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Health-care seeking among people with cough of 2 weeks or more in India. Is passive TB case finding sufficient?

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Setting: Thirty districts of India.
Objectives: To estimate 1) the proportion of people with cough of ⩾2 weeks, 2) those who did not seek care from a health care provider for cough, and 3) their characteristics.
Methodology: A cross-sectional community-based survey in which 4562 people (aged ⩾18 years) were interviewed.
Results: Of the 4562 individuals interviewed, 437 (9.5%, 95%CI 7.2–11.8) had cough ⩾2 weeks; this was more frequent in those >55 years of age (14%) and in those from districts in eastern (12%) and northern (11%) states of India. Of those with cough, 300 (69%, 95%CI 60–77) had not sought care from any health care provider. Not seeking care was more frequent in people residing in rural areas (73%) compared with urban areas (53%), and in the districts of eastern (82%) and northern (74%) states compared to districts from the southern (46%) and western (54%) states.
Conclusions: Nearly a tenth of those interviewed aged ⩾18 years had cough of ⩾2 weeks. About two thirds, especially those from rural areas, had not visited a health care provider for the cough. This finding has huge implications for India's current mostly passive case-finding strategy for detecting and controlling tuberculosis.

Tuberculosis (TB) remains one of the world's most common infectious diseases, with an estimated global annual incidence of more than 9 million cases.[1] Early diagnosis and appropriate treatment for the vast majority of people who develop pulmonary TB is the epidemiological basis of global TB control efforts.[2]

To detect pulmonary TB cases early, cough of ⩾2 weeks is considered one of the most important symptoms.[3] According to the International Standards for Tuberculosis Care, 'all persons with otherwise unexplained productive cough lasting 2–3 weeks or more should be evaluated for tuberculosis'.[4]

India is a high TB burden country with an estimated annual incidence of more than 2 million cases. According to the Government of India's Revised National TB Control Programme (RNTCP) guidelines, persons with cough of ⩾2 weeks, with or without other symptoms, are referred to as 'pulmonary TB suspects' requiring evaluation for TB.[5] To undergo this evaluation, pulmonary TB suspects must seek care from local health providers, as the RNTCP currently uses a passive case detection strategy. Active case finding is not advocated, except in human immunodeficiency virus (HIV) infected persons, under the premise that people with TB usually seek care from health care providers.[6]

Nationally representative information on the care-seeking behaviour of individuals with a cough of ⩾2 weeks is limited. A community-based survey was therefore conducted to estimate 1) the proportion with cough of ⩾2 weeks, 2) those who did not seek care from a health care provider for their cough, and 3) their characteristics.

METHODS

Study setting

A large Global Fund Project (IDA-910-G16-T) has been implemented since April 2010 in 374 of the 650 districts in India to strengthen the ongoing TB control efforts of the RNTCP by creating awareness and facilitating community mobilisation (http://www.axshya-theunion.org/). One of the key activities under this project is to raise awareness among the general population that cough of ⩾2 weeks is an important symptom of TB and that affected individuals should undergo appropriate evaluation. A baseline survey was conducted to assess the level of knowledge among the general population on the various aspects of TB (cause, symptoms, diagnosis, treatment, curability, information about RNTCP services). As a part of this survey, people were asked whether they had had cough of ⩾2 weeks in the past 2 months and, if so, whether they had sought care from a health care provider.

Study design, study site and study population

This was a cross-sectional survey; 30 of the 374 Global Fund Project Districts were selected by a stratified cluster sampling methodology described in detail elsewhere.[7] In brief, districts were initially stratified into the four RNTCP zones (north, south, east and west) of the country. The number of districts selected in each zone was proportionate to the distribution of the 374 districts in the respective zones.

Districts were further subdivided into primary sampling units (PSUs), each of 250–300 households. These PSUs were 'villages' for rural areas and 'wards' for urban areas. Ten PSUs were selected from each district by random sampling; the urban to rural ratio of the PSUs in each district was maintained in proportion to the district's actual urban to rural population ratio.

Sample size and selection of study participants

Sample size was calculated for estimating the proportion of the general population with appropriate knowledge on the various aspects of TB (the primary objective of the survey). It was assumed that 50% of the

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This study was conducted as part of the baseline survey for the advocacy, communications and social mobilisation activities under the Global Fund Round 9 India TB Project. The funds for conducting this survey were provided by The Union South-East Asia Regional Office, from the Global Fund Grant. The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. Conflict of interest: none declared.

KEY WORDS
cough; tuberculosis; symptoms; India; health-seeking behaviour; early diagnosis; case finding

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general population had correct knowledge about various aspects of TB; to estimate this with an absolute precision of ±10% with 95% confidence, a design effect of 1.5 and a non-response rate of 20%, 150 individuals per district were selected, with at least 15 from each PSU.

In every PSU, a house listing process was conducted. This involved assigning numbers to each residential structure, recording the address and location of the structures, collecting the name, age and sex of all individuals in the households and identifying the head of the household. Fifteen people aged ⩾18 years selected by systematic random sampling were interviewed from each PSU. An almost equal number of males and females were selected from each PSU and district.

Study investigators, data collection, study instrument and study variables

The study was implemented by the International Union Against Tuberculosis and Lung Disease (The Union) South-East Asia Regional Office with assistance from field investigators of the social research organisation GfK MODE (http://www.gfk-mode.com/). Trained field investigators visited the preselected primary sampling units during the months of January to March 2011 and conducted the survey.

A pretested, semi-structured questionnaire was translated into the nine local languages (Hindi, Punjabi, Telugu, Kannada, Malyalam, Oriya, Tamil, Bengali and Marathi). The relevant variables included in the interview were: age, sex, total current monthly household income from all sources (in Indian rupees), literacy status (illiteracy was defined as an inability to read or write in any language), whether the individuals had had cough of ⩾2 weeks in the past 2 months, and whether they had visited any health care provider (qualified or unqualified, government/private sector and practitioners of any form of medicine, allopathic or alternative) to seek care for their cough. Given the large, decentralised nature of data collection, and based on experience during pre-testing of the study methodology, the questionnaire was simplified for interviewees to understand and respond reliably. Ten per cent of the data collected by the field investigators were cross-checked by supervisors in each district; the interview process was repeated if the error was more than 5%.

Ethical considerations

The study protocol was reviewed and approved by the Ethics Advisory Group of The Union. The study was conducted with the approval of the RNTCP. Prior to conducting the survey, permission was also obtained from the community heads/representatives of the primary sampling units in each district, and consent was obtained from all those interviewed.

Data entry and analysis

Data collected from the field by the investigators were entered into a pre-structured format in Fox Pro version 2.6 (Microsoft Corp, Redmond, WA, USA), cross-verified for consistency and analysed using EpiData version 2.2.1 (EpiData Association, Odense, Denmark) and Epi Info version 7.0.8.3 (Centers for Disease Control and Prevention, Atlanta, GA, USA). The primary outcome variables (presence of cough and, when cough was present, whether care had been sought from a health care provider) were summarised by proportions; 95% confidence intervals (95%CI) were calculated using cluster analysis with districts as the basic sampling units to account for cluster sampling methodology. The data were then disaggregated, based on the primary outcome variables, into those with cough and those without and those who had sought care and those who had not. The association of the primary outcome variables with the other socio-demographic variables was studied using odds ratios (OR), adjusted OR (derived from unconditional logistic regression) and 95%CI. $P < 0.05$ resulting from logistic regression was considered statistically significant.

RESULTS

Of 4562 people interviewed, 49% were females, 80% were in the age group 25–54 years, 74% were from rural areas, 31% were from the states in the eastern zone and 23% each from states in the southern, western and northern zones; 31% were illiterate and 65% were from households whose current monthly income was ⩽4000 Indian Rupees (INR; US$1 = ~50 INR).

Overall, 437 (9.5%, 95%CI 7–12) people stated that they had had cough of ⩾2 weeks in the past 2 months prior to the survey. The proportion with cough varied from 7% to 14% across the various socio-demographic characteristics. Cough was more frequent in people aged ⩾55 years than among those aged 18–25 years, and in people from the eastern and northern zones as compared to those from the southern and western zones (Table 1).

Of the 437 persons with cough of ⩾2 weeks, 300 (69%, 95%CI 60–77) had not visited a health care provider for care. This proportion varied from 42% to 82% according to the various socio-demographic characteristics. A higher proportion of people in rural areas and in the eastern and northern zones had not sought care compared with those from urban areas and from the southern and western zones of the country (Table 2).

DISCUSSION

This is one of the few recent community-based surveys to provide information on the proportion of individuals in the community with cough of ⩾2 weeks who have not sought care from a health care provider. In a high TB burden country such as India, this information is of public health importance and highlights one of the key challenges in the early diagnosis of TB.

First, a large proportion (~10%) of those interviewed appeared to have had cough of ⩾2 weeks and therefore required evaluation for TB. The proportion who reported a cough of ⩾2 weeks in the past 2 months in the survey is also consistent with other regional/local surveys conducted in India,[8,9] given that these surveys included only individuals with cough on the day of the survey.

Second, and more importantly, the finding that nearly two thirds of individuals with cough ⩾2 weeks had not sought care emphasises the need to review India's current TB case-finding strategy, which relies heavily on passive case finding, whereby TB is identified by health care providers among individuals with cough ⩾2 weeks presenting to health facilities. The passive case-finding strategy was developed as a result of research from India and other parts of the world in the latter part of the last century, which showed that most patients with TB sought health care at some time during the course of their disease.[8] The present study, however, shows that this strategy may not be sufficient or appropriate in ensuring an early diagnosis of TB. Faced with similar scenarios, multiple additional approaches have been adopted in many other countries and have been found to be effective in detecting additional TB cases.[9–11] It is therefore necessary to review the current approach in India and strengthen the existing passive case detection strategy using a judicious mix of active and enhanced case finding.

The primary difference between active and enhanced case-finding approaches is the level of direct interaction with the target

TABLE 1 Characteristics of persons with cough of ⩾2 weeks in the last 2 months in a community-based survey in India, 2011 (N = 4562)

Characteristic	*n*	People with cough *n* (row %)	OR (95%CI)	Adjusted OR (95%CI)	*P* value
Sex					
Female	2242	232 (10)	Referent	Referent	
Male	2320	205 (9)	0.8 (0.6–1.0)	0.8 (0.67–1.02)	1.08
Age group, years					
18–24	692	64 (9)	Referent	Referent	
25–34	1266	101 (8)	0.8 (0.6–1.2)	0.8 (0.6–1.2)	0.34
35–44	1427	141 (10)	1.1 (0.8–1.5)	0.9 (0.7–1.3)	0.75
45–54	957	100 (10)	1.1 (0.8–1.6)	1.0 (0.7–1.4)	0.46
⩾55	220	31 (14)	1.6 (1.0–2.6)	1.8 (1.1–2.9)	0.01*
Residence					
Urban	1174	103 (9)	0.9 (0.6–1.2)	1.0 (0.8–1.3)	0.86
Rural	3388	334 (10)	Referent	Referent	
Zone					
North	1067	114 (11)	1.5 (1.0–2.0)	1.5 (1.1–2.1)	<0.01*
East	1399	169 (12)	1.7 (1.2–2.2)	1.7 (1.3–2.3)	<0.01*
West	1052	76 (7)	0.9 (0.7–1.3)	1.0 (0.7–1.4)	0.82
South	1044	78 (7)	Referent	Referent	
Literacy status					
Illiterate	1394	160 (11)	Referent	Referent	
Literate	3168	277 (9)	0.7 (0.6–0.9)	0.9 (0.7–1.2)	1.49
Household income, INR†					
⩾4000	1580	127 (8)	Referent	Referent	
<4000	2875	304 (10)	1.3 (1.0–1.7)	1.3 (1.0–1.6)	0.05
Don't know	107	6 (6)	0.7 (0.2–1.6)	0.6 (0.2–1.4)	0.24

*Statistically significant.
†US$1 = 50 Indian Rupees (INR).
OR = odds ratio; CI = confidence interval.

TABLE 2 Characteristics of persons with cough of ⩾2 weeks who have not sought care from any health care provider in a community-based survey in India, 2011 (n = 437)

Characteristic	*n*	People who have not visited any health care provider *n* (row %)	OR (95%CI)	Adjusted OR (95%CI)	*P* value
Sex					
Female	232	164 (71)	1.2 (0.7–2.0)	1.0 (0.6–1.6)	0.88
Male	205	136 (66)	Referent	Referent	
Age group, years					
18–24	64	43 (67)	Referent	Referent	
25–34	101	75 (74)	1.4 (0.7–3.0)	0.9 (0.4–2.0)	0.94
35–44	141	100 (71)	1.2 (0.6–2.4)	0.8 (0.4–1.6)	0.57
45–54	100	66 (66)	0.9 (0.4–1.9)	0.5 (0.2–1.1)	0.12
⩾55	31	16 (51)	0.5 (0.2–1.4)	0.4 (0.1–1.1)	0.09
Residence					
Urban	103	55 (53)	Referent	Referent	
Rural	334	245 (73)	2.4 (1.1–5.2)	1.7 (1.05–2.9)	0.03*
Zone of the country					
North	114	85 (74)	3.4 (1.7–6.6)	2.5 (1.3–4.8)	<0.01*
East	169	138 (82)	5.2 (2.7–9.8)	3.9 (2.0–7.3)	<0.01*
West	76	41 (54)	1.4 (0.6–2.7)	1.3 (0.6–2.6)	0.45
South	78	36 (46)	Referent	Referent	
Literacy status					
Illiterate	160	126 (79)	1.4 (1.0–1.7)	1.6 (1.0–2.7)	0.05
Literate	277	174 (63)	Referent	Referent	
Household income, INR†					
⩾4000	127	73 (57)	Referent	Referent	
<4000	304	221 (72)	1.9 (1.2–3.1)	1.3 (0.8–2.1)	0.29
Don't know	6	6 (100)	NA	NA	

*Statistically significant.
†US$1 = 50 Indian Rupees (INR).
OR = odds ratio; CI = confidence interval.

population. While active case finding is more resource-intensive, involving direct contact and immediate onsite evaluation, enhanced case finding increases awareness about TB symptoms in the target population through targeted communication and coordinated community mobilisation, and encourages people to seek appropriate services.[12,13] Only then can the country capitalise on the gains evident from achieving case detection and treatment outcome rates consistent with global targets over the last several years, and move quickly to achieving universal access and better TB control.[14] The recommendation to expand the case-finding strategy in India is not new; it was previously proposed by eminent Indian TB epidemiologists in 1981 and 1996, after a detailed review of the issues and challenges related to TB case finding in the context of India.[15,16]

Third, the data from this study provide an approximation of the volume of TB diagnostic services required in the country. In India, about 800 million people are aged ⩾18 years; if 7% (a conservative estimate based on the lower 95%CI levels from this study) fulfil the criteria for being eligible for TB diagnostic services by having at least an episode of cough ⩾2 weeks, this would amount to nearly 56 million people. Currently, each year, under the RNTCP, ~7 million people undergo sputum smear examination in ~13 000 designated microscopy centres for the diagnosis of TB.[17] There is a need to enhance laboratory capacity to cater for an approximately nine-fold increase in the demand for TB diagnostic services, if all persons with cough ⩾2 weeks actually sought care as a result of an expansion of the case-finding strategies.

Finally, there are several reasons why people may not seek care for cough of ⩾2 weeks' duration. Previous studies have indicated that if a cough is not distressing or associated with any other symptoms that restrict one's ability to function/work, people do not usually seek medical care.[18] The other important reasons why people do not seek care include inadequate awareness that cough of ⩾2 weeks' duration might be a symptom of a serious disease such as TB and/or due to lack of appropriate affordable health care facilities in the vicinity.[19–21] India is a diverse country, and studies conducted in some areas may not necessarily represent the situation across the country. Understanding why people have not sought care is very important; this needs to be assessed through qualitative research studies across the country to develop appropriate interventions to address the issue.

Limitations

The study had a number of limitations. First, the data to answer this research question were collected as part of a large survey with a different primary objective. The sample size was calculated to obtain estimates for the primary objective, and we may therefore not have sufficient power to identify differences between the various sub-groups. Nevertheless the information provides useful insights for TB control in the country, and for the Global Fund Round 9 India TB project in particular. Second, the data reported here concern the presence or absence of cough of ⩾2 weeks rather than the exact duration and nature of the cough (e.g., persistent/productive) and presence or absence of other symptoms associated with cough. Third, we focused on reporting information on persons who did not seek care rather than providing data on persons who had sought care, where they had sought care and whether or not it was appropriate. We did this intentionally, as we had found, during the pretesting of the study methodology and questionnaire and while analysing the data, the information on those who did not seek care to be most valid and reliable, given the large volume of data that was collected across diverse settings in 30 districts.

CONCLUSIONS AND RECOMMENDATIONS

This survey shows that nearly one in 10 people aged ⩾18 years in the community suffered from cough of ⩾2 weeks, and that two thirds of those identified with cough had not sought care from a health care provider. This has huge implications for the early diagnosis of TB, and highlights the need to review India's case-finding strategies and the scope for civil society engagement and community mobilisation for better TB control.

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Contexte : Trente districts en Inde.
Objectifs : Estimer 1) la proportion de sujets se plaignant de toux pendant ⩾2 semaines, 2) ceux ne recourant pas à des soins provenant de n'importe quel pourvoyeur de soins de santé pour la toux, et 3) leurs caractéristiques.
Méthodologie : Il s'agit d'une enquête transversale basée sur la collectivité dans laquelle on a interviewé 4562 sujets âgés de ⩾18 ans.
Résultats : Parmi les 4562 sujets interviewés, 437 (9,5% ; IC95% 7,2–11,8) toussaient depuis ⩾2 semaines et la toux a été plus fréquente chez ceux âgés de >55 ans (14%) ainsi que chez ceux provenant des districts des états de l'Est (12%) et du Nord (11%) de l'Inde. Parmi ceux se plaignant de toux, 300 (69% ; IC95% 60–77) n'avaient recouru aux soins d'aucun pourvoyeur de soins de santé. Le fait de ne pas recourir aux soins est plus fréquent chez les sujets habitant les zones rurales (73%) que les zones urbaines (53%), ainsi que dans les districts des états de l'Est (82%) et du Nord (74%) par comparaison aux districts des états du Sud (46%) et de l'Ouest (54%).
Conclusions : Environ un dixième des sujets interviewés d'un âge ⩾18 ans se plaignent d'une toux depuis ⩾2 semaines. Environ deux tiers, particulièrement ceux des zones rurales, n'ont recourt à aucun pourvoyeur des soins de santé pour cette toux. Cette observation comporte des implications majeures pour la stratégie actuelle, principalement passive, du dépistage des cas en vue de la détection et de la lutte contre la tuberculose.

Marco de referencia: Treinta distritos de la India.
Objetivos: 1) Calcular la proporción de personas que referían tos de ⩾2 semanas de evolución; 2) determinar quienes no buscaron atención de ningún profesional de salud por la tos; y 3) definir las características de las personas.
Método: Fue este un estudio comunitario transversal en el cual se entrevistaron 4562 personas (de ⩾18 años de edad).
Resultados: De las 4562 personas entrevistadas, 437 refirieron tos de ⩾2 semanas de duración (9,5%; IC del 95% de 7,2 a 11,8); con mayor frecuencia se trató de personas de >55 años de edad (14%) y provenientes de distritos de los estados del este (12%) y del norte (11%) de la India. De las personas con tos, 300 no buscaron atención sanitaria de ningún tipo (69%; IC95% de 60 a 77). No acudir en busca de atención sanitaria fue más frecuente en las personas que residían en zonas rurales (73%) que en las zonas urbanas (53%) y también en los distritos del este (82%) y del norte (74%), más que en los distritos del sur (46%) y el occidente (54%).
Conclusión: Cerca de un 10% de las personas entrevistados ⩾18 años de edad presentaba tos de ⩾2 semanas de duración. Alrededor de dos tercios no habían consultado a ningún profesional sanitario por la tos, sobre todo en las zonas rurales. Estos resultados tienen una repercusión importante en el enfoque de búsqueda pasiva de casos que predomina en la actualidad en la India como estrategia de detección y control de la tuberculosis.

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