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Assessment of Different Risk Factors Affecting Pulmonary Tuberculosis among Sudanese Patients

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Abstract: *Several risk factors have been proofed to have strong relation with the emergence and existence of pulmonary tuberculosis worldwide, these include poverty, malnutrition, overcrowding, smoking, gender, age, migration and alcoholism. This study observed socio economic status, age,smoking, and BCG vaccination in the development of pulmonary TB among Sudanese patients attending several hospitals in Khartoum State, Sudan. In addition, other laboratory tests were done to see where it might supplement the effect of genetic variability within the IFN-γR1 gene in increasing the risk of developing pulmonary TB among affected participants. A total of 100 participants with active TB and 50 matched healthy controls were investigated for association of three factors to increase risk of developing PTB.Research findings revealed that the four demographic datagender, BCG vaccination, socioeconomic status and smoking were significant (P-value=0.000) associated with increased risk of novel development of pulmonary tuberculosis (PTB). Poverty, low educational acquirement and old age were proved to have significant role in the determination o TB rate among Sudanese populations.*

Keywords: *Pulmonary TB, BCG, Smooking, PCR, Khartoum, Sudan.*

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I. Introduction

Tuberculosis is a devastating infectious disease of grave public health consequences infecting one-third of the global population, and considered second to human immunodeficiency virus (HIV) in causing death in majority parts of the world [1]. Despite global decrease in reported TB incidence, prevalence and mortality during the last 10 years, eradication of the disease has not yet been achieved, and great efforts must be launched to make it possible [1]. In 2013, estimated TB incidents cases were accounted for 9 million fresh cases with 1.5 million deaths annually worldwide [2]. Of the new TB cases, those co-infected with HIV formed 12%, while deaths from such combination were 24% [3].The geographic incidence of infection and disease impact extremely varies. Regions notified with high disease burden occurred in Asia (55%) followed by Africa 30% [2]. Currently, the greatest global TB threat is posed by 22 countries such as India, China and Indonesia in Asia, and Nigeria, Ethiopia, South Africa and Uganda are in Africa [2]. These countries share greater than 80% of global TB burden [2,4]. About one million prevalent cases were reported within EMRO populations. As stated by the WHO, 95% of TB burden in the region is contributed by nine countries namely; Afghanistan, Pakistan, Islamic republic of Iran, Iraq, Egypt, Morocco, Sudan, Somalia and Yemen [2]. In 2010, incidence rate in the same region formed 7% of the global trend [4].

Several epidemiological risk factors, socio-economic and socio-demographic characteristics attribute to TB existence and emergence. These associated risk factors include; poverty, malnutrition, overcrowding, tobacco smoking, gender, age, emergence of MDR-TB, migration and alcoholism [3,5,6]. In poor-resourced countries which lack a reasonable health infrastructure and facilities for early diagnosis and treatment programmes, TB flourishes [5]. Other factors such as vitamin D deficiency and co-infection with HIV can also aid in reactivation and resurgence of the disease [6]. In TB patients co-infected with HIV, treatment efficacy decreased while case fatality rate increased [1]. With regard to gender, 2.9 million infected women were reported out from about 9 million cases in 2012 [7]. Development of multiple drug resistance tuberculosis (MDR-TB, resistance to least isoniazid and rifampacin) was associated with 450,000 new cases and 170,000 deaths [4].Sudan is not an exception from other African countries in constituting an area with high TB prevalence estimated as 209 cases/100,000 population, while a figure of 50,000 incident cases were reported [8]. Following an investigation of emergent MDR-TB in the Eastern region of Sudan, the same co-authors detected a

higher rate of 24% in patients who previously received anti-tuberculosis drugs as opposed to 5% rate in freshly treated TB cases. They further identified and concluded that the Eastern region of Sudan as a geographic risk factor for inducing emergent drug-resistant cases. A relatively recent Sudanese study spanning the role of epidemiological and socio-demographic risk factors in predisposing TB in the mentioned region showed that illiteracy and male gender were the most probable attributes associated with the disease [9]. However, both studies did not tackle the role of genetic background in increasing risk of developing TB.

II. Patients And Methods

2.1 Demographic Data

This study cross-sectional laboratory based study. A total of 100 patients and 50 were control, socioeconomic status split into three figures (low, moderate and good), BCG vaccination, smoking and gender was included in the study.

2.2 Laboratory approach

All target samples were subjected to PCR. Searching for the presence of IS 6110 with it is unique size (123 bp).

III. Resultss

3.1 PCR Results

All of the 100 sputum samples that were collected from TB patients were present harbouring the target sequence (123 bp). At the same time all negative controls were appeared negative for this sequence (Fig 1).

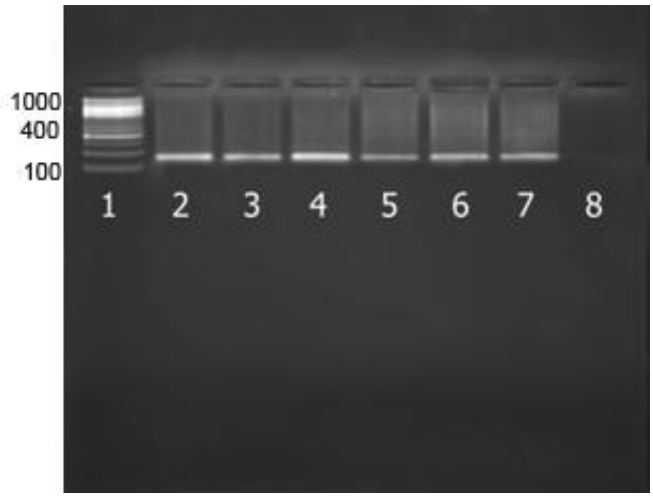

Figure 1. 1.5% Agarose gel with positive sputum samples (2-7), while sample 8 appeared free from IS6110 with 123 bp.

3.2 Analysis of Different Risk Factors

All parameters were investigated Using SPSS, Version 16. The results revealed significant differences in all variables as present in Tables 1,2,3,4 (p-value =0.000).

Table 1. Distribution of TB according to BCG vaccination

BCG	Frequency	Percent
Yes	15	%15
No	85	%85
Total	100	%100
p-value	0.000	

Table 2. Distribution of TB among enrolled subjects according to gender

Gender	Frequency	%
Male	75	75
Female	25	25
Total	100	100
p-value	0.000	

Table 3. Frequency distribution according to Socioeconomic status

Socioeconomic status	Frequency	Percent
Low	75	%75
Moderate	22	%22

Good	3	%3
Total	100	%100
p-value	0.000	

Table 4. Frequency distribution according to Smoking

Smoking	Frequency	Percent
Yes	14	%14
No	86	%86
Total	100	%100
p-value	0.000	

IV. Discussion

There are many factors increase infected by tuberculosis.To identify the factors gender, socio economic status, BCG vaccination and tobacco, we conducted analysis by used ssps analysis programme.In many countries TB registered double in as more in men than women.Male and female different susceptibility to infect by PTB according to many reasons behaver andthe immune response in this study percentage was 3:1 male: female [10].The male wasbeoame more infected than women according to many reasons and differences in immune response biological differences in male and female susceptibility to infect by PTB The people who had been vaccinated with BCG vaccine low infected with pulmonary tuberculosis than the other who didn't the result was significant (p-value =0.000) as we found in other countries the BCG protects against infectious by TB [11].Data revealed that most risk factors for TB was poverty which increase the prevalent among the poor people more than in the wealthier one [12] as such we have The proportion of tobacco smokers was significantly higher in TB patients in (p-value =0.000)Which is the same in result Part of demographic risk factors like air pollution and cigarette smoking, both indoor and outdoor, pose major threats to lung health as they reduce local defences and increase chances of TB disease [3,5].

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Conflict of interests

None

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