

# RETROSPECTIVE STUDY OF TUBERCULOSIS PATTERN IN KAFER EL-SHEIKH CHEST HOSPITAL IN THE PERIOD FROM JANUARY 2008 TO JANUARY 2018

By

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## ABSTRACT

**Background:** Tuberculosis, is an infectious mycobacterial disease either by inhalation, or direct contact with Tuberculosis bacilli. With 10.4 million persons, tuberculosis (TB) is a global public health concern. Significant factor in the decline of Tuberculosis is early diagnosis of the disease, efficient chemotherapy and prevention of disease transmission.

**Objective:** To study the pattern of tuberculosis in Kafer El-Sheikh Chest Hospital.

**Patients and methods:** This retrospectively study conducted on the result of patient diagnosed as a tuberculosis cases at Kafer El-Sheikh Chest Hospital during the period from January 2008 to January 2018. One thousand and two hundred and sixty patients were included in this study, and diagnosed according to National Egyptian TB control Programme (NTP) and guidelines of the Egyptian Ministry of Health. The total number of TB cases was 1260: 1034 cases of them (82%) were pulmonary, while 226 cases (18%) were extra pulmonary.

**Results:** the total numbers of TB cases were (1260), 1034 cases of them (82%) were pulmonary, while 226 cases (18%) were extra pulmonary. The total number recorded of T.B cases was 1260, the largest number of them was recorded in 2013(166) cases (13.2%), and the least number was recorded in 2009 (68) cases (5.4 %). In the current study 745 out of 1260 were males (59%),while 515 were females (41%). The mean age of TB cases was 39 years. There was no statistically significant difference as regards age between patients with pulmonary and patients with extra pulmonary TB. The total number of mortality was 41 cases, where the majority of them were recorded in 2010 (7.6%), and in 2013 was 0.6%.

**Conclusion:** TB affects the most productive age groups, and this necessitated more attention in TB control programs targeting those age groups. TB incidence was higher in males especially in pulmonary TB.

**Keywords:** Mycobacterial, Pulmonary, Tuberculosis.

## INTRODUCTION

Worldwide, tuberculosis (TB) is the leading cause of death from a single infectious disease agent and the leading cause of death among persons living with human immunodeficiency virus (HIV)

infection, accounting for approximately 40% of deaths in this population (*Gupta et al., 2015*). The United Nations' (UN) Sustainable Development Goals and the World Health Organization's (WHO's) End TB Strategy have defined ambitious targets for 2020–2035, including a 35%

reduction in the absolute number of TB deaths and a 20% reduction in TB incidence by 2020 (*Badje et al., 2017*).

Because of the introduction of successful social and economic development prevention mechanisms, developing countries consider tuberculosis as a disease of the past. The "death" of tuberculosis as a global public health issue is still a fact for many low and middle-income countries to achieve (*Sathiyamoorthy et al., 2020*).

Despite the new knowledge of tuberculosis pathogenesis and operation, it remains a significant disease, especially in developing countries. The predisposing factors influencing TB infection include: low socio-economic status, overcrowding, malnutrition, and immune suppression, either by drugs, diseases or malnutrition. Bacilluses such as gene specialists provide us with great support in the diagnosis and proper treatment of TB (*Houben and Dodd, 2016*).

A significant factor in the decline of TB was early diagnosis of the disease, efficient chemotherapy and prevention of disease transmission. Screening, diagnosis, disclosure and registration of TB According to national TB, cases were introduced all over Egypt. Strategy of the National Program of Tuberculosis Prevention (*Eissa et al., 2016*).

**The aim of this work was to** study the pattern of tuberculosis in Kafer El-Sheikh Chest Hospital during the period from January 2008 to January 2018.

## PATIENTS AND METHODS

This study was carried out retrospectively on the results of patients

diagnosed as a tuberculosis cases at Kafer El-Sheikh Chest Hospital in the period from January 2008 to January 2018.

The data was collected from record review of patients with TB notified, registered and treated at Kafer El-Sheikh Chest Hospital.

The diagnosis of TB was done according to the National Egyptian TB control Program (NTP) guidelines of the Egyptian Ministry of Health.

### **The recorded data of the patients were taken from records in the files of the TB outpatient clinic and included:**

1. Full medical history.
2. Clinical examination (general and local).
3. Results of sputum for acid fast bacilli.
4. Radiograph (plain X-ray P.A. or lateral view).
5. Tuberculin skin test.
6. Number of resistant cases either primary or secondary.

### **Patients were classified as regard:**

1. Age.
2. Gender.
3. Site of affection.
4. Comorbidity
5. Treatment course and duration.
6. Outcome.

### **The following items were included:**

- ◆ Pulmonary or extra pulmonary TB.
- ◆ Sputum positive or sputum negative.
- ◆ Unilateral or bilateral radiologically.

- ◆ Resistant cases either primary or secondary.
- ◆ Fate of the diseased patients and its relation to the type and extent of the disease.

#### Statistical analysis:

Data were performed using Statistical Package for Social Science. Version 20 (SPSS).  $P < 0.05$  was considered

statistically significant, parametric data were expressed as mean  $\pm$  standard deviation, and range. Qualitative data were examined as numbers and percentage the test used for correlation should be written here.  $P$  value  $< 0.05$  was considered significant.

## RESULTS

One thousand and two hundred and sixty patients were included in this study and diagnosed according to National Egyptian TB control Programme (NTP) and guidelines of the Egyptian Ministry of Health. The total numbers of TB cases were 1260: 1034 cases of them (82%) were pulmonary, while 226 cases (18%) were extra pulmonary. Out of 1260, 745 were males (59%), while 515 were

females (41%). The mean age of TB cases was 39 years. There was no statistically significant difference as regards age between patients with pulmonary and patients with extra pulmonary TB. Out of 1034, 631 cases were males (61%), while 403 were females (39%). Out of 226, 114 cases were males (50.4%), while 112 were females (49.6%) (**Table 1**).

**Table (1): Number age and sex of tuberculosis cases among the studied groups**

		Number of cases	%
Pulmonary		1034	82%
Extra pulmonary		226	18%
<b>Total</b>		<b>1260</b>	<b>100%</b>
Sex	Male	745	59%
	Female	515	41%
Age	Range	22-56	
	Mean $\pm$ SD	39 $\pm$ 17	

The total number of TB cases was 1260. The largest number of them was recorded in 2013 (166 cases 13.2%), and the least number was recorded was in 2009 (68 cases 5.4%). The total number of pulmonary T.B cases was 1034. The largest number of them was recorded in 2013 (133 cases 12.9%) and the least number was recorded in 2009 (53 cases 5.1%). The total number of extra pulmonary T.B cases was 226. The largest number of them was recorded in 2013 (33 cases 14.6%), and the least number was recorded in 2008 (11 cases 4.9%).

The majority of TB cases either pulmonary or extra pulmonary were in adults compared to children. Out of 1034 (91.3%), 945 had radiological findings, while 89 cases had no radiological findings. The most common radiological finding was infiltration in 283 cases (30%), while the least common finding was military in 38 cases (4%). The extent of radiological findings in patients with pulmonary TB was unilateral in 652 cases (69%) and bilateral in 293 cases (31%). The results of tuberculin skin test showed that, 1147 cases out of 1260 cases had positive tuberculin skin test (91%), while 113 cases had negative tuberculin skin test

(9%). Out of 1147 cases, who had positive tuberculin skin test, 621 cases (54.1%) had +ve tuberculin skin test between 10- <15mm, 303 cases (26.4%) had +ve tuberculin skin test 15-25mm and 223 cases (19.5%) had +ve tuberculin skin test more than 25mm.

The results of examination for acid-fast bacilli (AFB) for assessment of pulmonary TB, out of 1034, 762 cases were sputum +ve for AFB (73.7%), while 272 cases were sputum -ve for AFB (26.3%). The majority of cases with +ve sputum were diagnosed in 2012 (77.5%), while in 2009 it was 67.9%. The total number of sputum positivity were 762 cases, 632 cases (82.9%) were diagnosed by Zeil-Nelson stain, 91 cases (11.9%) were diagnosed by sputum culture and 39 cases (5.1%) were diagnosed by gene expert. The number of patients with -ve sputum for AFB, the majority of cases with -ve sputum were diagnosed in 2009 (32.1%), while in 2012 was (22.5%). The majority of the total number of 226 extra pulmonary cases were in lymph nodes (102 cases 45.1%), while the minority was laryngeal (1 case 0.4%). Out of 1260 (17%), 214 cases were treatment failure cases (**Table 2**).

**Table (2): Distribution of extra pulmonary TB according the site of affection**

Diagnosis	Frequency	Percent
Pleural effusion	57	25.2%
Lymph nodes	102	45.1%
Gastrointestinal TB	11	4.9%
Genital TB	18	8%
Musculoskeletal TB	20	8.8%
Military TB	7	3.1%
Neurological TB	3	1.3%
Pleuro pericardial effusion	2	.9%
Lymph node & skeletal	5	2.2%
Laryngeal	1	0.4%
Total	226	100%

The total number of patients with treatment failure were 214 cases, the majority of them were recorded in 2009 (27.9%), while in 2017 was (11.3%). Treatment failure cases with comorbidity were 117 cases (54.7%), while the cases without comorbidity were 97 cases (45.3%). The total number of resistance cases were 173 cases, the majority of them were recorded in 2009 (23.5%), while in 2017 was (7.8%). The total number of sputum negative cases were given treatment according to hospital committee was 47 cases. The majority of them were recorded in 2010 (6.5%), while in 2018

was (1.2%). The number of cured patients who had been received full course of treatment were 873 cases (69.3%), while 387 patients were not cured (30.7%). There was a statistically significant -ve correlation between outcome and age, comorbidity, extent of lesion on Chest X-ray, and resistance to treatment. There was a statistically significant +ve correlation between outcome and duration of treatment, while there was no statistically significant correlation between outcome and neither sex nor sputum positivity (Table 3).

**Table (3): Correlation between outcome and the studied variables**

Relation	Correlation coefficient(r)	p-value	Significance
Outcome and age	-0.14	0.001	HS
Outcome and sex	0.06	0.723	NS
Outcome and comorbidity	-0.23	0.003	HS
Outcome and extent of lesion on x ray	-0.53	0.012	HS
Outcome and resistance to treatment	-0.573	0.027	HS
Out come and duration of treatment	0.76	0.007	HS
Outcome and sputum positivity	0.039	0.43	NS

The total number of mortality was 41 cases, the majority of them were recorded

in 2010 (7.6%), while in 2013 was (0.6%) (Table 4).

**Table (4): Distribution of mortality cases in different years**

Years	Number of TB cases	Number of mortality cases	%
2008	93	4	4.3%
2009	68	2	2.9%
2010	92	7	7.6%
2011	88	6	6.8%
2012	150	2	1.3%
2013	166	1	0.6%
2014	141	4	2.8%
2015	105	3	2.9%
2016	130	5	3.8%
2017	141	4	2.8%
2018	86	3	3.5%
Total	1260	41	3.3%

## DISCUSSION

In the current study, the total numbers of TB cases were (1260), 1034 cases of them (82%) were pulmonary, while 226 cases (18%) were extra pulmonary. *Noppert et al. (2017)* studied 1254 cases: 70% of the cases had pulmonary TB, 22% extra pulmonary TB and 8% had both pulmonary and extra pulmonary TB.

In the current study, the total number recorded of T.B cases was 1260. The largest number of them was recorded in 2013(166 cases 13.2%), and the least number was recorded in 2009 (68 cases 5.4%).

*Eissa et al. (2016)*, in his study for assessment of tuberculosis situation in Cairo governorate from 2006 to 2012 after application of directly observed therapy short-course strategy, showed that the total number of tuberculous cases was 6355, of which 4627 (72.8%) were pulmonary TB, and 1728 (27.2%) were extra pulmonary TB. Statistical analysis between pulmonary and extra pulmonary cases showed significant difference throughout the study period.

In 2010 and 2009, the highest numbers of pulmonary and extra pulmonary cases were observed, and the lowest numbers of pulmonary and extra pulmonary cases were observed in 2007 and 2006, respectively. Across the years of the study era, statistical research between the pulmonary and extra pulmonary classes was highly important. The fact that TB arises almost exclusively from inhalation of droplet nuclei containing may be due to the high proportion of pulmonary cases relative to extra pulmonary ones. Tuberculosis occurs after pulmonary disease, and extra pulmonary TB occurs.

In the current study 59% were males, while 41% were females. The mean age of TB cases was 39 years. There was no statistically significant difference as regards age between patients with pulmonary and patients with extra pulmonary TB.

*Eissa et al. (2016)* showed that the highest incidence of TB occurred in the age groups of 15-35 and 35-55 years, and the lowest incidence occurred in those under 15 years of age those over 60 years of age, with a statistically significant difference as regards age groups throughout the study period. This could be attributed to the increased prevalence of smoking behavior in this active age group in our society. Moreover, poverty, malnutrition, physical, mental, and occupational stress, and greater exposure to infection are other contributing factors.

In the current study, cases of pulmonary TB were 61% males, and 39% were females. On the other hand in cases of extra pulmonary TB 50.4% were males, while 49.6% were females. *Khaliq et al. (2015)* showed that more cases were reported among males than females as (male to female ratio of 1.12). Similarly, *Ohene et al. (2019)* showed that there was male predominance for both EPTB and PTB. For EPTB, the male: female ratio was 1.17:1 while for PTB, the male: female ratio was 1.87:1. The proportion of females with EPTB was significantly more than the proportion of females with PTB.

In the current study, the largest number of pulmonary T.B was recorded in 2013 (12.9%), and the least number was recorded in 2009 (5.1%).

The largest number of extra pulmonary T.B was recorded in 2013 (14.6%) and the least number was recorded in 2008 (4.9%). The TB cases either pulmonary or extra pulmonary were commonly in adults compared to children.

*Sobh et al. (2016)* showed that EPTB cases were significantly younger and had a higher proportion of women. However, PTB cases were older and had a higher number of men.

In the current study 91.3% had radiological findings, while 8.7% had no radiological findings. The most common radiological finding was infiltration 30%, while the least common finding was milary 4%. The extent of radiological findings in patients with pulmonary TB was unilateral in 69% and bilateral in 31%. *Sreeramareddy et al. (2018)* reported that 16.4% had hilar lymph node enlargement and/or pleural pathology (unilateral or bilateral), 16.5% had concurrent PTB.

In the current study, had positive tuberculin skin test, while 9% of cases had negative tuberculin skin test. 54.1% had positive tuberculin skin test, between 10- <15mm, 26.4% had positive tuberculin skin test 15-25mm, and 19.5%, had positive tuberculin skin test more than 25mm.

*Huang et al. (2015)* showed that tuberculin skin test (TST;  $\geq 10$  mm) was positive in 69.6% of children with PTB (55/79) and 37.5% of children with EPTB (3/8). Children with PTB had a lower positive smear for acid fast bacilli (40.0%) and Mycobacterium tuberculosis culture (27.8%). Eighty percent of patients infected through household contact had a positive TST.

In the current study, 73.7% were sputum + ve for AFB, while 26.3% were sputum -ve for AFB. The majority of cases with +sputum were diagnosed in 2012 (77.5%), while in 2009 was (67.9%). *Sreeramareddy et al. (2014)* showed that microscopy for AFB was done on samples of sputum, gastric lavage and also used pus, ear swab or cerebrospinal fluid. However, microscopy was positive only in a small proportion (< 20%) of children in both pulmonary and extra-pulmonary TB and none in disseminated TB. Sputum for AFB was not done for 13 of 58 children who were aged above 10 years.

In the current study a 83% sputum positivity were diagnosed by Z\_N. stain, 11.9% were diagnosed by sputum culture and 5.1% were diagnosed by gene expert. Majority of cases with -ve sputum were diagnosed in 2009 (32.1%), while in 2012 was 22.5%.

*Nhung et al. (2015)* in this study of tuberculosis cases notification data in Vietnam from 2007 to 2012, a total of 4 243 630 presumptive TB cases were examined by sputum smear microscopy, with 368 594 (8.7%) being smear-positive. The number screened increased from 666 947 in 2007 to 768 449 in 2012, with the positivity rate significantly decreased from 9.4% in 2007 to 7.8% in 2012. There were 598 877 TB cases (all forms) notified: 313 225 (52.3%) were new smear-positive, 120 769 (20.2%) were smear-negative.

In the current study, the majority of extra pulmonary cases were TB lymphadenitis 45.1%, while the minority was laryngeal 4%. Out of 1260, 214 cases (17%) were treatment failure cases. the total number of patients with treatment

failure were 214 cases, the majority of them were recorded in 2009 (27.9%), while in 2017 it was (11.3%). *Sobh et al. (2016)* concluded that the most common form of presentation were new cases that accounted for 88.5% and relapse cases accounted for 7.2%; however, treatment failure, defaulters, and others constituted a small proportion of cases.

In the current study, treatment failure cases with comorbidity were 117 cases (54.7%), while the cases without comorbidity were 97 cases (45.3%). A total number of resistance cases were 173 cases, the majority of them were in 2009 (23.5%), while in 2017 it was (7.8%), the number of cured patients who had been received full course of treatment were 873 cases (69.3%) while 387 patients were not cured (30.7%).

*Eissa et al. (2016)* in the study of assessment of tuberculosis situation in Cairo governorate from 2006 to 2012 after application of directly observed therapy short-course strategy showed that there was a very good treatment outcome with increase in success rates (cure and complete rates). The highest cure and complete rates were observed in 2010 and the lowest rates were observed in 2007, with significant decrease in failure, death, default, and transfer out rates and statistically significant differences between treatment outcomes in different groups during the study period.

*Nhung et al. (2015)* showed that the cure rate of new smear-positive cases was maintained at high levels (above 85%) for all years in the study period; although this increased slightly from 89.8% in 2007 to 91.1% in 2012, the difference was not statistically significant.

In the current study, the total number of death was 41 cases, the majority of them were recorded in 2010 (7.6%), while in 2013 it was (0.6%). *Ohene et al. (2019)* showed that the mortality rate was highest among those with CNS EPTB (52%) and disseminated EPTB (47%). Death rate among those with pericardial EPTB was also very high, but the number was very small (3/5 patients). Among PTB patients, the overall treatment success rate was 84.2% while the mortality rate was 12.6%.

In the current study, there were statistically significant -ve correlations between outcome and age, comorbidity, extent of lesion on X-ray and resistance to treatment, and significant +ve correlation between outcome and duration of treatment. No statistically significant correlation between outcome and neither sex nor sputum positivity.

In a study of the treatment outcome of TB in Venezuela, 679 patients were treated with a 6-month treatment regimen of isoniazid, rifampicin, ethambutol, and pyrazinamide for the first 2 months followed by a combination of isoniazid and rifampicin 3 times a week for the remaining 4 months, treatment was directly observed. 99.5% of the patients who received over 90% of their therapy were cured (*Caminero et al., 2010*).

## CONCLUSION

TB affects the most productive age groups, and this necessitated more attention in TB control programs targeting those age groups. Although TB is increasing worldwide, this study showed decreased incidence of the disease in the last year of the study. TB incidence was higher in males especially in pulmonary TB.



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دراسة إسترجاعية لنمط الدرن في مستشفى الصدر بكفر  
الشيخ في الفترة من يناير 2008 إلى يناير 2018  
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**خلفية البحث:** الدرن هو مرض فطري معدي يسببه العدوى بالبكتيريا إما عن طريق الاستنشاق أو الابتلاع أو الاتصال المباشر مع بكتيريا الدرن. ويعتد الاكتشاف المبكر للمرض والعلاج الكيميائي الفعال والوقاية من إنتقال المرض عاملاً مهمًا في إنخفاض الإصابة بمرض الدرن. ويعتبر التشخيص المبكر للمرض والعلاج الكيميائي الفعال والوقاية من إنتقال المرض من العوامل المهمة في تراجع مرض الدرن.

**الهدف من البحث:** دراسة نمط الدرن في مستشفى كفر الشيخ في الفترة من يناير 2008 إلى يناير 2018.

**المرضى وطرق البحث:** أجريت هذه الدراسة بأثر رجعي على نتيجة تشخيص حالة مرض الدرن بمستشفى الصدر كفر الشيخ في الفترة من يناير 2008 إلى يناير 2018، وقد تم تضمين ألف ومائتين وستين مريضاً في هذه الدراسة، وتم تشخيصهم وفقاً للبرنامج الوطني المصري لمكافحة الدرن وإرشادات وزارة الصحة المصرية.

**نتائج البحث:** بلغ العدد الإجمالي لحالات الدرن (1260) منها 1034 حالة (82%) رئوية علوية علي 226 حالة (18%) خارج الرئة. وقد بلغ العدد الإجمالي المسجل لحالات الدرن 1260، تم تسجيل أكبر عدد منها في عام 2013 (166) حالة (13.2%)، وأقل عدد تم تسجيله في عام 2009 (68) حالة (5.4%). وكان 745 من أصل 1260 من الذكور (59%) كما كان 515 من الإناث (41%)، وكان متوسط عمر حالات الدرن 39 سنة. ولم يكن هناك فرقاً معتداً به إحصائياً فيما يتعلق بالعمر بين المرضى المصابين بالدرن الرئوي والمرضى المصابين بالدرن

الرئوي الإضافي. وقد بلغ العدد الإجمالي للوفيات 41 حالة، تم تسجيل غالبيتها في عام 2010 (7.6%)، بينما كانت في عام 2013 (0.6%).

**الاستنتاج:** يؤثر الدرن على الفئات العمرية الأكثر إنتاجية، وهذا يتطلب مزيداً من الاهتمام في برامج مكافحة الدرن التي تستهدف تلك الفئات العمرية. وكانت نسبة الإصابة بالدرن الرئوي أعلى عند الذكور.

**الكلمات الدالة:** المتفطرة، الرئوي، الدرن.