

## HIV/AIDS and Risky Sexual Behaviors Among Recognized High Risk Groups in Bangladesh

<sup>1</sup>Md. Nazrul Islam Mondal, <sup>3</sup>Nazrul Hoque, <sup>4</sup>Md. Humayun Kabir,  
<sup>1</sup>Sanjib Kumar Shaha, <sup>4</sup>Md. Shahidur Rahman Choudhary,  
<sup>2</sup>Md. Shariful Islam and <sup>1</sup>Md. Shahiduzzaman

<sup>1</sup>Department of Population Science and Human Resource Development,

<sup>2</sup>Department of Social Work, University of Rajshahi, 6205 Rajshahi, Bangladesh

<sup>3</sup>Hobby Center for Public Policy, University of Houston, Houston, 78207 TX, USA

<sup>4</sup>Ministry of Health and Family Welfare, Government of Bangladesh, Dhaka, Bangladesh

---

**Abstract:** The prevalence of Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) has become a stumbling block in the progress of human civilization and is one of the main health concerns in the 21st century all over the world. The HIV/AIDS epidemic poses a serious public health threat to young people both in Bangladesh and throughout the world. Therefore, the main purpose of this study is to examine the trend in HIV and HIV/AIDS risk related behaviors among recognized high-risk populations in Bangladesh. Researchers analyze serological surveillance data from 1998 to 2011 collected by the Ministry of Health and Family Welfare. Bivariate statistical techniques were used to examine the trends in HIV/AIDS related risk behavior among high risk populations in Bangladesh. The prevalence of HIV among people who inject drugs has increased considerably from 4.60% in 2003 to 2004 to 15.70% in 2011. The prevalence of HIV also increased significantly among transgender population from 0.20% in 2003 to 2004 to 4.20% in 2011. For the rest of the high risk population the pattern is not clear, this may be due to the nature of the survey. However, the total number of HIV/AIDS patients has increased considerably since the first case was detected in 1989. A comprehensive prevention program is an urgent need. Efforts should be concentrated on education and condom promotion to reduce sexually transmitted infections, screening programs for migrant workers and continuation of both behavioral and serological components of HIV surveillance, to prevent increased infectious or transmitted to high-risk groups with due to consideration to the consistency of surveillance indicators.

**Key words:** HIV/AIDS, high-risk group, risky sexual behavior, transgender, Bangladesh

---

### INTRODUCTION

Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) as a disease remains a global health problem. The illness interferes with the immune system making people with HIV much more likely to get infections including opportunistic infections and tumors that do not affect people with working immune systems. This susceptibility becomes worse as the disease progresses. Bangladesh, with more 160 million people, is the eighth most populous country in the world and is considered to be at risk for a large-scale HIV epidemic because of the variety and gravity of risk factors for the spread of HIV. Although, the exact number of HIV cases is not known, the most recent rounds of national surveillance (8th and 9th rounds) provide a drastic picture of rising prevalence, a high prevalence of

active syphilis and a high prevalence of risky sexual and injecting drugs behaviors among recognized high-risk populations. While, Bangladesh currently has low prevalence of the disease, it is surrounded by high prevalence countries including India, Myanmar and Thailand. Bangladesh must not adopt a complacent attitude as this country has all the determinants for an explosive outbreak of a HIV/AIDS epidemic. Challenges of poverty, illiteracy, ignorance, proximity of Bangladesh to the so-called 'Golden Triangle' and high prevalence of Sexually Transmitted Diseases (STDs), make this country vulnerable (Mondal *et al.*, 2009a). Drug use increases the HIV risk and can start very early for example, glue-sniffing by youngsters living or working on the streets. The danger of becoming infected with HIV by sharing injecting equipments is well known and real. The population faces unemployment, slum housing, family

fragility, frequent cross-border movement of people, lack of health information, unsafe blood transfusion, physical and sexual abuse these characteristics create a risk environment of violence for many young people in the region. In addition, increased number of migrant workers, unsafe health practice, unsafe sex practice, less use of condoms, polygamy, homosexuality, extra-marital relations increases the susceptibility to HIV infection (Mondal and Shitan, 2013). Migration is considered an important event to the increased risk of HIV infection among the general population (Mondal *et al.*, 2009b). Already, >30 million people around the world have died of AIDS related diseases. In 2010, 2.70 million people were newly infected with HIV, 1.80 million men, women and children died of AIDS-related causes and 34 million people around the world are now living with HIV (UNAIDS, 2011). The first case of HIV/AIDS in Bangladesh was detected in 1989. Since, then 2,533 HIV, 1,101 AIDS and 325 AIDS death cases have been reported (December 2011). The overall prevalence of HIV in Bangladesh is <1%, however, the high levels of HIV infection have been found among Injecting Drug Users (IDUs) (7% in one part of the capital city, Dhaka) (NASP, 2012). Due to the limited access to Voluntary Counseling and Testing (VCT) services, very few Bangladeshis are aware of their HIV status. It is generally believed that pediatric AIDS is going to be a huge challenge in Bangladesh in the years to come, since AIDS cases are largely underreported here. The emergence of a generalized HIV epidemic would be a disaster that poverty-stricken Bangladesh could ill-afford. The surveillance data shows that the virus has started to spread from high-risk groups to the general population and move from urban to rural areas. It is estimated that without any intervention the prevalence in the general adult population could be as high as 2% in 2012 and 8% by 2025. Even if only 1% of the general population becomes infected with HIV there will be 1.60 million people infected in Bangladesh. This massive burden would be almost impossible to cope with should the present socioeconomic structure remain unchanged.

The latest (9th) round of surveillance reported an alarming rise of HIV among IDUs in Central City of Bangladesh. A good number of research works have already been done grading HIV and AIDS epidemics in Bangladesh (Mondal *et al.*, 2012a, b; Ahmed *et al.*, 2006; Azim *et al.*, 2006, 2005; Nessa *et al.*, 2005; Baatsen and Kelly, 2004; Fakir, 2002; Azizul *et al.*, 2002; Rahman *et al.*, 2000; Cohen *et al.*, 1996; Mahfuzar *et al.*, 2008). However, no sound study has been concentrated on studying the trends of recognized high risk groups and their sexual behaviors. Therefore, the specific objectives of this study are to examine the trends of HIV/AIDS and HIV related risk behaviors among recognized high-risk groups in Bangladesh.

## MATERIALS AND METHODS

Data on the prevalence of HIV infection and other STDs was obtained from the 1st-9th round serological surveillances from 1998 to 2011 conducted by the Ministry of Health and Family Welfare (MOHFW). The first 5 rounds initially consisted of epidemiological and behavioral data whereas from 6 to most recent round (9th) only epidemiological data was gathered. The more recent rounds specifically looked at the prevalence of HIV and syphilis among several high-risk groups. The high-risk groups studied include IDUs, heroin smokers, female Sex Workers (SWs), Men who have Sex with Men (MSM), Transgender (TG), truckers, dock workers and rickshaw pullers. Bivariate statistical techniques were used to examine the trends in HIV/AIDS related risk behavior among high risk populations in Bangladesh.

**HIV-related behaviors among recognized high-risk groups:** Bangladesh has been undertaking periodic national surveillance since 1998 based on the joint United Nations Program on HIV/AIDS (UNAIDS)/World Health Organization (WHO) guidelines for second generation HIV surveillance (UNAIDS/WHO, 2000). The first five rounds of surveillance included both serological and behavioral assessments conducted in tandem on similar groups but not on the same individuals and the methodologies for sampling were different for the 2 assessments. However, only in the 6th-9th rounds serological assessment was conducted. Therefore, between the 9 rounds an accurate statistical comparison of the risk behaviors within and among the sentinel groups is difficult. Available data suggest that the vulnerability and risk factors for HIV transmission and acquisition remain high. HIV risk behaviors of individual risk groups are discussed in study.

**Drug users:** Many people do not understand why or how other people become addicted to drugs. It is often mistakenly assumed that drug abusers lack moral principles or willpower and that they could stop using drugs simply by choosing to change their behavior. In reality, drug addiction is a complex disease and quitting takes more than good intentions or a strong will. In fact, because drugs change the brain in ways that foster compulsive drug abuse, quitting is difficult even for those who are ready to do so. Drug abuse and addiction have negative consequences for individuals and for society. Drug use is a significant factor in the spread of HIV infection. Shared equipment for using drugs can carry HIV and hepatitis and drug use is also linked to unsafe sexual activity. HIV infection spreads easily when people share equipment to use drugs. Syringes are the easiest way to

transmit HIV during drug use because infected blood goes directly into someone's bloodstream. IDUs have remained the risk group with the highest prevalence of HIV and there is significant potential for sexual spread of HIV from IDUs to the remainder of the population. The 9th round surveillance found that ~60% of female IDUs were current SWs and 5.90% of these had active syphilis. Again, it has been identified that around 80% of the male drug users reported sex with multiple partners (either commercial or non-commercial partners) (Islam *et al.*, 2000). An HIV Prevention Program in Dhaka found that within few months, 78% of a cohort of 3,200 IDUs continued stably exchanging needles and syringes but their rate of reported condom use in commercial sex encounters remained disturbingly low, improving from only 7.80-17.70% (Jana *et al.*, 2002). Among 6,984 drug addicts studied, those who were HIV positive (15.70%) were mainly IDUs and every IDU with HIV reported sharing needles.

**Female sex workers:** The total number of female SWs is not known, however, it has been estimated that around 100,000 in the country. Although, there are 15 registered brothels in Bangladesh, the legal status of brothels is unclear (Jenkins and Rahman, 2002). The SWs register their names with a magistrate, signing an affidavit that they are entering the profession of their own will and are over 18 years of age. However, in reality they have often become SWs in response to poverty and other problems in their families. Police can raid brothels in order to remove women under 18 or to search for criminals. All other sex-working venues, e.g., Hotel-based Sex Work (HSW), Street Sex Work (SSW) or Residential-based Sex Work (RSW) are clearly illegal. The 9th round HIV surveillance reported that female SWs from Bangladeshi cities close to India and Myanmar frequently cross borders to sell sex. A study of 867 female SWs in brothels in Kolkata, India, found that nearly one in five (18%) were from Bangladesh (Pal *et al.*, 2003). In Bangladesh, Brothel-based Sex Workers (BSWs) report an average of 18.80 clients per week which is among the highest turnover of clients anywhere in Asia. Among HSWs, it is even higher, averaging 44 clients a week (FHI, 2001). In addition, riskier forms of sexual intercourse are reasonably common. Brothels show a mixed picture with active syphilis rates declining in cities and remaining unchanged. All types of female SWs are at greater risk to transmit and acquire HIV (Mondal *et al.*, 2010). It is not possible to determine the extent to which decline in syphilis rates is due to prevention programs or the enhanced treatment for syphilis among female SWs.

**Men who have sex with men:** The MSM are often overlooked as a high-risk population for HIV infection in Bangladesh. The role of MSM in the spread and

transmission of HIV is not well studied and is limited by a number of factors: males may not report participating in sex with other males due to societal acceptance or identity issues; males may deny such behavior due to discrimination or stigma and MSM may not report sexual behavior to health care workers. Three main groups are described within the context of MSM in Bangladesh and in South Asia and are known as Kothis, Panthis and the Hijra (transgender). The Kothis are usually males who are self-described as preferring the penetrated role in a coupling. Some in this group will sell sex to the panthi MSM who are the more masculinized males, preferring the penetrative or dominant role. The TGs are a complex group and encompass several physical descriptions including hermaphrodites, castrated males and TG individuals. A Non-Government Organization (NGO), as part of its community-based STI/HIV intervention, claimed that it reached a total of 1454 MSM and male SW between July 2000 and June 2001 (Fakir, 2002). Condom use was found to be increasing slowly both among male SW and MSM. The MSM often do not disclose their MSM practices to their female partners.

**Transgender (hijra) sex workers:** The TGs have been part of the South Asian landscape for thousands of years. The TGs are born male but grow up feeling like and dressing as women. Singled out because of their sexual difference, they are a despised and neglected minority. It is not easy to define a TG. There are differences between the cultural definition and the variety of individual lives and experiences. The TGs are culturally defined in terms of their traditional occupation as performers on auspicious occasions but not all TGs perform. Some TGs see them themselves as neither man nor woman but there are also many who feel and behave like women. There is also the definition that relates to physical sexuality. Many think that most TGs are hermaphrodites but that is not true. Most TGs are probably made rather than born that way. Becoming a real TGs are often means going through the emasculation ritual by removal of the penis and testicles. The emasculation is the major source of the ritual power of the TGs. It is the source of their uniqueness and the most authentic way of identifying oneself as a TG and of being recognized by the larger society. The TGs are treated with a combination of mockery and fear. The TGs often engage in homosexual prostitution. Many TGs are both performers and prostitutes. The TGs are fighting for their rights and they want to be treated equally among other people. They want others to know that they are also normal human beings. The TGs claim that others do not understand their life, gender and sexuality. The TGs live at the bottom of society and their traditional ways of making a living are under threat. They often make a living by walking

around the streets of Dhaka and other cities collecting money from shop keepers, bus and train passengers or by prostitution. The TGs population suffers from social stigma and are discriminated against. They wear women's clothing and usually behave like women. An NGO have been working with this group, an estimated around 5000 TGs live in Dhaka alone (Azizul *et al.*, 2002). By becoming eunuchs they are held as semi sacred and earn money blessing the health and fertility of newly weds and newborns.

**Bridging populations:** Certain population groups act as an epidemiological bridge from the most at risk populations to the general population (UNAIDS/WHO, 2000). The strategic plan of the National AIDS Program of Bangladesh (1997 to 2002) defines this group as including transport workers (including truckers, their helpers and cleaners and rickshaw pullers), uniformed forces, young people, working children, women in domestic work or in the workplace setting and in particular female garment-workers, internal and international male migrants, slum-dwellers and tribal people (GOB, 2005a).

However, surveillance and individual studies have concentrated their efforts on rickshaw pullers, truckers, slum dwellers and students.

**National response to HIV prevention:** Despite other critical health problems, Bangladesh acknowledged HIV as one of the emerging health and social problems in 1985 before its first case was detected in 1989. However, it still

took a number of years for specific interventions to be initiated. Recently the government introduced life-skills education and a curriculum has been developed for students in grades 6-12 which has been piloted in 88 educational institutions across urban and rural Bangladesh. Teaching issues relating to HIV/AIDS has been accepted by both teachers and students from religious and social points of view (Ahmed *et al.*, 2006). An Armed Forces HIV/AIDS education and life-skills program has been introduced and it is reported that of a total of 55,000 HIV negative Bangladeshi Peacekeepers deployed to missions in countries with very high HIV prevalence, only three persons have become HIV positive (GOB, 2005b). In 1998, the Imam (religious leader) Training Academy added HIV/AIDS awareness and prevention, primary health care, reproductive health and STIs to its curriculum. The >20,000 Imams including some female religious leaders, have now received training on HIV prevention (Usmani, 2002). They can also manage the social taboo of discussing HIV/AIDS as they address a male only or female only congregation. The majority of the government's current HIV/AIDS prevention activities are conducted through NGOs with management support from the United Nations Children's Fund (UNICEF), WHO and the United Nations Fund for Population Activities (UNFPA). In addition NGOs have implemented some independent programs. The >380 NGOs have been involved in HIV prevention in different parts of the country (UNAIDS, 2006). However, the quality of the interventions implemented by the NGOs varies considerably due to their limited capacity (Baatsen and

Table 1: Current status of HIV prevention measures in Bangladesh. Interventions are examined that target the risk factors for HIV infection

Reducing transmission probability	Reported implementation of measures	Reducing duration of infectiousness	Reported implementation of measures
Condom	Very little overall condom use Sex education Almost none	Contact tracing	Poorly established
Effective treatment of other STIs	Insufficient HIV education and safe sex messages Recently introduced into the secondary school curriculum	Partner notification	Poorly established
Reduce disassortative mixing	No systematic effort Add quality to relationships and development of skills for sustaining marital fidelity	Routine screening	Insufficient
HIV awareness among population	No systematic effort Not sufficient, need more effort Moral education Efforts have been made to encourage moral education (e.g., religious-leader training)	Social support to reduce stigma and encourage HIV testing	No systematic effort
Post-Exposure Prophylaxis (PEP), prevention of mother to child transmission	No reported intervention Interventions to high-risk group Interventions are in place but need more effort	Education about early symptoms (to people at risk and health staff)	Insufficient
Counseling for HIV positive people	Insufficient Delayed first sex No systematic effort	Accessible clinical services	Insufficient
Circumcision	Mostly circumcised Structural support to the bridging populations to be able to keep their spouses with them No reported effort	Quality of accessibility and treatments	Insufficient

STI = Sexually Transmitted Infection

Kelly, 2004). Despite these efforts, a number of areas for intervention have so far lacked attention. Several basic interventions which address these factors have been shown to be effective in HIV prevention elsewhere but are currently not well addressed in Bangladesh (Table 1).

**RESULTS AND DISCUSSION**

The most recent (9th) round of national HIV sero-surveillance revealed that the highest prevalence (0.7%) of HIV so far among IDUs. For the first time HIV was detected among IDUs although the prevalence remains very low. Among heroin smokers, 0% tested positive for HIV. HIV prevalence has remained low (<1%) amongst all groups of female SWs except the casual group. Similarly, all other high risk groups for sexual transmission of HIV had a low prevalence (<1%); for example, only two MSMs tested HIV positive out of a sample of 402. Only 3 transvestites/transsexuals out of a sample of 407 tested positive for HIV while none of the male SWs and none of the bridge population (rickshaw pullers, truckers and dockworkers) who are reported to be major users of SWs was HIV positive.

The prevalence of HIV among People Who Inject Drugs (PWID) is 15.7%, among SSWs 0.5%, among HSWs 0.6%, among casual female SWs 1.6%, among residence based female SWs 0.4%, among MSMs 0% among male SWs 0% and among hijras 4.2% (Table 2).

The reported HIV/AIDS cases and deaths in Bangladesh in 1989 to 2010 were 2088, 850 cumulative cases of AIDS and 241 total deaths related to AIDS (Fig. 1).

Though, Bangladesh is a low prevalence country, the prevalence of HIV/AIDS serological surveillance survey reports are explained in the following ways. The prevalence of HIV/AIDS in the 1st round is 0.8, in the 2nd round 0.3, in the 3rd round 0.4, in the 4th round 0.4, in the 5th round 0.4, in the 6th round 0.7, in the 7th

round 0.9, in the 8th round 0.7 and in the 9th round 0.7. This demonstrates that the prevalence decreases after 1st round, increases in 6th and 7th round and then decreases in the final rounds (Fig. 2).

Active syphilis rate among female sex workers in the first round 33.8, in the 2nd round 24.3, in the 3rd round 16.7, in the 4th round 8.4, in the 5th round 9.7, in the 6th round 6.2, in the 7th round 7.0, in the 8th round 7.3 and in the 9th round 4.6 (Fig. 3).

Prevalence of active syphilis rate among male SWs and MSMs respectively over the rounds as follows in the 3rd round 7.7 and 1.8, in the 4th round 3.2 and 0.7, in the

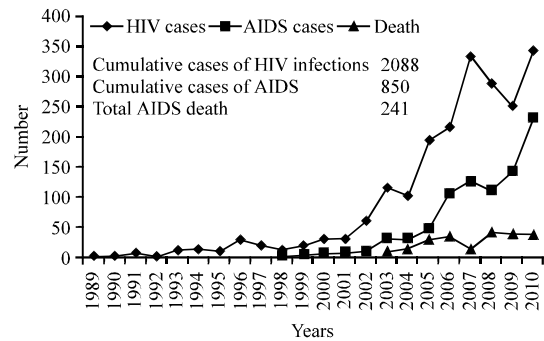


Fig. 1: Reported HIV and AIDS cases and deaths in Bangladesh from 1989 to 2010

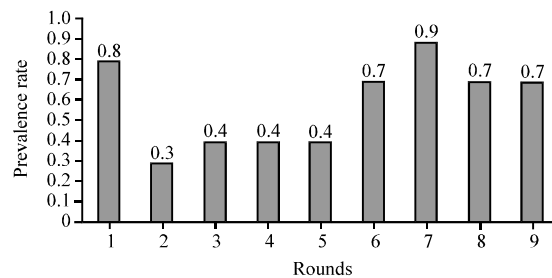


Fig. 2: HIV/AIDS prevalence from 1st-9th round

Table 2: Prevalence of HIV 5th-9th round of serological surveillance survey

Indicators	HIV percentage positive (total number tested)				
	2003 to 2004 round V	2004 to 2005 round VI	2006 round VII	2007 round VIII	2011 round IX
Drug users PWID	4.6 (1008)	15.9 (4624)	22.9 (5057)	22.5 (5937)	15.7 (6984)
Heroin smokers FSW	0.8 (391)	0.5 (399)	0 (401)	0.2 (402)	0 (388)
Brothel based	2.1 (2204)	2.2 (2155)	1.7 (2200)	NA	NA
Street based	0.2 (1206)	0.2 (804)	0.3 (791)	1.0 (1086)	0.5 (1398)
Hotel based	2.1 (698)	0.6 (293)	0 (287)	0.6 (701)	0.6 (867)
Casual	2.0 (679)	1.7 (967)	0.8 (1048)	3.0 (1217)	1.6 (227)
Residence based	NA	NA	NA	NA	0.4 (258)
MSW	0 (274)	0 (235)	0.7 (284)	0.3 (400)	0 (402)
MSM	0 (399)	0 (405)	0.2 (401)	0 (399)	0 (400)
Hijras	0.2 (405)	0.8 (381)	0.6 (353)	0.3 (392)	4.2 (438)

PWID = People Who Inject Drug; FSW = Female Sex Worker; MSW = Male Sex Worker; MSM = Men Who Have Sex with Men; NA = Not Available

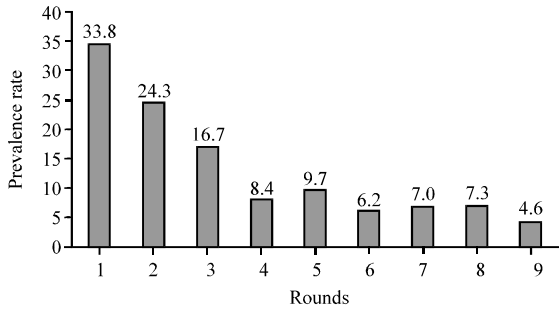


Fig. 3: Active syphilis rate among female sex worker

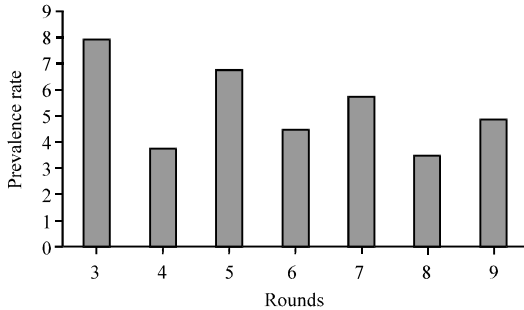


Fig. 4: Prevalence of active syphilis among male SW

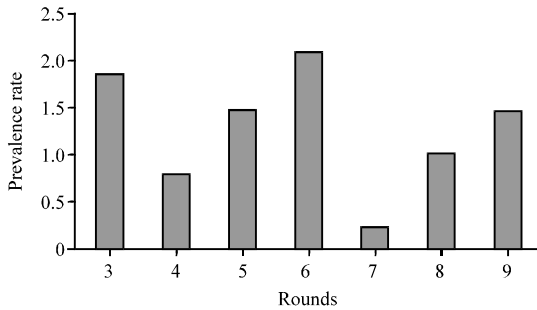


Fig. 5: Prevalence of active syphilis among MSM

5th round 6.2 and 1.5, in the 6th round 3.8 and 2.0, in the 7th round 4.9 and 0.20, in the 8th round 3.00 and 1.0 and in the 9th round 4.2 and 1.50 (Fig. 4 and 5).

While, Bangladesh is still a low HIV prevalence country, the country is clearly approaching a concentrated epidemic among IDUs. The increasing trend in HIV prevalence and its increasing geographic spread, the continued high-risk behaviors of IDUs and substantial mixing of most at risk groups with the bridging populations, remind us that HIV may not remain confined to any specific sub-population. The considerable prevalence of risky sexual behaviors among almost all the high risk groups is of grave concern. The negative effects of existing risk behaviors could potentially outweigh the positive effects of the slowly increasing trend in condom use and knowledge of HIV, unless further steps are swiftly taken.

Subgroups like prison inmates, uniformed personnel, international migrants, street children, slum-dwellers and garment-workers have not been included as vulnerable populations in national surveillance. Additionally, the international migrant group has reported the highest number of HIV cases. HIV prevention programs undertaken by the government have mostly been implemented by NGOs. The dependence of these NGOs on national and international funding can make program sustainability uncertain. For instance, during the 9th round surveillance, it was noted that the NGOs that were previously conducting interventions were no longer working but instead newly funded NGOs were preparing to start. As a result, there are wide gaps in coverage of vulnerable groups and estimates of coverage are speculative at best. In many districts numerous female SWs and IDUs have been identified but no specialized programs for working with these groups are available. The government, therefore, needs to make further efforts to facilitate more coordinated and comprehensive activities. The family planning campaign that started in the 80's achieved immense popularity and could form a potential platform for HIV prevention. This department has a huge staff network positioned throughout the countries who are already working with men and women of reproductive age. It has been reported that condoms purchased by the Department of Family Planning can only be used for family planning and NGOs working on HIV/STI prevention do not get condoms unless they declare they are working on family planning (Hossain *et al.*, 2004). Cooperation between these 2 government departments and involvement of family planning workers in HIV/STI prevention could ensure that the dual benefits of condoms in both birth control and STI/HIV are more effectively fulfilled.

Training of traditional healers and unqualified medical practitioners in STI/HIV prevention is needed, in many remote areas they are the first points of contact for rural people. Traditional healers in Bangladesh have insufficient knowledge about HIV/STI prevention and misdirect young people in the name of treatment for sexual dysfunction.

Sex between men occurs in all societies and is highly unsafe if unprotected. However, a lack of attention towards MSMs is observed in culturally strict countries. In Bangladesh, although some NGOs are claiming to reach high numbers of MSMs, this mode of sexual practice often remains hidden which makes prevention activities difficult.

Infections with other STIs increase the chances of acquiring HIV. Effective treatment of STIs is one of the proven methods for preventing HIV. In Bangladesh, the

HIV prevention campaign seems to be more effective than the general STI treatment/prevention (Islam *et al.*, 2000). For instance, one trained Imam confessed that he touches on the risks of promiscuity and stresses morality in relation to sexuality but leaves out condom use. Religious scholars could potentially be involved in discussions to find a way forward. Although, there are seven VCT centers in Bangladesh, full VCT facilities were reported to be available at only three sites. Better care and support services are needed for the growing number of people infected with and affected for HIV. The present ambiguous legal status of prostitution is not supportive of comprehensive intervention. Experience has shown that prohibition can only be effective in extreme settings and where civil liberties are severely curtailed. An enabling environment for more public health-oriented prevention and care is the precursor to effective prevention programs.

### CONCLUSION

The main objective of this study was to examine the trends in HIV/AIDS in Bangladesh. In Bangladesh, the first case of HIV/AIDS was detected in 1989 and since then the number of HIV/AIDS patients has increased significantly. Since, 2000 the number of HIV/AIDS infected population has increased from <10 to almost 3,000 in 2011. The number of deaths related to AIDS has increased from 1 or 2 in 1999 to 241 in 2011 (Fig. 1). Although, the overall HIV prevalence rates remain low, the HIV prevalence rate has increased substantially among the people who inject drugs. The prevalence of HIV has increased from 4.6% in 2003 to 2004 to 15.7% in 2011. The prevalence of HIV also increased for the Hijras population from 0.2% in 2003 to 2004 to 4.2% in 2011.

Although, Bangladesh has so far maintained a low prevalence of HIV, there remain numerous factors that place Bangladesh as a high risk country in acquisition and transmission of HIV because it is surrounded by the high prevalence countries. The increasing trend of HIV among recognized high-risk population and their high prevalence of risky behaviors might counterbalance the prevention efforts that have been taken in recent years. At the beginning of the serological survey the prevalence rate was high then low from round 2-5 then went up in round 7 and decline in rounds 8 and 9. The overall pattern is inconsistent which may due to the nature of the study design. The active syphilis rate among female SWs is decreasing and prevalence of active syphilis among MSM and male SW is fluctuating. Supportive care for HIV positive persons, more VCTs and consideration of public health-oriented services for SWs are other pressing issues that need immediate attention. Steps such as these

could help to prevent the immense suffering and economic cost that high rates of HIV would bring to Bangladesh.

### ACKNOWLEDGEMENTS

Researchers would like thank to the Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh without which this study would not have been possible. Again, researchers are also very grateful to the editor and the referees for their valuable comments and criticism which led to a much improved version of the study.

### REFERENCES

- Ahmed, L., N.U. Ahmed, S.I. Khan, K.B. Ali, S.M. Rasheduzzaman and A.Y. Chowdhury, 2006. Are teachers and students ready to accept lessons on HIV/AIDS: Experiences from Bangladesh? Proceedings of the 16th International Conference on AIDS, August 13-18, 2006, Toronto, Canada.
- Azim, T., E.I. Chowdhury, M. Reza, M. Ahmed and M.T. Uddin *et al.*, 2006. Vulnerability to HIV infection among sex worker and non-sex worker female injecting drug users in Dhaka, Bangladesh: Evidence from the baseline survey of a cohort study. *Harm Reduct. J.*, Vol. 3. 10.1186/1477-7517-3-33.
- Azim, T., N. Hussein and R. Kelly, 2005. Effectiveness of harm reduction programmes for injecting drug users in Dhaka city. *Harm Reduct. J.*, Vol. 2. 10.1186/1477-7517-2-22.
- Azizul, A., M. Hijra and M. Shale, 2002. A hidden sexuality: Hijra sex workers and their risks of HIV/AIDS and STD in Bangladesh. Proceedings of the 14th International Conference on AIDS, July 7-12, 2002, Barcelona, Spain.
- Baatsen, P. and R.J. Kelly, 2004. Working towards a coordinated response-mapping NGO interventions in Bangladesh. Proceedings of the 15th International Conference on AIDS, July 11-16, 2004, Bangkok, Thailand.
- Cohen, M.S., G.E. Henderson, P. Aiello and H. Zheng, 1996. Successful eradication of sexually transmitted diseases in the People's Republic of China: Implications for the 21st century. *J. Infect. Dis.*, 174: S223-S229.
- FHI, 2001. A situational analysis of the hotel-based sex trade in Dhaka. Family Health International (FHI), Bangladesh.
- Fakir, M., 2002. The outreach services for MSM provided by ODPUP-a situation analysis in Dhaka City. Proceedings of the 14th International Conference on AIDS, July 7-12, 2002, Barcelona, Spain.

- GOB, 2005a. National strategic plan for HIV/AIDS 2004-2010. Directorate General of Health Services, Government of Bangladesh (GOB), Ministry of Health and Family Welfare, Dhaka, Bangladesh.
- GOB, 2005b. Operational plan for NASP and SBTP (July 2003-June 2010). Directorate General of Health Services, Ministry of Health and Family Welfare, Government of Bangladesh (GOB), Dhaka, Bangladesh.
- Hossain, S., M. Khan and M. Arefin, 2004. Condom programming in Bangladesh: concerns for STI/HIV/AIDS prevention. Proceedings of the 15th International Conference on AIDS, July 11-16, 2004, Bangkok, Thailand.
- Islam, S.K., K. Hossain and M. Ahsan, 2000. Sexual life style, drug habit and socio-demographic status of drug addicts in Bangladesh. *Public Health*, 114: 389-392.
- Jana, S., T.K. Talukder, N. Sharif, K. Islam, K.A. Bhuiyan and B.C. Sutradhar, 2002. Resistance to change sex behaviours of IDUs: An experience of intervention program in Dhaka, Bangladesh. Proceedings of the 13th International Conference on AIDS, July 9-14, 2002, Durban, South Africa.
- Jenkins, C. and H. Rahman, 2002. Rapidly changing conditions in the brothels of Bangladesh: Impact on HIV/STD. *AIDS Educ. Prevent.*, 14: 97-106.
- Mahfuzar, R., M. Hossain and N.I. Mondal, 2008. Knowledge and awareness about HIV/AIDS among garments workers in Gazipur District, Bangladesh. *Soc. Sci.*, 3: 528-530.
- Mondal, M.N.I. and M. Shitan, 2013. Factors affecting the HIV/AIDS epidemic: An ecological analysis of global data. *Afr. Health Sci.*, 13: 301-310.
- Mondal, M.N.I., H. Takaku and Y. Ohkusa, 2009a. Impact of age at marriage and migration on HIV and AIDS epidemics in Japan. *BMC Int. J. Equity Health*, Vol. 8. 10.1186/1475-9276-8-23.
- Mondal, N.I., H. Takaku, Y. Ohkusa, T. Sugawara and N. Okabe, 2009b. HIV/AIDS acquisition and transmission in Bangladesh: Turning to the concentrated epidemic. *Jpn. J. Infect. Dis.*, 62: 111-119.
- Mondal, M.N.I., M.M. Rahman and M.K. Hossain, 2010. Socio-demographic condition and health complications of street-based sex workers in Rajshahi City, Bangladesh. *Res. J. Med. Sci.*, 4: 119-124.
- Mondal, M.N.I., M.M. Rahman, O.R. Rahman and M.N. Akther, 2012a. Level of Awareness about HIV/AIDS among ever married women in Bangladesh. *Food Public Health*, 2: 73-78.
- Mondal, N.I., R. Islam, O. Rahman, S. Rahman and N. Hoque, 2012b. Determinants of HIV/AIDS awareness among garments workers in dhaka city, Bangladesh. *World J. AIDS*, 2: 312-318.
- Nessa, K., S.A. Waris, A. Alam, M. Huq and S. Nahar *et al.*, 2005. Sexually transmitted infections among brothel-based sex workers in Bangladesh: High prevalence of asymptomatic infection. *Sexually Transmitted Dis.*, 32: 13-19.
- Pal, D., D.K. Raut and A. Das, 2003. A study of HIV/AIDS infections amongst commercial sex workers in Kolkata (India). Part-I: Some socio demographic features of commercial sex workers. *J. Commun. Dis.*, 35: 90-105.
- Rahman, M., U. Zaman, M. Sekimoto and T. Fukui, 2000. HIV-related risk behaviours among drug users in Bangladesh. *Int. J. STD AIDS*, 11: 827-828.
- UNAIDS, 2006. Bangladesh national AIDS committee: Reporting period January 2003-December 2005. UNGASS Indicators Country Report Template.
- UNAIDS, 2011. Core slides: Global summary of the AIDS epidemic. United Nations Program on HIV/AIDS (UNAIDS), Geneva, Switzerland.
- UNAIDS/WHO, 2000. Guidelines for second generation HIV surveillance. United Nations Program on HIV/AIDS/World Health Organization, Geneva, Switzerland.
- Usmani, F., 2002. Advocating for reproductive health, gender and HIV/AIDS prevention: A program intervention with religious leaders in Bangladesh. Proceedings of the 14th International Conference on AIDS, July 7-12, 2002, Barcelona, Spain.