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Prioritizing Investment Options for Ending AIDS in Bangladesh

Saima Khan[1], Mohammed Nazmul Huq[2*], Masud Reza[3], Zakir Hossain[4], Md. Anisur Rahman[5]

[1]UNAIDS Bangladesh, IDB Bhaban (8th Floor), Sher-e-Bangla Nagar, Dhaka 1207, Bangladesh

[2]Department of Statistics, Jahangirnagar University, Savar, Dhaka 1342, Bangladesh

[3]Center for HIV and AIDS, icddr,b, Mohakhali, Dhaka 1212, Bangladesh

[4]HIV/AIDS Sector, Save the Children, House No. CWN (A) 35, Road No. 43, Gulshan – 2, Dhaka -1212, Bangladesh

[5]Institute of Public Health, Directorate of Health Services, Ministry of Health and Family Welfare, Bangladesh

Abstract

Although Bangladesh maintained low prevalence of HIV in general population (<0.1%) and most key populations (KPs) (<1%), new HIV infections are increasing and in certain geographical areas KPs have higher HIV prevalence. The study examines different investment options in HIV/AIDS for achieving the global targets on treatment and 'Ending AIDS by 2030'. Data from national surveillances, other studies, and programs were used for analysis. The AIDS Epidemic Model (AEM) analysis reveals that with the ongoing interventions only 31.3 percent of adults in need will receive ART by 2030 and new HIV infections among KPs will still slowly increase. Rapid scale-up of prevention and universal treatment coverage through geographical prioritization, will limit new infections in Bangladesh to <300/year and the global goals will be achieved by 2030. The key investment strategy should also include scaling up behaviour change interventions, HIV counseling and testing focusing on key populations, early treatment for people found to be HIV positive and community adherence support.

Keywords: Key population, people living with HIV, AIDS epidemic model, HIV new infections, Ending AIDS.

Background

The first case of HIV in Bangladesh was detected in 1989 and up until December 2016 the total number of detected cases was 4,721 of whom 799 have died, leaving 3,922 known people living with HIV [1]. However, the majority of infections are likely to remain undetected and the total national

* E-mail of correspondence: nhuq@juniv.edu

estimate is over 9,600 PLHIV [2]. HIV prevalence has never exceeded 0.1% in the general population [3, 4] and has remained below one percent for most key populations [3, 5].

The Government of Bangladesh (GOB) has a strong political history of commitment to the HIV response. Bangladesh responded to HIV and AIDS before the first case was detected. Bangladesh was the first country in the region to adopt a comprehensive national policy on HIV/AIDS and STIs in 1997 [3].The early response helped keeping the HIV epidemic from expanding beyond its current level [3, 6]. Until recently, through well documented collaboration between government departments, civil society, private sectors, self-help groups and the development partners - the national response was multi-dimensional to maintain a low prevalence status in the country. It is estimated that the ongoing interventions have averted a total of 141,225 HIV infections up to 2014 and saved 3,841,000 DALYs and 19,545 lives. In the absence of any intervention among KPs, HIV prevalence will be exceeding 20 percent in most KPs within the next 20 years and a generalized epidemic will have taken off [3, 7]. These demonstrate the success of the past and ongoing HIV responses in Bangladesh.

But, the key populations in certain geographical areas have high HIV prevalence. A concentrated epidemic has been recorded only among the male PWID in Dhaka where the prevalence was 5.3% in 2011, down from 7% in 2007 [5, 8]. Moreover, in 2015, 9.9% of the male PWID and 4.9% of the PWID was found HIV positive in Dhaka [9]. Although HIV prevalence was below 1 percent in most groups of female sex workers, the prevalence was 1.6 percent among casual sex workers in Hilli. Moreover, among the hijras, the HIV prevalence was 7.1 percent in Hilli - a small border town in the North-western part of Bangladesh bordering the Indian State of West Bengal [5].

Although the current interventions will be able to contain HIV epidemic in the coming years, it will not be able to produce desired impact required to achieve the global goals and targets. For instance, with the ongoing intervention approach only 31.3 percent of the adults who are in need will receive ART in 2030, which is far from new treatment target ‘90-90-90’ by 2020. Further, the global goal of “Ending AIDS” will also remain

unreachable. Rapid scale-up of prevention and universal treatment coverage through geographical prioritization, will limit new infections in Bangladesh and the global goals will be achieved by 2030 [6].

With this backdrop, the study holistically looked into prevention, case detection, treatment, care and support programs among different population subgroups such as female sex workers (FSW), male sex workers (MSW), males having sex with males (MSM), hijra, people who inject drugs (PWID), people living with HIV (PLHIV), most at risk adolescents (MARA), migrants, clients of sex workers, etc. to showcase the best possible ways to make the response more effective, efficient and sustainable. In addition, the analysis compared different intervention scenarios and recommend future interventions to achieve the treatment target by 2020 and global goal of 'Ending AIDS by 2030'.

Methodology

Ending AIDS means reducing HIV incidence to a level that no longer represents a major health threat to any population [3]. In case of Bangladesh, the National AIDS STD Control Program (NASP) of Ministry of Health and Family Welfare (MoHFW) defines 'Ending AIDS' as ***less than 300 estimated new infections per year*** [6]**.**

The analytical framework of designing high-impact, cost-effective and sustainable options for Bangladesh followed several steps: (i) geographical prioritization in HIV response; (ii) determining program coverage and unit cost; and (iii) designing different scenarios separately for priority and remaining districts to develop Ending AIDS options and understanding implications.

Geographical Prioritization: Reviewing the KP size, HIV case reporting, HIV prevalence, and program "Reach" data by districts; 23 districts were identified as 'priority' districts for HIV response, while the remaining 41 districts were termed as 'remaining' districts. These priority districts have reasonably high KP size estimates (73%), KPs reached with program (81%), reported PLHIV (82%), and KPs living with HIV as per program data and surveillance reports.

Determining Program Coverage and Unit Cost: The program coverage by different KPs; i.e. FSW, PWID, MSM, MSW and hijra; were estimated by using the program Reach data and the denominators used for estimating program coverage were the estimated sizes of respective KP groups [10, 11]. Moreover, unit costs were taken from the 3rd revised National Strategic Plan for HIV and AIDS Response 2011-2017 [4] and 20 percent reduced unit costs are considered for the analysis to obtain cost effectiveness of the future investment options.

Designing Ending AIDS Scenarios: Several intervention scenarios were developed. Considering diverse investment needs by geographical areas the scenarios were devolved separately for 'priority' and 'remaining' districts. While designing intervention scenarios for priority districts, several options, e.g. scaling up of only prevention interventions, scaling up of treatment as well, scaling up of combined ART and prevention interventions, and strategic use of ART were considered. On the other hand, no prevention and reduced prevention coverage with current treatment levels were considered for the remaining districts.

After reviewing the scenarios developed for priority and remaining districts, a total of five scenarios were developed and compared with the baseline scenario. These scenarios are summarized in Table 1.

Table 1: Summary of AEM scenarios

Scenarios		**Description**
Continuation of the existing program	Scenario 1 (Baseline Scenario)	Continuation of the current program coverage
Ending AIDS scenarios	Scenario 2	Ending AIDS with high-impact: This scenario considers a rapid scale-up to universal access to ART by adopting the 'test and treat' model (treating 90% of PLHIV regardless of CD4 count) and prevention scale up as per the targets of the results based framework of the 3rd revised National Strategic Plan (NSP) for HIV and AIDS (2011-2017) in the 23 priority districts. On the other hand, it assumes business

Scenarios		Description
		as usual with current program and treatment (CD4<350) coverage in the remaining districts
	Scenario 3	Ending AIDS with rapid scale up in priority districts and half prevention coverage in non-priority districts: This scenario assumes a rapid scale-up to universal access to ART and prevention scale up as per NSP in the 23 priority districts. In the remaining districts, it assumes to maintain half of the existing prevention program coverage and the current treatment (CD4<350) coverage
	Scenario 4	Ending AIDS with moderate scale up of prevention interventions in priority districts: This scenario is designed to achieve 70% ART coverage (CD4<500 for low risk general population and treat all KPs regardless of CD4 count) with a moderate prevention scale in priority districts. However, it assumes to maintain the existing program coverage and treatment (CD4<350) in the remaining districts
	Scenario 5	Ending AIDS with moderate scale up of prevention interventions in priority districts and half prevention coverage in remaining districts

Modeling and Sources of Data: The analysis was conducted by using the AIDS Epidemic Model (AEM). The AEM can reflect the transmission modes driving HIV transmission in Asia [12]. The model has already been used in deriving 'Ending AIDS' strategies in many countries in the Asia including Thailand, Philippines, Viet Nam's, Indonesia, Nepal and Myanmar [13 - 16]. The updated version software and documentation can be accessed from the East West Center (www.EastWestCenter.org) and Avenir Health (www.avenirhealth.org) websites.

The user adjusts AEM fitting parameters until HIV prevalence outputs from the model agree with observed epidemiological trends [12, 17]. It has stringent input requirements which fall into a number of general categories and are primarily behavioural in nature. For instance, size of these key populations; average duration for which people remain in key populations;

frequency of risk behaviors (e.g., the number of vaginal or anal intercourse acts per week or number of injections in the last year); levels of protective measures taken with different partner types (e.g., condom use between sex workers and clients, reducing the fraction of injections shared or the prevalence of sharing); HIV and STI prevalence; etc. It also requires data on adult ART i.e. number of adults receiving ART by gender. Information on program coverage among key populations and unit cost data is also required.

The analytical work began with the review and analysis of national, regional and international qualitative and quantitative evidence, as well as global best practices for effective interventions. The recent and rigorous epidemiological and response data, including: Behavioural Surveillance Survey (BSS); HIV Serological Surveillance (HSS); national HIV estimations and projections from the AEM exercise of Bangladesh conducted for the Global Fund New Funding Model are used. The program coverage data from existing interventions; project and program evaluations; and other special studies by NASP/MOHFW, icddr,b, Save the Children International, WHO, UNICEF, etc. are also used. Data from 2000 to 2014were used as inputs for the AEM exercise and projections were made till 2030.

Some of the information/data requirements were based on assumptions as there were data gaps for some indicators such as IDU mortality, mobility between key population groups, client make-up, male circumcision, etc. Also, HIV prevalence data for Hijra was adjusted assuming that the available data was only for those who are sex workers. These assumptions were based on closest existing evidence and were discussed in the national Technical Working Group on M&E and Strategic Information.

Results

In order to decide on the most efficient Ending AIDS option for the HIV response in Bangladesh, each scenario (Scenario 1 to Scenario 5) was compared with the existing intervention (Baseline Scenario) and the impact of each scenario is measured in terms of number of new infections, number of current infections, number of PLHIV on ART, treatment costs saved,

etc. The return on investment for each scenario was also measured to obtain most cost effective investment option for Bangladesh.

Impact on estimated new infections: Although, Scenarios 1 and 5 reduce the new infections in the projected years, the reduction may not be sufficient to meet the definition of ending AIDS by 2030 for Bangladesh in all scenarios (**Fig. 1**). Scenario 2 (Ending AIDS with high-impact), Scenario 3 (Ending AIDS with half prevention coverage in remaining districts and rapid scale up in priority districts) and Scenario 4 (Ending AIDS with moderate scale up in priority districts and half coverage in remaining districts) reduce the number of new HIV infections to less than 300 per year by 2030, effectively halting the spread of the epidemic. If Scenario 3 is adopted, the estimated number of new HIV infections would be 264 in 2030, which is less than a third of the current number (i.e. 983 in 2014). As Scenarios 2 and 4 also reach the 'Ending AIDS' goal before 2030 (i.e. less than an estimated 300 new infections per year), it will be important to look into efficiency and return on investments among these three Scenarios.

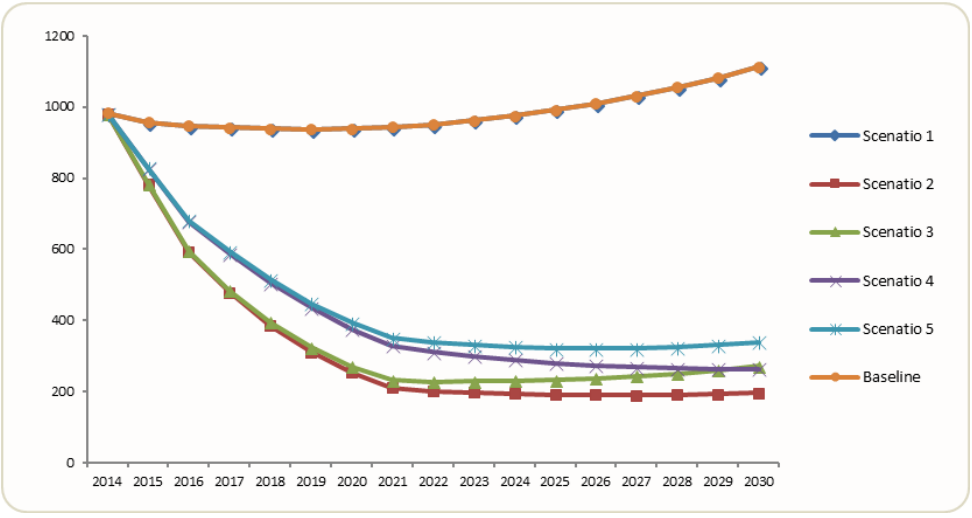

Figure 1: HIV New Infections in different scenarios, 2014-2030

Impact on PLHIV population: If the current program coverage continues, the number of current PLHIV between 2014 and 2020 remains stable at 8,620 – 8,855 and will reach 9,256 at the end of 2030. However, all other

Ending AIDS scenarios are able to reverse the epidemic (**Fig. 2**). The number of current PLHIV starts to decline in 2016 and by 2030 it will reach 5,566 with Scenario 4 (Ending AIDS with moderate scale up in priority districts) representing nearly 35.4 percent decrease over the period. With Scenario 3 (Ending AIDS with rapid scale up of coverage in priority districts and half of the current prevention coverage in remaining districts) the number of PLHIV will decrease to 6,379 in 2030.

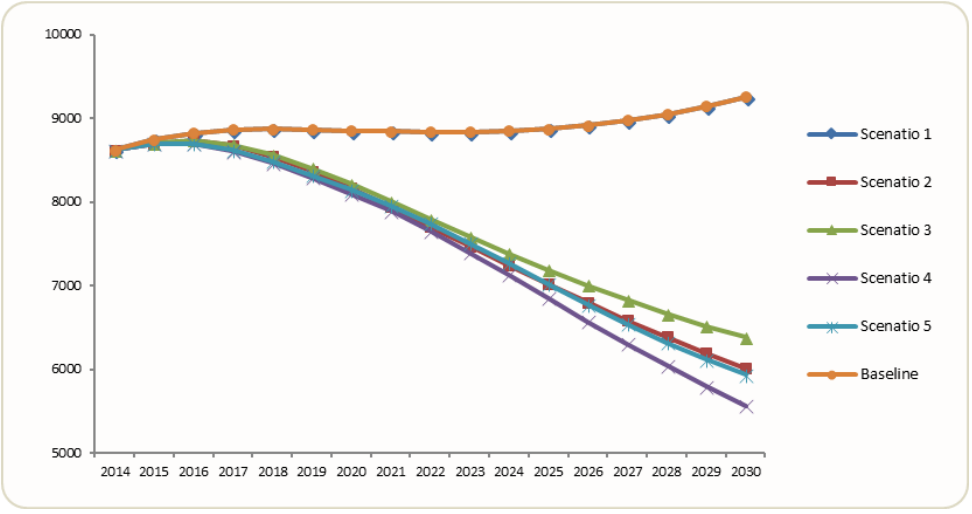

Figure 2: Number of Current Infections in different scenarios, 2014-2030

Impact on number of PLHIV on ART: The number of PLHIV receiving ART projected through different scenarios is compared with the ART need, which is measured by adopting the 'test and treat' model (i.e. treating 90% of PLHIV regardless of CD4 count). The analysis of the findings reveals that both Scenario 2 and Scenario 3 can include maximum number of PLHIV under ART treatment (**Fig. 3**). For instance, in Scenario 3, the number of PLHIV receiving ART will be increased to 6,582 in 2020 compared to 1,036 in 2014, which is more than a 6-fold increase over the period. The numbers of PLHIV receiving ART are much lower in the other scenarios. In comparison with the number of PLHIV in need of ART, only Scenario 2 and Scenario 3 reach the new treatment targets by 2030.

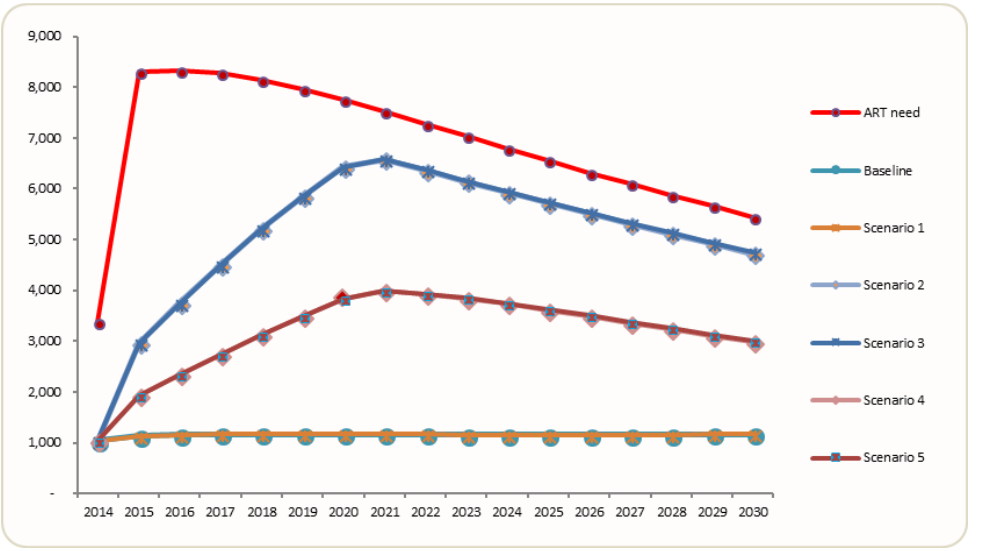

Figure 3: Number of PLHIV on ART vs. ART Need, 2014-2030

Cost Effectiveness: The analysis of the cost effectiveness indicators reveals that Scenario 3 (Ending AIDS with half prevention coverage in remaining districts) would produce the investment impact in a most cost effective manner. Both the cost per HIV infections averted and cost per DALY saved are lowest for Scenario 3, thus implying that the scenario is most cost effective (**Table 1**). Further, Scenario 3 shows that investing in prevention yields USD 21.4 savings on treatment costs (i.e. per additional prevention) and makes the program affordable over the long term. Scenario 2 will not save any treatment cost and Scenario 4 yields only USD 2.2 savings on treatment costs.

Table 2: Cost Effectiveness Analysis, 2015-2020

Scenarios	Cost per HIV infection averted	Cost per DALY saved	Treatment savings per additional prevention
Scenario 2: Ending AIDS with high-impact	28,727	1,056	-2.4
Scenario 3: Ending AIDS with rapid scale up in priority districts and half prevention coverage in remaining districts	**27,355**	**1,006**	**21.4**
Scenario 4: Ending AIDS with moderate scale up in priority districts	33,305	1,225	2.2
Scenario 5: Ending AIDS with moderate scale up in priority districts and half prevention coverage in remaining districts	31,660	1,164	0.7

In addition, Scenario 3 will save USD 79.8 million in future income and the cost-benefit ratio stands at 7.2. Moreover, the marginal cost per DALY saved is USD 145, which is less than the country's per capita GDP thus making 'Scenario 3' a sustainable and cost-effective investment option.

Conclusion

If the current intervention programs among KPs continue, the new HIV infections will be decreasing until 2020, but will be gradually increasing after that and will reach 1,113 by 2030. With the current intervention programs Bangladesh will not be able to achieve End AIDS by 2030 [6].To achieve Ending AIDS in Bangladesh by 2030, the most cost effective investment option for Bangladesh is to ensure a rapid scale-up for universal access to ART (i.e. treating 90% of PLHIV regardless of CD4 count) and scale-up of prevention as per National Strategic Plan in the 23 priority districts as well as maintain half of the existing program coverage and current treatment (CD4<350) coverage in the remaining 41 districts (i.e. Scenario 3). Moreover, scaling-up behaviour change interventions and

early treatment for people found to be HIV positive need to be ensured. Community support should be enhanced for adherence through empowering and supporting communities, particularly PLHIV and KP networks and organizations.

The HIV response also needs to ensure use of strategic approaches through PMTCT; addressing co-infections of HIV and TB, hepatitis and cervical cancer; focusing on migrants; implementing integrated interventions for clients of sex workers and informing vulnerable adolescents though the existing SRH services. A nationwide scale-up of the prevention and treatment interventions would require immense resources and will not generate significant impact in terms of new infections averted, lives saved and cost effectiveness. As a result, the key investment strategy should focus on investing resources where they are most needed geographically and by optimizing prevention interventions for key populations, and scaling up treatment. Without ensuring rapid scale-up of current prevention and universal treatment coverage the past achievements may be lost.

However, successful implementation of this need-based HIV response also has some challenges. Continued investment of development partners and ownership of GOB is identified as one of the major challenges of implementing the investment options. With a clear idea of both the investments needed and the potential returns, stakeholders should advocate more effectively for required resource allocations for the response. The other programmatic challenges that need to be addressed also include: quality of services and delivery challenges; diversity of facility costs; achieving the return on investment in a low prevalence country; social stigma and discrimination; gaps in the treatment cascade; addressing the epidemic in adolescents and children; and setting up HTC and community-based and peer-led testing in a cost-efficient manner.

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