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Original Research

Tuberculosis among patients attending Thamar University Al-Wahdah Teaching Hospital, Yemen

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Abstract

Background: Globally, tuberculosis (TB) remains the leading cause of death from a single infectious disease. It is a major public health problem in Yemen. However, there is few information about TB in Dhamar Governorate.
Aim: This work studied some selected demographic and medical characteristics of TB patients who attended Thamar University Al-Wahdah Teaching Hospital (TUWTH) in Dhamar Governorate between 2018 and 2019.
Methods: A retrospective hospital-based study was conducted on TB Patients at the Internal Medicine Department of TUWTH. Demographic data and medical information were collected from patients' files and records. The collected data were analyzed using Chi square or Fisher extract tests to find out the association between the studied variables and acid-fast bacilli (AFB) smear findings.
Results: One hundred and eighty (180) TP patients who had eighth information in patients' files and records during the study period. Most of them were males (n =105/180, 58.3%), aged 41 to > 60 years (n = 130/180, 73.3%), had low socioeconomic status (n = 154/180, 85.6%) and from Jahran District (101/180, 56.1%). Majority of the TB-types cases recorded were new cases (171/180, 95.0%). Medical history of diabetes mellitus; other chronic diseases; contact with TB cases; and using immunosuppressive drugs were reported among 23.9%, 21.70%, 10.60, 3.9% of the patients, respectively. While, 27.80% had a history of smoking habit. The findings revealed that possessing a history of using the immunosuppressive drugs, contact with confirmed TB cases and smoking habit were significantly associated with AFB smears findings (positive *vs.* negative results: 71.4% vs. 28.6%; 52.6% vs. 47.4%; and 28.0% vs.72.0%, respectively).
Conclusion: To the best of our knowledge, the present study is the first to provide the health authorities with essential information and simple profile about patients TB in the study area.

Keywords: Tuberculosis, Dhamar, Yemen

1.Introduction

Although, tuberculosis (TB) is a treatable and curable disease [1], it continuous to be a major global health problem as one of the most infectious diseases, and the leading causes of death [2,3]. Due to the serious public health threat posed by TB, the World Health Organization (WHO) declared it a global emergency in 1993[4]. In 2018, WHO reported 10 million new cases of TB and 1.2 million TB deaths worldwide. Accordingly, 80% of TB cases and 70% of deaths were recorded in middle-income and low-income countries [5]. It is estimated that around 54 million lives have been saved, between 2000 and 2017 through successful diagnosis and treatment of patients with TB worldwide [6]. It is estimated that around a quarter of the global population (~1.7 billion people) has

latent tuberculosis infection (LTBI) [7], a state of continuous stimulation of the immune system by Mycobacterium tuberculosis without evidence of clinical symptoms of active disease [8].

The smear-positive pulmonary TB cases are dangerous and can easily spread the infection within their community [9.10]. Moreover, droplet nuclei of sputum spread bacilli long after the patients are gone, sputum may be considered an independent source of TB [11]. Accordingly, early diagnosis and treatment of such cases are very important and necessary to reduce the progression of TB and the global burden of the disease as important part of the WHO strategy [10].

TB in Yemen is considered within the high-burden level in the eastern Mediterranean region, ranking the fourth on the country's list of public health priorities. In 2017, WHO reported 13,000 new TB cases, with an incidence rate of 47 cases per 100,000 inhabitants in Yemen [12]. Although there are several hospitals and health facilities in Dhamar Governorate, Yemen, including Thamar University, Al-Wahdah Teaching Hospital (TUWTH) in Ma'bar city that introduces the health services of TB patients. The official information and data about tuberculosis in Dhamar Governorate are limited. TUWTH is one of the major hospitals in the governorate and most of the cases are coming from the rural areas to it. This study provides important essential information about tuberculosis infections based upon the available patients' fields at the Internal Medicine department in TUWTH, 2018-2019.

2. Methods

This retrospective hospital-based survey was conducted at Thamar University Al-Wahda Teaching Hospital (TUWTH), Ma'bar City, Dhamar Governorate, Yemen. Data collection of this work depended on the available files of TB patients who admitted to Internal Medicine Department in 2018-2019. The collected data focused on the demographic data and available medical information of each patient. The demographic data included age, sex, residence, socioeconomic status and medical information included site of infection (pulmonary TB, extra pulmonary TB), type of TB cases (new case or relapse, failure, other), co-morbidities (diabetes mellitus, other chronic diseases), history of using the immunosuppressive drugs, history of contact with a case of TB as well as the history of smoking habiting. Cases with uncompleted-files data were excluded from the study. Ethics approval of this study was obtained from Faculty of Medicine, Thamar University Medical Ethics Committee (approval number: TUMEC- 20009). After recording of data and initial processing, data were analyzed using Statistical Package for Social Sciences (SPSS) version 21. Chi square ($\chi 2$) or Fisher extract test were used to find out the association between the studied variables and acid-fast bacilli (AFB) smear findings of the patients. $P < 0.05$ was considered to be statistically significant.

3. Results

As shown in Table 1, this study included 180 TB patients, registered and received the health service for tuberculosis disease at TUWTH during the 2018 and 2019. One hundred and five (58.3%) were males and 75 (41.7%) were females. Seventy-eight (40.6%) of the patients aged 41-60 years, 31.7 % of > 60 year and 25.0% of 20-40 years, whereas only 2.8% of < 20 year of age. The districts from which the patients came were Jahran (56.1%), Aness (19.4%), Al-Hada (9.4%), Utmah (6.1%), Anss (4.4%) and Wusab (4.4%), Dhamar Governorate, Yemen. Most of the patients had low socioeconomic status 85.6% (154/180). The main site of the infections was a pulmonary (92.2%), whereas only 7.8 % of the infections were both pulmonary and extra-pulmonary. The vast majority (95.0%) the TB cases were new, whereas the remaining cases were relapse (3.3%), failure (1.1%) and others (0.6%).

Table 1: Characteristics of the study patients (n= 180)

Variable	Frequency	Percentage
Age /years		
< 20	5	2.8
(20-40)	45	25.0
(41-60)	73	40.6
> 60	57	31.7
Sex		
Male	105	58.3
Female	75	41.7
Residence		
Al Hada	17	9.4
Aness	35	19.4
Anss	8	4.4
Jahran	101	56.1
Utmah	11	6.1
Wusab	8	4.4
Socioeconomic status		
High	26	14.4
Low	154	85.6
Site of infection		
Pulmonary	166	92.2
Pulmonary and extra pulmonary	14	7.8
Type of patient		
New case	171	95.0
Relapse	6	3.3
Failure	2	1.1
Others	1	0.6

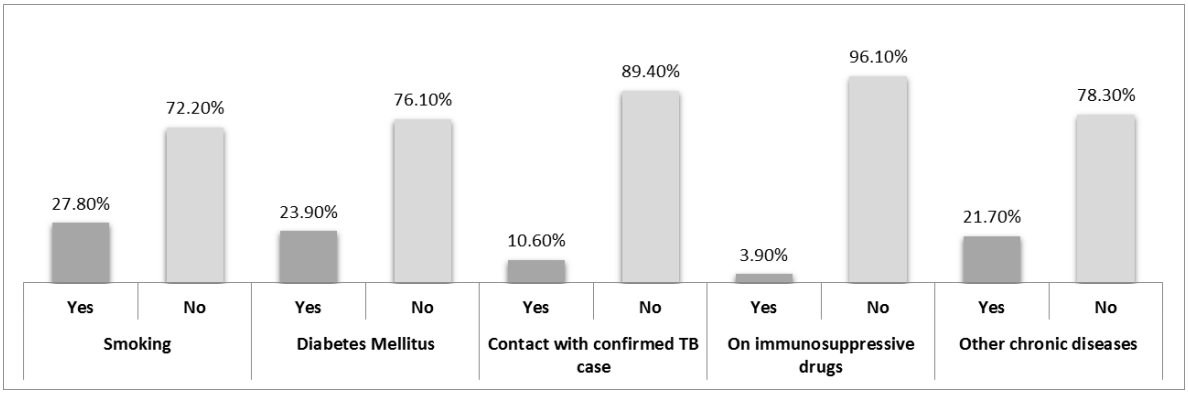

Figure 1: Proportions of the selected potential risk factors associated with tuberculosis among the TB patients (n=180)

Of the 180 patients, 43(23.9%) had diabetes mellitus, 39 (21.70%) had a history of other chronic diseases, 19 (10.60%) had a history of contact with TB cases and seven (3.9%) patients were on immunosuppressive drugs. While, fifty (27.80%) patients had a history of smoking habiting (Figure 1). Percentage of positive AFB smears among the 180 TB patients was 16.7% (30). The findings of the 150 remaining AFB smears (83.3%) were negative. There were no significant differences in the distribution of positive smears according to the age and sex of the patients ($P > 0.05$) (Table 2).

Table 2: Distribution of positive acid-fast bacilli smears according to age and sex of the TB patients (n=180)

	Positive (n = 30)	Negative (n = 150)			
Variable	**n (%)**	**n (%)**	**%***	***X²***	***P***
Age/ year					
< 20	1(20.0)	4(80.0)	3.3	0.500	0.919
20-40	6(13.3)	39(86.7)	20.0		
41-60	13(17.8)	60(82.2)	43.3		
> 60	10(17.5)	47(82.5)	33.3		
Sex					
Male	21(20.0)	84(80.0)	70.0	2.016	0.223
Female	9(12.0)	66(88.0)	30.0		

* Percentage of positive AFB smears (n=30)

Table 3 showed that the distribution of positive AFB smears among the TB patients according to the potential risk factors for tuberculosis. Positive AFB smears among TB patients with a history of using the immunosuppressive drugs, contact with a case of TB and smoking habiting were 71.4% (11/43), 52.6% (10/19) and, 28.0% (14/50), respectively. There were significant differences of AFB smears findings according to the potential risk factors ($P< 0.05$).

Table 3: Distribution of positive acid-fast bacilli smears according to the potential risk factors for tuberculosis (n=180)

	Positive	Negative			
Variable	**n (%)**	**n (%)**	**%***	***X²***	***P***
Diabetes Mellitus	11(25.6)	32 (74.4)	36.7	3.233	0.099
Contact with confirmed case	10(52.6)	9(47.4)	33.3	19.783	<0.001
On immunosuppressive drugs	5(71.4)	2(28.6)	16.7	15.726	0.002
Other chronic diseases	8(20.5)	31(79.5)	26.7	0.530	0.472
Smoking	14(28.0)	36 (72.0)	26.7	6.402	0.015

* Percentage of positive AFB smears (n=30)

4. Discussion

The present study reported a higher occurrence of the TB in males compared to females. This was in agreement with several previous studies conducted in Qatar [13], Palestine [14], Egypt [15-17]. However, this could be that females showed less awareness to the disease and they do not ask for medical advice because of some factors including illiteracy and the traditions predominant in the society, which may prohibit them from going out and seeking medical advice as well as TB stigma is felt more strongly in females [18]. On the other hand, the findings of the present study and they were in conflicts with findings of those conducted on TB patients: by Ahmad et al. in the District Head Quarter (DHQ) Hospital in Pakistan from 2011 to 2014 [19] and at the Assiut Chest Hospital in Egypt from 2005 to 2009 by Mohamed et al. who reported a higher incidence rate of TB among females compared to males [20]. Mohamed et al. attributed the higher prevalence of TB among females compared to men due to various conditions in Upper Egypt, where females particularly farmers have a main role of work outside or inside the home, with a greater chance of exposure to infection [20].

The current study also showed that most commonly

affected people (73.3%) were in age 41 to > 60 years followed by who were in age of 20-40 years (25.0%). While, only five patients were in age of < 20 years (2.8%). In a study carried out by Malik et al., in Giza Governorate, Egypt, most commonly affected people (78.8% - 87.1%) were in age of 18–65 years during the five years of study (2014–2018), indicating this may be attributable to high spread of smoking habit in this active age [14]. While, two separated studies carried out in Pakistan reported that most affected age (61.52%) were in age 20–50 years [21], however, the second study reported that the 46–75 years was the most affected (55.44%). The authors attributed that to the increased social and economic responsibilities during these ages. This may have profound effect on social and economic conditions of their families as well as the country in general [9].

This study reported that the socioeconomic status of the most TB patients was low. People with low socio-economic status could have a higher risk for TB due to exposure to several risk factors, including overcrowding, malnutrition, indoor air pollution, smoking [22]. Majority (95.0%) of the TB patients registered during the present study were new TB cases whereas the remaining were relapse (3.3%), failure (1.1%) and others (0.6%). These findings were nearly comparable with results of a recent study conducted on 515 TB patients in Pakistan reported 95.72% new TB cases whereas the relapse and other cases were 1.94% and 2.33%, respectively [19]. Similarly, findings of the present study were also nearly comparable with findings of a study conducted on TB patients in Giza Governorate during the period from 2014 to 2018 reported that the new TB cases ranged from 89.6% to 92.9% followed by the relapse and failure, and the lowest incidence was the resistant cases [14].

More than half (56.1%) of the TB patients registered during the study period were from Jahran district. While, the TB patients registered from Aness, Al Hada, Utmah, Wusab and Anss districts were ranged from 19.4% to 4.4%. This indicates the need for further studies address the reasons of this variation and the potential risk factors. Also, to provoke the attention of health authorities towards this important health problem.

This study reported that proportion of TB patients with diabetes mellitus (DM) or a history of the contact with confirmed TB cases (23.9% and 10.6%, respectively) were higher compared to that reported in Qatar (14.3% and 1.0%, respectively) [13]. However, a higher (21.4%) proportion of contact with confirmed TB cases was reported in Thailand [23].

In study of Saleem et al. included 752 TB patients in Pakistan, 579 (76.99%) of them were diagnosed with pulmonary TB. Of the 579 pulmonary TB patients, 259 (44.78%) were sputum smear positive [9]. Morasert et al.'s study included 4007 prison inmates in Thailand, 84 of them were diagnosed with TB (2.1%). Of the 84 TB patients, 31 (36.9%) were sputum smear-positive [23]. Findings of sputum–smear positive cases in these studies were higher compared to overall proportion of sputum-smear positive among the TB patients registered during the period of the present study (16.7%). Studies from the pre-chemotherapy time had revealed that approximately 70% of people with sputum smear-positive pulmonary TB died within 10 years. Thus, evaluating treatment outcomes among patients with newly diagnosed smear positive TB can help determine the success of national TB control programs (NTCPs) [24]. This study showed that a history of using the immunosuppressive drugs (71.4% vs. 28.6%), contact with confirmed TB cases (52.6% vs. 47.4%) and smoking habit (28.0% vs.72.0%) were significantly (P < 0.05) associated with AFB smears (positive vs. negative).

5. Conclusion

To the best of our knowledge, the present study is the first to provide health sectors with an essential information about tuberculosis infections in the study area. Further studies are necessary to address the prevalence, risk factors and treatment outcomes of TB infection within large study sample at the study area and other Yemeni areas.

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Competing interests
The authors declare that they have no competing interests.

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