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Clinical Pattern of Tuberculosis among Saudi Nationals in the Western Region of Saudi Arabia

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ABSTRACT

Background*: Tuberculosis is a major health problem in Saudi Arabia and developing countries. Understanding the epidemiology of the disease helps in its early identification and prevention. This study was conducted to evaluate the pattern and clinical presentation of Mycobacterium tuberculosis (MTB) among Saudi nationals.*

Materials and Methods*: We reviewed the clinical and laboratory records of 147 patients with proven cultural diagnosis of MTB attending King Khalid National Guard Hospital (KKNGH), Jeddah, Saudi Arabia between June 1993 and June 1999 and also studied the symptoms and clinical pattern of the disease.*

Results*: Our study demonstrated that MTB affected mainly young adults in their second and third decades. There was no significant difference in the prevalence of the disease between the genders, though slightly more males (75/147, 51%) were affected compared to females (72/147, 49%). There was a high incidence of extra-pulmonary TB (36.6%), with lymph node involvement being the most common extra-pulmonary site (27%). Although the most common symptoms were chronic cough (51.7%), fever (46.3%) and weight loss (41.5%), these symptoms seem to occur less frequently in patients with TB than previously reported. There was an alarming high prevalence of drug resistant MTB (15% for isoniazid, 9.5% for rifampicin, 8.2% for pyrazinamide, 15.6% for ethambutol, and 9.5% for multi-drug resistant).*

Conclusion*: The presence of classical symptoms of MTB (cough, fever, weight loss) was less frequent than expected suggesting atypical presentation of the disease may be more common than what was previously held. There was a high incidence of extra pulmonary TB in our study, lymph node involvement being the most common. Physicians working in Saudi Arabia should be aware of the unusual presentation of the disease. The high prevalence of drug resistant MTB emphasizes the importance of performing culture and sensitivity tests for MTB in all new cases.* ***(Tanaffos 2005; 4(14): 37-42)***

Key words: *Tuberculosis, Mycobacterium tuberculosis, Clinical pattern, Saudi Arabia*

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INTRODUCTION

Despite the recent modest rise in the notification of tuberculosis (TB) against a trend of decline over the last 40 years in industrialized countries, its prevalence remains low in these countries (1). In contrast, the incidence of TB continues to rise and pose a major health problem in developing countries, including Saudi Arabia. Indeed, several studies have demonstrated that the incidence of this condition is still high in Saudi Arabia, particularly in the western province, probably due to influx of a large number of visitors and laborers from developing countries through Jeddah's seaport and airport (1-3). However, most epidemiological studies from Saudi Arabia and worldwide concentrated on the demographic distribution of the disease and only few studies addressed the clinical patterns of TB (4-6). Furthermore, as a result of increased traveling and immigrations, advances in medical technology, prolongation of the lives of the elderly, HIV epidemic and the increased prevalence of multi-drug resistant *Mycobacterium tuberculosis* (MDR-MTB), the epidemiology and clinical presentation of TB is changing with corresponding changes in the clinical pattern of the disease described in the past (7, 8).

As early identification and treatment of patients suffering from tuberculosis is crucial in the control of the condition, description of the clinical pattern of the disease may be invaluable for clinicians and public health officials. Therefore in this study we reviewed all patients with documented microbiological evidence of MTB attending King Khalid National Guard Hospital (KKNGH) and studied the clinical manifestations and pattern of the disease.

MATERIALS AND METHODS

Patients:

All consecutive cases of culture-proven MTB infection seen at KKNGH from the period June 1993 to June 1999 were obtained from Microbiology Laboratory and their files and x-rays were retrieved and analyzed. KKNGH is a referral hospital located in Jeddah and caters mainly for National Guard personnel and their dependents with access to all Saudi Nationals, who have been referred to our hospital.

Laboratory tests:

Only patients with microbiological evidence of infection with MTB based on positive culture with or without positive smear were included. Specimens were held at 4 ° C until being processed by standard laboratory procedures. The specimens were decontaminated within 24 hours by a standard N-acetyl-L-cysteine sodium hydroxide method (9), and were centrifuged at 15,000-x g for 20 minutes. For each specimen, two Lowenstein-Jensen (LJ) slope (BBL) and Middlebrook media were inoculated with 0.2 ml of the specimen and smear was prepared for auramine-phenol staining. All positive smears were counterstained by Ziehl Neelsen stain (ZN). Slope cultures were incubated at 36 ° C and were examined weekly for 8 weeks (10). All positive isolates were confirmed as Mycobacterium species on the basis of ZN stain and characteristic morphological appearance. All isolates were sent to Bioscientia Laboratory, Ingelheim, Germany for identification and sensitivity testing. Sensitivity testing was performed using Bactec system at German Reference Center for Tuberculosis (Dr. Rusch-Gerdes, Brostel). Sensitivity testing was performed for isoniazid, rifampicin, pyrazinamide and ethambutol. MDR-MTB was defined as a strain resistant to at least isoniazid and rifampicin *in vitro*.

HIV status was not tested routinely; however, all those tested were negative. Mantoux test was positive in 42 patients, negative in 10 patients, and in the remaining the test was not done, done but not read or not documented in the notes.

Analysis of the data:

Age, sex, and site of the disease (pulmonary, extra pulmonary or both) were obtained and analysed. The socio economic status of the patients was obtained according to the income and classified into low, middle and high socio-economic class. Other co-existing diseases were noted. The major presenting symptoms were analysed.

The chest x-rays were reviewed and classified into normal or abnormal, and if abnormal, what abnormalities were present. These abnormalities were distributed into one of the following categories: cavitary, infiltrative, consolidative and miliary. Other abnormalities such as bronchiectasis, adenopathy and pleural effusion were also noted.

RESULTS

In this study, 147 patients were reviewed (75 males and 72 females) with a mean age of 43.6 years (range 5 - 81 years). MTB was found to affect mainly young adults in their second and third decades (Fig 1).

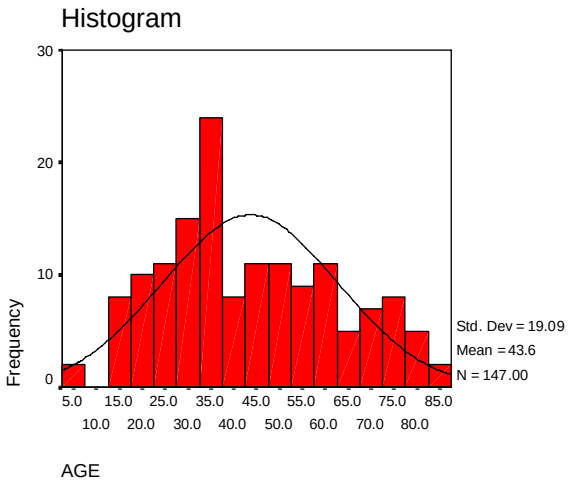

Figure 1. Frequency of Mycobacterium tuberculosis lesions according to age distribution.

The common symptoms reported were cough (76/147, 51.7%), fever (68/147, 46.3%), and weight loss (61/147, 41.5%). Other symptoms reported with less frequency include night sweat (46/147, 31.3%), dyspnea (19/147, 12.9%) and haemoptysis (14/147, 9.5%) (Table 1).

Table 1. Prevalence of symptoms, radiological findings, social background, type of TB (pulmonary versus extra-pulmonary) and drug resistance among patients with Mycobacterium tuberculosis.

	Patients No (%) (n=147)
Clinical features	
Cough	76 (51.7%)
Hemoptysis	14 (9.5%)
Dyspnea	19 (12.9%)
Fever	68 (46.3%)
Night sweat	46 (31.3%)
Weight loss	61 (41.5%)
Chest X ray findings	
Cavitation	24 (16.3%)
Consolidation	19 (12.9%)
Infiltration	37 (25.2%)
Hilar	14 (9.5%)
Pleural effusion	8 (5.4%)
Bronchiectasis	13 (8.8%)
Social Status	
Low	90 (61.2%)
Middle	22 (15.0%)
Unknown	35 (23.8%)
Type of TB	
Pulmonary	79 (53.7%)
Extra-pulmonary	54 (36.7%)
Both	14 (9.6%)
Drug resistance (DR)	
Isoniazid-DR	22 (15 %)
Rifampicin-DR	14 (9.5%)
Pyrazinamide-DR	12 (8.2 %)
Ethambutol-DR	23 (15.6%)
Multi-DR	14 (9.5%)

The prevalence of drug resistance were reported as 15% for isoniazid, 9.5% for Rifampicin, 8.2% for pyrazinamide, 15.6% for ethambutol, and 9.5% for MDR-MTB (Table 1).

Chest X-ray was normal in 30% and abnormal in 70% of patients. Lung infiltrations was the most common abnormality noticed (37/147, 25.2%) (Table 1).

The prevalence of pulmonary TB, extra pulmonary TB and both were 53.7%, 36.7% and 9.6%, respectively (Table 1). Lymph node involvement was the most common extra pulmonary manifestation (14.3%) (Table 2).

Table 2. Number and percentage of patients presenting extra pulmonary manifestations.

	Patients No (%)
Extra pulmonary site	(n = 147)
Lymph node involvement	40 (27.2%)
Pleural effusion	8 (5.4%)
Bone	9 (6%)
Liver	6 (4.1%)
Skin	3 (2%)
CNS	5 (3.4%)
Chest wall abscess	3 (2%)
Psoas abscess	2 (1.4%)
Miliary	3 (2%)
Gut	2 (1.4%)

Social class was obtained in 112 patients; most of them were from the lower class (90 patients). History of smoking was obtained in only 45 patients, of whom 15.3% were smokers. The most common coexisting disease noted was diabetes mellitus (14.3%).

DISCUSSION

According to the World Health Organization (WHO), about one third of the world population is infected with tubercle bacilli, causing eight million new cases of TB and three million deaths each year (11). Understanding the epidemiology and clinical presentation of the disease will lead to an early identification and efficient treatment of the index cases and better control of TB.

Our study has demonstrated that MTB affected predominantly young adults in their second and third decades, an observation reported by others in Saudi Arabia, Gulf States and USA (12, 13, 14). Contraction of the disease at this age has a negative impact on the economy as the disease has the highest prevalence in the economically productive age group in the country. On the other hand, the disease was less common among young children and adolescents, probably as a result of successful implementation of a national BCG vaccination program. Although other studies from Saudi Arabia and elsewhere (13, 15) demonstrated that males tend to be affected more than females, there was no significant difference between genders in our study.

Previous studies of the clinical manifestations of TB reported relatively high prevalence of the incidence of symptoms such as cough fever and weight loss. Barnes and associates, in a prospective study of 188 patients found cough (78%), weight loss (68%) and fever (60%) to be the most frequent symptoms of TB, while hemoptysis was reported only in 37% of patients (16). Similar results were found by MacGregor (17) (cough; 81%, weight loss; 75%, and fever; 44%, and hemoptysis; 24%) and Gnaore et al. (18) (cough; 79%, weight loss; 74%, and fever; 69%). In contrast, a recent population based study by Miller and co-workers reported a relatively lower prevalence of these symptoms in TB (cough; 48.2%, weight loss; 44.5%, fever; 29.4%, and hemoptysis; 20%) (6).The latter results were more concordant with our findings (cough; 51.7%, weight loss; 41.5%, fever; 46.3%, and hemoptysis; 9.5%). These findings suggest that the symptoms reported in the past in association with TB are probably becoming less frequent and significant

number of patients may present with atypical manifestations.

The high incidence of extra pulmonary TB in our study is concordant with other studies and may reflect the high prevalence of TB in Saudi Arabia. Lymph node involvement was the most common extra pulmonary TB encountered in our patients. Tuberculous lymphadenopathy is one of the most common types of extra pulmonary TB, usually affecting patients in their second and third decades. Its prevalence was found to be significantly higher in populations investigated from TB endemic areas. Thompson and co-workers (19) in the United Kingdom, and Pang (20) in Australia, found a predilection for lymph node involvement with TB in immigrants coming from regions where TB is highly endemic. Additionally, our study also demonstrated that TB could involve other organs with significant frequency and physicians should be aware of this to avoid late diagnosis or misdiagnosis.

Multi-drug resistant TB has recently gained a widespread interest and recognition following reports of outbreaks in the USA, and was associated with HIV co-infection, high fatality rate and significant transmission to health care workers (21, 22). Also a recent study by Khan and co-workers has shown a high prevalence of MDR-MTB in Saudi Arabia, particularly in the western province (23). Our study demonstrated an alarmingly high rate of MDR-TB and mono-resistance to other individual anti-tuberculosis drugs. This finding may have a serious implication for the management and control of TB in the Kingdom. In fact treatment was unsuccessful, despite being adjusted according to drug sensitivity test, in 7 out of 14 patients with MDR-MTB isolated in our study. This emphasizes the importance of drug sensitivity test in the management and control of TB in Saudi Arabia.

Although this is a hospital based-study, useful clinical information has been obtained from the study. Additionally, apart from the study by Miller and co-workers (6), all the studies of the clinical presentation of TB were hospital-based. Furthermore, population-based studies may have their limitations as they are usually done after the patient has been diagnosed and received treatment, and therefore the symptoms reported by the patients in retrospect may not reflect the same symptoms the patient was particularly concerned about at the beginning of the disease. Also all the subjects included in our study were Saudis and the sample may not be a true representation of Jeddah's population, half of which are non-Saudis. However this is beyond our control and further studies to examine the symptoms of TB among both Saudis and non-Saudis are needed.

Although the HIV epidemic worldwide has been incriminated as one of the major causes of resurgence of TB, particularly in developing countries, we feel this is not the case in Saudi Arabia. Additionally we do not think the difference observed in the clinical presentation can be due to HIV infection, as all those tested for HIV were negative. This is not surprising since the prevalence of HIV in the Kingdom is extremely low (24, 25).

In summary, our study demonstrated that MTB affected mainly young adults. There was no significant difference in the prevalence of the disease between the genders, though slightly more males were affected. There was a high incidence of extra-pulmonary TB (36.6%), with lymph node involvement being the most common extra-pulmonary site (27%). Although the most common symptoms were chronic cough, fever and weight loss, these symptoms seem to occur less frequently in patients with TB than what was reported in the past, suggesting that atypical presentation of this disease may be more common than previously held. In area where TB is endemic, such as Saudi Arabia, physicians should be aware of the atypical presentation of the disease. There was an alarming high prevalence of MDR-MTB in our area, and every effort should be made to obtain specimen for microbiological and sensitivity testing prior to instituting anti-tuberculosis treatment.

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