

Gender Differences among Suspected Pulmonary Tuberculosis Patients undergoing Sputum Smear Microscopy

*Tehseen Iqbal**
*Muhammad Abdul Raziq***
*Zafar Hussain****
*Naveed Anjum*****
*Salman Atiq******

**Associate Professor,
 Department of Physiology,
 Quaid-e-Azam Medical College,
 Bahawalpur*
***Demonstrator
 Department of Physiology,
 Quaid-e-Azam Medical College,
 Bahawalpur*
**** Associate Professor,
 Department of Physiology,
 Punjab Medical College, Faisalabad*
*****Consultant Pulmonologist
 Department, of Pulmonology,
 Nishtar Hospital, Multan.*
******Medical Officer,
 Services Hospital, Lahore*

Address for Correspondence

Dr. Tehseen Iqbal,
 Associate Professor, Department of
 Physiology, Quaid-e-Azam Medical
 College, Bahawalpur
 Email: dr_tehsiniqbal@yahoo.com

Background: This retrospective study was carried out in the Department of Physiology Nishtar Medical College/Hospital Multan in collaboration with Department of Chest Medicine and Tuberculosis to assess the gender differences among pulmonary tuberculosis suspects undergoing diagnostic sputum smear microscopy. Data from Pulmonology Ward Nishtar Hospital, Multan during January 2005 to October 2007 was summarized and analyzed for this study.

Objective: To assess the gender differences among suspected pulmonary tuberculosis patients undergoing diagnostic sputum smear microscopy.

Study Design: Retrospective, hospital based study.

Materials and Methods: The hospital records of 2468 newly diagnosed patients of pulmonary tuberculosis were analyzed. The patients were classified into various groups according to gender and age.

Results: Female to Male ratio of more than one (1.05/1) was found among pulmonary tuberculosis suspects undergoing sputum examination attending the Out Patient Department of Chest Medicine. However, AFB sputum smear positive cases were less among female patients, and female to male ratio was less than one (0.84 / 1.0). The overall AFB sputum smear positive cases were significantly higher in male patients.

Conclusion: Gender & age are both traditionally known variables in terms of incidence and prevalence of pulmonary tuberculosis. The existing gender disparity and pattern of gender specific treatment seeking is one of such indicators which call for more attention to both males and females, especially because they are in economically productive age group.

Key Words: Gender, pulmonary tuberculosis, sputum smear, acid fast bacilli.

Introduction

Among all regions of the world the burden of tuberculosis (TB) within the SAARC region is considerably high.¹ While housing 22% of the world's population, SAARC region accounts for 29% of global Tuberculosis burden.² Three SAARC countries, India, Bangladesh and Pakistan have been listed among the 22 high burden countries. Despite adoption of DOTS strategy in all the SAARC member countries, the entire region is still far behind the WHO target of 70% case detection rate.

According to TB data reported to WHO and studies done to address gender issue and TB, gender differences in TB epidemiology have been identified.

The differences identified in TB epidemiology may arise either as a result of biological or physiological differences between sexes or due to gender itself.³ Yet comprehensive studies have not been done to identify underlying gender based reasons for this disparity. Although case notification rates for TB in SAARC region show higher rates for males (approximately 2: 1 male to female ratio), estimates show that 70% of the world's poor are women.⁴ Evidence from various researches strongly suggests that there is a close link between TB and poverty.⁵⁻⁸ The link also highlights the relevance of gender issue in the context of prevalence and treatment of TB in developing countries.⁹

Poverty and gender are two key factors implicated in woman's vulnerability to TB. Moreover

profound gender differentials existing in the SAARC member countries create numerous barriers for women, in seeking health care as well as in obtaining health care with special reference to diseases such as Tuberculosis. A person with TB loses, on average, 20 to 30 per cent of annual household income due to illness.¹⁰

SAARC region is one of the most gender sensitive regions in the world with females confronting many gender-based inequalities. Such inequalities may impose an impact on female's health in terms of their poor health seeking behavior and obtaining health care services.¹¹ Males and females are almost equally distributed within the populations of SAARC member countries.

Gender and TB experts have since been working on an agenda for research into biological, epidemiological, social and cultural differences in the occurrence of TB in men and women and their access to the TB treatment strategy.¹³ Although the overall prevalence of pulmonary TB is lower in women, the progression from infection to disease is higher. This could be because of the triple burden of housework, childcare and employment, leaving very little time for taking care of her.¹⁴

The purpose of our study was to generate basic estimates by gender for one region of Pakistan. Such estimates are mandatory as a foundation for generating future testable hypotheses, and remain vital for effective TB care. Identification of gender differences in tuberculosis epidemiology would provide a sound basis to study gender inequalities occurring at various levels of effective tuberculosis care.

Material and Methods

This retrospective study was carried out in the Department of Physiology in collaboration with the Department of Chest Medicine and Tuberculosis, Nishtar Medical College / Hospital Multan. The hospital records of newly diagnosed patients of pulmonary tuberculosis were analyzed. The patients were classified into various groups according to gender and age. The study population included all reported cases of Tuberculosis patients and symptomatic Tuberculosis subjects (TB suspects) in the period, January 2005 to October 2007. Data sources were the routinely maintained registers in the Department of Chest Medicine and Tuberculosis, Nishtar Medical College/Hospital, Multan. Gender & age specific data were collected for case detection in all types of TB cases (new smear positive, & patients under DOTS registration programme).

Results

During the study period, 2468 patients with pulmonary tuberculosis presented to the Chest Medicine Out Patient Department (OPD) of Nishtar Hospital Multan between Jan 2005 and Oct 2007, Out of which 1199 were males and 1269 were females.

Table I shows the total number of males & females of pulmonary tuberculosis suspects undergoing AFB sputum smear examination. According to the above data, females' presentation was slightly more than the males. Females presented dominantly with 51.42% while the male presentation was 48.58% in the Out Patient Department.

Table I: Gender & TB Suspects (undergoing Sputum Examination) from Jan 2005 – Oct 2007.
(n = 2468)

Gender	TB suspects	Percentage
Males	1199	48.58%
Females	1269	51.42%

Table II: Percentage of AFB smear positive TB suspects from Jan 2005 – Oct 2007

GENDER	NO. OF PATIENTS	AFB +ive	Percentage
Males	1199	297	24.77%
Females	1269	250	19.70%
Total	2468	547	22.16%

Table III: Age wise distribution of 2468 patients with suspicious PTB (10-90 yrs) from Jan 2005 – Oct 2007

Age group	No. of patients	Percentage
10-20	704	28.52%
21-30	603	24.43%
31-40	488	19.77%
41-50	287	11.62%
51-60	206	8.34%
61-70	134	5.42%
Above 71	46	1.86%

Table II shows the percentage of AFB smear positive TB suspects during the study period. According to the data, females' presentation to the hospital was slightly more than the males. However, the AFB smears were found to be positive more in males. Out of 1199 males, 24.77% were positive for AFB. On the other hand, 19.70% were found positive out of 1269 females.

Table III shows the age wise distribution of the pulmonary tuberculosis suspects, ranging from 10 to 90 years of age during the study period. Age wise distribution of new smear positive cases (total of both sexes) shows that the majority of cases are spread between the ages from 15 to 54 years. This is economically the most productive age group.

Discussion

The poorest of people from the poorest of countries are the ones mostly affected by tuberculosis. Not only are they more vulnerable to the disease because of their living and working conditions, but they are also plunged deeper into poverty as a consequence of TB.¹⁵ Relatively few studies of gender differences in TB have generally come out from Third World countries. These studies suggest differences in diagnosis, treatment and societal perceptions of TB in women, usually to their disadvantage, and reflecting their lower socio-economic status in many societies.¹⁶⁻¹⁸ However, Hamid and colleagues found that the gender difference observed in routine TB diagnosis is real, and is not due to lesser accessibility of women to health services.¹⁹

Barriers to early detection and treatment of TB may be greater for women than for men.²⁰ In addition, progression from TB infection to disease may be faster in women of reproductive age than men of the same age.²¹⁻²² Nonetheless, there is an estimated 2:1 male to female ratio in the number of TB cases notified to public health authorities.²³

According to the National TB control programmes within SAARC countries, all the countries except Pakistan female/male ratio in TB suspects undergoing sputum smear examination was less than one. In Pakistan this ratio was 1:2.¹¹

A retrospective study was conducted in Combined Military Hospital Multan from January 2001 till December 2004. The total number of patients registered in 4 years was 545. Among these 30% (n=163) were females and 70% (n=382) were males.²⁴

Another study was conducted in the Chest Medicine Department of Mayo Hospital, Lahore in the year 2005, to review the epidemiological factors associated with high prevalence of tuberculosis and to study their clinical profile. Out of 100 cases, there were 67% of males and 33% of females who presented to indoor / out patient department.²⁵

In a prevalence survey done in Dhaka, Bangladesh, a total of 7001 tuberculosis suspects (2406 females and 4595 males) and 64 confirmed TB cases (16 females and 48 males) were found. The female/male ratio (0.33:1) of cases found during the survey was not higher than that observed through routine diagnosis (0.42:1).²⁶ A national morbidity survey

in Bangladesh (1994 - 1995) showed 2.1: 1 male to female prevalence ratio for TB.²⁷

Results from a study in Nepal comparing active and passive case finding methods suggests access problem among women as women made up 28% of the 159 cases by passive case finding, whereas with active case finding the percentage of female cases detected rose to 46% of 111 cases identified.²⁸ Another study in Nepal found that women had a longer total delay before diagnosis of Tuberculosis (median 3.3 months) than men (2.3 months).²⁹ These facts pave the way to the assumption that female TB cases are under detected or under reported.

Another study in Bangladesh on sex differences in diagnosis and treatment outcome revealed low female to male ratios (less than 1) in tuberculosis suspects undergoing smear microscopy, and suspects diagnosed with positive smears which were 0.51 and 0.35 respectively.³⁰

Gender & age are both traditionally known variables in terms of incidence and prevalence of pulmonary tuberculosis. The existing gender disparity and pattern of gender specific treatment seeking is one of such indicators which call for more attention to both males and females, especially productive age group.

The SAARC region being one of the most gender insensitive regions in the world, existing gender inequalities may reflect gender differences in TB epidemiology.¹ To date there has been no satisfactory explanation of the worldwide excess of tuberculosis notifications among adult males. Cigarette consumption may be a significant predictor of the gender ratio of TB notifications, smoking is a modifiable factor which has a significant impact on the global epidemiology of TB, and emphasizes the importance of tobacco control in countries with a high incidence of TB.¹²

Improving economy and reducing poverty are rather long term goals; it may take several years to bring down level of poverty and increase in standard of living or provide better housing. However, education is key towards better future, especially for females who are traditionally prohibited to take independent decision in their favor.¹⁵

Conclusion

Our study reveals that low AFB sputum smear positivity was observed among females, although number of female TB suspects presented and undergoing sputum examination was higher when compared with males. The results support the hypotheses such as males are more susceptible to TB infection.

References

1. Libby Tuberculosis in the SAARC Region. A publication by SAARC-CANADA Regional tuberculosis and HIV/AIDS Project: 2002, 1-14.
2. WHO Report 2003, Global Tuberculosis Control, Surveillance, planning, financing; communicable diseases, WHO, Geneva.
3. Borgdorff M.W., Nagelkerke, N.J.D, Dye C , Nunn P.; Gender and tuberculosis: a comparison of prevalence surveys with notification data to explore sex differences in case detection, *Int J Tuberc Lung Dis* 2000; 4: 123-32.
4. Narain J P, Raviglione M C, Kochi A. HIV associated Tuberculosis in developing countries: epidemiology and strategies for prevention. *Tubercle*.
5. Diamond I., Matthews Z., Stephenson R., Assessing the health of the poor: towards a pro-poor measurement strategy. Health Systems Resource Centre, Department for International Development, London, 2001.
6. Nair D.M., George A., Chacko K. T. Tuberculosis in Bombay: new insights from poor urban patients. *Health Policy and Planning*, 1997; 12 (1): 77-85.
7. McKay H.A., Editorial. Tuberculosis and the poverty-disease cycle. *Journal of the Royal Society of Medicine* 1999; 92(3).
8. Rajeswari R., Balasubramanian., Muniyandi M, Geetharamani S, Thresa X, and Venkatesan P., Socioeconomic impact of tuberculosis on patients and family in India. *Int J Tuberc Lung Dis*, 1999; 3(10): 869-77.
9. Diwan V.K. and Thomson A., Sex, gender and tuberculosis, *Lancet*, 1999; 353(9157): 1000-1.
10. World Health Organization Department of Gender and Women's Health, Gender and Tuberculosis, Geneva, Switzerland, January 2002.
11. SAARC Canada regional TB & HIV project. Gender Differences among TB Patients in National TB Control Programmes within SAARC Countries; Dec 2001; 2-13.
12. R. E. WATKINS and A. J. PLANT. Does smoking explain sex differences in the global tuberculosis epidemic? *Cambridge University Press. Epidemiology and Infection* (2006), 134:2:333-9.
13. UN Chronicle TB: the leading infectious killer of adults and the single biggest killer of young women tuberculosis spring 1999.
14. Thomas B.E. Tuberculosis in women Status of tuberculosis in India - 2000 published by Society for innovation and Development, Indian Institute of Science, Bangalore., Editors; R. Nayak, M.S.Shaila, G.Ramanda Rao, 2000, 25-32.
15. Aarti Kaulagekar and Anjali Radkar, Social status makes a difference: Tuberculosis scenario during national family health survey-2, *Indian J Tuberc* 2007; 54: 17-23.
16. Thomson A and Diwan V.K., Gender inequalities in tuberculosis: aspects of infection, notification rates, and compliance. *Curr Opin Pulm Med*, May 2001; 7(3): 165-9.
17. Bashour H., and Mamaree F. Gender differences and tuberculosis in the Syrian Arab Republic: patients' attitudes, compliance and outcomes, *East Mediterr Health Journal*, July 2003; 9(4): 757-68.
18. Ashan G., Ahmed J., Singhasivanon P., Kaewkungwal J., Okanurak K. Suwannapong N., Akarasewi P., Majid M.A., Begum V., Belayetali K., Gender difference in treatment seeking behaviours of tuberculosis cases in rural communities of Bangladesh, *Southeast Asian Journal of Tropical Medicine Public Health*, March 2004; 35(1): 126-35.
19. Hamid Salim M.A., Delercq E., Van Deun A., Saki K.A. Gender differences in tuberculosis: a prevalence survey done in Bangladesh, *Int J Tuberc Lung Dis*. August 2004, 8(8), 952-957. UN Chronicle TB: the leading infectious killer of adults.... and the single biggest killer of young women -tuberculosis. Spring, 1999
20. Holmes C.B., Hausler H., Nunn P. A review of sex differences in the epidemiology of tuberculosis, *Int J Tuberc Lung Dis*; 1998; 2: 96-104.
21. Fine, P.E.M. Immunities in and to tuberculosis: implications for pathogenesis and vaccination. *Tuberculosis: back to the future*, 1983
22. Murray C.J.L., Social, economic and operational research on tuberculosis: recent studies and some priority questions. *Bull Int Union Tuberc Lung Dis* 1991; 66: 149-56.
23. Kumaresan. I.A; Raviglione, M.C.; Mun-ay, C.I.L. Tuberculosis. The global burden of disease and risk factors in 1990: World Health Organization Press. 1996.
24. Muhammad Babar Khan, Asher Ahmed Mashhood, Waqar Ahmed Qureshi, Kashif Ibrar. Tuberculosis - Disease pattern & the sputum microscopy yield: *Pak J Chest Med*, Dec 2005; 11(4): 9-11.
25. Iffat Shabbir, Nazir Mirza, Rizwan Iqbal, Saulat Ullah Khan, Shamshad Rasool Awan. Clinico-epidemiological profile of one hundred AFB smear positive cases of pulmonary tuberculosis; *Pak J Chest Med Dec* 2005; 11(4): 29-33.
26. Zaman K, Yunus M, Arifeen SE, Baqui AH, Sack DA, Hossain S, Rahim Z, Ali M, Banu S, Islam MA, Begum N, Begum V, Breiman RF, Black RE, Prevalence of sputum smear-positive tuberculosis in a rural area in Bangladesh: *Epidemiol Infect*. 2006 Oct; 134(5): 1052-9.
27. Bangladesh Bureau of Statistics. Summary report of survey of prevalence of morbidity and health status, October 1994 (second round) and February 1995 (third round) Dhaka: Bangladesh Bureau of Statistics; 1996.
28. Yamaski -Nakagawa M, Ozasa K, Yamada K, et al. Gender difference in delays to diagnosis and health care seeking behaviour in rural areas of Nepal. *Int J Tuberc Lung Dis* 2001; 5: 24-31.
29. Begum V, de Colombani P, Das Gupta S, et al. Tuberculosis and patient gender in Bangladesh: sex differences in diagnosis and treatment outcome. *Int J Tuberc Lung Dis* 2001; 5:604-10.
30. Narain J P, Raviglione M C, Kochi A. HIV associated Tuberculosis in developing countries: epidemiology and strategies for prevention. *Tubercle*.