs. 5%) among adolescent FSWs is much higher than for sexually-active young women of the same age in China.[11]

More than half of adolescent FSWs (61%) in our study (Article 2) had their first abortion at a commercial health setting which is not recommended by health authorities due to the potential risk of unsafe abortion; this was substantially higher than in the entire group of sexually-active Chinese women of the same age (49%).[11] Of those adolescents who had ever had an abortion, around half

reported ever experiencing complications. Menstrual disturbances and discharge were the most commonly reported symptoms (29% and 24% respectively), whereas fever and vaginal bleeding (4%) and uterine perforations (1%) were less frequent reported (Article 3). Stigma associated with premarital pregnancy, lack of adequate information, high service costs, negative attitudes of service providers, fear of disclosure of sexual activity and the illegal status of sex work are all likely to deter adolescent FSWs from seeking abortion care from official providers in the public sector.[35,55] Our findings suggest the need to greatly improve their access to comprehensive contraceptive services and supplies.

Further in comparison to previous studies in China, largely among adult FSWs,[56-60] our study showed similar HIV and syphilis prevalence rates among adolescent FSWs. The girls in higher-risk workplaces had a similar HIV prevalence as average provincial level across all age groups of FSWs (2.1% vs. 1.9%) (Article 1). Nearly a third of the study population had at least one STI diagnosed during study screens (Article 1); moreover, near two-thirds of adolescent FSWs self-reported ever experiencing at least one RTI symptoms in past year (Article 3). Our findings highlight that adolescent FSWs face the crisis of STI infection including HIV.

4.2 Strengths and limitation

To our knowledge, our studies are the first to document sexual risk behaviour (Article 1,2,3,4), amphetamine-type stimulants and other illicit drug use patterns (Article 1, 4), clinical and laboratory-based HIV/STI prevalence (Article 1), contraceptive practices and lifetime abortion (Article 2, 3), unmet need for modern contraceptives, unintended pregnancy and outcomes (Article 3) among adolescent FSWs in China.

However, it is important to note that our studies have several limitations and the results should be interpreted with caution. The sensitive nature of these topics and the hidden and mobile nature of this population in China presented these studies with considerable challenges. First, our 2010 quantitative study design was limited due to ongoing police crackdown, which prevented random sampling; the

snowball and convenience sampling strategy used may have contributed to a selection bias and may result in findings that are not representative of the entire population of adolescent FSWs. Secondly, the causality cannot be attributed due to the cross-sectional design of our studies; while we did not collect data regarding the timing and duration of modern contraceptive use, nor on the timing of abortion, which makes interpretation of this finding difficult (Article 2); moreover, the reasons for non-use and discontinuation of contraceptives, preferred methods of contraception and timing of pregnancy require further investigation (Article 3). Thirdly, our studies relied on self-reported illicit drug use and sexual behaviours, practices related to sex work, contraceptive use and history of abortion, which may have introduced a recall bias or a social desirability bias, particularly given the highly sensitive or criminalized nature of these behaviours. Fourth, by using a small sample of adolescent girls with a history of using ATS and selling sex in our 2011 qualitative study, it was not possible to know if their perspectives and risk-taking behaviours can be generalized to other young female ATS users. Finally, collected information from our studies are limited within the Kunming area, the low geographical variation of study sites likely results in the sample bias, thereby our findings cannot be generalized to all adolescent FSWs in China.

4.3 Priorities for further research

There is a need for a longitudinal study to test these risk factors as true determinants of HIV/STI, unplanned pregnancy and unmet need among adolescent FSWs in China, also taking into account the temporality of events, for example, the timing and duration of modern contraceptive use, the timing of abortion, unplanned pregnancy trends before and after becoming sex workers; importantly, qualitative methods could provide insights into the reasons for poor utilization of public healthcare services, as well as adoption, non-use and discontinuation of contraceptives, particular with the interaction of their sexual partners.

Fear of disclosure of illegal drug use may has resulted in an underestimation of the prevalence of drug use, further research is needed to obtain more detailed

information on context and content of risk behaviour associated with drug use among young FSWs, as well as factors or influences behind their sexual and reproductive behaviours to offer reliable explanations and implications for programming.

A better understanding is also needed on how adolescent FSWs can be more empowered to promote their SRH rights, and how to effectively reach and provide them with services through outreach, mass media and digital interactive mobile technology.

Other marginalized adolescents with overlapping vulnerabilities, for example, male or transgender adolescents involved in selling sex was beyond the scope of this thesis. Nevertheless, considerable knowledge gaps still remain and further research is required to address these vulnerable adolescents.

4.4 Implications for policy makers and programmatic initiatives in China

4.4.1 Review and remove laws and policies that prohibit universal access to sexual and reproductive health and rights

Around 17-18% of participants in our studies were under 18 years. It is important to ensure that minors are removed from exploitative situations. However, it is not simply a case for the law-enforcement efforts of immediate removal of the adolescents from the sex trade exclusively, without further family, social support and livelihoods strategy instead. When understanding adolescent FSWs' uniquely socioeconomic and legal circumstances, the public health system could provide important entry points for comprehensive SRHR services including

housing, education, empowerment and livelihood skills training, mental health and legal support. There is a need for a distinct approach to minors in core packages of interventions, and special training on ethical considerations and timely referrals in relation to child protection services. Further, the Convention on the Rights of the Child clearly articulates that children younger than 18 have a right to "the enjoyment of the highest attainable standard of health" (clause 24) and that "the best interests of the child should guide all actions concerning them" (clause 3), that people younger than 18 years have a right to participate in decisions that affect them and their evolving capacities should be taken into account to determine the most appropriate interventions to support them. In recognition of this, adolescents who are sexually exploited have the right to access comprehensive SRH services, which should be tailored to feature their own perspectives and unique needs.

WHO's Global reproductive health strategy emphasizes the importance of political, legal and regulatory environments that support and facilitate universal and equitable access to SRH services for adolescents. In many countries, effective responses will include legal and policy reform. China has placed emphasis on legal reform and has achieved some impressive progress in abolishing the "Re-education Through Labour" policy in 2013. The existing "Custody and Education" system should also be reviewed and compulsory detention and rehabilitation centres should be shut down in line with the Global Commission on HIV and the Law. In view of protecting children from sexual exploitation, we need draw attention to the law on "whoring an underage girl crime", as we discussed in background, which actually plays the role of a shield for criminals who sexually assault young girls below 18 years, and encourages prostitution rings to lure and coerce underage girls into prostitution, while further infringing on adolescent FSWs' rights to seek legal services to fight rape and sexual abuse. Discriminatory health policy and regulations can present significant barriers to adolescent FSWs, many of whom face the triple stigma of being unmarried, engaged in sex work, and of migrant status. Removing the restriction on unmarried young people's access to government subsidised FP services in China is a key priority to improve the SRHP of adolescents, including those engaged in sex work. The nationwide integration of the public health

system and the FP system initiated in 2013[19,61-64] provides an important opportunity to provide comprehensive SRH services to Chinese adolescents and other unmarried youth.

Beyond the structural barriers that limit access to this vulnerable group, historical tensions between SRHR promotion and moral repercussions must be overcome in order to develop effective strategies to address this large scale yet little recognised human rights and HIV-related crisis. Globally, an emerging body of evidence showed that education is an important determinant of girls' health and well-being.[2,7,11,65] Our findings showed that the FP/SRH knowledge were at a general low base regardless of adolescent FSWs' education level. Schools and health providers were the least commonly reported knowledge sources by adolescent girls, thus it is essential to invest both in SRHR education based in schools and healthcare settings to increase adolescent girls' information, practical skills and build-up their decision-making power before withdrawal from school, entering the labour market and engaging in sexual relations.

Periodical crack down and long-term compulsory detention of sex workers causes harm and rights violations, affecting public health responses negatively.[1,4,16,25] Evidence also shows that a punitive approach to drug use, for example compulsory incarceration of drug users, is not effective in addressing the complex social and health factors associated with drug use. Harm reduction, a public health and rights-based approach to mitigate long-term harm should supersede a punitive approach.[28,66-68] In particular, for adolescents aged 15-19 in a critical period of transition to adulthood, the long-term compulsory-incarceration will severely impede their social development and well-being.

4.4.2 Strengthening representation and involvement of community-based organizations in policy and program formulation

Although HIV risk reduction among adult FSWs has been a major focus of HIV

prevention efforts across the globe, no public health interventions to date have addressed the increased hazards and SRH risk including HIV faced by adolescent FSWs. [48] Government-led health programmes through public health facilities in China continue to act as the primary HIV prevention service providers rather than community-led organizations.[1] Nevertheless, institutionalised discrimination and criminalization, lack of confidentiality and health insurance result in poor access for this group (Article 4). Previous studies revealed that peer networks and support is important to children or youth away from family and school [67,69], while the community-based and peer-led programmes and their outreach/peer education approach demonstrated a unique role for delivering comprehensive harm reduction services, as well as reducing both risks of unsafe sex and injecting for drug users.[31,54,70-72] Our study showed that 70% of adolescent FSWs reported accessing SRH information from their peers (Article 3). The Asian NGOs representing sex workers in India and Thailand have achieved success in HIV/STI prevention by creating a mechanism for voice and agency for sex workers through civil society.[1] Since 2003 the community-led FSWs intervention model through NGOs has been explored with international donor support on a small scale in China, such as adult FSWs working at low-end venues-specific programmes in Kunming.[1,16] Encouragingly, the impact of community-led FSWs/IDUs interventions revealed that, even though under legislative and regulatory constraints in China, the community-based HIV/STI prevention and harm reduction programmes were successfully integrated with existing gynaecological care services for FSWs and IDUs in collaboration with local government health facilities, custody settings and owner of entertainment establishments.

What we have achieved in HIV/STI prevention programmes for FSWs and IDUs in the past, can also be done in SRHR promotion for adolescent FSWs. For example, recruiting and training young peer educators/outreach workers to reach adolescent FSWs in their workplaces or living places; re-orientating Drop-in Centres operated by local NGOs to create safe and specific spaces for adolescent girls involved in sex work or/and illicit drug use; providing confidential and youth-friendly counselling and SRH services at community-based clinics or health centres in areas where adolescent FSWs connect or congregate.

Meanwhile, given the fact of periodic crackdowns on sex work, it is worth exploring the mobile phone technology to reach and provide timely interactive peer support to the adolescent FSWs. When attempting to reduce the harms associated with drug use and sexual risk behaviours, key population networks and wider civil society are crucial for successfully delivering services to them, and must be invested in. Both government and civil society should ensure that adolescents are involved in the development, implementation and evaluation of intervention initiatives at all levels.

4.4.3 Implementing early intervention integrated HIV/STI prevention and sexual and reproductive health services for adolescent female sex workers

Importantly, our findings indicate that timing is a crucial element of addressing the specific SRH risks of adolescent FSWs. The risks of pregnancy and of abortion are time-dependent in this population. For example, the longer the involvement in sex work or the cohabitation with non-paying partners, the greater the risks of pregnancy and abortion (Article 2). While adolescent girls who recently started sex work (i.e., less one year) were more likely to report inconsistent condom use, received less frequent outreach/peer education services and worked at "higher risk" venues (Article 1). Our study among adolescent girls who sell sex and use drugs also indicates they are at a critical moment of progressing to dependence and intensive polydrug use (Article 4). Available data suggest the crystalline form of methamphetamine poses a higher dependence potential. In some South-East Asia countries, the "smoking" crystal methamphetamine users are at risk of transitioning to more harmful routes such as injecting.[31] For adolescents who are not involved in injecting drugs, preventing the transition to injecting should become the primary and urgent aim of harm reduction strategies. Our findings suggest that as early as possible, a comprehensive and multi-sector coordinated response should be conducted to ensure that adolescent FSWs receive a full-range of SRH and harm reduction

services.

The relatively high coverage of HIV/STI prevention programmes shown by our studies presents an important opportunity to reach adolescent FSWs, moreover, integration of national public health system and national family planning system also show an appropriate time for policy makers to strengthen the capacity of public health facilities to adequately respond to SRH information needs and achieve universal access to SRH services for adolescent girls.

The markedly low use of long-acting contraceptive methods among our participants is an important target for health programmes. As the most effective and reliable reversible methods, and given the advantages of LARCs for teens, it should be promoted for adolescent FSWs at all level of health facilities. Integrating contraceptive counselling and services into HIV/STI prevention, maternal health and gynaecological settings is an important strategy to make these methods more accessible to sexually active adolescents. Studies and projects demonstrate that increasing the awareness of both providers and young women about LARCs many lead to improvement in reproductive health for adolescents.[47,73] This begins in the training of health providers addressing fears and misinformation, accurate information in a rights-based and non-judgemental approach, which is the key consideration to increasing acceptance and uptake of LARCs among this population.

4.4.4 Creating new platform to reach adolescent girls with overlapping risky behaviours

We need specific measures to reach those most marginalized adolescent girls who both use drugs and sell sex. This group neither identify themselves as injecting drug users nor sex workers, consequently, they are unlikely captured by existing targeted services and public health programmes for FSWs and IDUs. It is necessary to review and integrate multi-component harm reduction interventions into existing HIV/STI prevention programmes to improve the accessibility and acceptability of health services for these girls. One example is creating safe spaces for these female adolescents. Our study experience shows a

relatively private and female peer-only space might be an important means of encouraging female adolescents to communicate their own circumstances and perspectives, where such place can play a role of platform for female adolescents to get professional support and care in a non-discriminatory manner; providing addition of safe sex work-specific items (information of HIV/STI, list of service source of counselling/treatment/drop-in centers/law, skill of condom negotiation/coping intoxication/identifying gender-based violence) to basic harm reduction kits; vice versa, addition of harm reduction items to basic sex work kits.[25]

Research indicates that providing younger ATS users with adequate information and counselling could enable them to appreciate the potential risks from ATS use, and take measures to mitigate these harms and prevent intensive drug use.[282828] Our study suggests that NGOs or the primary health-care system can play a unique role for service provision. Legal support, safe spaces of communication and peer education services should be particularly focused on for this vulnerable population to build up their self-awareness and expand their knowledge base of harm reduction. Given the nature of adolescent psychological and physical development, age-appropriate information and services of gynaecology, contraception should be included in both sex work and harm reduction service kits and settings.

4.5 Final remarks

Adolescent girls who are involved in sex work or/and substance use are an emerging population in China. Existing law, health and social strategies actually increase their marginalization and isolation, and insufficiently address the on-going human rights violations against FSWs including adolescent FSWs. Therefore, review and potential reform of policies and legal frameworks are needed. In recognition of adolescents' rights to access comprehensive SRHR services and in accordance with their best interests, the principle of "nothing about us without us" should be adopted in further SRHR programming and

initiatives.

SRH, HIV/STI and harm reduction programmes need to be integrated and significantly re-orientated to address the health disparities and specific vulnerabilities among adolescent FSWs, particularly those who used drugs.

Evidence of effective intervention to FSWs has emerged in Asia and other regions by using rights-based approaches and fostering grass-root NGOs' efforts to empower FSWs/female drug users and serve their specific SRHR needs. Chinese programmatic initiatives should support to learn about the work of other Asia countries and scale up the positive outcomes from pilot programmes in China. Policy-makers should ensure allocation of adequate resources to facilitate public health system and civil society for the wide improvements and linkages of SRHR and HIV services for vulnerable girls.

"Timing" is everything when considering intervention measures to enhance SRHR for adolescent FSWs to improve health outcomes. Innovative approaches to reach adolescent FSWs at workplaces and communities, to attract their participation and to protect or remove those minors from involvement in the sex trade are urgently needed to secure their future.

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CHAPTER 5: SUMMATION

5.1 Summary

In China, the estimated number of FSWs in 2005 was 2.8-4.5 million. Social stigma and the political regimen against female sex workers (FSWs) are reflected in laws criminalising FSWs and their clients. In China, sex workers bear the reputation of "social evil" and "bridge population of HIV/STI". For those women who use drugs and sell sex, the impact of criminalization and discrimination is doubled. The moral debates and law enforcement's periodical crack-down against FSWs interfere with public health responses. FSWs under 20 years of age account for almost 15%-40% of FSWs. However there are few channels or opportunities to have their voices heard and they are given the least attention in research and programmatic intervention delivery.

This PhD thesis consists of three research studies based in Kunming, China between 2010 and 2012. It aims to identify vulnerabilities and assess opportunities for improving sexual and reproductive health and rights for adolescent FSWs. To achieve this objective, the first cross-sectional quantitative study was conducted with 201 adolescent FSWs to assess their socio-demographic characteristics, working contexts, HIV/STI prevalence, sexual risk factors and health–seeking behaviour (Article 1); as well as their contraceptive practices and predictors of prior abortion and use of modern contraception (Article 2). A second cross-sectional quantitative study was conducted with 310 adolescent FSWs in 2012 to describe knowledge level and information sources regarding sexual and reproductive health, and to assess factors associated with unmet need for modern contraceptives and unintended pregnancy (Article 3). A third qualitative study among adolescent girls who use amphetamine-type stimulants (ATS) and sell sex explores the culture of ATS use, their own perspectives on sex work, their needs for health and social development. These studies aim to assist in recognizing the disparities and

vulnerabilities to adverse health outcome and long-term development in this vulnerable group of girls, and could inform more effective health initiatives for adolescent female sex workers.

Our study shows similar HIV and STI prevalence rates among adolescent FSWs in comparison with adult FSWs in China. While our studies indicate adolescent FSWs' sexual and reproductive health risks are in relation to low utilization of public healthcare, dual protection and effective modern contraceptive methods, less contact with existing intervention services, as well as substance use, poor education level and knowledge on sexual health and family planning. Adolescent FSWs' vulnerabilities result in high rates of unplanned pregnancies and abortion, which are much higher than other sexually-active young women of the same age in China. Our study among female adolescent drug users who sell sex shows clustering of risk factors, leading to adverse health outcomes. Interestingly, these girls do not regard themselves as 'sex workers', which presents an important gap in health programme delivery that target FSWs. Experiences of these young girls demonstrated that long-term compulsory detoxification and rehabilitation enhances their social exclusion and likely minimizes their chance to develop their social skills and well-being. Our findings suggest that, early intervention and continuous integrated HIV/STI prevention into family planning services in an age-appropriate approach is the key to ensure their sexual and reproductive health rights and secure their future. Policy-makers should ensure allocation of adequate resources to facilitate initiatives from the public health system and civil society aimed at wide improvements of sexual and reproductive health services and HIV prevention for vulnerable girls.

Further longitudinal research with the same population is needed to test in how far these risk factors are true determinants for HIV/STI infection, unplanned pregnancy and unmet need for contraception among adolescent FSWs.

5.2 Samenvatting

Sociaal stigma en politieke afkeuring van vrouwelijke sekswerkers (VSW) in China wordt weerspiegeld in de criminalisering van VSW en hun klanten. VSW hebben de reputatie een 'sociaal kwaad' en een 'brugpopulatie voor HIV en

SOAs' te zijn. Vrouwen die zowel drugs gebruiken als seks verkopen hebben dubbel te lijden onder het repressief beleid. Het moreel debat en de periodieke politionele acties tegen VSW hebben ernstige gevolgen voor de volksgezondheid. Adolescenten vormen een niet zo kleine minderheid onder de sekswerkers, maar hun stemmen worden weinig gehoord en er wordt weinig aandacht aan besteed of onderzoek naar gedaan.

Dit doctoraatsproject bestaat uit drie studies die werden uitgevoerd in Kunming, China tussen 2010 en 2012. Het doel was het onderzoeken van de kwetsbaarheid van adolescenten-VSW en het nagaan van mogelijkheden om hun seksuele en reproductieve gezondheid en rechten te verbeteren. Om dit doel te bereiken werd tussen 2010 en 2011 een eerste cross-sectionele kwantitatievestudie uitgevoerd bij 201 adolescenten-sekswerkers om hun sociaal-demografische karakteristieken, werkomgeving, prevalentie van HIV/SOAs, seksuele risicofactoren en zorgzoekend gedrag in kaart te brengen (Artikel 1); en om hun anticonceptiegebruik te beschrijven en factoren te identificeren die geassocieerd zijn met vroegere abortussen en het gebruik van moderne anticonceptiemethoden (Artikel 2). De tweede cross-sectionele kwantitatievestudie werd in 2012 uitgevoerd bij 310 adolescenten-sekswerkers, met als doel het beschrijven van het kennisniveau en de informatiebronnen inzake seksuele en reproductieve gezondheid, en het identificeren van factoren die geassocieerd zijn met onbevredigde nood aan moderne anticonceptie en ongeplande zwangerschappen (Artikel 3). Eenderde kwalitatieve studie werd uitgevoerd bij adolescenten die ATS (amphetamine-type stimulants) gebruiken en seks verkopen, en gebruikte meerdere focusgroepgesprekken om inzicht te verwerven in decultuur van ATS-gebruik met het oog op het beperken van de schade en het opzetten van seksuele en reproductieve gezondheidsprogramma's. Deze onderzoeken hopen bij te dragen tot de erkenning van bestaande ongelijkheden en kwetsbaarheid voor gezondheidsproblemen en ontwikkelingsproblemen op langere termijn, en tot het opzetten van effectievere gezondheidsinitiatieven voor adolescenten-VSW.

Ons onderzoek toont aan dat de prevalentie van HIV en SOAs bij adolescenten-VSW vergelijkbaar is met die bij volwassen VSW in China. Andere bevindingen zijn dat de seksuele en reproductieve gezondheidsrisico's van

adolescenten-VSW gerelateerd zijn aan laag gebruik van publieke gezondheidszorg, interventiediensten, dubbele bescherming tegen SOAs en ongewenste zwangerschappen, alcoholgebruik, laag opleidingsniveau en gebrekkige kennis over seksuele gezondheid en anticonceptie. De kwetsbaarheid van adolescenten-VSW leidt tot percentages ongeplande zwangerschappen en abortussen die veel hoger zijn dan bij andere seksueel actieve vrouwen van dezelfde leeftijd in China. Onze studie bij adolescenten-VSW laat zien dat clustering van risicofactoren vaak voorkomt. Bovendien vormen meisjes die het verkopen van seks niet als sekswerk beschouwen en zichzelf niet als sekswerkers zien een belangrijk hiaat in zowel op sekswerkers als op druggebruikers gerichte gezondheidsprogramma's. De ervaringen van deze jonge meisjes tonen dat repressief beleid met gedwongen langdurige ontwenning en rehabilitatie geen effectieve strategie kan zijn om druggebruik te elimineren noch om hervallen te voorkomen. Integendeel: het bevordert hun sociale uitsluiting en verkleint waarschijnlijk hun kansen op welzijn en het ontwikkelen van sociale vaardigheden. Onze bevindingen suggereren dat leeftijdsspecifieke interventies in een vroeg stadium en continue geïntegreerde HIV/SOA preventie en geboorteplanningsdiensten van doorslaggevend belang zijn voor het verzekeren van de seksuele gezondheid en rechten en van de toekomst van de betrokkenen. Beleidsmakers zouden adequate middelen moeten voorzien voor het faciliteren van initiatieven vanuit het gezondheidssysteem en het middenveld, die gericht zijn op een brede verbetering van seksuele en reproductieve gezondheidsdiensten en HIV preventie bij kwetsbare meisje. Verder longitudinaal onderzoek in dezelfde populatie is nodig om na te gaan in hoeverre deze risicofactoren werkelijk determinanten zijn voor HIV/SOA besmetting, ongeplande zwangerschappen en onbevredigde behoefte aan contraceptie onder adolescenten-VSW.

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