Retrospective Study of the Pattern of Pulmonary and Extrapulmonary Tuberculosis Cases in Ain Shams University Hospitals during the period of 2016– 2022

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Receive date:12/10/2023
Revise date:19/11/2023
Accept day:27/11/2023
Publish date:30/11.2023
.Keywords
Tuberculosis; Pulmonary Tuberculosis; Extrapulmonary Tuberculosis; COVID-19; Frequency.

Background and study aims: Tuberculosis (TB) is a global health problem and ranks second in mortality caused by a communicable ailment. Egypt is a moderate TB burden country. Studying the pattern of TB and the patients' characteristics can help plan diagnosis, treatment, and prevention. The current work aimed to assess the pattern of pulmonary and extrapulmonary tuberculosis cases in Ain Shams University Hospital (ASUH) and correlate it with the characteristics of positive TB patients.

Materials and Methods: This retrospective study included the records of all TB patients or suspects presenting to ASUH who underwent diagnostic tests for tuberculosis from January 2016 through July 2022.

Results: The records of 7704 patients were analyzed. 124 patients were positive for TB. Most positive samples were lower respiratory (92.74%) and pleural fluid (2.42%). The remaining extrapulmonary tuberculosis cases were (4.84%). Positive TB cases were prevailing among males in the productive age group (31–60 years). The positivity rate of TB cases showed a rising pattern from 2016 to 2018, where the highest rate (2.26%) was observed followed by an upward and downward pattern to reach its lowest rate (0.84%) in 2021. Afterward, a sharp rise was noticed in 2022.

Conclusion: TB is more prevailing among males, especially pulmonary tuberculosis. We noted an increasing trend among females. Thus, the TB control approach should provide more care for those patients and propagate awareness to avoid unhealthy practices. We recommend encouraging hygienic practices such as those used for COVID-19. This would help us minimize the number of TB patients, thus decreasing the financial burden.

INTRODUCTION

Tuberculosis (TB) is an infectious bacterial disease. It can present with pulmonary or extrapulmonary TB [1]. It represents a global health concern. Millions of people are diagnosed with TB every year worldwide, mostly in developing countries **[2]**. According to the reports of the World Health Organization (WHO), the estimated count of new cases was 8.6 million in 2012. It rose to 10 million in 2019 **[3, 4]**. It follows the human immune-deficiency virus (HIV) as a leading infectious cause of death, accounting for 1.2 million deaths in 2019 **[1]**. Although vaccines and antimicrobial treatment are widely used, the infection rates have been rising after an initial fall. This problem is compounded by the spread of multidrug resistance among Mycobacterium tuberculosis (MTB) strains **[5]**.

In Egypt, the estimated incidence is approximately 11-14 new cases/100,000 population, with a death rate of 0.43/100,000 population **[6]**. Therefore, the TB burden in Egypt is considered low to moderate **[7]**. Despite efforts to control the spread of TB in the Egyptian community, it is still a public health issue **[6]**. Centers everywhere in Egypt have participated in the screening, diagnosing, notifying, and registering of TB cases under the umbrella of the National Tuberculosis

Control Program (NTP) **[2]**. This is essential for early detection, adequate treatment, and control of the spread of new cases **[1]**.

The current work aims to assess the TB pattern at Ain Shams University Hospitals (ASUH) and correlate it with the characteristics of TB patients or suspects presenting to the hospital during the period from January 2016 through July 2022.

MATERIALS AND METHODS

Study design:

This retrospective study was conducted at the Central Microbiology Laboratory, Clinical Pathology Department, ASUH. This study included the records of all TB patients or suspects presenting to the hospital who underwent diagnostic tests for tuberculosis, either smear analysis, Polymerase chain reaction (PCR), GeneXpert, or culture, during the period from January 2016 through July 2022. The in-patients were admitted to the different departments of surgery, medicine, pediatrics, gynecology, and obstetrics hospitals, and the various intensive care units. The records were collected using the data gathered from the laboratory information system, excluding duplicate samples.

Study procedures:

Information regarding the following was collected and recorded using the records of all patients who underwent diagnostic testing for tuberculosis:

- Demographic data: age and sex.
- Forms of tuberculosis; either pulmonary or extrapulmonary (and its site as LN, intestine, meninges, tissue, renal).
- Complete blood count (CBC) of the tuberculosis-positive patients.

Statistical Analysis: The data were tabulated and analyzed using Microsoft Excel. Qualitative data were described as frequency and percentage and compared using the chi-square test ($\chi 2$)-testing, while the quantitative one was presented as mean ± SD and was compared using Student's t-test. Statistical significance was set at $P \leq 0.05$.

RESULTS

This retrospective study included the records of 7704 patients admitted to ASUH and suspected to have tuberculosis during the period from the first of January 2016 to the 31st of July 2022. We found that 124 out of 7704 patients (1.61%) were positive for TB by either of the diagnostic tests. The majority of the collected samples were lower respiratory samples (92.16%); 2.91% were blood, and 2.17% were pleural fluid. The least common sample type was urine (0.09%). Most of the positive samples were lower respiratory samples (92.74%), followed by pleural fluid (2.42%). All ascitic fluid, synovial fluid, tissue, and urine samples were negative for TB.

The age of the total positive TB cases was 41.84±16.06 years, with 58.87% in the productive age group (31–60 years) and 65.52% in males. The comparison between the positive and negative cases revealed that there was a statistically significant difference between the two groups regarding age, age group, and sex (Table 1).

A higher percentage of cases were below 50 years old (60.48%). Of them, 56% were males and 42.1% were females; however, for the elderly group (≥ 50 years), 77.55% were men and 22.45% were women. There were significant differences between young and elderly patients according to sex (P value=0.0142) (Tables 2, 3).

As per the distribution of hemoglobin (HB) (gm/dl) and total white blood cells (WBC) ($x10^9$/L) levels among positive TB cases, table (4) shows that the mean HB was 10.66 gm/dl, with 96 patients with HB level less than 12 gm/dl. For WBCs, the mean was 9.4 $x10^9$/L, and 35 cases exhibited leucocytosis. Table (5) demonstrates that there were significant differences between the age of patients and HB level (p=0.0273). However, there were insignificant differences in WBC levels (P = 0.7766).

Table (6) and figures (1, 2) demonstrate the frequency rates of TB-positive cases and their relation to the total number of patients from 2016 to 2022. They revealed that, concerning the total number of patients, the positivity rate showed a rising pattern from 2016 to 2018, where the highest rate (2.26%) was observed. Then, the percentage of positive cases showed an upward and downward pattern to reach its lowest rate (0.84%) in 2021. Regarding the frequency of TB-positive cases, the lowest frequency was reported in 2016 (7/124, 5.65%) and continued to

increase to reach the highest level in 2018 (22/124, 23.39%). Afterwards, the frequency continued to decrease until 2021 (10/124, 15.32%), and then a sharp rise was noticed in 2022.

Table (7) shows that during the 7 years of study, most of the positive TB cases were among the productive age group (31-60 years), except for 2017, where a higher rate was found among the 16-30 years group. For the sex distribution, the number of cases was higher among males except for 2020, when higher numbers were observed among females. It is worth noting that starting in 2018, high positivity rates were observed among females. Regarding the sample type, pulmonary TB cases outnumbered the extrapulmonary cases (EPTB). No cases of EPTB were detected in 2016 and 2018, and the highest numbers were found in 2022 (Figure 2).

Table (1): Comparison between the positive and negative cases regarding age, sex, and sample type.

	The studied groups (N=7704)			**Test of significance**	**P value**
	Positive (N=124)	**Negative (N=7580)**	**Total (N=7704)**		
Age (years)				t Test=4.27	0.000
Mean ± SD	41.84 ± 16.07	47.18 ± 15.51	47.09 ± 15.53		
Range	0-80	0-102	0-102		
Age group [n (%)]				X^2=20.21	0.000
0-15	2 (1.61%)	145 (1.91%)	147 (1.91%)		
16-30	34 (27.42%)	1051 (13.86%)	1085 (14.08%)		
31-60	73 (58.87%)	4886 (64.46%)	4959 (64.37%)		
>60	15 (12.11%)	1498 (19.77%)	1513 (19.64%)		
Sex				X^2=4.420	0.036
Male	80 (65.52%)	5532 (72.98%)	5612 (72.85%)		
Female	44 (34.48%)	2048 (27.02%)	2092 (27.15%)		
Sample type				NA	NA
Pulmonary TB					
Sputum/BAL	115 (92.74%)	6985 (92.15%)	7100 (92.16%)		
Extrapulmonary TB	9	595	604		
Blood	1 (0.81%)	223 (2.94%)	224 (2.91%)		
Pleural fluid	3 (2.42%)	164 (2.16%)	167 (2.17%)		
Wound swab	1 (0.81%)	93 (1.23%)	94 (1.22%)		
CSF	2 (1.61%)	38 (0.50%)	40 (0.52%)		
Ascitic fluid	0 (0%)	32 (0.42%)	32 (0.41%)		
Pus	2 (1.61%)	18 (0.24%)	20 (0.26%)		
Synovial fluid	0 (0%)	12 (0.16%)	12 (0.16%)		
Tissue	0 (0%)	8 (0.11%)	8 (0.1%)		
Urine	0 (0%)	7 (0.09%)	7 (0.09%)		

BAL: Bronchoalveolar lavage, NA: Not applicable.

Table (2): Correlation of the studied patients according to age/distribution of cases concerning age.

Age	**Number of cases (%)**	**Range**	**Mean ± SD**	**T-test**	**P Value**
Young patients (<50 years)	75 (60.48%)	1 day-48 years	31.15 ± 10.21	T= 16.207	P < 0.0001
Elderly patients (≥ 50 years)	49 (39.52)	50-80	58.20 ± 7.01		

https://aeji.journals.ekb.eg/
DOI: 10.21608/AEJI.2023.236728.1321

Table (3): Correlation between age and sex among studied patients.

Sex	Young patients (<50 years)	Elderly patients (≥ 50 years)	T-test	P Value
	Number (%)		X^2=6.013	P=0.0142
Male	42 (56%)	38 (77.55%)		
Female	33 (44%)	11 (22.45%)		

***X*² Chi-squared test**

Table (4): Distribution of HB and WBC levels among positive TB cases.

Parameter	Range	Mean ± SD
HB (gm/dl)	6.7-15.5	10.66 ± 1.78
Patient <12 g/dl (N=96)	6.7-11.9	9.89 ± 1.13
Patient ≥ 12 g/dl (N=28)	12-15.5	13.27 ± 0.94
Age Group		
0-15 (N=2)	13.3-13.7	13.5 ± 0.28
16-30 (N=34)	7.7-14.2	10.36 ± 1.59
31-60 (N=73)	6.7-14.5	10.54 ± 1.68
>60 (N=15)	8.1-15.5	11.52 ± 2.26
WBC (x10^9/L)	2.1-31.1	9.4 ± 4.00
Leucocytosis cases>11 (N=35)	11.1-31.1	14.01 ± 3.83
Leucopenia cases<4 (N=5)	2.1-3.7	2.86 ± 0.63
Age Group		
0-15 (N=2)	11.8-13.1	12.45 ± 0.92
16-30 (N=34)	4.5-19.1	9.52 ± 3.64
31-60 (N=73)	2.1-31.1	9.22 ± 4.20
>60 (N=15)	2.9-21.1	9.72 ± 4.15

Table (5): Correlation between young and elderly individuals according to HB and WBC levels.

Age Group	Mean ± SD	Test of Significance	P value
	HB (gm/dl)		
<50 (N=75)	10.37 ± 1.71	T=2.235	P = 0.0273
≥50 (N=49)	11.09 ± 1.82		
Age Group	**Mean ± SD**	**Test of Significance**	**P value**
	WBCs (x10^9/L)		
<50 (N=75)	9.49 ± 3.66	T=0.284	P = 0.7766
≥50 (N=49)	9.28 ± 4.52		

Table (6): The frequency of TB-positive cases and their relation to the total patient number from 2016 to 2022.

Year	Frequency of Positive Cases	%	Total number of patients	Positive TB cases/Total number of patients
2016	7	5.65%	536 (6.96%)	1.31%
2017	16	12.9%	1101 (14.29%)	1.45%
2018	29	23.39%	1281 (16.63%)	2.26%
2019	22	17.74%	1551 (20.13%)	1.42%
2020	21	16.94%	1065 (13.82%)	1.97%
2021	10	8.06%	1187 (15.41%)	0.84%
2022	19	15.32%	983 (12.76%)	1.93%
Total	124	100%	7704 (100%)	1.61%

Table (7): Distribution of cases according to age group, sex, and sample type during the study period.

	2016 (N=7)		2017 (N=16)		2018 (N=29)		2019 (N=22)		2020 (N=21)		2021 (N=10)		2022 (N=19)	
Year/age														
0-15	0	(0%)	0	(0%)	1	(3.45%)	0	(0%)	1	(4.76%)	0	(0%)	0	(0%)
16-30	1	(14.29%)	7	(43.75%)	5	(17.24%)	8	(36.36%)	8	(38.10%)	3	(30%)	2	(10.53%)
31-60	4	(57.14%)	6	(37.50%)	20	(68.97%)	11	(50.00%)	11	(52.38%)	5	(50%)	16	(84.21%)
>60	2	(28.57%)	3	(18.75%)	3	(10.34%)	3	(13.64%)	1	(4.76%)	2	(20%)	1	(5.26%)
Sex														
Male	7	(100%)	12	(75%)	19	(65.52%)	14	(63.64%)	9	(42.86%)	6	(60%)	13	(68.42%)
Female	0	(0%)	4	(25%)	10	(34.48%)	8	(36.36%)	12	(57.14%)	4	(40%)	6	(31.58%)
Sample type														
Pulmonary TB (PTB)														
Sputum/BAL	7	(100%)	14	(87.50%)	29	(100%)	21	(95.45%)	20	(95.24%)	9	(90%)	15	(78.94%)
Extrapulmonary TB (EPTB)														
Blood	0	(0%)	1	(6.25%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)
Pleural fluid	0	(0%)	0	(0%)	0	(0%)	1	(4.55%)	0	(0%)	0	(0%)	2	(10.53%)
Wound swab	0	(0%)	1	(6.25%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)
CSF	0	(0%)	0	(0%)	0	(0%)	0	(0%)	1	(4.76%)	1	(10%)	0	(0%)
Pus	0	(0%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)	0	(0%)	2	(10.53%)
Total EPTB	0	(0%)	2	(12.50%)	0	(0%)	1	(4.55%)	1	(4.76%)	1	(10%)	4	(21.06%)

Figure (1): The TB-positive cases about the total number of cases from 2016 to 2022.

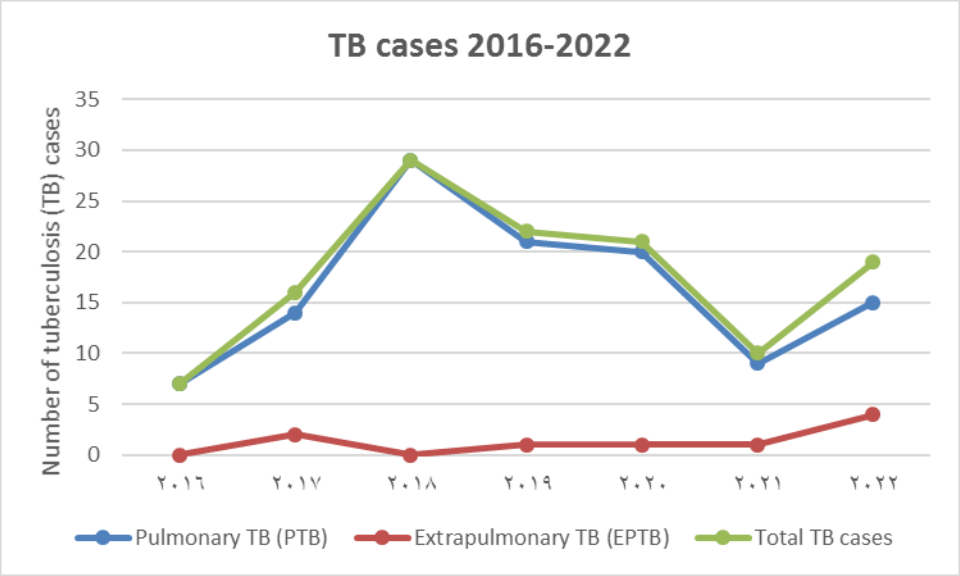

Figure (2): Number of tuberculosis (TB) cases in ASUH, 2016–2022.

DISCUSSION

Tuberculosis (TB) is responsible for most cases of illness and death worldwide, especially in Asia and Africa **[8]**. Although Egypt is not one of the 22 countries listed by the WHO for its high levels of tuberculosis (TB) infection, TB is a considerable public health problem in Egypt **[9]**.

In the current study, we analyzed the records of 7704 patients registered for different diagnostic tests of TB from 1st January 2016 to 31st of July 2022. The lower respiratory samples represented most of the collected samples (92.16%), followed by blood (2.91%) and pleural fluid (2.17%). Urine was the least common sample type collected (0.09%). All ascitic fluid, synovial fluid, tissue, and urine samples were negative for TB. Regarding the type of TB, pulmonary TB cases outnumbered the extrapulmonary cases (EPTB). Pleural fluid represented the majority of EPTB cases (3/9, 33.33%). The age of the total positive TB cases was 41.84±16.06 years, with 58.87% in the productive age group (31–60 years) and 65.52% males. The comparison between the positive and negative cases revealed that there was a statistically significant difference between the two groups regarding age, age group, and sex. In the current study, males predominated, and most of the patients were under the age of 60 years. It is worth noting that starting in 2018, high positivity rates were observed among females.

These findings were in agreement with several Egyptian studies. They found that there was a male predominance among the TB patients, with much higher cases among reproductive age. They stated that pulmonary TB cases surpassed extrapulmonary cases **[2, 7, 9-12]**. Shafiek and colleagues (2022) stated that the majority of EPTB patients in their study had tuberculous pleural effusion (32%) **[6]**.

Malik et al. (2021) also revealed that 3357 TB cases were identified in Giza Governorate from 2014 to 2018. They agreed with our results, as they reported a higher incidence of TB in the age group 18–65 years with lower values among extremes of age. This active age group is more exposed to infection with a high prevalence of smoking behavior. Moreover, they observed a higher frequency among male patients, and the highest number of cases was noted in 2017 **[1]**. Additionally, Mori and Leung (2010) stated that TB affects the most productive age groups and demands more attention to TB control programs targeting those age groups **[18]**.

Malik and colleagues (2021) stated that the higher frequency of TB in males compared to females is due to several reasons. First, females tend to seek medical advice less than males because of their lack of education. Moreover, men are more exposed to outdoor activities. Another cause is the prevalence of the attitude of cigarette and shisha smoking among men **[1]**. On the other hand, Mohamed and his team (2010) **[13]** found that TB was more prevalent among

female patients (70.87%) than males (29.13%) admitted to the Assiut Chest Hospital from 2005 to 2009. That variance can be attributed to the fact that in Upper Egypt, the female shares the male the responsibility of work both outside and inside the home, with a greater chance of exposure to infection.

In the present work, the increasing positivity rate among the female group can be attributable to the predominance of tobacco smoking among young females in Egypt and different parts of the Arab world **[14]**. Various studies have declared an increasing tendency towards consuming tobacco, either in the form of cigarettes or water pipes, among young ladies. Such a high consumption rate can be associated with the increasing numbers of employed women and admiration for Western culture. Some studies forewarned that if no active steps are taken to contain this problem, it might turn into a health disaster **[15-17]**.

Malik and his colleagues (2021) reported a higher percentage of PTB from 2014 to 2018, except for 2017. The highest percentage of EPTB was noted in 2017 (51.6%) **[1]**. Similarly, Essawy et al. (2016) found that 72.8% were PTB and 27.2% were EPTB **[19]**.

Unlike our findings, Hashem and colleagues (2022) reported that the number of EPTB cases was higher than that of PTB cases throughout the 4-year study period. This can be attributed to the higher number of TB patients included in their study (2256) compared to the low number (124) included in the present study. Moreover, different geographical areas might play a role in the distribution of TB cases, as their study took place in Assiut Chest Hospital in upper Egypt. Hashem et al. (2022) presented several explanations for the high EPTB cases in their work. They stated multiple risk factors, such as higher age, female gender, geographical distribution, birth in high TB-prevalent countries, exposure at residence or work, homelessness, and presence of other comorbid conditions **[20-22]**.

Regarding the distribution of HB and WBC levels among positive TB cases, the mean HB level was 10.66, with 96 patients with HB levels lower than 12 gm/dl. For WBCs, the mean was 9.4 $x10^9$/L, and 35 cases exhibited leucocytosis. Our results regarding HB agreed well with Ghweil and colleagues (2018), who reported an HB mean of 10.4 mg\dl. However, the mean WBC count in their study was higher (14.74 $x10^9$/L) **[11]**.

In the present study, the frequency of TB-positive cases in the total number of patients from 2016 to 2022 revealed that there was a rising pattern from 2016 to 2018, where the highest percentage (2.26%) was observed in 2018. After that, the percentage of positive cases showed an upward and downward pattern to reach its lowest level (0.84%) in 2021. For the frequency of TB-positive cases, the lowest number was reported in 2016 (7/124, 5.65%), and the highest number was noticed in 2018 (22/124, 23.39%). No cases of EPTB were detected in 2016 and 2018, and the highest numbers were found in 2022.

In a similar fashion to our results, Hashem and colleagues (2022) reported that TB cases in their study from 2017 to 2020 showed a declining pattern until the first half of 2021, except for a rise noticed in 2018. Both their study and ours agreed that the magnitude of TB cases markedly declined in 2021. They linked this noticeable drop in tuberculosis case detection with the COVID-19 pandemic **[20]**.

Similarly, countries known for their high burdens of TB, such as Indonesia, India, South Africa, and the Philippines, witnessed a significant reduction in TB incidence along with the COVID-19 pandemic, especially in the second quarter of 2020 and the first half of 2021, correlating with many TB management setting reports **[23-26]**.

Some authors attribute this decline to the COVID-19 pandemic, where all healthcare systems directed their efforts toward the prevention, screening, and diagnosis of COVID-19. This led to the attrition of the healthcare system and the exhaustion of its resources, affecting tuberculosis screening programs and management facilities **[20, 27]**.

They also assumed this phenomenon was because the lockdown and the reduction in public transportation hours made access to public health services more difficult. Another factor was the overwhelming fear of TB patients from contracting COVID-19 infection, resulting in missed or delayed diagnosis of TB cases. Additionally, reduced healthcare working power due to the closure of numerous tuberculosis outpatient clinics and a lack of personal protective equipment in some health facilities

obliged them to halt conducting tuberculosis tests temporarily **[23, 28]**. Moreover, the similarities in symptoms between TB and COVID-19 masked some TB cases and thus were treated empirically as COVID-19 or refused to seek medical advice. Despite the release of the lockdown and restoration of most daily activities with the application of protective measures, TB cases continued to decline in 2021.

The rise in 2022 might be due to the cumulative cases seeking medical services after the lockdown period ended. Another hypothesized cause for that rise was the increased indoor/household infections during the lockdown phase **[28]**.

In May 2020, the WHO stated that TB and COVID-19 cases disseminate through close contact. Thus, similar measures can control both. However, it was concerned about the medical status of TB patients. The WHO stressed ensuring the availability of diagnostic techniques and therapeutics for TB patients when all efforts were directed at containing the COVID-19 pandemic. The WHO warned against the potential deterioration in progress achieved in lowering the death rate of TB patients in the last five years **[29]**.

Alene and coworkers (2022) alerted that reallocating the available sources to control COVID-19 will threaten the lives of TB patients and might result in disastrous health problems. Hence, a balanced direction of expenses and services in case of an epidemic is mandatory to maintain supplying the requirements to TB patients **[30]**.

On the other hand, Wu and colleagues (2022) from China offered an interestingly different opinion assuming that the decline in TB cases was true owing to the effect of the strict measures posed by the Chinese authorities for containing the COVID-19 crisis, such as social distancing, wearing masks, and frequently washing hands. Therefore, they studied the impact of these measures by introducing three models for the prediction of variation in the incidence of PTB cases in China after January 2020. One of them was noninterventional, and the other two were interventional with regular and strict interventions. They observed a marked overall reduction in PTB occurrence during 2020, which probably was the outcome of the intervening actions against COVID-19. They concluded that by applying the aforementioned strategy for the following two years, the incidence of PTB would decrease by approximately 1.03 per 100,000 people each month compared with the incidence predicted by the noninterventional model. They estimated that the annual incidence would be reduced from 59.15 to 50.65 per 100,000 in 2021 by performing strict instead of regular interventions. Based on their results, they suggested that the continuous application of regular interventions would play an important role in the future prevention and control of PTB **[31]**.

They explained the difference between their study and the other studies in that they quantified the potential effect of preventive measures based on limiting close contact between infected people and uninfected people, which may exert positive effects in preventing PTB if continues to be implemented post-COVID-19 **[31]**. However, other studies stressed the compromising impact of these measures on TB diagnosis, thus resulting in an artificial decline in the number of TB cases **[32, 33]**.

In summary, our findings have important implications for clinical and public health policies for tuberculosis prevention via the disruption of the chain of tuberculosis transmission. We recommend several strategies for the regular prevention of TB, including wearing masks in endemic regions, providing government-subsidized masks for crowded public places, maintaining good hand hygiene, avoiding large crowded indoor gatherings, and controlling the number of people in gatherings.

The limitations of the present work were the unavailability of data regarding clinical conditions, radiologic findings, smoking, residence rural/urban, socioeconomic status, history of previous treatment, and whether the infection was new or old. Additionally, different methods of diagnosis were used, and not all the samples were tested by Gene Xpert. Sputum analysis for acid-fast bacilli was used as it is an affordable and quick test for diagnosis, but it might yield negative results with poor sample quality.

CONCLUSION

TB is more prevalent among the productive age group, especially PTB. Although TB is more common among men, we noted an increasing trend among females. Thus, it is suggested that the TB control approach should provide more

care for those patients and propagate awareness to avoid unhealthy practices that participate in the dissemination of positive cases, such as tobacco smoking. The frequency of TB-positive cases was the highest (2.26%) in 2018. It reached its lowest level (0.84%) in 2021, in concurrence with COVID-19. We recommend encouraging hygienic practices similar to those used to control COVID-19, such as washing hands and wearing masks in crowded places. In our opinion, this would help us achieve our dream and minimize the number of TB patients, thus decreasing the financial burden. Additionally, we recommend conducting large-scale studies to propagate awareness and study the effect of implementing health practices on the number of TB cases.

Funding: None.

Conflict of interest: None.

Ethical Considerations: This research was approved by the Ethical Research Committee, Faculty of Medicine, Ain Shams University. (ethical approval number: FMASU R219/2023, FWA 000017585).

HIGHLIGHTS

- This study evaluated the pattern of TB infection at Ain Shams University Hospitals (ASUH) among TB patients or suspects presenting to the hospital during the period from January 2016 through July 2022.
- TB is more prevalent among male patients of the productive age group, especially Pulmonary TB. There is an increasing trend among females. The positivity rate of TB cases showed a rising pattern from 2016 to 2018, where the highest rate (2.26%) was observed. Followed by an upward and downward pattern to reach its lowest rate (0.84%) in 2021, in concurrence with COVID-19. Afterward, a sharp rise was noticed in 2022.
- We recommend adopting the same control measures as those used for COVID-19, such as washing hands and wearing masks in crowded places. This would help to minimize the number of TB patients.

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Site as: Fahim, N., Mahmood, Y., Ezz elarab, H. Retrospective Study of the Pattern of Pulmonary and Extrapulmonary Tuberculosis Cases in Ain Shams University Hospitals during the Period of 2016– 2022. *Afro-Egyptian Journal of Infectious and Endemic Diseases*, December 2023; 13(4): 270-279. doi: 10.21608/aeji.2023.236728.1321