

Prevalence of Tuberculosis among Veterans, Military Personnel and their Families in East Azerbaijan Province Violators of the last 15 Years

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Abstract- Nowadays in the world, tuberculosis is the second largest killer of adults after HIV. Due to the location of presidios that is mostly located in hazardous zones soldiers and army personnel are considered high risk, therefore we decided to determine the prevalence of tuberculosis status in this group of people. This was a cross-sectional descriptive research that studied the prevalence of pulmonary tuberculosis in soldiers and military personnel in the last 15 years in tuberculosis and lung disease research center at Tabriz University of Medical Sciences. The statistical population consisted of all the soldiers and military personnel. The detection method in this study was based on microscopic examination following Ziehl-Neelsen Stain and in Leuven Stein Johnson culturing. Descriptive statistics was used for statistical analysis and statistical values less than 0.05 were considered significant. By review information in this center since the 1988-2013 with 72 military personnel suffering from tuberculosis, it was revealed that among them 30 women, 42 men, 14 soldiers, 29 family members, and 29 military personnel are pointed. A significant correlation was found between TB rates among military personnel and their families. Although in recent years, the national statistics indicate a decline of tuberculosis, but the results of our study showed that TB is still a serious disease that must comply with the first symptoms of tuberculosis in military personnel and their families that should be diagnosed as soon as possible.

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Introduction

Tuberculosis is a bacterial infectious disease that has the second highest mortality rate in the world (1,2). Two to three million people a year die of this disease. This is also known as the white plague (3). About a third of the world's population has been infected by «M. Tuberculosis». A new infection occurs every second, on a global scale (4). However, many infections by «M. Tuberculosis» do not lead to TB disease (5) and 90-95% of them remain asymptomatic (6). In 2007, about 13.7 million chronic active cases were found (3). In 2010, 8.8 million new cases of TB, and 1.45 million deaths were identified that most of them occur in developing countries (7). TB is more common in developing countries. About 80% of the tuberculin test of the

population in many Asian and African countries has been reported positive; however, only 5-10% of the population of the United States had a positive test (8). The incidence of the disease in areas where are supervised by the World Health Organization in Africa continental is high, and its average have been reported, 332 people per 100,000 (9). Furthermore, given the global spread of AIDS and its impact on tuberculosis and multiple antibiotic resistance bacteria is added to the concern. Besides these TB arguably is one of the emerging diseases threatening the human life in the world (9). Therefore, highly preparedness in public health is important.

Respiratory infections are the major cause (25% to 30%) of hospitalization due to infectious diseases in U.S. military personnel (10-12). While military

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personnel and soldiers may be at risk for acquiring TB infection because of crowded and populous living conditions, stressful working environment, and exposure to respiratory pathogens in disease-endemic areas, military trainees are at particularly high risk for respiratory disease (10,11,13-15).

And also their worldwide deployment, historically, their greater risk has been exposure to military members with active TB in the close-contact environments in which they live and work (16-18). Beebe in his research in 1975 documented that World War II prisoner's war captured in Japan and Korea suffered far more from tuberculosis, other infectious, and parasitic diseases than did POWs captured in Europe (19). Keehn noted an increase in mortality from tuberculosis and other infectious and parasitic agents in returned prisoner's war for many years after their return to the United States (20).

Since the TB bacterium is highly resistant to heat and dry condition and also transmit the disease directly from person to person and through the air, is as well as common and densely populated environments will speed up the spread of diseases. Therefore, crowd places, particularly army garrisons, are in the risk of infectious diseases such as tuberculosis. Due to the spread of the debilitating disease of the immune system that underlies the bacterial infections including tuberculosis, implementation of TB control programs to maintain the health of military in many countries is strongly concerned by researchers' centers related to military medical centers. The greatest risk of infection is in people under 20 years old, and the highest prevalence is among people 15-45 years old (21-25). TB prevalence is different at different ages. In Africa, TB is mainly a threat to teenagers and young people between 12 and 18 years old (25).

However, in countries that TB incidence rates have decreased dramatically (such as the United States), TB is mainly observed among the elderly ones and people with weak immune system. Considering that the body of Iranian military forces is formed by young people in the risk age reviews, studying the prevalence of the disease in the armed forces is very important. Given that accurate information about the incidence and prevalence of tuberculosis in military zones of Iran is not available, this research studies the prevalence of pulmonary and extrapulmonary tuberculosis within the soldiers and military personnel and their families in the last 15 years based on data of Tuberculosis and Lung Disease Research Center of the Tabriz University of Medical Sciences.

Materials and Methods

This cross-sectional study was conducted to assess the prevalence of tuberculosis among military personnel and their families in the last 15 years (from 1988 to 2013) at the Research Center for Tuberculosis and Lung Diseases, Tabriz University of Medical Sciences. In this research, inclusion criteria included all military personnel, including retired ones, conscript personnel and employees of the armed forces and their families and soldiers who have passed their four months of military service and exclusion criteria were not having any of the inclusion criteria. Data gathering tool was a self-made checklist that its validity was confirmed by experts and its reliability was measured by using Cronbach's alpha coefficient (0.7). The method of sampling was including all military personnel and their family with sample size: 1254 referred to hospitals with symptoms similar to TB and for performing TB test. Diagnosing of tuberculosis in most cases was based on microscopic examination following Ziehl-Neelsen Stain and in Leuven Stein Johnson culturing. Choosing and using Ziehl-Neelsen Stain method is due to its high positive predictive value and the best method for acid-fast bacilli. Descriptive statistics was used to show frequency and mean. After data collection with valid and reliable checklist (Cronbach's alpha coefficient: 0.98), the chi-square statistical test was used for evaluation of the samples in terms of study variables (such as age and sex). And to evaluate the average of TB in samples, the type of TB in patients and every three of five years, the T-Student test was used. Data were analyzed by SPSS18 and *p*-values lower than 0.05 were considered significant ($P < 0.05$).

After performing the study, the participants' information was kept complete confidentiality.

Results

In this study, 72 military personnel were suffered from TB, 42 (57.14%) of them were male. Fourteen patients were conscript personnel (19.4%), and 29 ones were family members of military personnel (40.47%) and 29 patients (40.47%) were also military personnel or retired. A significant correlation was found between TB rates among military personnel and their family's (Table 3). Among patients, 34 (47.62%) patients had pulmonary TB and 19 (55%) were smear-positive, and 15 (45%) were smear-negative. A total of 38 (52.38%) participants were diagnosed with pulmonary TB among which 18 (50%) patients had adenitis, 7 (18.18%)

patients pleurisy, 5 (13.63%) patients had epididymis and frequency of pulmonary TB in bone area was 4.54 %, pericardial 4.54%, eye 4.54% and soft tissue 4.54%. Prevalence of TB during the last 15 years in the military personnel is showed in Table 1 and for comparing the prevalence of TB per years; the study period was divided into 3 parts. As the Table 1 shows the growth

Table 1. Prevalence of TB in the last 15 years

Year	2008-2013	2003-2008	1998-2003
Abundance	27 people	22 people	23 people
Percent	37.5%	30.55%	31.95%

and spread of TB among military personnel has positive rate comparing to the first and second five years. Demographic characteristics of samples are presented in Table 2.

According to Table 2 no statistically significant difference was observed between demographic characteristics and TB rates.

Table 2. Demographic characteristics of study participants

Variable	Abundance / (Mean ± SD)	P-value
Age (years)	36±1.84	
Sex		>0.05
Female	533	
Male	721	

Table 3. Prevalence of TB in the three groups of military person

Groups	Abundance	P-value
Draftees	14	
Military Personnel	29	<0.05
Families of Military Personnel	29	

Discussion

In this study, men were more likely to have TB while many studies show a higher prevalence of TB in women (23,26). The reason for this difference in the current study may be due to the fact that military service in Iran focuses on male employees. Some studies have reported a higher incidence of TB in men (27). In Hosseini study quoted from Sadegh Yusufnejad, conducted in Zaboul TB incidence in men was 64% and 56% in women (27). According to the findings, all military personnel who were suffering from TB have infected their families; this reflects the lack of knowledge and failure to observe safety precautions to prevent the spread of this disease. Thus, it is not unexpected that veterans returned to their home harboring infectious agents. It is important for the patient to remain at home in isolation. As much as possible, he/she should stay away from other people in the house by staying in a separate room or wearing a surgical mask when leaving the room. Separate bedroom or beds are highly recommended, if possible (28). TB spreads through the air by coughing or sneezing, even

talking that distributes microbes in environment were dispersed in the environment, and it is inhaled by others and for this reason, TB is so common among those who have close relationship or live together (29). In other words, TB is so sensitive to overcrowding and poor nutrition. This relationship makes tuberculosis, a disease of poverty (30). The frequency of pulmonary TB in the present study was lower than pulmonary TB. A conducted review of TB in Iran studied epidemiology in the past decade suggests that most common form of TB in Iran is the lung TB (31).

In another study, that was done in America in the past 14 years the number of cases of pulmonary tuberculosis was 55 percent more than the number of cases of pulmonary TB (32) that outcome was consistent with the results of this study, this difference may be due to the selection of the study population in this research. Out of pulmonary TB, smear positive patients are 10 percent more than smear negative ones and sputum positive are more than sputum negative (31) that is similar to current results. Most cases of pulmonary TB in this study were: adenitis, pleurisy, and epididymis. In

Peto and Metanat's research, the frequency of pulmonary TB was in the same order that was completely consistent with the results of this study (31,32). Unlike the Internal studies, which implies a lower incidence of TB in the ordinary population (31,33), the study of military personnel with TB has been increased in the last 15 years. So that in the past 5 years, TB incidence among military personnel increased at a rate of 7 to 8 percent comparing to first and second five years, and this could be an alarm for military areas and military personnel.

It should be noted that although the results' investigation and national statistics show that the incidence of TB in 1965 has reduced from 142 people out of 100000 to less than 14.4 people out of 100000 in 2013 (34) but according to information obtained from this study one can conclude that as soon as observing one of the TB symptoms such as cough with sputum or phlegm for more than three weeks, weight loss, fever, chest pain, short of breath, fatigue or night sweats in military personnel and their families quick evaluation must be done for both diagnosis and treatment.

Also, the following suggestion and solution are recommended:

- Provide counseling and education about TB and how to prevent its in military personnel and their families,
- Perform the annual follow-up among military personnel and their families,
- Create military environments with appropriate hygienic conditions.

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