

ORIGINAL ARTICLE

Tuberculosis among Students of Jimma University

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ABSTRACT

Background: *Prospective studies among nursing and medical students have shown that Tuberculosis (TB) is an occupational hazard. Though TB commonly occurs in students of Jimma University its actual prevalence is not known. The purpose of this study was to determine the prevalence of Tuberculosis in Jimma University and describe the different clinical presentations and assess factors associated with the acquisition of the disease.*

Methods: *A three year retrospective analysis of Tuberculosis (TB) patients who attended the student's clinic of Jimma University (formerly called Jimma Institute of Health Sciences) was conducted. It is aimed to determine the prevalence of TB in the students and describe the clinical presentations and factors associated with the acquisition of TB. Data were retrieved from the individual medical records and patients were interviewed to supplement missed major variables.*

Results: *The overall prevalence of TB in the student population was 2.2% (49/2212). Out of the total 49 cases, 42 (87.2%) were analyzed. Majority had Pulmonary TB, 83.3%. Group specific prevalence was highest in the Environmental Health students (4.3%) followed by medical students (2.9%) and Pharmacy students (2.8%). Nursing students and medical Laboratory students each had prevalence of 1.9% and 1.7% respectively. Prevalence of TB in medical students who had patient contact for training was 1.9% (8/428), and in those with no contact it has nearly doubled 3.7% (19/510). One third of the patients (16/49) gave history of contact to chronic cough. Among which the great majority (14/16) had the contact in the university.*

Conclusion: *In conclusion, TB has affected students of all categories of studies irrespective of contact to TB patients in the hospital during professional training. Contact in the campus to students who have TB seems to be one of the major factors responsible for the acquisition of TB.*

Key words: Tuberculosis, Mycobacterium tuberculosis, Jimma University students

INTRODUCTION

Tuberculosis (TB) is a chronic bacterial infection caused by *Mycobacterium tuberculosis*. Almost half of the population of the world is infected with

Mycobacterium tuberculosis and 10 million cases of active TB and 20 million new cases appear annually and about 3 million die of the disease each year (1). The prevalence of TB in Ethiopia is not

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well known but it is estimated to range from 0.36% to 0.62% per year in the general population (2). According to ministry of health report it is among the top ten diseases seen in outpatient department, hospitalized patients and it is the leading cause of death among admitted patients (3). Moreover, there has been a global resurgence of tuberculosis in the last decade and the vast majority of these cases occur in the impoverished countries of Asia, Africa and South America (4). This is largely due to the HIV epidemic which has worst hit sub-Saharan Africa (5).

After decades of debate a consensus that Tuberculosis is an occupational hazard emerged as a result of dozens of well conducted prospective studies infection and disease rates among nursing and medical students. It was found that overall health care workers had a risk that was about 2-10 times that of the general public and that nurse had the highest risk (6).

The most important determinants of contracting TB are infectiousness of the source and closeness of contact (7). From study done in JIHS and direct observation TB commonly occurs in the students of Jimma University (8, personal communication). Thus, with the aforementioned risk for health care students, the magnitude of TB could even be more serious in the face of the students crowding in the dormitories and classrooms.

So far no study has been done to determine the magnitude of TB in a medical school in Ethiopia. Hence, this study is the first of its kind in Ethiopia. The purpose of this study was to determine the prevalence of Tuberculosis in Jimma University and describe the different clinical presentations and assess factors

associated with the acquisition of the disease.

MATERIALS AND METHODS

Jimma University (formerly Jimma Institute of Health Sciences) is one of the three medical universities in Ethiopia training different categories of health workers, i.e. medicine, nursing, pharmacy, medical laboratory and environmental health. All programs of the university expose their students to risky working situation during their professional practice. Moreover, the students attend classes and lodge in crowded situations. The university has a student clinic, which gives medical care for all students free of charge. It is run by a General Practitioner and two nurses.

A three year retrospective review of medical records of students with TB who attended the student health service of the institute from September 1994 G.C to August 1996 G.C and supplemented by active data collection on major variables. Medical records of individual patients were retrieved by a nurse working in the clinic who is oriented about the study. Data were collected using a questionnaire. Additionally, interviewer administered questionnaire was employed for missed information on major variables.

All patients, 1511 (new and repeat cases) who visited the student health service of the institute in the specified period were used as a source, from which all Tuberculosis cases were used as a study population. Prevalence is calculated from the total number of student population who were by then registered in the university registrar office. As diagnostic test sputum for AFB, chest X-ray, ESR and failure to respond to antibiotics was used. All TB cases were considered in calculating the

prevalence and describe the frequency according to certain variables like socio-demographic factors, modes of presentation, laboratory investigations and treatment outcome. Those on whom two or more major variables were missing were excluded from the analysis.

Data were described using proportion of variables and different variables were compared with in the study group.

RESULTS

A total of 49 patients were diagnosed to have Tuberculosis over the last three years. These 49 cases were used to determine the prevalence of TB in the student population and distribution of cases according to the students' field of study. Out of the total 49 students, 42 (87.5%) were analyzed. And a total number of 2212 students were studying in the university during the study period.

Prevalence of Tuberculosis in the student population of Jimma University was 2.2% (49/2212). Majority had pulmonary TB (83.3%). Group specific prevalence of TB i.e. according to their respective field of study is shown in Table 1. It was highest in Environmental health students 4.3%, then 2.9% in medical students, 2.8% in pharmacy students, 1.9% in nursing students and 1.7% in medical Laboratory technology students. The remaining were students who had previous training in other medical institutions i.e.

post basic program students which had collectively a rate of 2.2%.

Prevalence of TB in medical students who had clinical attachments was 1.9% (8/428) and in those who didn't start clinical attachment it has nearly doubled i.e. 3.7% (19/510).

On reviewing past medical history 5 (11.9%) had TB before joining the institute. Otherwise in 13(31%) patients information on past history of TB was not available. From a total of 25(59.5%) patients on whom information about contact history to chronic cougher or TB patient was available, 16(64%) had contact history. Among those with history of contact to chronic cougher and/or TB patient 14 had the contact in the university. Among which six of them had the contact in the dormitory, four in the class rooms and four in the hospital.

Twenty-eight patients had sputum production. It was examined in 16 of them and 5 were found to be positive for AFB. Sputum was not investigated for AFB in the remaining 12 patients i.e. nearly half of them.

Chest X-ray showed spectrum of findings. Table 2. The common findings were apical infiltrates and hilar lymphnode enlargement with a frequency of 30% in both, followed by pleural effusion with 21% of frequency. ESR was increased in 60% of the cases and antibiotics was tried in 46.7% of the patients.

Table 1. Distribution of the student population of Jimma University and TB cases according to field of study, Jimma University, September 1994- August 1996.

Category of Study	Male	Female	Total	TB patients	
				No	%
Medicine	845	93	983 (42.4%)	27	2.9%
Nursing	230	83	313 (14.2%)	6	1.9%
Pharmacy	145	35	180 (8.1)	5	2.8%
Med. Laboratory Technology	171	9	180 (8.1)	3	1.7%
Environmental Health	147	16	163 (7.4%)	7	4.3%
Others	390	48	438 (19.8%)	1	0.2%
Total	1775	437	2212 (100%)	49	2.2 %

Table 2. Distribution of chest X-ray appearances of individual TB patients, Jimma University, students clinic, September 1994- August 1996.

Chest X-ray result	Number	Percentage
Apical infiltrate only	6	18%
Pleural Effusion	6	18%
Hilar Lymph node enlargement	4	12%
Apical infiltrate + Hilar Lymph node enlargement	4	12%
Basal infiltrate	3	9%
Perihilar infiltrate	2	6%
Paracardiac infiltrate	2	6%
Hilar Lymph node enlargement + Pleural Effusion	1	3%
Hilar Lymph node enlargement + Paracardiac infiltrate	1	3%
Cavity + bilateral nodular infiltrate	1	3%
Miliary infiltrate	1	3%
Normal	2	6%
Total	33	100%

DISCUSSION

Relatively few studies have been carried out on the magnitude of Tuberculosis in Ethiopia and little is known about its incidence and transmission in different population groups. Due to the well known problem of incomplete information system especially in developing countries the magnitude of problem of TB is estimated by the use of indirect epidemiological parameters. Tuberculin surveys of sample population is most useful and cost effective

to estimate the incidence, prevalence, mortality and risk of infection. On the contrary Teklu (10) concluded that this test is not useful in diagnosing TB in Ethiopia as a result of his comparable positive results between adult normal subjects and sputum positive TB patients, however difficult to compare for methodological reasons 9). The National Tuberculosis control programme of Ethiopia estimated the prevalence of TB based on Stylbo's and his coworkers estimate of annual risk of infection for sub-Saharan Africa, is

between 1.05% and 2.5%. Based on this figure the prevalence is estimated to be 180,000 to 308,000 per year, making a rate of 0.36 - 0.62% (2).

The magnitude of Tuberculosis in this study population (2.2%) is higher compared to a previous report (2.0%), from analysis of over 3 million outpatients carried out nationwide in 1982 (11). The present finding is from a small population of a training institution while the other is representing a larger population. Crowded living conditions and other environmental factors could be attributed in addition to host and epidemiological factors for the higher prevalence observed in this study population.

Similar to other reports Pulmonary TB is the most common form of infection in this study and spectrum of diagnostic tests were used to support the diagnosis. But sputum was not examined in nearly half of the patients with sputum production. However, diagnosis of active Pulmonary TB may be suggested by chest X-ray, but it can be well proven only by demonstrating AFB from sputum, body fluids or tissues on direct examination or culture. Moreover, smear positive cases for being infectious, too are currently recommended to be treated with higher number of drugs i.e., short course variety regimen (13). So diagnosing them properly has importance on management decision for the prevention of the disease transmission. Thus missed smear positive cases might have contributed to the higher prevalence.

The distribution of TB cases were across students of all fields of study. Environmental Health students, who have low exposure to patients in the health institutions, had the highest prevalence. Moreover, prevalence of TB in medical students who didn't start clinical

attachment, i.e. training in health institutions, was higher than in those who started. Thus, these findings suggest that other environmental, host and epidemiological factors might play an important role in the transmission of the infection in this study population. This is also supported by the fact that majority of patients, 10 out of the 14 patients reported history of contact to chronic cough and/or TB patient outside the health institution setting i.e. class rooms, dormitories etc. However, in the absence of a comparable study, and with the incompleteness of data on determinant factors for TB acquisition, it is very difficult to conclude that the hospital settings for training in health institutions in this study as safer or with no risk to trainees.

In conclusion, this study has shown that the magnitude of problem of TB is significant in Jimma University. The pattern of distribution in the students didn't suggest the expected fact that students acquire TB during training in health institutions from patients. Thus other factors like contact to students with TB in the campus may be more associated with the acquisition of TB by the students.

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REFERENCES

1. Jean DW *et al.* Tuberculosis. In: Thomas A Daniel. Harrison's Principles of Internal Medicine. 12th ed. 1991.
2. MOH. Guidelines for the National Tuberculosis control Programmes in Ethiopia. National tuberculosis control programme. August 1992
3. MOH. Health and health related indicators. Health information processing and documentation team. Planning and Programming department. January 1998.
4. Sudre P. Tendam G. Kochi A. Tuberculosis: a global overview of the situation today. *Bull Wrd Health Organ* 1992; 70:149-159.
5. Dolin P J. Raviglione M C. Kochi A. Global Tuberculosis incidence and mortality during 1990 to 2000. *Bull Wld Health Organ* 1994; 74:123-220.
6. Kent A Sepkowitz. AIDS commentary. AIDS Tuberculosis and the Health care worker. *Clin Infect Dis* 1995; 20:232-242.
7. Mandell D. Benett. Principles and Practices of Infectious Disease. 2nd Ed. 1985.
8. Solomon M. Pattern of disease among Jimma Institute of Health Sciences students. Thesis as a requirement for MD. 1992.
9. Zein AZ. Kloos. Ecology and diseases in Ethiopia. MOH, 1993.
10. Teklu B. Is the Mantoux test helpful for screening Pulmonary Tuberculosis in Ethiopia? *West Afr Med J* 1988;7: 196-199.
11. MOH. Comprehensive Health Service Directory. 1993-1984. Planning and programming department. MOH, 1986.
12. Schaller KF. Kuls W. Ethiopia Geomedical Monograph Series. NewYork and Heidelberg, Springerr Verlag 1972.
13. WHO. A clinical manual TB/HIV. 1996.