

Visceral Leishmaniasis Elimination Program in

Bangladesh and Achieving Millennium Development Goal

ABSTRACT

Aims: The aim of this review is to present the status of Visceral Leishmaniasis (VL) in Bangladesh and various steps taken to achieve the Millennium Development Goal (MDG). Additionally, the review covers the related challenges and opportunities to achieve this goal.

Main Body: Currently, 45 out of 64 districts of the country are endemic for VL and 20 million people, around 18% of the total population, are considered to be at risk for VL. However, there is a concern about the total number of VL reported cases. It has been mentioned that the number of cases reported in surveillance data is likely to be at least five times underestimated. The current burden of VL disease is 23.4 times higher compare to the MDG of 1 case per 10,000 populations by 2015. In order to achieve the MDG various national strategies have been taken so far to eliminate VL from Bangladesh. Government of Bangladesh constituted a national steering committee and formed a technical working group to provide support to VL elimination program. Lack of trained and efficient labour force, along with lack of knowledge among the people are big challenges for VL elimination in Bangladesh. In addition, drug unavailability, unfriendly behaviour of health worker and existence of unofficial payment to the health provider in public hospital work as barriers to achieve MDG. A major challenge towards VL elimination is the rising incidence of Post kala azar dermal Leishmaniasis. Recent introduction of oral therapy with miltefosine and rapid diagnostic with rk39 as cost effective case management have the potentiality to work against all the barriers.

Conclusion: From the public health view and guided by research evidence it seems the elimination of VL from Bangladesh is technically feasible and operationally possible. Ensuring sufficient health worker with adequate training remains the major challenges. Strengthening referral services, adapting active case detection strategies, and creating public awareness are also important for achieving MDG.

Keywords: Visceral Leishmaniasis, Millennium Development Goal, Bangladesh.

INTRODUCTION

Visceral Leishmaniasis (VL) is a serious public health concern with an estimated 200 million people at risk of infection in Indian subcontinent [1]. Approximately 25,000 to 40,000 people are infected and 200-300 die every year in Bangladesh, India and Nepal, comprising 60% of the global burden of VL [1-3]. The global burden estimate for VL is 0.5 and 2.5 million incident and prevalent cases per year, respectively [4]. In Bangladesh the VL disease is known as 'Kala azar'. A total of 73,467 kala azar cases during 1994 and 2004 were reported by Government of Bangladesh [5]. However, this information was based on hospital utilization and thus was believed to be underestimated.

In Bangladesh, *Leishmania donovani* is the only species causing VL "the female sand fly *Phlebotomus argentipes*" is the only vector and humans are the only reservoir [1,5]. The unique characteristics of single vector and simple reservoir, recent advances in rapid field based diagnostics and availability of effective and safe oral drugs makes the disease a target for elimination. The elimination of this disease is important in order to achieve sustained economic development as VL mostly affects the poorest of the poor people residing in rural areas [2]. As a part of its millennium development goals (MDG), World Health Organization (WHO) declared to combat HIV/AIDS, malaria and other diseases (MDG 6). As a result WHO targeted to decrease the incidence of VL below 1 case per 10,000 populations by 2015. Consequently, a memorandum of understanding was signed among the ministry of Bangladesh and WHO declaring a commitment to decrease the incidence of VL at the MDG targeted level [2]. The VL control strategies focus on the physical and chemical barriers to the vector of the disease and early case detection and treatment. The control program targets to epidemiological entities of VL where humans and animals are the reservoirs for infection. The options available for VL control are indoor residual spraying (IRS), long lasting insecticidal nets (LLINs), environmental management (EVM), early detection and treatment. So far, government of Bangladesh has taken various steps and implemented various programs to eliminate VL from the country. The present review will summarize the present status of VL in Bangladesh, the various steps taken to achieve the MDG and related challenges and opportunities to achieve this goal. The findings of this

review will help to design evidence based policy that motivates to implement programs targeting MDG.

1. HEALTH FINANCING AND HEALTH CARE SYSTEM IN BANGLADESH

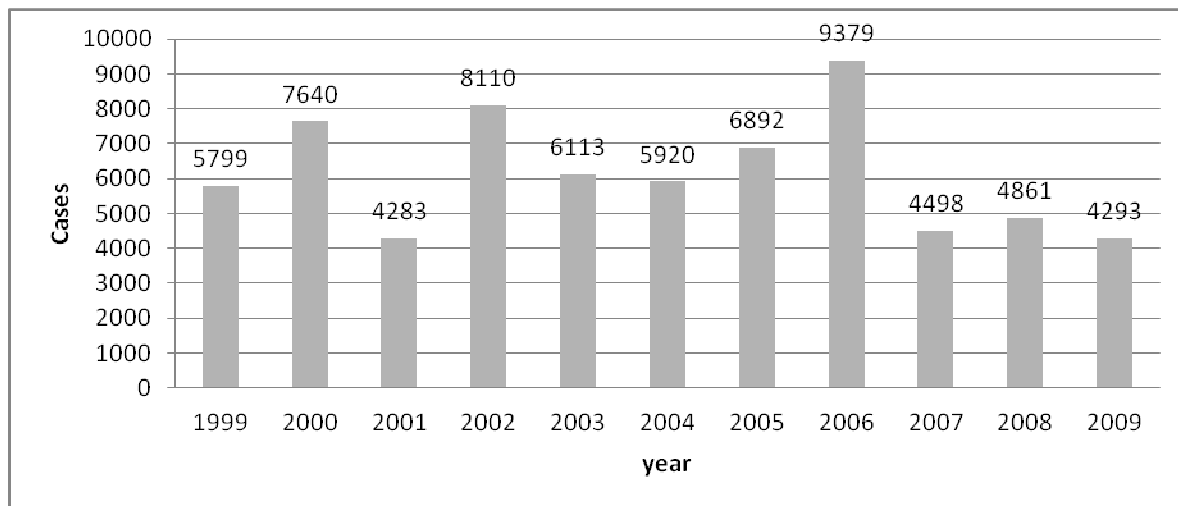
Bangladesh is located in South Asia with an area of 147,570 kilometers. The country has 146 million populations with a density of 990/square kilometers (Ministry of Finance 2010). The country is an agricultural based economy with 72% of its population living in the rural areas. Per capita Gross National Income (GNI) and Gross Domestic Product (GDP) are USD 750 and USD 686 respectively [6]. Nearly half of the population lives below the poverty line and 36% of the total population has an income of less than one dollar per day. Total health expenditure (THE) is 3.4% of GDP. 64% of THE is borne by the household through out of pocket expenditure [7].

The health sector of Bangladesh remains under the direct authority of the government as this sector has to achieve a number of social objectives for enhancing development. The constitutional commitment of the Government of Bangladesh is to provide basic health and medical requirements to all people in the society [8]. The government's policy objectives in the health care sector are to provide a minimum level of health care services for all, primarily through the construction of health facilities in rural areas and the training of health care workers. Government health care facilities in rural areas consist of subdistrict health centre i.e. Upazilla Health Complex (UHC), union-level health and family welfare centre such as sub centre (SC) and Union Health and Family Welfare Centre (UHFWC) , and rural dispensaries. The UHFWC or SC provide the first contact between the people and the health care system and is the nucleus of primary health care delivery. District hospitals and some infectious-disease and specialized hospitals constituted the second level of referral for health care. Medical college hospitals and postgraduate specialized institutes with attached hospitals constituted the third level of health care. At all cases, the services are free at the point of delivery and some drugs are provided free of cost [9].

2. VL BURDEN IN BANGLADESH AND UNDERESTIMATION OF REPORTED CASE

VL was first reported in 1824 in Jessor district of Bangladesh. As per report, an endemic occurred in 1824-27 caused 75,000 deaths [10]. However, VL has developed epidemic cycles taking place every 15-20 years [11]. Currently, 45 out of 64 districts of the country are endemic for VL and 20 million people, around 18% of the total population, are considered to be at risk for VL [12]. Nearly 54% of the cases are from one district, namely Mymensingh, and 25% cases are account from three more districts. On average 10,000 cases are detected annually in facility based surveillance. The reported number of VL cases per year from 1999 to 2009 is shown in figure below.

Figure 1: Number of VL reported cases in Bangladesh during 1999 and 2009



Source: Director General of health services (DGHS), Dhaka

Figure 1 shows that the number of reported VL cases decreased gradually in Bangladesh. However there is a concern about the number of this reported case [5]. The issue of under reporting has been mentioned in some other articles [1, 13, 14]. Accordingly the true burden of VL disease in Bangladesh is far greater than the reported cases as many cases remain under-reported. Again most of these researches have been done in VL endemic areas of the country and thus the findings are reported based on this geographical based data. Table 1 summarizes the incidence of VL patient mentioned in various literature.

Table 1: Incidence of VL cases reported from various studies

Year	Reference location	VL incidence (per 10,000)	Reference
2002	Country	28	Rahman <i>et al.</i> 2010
2004	Country	85	Rahman <i>et al.</i> 2010
2007	Country	46	Rahman <i>et al.</i> 2010
2008	District, Rajshahi	27	Mondal <i>et al.</i> 2009
2008	Upzilla, Fulbaria	>80	Rahman <i>et al.</i> 2010
2008	District, Mymensingh	109.4	Hrive <i>et al.</i> 2010
2009	District, Mymensingh	23.4	Singh <i>et al.</i> 2010

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105 Considering the latest available information in the literature, the current burden of VL disease (23.4
 106 cases / 10,000 populations) is 23.4 times higher than the elimination target of 1 case per 10,000
 107 populations in 2015.

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109 3. NATIONAL STRATEGIES TO ADDRESS MDG

110 Various national strategies have been taken so far to eliminate VL from Bangladesh. Some of the
 111 most important strategies are mentioned below.

112 **Creating regional technical advisory group:** A regional technical advisory group was established and
 113 the ministries of Bangladesh, India and Nepal signed a memorandum of understanding to enhance
 114 their country and cross country collaboration [15].

115 **Identifying VL elimination strategies:** The five pillars of the VL elimination strategy have been
 116 identified - ensuring access to early diagnostic and complete treatment, effective disease
 117 surveillance, integrated vector management and vector surveillance, social mobilization and building
 118 partnership and implementation research [1,16].

119 **Establishing national steering committee:** Government of Bangladesh constituted a national steering
 120 committee and formed a technical working group to provide support to VL elimination program. A
 121 strategic plan and district level operation plan have been developed in 2005. Consequently, a national

guideline, a training module, diagnostic procedure module and a booklet for health workers have been developed (Ministry of Health and Family Welfare 2010b).

Ensuring cost effective case management: A sensitive diagnostic tool, namely '*rk39*' has been recommended for screening process. In addition, miltefosine, the most effective and reasonably safe oral drug for VL treatment, has been registered in 2008 for use in Bangladesh [17]. Surveillance through passive case detection is done by government institution. Various materials such as patient registers, treatment cards, laboratory registers, and patient referral forms have been developed [18]. Efforts have also been taken to develop new diagnostic tool, namely '*rk28*' [17].

Forming partnership with developing partners: Government of Bangladesh has developed partnership with several organizations such as World Bank, UNICEF, DFID, GTZ, Bill and Melinda Gates Foundation, JICA, USAID and WHO TDR to promote basic and implementation research on drug and diagnostic [12]. Various operation researches have been initiated. For instance, disease and economic burden studies, mapping of the disease using geographical information system (GIS), entomological spot checks and cost effectiveness of various methods of identifying VL patient have carried out as preparatory activities [1,2,17].

4. CHALLENGES TO ACHIEVE MDG

There are several constraints in the health system and these challenges have still to be overcome in order to achieve MDG. Some of the challenges are stated below:

Unavailability of complete data: There are limited sound data about the VL incidence in the country and incomplete and partial information about people's access and use of health care seeking [1]. The wide gap between the number of reported and estimated cases constrains planning of elimination [17].

Lack of resources: Due to drug unavailability, unfriendly behaviour of health worker and existence of unofficial payment in public hospital patient often seek treatment from informal sector who provide expensive, incomplete or inappropriate treatment that favors continued transmission of the disease [2]. In addition, delays between onset of symptoms and diagnosis, high non adherence to treatment in

the under-served districts may affect achieving the targeted goal [20]. Lack of trained and efficient labor force is a big challenge for VL elimination in Bangladesh. For instance, after a decade pause, Bangladesh has recently initiated the indoor residual spray (IRS) as vector control program for control and elimination of VL. Several shortcomings have been identified during the program such as lack of training of spraying squad and supervisors, deficient spray equipment, poor spraying performance, lack of protective clothing and poor disposal of left over insecticides [21]. The mobilization of financial and human resources and its allocation until recently is low [1]. Ensuring timely procurement of quality drugs, diagnosis, insecticides and spraying machines is a major concern of the elimination program.

The rising incidence of *Post kala azar dermal leishmaniasis* (PKDL): A major challenge towards VL elimination is the rising incidence of PKDL which occurs after the VL treatment and act as an infection reservoir threatens the VL elimination initiative. These patients are difficult to diagnosis and treat, as some of them may not have even post history of VL [12]. However, without better treatment of these PKDL patients the MDG is unlikely to be achieved. A cost effective diagnostic tool to facilitate community based PKDL cases detection, along with shorter course treatment schedule, is need to be developed [20].

Lack of knowledge among the people: Development and implementation of behavioural change and communication is important as people's knowledge of the disease is very poor. Only 21% of the people in the VL affected area are aware of sand fly involvement in transmission [15].

5. OPPORTUNITIES TO OVERCOME CHALLENGES

Over the last years, significance progresses have been made developing several diagnostic tools and alternative treatments. Among these, oral therapy with miltefosine and rapid diagnostic with rk39 has lead to Bangladesh along with other countries of Indian subcontinent initiative to eliminate VL by year 2015.

The VL elimination program is possible in Bangladesh because of its unique epidemiological features. The favoring factors are that: human beings are the only reservoir host; *Phlebotomus argentipes* is the only vector [1] and 80% of the VL cases are from only 4 districts of the country [5]. The high political motivation and commitment by government of Bangladesh is a positive step on

elimination of the VL disease. Collaboration with different development partners and improvement partnership at national level with different stakeholder is the strength of the VL elimination initiative. An experience from the maternal health voucher program [22] can be adopted to improve payment of services.

6. CONCLUSION

It seems the elimination of VL from Bangladesh is technically feasible and operationally possible. However, achieving MDG to eliminate VL from Bangladesh will be extremely challenging. Some of the major challenges can be overcome with adequate training, ensuring sufficient health workers, confirming adequate supplies of drugs and diagnostic tools and finally through strengthening referral services. Bangladesh needs to adapt active case detection strategies, expand the indoor residual spray and long lasting insecticide treated nets program. The evidence based policy should be designed to create public awareness to control VL. A partnership between government facilities and non government organization (NGO) can be an option to provide treatment and health services for the VL patient is needed. Finally, improvement of access to diagnosis, strong integration of early diagnosis and treatment into the existing health services along with investment of resources into transmission control may lead to eliminate the VL from Bangladesh thus help to achieve the MDG.

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

COMPETING INTEREST

Authors have declared that no competing of interest exists.

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