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Epidemiology of tuberculosis in Diyala Governorate (Iraq) and relationship with blood group and hypertension

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Abstract
Background: Tuberculosis is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It typically affects the lungs and also other sites. It causes ill-health among millions of people each year and ranks as the second leading cause of death from an infectious disease worldwide, after the human immunodeficiency virus (HIV).
Aim of the study: To Study
1. Epidemiological distribution of TB in dyalia governorate.
2. Relationship between TB and Hypertension.
3. Relationship between TB and Blood group.

Materials and Method: This study was conducted in the chest & respiratory disease center in Baquba city in Diyala government as a cross sectional study from the period of 1st February to 31th July 2017. One hundred patients with TB included in this study.
Results: Patients were categorized according to their age, gender, site of infection, type of blood group and relation with hypertension. From (100) patients have tuberculosis most age group affected is 61-70 years (29%), Males are more affected by tuberculosis than females(65%), The most blood group among tuberculous patients is blood group O (36%), Regarding to relationship between hypertension with tuberculosis there is a weak relationship. Incidence of pulmonary tuberculosis is far more than extra-pulmonary tuberculosis (85%).
Conclusion: The most age group affected by tuberculosis is 61-70 years old in diyala governorate Males are more affected by tuberculosis than females. The most blood group among tuberculous patients is blood group O. and there is a weak relationship between tuberculosis diabetes mellitus.

Keywords: tuberculosis, hypertension, blood groups

Introduction
Tuberculosis is an infectious disease caused by the bacillus M. tuberculosis. It typically affects the lungs (pulmonary TB) but can affect other sites as well (extra pulmonary TB). The disease is spread in the air when people who are sick with pulmonary TB expel bacteria, for example by coughing. In general, a relatively small proportion of people infected with M. tuberculosis will develop tuberculosis disease; however, the probability of developing TB is much higher among people infected with HIV. TB is also more common among men than women, and affects mostly adults in the economically productive age groups [1].

History
Tuberculosis (TB) has a long history. It was present before the beginning of recorded history and has left its mark on human creativity, music, art, and literature; and has influenced the advance of biomedical sciences and healthcare. Its causative agent, M. tuberculosis, may have killed more persons than any other microbial pathogen. Tuberculosis was documented in Egypt, India, and China as early as 5000, 3300, and 2300 years ago, respectively [2].
Tuberculosis, also known as the white plague, received the title of "captain of all these men of death" by John Bunyan in the second half of the 17th century, when the disease reached a high level of death rates in Europe. Although it was probably described for the first time in Indian texts, pulmonary Tuberculosis is known since the time of Hippocrates as “phthisis”, which is derived from the Greek for "wasting away". In 1689, the English Doctor Richard Morton used the term "consumption" to specifically denote TB, & finally, in 1819, the inventor of the stethoscope, the French Doctor René Laennec identified for the first time the Tuberculosis manifestation unit [3].

Epidemiology of TB
TB is a top infectious disease killer worldwide. In 2014, 9.6 million people fell ill with TB and 1.5 million died from the disease. Over 95% of TB deaths occur in low- and middle-income countries, and it is among the top five causes of death for women aged 15 to 44. In 2014, an estimated 1 million children became ill with TB and

140,000 children died of TB**.** TB is a leading killer of HIV-positive people: in 2015, 1 in 3 HIV deaths was due to TB**.** Globally in 2014, an estimated 480,000 people developed multidrug-resistant TB (MDR-TB). The Millennium Development Goal target of halting and reversing the TB epidemic by 2015 has been met globally **[4].**

TB incidence has fallen by an average of 1.5% per year since 2000 and is now 18% lower than the level of 2000.The TB death rate dropped 47% between 1990 and 2015**.** An estimated 43 million lives were saved through TB diagnosis and treatment between 2000 and 2014 [4]**.**

Pathogenesis of TB

Infection occurs when a person inhales droplet nuclei containing tubercle bacilli that reach the alveoli of the lungs. These tubercle bacilli are ingested by alveolar macrophages; the majority of these bacilli are destroyed or inhibited. A small number may multiply intracellularly and are released when the macrophages die. If alive, these bacilli may spread by way of lymphatic channels or through the bloodstream to more distant **[5].**

Tuberculosis and Blood Groups

Since the discovery of the ABO blood group, there has been an ongoing interest in the potential role of blood groups in infectious disease. Blood groups are frequent targets in epidemiological investigations. Many blood groups are receptors for toxins, parasites, and bacteria, where they can facilitate colonization or invasion or evade host clearance mechanisms. Blood groups can also serve as false receptors, preventing binding to target tissue. Finally, bacteria can stimulate antibodies against blood group antigens, including ABO [6].

Earlier attempts have been made to find whether any correlation between tuberculosis and any particular blood groups. One of the earliest attempts to find out the association between these two by Buchanan and Hursley (1921-22) and he concluded that there was no relationship between blood groups and any disease**.** Jain (1970) observed higher incidence of AB group among pulmonary tuberculosis cases. The authors agree with the views of Jain (1970) that there is some association between blood group and pulmonary tuberculosis **[7].**

Tuberculosis and Hypertension

With regard to TB leading to hypertension, it has been hypothesized that the triggering of immunological responses can cause an impairment of endothelial function and lead to an increased risk of CVD and possibly hypertension. TB may lead to parenchymal destruction of the lung tissue, which may affect the vascular structure and cause vasculitis and endarteritis, subsequently leading to a reduced cross-sectional area of the pulmonary vasculature and thereby pulmonary hypertension [8].

Patients and Methods

The Sitting of Study

This study was conducted in the chest & respiratory disease center in Baquba city in Diyala government as a cross sectional study from the period of 1st February to 31th July 2017.

Chest & respiratory disease center is the main center of respiratory disease in Diyala government.

Inclusion Criteria

This study reviews all patients diagnosed and managed as tuberculosis at chest & respiratory disease center in Baquba, including different ages and gender.

Exclusion Criteria

All patients with tuberculosis are including in this study without exclusion criteria.

Preparing Data Collection

One hundred patients diagnosed as tuberculosis at chest & respiratory center of Baquba based on sputum acid-fast bacilli culture, PCR (polymerase chain reaction) and tuberculin test, whom were diagnosed by expert persons in the laboratory in this center.

Patients were categorized according to their age, gender, site of infection, type of blood group and relation with hypertension.

Regarding the age, it was categorized into groups with 10 years intervals.

All patients whom were included the following investigations were done for every patients

1. To detect blood group, ABO typing method was used.
2. To assess the relationship with hypertension, blood pressure was measured by the use of sphygmomanometer and stethoscope, the normotensive patient's ≤ 120/80 and hypertensive > 120/80, which was done by the researcher, examination blood pressure for every patient in the lying position.

Statistical Analysis

The collected data was analyzed by using computer, excel. All the variables were analyzed by number, proportion and percentage.

Results

The result of the study shown in the following tables

Table 1: Distribution of patient with tuberculosis according to their age.

Age	No.	Percent
≤ 20	11	11%
21-30	16	16%
31-40	11	11%
41-50	10	10%
51-60	17	17%
61-70	29	29%
≥71	6	6%
Total	100	100%

Table 2: Distribution of patient with tuberculosis according to their gender.

Gender	No.	Percent
male	65	65%
female	35	35%
Total	100	100%

Table 3: Distribution of patient with tuberculosis according to their Blood group

B. Group	No.	Percent
A	17	17%
B	36	36%
AB	9	9%
O	38	38%
Total	100	100%

Table 4: Distribution of patient with tuberculosis according to the site of infection

Site	No.	Percent
Pulmonary	85	85%
extra-pulmonary	15	15%
Total	100	100%

Table 5: Hypertension among tuberculosis patients

HT	No.	Percent
Positive	38	38%
Negative	62	62%
Total	100	100%

Discussion

In this study, from (100) patients have tuberculosis, the age distribution was ≤ 20 years 11 patients (11%), 21-30 years 16 patients (16%), 31-40 years 11patients (11%),41-50 years 10 patients (10%),51-60 years 17 patients (17%), 61-70 years 29 patients (29%), ≥ 70 years 6 patients (6%). In relation to the age distribution, this study disagree with yakimova in Russian who reported that largest age group incidence of TB was 25-34 years old and lowest age group was < 15 years old [9], this could be due to their life style and probably due to health education.

This study, among (100) tubercular patients, consist of (65%) male and (35%) female. he study is similar to the study of sukhesh, in India which records 446 patients that formed the study group. Out of this, 308 (69%) were of males and 138 (31%) of females [10].

The study shows that (38%) of patients with tuberculosis have blood group O, (36%) have blood group B, (17%) have blood group A and (9%) have blood group AB. And this is similar to the study done by Rao B.N *et al*. in India which reported among patients with TB, (18%) have blood group A, (37%) have blood group B, (11%) have blood group AB, (34%) have blood group O [11]. But in his study, he reported that blood group B is largest percentage and our study reported that blood group O is the largest, this is may be or probably blood group O is dominant in our governorate.

This study shows 85% is pulmonary TB and 15 % is extra-pulmonary TB. This goes with Aaron L. in UK that reported that 75% of newly diagnosed cases were pulmonary TB, 15% were extra-pulmonary and 10 % both [12].

Regarding to hypertension this study shows that 38% of patients are hypertensive and 62% non-hypertensive. We could not find thesis showed the relationship between TB & HT.

Conclusion

1. The most age group affected by tuberculosis is 61-70 years old in diyala governorate.
2. Males are more affected by tuberculosis than females.
3. The most blood group among tuberculous patients is blood group O.
4. Regarding to relationship between hypertension and tuberculosis, the researcher concludes that there is fair relationship and need more researches.
5. Incidence of pulmonary tuberculosis is far more than extra-pulmonary tuberculosis.

Recommendations

The fundamental step in TB control measures is diagnosis of all TB cases in the community followed by a strict treatment regimen and this can be achieved by increasing the case detection rate of TB control program.

1. More effort should be expanded to increase the cure rate which can be done by a good relationship with patients to increase the compliance with the treatment regimen.
2. The role that surveillance of TB treatment outcomes can and ought to play in strengthening TB control.
3. Strengthen BCG immunization of national immunization Programme to protect people especially children bellow 10 years of age from TB infection.
4. Further researches, especially national TB prevalence surveys in Iraq.
5. Further studies regarding effect of tuberculosis in causing hypertension and cardiovascular disease.

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