

Public Health Response to HIV Epidemics among Injecting Drug Users in South Asia: A Systematic Review

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ABSTRACT

BACKGROUND: World Health Organization (WHO) has defined harm reduction (HR) programs specifically in relation to injection drug users (IDUs) which states that the comprehensive intervention included in HR package aims to prevent the propagation of blood borne infections including HIV that occurs through sharing of contaminated injecting equipment and drug preparations. In the present systematic review, we aim to describe HR programs targeted towards IDUs in South Asia (SA) and to explore the trend of HIV infection and risk behaviors among IDUs in these countries.

METHODS: Online search was done using electronic databases including PubMed (Medline), Psycinfo, SCIRUS Studies (Elsevier and Google Scholar). Studies that described HR program, HIV infection and risk behaviors among IDUs were included in the review. The authors selected the original articles in English language, extracted the data and performed narrative analyses based on WHO's comprehensive intervention criteria evaluating the prevention and treatment of HIV among IDUs.

RESULTS: Search resulted in 76 peer reviewed and 78 grey literature manuscripts from 1991 to 2010. HIV among IDUs has

been reported in all countries of SA except in Bhutan and Maldives. The problem is concentrated (>5%) in India, Nepal and Pakistan. HR interventions are implemented in all countries where HIV among IDUs exists, but the coverage is low. The access of IDUs to the HR program ranged from 17% in Afghanistan to 50% in India. None of the countries had all elements of the WHO's comprehensive intervention package. Considerable decline in HIV prevalence and risk behaviors among IDUs is observed in Nepal and India (north-eastern states). The initiation of HR program in Bangladesh has maintained low HIV prevalence among IDUs, but HIV prevalence in Pakistan and other areas of India continues to increase.

CONCLUSION: Decrease in risk behaviors and HIV prevalence among IDUs have been found in areas with good coverage of HR program. Hence, the SA countries should continue HR interventions with emphasis on increasing the comprehensive coverage. However, the inconsistent results from the region and the lack of effectiveness studies makes it difficult to reach a general conclusion about the role of HR program in reducing HIV infection and risk behaviors among IDUs in SA. Therefore, there is a need for effectiveness studies of available HR programs in SA.

Keywords: Intravenous/Injecting Drug Use; Harm Reduction; Syringe Exchange; Opioid Substitution; Injecting Risk Behaviors; HIV/AIDS

INTRODUCTION

Intravenous drug use is a global public health challenge. About 15.9 million (11.0–21.2

million) people inject drugs intravenously worldwide [1]. The phenomena is also spreading rapidly in those nations where it has not been described formerly [2]. Eight countries,

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Afghanistan, Pakistan, India, Nepal, Bhutan, Bangladesh, Sri Lanka, and Maldives are considered to comprise South Asia (SA). Presence of Afghanistan, the largest opium producer in the world, has led to the easy availability and use of opiates and its derivatives in the region [4]. During the last two decades, most countries in SA are experiencing the dual epidemic of intravenous drug use (IDU) and human immune deficiency virus (HIV) infection among IDUs. An estimated number of IDUs in SA in 2008 is 569,500 and the midpoint prevalence of HIV among IDUs is 13.03% [1]. Harm reduction (HR) is an important public health measure that includes policies, programs and interventions with an aim to reduce the health, social and economic consequences of drug use to individual, community and society as a whole [6]. World Health Organization (WHO) has defined HR specifically in relation to IDUs which states that the comprehensive intervention included in HR package aims to prevent the propagation of blood borne infections including HIV that occurs through sharing of contaminated injecting equipment and drug preparations [7]. The notion of HR lies on implementing evidence based measures to reduce or prevent negative consequences of certain behaviors without getting rid of those behaviors [8]. HR strategy is proven to be effective as well as efficient in reducing the transmission of HIV amongst and from IDUs [9, 10]. These interventions are also found to be safe and did not amplify the number of drug users or the rate of drug use [11]. With increasing international evidence of the success of HR program, all countries in SA has implemented HR program to combat the spread of IDU-associated HIV epidemic. Few studies have been carried out at different time periods in relation to the HR response to HIV epidemics among IDUs by UNODC, UNAIDS and World Bank. However, a systematic review of these studies including the examination of effectiveness of HR programs in addressing the HIV among IDUs has been missing. Hence, we conducted this review to systematically assess the effect of HR programs on HIV infection among IDUs in SA and to explore the trend of HIV infection and risk behaviors among IDUs in these countries.

METHODOLOGY

We searched electronic databases (PubMed, Medline, PsycINFO, and Science Direct via SCIRUS (Elsevier) and Google Scholar).

Carefully selected keywords (substance abuse, intravenous/ injecting drug use, harm reduction, syringe exchange, opioid substitution, injecting risk behavior, HIV/AIDS, South Asia) and their combinations were used to identify relevant studies. Further, the bibliographies of the included articles were hand-searched to identify additional relevant literatures.

The literature search also included identifying grey literature that was publicly available from the website of the international agencies, HR program, surveillance system and HIV and sexually transmitted infection (STI) control board of specific countries. The search was further repeated by using the key words and key words combination using Google's web search engine. Finally, an EndNote Library was produced to list these literatures. The description of the procedure for identification and selection of included studies in the review is illustrated in Figure 1.

Authors selected articles based on the selection criteria. We included studies that enrolled IDUs (defined as use of an injection within past six months) from countries in SA and examined a HR program or one of its nine elements. According to WHO, a comprehensive program for the prevention, treatment and care of HIV among IDUs includes nine interventions [5]; needle and syringe program (NSP), opioid substitution therapy and other drug dependence treatment, HIV testing and counselling, antiretroviral therapy (ART), prevention and treatment of STIs, condom programs for IDUs and their sexual partners, targeted information, education and communication (IEC) for IDUs and their sexual partners, vaccination, diagnosis and treatment of viral hepatitis, and prevention, diagnosis and treatment of tuberculosis.

We included studies that reported on the availability or coverage of HR program, risk behaviors of the IDUs, and incidence of new HIV infection among IDUs.

As we were unable to identify randomized controlled trials, we included observation studies published in peer-review medical journals in this review. Even information from observational studies were incomplete or insufficient, therefore, studies published in grey literature from national and international agencies were used. We included those studies that were published in English language from 1990 to 2010. When the multiple report of a single study was found, it was treated as a single study and referenced for all publications. Data extraction was done by using a specially designed form. Data synthesis was done by the narrative approach, limiting

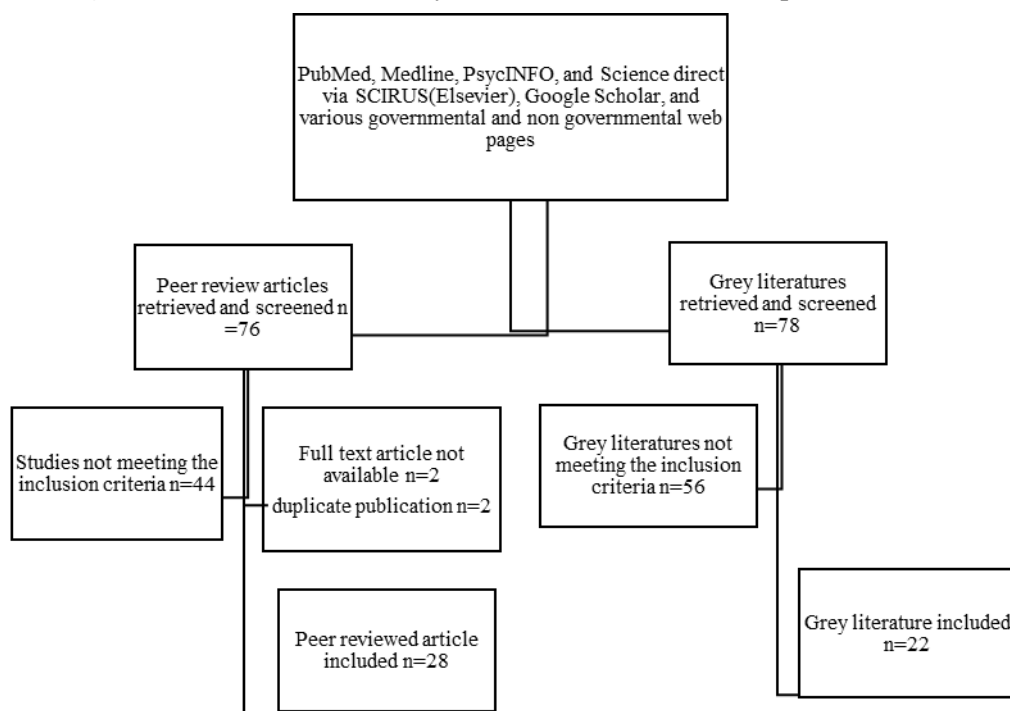
Table 1 : Characteristics of peer reviewed literatures included in the review

S.N.	Reference	Location	Summary of findings
Systematic review			
1	Mathers et al. (2010)	Global review	Low coverage of HIV prevention, treatment and care services for IDUs globally. Urgent need to increase coverage of services.
2	Emmanuel et al. (2007)	Pakistan	Continuous rise of HIV prevalence among IDUs due to low coverage of HR services. Urgent to expand coverage of HR services.
3	Azim et al. (2005)	Dhaka	NSP is responsive to HIV infection but insufficient to change injecting risk behaviors among IDUs.
Mathematical modelling study			
4	Foss et al. (2006)	Dhaka	HR interventions in Dhaka may have significantly reduced HIV in IDUs.
Follow-up study			
5	Kumar et al. (2000)	Madras (India)	High injecting risk behaviors were common among heroin injectors as compared to buprenorphine injectors.
Cross sectional study			
6	Khan et al. (2009)	Sargodha (Pakistan)	Large sharing networks, high injecting frequency and universal use of street injectors are the cause for rise of HIV prevalence among IDUs in Sargodha.
7	Altaf et al. (2009)	Hyderabad, Sukkur (Pakistan)	High burden of HIV among IDUs exists in Hyderabad and Sukkur with possibility to transmit the infection to other risk groups.
8	Haque et al. (2004)	Quetta, Peshawar and Rawalpindi (Pakistan)	Risky sexual behaviors and low awareness of transmission risk were common among IDUs.
9	Kuo et al. (2007)	Quetta, Lahore (Pakistan)	Perceived increase drug cost, family history of drug use & group drug use was associated with recent onset of injection.
10	Shah et al. (2004)	Karachi (Pakistan)	First outbreak of HIV infection among IDUs in Larkana in Pakistan.
11	Bokari et al. (2007)	Karachi, Lahore (Pakistan)	HIV epidemics entered IDUs in Karachi and Lahore. Injecting and sexual risk behaviors were common.
12	Emmanuel et al. (2004)	Lahore (Pakistan)	Low knowledge of HIV transmission along with high risk injecting and sexual behaviors was reported.
13	Emmanuel et al. (2009)	Sargodha (Pakistan)	HIV prevalence among IDUs in Sargodha sky rocked within short time. Sharing injecting equipment, injecting in groups and geographical location was associated with HIV infection among IDUs.
14	Bhattacharya et al. (2006)	Kolkata (India)	A NSP was significantly associated with reduced threat of development of abscess.
15	Kumar et al. (1998)	Madras (India)	Outreach services are significantly linked to changes with injecting risk behaviors but sexual risk behaviors was difficult to change.
16	Sharma et al. (2003)	Manipur (India)	The level of unsafe injecting practice was very high in the state. Levels of risk behaviors were high among IDUs from NSP.
17	Panda et al. (1998)	Calcutta (India)	Majority of IDUs reported using risky injecting practices despite good awareness.
18	Sarkar et al. (1993)	Manipur (India)	HIV prevalence among IDUs rose from 0% to 50% within six month which shows inevitable spread of HIV with prevalent risk behaviors.
19	Niak et al. (1991)	Manipur (India)	Recent outbreak of HIV infection among IDUs in Manipur.
20	Dorabjee et al. (1999)	Mumbai, Delhi Chennai, Calcutta, Imphal (India)	Rapid assessment provides valuable insights about IDUs scenario and is an effective tool for advocacy and improvement of services for IDUs.
21	Solomon et al. (2008)	Chennai (India)	High burden of HIV, HCV and HBV exists among IDUs that needs to be addressed by improving access to appropriate treatment services and preventive measures.
22	Kermode et al. (2010)	Manipur, Nagaland (India)	Manipur and Nagaland are two highest HIV prevalence states in India. Recognition of HIV and IDUs as an important issue to effective response is complicated by structural factors.
23	Sarkar et al. (2006)	Darjeeling (India)	High prevalence of HIV and HCV was reported among IDUs along with risk behaviors.
24	Mahanta et al. (2009)	Mizoram, Nagaland (India)	Type of injecting drug use also influence the pattern of HIV/HCV transmission apart from risk behaviors.
25	Singh M (1998)	Kathmandu (Nepal)	Reduction in HIV prevalence from 1.6% to 0 was observed among IDUs in regular contact of NSP.
26	Peak et al. (1995)	Kathmandu (Nepal)	HIV prevention programs for IDUs in Asia are effective and are urgently needed.

27	Azim et al. (2008)	Dhaka (Bangladesh)	Study first time reported existence of concentrated epidemic in a cohort of Dhaka.
28	Todd et al. (2007)	Kabul (Afghanistan)	High prevalence of risky behaviors in Kabul indicates high risk for HIV epidemic in IDUs.

Annex 2 : List of grey literatures included in review

S.N.	Reference	Title of grey literatures
1	Government of Pakistan (2008). National AIDS Control Program. Ministry of Health	HIV Second Generation Surveillance in Pakistan, National Report, Round Three. 2008
2	Lawyers Collective HIV/AIDS Unit. United Nations Office on Drug and Crime.	Legal and Policy concerns related to IDU harm reduction in SAARC countries, A review commissioned by UNODC. 2007
3	Government of India. Ministry of Health and Family Welfare. Department of AIDS Control	Annual Report 2009-10
4	National AIDS Control Organisation. Ministry of Health and Family Welfare. Government of India	National Behavioural Surveillance Survey 2006 Men who have Sex with Men and Injecting Drug Users
5	National AIDS Control Organisation. Ministry of Health & Family Welfare	Annual HIV Sentinel Surveillance Country Report 2006
6	National AIDS Control Organisation. Ministry of Health & Family Welfare Government of India	Annual report 2008- 2009
7	Burrows DP, S. Crofts, N. Report for the Centre of HR 2001	HIV/AIDS Prevention Among IDUs in Kathmandu Valley
8	Joint United Nations Program on HIV/AIDS (UNAIDS).	UNGASS Country Progress Report Nepal 2010.
9	Joint United Nations Program on HIV/AIDS (UNAIDS).	UNGASS Country Progress Report Nepal 2008.
10	Family Health International. New ERA. National Center for AIDS and STI Control	IBBS among Male IDUs in Western to Far-Western Terai of Nepal Round III- 2009
11	Family Health International. New ERA. National Center for AIDS and STI Control	IBBS among Male IDUs in the Eastern Terai of Nepal Round IV - 2009
12	Family Health International. New ERA. National Center for AIDS and STI Control	IBBS among IDUs in Pokhara Valley Round IV - 2009
13	National Center for AIDS and STD Control	Factsheet N°1: HIV and AIDS Epidemic Update of Nepal, as of November 2009
14	International HR Association	The Global State of HR 2010 Key issues for broadening the response 2010
15	Joint United Nations Program on HIV/AIDS (UNAIDS)	Global AIDS Epidemic. 2008.
16	United Nations Office on Drug and Crime (UNODC). Government of Afghanistan. Ministry of Counter Narcotics	Afghanistan Drug Use Survey 2005
17	Médecins du Monde-France (MdM-F).	Implementing and scaling up of HR in Afghanistan (2006-2011)
18	The World Bank	HIV/AIDS in Afghanistan 2010
19	The World Bank.	HIV/AIDS in Bhutan 2008
20	Government of Maldives	UNGASS Country Progress Report 2010
21	Government of Sri Lanka	United Nations General Assembly Special Session on HIV/AIDS Country Progress Report - Sri Lanka 2008-2009

Figure 1: Flowchart of the study identification and selection process

itself in relying on the reported results of the author's analyses.

RESULTS

Injecting drug use is documented in all countries of SA. However, the estimates for the number of IDUs are available only for five countries as IDU in Bhutan, Maldives and Sri Lanka is not common. The midpoint prevalence of HIV among IDUs ranged from 0% in Maldives and Bhutan to about 41% in Nepal. Countries of particular concern are India, Nepal and Pakistan in terms of prevalence of IDUs among general population and HIV prevalence among IDUs (Figure 2) because of poor coverage of HR programs.

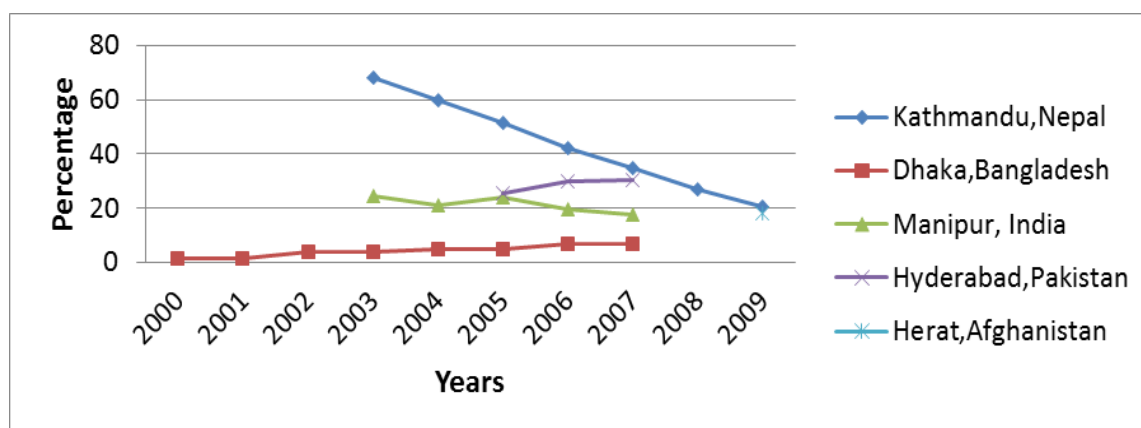
Pakistan: At present, HIV prevalence among IDUs in Pakistan is 20.8%, whereas the prevalence among general population is less than 0.1% [23]. In 2008, the midpoint estimate of the number of IDUs and IDUs with HIV was 141,000 and 29,610, respectively [24].

Harm reduction program: Pakistan is among the first country in SA to develop HIV prevention programs for IDUs. A NSP started in Karachi in governmental organization (NGO) *Nai Zindagi* initiated a pilot HR program in Lahore by distributing sterile needle and syringes [25]. A

comprehensive HR program was introduced only in 2002 with support from Department for International Development (DFID) and UNAIDS in five cities, and was further extended by government of Pakistan with support from World Bank in 2005 [23, 26]. At present, there are HR programs in different parts of the country with services like needle and syringe exchange, voluntary counselling and testing (VCT), medical services and behavioral counseling [27]. Services are provided through mobile vans and drop in centers (DICs). OST pilot project was started in Pakistan in the year 2010 as a part of HR program for IDUs [23].

Program process outcomes: Only about 19% of IDUs in Pakistan had ever participated in the HIV prevention programs. Participation in the prevention program was lowest in Hyderabad, Sukkur and Multan and highest in Lahore and Peshawar, the effect of which is visible in the prevalence of HIV and risk behaviors [20]. The utilization of HIV service delivery program by IDUs increased from 19% in 2005 to about 51% in 2008 as reflected by the rounds of surveillance [18, 20]. Table 4 provides a more comprehensive picture of available HR services in Pakistan from 1st April 2008 to 31st March 2009 [24].

Risk behaviors: A cross sectional study among heroin addicts in Lahore found that around 58%

Figure 2: HIV prevalence among IDUs in selected cities of South Asia [15-21]

of IDUs shared their syringes and 78% used old syringes during their last injection [28]. A decrease in injecting risk behaviors was observed in successive round of IBBS (Integrated Biological and Behavioral Surveillance), as mentioned in Table 2. Cities with HR programs showed reduced needle sharing i.e. 12% versus 40% in cities without implementation of HR [18]. Similarly, sharing of injecting paraphernalia in IDUs of Sukkur, an area without HR program, was 34% as compared to Hyderabad (8.5%), where some HR service is available [29].

HIV infection in IDUs: There were no identified cases of HIV among IDUs until 2003, although

Table 2: Trends in risk behavior among IDUs in Pakistan [18, 20]

IDUs injection with	2005	2008
Used needle	35%	22.5%
Shared syringe	47%	18%
New syringe	30%	48%

high risk behaviors were reported in several studies [28, 30, 31]. However, in June 2003, the first case of HIV infection was identified in an IDU in Larkana, which then manifested into a concentrated epidemic when 10% of the randomly selected IDUs in that city were found to be HIV positive [23, 32]. HIV prevalence among IDUs is mentioned in Table 3. Despite increasing utilization of the HIV prevention program and decreasing injecting risk behaviors, the HIV prevalence among IDUs continued to rise from 10.8% in 2005 to 21% in 2008 [18, 20]. The outbreak of 2003 spread rapidly to several cities, which are also shown in Figure 3.

India: There are estimated 172,000 IDUs in India. Whereas HIV prevalence among IDUs is

Table 3: HIV prevalence among IDUs in different cities of Pakistan

Reference	Cities	HIV prevalence
[33]	Karachi	24%
[29]	Hyderabad	25.4%
[29]	Sukkur	19.2%
[34]	Sargodha	51%

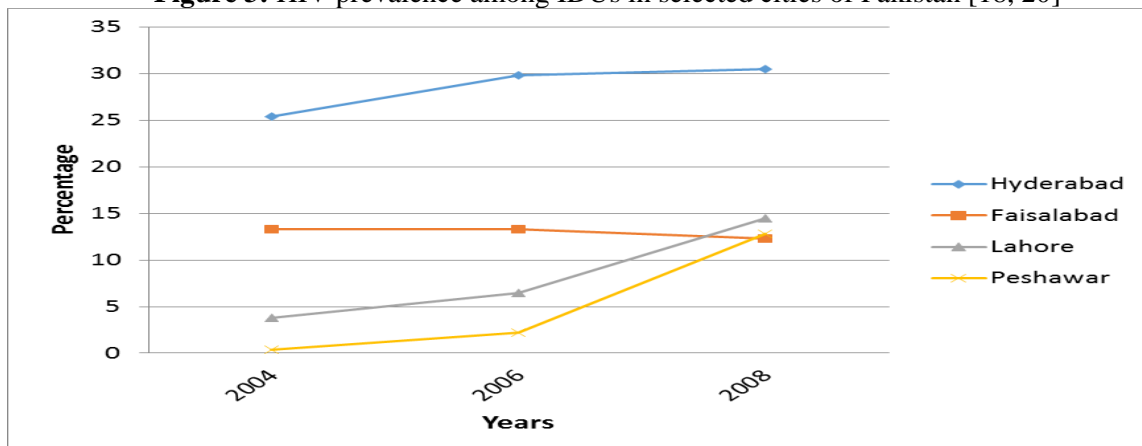
9%, it is only 0.3% in general population [24, 35].

Harm reduction program: The first NSP was introduced in Manipur, a north-eastern state of India in 1995 by a NGO named Society for HIV/AIDS and Lifeline Operation in Manipur [36]. A NSP was introduced in Kolkata only in 2000 [37]. In 2006, OST was introduced in selected districts of Manipur and Nagaland [38]. The NSP of Manipur is among the largest in India and fewer programs exist in other parts. The HR services offered are distribution of sterile syringes, condoms, peer health education, STI and abscess management, referral for drug user treatment and management of tuberculosis [4].

Program process outcomes: An IBBS round one reported that about 50% of IDUs were reached by the HR programs in surveyed districts. HR interventions are clustered in north eastern areas, as 96 out of 133 targeted intervention and about half of OST sites are available in these states [39]. Table 4 provides a more comprehensive picture of available HR services in India from 1st April 2008 to 31st March 2009 [24].

Injecting risk behaviors: After a follow-up of a cohort of IDUs for 18 months, a significant decrease ($p=0.01$) in needle sharing behaviors was observed among IDUs of the outreach program as compared to IDUs without outreach

Figure 3: HIV prevalence among IDUs in selected cities of Pakistan [18, 20]



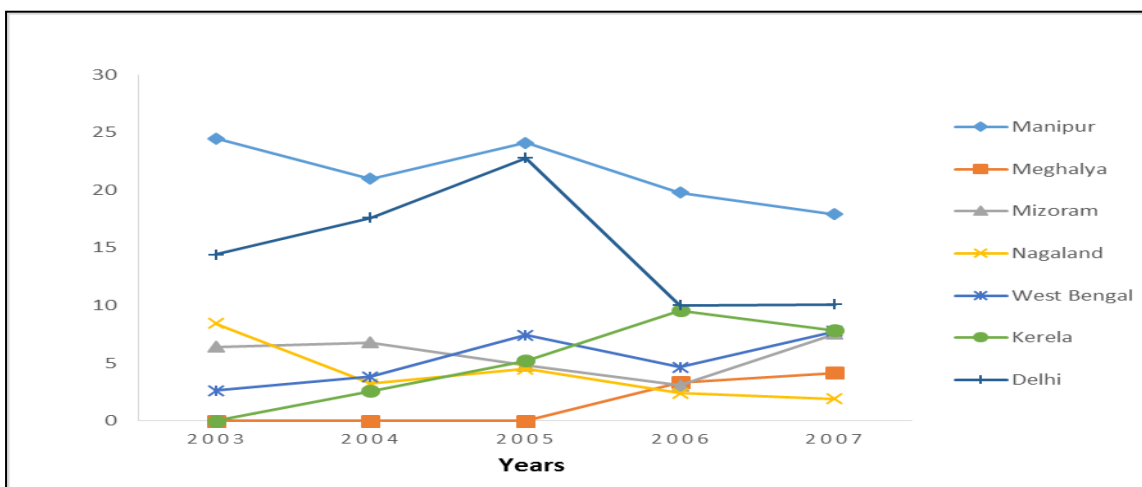
program [40]. On the contrary, a study in Manipur revealed that the overall injecting risk behaviors were higher among IDUs attending NSP as compared to IDUs not attending NSP [41]. Behavioral Surveillance Survey (BSS) 2006 found the significant reduction in risky injecting practices in Manipur and Kolkata as compared to 2001; while injecting risk behaviours increased in Chennai and Delhi [42]. The proportion of IDUs using new syringe in their last injection was highest (61%) in Manipur and lowest in Nagaland (46%) according to the first round of IBBS.

HIV infection in IDUs: The first case of HIV infection among IDUs was observed in Manipur in 1989, after which the reported prevalence increased to 50% within a period of six months. It remained stable until 1991 and again peaked to about 73% in 1992 [43, 44].

A multi-centre rapid assessment in 1998 revealed the lowest HIV prevalence of 2% in Kolkata and highest of about 81% in Imphal (capital of Manipur) [45]. Since then, several studies have reported high HIV prevalence among IDUs in Chennai (29.8%), Darjeeling (11.8%) and Mumbai (17%) [46-48]. Annual sentinel surveillance in 2006 reported that HIV prevalence in IDUs was > 5% in 17 out of 45 sentinel sites which further increased to 24 sites by 2007 [17]. The HIV prevalence among IDUs is declining in Manipur, Nagaland and Chennai. While, the situation in Meghalaya, Mizoram, West Bengal, Mumbai, Kerala and Delhi is worrisome as HIV prevalence among IDUs in these area is inclining, which is illustrated in figure 5 [17, 42, 49].

Nepal: Although HIV prevalence among general population is less than 1%, Nepal faces a concen-

Figure 4: HIV prevalence among IDUs in selected cities of India[17]



trated epidemic among IDUs [50]. The HIV prevalence among IDUs was 41.39% in 2003. There were about 29,500 IDUs in Nepal in 2008 [24].

Harm reduction program: The first HR program in Nepal (Kathmandu) was introduced in 1991 by a NGO named Life Saving and Life Giving Society (LALS). The services offered were health education, counseling, primary health care, bleach, sterile water, condoms and new needles and syringes [51]. Substantial cutback of HR services during 1998 to 2001 was observed due to financial crisis [52]. Systematic HR program started only in early 2000 as an element of Nepal initiatives with financial support from DFID. Since then, NGOs has been actively involved in providing the services [53].

Program process outcomes: Only about 10% of the IDUs in Kathmandu valley were reached by HR services in 2000 [52]. The number of needles and syringes dispensed through NSP was very low [54]. According to National AIDS program, IDUs reached by NSP in Kathmandu valley increased from 31% in 2007 to 56.9% in 2009 [53]. Table 4 provides a comprehensive picture of available HR services in Nepal from 1st April 2008 to 31st March 2009 [24].

Injecting risk behaviors: A decrease in risk behaviors was reported among IDUs attending NSP in Kathmandu during the period of 1991 to 1994 [55]. At present, the rate of sharing needle in past week in Kathmandu decreased from 45% in 2003 to 7% in 2009 [16, 56-58]. Similarly almost all IDUs in Kathmandu used sterile

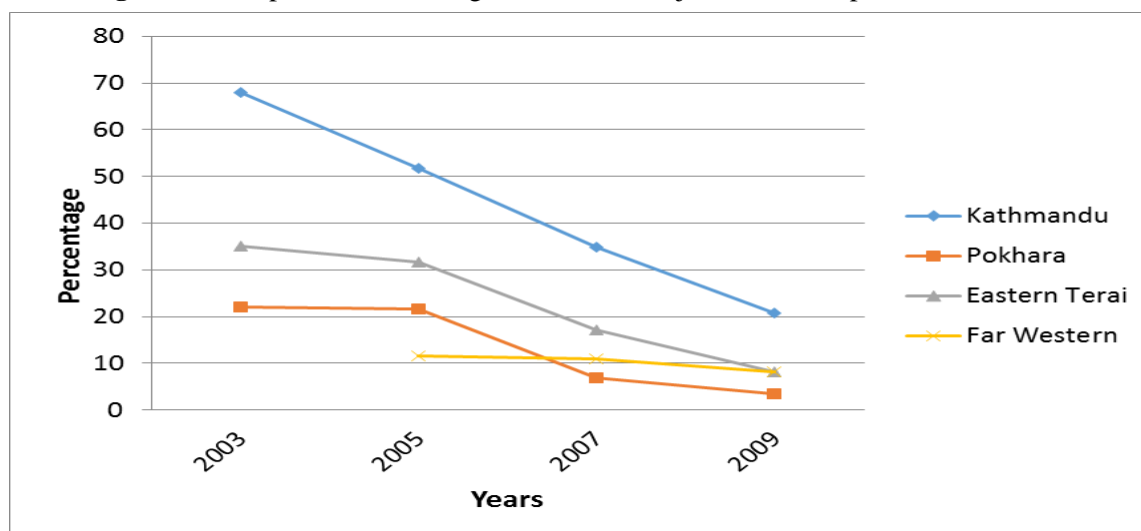
injecting equipment during their last injection as reported by IBBS 2009 [16].

HIV infection in IDUs: About 2% of IDUs tested in Kathmandu were HIV positive in the year 1991. No evidence of HIV was found among IDUs tested between 1993 and 1994 [55]. Massive epidemic (50%) was observed among IDUs of Kathmandu during 1994 to 1997 concurrently with the cutback of services during the same period [59]. However, at present the HIV incidence and prevalence among IDUs is in declining trend as reported by national centre of AIDS and STI control and rounds of IBBS [16, 50, 56-58]. However, the prevalence is still concentrated in most places as shown in Figure 5, which is a matter of great public health concern.

Bangladesh: There are about 22,000-43,500 IDUs in Bangladesh [1]. The HIV prevalence among IDUs is just over 1%, while the prevalence among general population is less than 0.1% [15].

Harm reduction program: Efforts for HIV prevention in Bangladesh was initiated even before the first case was seen. The national AIDS committee was formed in 1985. Since then the interventions were focused mainly on creating awareness, targeting mostly at risk population including IDUs [15]. CARE Bangladesh through, CARE SHAKTI, introduced the first NSP in 1998 in the capital city Dhaka [60, 61]. By 2004, CARE uncovered 19 districts with 21 DICs. The HR package at this time along with NSP also included DIC based clinical services [60]. In 2007, HR services were available in 43 districts

Figure 5: HIV prevalence among IDUs across major areas in Nepal [16, 56-58]



with 130 DICs and also included VCT referral services [15]. Bangladesh has most of the elements of comprehensive HR package except OST [39].

Program process outcomes: According to BSS, the number of IDUs reached by NSP at least once a year increased from 44.5% in 2002 to 88.3% in 2004 [62]. Similarly, the reach of NSP increased from 31% in 2006 to 44% in 2008 [39]. Table 4 provides more a comprehensive picture of available HR services in Bangladesh from 1st April 2008 to 31st March 2009 [24].

Injecting risk behaviors: A baseline survey of cohort study in Dhaka among male IDUs from NSP in 2002 reported about 38% IDUs borrowed used syringes in the last month [63]. It is encouraging to note the declining trend in risky injecting behaviors among IDUs of Dhaka according to BSS 2006-2007 [15] and confirmed by another cohort study [63].

HIV infection in IDUs: The overall HIV prevalence among IDUs in Bangladesh is 1.2%. A rise in HIV prevalence has constantly been reported among IDUs from NSP in Dhaka over the round of serological surveillance. In 2006, the prevalence first surpassed 5%, the threshold for concentrated epidemic, and reached 7%. HIV prevalence has been low in all other cities as shown in Figure 6 [15]. Contrary to the findings of serological surveillance, data from the male cohort study since 2002 in Dhaka shows a quite stable cumulative incidence rate from 1.16 in the 1st round to 1.29 in the 8th round [15]. The low

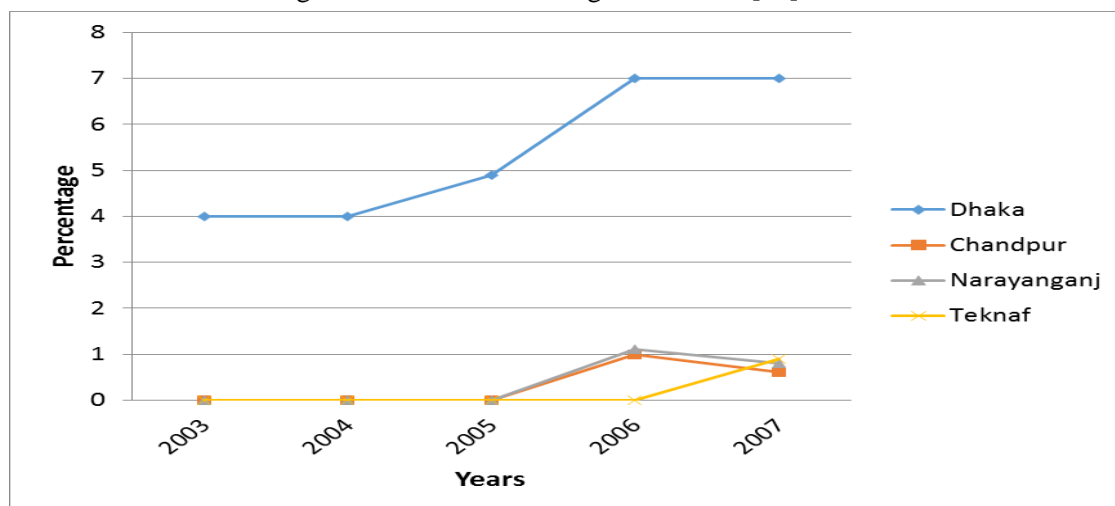
incidence observed in this longitudinal study might be attributed to early implementation of NSP as discussed above [64].

Afghanistan: Afghanistan is a low prevalence country as HIV prevalence among general population is less than 0.5% [65]. The HIV prevalence among IDUs is 3.4% [6, 66]. There are about 19,000 to 25,000 IDUs in Afghanistan [67]. The information about HR services and HIV status of IDUs is very scarce in Afghanistan. There are very few individual studies and no large-scale epidemiological study and the routine surveillance study.

Harm reduction program: The HR program in Afghanistan was introduced by a NGO Médecins du Monde-France in April 2006 [68]. The government formally introduced intervention among high-risk group including IDUs in 2008. The services currently available to IDUs include syringes, condoms, management of STIs and abscess, counseling and referral to HIV testing and counseling and tuberculosis center [65]. A pilot project for OST has been started recently in February 2010 [69].

Program process outcomes: Very few IDUs (17%) have access to HR services in the country [65]. However, the country seems to be committed in increasing the coverage of HR services, as the number of NSP sites increased from 1 in 2008 to 18-28 in 2010 [6]. Table 4 also highlights the lack of adequate information about the available HR services in the country from 1st April 2008 to 31st March 2009 [24].

Figure 6: HIV prevalence among IDUs in selected cities of Bangladesh Serological surveillance in Bangladesh 2007 [15]



Injecting risk behaviors: A study among male IDUs in Kabul in 2006 reported about 50% IDUs shared needles and syringes [70]. According to IBBS 2009, about 94 % IDUs used sterile injecting equipment during their last injection [65]. The considerable difference in injecting risk behavior might be because IBBS recruited IDUs only from HR program sites.

HIV infection in IDUs: A cross sectional study in a VCT centre, Kabul from 2005 to 2006 June found HIV prevalence of 3% among IDUs [70]. IBBS 2009 for the first time reported an average HIV prevalence of 7% among IDUs in the three cities surveyed, with HIV prevalence as high as 18% in Herat [65]. This may be the first study to caution the existence of concentrated epidemic among IDUs in some cities of Afghanistan.

Bhutan, Maldives and Sri Lanka:

Bhutan: Injecting drug use is minimal in Bhutan in spite of its proximity to countries with dual epidemics of HIV and IDUs [71]. HIV infection among IDUs has not been reported in Bhutan and the adult HIV prevalence among general population is less than 0.01% [71]. Hence, there are not any HR services targeted towards IDUs [6, 24, 25].

Maldives: Although intravenous drug use is rising in Maldives, there are no estimates available on the number of IDUs [21, 24]. No case of HIV/AIDS has been identified among IDUs in Maldives till date and the adult HIV prevalence among general population is below 0.1% [21]. As such there are not any active HR programs; however, Maldivian government has

initiated a methadone pilot project in 2009 [6].

Sri Lanka: Sri Lanka currently has low level of HIV epidemic. The HIV prevalence even among high-risk group is <1%. Injecting drug use is still uncommon in Sri Lanka [72]. Until recently, only two cases of HIV among IDUs have been reported, out of which one was reported to be imported [73]. Therefore, the HIV among IDUs in Sri Lanka is not a public health problem. No HR measures for IDUs are available in the country at present [72].

DISCUSSION

There were very few studies examining the utility of HR programs in decreasing the risky behaviors and HIV incidence among IDUs. However, the review has tried to overcome the limitation by collecting information from serological and behavioral surveillance surveys. This approach does not allow to state with certainty that changes observed are attributable to HR programs. We found that intravenous drug users are present in all countries in SA. HIV among IDUs is not considered as a public health problem in Bhutan, Maldives and Sri Lanka.

According to classification of HIV epidemics by UNAIDS/WHO, India, Nepal and Pakistan fall into the category of concentrated epidemic i.e. HIV prevalence greater than 5% in the high-risk group [74]. New pockets of HIV epidemic among IDUs are reported in Afghanistan, India and Pakistan.

HR programs are implemented in countries of SA where HIV prevalence among IDUs is above 1%. However, none of the countries have implemented all elements of comprehensive HR

Table 4: Comparing Harm Reduction Services in South Asian Countries

INDICATORS	MIDPOINT ESTIMATES 2008				
	PAKISTAN	INDIA	NEPAL	BANGLADESH	AFGHANISTAN
Percentage of IDUs in contact with NSP in a year	10.6	78.1	45.7	92.7	Not Known
No. of needle and syringe distributed/IDU in a year	19.7	33.9	24.1	117.7	24.6
No. of OST sites/1000 IDUs	Not Available	0.35	0.05	Not Available	Not known
No. of all HIV testing and counselling sites/1000 IDUs	0.08	28.24	1.85	2.8	Not known
No. of ARV treatment sites/1000 IDUs with HIV	0.49	10.27	1.88	7.7	0

package as recommended by the UN agencies. Bangladesh and India have the highest coverage of HR services. The HR program in Bangladesh can be documented as the best program among countries in SA as it has been able to curb and maintain low HIV prevalence of around 1% among IDUs since the initiation of HR program. The success of Bangladesh in curbing the epidemic can be attributed to the early implementation and symmetrical coverage of HR services in the country. While in India, HIV prevalence among IDUs is declining significantly only in the north-eastern states whereas in other states, prevalence has been constant or rising. In Nepal, a consistent decline in risk behaviors and HIV burden has been observed across all regions since 2002. The consistent decline might be due to even distribution of HR services across the country. The HIV prevalence among IDUs grew to massive epidemic within few years of cutback of HR services [55, 75]. This rapid relapse of HIV prevalence due to HR program failure should serve a lesson to Nepal and other countries in SA. Pakistan introduced HR program even before the first case of HIV among IDUs was identified, but the HIV prevalence among IDUs is rising since the identification of the first case. The cause might be the low coverage of HR service. Pakistan has the lowest coverage of HR services in SA and it is the only country in SA which has less than one NSP sites per 1000 IDUs [24]. There is paucity of information about HR services and HIV infection among IDUs in Afghanistan. Existing information suggests that Afghanistan is a low prevalence country but high level of infection is reported in some cities.

HIV prevalence among IDUs in SA could have been higher without HR services. The HIV prevalence in IDUs is expected to reach 40% or more in areas without HR services within one or two year of introduction of HIV virus among the communities of IDUs [76]. Studies have reported comparatively low risk behaviors among IDUs from NSP in most countries of SA [29, 40, 55, 77]. With the above evidence, we can generalize that HR program in SA is successful in curbing the HIV epidemic among IDUs which is consistent with the evidence from other areas of the world [78].

On the other hand, HIV among IDUs is increasing in several regions of India, Pakistan and Afghanistan. IDUs from NSP in India were found to have more risk behaviors as compared to IDUs without NSP [41]. Studies have shown NSP was not considerably associated with HIV seroconversion among IDUs in India and Bangl-

adesh [36, 60]. A negative relationship between HIV seroconversion and NSP users is also reported in Montreal, Canada [79]. Similarly, a review reported that the effectiveness of NSP in reducing HIV among IDUs is overvalued [80].

Therefore, it is difficult to state with certainty that HR programs in all SA countries are effective in reducing risk behaviors and HIV infection among IDUs. As most of the information on risk behaviors and HIV infection among IDUs relied on surveillance data, there is a need to conduct a study with the aim of evaluating HR programs in these countries.

Our study has several strengths and few potential limitations. The review is based on clearly defined research question. The procedure of review is transparent and reproducible as detailed search strategy and inclusion criteria of included studies are clearly documented. The review is also cost effective as it was performed within a short period of time by a reviewer without field work. Limitations of the review are mostly due to the methodological weakness of the included studies and limitation of the review. The review has several limitations. First, the review might have suffered from publication bias as the review included only published literatures due to short period of time. Second, the review might not have been able to include all the published literature as literature search was done by only one reviewer. Third, the study might have suffered from language bias as the review included literatures published only in English language. Finally, the study might not have been able to represent the current scenario of SA as all the information included in the study is not recent.

The services provided through HR program as described in review varied in terms of elements of service, the service providers, the location of service and the way it was provided. All of these variations may not allow generalizing the results of intervention.

The review relied mostly on the serological and behavioral surveillance data. In developing countries, very few attempts have been made to evaluate the effectiveness of HR programs as these interventions are small or transient and requires research infrastructure which is usually not available. In such conditions, the next available option is to use behavioral surveillance [64]. Very few studies included in the review had primary objective of evaluating the HR program. Most studies used convenience sampling to select the IDUs; hence, they may not be the representative of the wider IDU population.

Similarly the lack of operational definition of the IDUs included in the studies was another weakness. Almost all studies relied on self-reported response for risk behaviors which may be susceptible to social desirability bias. Ideally to evaluate the effectiveness of the HR programs, a randomized control trial with adequate sample size would be necessary [81]. However, with the body of evidence about the effectiveness of HR programs in developed countries, ethical concerns arises for the implementation of such experimental studies [82].

CONCLUSION

In conclusion, while HR programs are in place in many countries in SA, a significant impact of such programs is yet to be seen. The coverage of HR programs is still inadequate to have a sufficient impact and to halt the transmission of HIV infection among IDUs. Furthermore, none of the countries have all the elements of comprehensive HR package. With the information available, it is difficult to support or discount the role of HR program in curbing the HIV burden and associated risk behaviors among IDUs in SA. Though promising results have been found from evaluation of HR program among IDUs from other areas of the world, further studies are needed in South Asian context, principally with the aim of evaluating the effectiveness of HR program.

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