

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/7092472>

Incidence of pulmonary tuberculosis in garments workers of Dhaka City, Bangladesh

Article in *Bangladesh Medical Research Council Bulletin* · May 2005

Source: PubMed

CITATIONS

8

READS

1,157

10 authors, including:



Kazi Bennoor

Bangladesh Lung Foundation

34 PUBLICATIONS 676 CITATIONS

SEE PROFILE



Asif Mahmud

Asgar Ali Hospital, Dhaka, Bangladesh

35 PUBLICATIONS 310 CITATIONS

SEE PROFILE



Md Ahnaf Hossain

Gannon University

12 PUBLICATIONS 34 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Autonomic neuropathy in obesity [View project](#)

Incidence of Pulmonary Tuberculosis in Garments Workers of Dhaka City, Bangladesh

MR Hassan¹, KS Bennoor¹, MF Rahman², AM Mahmud¹, MA Hossain¹,
GMM Habib³, MH Kabir⁴, AFM Kamaluddin⁵, T Ali⁶, AKM Shamsul Huq¹

Bangladesh Med. Res. Counc. Bull. 2005; 31(1): 7-14

Summary

This study was conducted to find out the incidence of Pulmonary Tuberculosis (PT) in garments workers of Dhaka city and to find-out the relationship between the incidence of PT and socio-demographic factors of the respondents. From all garments factories of Dhaka city, 30 factories were included by stratified random sampling method. Then workers were selected by simple random sampling technique. Following selection, detailed history was taken and recorded in a pre-tested questionnaire. Chest X-ray, Sputum for AFB, M.T and ESR were done in the suspected cases. PT was diagnosed when any patient fulfilled predefined inclusion criteria. Out of 2400 selected workers, 2281 workers were studied finally. A total of 22 (9.6 per 1000) definite PT cases were identified. Sputum positive were 4/2281 (1.75 per 1000) cases. All were diagnosed as new cases; none had received any treatment of tuberculosis in the past. The study concludes that PT among the garments workers is a more alarming health issue than among the general population of Bangladesh. Improved and regular health check-up system and 'directly observed treatment shortcourse' (DOTS) should be implemented in the working places particularly where clusters of workers are working together.

Introduction

About one third of the world population is latently infected with mycobacterium tuberculosis¹. Over 8 million new cases occur every year; of them 4 to 5 million are highly infectious². More than three quarters of these cases are in the developing countries³. Every

year 2-3 million people die of the deadly disease⁴, one in every ten to fifteen seconds. Tuberculosis is the single leading cause of death from any single infectious agent.

Tuberculosis is increasing globally, partly because of concomitant HIV- infection, and

1. Deptt. of Respiratory Medicine, National Institute of Diseases of the Chest and Hospital (NIDCH), Dhaka. 2. Deptt. of Epidemiology and Biostatistics, Institute of Child & Mother Health, Dhaka. 3. Asthma Physician, Member of NRTC, Asthma Library, Khulna. 4. Nirupam Hospital (Pvt.) Ltd., Dhaka. 5. Deptt. of Medical Oncology, National Institute of Cancer Research & Hospital, Dhaka. 6. Deptt. of Physiology, Bangabandhu Sheikh Mujib Medical University, Dhaka.

with poverty and lack of social welfare and public health services contributing substantially⁵. In the USA tuberculosis cases in 1991 were 26246, a rise of 18% since 1988⁶. The situation in third world countries is even worse.

In Bangladesh, two nation wide epidemiological survey of tuberculosis were carried out in the years 1964-65⁷ and 1987-88⁸. The first survey (1964-65)⁷ showed, about 57% of the population had a positive tuberculin test and there was 4% radiological suspects. The second survey (1987-88)⁸, based on sputum examination, demonstrated that, 0.87% of adult population, which was 0.46% of the total population, was suffering from infectious pulmonary tuberculosis.

These two surveys showed that there has been no substantial change in tuberculosis prevalence rate over a period of 25 years. At present in Bangladesh the incidence of sputum positive tuberculosis is 106 per 100,000 and cases of all form of tuberculosis are 238 per 100,000⁹.

The Government of Bangladesh has adopted a National Tuberculosis Control Programme (NTP) since 1976. It is an ambitious community level project whose ultimate goal is to achieve the international target of an 85% cure rate and 70% detection of tuberculosis¹⁰. Although cure rate of 83% have been achieved in Bangladesh, unfortunately the case detection is only 30%, which is far below the desired goal⁹.

It is known that tuberculosis is prevalent in an over crowded and unhealthy atmosphere¹¹. Inhalation of tubercle bacilli from droplet nuclei is a common mode of spreading of the disease¹².

Readymade garment factories are the main foreign currency earning industry of our country. One million people are working in about four thousand garment factories of Dhaka city. In almost all these factories, workers belonging to low socio-economic class work in over crowded conditions, owing to paucity of floor space. In such conditions, spread of tubercle bacilli from an infected worker to another is most likely.

No study among the garment workers of Dhaka city has been carried out as yet regarding incidence of tuberculosis or other infectious respiratory diseases. This study was conducted in randomly selected 30 garment factories of Dhaka city to ascertain the incidence rate of PT among garments workers.

Materials and Methods

This was a cross sectional study, which quantified the distribution of PT in garments workers of Dhaka city, Bangladesh. It was conducted from June 2001 to June 2002. In total, 2400 garments workers were recruited for the study. At first, we selected 30 garment factories out of 4000 by stratified random sampling method. In this process, two garment factories from each of 15 Thanas (administrative unit) were selected to cover all the garment factories of Dhaka city. Eighty garments workers were then selected by simple random sampling technique from each garment factory.

Informed consent was taken from the selected sample after full explanation of the procedure of investigations. Persons not providing consent were excluded from the study. Two teams were formed for data collection. All

members of the teams were physicians led by a Pulmonologist. Data were collected from the selected garments workers by face-to-face interview using a pre-tested structured questionnaire. Based on the predetermined criteria suspected PT cases were screened. The criteria for suspected tuberculosis cases were:

1. Persistent cough with or without sputum more than 2 weeks
2. Fever more than 2 weeks
3. Pain in the chest for more than 2 weeks
4. Single episode of haemoptysis
5. Unexplained weight loss over 1 month
6. Unexplained loss of appetite more than 1 month

A patient having any one of the above or more was considered as a suspected case¹³ of PT.

All suspected cases were taken to the National Institute of Diseases of the Chest and Hospital (NIDCH) for thorough physical examination, chest x-ray P/A view, ESR, Mantoux test and sputum for AFB (3 consecutive samples).

Then definitive case of PT was diagnosed using the following protocol:

- AFB Present in the sputum¹⁴
- Any Shadow suggestive of PT in Chest x-ray with M.T ≥ 16 mm¹⁵

Presence of any one of the above 2 criteria was considered as definite case of PT.

Results

Out of 2400 primarily selected garments workers, 2281 workers participated in the

study finally. Table-I shows the population characteristics of the garments workers. More than two third of the garments workers were female and majority were under 21 years of age. Mean duration of schooling of garments workers was 4.98 years. Fig.-1 shows the nature of work of the studied population. Sewing/linking was the main job of garments workers (47%). About 14.6% workers were engaged in weaving/knitting, which was the next frequent job. Other major jobs were finishing/packaging (9.1%) and winding of thread/wool and dealing with raw materials (3.3%).

Table-I: Socio-demographic Characteristics of garments workers

Variables	Number (n=2281)	Percentage %
Age		
20 years and less	1300	57
Mean age $\pm$ SD	21.9 years $\pm$ 6.5	
Sex		
Female workers	1575	69
Education		
Literacy rate	1749	76.7
Mean years of schooling $\pm$ SD	5 years $\pm$ 3.8	
Income		
Monthly income <2500 Taka (US \$ 50)	1737	76.2
Immunity status		
Evidence of BCG scar	625	27.4
Living and working condition		
Average number of persons living in same room $\pm$ SD	4 $\pm$ 1.7	
Average number of persons sleeping in same bed $\pm$ SD	2.5 $\pm$ 1.0	
Average daily work hour $\pm$ SD	10.9 hours $\pm$ 1.6	

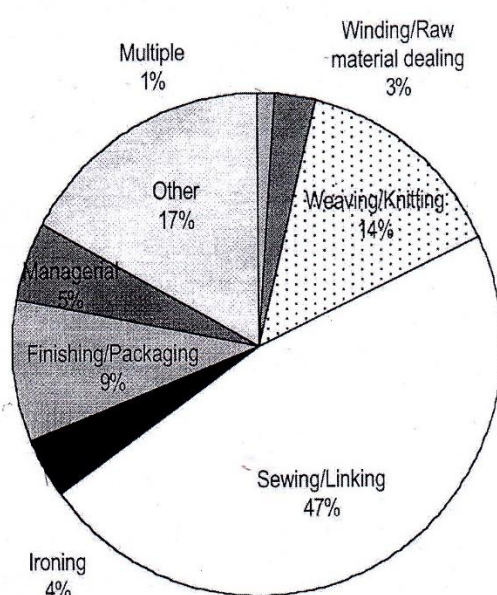


Fig.-1: Nature of Work of the Garments Workers

It was found that 90.7 % workers heard the name of tuberculosis as an important disease. However, only 3.4 % workers knew correctly that the tuberculosis was transmitted through inhalation route. About 10.5 % workers gave history of contact of tuberculosis. It signifies

that most of the patients were unaware of their exposure. Only 27.4% workers had evidence of BCG scar and 72.6% had no scars.

Table-II shows prevalence of suspected PT. About 10.5% workers had clinical features suggestive of PT. There was no significant difference observed between suspected male and female workers.

About 9.6 per 1000 workers had definite PT. Sputum positive cases were 1.75 per 1000 cases. All were new cases who did not receive any treatment of tuberculosis in the past.

There was no significant difference observed between suspected and non-suspected tuberculosis groups except age variable. It was demonstrated that workers aged 31 years or more have significantly more chance to develop tuberculosis or tuberculosis like presentations than the age group of 20 years or less (OR 1.63) (Table-III).

Table-II: Incidence of Pulmonary Tuberculosis among garments workers of Dhaka city, Bangladesh

Tuberculosis	Frequency	Percent	95% Confidence Interval
Suspected	239/2281	10.5	9.2-11.8
Suspected male	73/706	10.3	8.1-12.5
Suspected female	166/1575	10.5	9.0-12.0
Definite pulmonary tuberculosis	22/2281	0.96	0.62-1.48
Sputum Positive pulmonary tuberculosis	4/2281	0.18	0.06-0.48

Table-III: Crude and Adjusted Odds Ratio (OR) and 95% CI for the association of selected risk factors and Suspected TB among garments worker

Variables	No	Suspected TB	Non-Suspected TB	OR*	95% CI
Age					
20 yrs and less	1300	122	1178	1	
21-25 yrs	473	50	423	1.16	.80-1.67
26-30 yrs	320	41	279	1.45	.97-2.17
31 yrs and above	188	26	162	1.63	1.00-2.68
Sex					
Male	706	73	633	1	
Female	1575	1409	91	.61	.36-1.36
Nature of work					
Managerial	122	12	110	1	
Finishing / Packaging	208	19	189	.95	.43-2.12
Ironing	82	8	74	.97	.35-2.64
Sewing/ Linking	1056	127	929	1.30	.64-2.66
Weaving/Knitting	329	32	297	.99	.47-2.09
Winding/Raw material dealing	75	8	67	1.14	.42-3.09
Education					
HS+	169	15	154	1	
Primary	860	92	768	1.88	.93-3.78
Secondary	720	66	654	1.57	.80-3.08
Illiterate	532	66	466	1.23	.65-2.33
Monthly income (US \$)					
More than 50	544	59	485	1	
Less than 50	1737	180	1557	1.04	.72-1.49
Working Hour					
8 hrs or less	231	23	208	1	
9-10 hrs	889	82	807	.95	.57-1.56
11-12 hrs	855	91	764	1.10	.67-1.79
More than 13 hrs	306	43	263	1.45	.83-2.51
No. of person per room					
1-2	528	60	468	1	
3-4	987	102	885	.83	.57-1.21
5 and more	766	77	689	.81	.52-1.33
No. of person per bed					
Single	218	25	193	1	
Double	1200	121	1079	.83	.52-1.32
Three or more	863	93	770	.94	.57-1.56
Smoking History					
No smoking	2120	216	1904	1	
Active smoking	161	23	138	1.57	.92-2.69

* Variables mutually adjusted for each other

Discussion

This cross sectional study confirms that the incidence of pulmonary tuberculosis in garments worker of Dhaka city of Bangladesh is relatively higher than general population. Chances of new cases were more in the group of workers aged 31 years or more than 20 years or less. Sex characteristics, nature of work, level of education, monthly income, working hours, number of persons per room, number of persons per bed and smoking history did not increase chances of tuberculosis like features in garments workers. As total definite pulmonary tuberculosis cases were 22 out 2281 subjects, risk of tuberculosis among the workers could not be calculated. Most of the workers were within 16 to 30 years of age and female workers were 2 times more than males. 76.7% workers were literate, of them about 69% workers were educated up to primary or secondary school level. It signified that this group of workers was more educated than general population, since literacy rate of Bangladesh is only 48% according to the national population census 2001¹⁶.

Although for comparison no such study was carried out in Bangladesh in the past, The Institute of Nutrition and Food Sciences of Dhaka University carried out a survey on nutrition status of the female garment workers of Dhaka city in 1997. It showed that 15.5% of the workers were under weight. 56% had an inadequate level of serum vitamin A with 14% having pronounced vitamin A deficiency. 44% of them were found to be anemic. This survey clearly indicated poor nutrition and health status of the garment workers in Bangladesh¹⁷.

Another case-control study to assess the magnitude of respiratory problems among the garments workers of Dhaka city reveals that, 42% of the garments workers have some sort of respiratory ailments, which is higher than the prevalence of those among the controls (15%). The garment workers also showed a lower level of pulmonary function measurements such as FVC, FEV₁ and PEFR¹⁸.

Sewing and weaving were the two most important jobs of garments workers. But there was no significant relation between nature of work and development of pulmonary tuberculosis. Much larger sample size is required to confirm relationships of different parameters and development of disease. It is important to note that about 89% workers were working more than 8 hours, living in overcrowded conditions, more than 90% slept by sharing their beds. Though 90.7% workers heard the name of tuberculosis as a dreadful disease, but only 3.4% answered correctly that it is transmitted by airborne route, indicating an unsatisfactory level of health awareness.

Though 10.5% garments worker gave history of exposure of tuberculosis we were unable to correlate it with incidence of tuberculosis, as sample size was small for correlation.

Out of 2281 workers, 239 (10.5%) had features suggestive of tuberculosis. The male female ratio was 1:1. After investigations 22 cases were confirmed as definite tuberculosis (9.6/1000). This findings is about 4 times more than estimated national figure of tuberculosis burden in Bangladesh in the year 2000 (9.6/1000 Vs 2.38/1000)⁹. Sputum positive rate in this study was 4/2281 (1.75/

1000), which is also about 1.6 times more than estimated national figure (1.75/1000 Vs 1.06/1000)⁹.

In a large-scale survey of tuberculosis among 2,592,541 textile workers of China, 7,294 active tuberculosis cases were found¹⁹. The prevalence rate was 181 per 100,000. There were 1,100 smear-positive cases, the prevalence rate being 42 per 100,000. Sputum positive cases were more in our series (175 per 100,000 Vs 42 per 100,000). Incidence rate was determined in our series; still the rate was much higher (960 per 100,000) than total tuberculosis prevalence rate (181 per 100,000) among textile workers in China. Although similar working conditions prevail in both countries, poor primary health care system and a low level of health awareness may be additional risk factors for this higher incidence rate in Bangladesh. Further study should be carried out to find out the risk factors of tuberculosis in garment workers of Bangladesh.

It was concluded, the health check-up system in garments factory should be improved and expanded to include detection of tuberculosis on priority basis. The garment workers should be brought under national TB Control Program. DOTS should be implemented in the working place particularly where clusters of worker working together.

Effective health education programs should be conducted regularly among garment workers. Smear positive patients should be asked to abstain from work till conversion. Moreover, from ethical point of view the employers should be convinced not to terminate the tuberculosis patients if defected

from their jobs. They should be allowed to work after completion of intensive phase or sputum conversion. Otherwise, the workers will refrain from seeking health care in fear of losing their jobs which will be detrimental to the society.

References

1. Snider DE Jr, La MonFagne JR. The neglected global tuberculosis problem: a report of the 1992 world Congress on Tuberculosis. *J Infect Dis* 1994;169:1189-96.
2. IUATLD/ WHO Study group. Tuberculosis Control. *Tubercle* 1982; 63: 157-67.
3. Bates JH. The changing scene in tuberculosis. *New Engl J Med* 1977; 297: 610-4.
4. Proter JD. Tuberculosis in developing countries. CDR (London: England Review) 1991; 1: 136-9.
5. Bjune G, Heldal E. The global tuberculosis problem. An apparition from history? [In Norwegian] *Tidsskrift for den Norske Laege forening* 1994; 114: 578-81.
6. Reichman LB. Can we control tuberculosis by the year 2000 - USA perspective. *Proceedings: The 17th eastern regional conference on tuberculosis & respiratory disease* 1993; 55.
7. Islam MS. The Report of tuberculosis survey of Bangladesh. TB Control & Research project, Govt. of Bangladesh, Dhaka. 1974; 1: 140-55.
8. Report of National TB control project, MBDC Bangladesh 1990; 1: 110-30
9. DGHS/NTP, Dhaka, Bangladesh. TB burden in Bangladesh: estimated numbers. 16th June 2001.

10. Onozaki I, Shakya TM. Feasibility study of a district tuberculosis control programme in Nepal. *Tuberculosis & Lung Dis* 1995; 76: 65-71.
11. Rao VR, Joanes RF, Kilbane P, Galbraith NS. Out break of tuberculosis after minimal exposure to Infection. *BMJ* 1980; 281: 187-91.
12. Ratcliffe HL. Tuberculosis induced by droplet nuclei infection. *Am J Hyg* 1952; 55: 36-45.
13. Crofton S, Horne N, Miller F. Symptoms of tuberculosis. *Clin Tuberculosis* 1992; 1: 2-20.
14. IUATLD, Paris. France. Technical guide for sputum examination for tuberculosis by direct microscopy. 1978; 1-30.
15. Takai R, Mori T. Current Literatures on Tuberculosis. [In Japanese] *Resp Dis* 1975; 26: 327.
16. Rahman A. Jugglery with literacy rate. [In Bangla] *The Prothom Alo* 2002; September 8; 1 (col. 5).
17. Ahmed F, Hasan N, Kabir Y. Vitamin A deficiency among adolescent female garment factory workers in Bangladesh. *Eur J Clin Nutr* 1997; 51: 698-702.
18. Khanam F, Islam N, Begum M, Begum S, Sheikh MEH, Hai MA. Respiratory problems among the garment industry workers of Dhaka city. *Chest & Heart J* 2000; 24: 87-91.
19. Wang YN. Tuberculosis epidemiology and control measure of textile employees of China. *Proceedings: The 17th eastern regional conference on tuberculosis & respiratory diseases* 1993; 112.