# Magnitude of Presumptive Tuberculosis Cases, in the Rural Communities of North Western and North Eastern Parts of Amhara Regional State, Ethiopia

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## Abstract

Despite the availability of highly efficacious treatment for decades, TB remains a major global public health problem. Nearly one third of the world's population is infected with *Mycobacterium tuberculosis* (MTB) and hence at risk of developing active disease. Tuberculosis is a major cause of morbidity and mortality in Ethiopia, and the country belongs to one of the most affected high burden countries in the world. Presumptive tuberculosis cases which are individuals having cough duration of more than two weeks has been used as a quick TB diagnosis in rural settings. Determining the prevalence of presumptive tuberculosis cases in selected rural communities of north western and north eastern parts of Amhara regional state was the study objective. For this study 10 districts from North Gondar and North Wollo zones were purposefully selected and 26 kebeles were included where Kebeles selected randomly based on the district tuberculosis report. The study was cross-sectional conducted from March 15, 2016 to March 30, 2016. All households in the selected kebeles were considered as a study population. A house to house check was also used as message dissemination to all dwellers in the kebele to register presumptive tuberculosis cases and all reported to have the problem were registered. A pretested semi-structured questionnaire was administered to collect socio demographic and related information. The questionnaires were filled by data collectors and all the responses were kept confidential. The overall prevalence of presumptive tuberculosis at household level in both zones was 2%. A relatively higher household prevalence were found on Gebsye, Achera, Dib-bahir, Dabat Zuria, Kino, and Debot kebeles' with 3.9%, 4.0%, 5.3%, 6.0%, 7.0% and 8.1%, respectively. The mean presumptive cases per kebele was 28 cases. Dibbahir (57 cases), Achera (64 cases) and Debot (102 cases) kebeles' were found to have the highest count, which were more than twice the mean number of cases on the studied kebeles. The mean proportion of presumptive tuberculosis cases was found to be 441 cases per 100,000 population and the highest rates were found on Dabat Zuria, Achera, Dib-bahir, Kino and Debot kebeles' with 912 cases, 939 cases, 1230 cases, 1466 cases and 1888 cases, respectively per 100,000 populations. The magnitude of presumptive tuberculosis cases in the study areas was relatively high. Intensive health education, early case detection, frequent surveillance, diagnosis, real causes of chronic cough identifications & treatment are suggested to reduce the probable spread of the tuberculosis to a wider population.

## Background

TB is a chronic mycobacterial contagious disease caused primarily by *M. tuberculosis*, and occasionally by *M. bovis* and *M. africanum* in humans. The disease is, spreading through the air by coughing, sneezing, or spitting [1,2] and it has remained a public health challenge in the world and considered as a major cause of morbidity and mortality. Worldwide there are about 2 billion persons infected with TB, of which 5-10% will become sick in their life time [3,4]. Human tuberculosis is known in Ethiopia; according to the latest estimate, Ethiopia is one of the highest tuberculosis burden countries in the world, which ranks 8th amongst the 22 global tuberculosis high-burden countries. In a study carried out in 2014 in the country an overall prevalence of MDR-TB 5.7 % was reported where it was 2.3 % and 13.9% among new cases and previously treated cases, respectively [5].

The most common source of infection for TB is the human case whose sputum is positive for the tubercle bacilli (active TB patient). Moreover, those who are totally not treated or treated inadequately can also be used as a source of infection. People who have just started on TB treatment and who has a poor response to treatment can also be used as a source of infection and milk containing *Mycobacterium bovis* could be a source of infection to humans [1,6-8]. The source of infection for tuberculosis is mainly those patients who harbour the infectious agents; however, it has also been reported in a wide range of domestic and wild animals most frequently in animals, which have close and prolonged contact with humans. Among domestic animals,

infection with *M. tuberculosis* was identified in cattle and isolated from pathological lesions and milk of intradermal skin tested positive animals. The prevalence of diagnosis infection in cattle herds could reach to 7.4% [9]. It has also been reported that animal attendants with active pulmonary tuberculosis can serve as a source of *M. tuberculosis* for animals. Conditions like sharing common houses will facilitate infection of both populations [10].

According to WHO those individuals who suffered from cough with a duration of more than two weeks are expected to visit health institutes for tuberculosis diagnosis [11]. In most of our societies, chronic cough in a family is not seen as a problem. In most of our community health seeking behavior is less compared to others. Delay in the diagnosis of the problem might lead to severe health consequences apart from the possibility of being active pulmonary TB. Individuals who suffered from chronic cough will not devote much of their time to work and at times wasting time in finding solutions and therefore, resulting in lower participations in agricultural activities. Apart from the societal impacts of chronic cough, the indirect and direct economic losses could be magnificent if left untreated. The objective of this study was to assess the magnitude of presumptive tuberculosis cases in selected districts of North Gondar and North Wollo zones.

## Material and Methods

### Study areas

The study was conducted in 10 districts of North Gondar and North Wollo zones of the Amahra Regional State. North Gonadr zone is situated at Latitude: 12°39'29.05" and Longitude: 37°5'18.14. It is located at a distant of about 710km from Addis Ababa, capital of Ethiopia. While North Wollo zone is situated at Latitude: 11°55'12"" and Longitude: 39°5'59.99" and it is located at a distant of about 520 km from Addis Ababa, capital of Ethiopia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), north Gondar zone has a total population of 2,929,628, of whom 1,486,040 were men and 1,443,588 women with a population density of 63.76 and more than 74% lives in rural areas. A total of 654,803 households were counted in this Zone, which results in an average of 4.47 persons to a household. North wollo Zone has a total population of 1, 500, 303, of whom 752,895 are men and 747,408 women with a population density of 123.25. More than 87% of them are living in the rural settings. A total of 355,974 households were counted in this Zone, which results in an average of 4.21 persons to households [12]. A study conducted to evaluate health seeking behaviors in North Wollo zone indicated that 62.3% of the interviewed TB patients responded that they visit health institutes for consultation after 30 days of onset of the clinical signs [13]. Six and 4 districts were selected from North Gondar and North Wollo zones, respectively. Two to three Kebeles were included from each district.

### Study design and Selection

The study was a cross-sectional one conducted from March 15, 2016 to March 30, 2016. The study zones and districts were selected purposefully and based on some previous experiences. Study kebeles were selected based on relatively high tuberculosis cases or suspected case reports. If the numbers are more than three kebeles per district we used a simple random sampling technique to select the Kebeles. The health extension workers in each kebele tour house to house and enquire the presence of persons having a chronic cough with a duration of more than two weeks [11].

### Source and study Populations

Usual residents of the two study zones are considered as the source population while households in selected districts are considered as the study population.

### Exclusion criteria

For this study those under TB or other treatment against cough were not included in the study.

### Data collection

A pretested structured and semi-structured questionnaire was administered. All households were taken as a cluster and in each kebele, the required data were collected by using a house-to-house move and dissemination of the information through the developmental or health army teams. Those who had cough more than 2 weeks were interviewed on the spot and those heard the message were appear to the health post and gave information. The questionnaires were filled by data collectors.

### Data management and analysis

The collected questionnaire was checked for its completeness. The variables were coded as 0 (No) and 1 (Yes) and data were entered into excel spread sheet by the data clerk. The data were edited and cleared before analysis and exported to SPSS (20.0) Statistical Packages for Social Sciences [14]. Purely descriptive statistics was used to analyze the data and table and graphs as well as charts were used to present the findings.

### Ethical consideration

The research was approved by the university of Gondar ethical review board and then Amhara National health research center. Before starting the research permission was obtained from each zonal health departments and then district health offices. Almost all activities were facilitated by district tuberculosis officers. All participants gave oral consents and were explained about the study and told to withdraw from the research, if they are not willing. Those who identified as presumptive tuberculosis cases were registered by health extension workers and subjected to acid fast bacilli stain for further diagnosis and actions and these mandates was given to health extension workers to follow all the forthcoming procedures.

## Results

Of the participants 53.2%, 88.3%, 46.4% and 93.0% where males, farmers, illiterate and orthodox Christianity followers respectively (Table 1).

Six districts were included from North Gondar Zone accounting about 60% of the area and 461 (68%) of presumptive Tuberculosis cases were from it. Highest presumptive TB cases were recorded in Dabat (20%) (N. Gondar) and Gubalafto (20.3%) (N. Wollo) districts (Figure 1). The overall prevalence of presumptive tuberculosis cases at household level was 2%. A relatively higher household prevalence were found on Gebsye, Achera, Dib-bahir, Dabat Zuria, Kino, and Debot kebeles' with 3.9%, 4.0%, 5.3%, 6.0%, 7.0% and 8.1%, respectively. The

mean presumptive cases per kebele was 28+15.6 (95% CI: 26.84-29.16) cases. Dibbahir (57 cases), Achera (64 cases) and Debot (102 cases) kebeles' were found to have the highest count, which were more than twice the mean number of cases on the studied kebeles. The mean proportion of presumptive tuberculosis cases was found to be 441 cases per 100,000 population and the highest rates were found on Dabat Zuria, Achera, Dib-bahir, Kino and Debot kebeles' with 912 cases, 939 cases, 1230 cases, 1466 cases and 1888 cases, respectively per 100, 000 populations.

| Descriptive | Frequency | Per cent | Descriptive | Frequency | Per cent |
|---|---|---|---|---|---|
| **Sex** | | | **Religion** | | |
| Male | 362 | 53.2 | Orthodox Christian | 633 | 93 |
| Female | 319 | 46.8 | Muslim | 48 | 7 |
| **Occupation and income** | | | **Education** | | |
| Farmer | 601 | 88.3 | Illiterate | 316 | 46.4 |
| Employee | 20 | 3 | Primary | 214 | 31.4 |
| Trade | 7 | 1 | Secondary | 30 | 4.4 |
| Other | 53 | 7.7 | College/University | 9 | 1.3 |
| | | | Traditional | 112 | 16.4 |

**Table 1:** Sociodemographic characteristics of presumptive TB cases in the study areas, 2016.
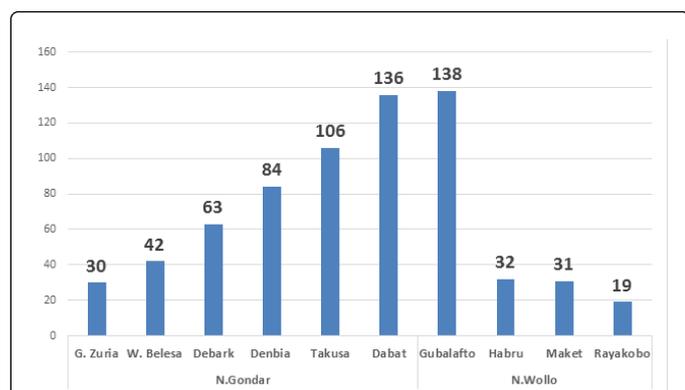


**Figure 1:** Distribution of Presumptive TB cases by Districts, 2016.



**Figure 2:** Contact history with tuberculosis patient and related points, 2016.

Of the participants 501 (73.6%), 535 (78.6%) and 153 (22.3%) tried to take treatments (either modern or traditional), owned animals and had contact with confirmed tuberculosis patients, respectively (Figure 2).

## Discussion

According to WHO 2014 global report of TB, the estimated prevalence of TB in Ethiopia was 211 per 100,000 populations (0.211%) [15]. In the present study, the overall prevalence of presumptive TB cases was 2%, which is higher than the above figure. The difference could be due to the fact that our study participants were TB suspected cases within the selected kebeles and the methodology used compared to WHO report.

On the other hand, a study conducted in Bahir Dar health center, Northwest Ethiopia among presumptive pulmonary TB patients who visited the health center the overall prevalence of smear positive PTB was 6.8% [16]. On similar studies conducted in South and Eastern part of Ethiopia, among presumptive cases the prevalence of smear positive TB was 9.2% [17] and 21.6% [5], respectively which are significantly higher than the finding of the present study. The difference could be due to the fact that our data was collected based on self-report and population difference.

The mean proportion of presumptive tuberculosis cases was found to be 441 cases per 100,000 populations, whereas the WHO annual estimate (2014) of an overall TB prevalence of the country is 211 per 100000 populations [15]. The higher prevalence in the current study could be due to the methodology used, study population, study setting as well as study time difference.

Tuberculosis affects all age and sex groups. According to a study in Ethiopia the age groups 15-45 were more affected than other groups [5]. In contrast, in the present study relatively high prevalence of presumptive TB (11%) was observed among people aged between 45-50 groups followed by 35-40 and 25-30 age groups with 10.7 and 10.1% prevalence respectively. On the other hand, relatively smaller prevalence (4.1%) were found on study subjects belonging 15-20 age

groups, while the mean age of the study participants were 28.4 years. This can be explained by the fact that our study participants who were of course presumptive TB suspected cases in which the possibility of being positive for TB is higher as age of study subjects increases.

According to 2014 World TB report, WHO declared that most TB cases and deaths occur among males, which is in line with the present study where 53.2% of the presumptive TB cases were males. However burden of the disease is also high among women. The global attention to maternal and child health created demand for interest in detection and management of TB among women [15].

In relation to contact history, more than three fourth (77.5%) of the respondents were associated with a history of having contact with TB patients. This result was a little bit higher than Yohanes et al. in 2012 [18] where 41% of the study participants in metehara sugar factory hospital suspected cases had contact with chronic coughers (TB infected patients). On the other hand, a lower close contact history (only 4.5%) was also found on the first Ethiopian national population based tuberculosis prevalence survey in 2011 [19]. The difference could due to the difference in diagnostic approach, population difference and study time.

In this study, the majority of presumptive TB cases (88.3%) were farmers by profession and illiterates (46.4%) regarding their educational background. Similarly, farmers account about 49.6% on the first Ethiopian national population based tuberculosis prevalence survey in 2011 [19]. This could be attributed by the inclusion of large sample size and study approaches.

As far as family size is concerned, household having 5 family size was found to have greater proportion of presumptive TB cases. This is in line with similar study conducted in Bahir Dar health center, Northwest Ethiopia [16]. This could explained by the socio-demographic similarity of the study subjects and closeness of the study period. Considering only the prevalence of presumptive tuberculosis cases, lack of collecting sputum samples, lack of identification of the possible causes of chronic coughers were the limitations of this study.

## Conclusion and Recommendations

In conclusion, the prevalence of presumptive TB cases at household level was 2% in the rural communities of north western and north eastern parts of Amhara regional state. More frequencies regarding presumptive TB cases were reported among 45-50 age groups, male sex, and households having 5 family sizes. Hence, it is recommend strict presumptive TB screening, early case finding and treatment among households and intensive health education to reduce the chance of spread of the disease. It is also wise to recommend longitudinal studies with advanced laboratory techniques and chronic cough causes identifications.

## Acknowledgement

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