



ROAD TO VISCERAL LEISHMANIASIS ELIMINATION IN BIHAR: A SITUATIONAL ANALYSIS.

Medicine

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ABSTRACT

Visceral Leishmaniasis (VL) is endemic in very few countries and the predominant incidence is in the Indian state of Bihar. We aimed to study the implementation of key elimination strategies in Bihar in the last 5 years. We studied secondary data obtained from the National Vector Borne Disease Control Programme. Variables studied were VL case count, adequacy of drug and diagnostics supply and also of coverage of insecticide residual spray. Our results show a drastic decrease in VL case count in Bihar although some hot spots still remain. Case count does not show any specific trend with drug and diagnostic supply. The continuous drug availability and diagnostic kits along with indoor residual spray (IRS) is key to VL elimination.

KEYWORDS

Visceral Leishmaniasis, Ambisome, IRS, rK39 kit.

INTRODUCTION

Visceral Leishmaniasis (VL), also known as kala-azar (KA) caused by intracellular protozoan parasites of the *Leishmania donovani* complex is the second most common cause of mortality and fourth most common cause of morbidity among all Neglected Tropical Diseases (NTDs). VL is endemic in more than 80 countries. However, more than 90% of the world's cases come from just six countries: India, Bangladesh, Nepal, South Sudan, Brazil and Ethiopia.[1,2,3]

In India, Kala-azar is endemic in a geographically confirmed area of 54 districts across four states of Bihar, Jharkhand, West Bengal and Uttar Pradesh, with approximately 140 million population at risk of infection. According to the World Health Organization Neglected Tropical Disease (NTD) roadmap, VL elimination was targeted in India by 2020[4]. Visceral Leishmaniasis (VL) was included under the umbrella of National Vector Borne Disease Control Programme (NVBDCP) in 2003. NVBDCP provides funding and develops evidence-based strategies / policies which are then to be implemented by individual states. In the last decade, several major policy changes have been implemented to achieve this goal. Only 37 endemic blocks remain to achieve the elimination target by 2020.[4] Elimination was defined as reducing the annual incidence of kala-azar to less than 1 case per 10,000 population at the sub-district level.[5]

Bihar accounts for more than 80% of the total cases with 33 districts considered endemic. [5] Hence the status of elimination programme in Bihar becomes the driver of success or failure of the national programme per se. Therefore, this study was undertaken to evaluate the implementation of the selected strategies of VL elimination in Bihar in the last five years.

METHODS

It was an Observational study using secondary data of five years (2014-15 to 2019-20) obtained from NVBDCP cell of the Bihar state located at Patna. Bihar is the top ranked state in terms of total no of VL case reporting. We analyzed the data in terms of following variables: (i) Annual number of cases and deaths (if any), (ii) availability and use of first- and second-line drugs (Ambisome and Miltefosine) and diagnostics (rK39 kits), (iii) population coverage of IRS in both rounds. Ambisome and Miltefosine is the drug of choice for Kala Azar and available free of cost under NVBDCP. Simple charts and table were made to see the adequacy of the programme strategy by comparing the utilization of Drugs and diagnostics and population coverage of IRS. Secondly, implementation of the strategies was compared with number of cases to find out if they had any relation. It aimed to compare the number of cases of Kala azar as a dependent variable against the timeliness and completeness of IRS and adequacy & availability of first- and second-line drugs and diagnostics as independent variables. The study is an attempt to gauge the feasibility of elimination of the disease in near future by looking into the details of the implementation status of Kala-azar elimination in the state in last five years.

The study was approved by the "Institutional Ethical Committee" of Patna Medical College. Necessary permissions were sought from the department of Health for handling the data stored with the department.

RESULTS

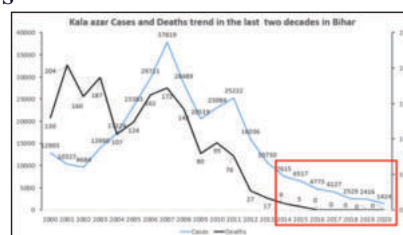


Figure 1: Trends of cases and deaths from Visceral Leishmaniasis in Bihar from 2000-2020.

Table 1: Year wise distribution of cases and deaths due to VL from 2015-2019

Year	cases	Deaths
2015	6517	05
2016	4773	00
2017	4127	00
2018	2529	00
2019	2416	00

Bihar has observed a steep decline in disease burden, especially since the KA elimination initiative was launched in the year 2005 (Figure 1). The incidence of Visceral Leishmaniasis has gradually decreased from 2015 to 2019. In the year 2015 total 5 deaths were reported but thereafter no death was reported due to VL. In 2020, only 1424 cases were reported which is a drastic decline from 6517 cases in 2015.(Table 1)

Block Endemicity (> than 1 case / 10,000 population) also declined steadily from 103 blocks in 2015 to only four blocks in 2020 (Figure 2). These include three in Saran district and one in Siwan district. However, hotspots remain in non-endemic blocks too. 24 hotspot villages are spread over 18 blocks in 7 districts.

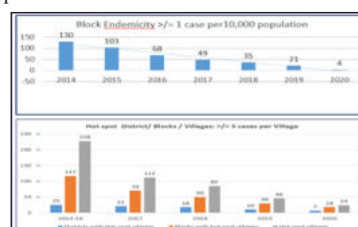


Figure 2: Visceral Leishmaniasis elimination status in Bihar.

Figure 3 shows the performance of Bihar over various VL Elimination strategies. There was no shortfall of first- and second-line drugs Ambisome and Miltefosine pointing to adequate availability. Similarly, availability of diagnostic rk39 kit also appears to be optimum. Coverage of IRS has remained within 95% of expected population coverage except in 2018 which could not be conducted due to non-supply of insecticide.

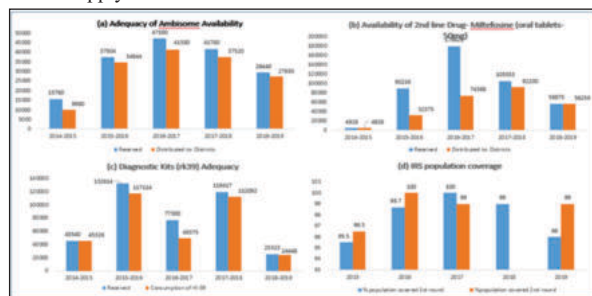


Figure 3: Performance of Bihar in various elimination strategies; a) Availability and distribution of Ambisome; b) Availability and distribution of Miltefosine; c) Availability and consumption of rk39 diagnostic kits; d) Population coverage of Insecticide Residual Spray (IRS).

On tabulating the yearly decline of VL cases in Bihar to drug and diagnostic kit availability (Figure 4), there is no clear trend - the cases of VL are declining each year but not at a steady pace. We noted a decrease in diagnostic kit consumption in 2017 and 2019 and for ambisome distribution in 2018 and 2019.

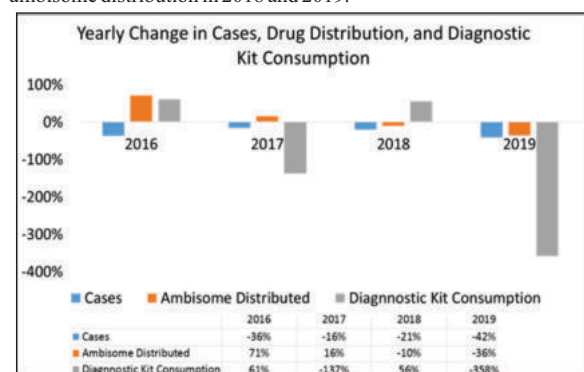


Figure 4: Case count of visceral Leishmaniasis tabulated with implementation of elimination strategies.

DISCUSSION

We found that the incidence of VL has decreased significantly in recent past in Bihar. The state of Bihar has worked in good direction in terms of availability of diagnostic kits and effective medicines for VL. The state had surplus of medicine stocks in comparison to its requirement. It is one of the reasons which is responsible for decreasing trend of VL incidence. This good work should be continued in future which will be driving force in field of its elimination. Coverage of IRS has remained within 95% of expected population coverage except in 2018 which could not be conducted due to non-supply of insecticide. The continuous adequate coverage of IRS should be maintained.

Another area of concern is that in some years like 2016-17 and 2018-19 the testing for VL has decreased. The health care system should take care of this, as adequate testing is key for finding new cases and their treatment and ultimately success of elimination programme.

Our study reinforces the fact that despite adequate diagnostic and treatment modalities, emergence of focal hotspots persists. There were still some pockets of hotspot but they are also decreasing gradually. Our results show that there is no clear relationship between case load and availability / use of medications and diagnostic kits. Thus, there are other factors that are currently unknown driving the emergence of these hot-spots. A previous study by Bulstra et al reported that the characteristics of these hotspots, underlying transmission dynamics, and their importance for shaping control strategies are not yet fully understood which is responsible for spatiotemporal heterogeneity in VL incidence at subdistrict level. [7]

Priyamvada et al reported on 272 VL patients diagnosed between 2012-2019. They note that hotspots center around disadvantaged communities – scheduled caste / scheduled tribe households and also in households that are economically disadvantaged with lack of sanitary facilities, household crowding, migrant labor etc. [8] There is also a significant association between household asset index and the likelihood of being in a hot spot, postulating poverty as a driving force. [7]

In a study from Tamil Nādu, Nandha et al showed that compliance with treatment rounds was less than the 80% mark considered to be optimum and visits from drug delivery personnel to household were also scant in the areas with low compliance. [9]

As we have marched in a direction of near future elimination of Visceral Leishmaniasis, the role of community also become very important. Interventions designed as behavioral change communication also have shown to improve community participation in preventive measures such as IRS and likelihood of seeking medical care with any symptoms suggestive of VL. [10]

Since it is analysis of a secondary data we should have also studied the ground realities by going into the field areas. It should be considered as limitation of this study.

CONCLUSION:

Thus, our study reinforces the fact that despite adequate diagnostic and treatment modalities, emergence of focal hotspots persists. The continuous good quality drug availability and diagnostic kits along with indoor residual spray (IRS) will remain key to VL elimination.

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