

# IMPACT OF EDUCATION AND MEDIA EXPOSURE ON TUBERCULOSIS RELATED AWARENESS AMONG INDIAN ADULTS: A STUDY BASED ON NFH-3

Barman P<sup>1</sup>

<sup>1</sup> Assistant Professor in Economics, Faculty of Commerce and Management, St. Xavier's University, Kolkata, India

## ABSTRACT

**Introduction:** Lack of awareness about a contagious disease like pulmonary tuberculosis (TB) among the general population may be a hindrance to early prevention of infection and timely care-seeking, besides being a stigma fuelling factor. The objective in this study is to identify the roles of education and media exposure on correct knowledge regarding the route of TB transmission across selected low awareness geographical regions of India, one of the 30 high TB burden countries according to the WHO.

**Methods:** The study is based on NFHS 3 (2005-06) unit level data on adult men and women using basic statistical tools and logistic regression analysis.

**Results:** Adults of both sexes in the northern, central and eastern regions of India are found to have lower than all India share of correct knowledge about the route of TB transmission. Education seems to be positively impacting correct knowledge among women in all three regions and among men, only in the East. Good exposure to mass media significantly raises the probability of correct knowledge among both genders in the east while leaving no impact in the north and central regions.

**Conclusion:** Adoption of a more holistic approach in fighting TB is the need of the hour. Besides addressing the medical aspect of the disease, region-specific deeper socio-economic factors like education and media exposure that can potentially impact disease related knowledge and awareness need to be incorporated in attempts to control TB particularly in a high endemic country like India.

**Key words:** Tuberculosis, Correct knowledge, Education, Media exposure

## INTRODUCTION

Tuberculosis (TB), though an ancient scourge, remains a public health emergency contributing substantially to the global burden of disease. India features as one of the thirty high TB burden countries identified by the WHO, accounting for more than a quarter of the annual global incidence of TB<sup>1</sup>. The Revised National Tuberculosis Control Program (RNTCP) with the Directly Observed

Treatment, Short Course (DOTS) has steadily brought down TB prevalence and mortality in India over the years. However, it has failed to have much impact on the incidence of TB in India, implying that although the initiation of affected persons into the treatment trajectory has been taken care of to some extent, the aspects of prevention and completion of treatment have not been satisfactorily attended to. In this context, awareness regarding TB is expected to play an important role in prevention through timely care seeking and treatment completion, thus lowering incidence of the disease. Literature provides support to the role of education and media in impacting TB related awareness<sup>2,3,4,5</sup>. However, the situation among adults in India at a regional level with respect to TB related awareness and its correlates remains understudied. The pathways for better access to treatment of TB are not achieved

### Correspondence:

Ms. Paramita Barman  
Assistant Professor in Economics  
Faculty of Commerce and Management  
St. Xavier's University  
Action Area IIIB, Plot IIIB/1  
New Town, Kolkata 700160, India  
E-mail: paramitabarman11@gmail.com

only through mere physical availability of curative facilities and patients' affordability, but are also intertwined with the non-medical societal response of accepting and accommodating patients into the supply side network. These factors are expected to be improved with general education and wider exposure to mass media, along with improvement in some of the basic demographic and socio-economic characteristics. Given this background, the objectives of the present study are two-fold:

- (i) Identifying regions in India where TB related awareness levels of both adult men and women are lower than their respective all India counterparts.
- (ii) Determining the impacts of education and mass media exposure on the TB related awareness of both genders in the identified problem regions.

## METHODOLOGY

The current study is based on the National Family Health Survey (NFHS) 3 (2005-06) unit level data for 62,570 men and 96,556 women in India. It also makes use of household level data to determine the prevalence of TB. The present study makes an attempt to explore the impacts of education and media exposure on tuberculosis related awareness with socio-economic variables in control, for adult men and women across identified poor performing low- awareness regions in India. Apart from simple statistical tools, the specific econometric method used in for the study is Logistic Regression Analysis and data has been analyzed with the help of the Stata 12 software.

The paper has tried to capture TB related awareness in terms of whether individual respondents had '*correct knowledge without misconceptions about the mode of transmission of TB*'. In NFHS-3, questions regarding tuberculosis transmission process were imposed on only those individuals who responded as 'yes' to the question

- *Have you ever heard of an illness called tuberculosis or TB?*

The share of respondents who answered as 'no' to the above question is 8.03 percent and 12.33

percent for men and women respectively. Our dataset comprises of those respondents who conformed to ever having heard of the disease, since hearing about TB ever is a necessary prerequisite for having any further knowledge about transmission of TB. The specific question asked by NFHS 3 that addresses the particular issue of correct knowledge is:

- *How does tuberculosis spread from one person to another?*
  - i. By air when coughing or sneezing
  - ii. By sharing utensils
  - iii. By touching a person with TB
  - iv. Through food
  - v. By sexual contact
  - vi. By mosquito bites
  - vii. By sharing clothes/bed/towel
  - viii. By blood/blood transfusion
  - ix. By smoking bidis/cigarettes/tobacco
  - x. By spit/sputum/stepping on spit
  - xi. Don't know

Individuals having '*correct knowledge without misconceptions about TB transmission*' are those who responded as 'yes' to the first option, i.e. 'By air when coughing or sneezing' and 'no' to all of the rest, which are misconceptions. Individuals with incorrect knowledge about TB transmission therefore include

- those who said 'yes' to one or more of the remaining options despite saying 'yes' to the first one
- those who said 'no' to the first option
- those who responded as 'Don't know'

Only identifying the actual route of TB transmission could have been taken as the base for correct knowledge, notwithstanding the fact whether the person is choosing any other wrong route(s) besides the actual one. However, this is not only technically and medically unacceptable, but also has certain implications for stigma that arises largely from perceived knowledge about transmission of disease. Hence in this study those who have reported only the first route have been taken as possessing correct knowledge about TB transmission (without misconceptions).

The generated variable '*correct knowledge about TB transmission without misconceptions*' is the

dependent variable in the study. It is a binary variables taking values 0 (misconception) and 1 (correct knowledge without misconception). The explanatory variables that have been considered are 'highest individual education level' and 'media exposure'. Highest individual education level is a categorical variable with categories 'no education' and 'primary' clubbed as 'primary and below'; the other two categories are 'secondary' and 'higher'. The three forms of media considered by NFHS-3 during interview were newspaper/magazine, radio and television. The paper briefly describes how the explanatory variable 'media exposure' has been generated: those who read newspapers 'not at all' and 'less than once a week' have been clubbed as 'irregular exposure' while those who read it 'at least once a week' and 'almost every day' have been clubbed as 'regular exposure'. A similar exercise has been repeated for each of radio and television. The paper then defines individuals with 'poor mass media exposure' as those who had irregular exposure to all three and/or regular exposure to any one form of media and 'good mass media exposure' as those who had regular exposure to at least two forms of media. The control variables considered are:

- *Age:* 15-54 for men and 15-49 for women
- *Residence:* Urban and Rural
- *Religion:* Hindu and Non-Hindu
- *Reservation:* Reserved (Scheduled Caste & Scheduled Tribe) and Non-Reserved (Other Backward Classes & Others)
- *Wealth Index:* Poor, Middle Income and Rich
- *Occupational Status:* Unemployed and Employed
- *Family Structure:* Nuclear and Non-Nuclear

NFHS-3 provides data for 29 states across India. Since the paper intends to carry out the exercise across selected geographic regions of India, 29 states have been clubbed into 6 geographic regions as Table 1 shows.

## RESULTS

### *Regional variation in correct knowledge*

From Table 2: Shares of Correct Knowledge & Stigma among Men & Women across Regions of India it is seen that at all India level, only 1.88 percent households report as having a member who suffers from TB. When looked across regions, northeast has the highest share of households who report positive TB status of a family member, followed by the east. The percentage is lowest in the north. The unit of enquiry being the household when looking at TB prevalence, there is no variation in the reported percentage between men and women. At all India level, 25 percent men and 19.41 percent women possess correct knowledge without misconception about TB transmission. East performs worst in terms of correct knowledge. North, central and east have lower than all India share of correct knowledge among both men and women. In this analysis, the critical regions for correct knowledge are identified as north, central and east. Thus it is pertinent to locate the possible barriers to increasing correct knowledge regarding TB among the general population in India. Identifying causal determinants in particular regions, with their demographic and socioeconomic characteristics in control, is expected to help policy makers to locate the specific sectors to intervene for best results.

**Table 1: Geographical regions of India**

NORTH	CENTRAL	EAST	NORTHEAST	WEST	UTH
J & K Himachal P Uttaranchal Haryana Delhi Punjab Rajasthan	Uttar P Chhattisgarh Madhya P	West Bengal Jharkhand Bihar Orissa	Sikkim Arunachal P Manipur Mizoram Nagaland Tripura Meghalaya Assam	Gujarat Maharashtra Goa	Andhra P Karnataka Kerala Tamil Nadu

Source: Analysis of NFHS 3 unit level data

Table 2: Shares of Correct Knowledge & Stigma among Men & Women across Regions of Ind												
	NORTH		CENTRAL		EAST		NORTHEAST		WEST		SOUTH	
	M	W	M	W	M	W	M	W	M	W	M	W
TB prevalence in households	1.23		1.93		2.47		2.95		1.54		1.29	
Correct Knowledge	18.60	15.65	12.48	10.86	16.65	9.90	31.14	23.67	35.02	30.33	31.81	28.66
Education above primary %	74.94	58.42	66.97	44.20	64.18	47.23	74.61	63.77	82.05	70.62	73.77	67.66
Media exposure Good%	63.81	42.69	58.70	34.38	54.06	30.97	61.65	45.47	74.50	55.92	74.69	52.82

Source: Analysis of NFHS-3 unit level data. All values in percentages

Table 3: Logistic Regression Results for Correct Knowledge: Men						
Variables	NORTH		CENTRAL		EAST	
	OR	Marginal effect	OR	Marginal effect	OR	Marginal effect
Education Primary & below Ref						
Secondary	1.03	0.005	0.95	(-) 0.005	1.43***	0.05
Higher	1.19	0.03	1.01	0.001	2.08***	0.11
Poor media exposure Ref						
Good	0.94	(-) 0.01	1.04	0.005	1.6***	0.06
Age of the respondent (in years)	0.99*	(-) 0.001	0.99	0	1.01**	0.001
Residence Urban Ref						
Rural	0.9	(-) 0.02	0.77***	(-) 0.03	1.52***	0.05
Religion Hindu Ref						
Others	1.03	0.005	1.01	0.001	0.46***	(-) 0.08
Caste Reserved Ref						
Unreserved	1	0	1.09	0.01	1.35***	0.04
Wealth index Poor Ref						
Middle	1.22	0.03	1.54***	0.05	1.11	0.01
Rich	1.62***	0.07	1.44***	0.04	1.15	0.02
Occupation Unemployed Ref						
Employed	0.82**	(-) 0.03	0.91	(-) 0.01	0.81*	(-) 0.03
Family structure Nuclear Ref						
Non-nuclear	1.03	0.005	0.98	(-) 0.002	0.85**	(-) 0.02

Source: Analysis of NFHS-3 unit level data, \*\*\* significant at 1 per cent level, \*\* significant at 5 per cent level, \* significant at 10 per cent level

**Results of Causal Analysis: Effects of education and media exposure on TB related correct knowledge**

The logistic regression results for TB related correct knowledge for both men and women across the northern, central and eastern regions of India are summarized in Table 3&4. All the regressions satisfy the F-Test.

From Table 3, we find no impact of education (secondary or higher) or better exposure to mass media exposure on TB related correct knowledge of transmission without misconceptions among men in the northern and central regions, though both appear to have significant control in the eastern zone. The marginal effect of higher education in the east is quite strong. The corresponding marginal effect from media exposure, though significant, is far lower in that region. Among the control variables, the effect on correct knowledge appears

to be heterogeneous in nature and degree. Older respondents have better knowledge in the east, though no such crucial impact is recorded in other regions. Geographical locations have opposite impacts in central and eastern regions. While in the former the people in the rural areas have lower awareness about correct knowledge, the opposite appears to be true in the latter. Religion and ethnicity have strong presence in the east as men belonging to religious groups other than the Hindus and socially backward castes have far lower correct knowledge. No such impact is found in the other two regions. Economic status has significant impact in the central and northern zones.

Similar analysis for women in Table 4 below reveals far stronger impact of education on correct knowledge across regions, with marginal effects highest in north region. The impact of exposure to media, however, is only statistically significant in eastern region. Similar to the men, geographical

Table 4: Logistic Regression Results for Correct Knowledge: Women						
Variables	NORTH		CENTRAL		EAST	
	OR	Marginal effect	OR	Marginal effect	OR	Marginal effect
Education Primary & below Ref						
Secondary	1.45***	0.05	1.24***	0.02	1.93***	0.06
Higher	1.82***	0.09	1.35***	0.03		
Poor media exposure Ref						
Good media exposure	0.97	(-) 0.004	1.01	0.001	1.23***	0.02
Age of the respondent (in years)	1	0	0.99**	(-) 0.001	1	0
Residence Urban Ref						
Rural	1.05	0.01	0.66***	(-) 0.04	1.33***	0.02
Religion Hindu Ref						
Others	1.02	0.002	0.88**	(-) 0.01	0.74***	(-) 0.02
Caste Reserved Ref						
Unreserved	1.01	0.001	0.93	(-) 0.01	0.86**	(-) 0.01
Wealth index Poor Ref						
Middle	1.1	0.01	0.96	(-) 0.003	1.1	0.01
Rich	1.26**	0.03	0.93	(-) 0.01	1.46***	0.03
Occupation Unemployed Ref						
Employed	0.98	(-) 0.002	0.98	(-) 0.002	0.89	(-) 0.01
Family structure Nuclear Ref						
Non-nuclear	1.02	0.003	1.04	0.004	0.94	(-) 0.005

Source: Analysis of from NFHS-3 unit level data \*\*\* significant at 1 per cent level, \*\* significant at 5 per cent level, \* significant at 10 per cent level

residence, religion and caste have significant effects in the east. Interestingly, religion has strong effects among women in central region too, though the effect was absent among the men. As discussed in popular media, however, family structure does not create any relevance in any region. However, in general, the marginal effects of education and media exposure are smaller in magnitude among women.

---

## DISCUSSION

The eastern, northern and central regions appear to be critical with respect to the proportions of men and women possessing correct knowledge about the path of transmission of TB. Share of women having correct knowledge is less than that of men at the country level as well as across regions. Among women, in all of the north, central and east, education (both secondary and higher) is strongly, positively associated with correct knowledge whereas media has awareness improving role only in the east. Neither education nor media has any strong impact on TB related awareness among men in the north and central regions with the exception of the east. A survey of adult patients across four north Indian states at the beginning of treatment in the public sector demonstrated that overall TB related knowledge was positively and significantly associated with literacy and education<sup>6</sup>. The eastern zone presents one area of concern, where the prevalence of TB is the highest, following the north eastern states. However, there is significant impact of education and exposure to mass media to increase correct knowledge regarding the disease among both sexes. A study conducted in Ethiopia which is one of the high TB burden countries using its health and demographic survey data reveals that overall knowledge among adults regarding TB was low and lower among men than a woman which is contrary to the finding of the present study. Additionally, rural residence and unskilled manual and agricultural labourers in case of women and primary and lower level of education, lowest wealth quintiles and lack of access to media in case of both genders were significantly associated with low awareness of TB<sup>7</sup>. The present paper succinctly brings out a crucial point pertaining to TB management. For nearly asymptomatic communicable diseases like TB, in

the initial phases, people do not actually realize that they are infected and hence often demand less of care, even if they are physically available and free of cost. Lack of knowledge creates barriers for patients to reach the window of health care. Also, undertaking preventive measures becomes a challenge. Hence, in addition to free public services for cure, optimal levels of education and awareness programs are called for. The paper delves deeper to find that improved education and media exposure really cannot solve the problem in isolation, rather interaction of a set of socio-economic factors also plays a crucial role. This is in sync with the findings of a number of studies<sup>8,9</sup>.

---

## CONCLUSION

TB related awareness in communities is indispensable as it complements efforts and programs targeted at controlling the TB epidemic. Correct knowledge without misconceptions about the route of transmission of TB infection not only provides primary prevention from infection on following cough etiquette but also ensures that people do not suffer from myths and baseless fears about the disease which may encourage stigma. The success of the target oriented RNTCP in tuberculosis control in India relies heavily on passive case detection and self-reporting by patients to the health facility, which largely remains as only a supply-side response to the problem. Providing correct information relating to symptoms and mode of spread of pulmonary TB can potentially increase the demand for sputum smears. With such demand issues remaining grossly unaddressed, universal coverage and effectiveness of TB control programs is less probable. Singular focus on treatment of reported cases leaves out many diseased individuals who are potential threats to community health but have not been medically diagnosed because they did not seek medical assistance by self-reporting due to reasons including TB related knowledge deficiency and/or stigma issues. The paper highlights the need to look beyond the jargon of 'detection and cure rates' as the TB control program in India most often tends to focus on. A part of such program, the Information-Education-Communication (IEC) wing in particular should be consciously directed to information dissipation and delivery of TB

related messages via alternative forms of media, taking particular care to address socio-economic vulnerabilities specific to regions, that pose further challenge to ensuring the effectiveness of raising awareness. Door to door campaign might be suggested as a step towards improving the awareness scenario.

#### CONFLICT OF INTEREST

None

#### ACKNOWLEDGEMENT

None

#### REFERENCES

1. WHO. Global Tuberculosis Report 2018. <https://www.who.int/tb/publications/globalreport/en/>
2. Ramachandran R, Diwakara, A. M., Ganapathy, S., Sudarsanam, N. M., Rajaram, K., Prabhakar, R. Tuberculosis Awareness among Educated Public in Two Cities in Tamil Nadu. *Lung India*. 1995;3(4):108-13
3. Subramanian T., Charles N., Balasubramanian R., Balambal R., Sundaram V., Ganapathy S., et al. Knowledge of Tuberculosis in a South Indian Rural Community, Initially and After Health Education. *Indian Journal of Tuberculosis*. 1999;46:251-54
4. Jaramillo, E. The Impact of Media-based Health Education on Tuberculosis Diagnosis in Cali, Colombia. *Health Policy and Planning*. 2001;16(1):68-73
5. Sreeramareddy Chandrashekhar T., Harsha Kumar H. N., Arokiasamy John T. Prevalence of self-reported tuberculosis, knowledge about tuberculosis transmission and its determinants among adults in India: results from a nationwide cross-sectional household survey. *BMC Infectious Diseases*. 2013. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3551631/pdf/1471-2334-13-16.pdf>
6. Huddart S., Bossuroy T., Pons V., Baral S., Pai M., Delavallade C. Knowledge about tuberculosis and infection prevention behavior: A nine city longitudinal study from India. *Plos One*. 2018. Available from <https://doi.org/10.1371/journal.pone.0206245>
7. Gelaw, S. M. Socioeconomic Factors Associated with Knowledge on Tuberculosis among Adults in Ethiopia. *Tuberculosis Research and Treatment*. 2016. Available from <https://doi.org/10.1155/2016/6207457>
8. Rubel, Arthur J. and Linda C. Garro. Social and Cultural Factors in the Successful Control of Tuberculosis. *Public Health Reports*. 1992;107(6):626-36
9. Hargreaves James R., Boccia D., Evans Carlton A., Adato M., Petticrew M., Porter John D. H. The Social Determinants of Tuberculosis: From Evidence to Action. *American Journal of Public Health*. 2011;101(4):654-62