

Profile of animal bite victims attending anti - rabies clinic in a tertiary care hospital, Bengaluru

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ABSTRACT

INTRODUCTION: Timely and complete post exposure prophylaxis is necessary for the animal bite victims to prevent rabies. Henceforth this study is done to know the profile of animal bite victims attending Anti - Rabies Clinic and also to estimate their compliance rate to complete course of Anti-Rabies Vaccination by intradermal route (IDRV).

METHODS: A Retrospective record based review was conducted in the Anti - Rabies Clinic of Victoria Hospital, Bengaluru from January 21st to July 31st, 2015. The number of study subjects was 1418 after excluding rat and human bite, re-exposure and pre-exposure cases. The compliance rate to IDRV was found out from records and also by interviewing the patient or their guardian through the telephone.

RESULTS: This study shows that males were predominantly affected (75.8%) constituting the male: female ratio 3.1:1. Majority of the cases were children \leq 15 years (28.9%). 96.7% of the victims were bitten by dogs, of which 65% were from stray dogs whereas the rest from pet dogs of which only 14% were immunized. Lower limbs (32.4 %) were the most commonly involved biting site. Majority (64%) had category III exposure. Only 25.3% of the victims reported for treatment within 24 hours and 76.4% had completed the full course of vaccination.

CONCLUSION: From this study we observed that males have higher incidence of animal bite than the females and most of the cases were children \leq 15 years old. Majority had category III exposure. Only 76.4% had completed the full course of IDRV which is considerably low for this highly fatal disease. Communities especially the parents and the teachers should be educated through a strong Information Education and Communication programme.

KEYWORDS: Rabies, Post-exposure prophylaxis, Anti-Rabies Clinic, Compliance.

Introduction

Rabies is an acute infectious viral zoonotic disease of central nervous system that is almost always fatal following the onset of clinical signs (1). Rabies is the 10th biggest cause of death due to infectious diseases worldwide (2). Globally 61,000 deaths occur annually due to rabies, of which 16,450 (27%) occur in India (3). In India, every 2 seconds, a person is bitten and every 30 minutes, someone dies from rabies (4). 99 % of human rabies cases are due to bites from rabid dogs (1). 40% of people who are bitten by suspect rabid animals are children under 15 years of age. 5 In India, rabies is not a notifiable disease and there is no organized surveillance for human or animal cases (4). India has the highest population of stray dogs in the world, an estimated 19 million. In Bengaluru alone, there are an estimated 200,000 stray dogs, an average of about 10 dogs for every kilometer of road length in Bengaluru. There are over 25,000 dog bites a year in Bengaluru Municipal limits alone (6). Rabies is a vaccine-preventable viral disease (5). Every year, more than 15 million people worldwide receive a post-exposure vaccination. This is estimated to prevent hundreds of thousands of rabies deaths annually (5). In Rabies endemic countries like India, preventive measures such as Anti Rabies Vaccine (ARV) and rabies immunoglobulin (RIG) are available in the hospitals and health centres. In spite of it, the reason for high death rate is due to lack of awareness among people regarding management of animal bites and also low compliance towards complete course of anti rabies vaccination (7).

Timely and complete PEP for the animal bite victims is necessary to prevent rabies (2). The annual number of person days lost because of animal bites is 38 million, and the cost of post-bite treatment is about \$25 million (8). The most vulnerable members were children belonging to lower socio-economic classes. Most of them were unvaccinated, adult males, from rural areas. Many victims use indigenous methods of treatment following animal bite, and only about half of them seek hospital attention. One tenth of these patients had taken a partial course of vaccine (4). Therefore, the present study was done to know the profile of animal bite victims attending Anti - Rabies Clinic and also to estimate the compliance rate to Intradermal Anti-Rabies Vaccination (IDRV) among them.

Methods

The Institutional ethics committee of BMCRI, Bengaluru had approved the study. A Retrospective record based review was conducted in the Anti-Rabies Clinic attached to Bangalore Medical College and Research Institute (ARC-BMCRI), Bengaluru where patients were provided Intradermal Rabies Vaccination (Updated Thai Red Cross regimen) for prophylaxis. All patients were given health education regarding the importance of completing the recommended course of vaccination at their first visit. The record maintained at ARC-BMCRI under Department of Community Medicine from January 21st to July 31st 2015 was analyzed. The total number of patients was 1453 from which 1418 subjects were recruited for the study after excluding rat bite, human bite, re-exposure and pre-exposure cases. On record basis, all relevant data such as socio-demographic profile of animal bite victims, details of exposure, status of the biting animal, time interval between the animal bite and patient reaching the

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hospital, categories of contact and number of ARV doses administered in the Victoria hospital were collected. In ARC - BMCRI, the anti-rabies vaccine was continuously available throughout the study period. The patients/relatives/guardian phone number had been noted down from the records for those who had not completed the full course of ARV. Then through telephone survey they were interviewed and the details regarding the ARV doses which was taken outside was found out. The data collected was coded and entered in Microsoft Excel version 2007 and it was analyzed using SPSS version 17.0 software. Descriptive statistics was used for data analysis and the data was represented in the form of percentages. The results were presented in the form of tables, figures, diagrams, where ever necessary.

Results

Out of the total 1418 patients studied, 411 (28.9%) belong to ≤ 15 years age group. 1075 (75.8%) were males constituting male: female ratio to 3.1:1 and 1238 (87.3%) were from urban areas, 1009 (78.3%) were literates and 292 (35.9%) were unskilled workers. (Table 1)

This study shows that 1371 (96.7%) of patients were bitten by Dog. (Figure 1) Among them 891 (65%) were bitten by stray dogs, remaining by pet dogs. Among those pet dogs, only 67 (14%) were immunized (Table 2).

Table 1: Socio-demographic profile of animal bite victims		
Age group (years)	n = 1418	Percentage (%)
≤ 15	411	28.9
16 – 30	343	24.2
31 – 45	303	21.4
46 – 60	228	16.1
> 60	133	09.4
Gender	n = 1418	Percentage (%)
Male	1075	75.8
Female	343	24.2
Domicile	n = 1418	Percentage (%)
Urban	1238	87.3
Rural	180	12.7
Education*	n = 1289	Percentage (%)
Literate	1009	78.3
Illiterate	280	21.7
Occupation**	n = 812	Percentage (%)
Profession	37	04.6
Semi – professional	70	08.6
Clerical, shop-owner, farmer	107	13.2
Skilled worker	101	12.4
Semi – skilled worker	186	22.9
Unskilled worker	292	35.9
Unemployed	19	02.4

* The number of children < 7 years was 129, they were excluded; ** 400 were children < 15 years and 206 were students, so 606 were excluded.

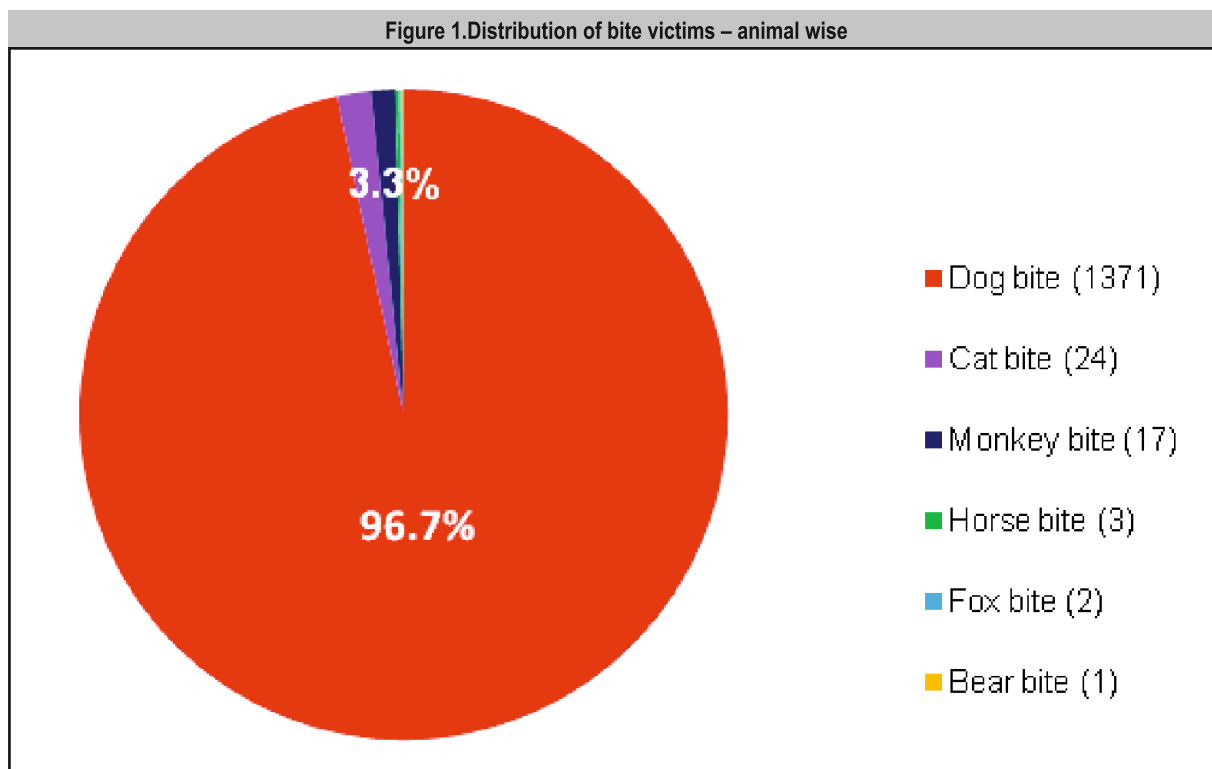
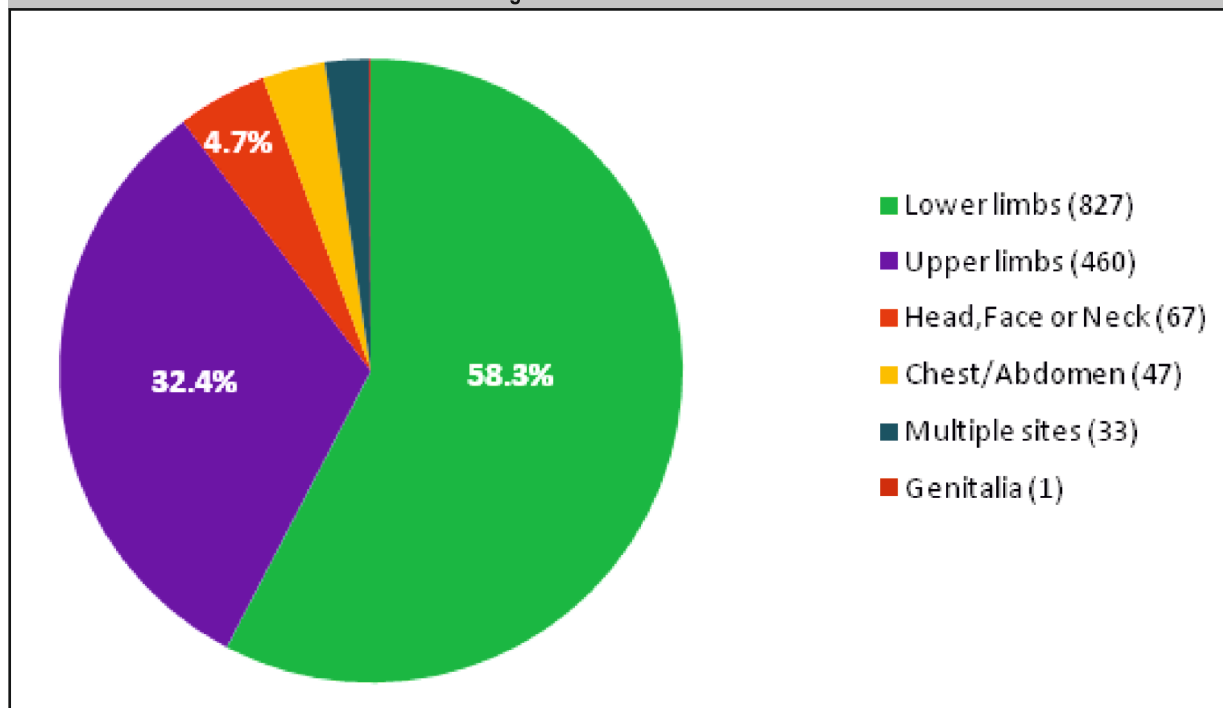


Table 2: Profile of the biting dog

Particulars of dog	n = 1371	Percentage (%)
Stray	891	65
Pet	480	35
Immunization of pet dog	n = 480	Percentage (%)
Yes	67	14
No	413	86

In this study, 827 (58.3%) of the bites/licks were on the lower limbs, 460 (32.4%) on the upper limbs, 67 (4.7%) on the head, face or neck, 47 (3.3%) on the chest/abdomen, 33 (2.3%) on multiple sites and the remaining 1 (0.1%) on the genitalia (Figure 2).

Figure 2. Site of animal bite

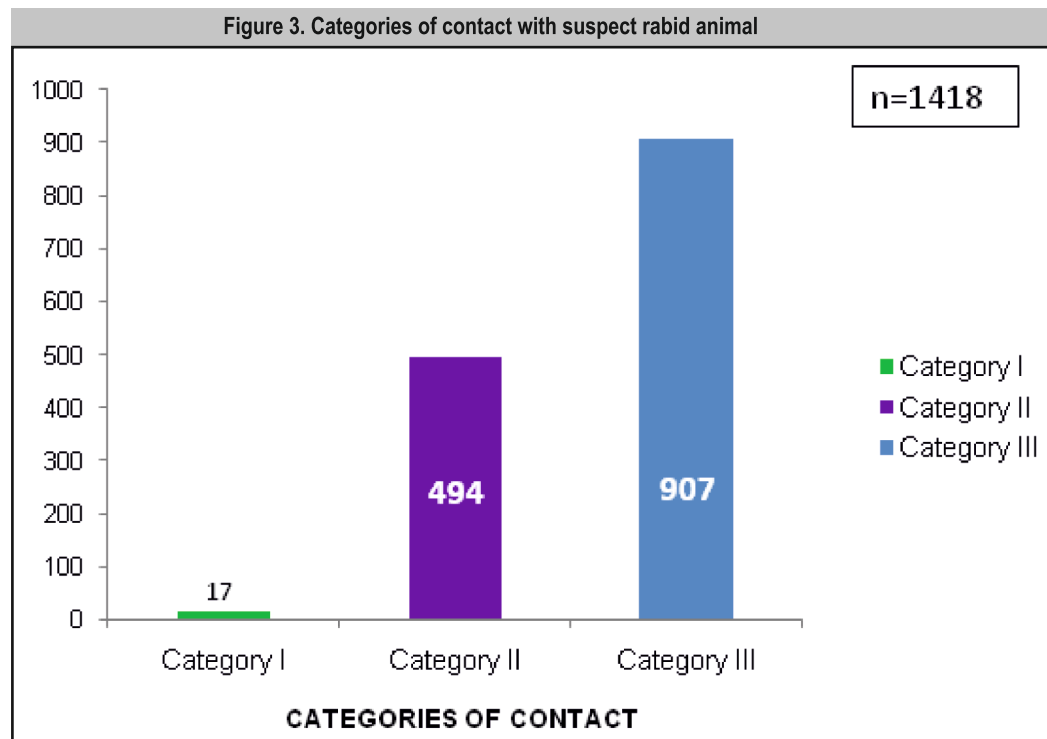


Among those 1418 patients studied, only 359 (25.3%) of them came to the hospital within 24 hours of post exposure. (Table 3)

Table 3: Time interval between the animal bite and patient coming to the hospital

Time interval	n = 1418	Percentage (%)
< 24 Hours	359	25.3
> 24 Hours	1059	74.7

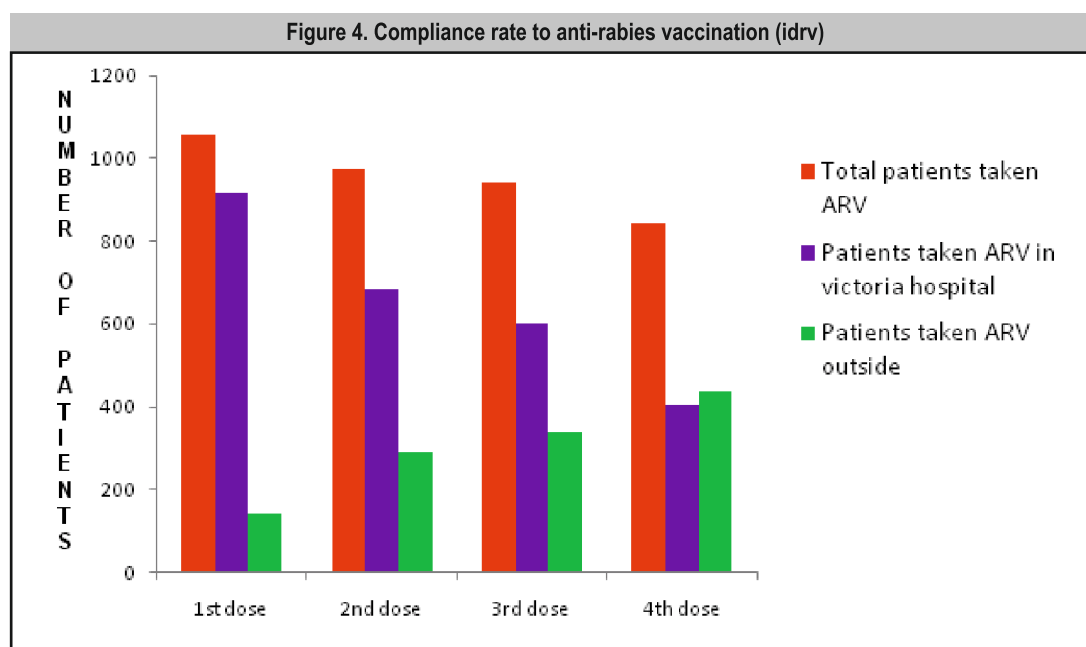
After exposure to the animal, based on WHO classification physician categorizes the animal bite wound for further management. Among the patients studied, 907 (64%) belong to category III animal bite wound, 494 (34.8%) were category II and rest of them were category I. (Figure 3)



To estimate the compliance rate to Intradermal Anti-Rabies Vaccination, category I (17) cases for whom ARV was not given was excluded. So of the total 1401 patients who were given ARV,

403 had taken all the 4 doses of IDRV in the Victoria hospital. Of the remaining 998 patients, who were contacted through

telephone, only 699 had responded. Among those patients who had responded, 439 had completed their vaccination course in the outside hospital whereas the remaining 260 patients did not complete the full course. The non-responders (299) were also excluded from this denominator (1401) whose vaccination status is unknown (Figure 4).



Discussion

The present study showed that maximum number of cases i.e. 411 (28.9%) were ≤ 15 years and 1075 (75.8%) of the patients were males constituting male: female ratio to 3.1:1. Similarly in a study conducted by Chauhan P et al in Jodhpur, shows that 53.9% were children less than 15 years and 69.9% were males (9). Children were more exposed, may be due to their inability to protect themselves. As the age advances, the number of cases decreases. Males were more exposed which may be due to their more outdoor activity. In this study, we observed that most of the patients 1238 (87.3%) were from urban areas and 1009 (78.3%) were literates. In a similar study conducted by Seenivasan P et al in Tamil Nadu, 82.1% were from urban area and 81.7% were literates (4). This could be due to the reason that as the study setting is in the tertiary care hospital and both the studies were conducted in metropolitan cities like Bengaluru and Chennai where most of the people were urban and literates.

This study showed that dog is the most common biting animal (1371; 96.7%). Similar findings were observed in other studies. (2, 8, 9, 10) We also observed from this study, 891 (65%) were bitten by stray dogs, remaining by pet dogs. Among those pet dogs, only 67 (14%) were immunized which indicates poor vaccination even among pet animals. These findings were consistent with the study conducted by Seenivasan et al in Tamil Nadu (4). This may be due to the lack of strict implementation of the legal provisions for licensing and regular vaccination of pet dogs. In this study regarding the site of animal bite, 827 (58.3%) were on the lower limbs, 460 (32.4%) were on the upper limbs. Similar findings of higher incidence (58.6%, 32.8%) of animal bite in lower limbs were also observed by Seenivasan P et al in Tamil Nadu and Chauhan P et al in Jodhpur (4, 9). The lower limbs and upper limbs were more exposed which may be due to the bare skin area. In our study we also observed 1 (0.1%) case which was 10 days old newborn who had a dog bite on the genitalia due to mother carelessness.

In this study we observed that only 25.3% (359) of animal bite victims came to the hospital within 24 hours of post exposure. Similarly a study conducted by Seenivasan P et al in Tamil Nadu and sheetal V et al in Ahmedabad showed that only 15.2% and 22.5% of the patients approached the hospital on the same day of exposure (4, 8). This could be due to the lack of awareness among animal bite victims regarding the management of animal bite wounds or else the seriousness of the disease. In this study we observe that most (907; 64%) of the patients had category III exposure and 494 (34.8%) had category II exposure. Similarly a study conducted by Chauhan P et al in Jodhpur also showed that 72.7% were category III cases (9). Similar observations were also observed by Sajna MV et al and sheetal V et al (2, 8). This could be due to the fact that this study is done in a tertiary care hospital, most of the patients were referred for RIG.

In this study, the compliance rate to IDRV was found to be 76.4%. Similarly a study done by Shankaraiah et al in Bangalore in 2012 and Bariya et al in Gujarat in 2011 where the

compliance rate to IDRV was observed to be 77% and 70% (11, 12) whereas in studies done by Seenivasan et al in 2013 in Tamil Nadu and Nikhil et al in 2011 in Puducherry observed the compliance rate to Intramuscular Rabies Vaccination (IMRV) to be 6% and 0% (4, 10). This shows that compliance to IDRV was found to be greater than IMRV which may be due to the reduced number of visits which in turn reduces the travelling costs, loss of wages and vaccine costs. In this study 95.8%, 88.1%, 85.6% and 76.4% of patients had received 1st, 2nd, 3rd and 4th dose respectively. 4.2% of patients had not taken the first dose itself due to non-affordability, did not bring the BPL card etc., and the difference between the 3rd and 4th dose is comparatively high when compared to the difference between the other doses. Similarly a study done by Malkar et al in Maharashtra in 2014 shows that 100%, 82.9%, 70.1%, 46.2% of patients had received 1st, 2nd, 3rd and 4th dose (7). Similar observations were also observed by Vinay et al in Mandya in 2012. (13) In all these studies, as the dose increases, the compliance rate decreases. There is high drop out for 4th dose; it may be attributed to comparatively longer interval (21 days) between 3rd and 4th dose as compared to that between 1st and 2nd dose (3 days) and 2nd and 3rd dose (4 days).

Conclusion

From this study we observed that males have higher incidence of animal bite than the females and most of the cases were children ≤ 15 years old. Most of the cases had stray dog bites, on the other hand only few pet dogs were immunized. Majority had category III exposure and only few reported for treatment within 24 hours. Only 76.4% had completed the full course of IDRV which is considerably low for this highly fatal disease.

Communities especially the parents and the teachers should be educated through a strong Information Education and Communication programme regarding hazards of animal bite and its consequences, immediate reporting of dog bites, importance of proper wound care, necessity of taking anti-rabies vaccination, dangers of inadequately managed animal bite wounds, registration, licensing and vaccination of all domestic dogs, importance of Animal Birth Control – Anti-Rabies Vaccination (ABC-AR) programme and cooperating with the authorities in its implementation.

Limitations: Telephone survey was conducted to estimate the compliance rate to IDRV, in which 299 patients did not respond to the call, whose vaccination status is unknown so those were excluded. If they would have responded, compliance rate may vary from 76.4%.

Acknowledgements:

We express our sincere and heart full gratitude to the opportunity and support provided by Director cum Dean, Bangalore Medical College & Research Institute. We are extremely thankful for the support provided by all the faculties and post graduates of Department of Community Medicine, Bangalore Medical College & Research Institute, Bengaluru. We also thank the Interns of Anti Rabies Clinic, Victoria Hospital, Bengaluru. Last but not the least we

are thankful to all the study subjects for their cooperation without whom this study would not have been possible.

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The need for social protection interventions for Tuberculosis control

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Introduction

Tuberculosis (TB) remains a major public health challenge worldwide, with concentrated burden among lower socio-economic populace of low and middle-income countries. It is a leading killer among people in the most economically productive age groups. Those who are cured of TB can be left with lifetime sequelae that substantially reduce their quality of life.

In spite of significant progress made in tuberculosis control, there were estimated 9 million incident cases and 1.4 million deaths from TB globally in 2013. 2.1 million incident cases and 0.24 million deaths from TB were estimated to have occurred in India alone (1). Implementation of the Stop TB (DOTS) Strategy has cured millions of patients with TB and undoubtedly prevented premature mortality. However, at the current rate of decline, TB elimination by 2050 is considered impossible (2). Hence the need for social and economic protection interventions alongside and universal health coverage is advocated achieve WHO's post-2015 global end TB strategy.

Social Determinants of Tuberculosis:

Tuberculosis is a classic disease of poverty. Largest burden of disease is concentrated among the poor, vulnerable and marginalised populations (4). Although DOTS has significantly reduced TB morbidity and mortality, national TB incidence rates appear more closely correlated with social and economic determinants than to the success of DOTS (5). Key structural determinants of TB epidemiology include global socioeconomic inequalities, high levels of population mobility, and rapid urbanization and population growth (5).

Poor ventilation and overcrowding in homes and work-places increase likelihood of uninfected individuals being exposed to TB infection. Poverty, malnutrition and hunger may increase susceptibility to infection, disease and severity of clinical outcome. Individuals with TB often face significant social and economic barriers that delay their contact with health systems, including difficulties in transport to health facilities and lack of social support to seek care when they fall sick (5).

Action on social determinants of Tuberculosis:

Action on the social determinants of TB will require shifting the target to "the conditions in which people grow, live, work, and age." Although definitions vary, such approaches are sometimes referred to as structural interventions. These interventions often require leadership or significant involvement from outside the health sector (5).

Within this framework, 2 strategic entry points for action that will require collaboration with stakeholders from beyond the health care sector has been identified (shown in grey in figure 2). Growing consensus indicates that progress in tuberculosis control in the low and middle-income world will require not only investment in strengthening tuberculosis control programs, diagnostics, and treatment but also action on the social determinants of tuberculosis (5).

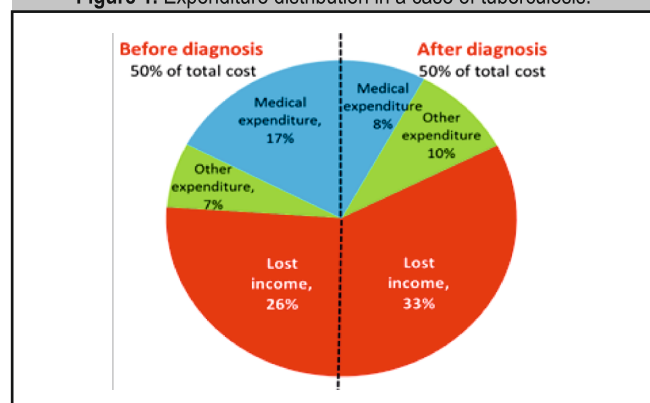
Most experts agree that only by addressing the social and economic determinants of tuberculosis, will countries see substantial declines in incidence of TB cases. There is growing evidence that social protection interventions can improve, directly and indirectly, clinical outcomes for people with TB, especially among the poorest. Economic support in combination with other types of assistance, has been associated with improved uptake of TB services, improved adherence to treatment and improved outcomes of treatment for drug-susceptible and MDR-TB (6). The social determinants of TB might be addressed by strengthening social protection and livelihood-strengthening interventions (5).

Table 1. Burden of Tuberculosis in India, 2013.

TB burden	Number (Millions) (95% CI)	Rate Per 1,00,000 Persons (95% CI)
Incidence	2.1 (2.0-2.3)	171 (162-184)
Prevalence	2.6 (1.8-3.7)	211 (143-294)
Mortality	0.24 (0.15-0.35)	19 (12-28)

Source: WHO, 2015 (1)

Figure 1. Expenditure distribution in a case of tuberculosis.



Source: WHO fact sheet 2013 (3).

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