

Extrapulmonary tuberculosis situation in El-Behira Governorate, Egypt

Nabil A. Abdelghaffar Hibah

Aim There have been little published data about extrapulmonary tuberculosis (EPTB) situation in Egypt. The aim was to throw some light over EPTB patterns in Egypt regarding demographics, sites of affection, and treatment outcome.

Methods This work was a retrospective, descriptive analysis of EPTB cases, carried out at El-Behira Chest Hospital and 14 related dispensaries. All available data about registered EPTB cases from January 1996 to December 2010 (15 years duration) were collected including demographic data, site of EPTB, previous treatment history, treatment category, and treatment outcome. A descriptive analysis of the data was performed using the SPSS statistical program. Data were described in absolute numbers and percentages. Statistical significance was set at *P* value less than 0.05.

Results EPTB [*n* = 2119 (21% of all diagnosed tuberculosis)] occurred more in age groups between 15 and 29 and 30 and 44 years [*n* = 965 (45.5%) and *n* = 572 (27%), respectively] and in male patients [*n* = 1233 (58%)] than in female patients [*n* = 886 (42%)]. Pleural [*n* = 1341 (63.3%)], bone [*n* = 157 (7.5%)], and renal [*n* = 34 (1.6%)] tuberculosis were more common in male patients [*n* = 856 (64%), *n* = 99 (63%), *n* = 22 (64.5%), respectively], whereas lymph node [*n* = 427 (20%)] and genital [*n* = 70

(3.3%)] tuberculosis were more common in female patients [*n* = 240 (56.5%), *n* = 42 (60%), respectively]. Regarding treatment outcomes, successful treatment was obtained in 1725 cases (81.5%), treatment failure in 13 cases (0.5%), defaulting in 179 cases (8.5%), death in 77 cases (3.5%), and transfer-out in 125 cases (6%). Number of cases diagnosed declined through the years of study and was the highest in winter months, peaking in March.

Conclusion EPTB is a burden of reproductive age groups (15–44 years), with pleura being the commonest site of the disease that occurred more in male patients and age groups 15–44 years, followed by lymph nodes that occurred more in female patients and age group below 15 years. Successful treatment outcome was obtained in 81.5% of EPTB cases. *Egypt J Broncho* 2015 9:96–100
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Egyptian Journal of Bronchology 2015 9:96–100

Keywords: Egypt, extrapulmonary, lymph nodes, pleura, tuberculosis

Department of Chest, Faculty of Medicine, Benha University, Benha, Egypt

Correspondence to Nabil Ali Abdelghaffar Hibah, MD,

Department of Chest, Benha University Hospitals,

Benha City 13512, Egypt

Tel: 013-3227518;

fax: 013-3227518;

e-mail: nabil.hibah@yahoo.com

Received 25 September 2014 **Accepted** 16 November 2014

Introduction and aim of the work

There have been little published data about extrapulmonary tuberculosis (EPTB) situation in Egypt. The aim of this work was to throw some light over EPTB patterns in Egypt regarding demographics, sites of affection, and treatment outcome.

Most studies are directed to the pulmonary form because it is the most common and the most infectious, neglecting the EPTB. EPTB should drag more attention after increasing numbers of immunocompromised individuals (including HIV-positive) with higher risk of developing EPTB than the rest of the population [1].

For proper application and assessment of any guideline for treatment of tuberculosis (TB), data about the target population and disease patterns must be available first.

The site of EPTB may differ from one geographic location to another and from a population group to another with wide variety of host factors [2,3].

Methods

This work was approved by the Research Ethics committee in the Faculty of Medicine, Benha University. This work was a retrospective descriptive analysis of EPTB cases carried out at El-Behira Chest Hospital and 14 related dispensaries and included all registered EPTB cases from January 1996 to December 2010 (15 years duration). Extrapulmonary TB was defined as TB of any organ other than the lung (e.g. pleural TB, bone TB, intestinal TB, and lymph nodes TB).

Data collection

Demographic data, TB registration code, site of EPTB, previous treatment history, and treatment outcome were recorded.

Statistical analysis

A descriptive analysis of the data was performed using the SPSS statistical program (version 14, SPSS Inc., Chicago IL, USA). Data were described in absolute numbers and percentages. Statistical significance was set at *P* value less than 0.05. For comparison of data, *t*-test was used. The Student's *t*-test was used for paired

data, if they followed a normal distribution. Otherwise, χ^2 -test was used to compare more than two percentages.

Results

Demographic data

Extrapulmonary cases ($n = 2119$) collected in this study represented 21% of all diagnosed TB cases ($n = 10\,035$); 147 cases (7%) were below 15 years of age, 965 cases (45.5%) were between 15 and 29 years of age, 572 cases (27%) were between 30 and 44 years of age, 316 cases (15%) were between 45 and 59 years of age, and 119 cases (5.5%) were 60 years of age or above (Tables 1–3).

Male patients constituted 1233 cases (58%) and female patients constituted 886 cases (42%) with no significant differences between age groups distribution of male patients and female patients (Tables 2 and 3).

Site of extrapulmonary disease

Pleural TB constituted 63.3% ($n = 1341$) of all EPTB cases [male $n = 856$ (64%) and female $n = 485$ (36%)] (Tables 4 and 5). Lymph node TB constituted 20% ($n = 427$) of EPTB cases [male $n = 187$ (43.5%) and female $n = 240$ (56.5%)]. Bone TB constituted 7.5% ($n = 157$) cases [male $n = 99$ (63%) and female $n = 58$ (37%)]. Genital TB constituted 3.3% ($n = 70$) of all EPTB cases [male $n = 28$ (40%) and female $n = 42$ (60%)]. Renal TB constituted 1.6% ($n = 34$) of all

EPTB cases [male $n = 22$ (64.5%) and female $n = 12$ (35.5%)]. Intestinal TB constituted 1.3% ($n = 27$) of all EPTB cases [male $n = 14$ (51.5%) and female $n = 13$ (48.5%)]. Other sites of TB (central nervous system, eye, and others) constituted 3% ($n = 63$) of all EPTB cases [male $n = 41$ (65%) and female $n = 22$ (35%)].

Pleural TB ($n = 1341$) was the most common site in all age groups except in those below 15 years ($n = 64$) (lymph node TB takes its place). Lymph node TB ($n = 427$) was the second most common site except in those below 15 years ($n = 66$) as mentioned earlier, and in age group 60 years or above ($n = 7$) it became third common (bone TB takes its place). Bone TB ($n = 157$) comes third in all groups except in age group 60 years or above ($n = 16$) as mentioned earlier. Genital TB ($n = 70$) was more common in age groups 15–29 years ($n = 36$) and 30–44 years ($n = 26$) and was rare in age group below 15 years ($n = 1$). Renal TB occurred more in the three age groups of 30 years or above.

History of previous treatment

Newly diagnosed cases accounted for 94.4% ($n = 1998$) of all EPTB cases [male $n = 1151$ (57.5%) and female $n = 847$ (42.5%)] (Table 6). Defaulters constituted 2.2% ($n = 47$) of all EPTB cases [male $n = 37$ (78.5%) and female $n = 10$ (21.5%)]. Cases with history of previous treatment failure constituted 1.8% ($n = 40$) of all EPTB cases [male $n = 23$ (57.5%) and female $n = 17$ (42.5%)]. Cases with history of relapse constituted 1.6% ($n = 34$) of all EPTB cases [male $n = 22$ (64.5%) and female $n = 12$ (35.5%)].

Treatment and outcome

Majority of cases in this study were under category I treatment [$n = 1141$ (54%)]. Category II contained 372 cases (17.5%), category III contained 346 cases (16.5%), and 260 cases (12%) were with unknown category (not found in their records) (Tables 7 and 8).

Of the 2119 EPTB cases, 1725 (81.5%) cases [male $n = 988$ (57%) and female $n = 737$ (43%)] successfully completed their treatment. Treatment failure was met in 13 (0.5%) cases [male $n = 8$ (61.5%) and female $n = 5$ (38.5%)]. Defaulters accounted for 179 (8.5%) cases [male $n = 106$ (59%) and female $n = 73$ (41%)]. Death was the outcome (no available details about cause of death) in 77 (3.5%) cases [male $n = 45$ (58.5%) and female $n = 32$ (41.5%)]. Transfer-out was carried out in 125 (6%) cases [male $n = 86$ (69%) and female $n = 39$ (31%)]. There was a significant difference in treatment outcome between male patients and female patients.

Table 1 Shows age distribution of EPTB cases in absolute numbers and percent

| Age group | <15 | 15–29 | 30–44 | 45–59 | ≥60 | Total |
|--------------|---------|------------|----------|----------|-----------|------------|
| <i>N</i> (%) | 147 (7) | 965 (45.5) | 572 (27) | 316 (15) | 119 (5.5) | 2119 (100) |

EPTB, extrapulmonary tuberculosis.

Table 2 Shows age distribution of both sexes in absolute *n* (%)

| Age group | <15 | 15–29 | 30–44 | 45–59 | ≥60 | Total |
|-----------|-----------|------------|------------|------------|-----------|-------|
| Male | 83 (56.5) | 563 (58.5) | 341 (59.5) | 172 (54.5) | 74 (62) | 1233 |
| Female | 64 (43.5) | 402 (41.5) | 231 (40.5) | 144 (45.5) | 45 (38) | 886 |
| Total | 147 (100) | 965 (100) | 572 (100) | 316 (100) | 119 (100) | 2119 |

Table 3 Shows age distribution within each sex (%)

| Sex | <15 | 15–29 | 30–44 | 45–59 | ≥60 | Total |
|--------|------|-------|-------|-------|-----|-------|
| Male | 7 | 45.5 | 27.5 | 14 | 6 | 100 |
| Female | 7.25 | 45.5 | 26 | 16.25 | 5 | 100 |

Table 4 Shows site of EPTB in both sexes in absolute *n* (%)

| Site | Pleural | Lymph node | Bone | Genital | Renal | Intestinal | Others ^a |
|--------|------------|------------|-----------|----------|-----------|------------|---------------------|
| Male | 856 (64) | 187 (43.5) | 99 (63) | 28 (40) | 22 (64.5) | 14 (51.5) | 41 (65) |
| Female | 485 (36) | 240 (56.5) | 58 (37) | 42 (60) | 12 (35.5) | 13 (48.5) | 22 (35) |
| Total | 1341 (100) | 427 (100) | 157 (100) | 70 (100) | 34 (100) | 27 (100) | 63 (100) |

EPTB, extrapulmonary tuberculosis; ^aOther EPTB sites (e.g. central nervous system, eye).

Annual and seasonal changes

EPTB diagnosis and notification rate seems to have a gradual decline in the number of cases (Graphs 1 and 2).

The rate of EPTB diagnosis seems to peak in March then decline in warm summer months.

Discussion

After reviewing the published literature for data about the situation of EPTB in Egypt, very little published data were available. This study was conducted to put light on EPTB regarding the demographic patterns, clinical patterns, and treatment outcome in Egypt.

EPTB was more likely to occur in male patients [$n = 1233$ (58.2%)] than in female patients [$n = 886$ (41.8%)].

Table 5 Shows different EPTB site in age groups

| Site | Age group | | | | | Total |
|---------------------|-----------|-------|-------|-------|-----|-------|
| | <15 | 15–29 | 30–44 | 44–59 | ≥60 | |
| Pleural | 64 | 644 | 360 | 193 | 80 | 1341 |
| Lymph node | 66 | 196 | 108 | 50 | 7 | 427 |
| Bone | 9 | 44 | 42 | 46 | 16 | 157 |
| Genital | 1 | 36 | 26 | 6 | 1 | 70 |
| Renal | 0 | 5 | 10 | 9 | 10 | 34 |
| Intestinal | 2 | 14 | 10 | 1 | 0 | 27 |
| Others ^a | 5 | 26 | 16 | 11 | 5 | 63 |
| Total | 147 | 965 | 572 | 316 | 119 | 2119 |

EPTB, extrapulmonary tuberculosis; ^aOther EPTB Sites (e.g. central nervous system, eye).

Table 6 Shows history of previous treatment in absolute n (%) in both sexes

| History of previous treatment | New cases | Treatment after default | Treatment after failure | Relapsed |
|-------------------------------|-------------|-------------------------|-------------------------|-----------|
| Male | 1151 (57.5) | 37 (78.5) | 23 (57.5) | 22 (64.5) |
| Female | 847 (42.5) | 10 (21.5) | 17 (42.5) | 12 (35.5) |
| Total | 1998 (100) | 47 (100) | 40 (100) | 34 (100) |

Table 7 Shows distribution of EPTB cases according to their treatment category

| Category of treatment | N (%) |
|---------------------------|------------|
| Category I ^a | 1141 (54) |
| Category II ^b | 372 (17.5) |
| Category III ^c | 346 (16.5) |
| Unknown category | 260 (12) |
| Total | 2119 (100) |

EPTB, extrapulmonary tuberculosis; ^aCategory I, 2 EHRZ or 2 SHRZ then 4 HR; ^bCategory II, 2 SHRZE/1 HRZE then 5 HRE; ^cCategory III, 2 HRZ then 4 HR.

Table 8 Shows treatment outcome in both sexes in absolute n (%)

| Outcome | Completed | Treatment failure | Default | Death | Transfer-out | Total |
|---------|-------------|-------------------|-----------|-----------|--------------|------------|
| Male | 988 (57) | 8 (61.5) | 106 (59) | 45 (58.5) | 86 (69) | 1233 |
| Female | 737 (43) | 5 (38.5) | 73 (41) | 32 (41.5) | 39 (31) | 886 |
| Total | 1725 (81.5) | 13 (0.5) | 179 (8.5) | 77 (3.5) | 125 (6) | 2119 (100) |

This finding was different from the finding in another study [4], where male EPTB cases ($n = 2739$) accounted for only 48% and female patients ($n = 2936$) accounted for 52%. The difference between both studies is more likely due to the difference in culture; in Germany, men and women work outdoors with equal risk for infection, whereas in Egypt the majority of women do not work.

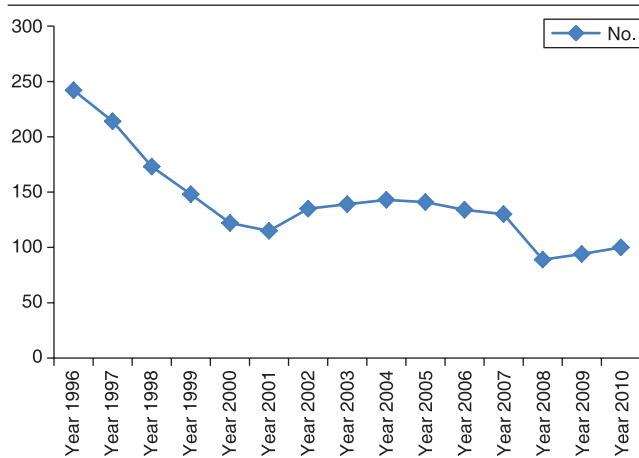
The majority of EPTB cases were in the age groups 15–29 and 30–44 years [$n = 1537$ (72.5%)], and the majority of these two age groups were male patients [$n = 904$ (59%)] and the minority were female patients [$n = 633$ (41%)]. This may be explained by the fact that this age group is more exposed to both physical and psychological stress and more male patients than female patients because male patients are more exposed to infection. Similar results were reported by Prakasha and colleagues [5–7].

The number of cases of EPTB below 15 years of age was a minority in this study [$n = 147$ (7%)], with majority of male patients [$n = 83$ (57%)] and minority of female patients [$n = 64$ (43%)]. Similar results were reported by Prakasha *et al.* [5].

Older age group (≥ 60 years) had lower rate of EPTB [$n = 119$ (5.5%)], which is much lower than the findings of another study by Forssbohm *et al.* [4] in Germany [$n = 1686$ (29.7%)]. This may be due to longer lifespan in Germany and more nursing homes for old people (with higher exposure to infection) and better notification than in Egypt.

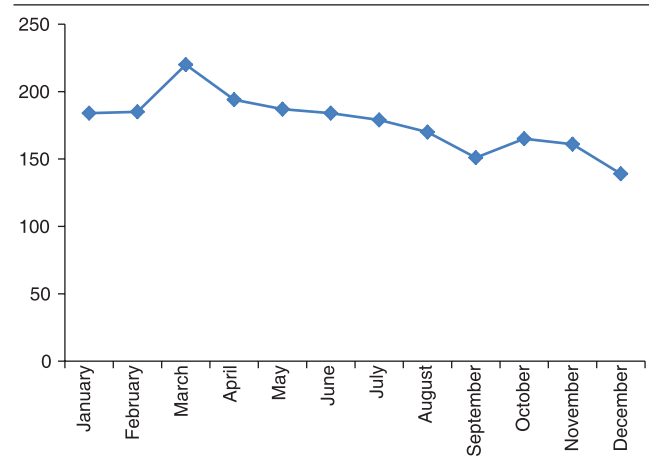
Pleural TB was the most common site of EPTB [$n = 1341$ (63%)] in both male patients ($n = 856$) and female patients ($n = 485$) with higher percentage among male patients (69% of EPTB in males) than female patients (55% of EPTB in females). Lymph node TB was the second most common EPTB site [$n = 427$ (20%)] but was higher in female patients [$n = 240$ (27%) of EPTB in females] than in male patients [$n = 187$ (15%) of EPTB in males]. Similar results regarding sex differences in both pleural and lymph node TB were found by another study [4] but in their study and another two studies in India [5] and in the USA [8], lymph node TB rate was higher than pleural TB in general and in both male patients and female patients in their studied cases of EPTB. Pleural TB is more associated with rupture of subpleural focus into the pleura (reactivation or secondary TB) [9],

Graph 1



Distribution of cases according to year of diagnosis and notification.

Graph 2



Distribution of cases according to month of diagnosis and notification.

whereas lymph node affection is more with primary TB infection. Prevalence of pleural TB in Egypt suggests more relation to secondary or reactivation TB.

Genital TB rate [$n = 70$ (70%)] was more in female patients [$n = 42$ (5%) of EPTB in females] than in male patients [$n = 28$ (2.25%) of EPTB in males], whereas renal and bone TB were more common in male patients ($n = 22$, $n = 99$) than in female patients ($n = 12$, $n = 58$). Another study by Forssbohm *et al.* [4] found nearly equal rates of genitourinary and bone TB in male patients ($n = 489$, $n = 235$) and in female patients ($n = 469$, $n = 222$).

Pleural TB ($n = 1341$) is the most common site in all age groups except in those below 15 ($n = 64$) years (lymph node TB takes its place). Lymph node TB ($n = 427$) is the second most common site except in those below 15 ($n = 66$) years as mentioned earlier, and in age group 60 years or above ($n = 7$) it became third common (bone TB takes its place). Bone TB ($n = 157$) comes third in all groups except age group 60 years or above ($n = 16$) as mentioned earlier. Genital TB ($n = 70$) was more common in age groups 15–29 ($n = 36$) and 40–59 ($n = 26$) and was rare in age group below 15 ($n = 1$). Renal TB occurred more in age group 30 years and above. Sites of EPTB may show predilection of some age over another as reported by some authors [10,11], and as evidenced in this study genital and urinary TB were rare in children (age group <15 years) [12].

Newly diagnosed EPTB cases constituted the majority of cases in this study [$n = 1998$ (94.4%)]; other cases with history of default [$n = 47$ (2.2%)], cases with history of treatment failure [$n = 40$ (1.8%)], and cases with history of relapse [$n = 34$ (1.6%)] are minority in this study [$n = 121$ (5.6%)].

There is a gradual decline in the occurrence of EPTB during the duration of this study that can be attributed to DOTS (direct observed therapy short course strategy) since 1999.

The rate of EPTB diagnosis seems to peak in March, which shows the highest number of diagnosed EPTB cases, then decline in warm summer months. Similar finding of seasonal variation in TB was reported by others [13,14].

Conclusion

EPTB burden is much more during the reproductive age, between 15 and 44 years, in both male patients and female patients. Male patients have higher rates of pleural effusion than female patients and female patients have higher rates of lymph node and genital TB. Some sites of EPTB have predilection to some age groups over other age groups, such as lymph nodes in children, pleural in young and middle aged, and bone in old age. Regarding treatment outcomes, successful treatment was obtained in 1725 cases (81.5%), treatment failure in 13 cases (0.5%), defaulting in 179 cases (8.5%), death in 77 cases (3.5%), and transfer-out in 125 cases (6%). There is a gradual decline in the occurrence of EPTB with seasonal variation of case diagnosis and gradual rise through winter months during the duration of this study.

Acknowledgements

Conflicts of interest

None declared.

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