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Trends in extrapulmonary TB cases at three teaching hospitals in Ghana, 2008–2017

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SETTING: Three teaching hospitals in Ghana.
OBJECTIVE: To elucidate trends in demographics, clinical characteristics and treatment outcomes in extrapulmonary TB (EPTB) patients.
DESIGN: This was a retrospective study involving the review and comparison of EPTB and pulmonary TB (PTB) data from 1 January 2008 to 31 December 2017 in TB registers and treatment cards.
RESULTS: Of 15,392 TB cases, 4607 (30%) were EPTB, including 4477/4607 (97%) new cases. There were 2,679/4607 (58%) males and the age range was 0.3 to 96 years. Pleural TB (1021/4607, 22%) was the most common. Treatment success rates for EPTB and PTB were respectively 72% and 84%. HIV positivity was high among patients with disseminated/miliary TB (429/779, 55%) and TB meningitis (242/526, 46%). To note, disseminated/miliary TB ($\chi^2 = 33.53$, $P < 0.0001$) increased, whereas TB meningitis ($\chi^2 = 19.43$, $P < 0.0001$) decreased over the 10-year period. Mortality among EPTB patients was associated with increasing age (⩾25 years), disseminated/miliary TB, TB meningitis and HIV positivity.
CONCLUSIONS: There is male preponderance for both EPTB and PTB in Ghana. Increasing age, disseminated/miliary TB, TB meningitis and HIV are risk factors for mortality among EPTB patients. This emphasises the need for public education on the risk factors for EPTB and preventive strategies.

TB remains the leading cause of morbidity and mortality from a single infectious disease worldwide. In 2018, global estimates of TB cases was 10.4 million, but only 6.5 million were reported. In Ghana, the estimated and notified TB cases were respectively 44,000 and 14,000.[1] Pulmonary TB (PTB) affects the lungs primarily and it is the most common presentation of TB compared to extrapulmonary TB (EPTB). EPTB is any bacteriologically confirmed or clinically diagnosed case of TB involving organs other than the lungs.[2] Due to diagnostic challenges, EPTB diagnosis is often delayed and depends on a high index of suspicion, although bacteriological, biochemical, imaging and radiological techniques are used when available.[3] The prevalence of EPTB among TB cases globally in 2018 was 15% which was slightly lower than the 16% recorded in the Africa region but higher than 8% recorded in Ghana.[1]

The global strategy to end TB includes early diagnosis and adequate treatment of all forms of TB.[4] However, most interventions and strategies are focused on PTB. Therefore, there is need for specific interventions to focus on EPTB based on evidence of disease trends. In Ghana, available data on TB from the National Tuberculosis Control Programme (NTP) is limited to aggregated figures, and published data on existing EPTB burden and trends over a period are limited. A previous study described the epidemiology of EPTB cases in selected hospitals in Accra.[5] The study excluded children as well as patients who failed initial TB treatment; however, children with TB are more likely to have ETPB.[6] Our study describes the trends of all EPTB cases in terms of demographic and clinical characteristics, disease type/sites affected, treatment outcomes, HIV co-infection and risk factors for mortality. To our knowledge, the present study offers the first in-depth analysis of EPTB trends involving patients of all ages irrespective of previous TB history over a 10-year period at three major teaching hospitals in Ghana, strategically situated to serve the southern, middle and northern parts of the country.

METHODS

Design

This was a hospital-based cross-sectional study involving retrospective review of TB registers and treatment cards.

Setting

The study was conducted in Ghana at Korle Bu Teaching Hospital (KBTH; Accra, Ghana), Komfo Anokye Teaching Hospital (KATH; Kumasi, Ghana) and Tamale Teaching Hospital (TTH; Tamale, Ghana). KBTH is the largest teaching hospital and a major referral centre serving Ghana and the West African sub-region. It has a bed capacity of more than 2,000.[7] KATH is the second largest teaching hospital with a bed capacity of about 1200. It takes direct referrals from the middle and northern regions of Ghana, as well as neighbouring Cote d'Ivoire and Burkina Faso.[8] TTH (bed capacity: approximately 800) serves as a major referral hospital for the five northern regions and some parts of the Bono and Bono-East regions of Ghana.[9]

Study population

All EPTB and PTB patients diagnosed at KBTH, KATH and TTH from 1 January 2008 to 31 December 2017.

Source of data

Data were obtained primarily from the health facility TB register. However, TB treatment cards were only

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used in some few instances where the main register was not available. Data were extracted by the principal investigator, assisted by a data clerk at each of the three hospitals. An electronic data extraction form was designed using Microsoft Office Access 2013 (Micro-Soft, Redmond, WA, USA) to extract demographic (age, sex), clinical (type of patient, type of TB or site affected), treatment (treatment categorisation and outcomes) and HIV status data of patients, as well as name of facility, year and method of diagnosis for analysis. Data were cross-checked for accuracy before being exported for analysis.

Statistical analysis

STATA v15 (StataCorp, College Station, TX, USA) was used for data analysis. Demographic and clinical characteristics were compared between EPTB and PTB patients. Data were described as frequencies and percentages. χ^2 was used to determine if differences observed in the two groups were statistically significant. The Mantel Haenszel χ^2 for linear trends was used to calculate test for linear trends for EPTB; $P < 0.05$ was considered statistically significant. Multiple variable logistic regression analysis was conducted to identify factors associated with mortality among EPTB patients. A model for those who died during treatment was compared to those who completed treatment or had outcomes other than death. Sex, age group, patient category, type of EPTB and HIV status were included in this model. Odds ratio (OR), 95% confidence intervals (CIs) and P values were calculated for each potential predictor variable, with $P < 0.05$ set as the level of significance.

Ethical consideration

This was part of a larger study which obtained ethical approval from the Noguchi Memorial Institute for Medical Research Institutional Review Board (NMIMR; Legon, Accra, Ghana; NMIMR-IRB CPN 093/17-18), KBTH Institutional Review Board (KBTH-IRB 000137/2019) and the Kwame Nkrumah University of Science and Technology/KATH Committee on Human Research and Publication Ethics (CHRPE/AP /048/19). A certificate of authorisation (TTH/R&D/SR/153) to conduct research was obtained from TTH, which waived the need for additional ethical clearance certificate after assessing the three already obtained from NMIMR, KBTH and KNUST/KATH. As the study was limited to routinely collected surveillance data in TB registers, informed consent was not sought from patients for use of their demographic and clinical data. However, permission was obtained from heads of the chest clinics as well as the NTP for use of TB data for research.

RESULTS

Demographic and clinical characteristics of study participants

Of 15,392 TB cases recorded at the three hospitals from 2008 to 2017, 4607 (30%) were EPTB. This figure represented about 28% of the total number of EPTB cases (16,200) registered in Ghana over the period. The male:female ratio for EPTB was 1.4 compared to 1.7 for PTB ($P < 0.0001$). The ages for EPTB patients ranged from 0.3 to 96 years. Of a total of 4,607 patients, 638 (14%) were children aged <15 years, while 401 (9%) constituted the elderly (≥65 years). Patients within the 15–44 years' age group were in the majority (2,399, 52%). A vast majority 4,477 (97%) of the patients were classified as new (no known history of TB diagnosis or previous treatment for TB), with the remaining 3% consisting of relapsed, transferred in and treatment after lost to follow-up among others (Table 1). HIV status was known for 3691 (80%) of the patients, 1317 (36%) of whom were HIV-positive (Table 1). The rate of HIV positivity was high among patients with disseminated/miliary TB (429/779, 55%) and TB meningitis (242/526, 46%).

The type of EPTB or the body site affected was specified for 4,253 (92%) of the patients, and the remaining 354 (8%) were unspecified. Overall, the three most common types of EPTB were pleural TB (1,021, 22%), disseminated/miliary TB (779, 17%) and spinal TB/Potts TB (589, 13%) (Figures 1 and 2). Types of EPTB with frequency of occurrence less than 20 were classified as "other". These included TB of the hip bone/pelvis (n = 19), TB of the knee (n = 17), renal TB (n = 16), TB of the brain (n = 12), cutaneous TB (n = 10), TB of the breast (n = 9), TB of the testes (n = 7), laryngeal TB (n = 5), TB of the epididymitis (n = 4), TB of the prostate (n = 3), TB of the ankle (n = 3), TB salpingitis (n = 3), hepatic TB (n = 2), ocular TB (n = 1), TB of the pancreas (n = 1), TB of the wrist (n = 1) and tonsilar TB (n = 1). A significantly higher proportion of males had pleural TB, TB meningitis and TB lymphadenitis than females (Figure 1); a significantly high proportion of children less than 15 years had abdominal TB and TB lymphadenitis (Figure 2).

Trends in EPTB occurrence

The trend analysis showed significant linear increase in disseminated/miliary TB ($\chi^2 = 33.53$, $P < 0.0001$). In contrast, there was a decreasing linear trend in TB meningitis ($\chi^2 = 19.43$, $P < 0.0001$) and 'other' forms of TB ($\chi^2 = 8.47$, $P = 0.003$) (Table 2).

Trends in treatment outcomes

Treatment outcomes of almost all the patients (4568, 99%) were recorded in the TB registers. The remaining 39 patients (1.0%) were 'transferred out'. Of the 4,568 EPTB patients whose treatment outcomes were known, 3,302 (72.2%) were successful (completed or cured) compared to 84% for PTB. About 27.8% of EPTB patients had adverse treatment outcomes, including death (n = 1080, 23.4%), loss to follow-up (n = 180, 3.9%) and failures (n = 6, 0.1%) (Table 1). Overall treatment success rate (TSR; i.e., completed and cured) decreased from 74.8% in 2008 to 67.8% in 2009 and increased to 82.3% in 2010, before declining steadily to 70.2% in 2017. Mortality rates were below 30% from 2008 to 2014 and increased to 32.2% in 2015, before declining to 23.3% in 2017. Loss to follow-up rate decreased from 3.6% in 2008 to 2.7% in 2013, increased threefold to 8.2% in 2014, before a marginal fall to 6.2 in

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Conflicts of interest: none declared.

TABLE 1 Demographic and clinical characteristics of EPTB and PTB patients at three teaching hospitals in Ghana, 2008–2017

Characteristic	All (*n* = 15,392) *n* (%)	EPTB (*n* = 4607) *n* (%)	PTB (*n* = 10785) *n* (%)	*P* value
Sex				<0.0001
Male	9474 (61.6)	2679 (58.2)	6795 (63.0)	
Female	5918 (38.4)	1928 (41.8)	3990 (37.0)	
Male:female	1.6	1.4	1.7	
Age, years				<0.0001
<15	1662 (10.8)	638 (13.9)	1024 (9.5)	
15–24	1632 (10.6)	534 (11.6)	1098 (10.2)	
25–34	3214 (20.9)	895 (19.4)	2319 (21.5)	
35–44	3385 (22.0)	970 (21.0)	2415 (22.4)	
45–54	2705 (17.6)	707 (15.4)	1998 (18.5)	
55–64	1357 (8.8)	462 (10.0)	895 (8.3)	
⩾65	1437 (9.3)	401 (8.7)	1036 (9.6)	
Patient category				<0.0001
New	14,745 (95.8)	4477 (97.1)	10,268 (95.2)	
Relapse	564 (3.8)	111 (2.4)	453 (4.2)	
Treatment after failure	32 (0.2)	0 (0)	32 (0.3)	
Treatment after lost to follow-up	25 (0.1)	7 (0.2)	18 (0.2)	
Other	26 (0.1)	12 (0.3)	14 (0.1)	
HIV status				<0.0001
Positive	3732 (24.2)	1317 (28.6)	2415 (22.4)	
Negative	8178 (53.2)	2374 (51.5)	5804 (53.8)	
Unknown	3482 (22.6)	916 (19.9)	2566 (23.8)	
Treatment category*				<0.0001
I	13,173 (85.6)	3881 (84.2)	9292 (86.2)	
II	585 (3.8)	125 (2.7)	460 (4.3)	
III	1634 (10.6)	601 (13.1)	1,033 (9.5)	
Treatment outcome†				<0.0001
Completed/cured	12,053 (78.3)	3302 (71.7)	8751 (81.1)	
Lost to follow-up	267 (1.7)	180 (3.9)	87 (0.9)	
Died	2868 (18.6)	1080 (23.4)	1788 (16.5)	
Failure	89 (0.6)	6 (0.1)	83 (0.8)	
Transfer out	115 (0.8)	39 (0.9)	76 (0.7)	

*Group I (all new cases, excluding children aged <12 years): initial phase, 2HRZE; EMB to be replaced with SM in meningitis; continuation phase, 4HR; the continuation phase may be extended in some types of EPTB cases; Group II (previously treated cases, i.e., relapse, treatment after failure, treatment after lost to follow-up, other): initial phase, 2HRZES + 1HRZE; continuation phase, 5HRE; Group III (children aged <12 years): initial phase, 2HRZ; SM should be added in meningitis; continuation phase, 4HR.[31] Numbers before the letters indicate the duration in months of the phase of treatment.

†Treatment outcomes were defined as follows: "completed", a patient who completed treatment without evidence of failure but with no record to show that smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because tests were not done or because results were unavailable; "cured", a patient with bacteriologically confirmed TB at the beginning of treatment who was smear- or culture-negative in the last month of treatment and on at least one previous occasion; "lost to follow-up", a patient who did not start treatment or whose treatment was interrupted for ⩾2 consecutive months; "died", a patient who dies for any reason before starting or during the course of treatment; "failure", a patient whose smear or culture is positive at month 5 or later during treatment; and "transfer out", a patient whose treatment outcome is unknown to the reporting unit because of transfer to another treatment unit.[2]

EPTB = extrapulmonary TB; PTB = pulmonary TB; H = isoniazid; R = rifampicin; Z = pyrazinamide; E, EMB = ethambutol; S, SM = streptomycin.

2017. The treatment failure rate remained fairly constant (below 1%) throughout the 10 years (Figure 3).

Factors associated with mortality among EPTB patients

As shown in Table 3, EPTB patients aged ⩾25 years (25–34 years: OR 1.63, 95% CI 1.20–1.29; $P = 0.001$; 35–44 years: OR 1.42, 95% CI 1.22–2.20; $P = 0.001$; 45–54 years: OR 2.38, 95% CI 1.75–3.23; $P < 0.0001$; 55–64 years: OR 2.63, 95% CI 1.89–3.66; $P < 0.0001$; ⩾65 years: OR 3.84, 95% CI 2.76–5.36; $P < 0.0001$) were more likely to die during treatment than patients aged <15 years. Patients with disseminated/miliary TB (OR 2.9, 95% CI 2.33–3.61; $P < 0.0001$) and TB meningitis (OR 2.14, 95% CI 1.67–2.73; $P < 0.0001$) were more likely to die than pleural TB patients. Mortality among EPTB patients with HIV was worse than patients without HIV (OR 2.27, 95% CI 1.90–2.69; $P < 0.0001$).

DISCUSSION

We described the trends in demographic, clinical characteristics, type of EPTB, treatment outcomes and HIV co-infection of EPTB patients at three teaching hospitals in Ghana from 2008 to 2017. Over the 10-year period, nearly one third of the total EPTB cases nationwide were recorded at KATH, KBTH and TTH. As the study sites were tertiary care hospitals, there were possibly more referrals and increased EPTB detection rates than at peripheral hospitals. The proportion of EPTB cases among all forms of TB was esti-

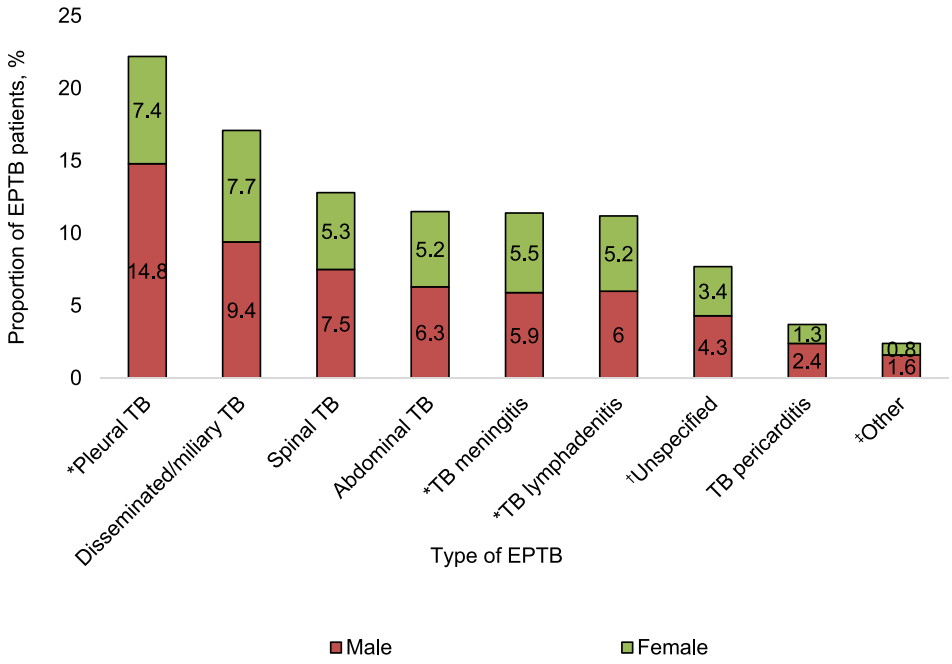
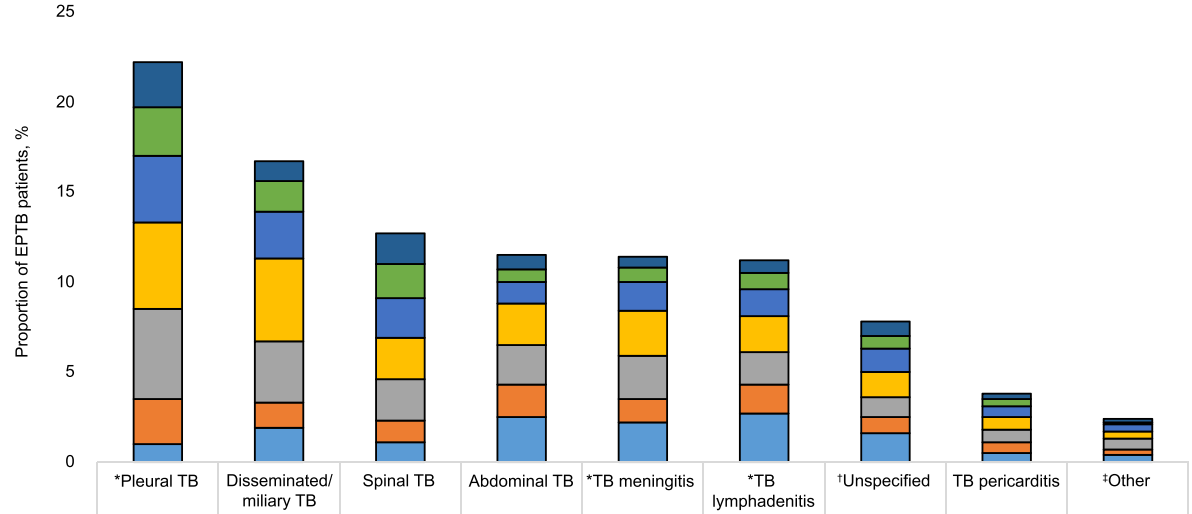


FIGURE 1 Distribution of EPTB patients (n = 4607) by infection site and sex at three teaching hospitals in Ghana, 2008–2017. The numbers in the bars represent the percentage of males and females affected by each type of EPTB. *$P < 0.05$. †Type of EPTB with site of infection not clearly stated. ‡A group of EPTB types with respective frequency of occurrence less than 20.



	*Pleural TB	Disseminated/ miliary TB	Spinal TB	Abdominal TB	*TB meningitis	*TB lymphadenitis	†Unspecified	TB pericarditis	‡Other
≥65	2.5	1.1	1.7	0.8	0.6	0.7	0.8	0.3	0.2
55–64	2.7	1.7	1.9	0.7	0.8	0.9	0.7	0.4	0.1
45–54	3.7	2.6	2.2	1.2	1.6	1.5	1.3	0.6	0.4
35–44	4.8	4.6	2.3	2.3	2.5	2	1.4	0.7	0.4
25–34	5	3.4	2.3	2.2	2.4	1.8	1.1	0.7	0.6
15–24	2.5	1.4	1.2	1.8	1.3	1.6	0.9	0.6	0.3
<15	1	1.9	1.1	2.5	2.2	2.7	1.6	0.5	0.4

FIGURE 2 Distribution of EPTB patients (n = 4607) by infection site and age group (years) at three teaching hospitals in Ghana, 2008–2017. The numbers in the table represent the percentage of the various age groups affected by each type of EPTB. * $P < 0.05$. †Type of EPTB with site of infection not clearly stated. ‡A group of EPTB forms with respective frequency of occurrence less than 20.

TABLE 2 Annual trend of EPTB cases in three teaching hospitals in Ghana, 2008–2017

Type of EPTB	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total	χ^2 for linear trend, *P* value
Pleural TB	95	129	94	116	41	108	104	113	121	100	1021	0.27, 0.59
Disseminated/ miliary TB	47	68	88	71	41	67	105	85	106	101	779	33.53, <0.0001*
Spinal/Potts TB	54	61	56	98	47	58	55	47	58	55	589	2.21, 0.13
Abdominal TB	42	48	49	75	51	54	73	42	51	46	531	0.001, 0.97
TB meningitis	65	88	35	69	37	55	46	41	58	32	526	19.42, <0.0001*
TB lymphadenitis	34	64	38	64	51	66	44	54	57	42	517	0.03, 0.85
Unspecified†	43	35	29	30	51	38	34	38	21	35	354	1.74, 0.18
TB pericarditis	15	14	14	19	17	21	19	17	22	18	176	1.69, 0.19
Other‡	18	11	15	10	13	11	18	7	7	4	114	8.47, 0.003*
Total	413	521	418	552	349	478	498	444	501	433	4607	

*Statistically significant linear trend ($P < 0.05$).
†Unspecified: type of EPTB with site of infection not clearly stated.
‡A group of EPTB types with respective frequency of occurrence less than 20.
EPTB = extrapulmonary TB.

mated at 30% at the study sites, which is higher than reported range for other hospital-based studies in Ethiopia (22.7%)[10] and Nigeria (14.7%).[11] However, the proportion of EPTB is lower than reported in studies from China (31.3%)[12] and Australia (39%).[13]

Our study found a predominance of males for both EPTB and PTB. Other study findings have been similar,[10,11] except for a study from Egypt by Mohammadien et al.,[14] who reported a male:female ratio of 1:2. The male predominance in EPTB may be due to a general trend of males being at increased risk of TB compared to females, as reported in a systematic review on social determinants of TB in sub-Saharan Africa.[15] The majority of cases (52%) were in the 15–44 years' age group, which highlights the socio-economic burden of EPTB in the country. Similar reports of higher incidence of EPTB among the youth have been reported by other studies.[16,17] We found pleural TB to be the most common EPTB presentation; this is in line with studies from Benin[18] and India.[19] However, studies conducted in other countries reported pleural TB as the second most common form after TB lymphadenitis.[14,20,21] At two of the study sites (TTH and KATH), a fifth of the cases were abdominal TB. This observation could be due to

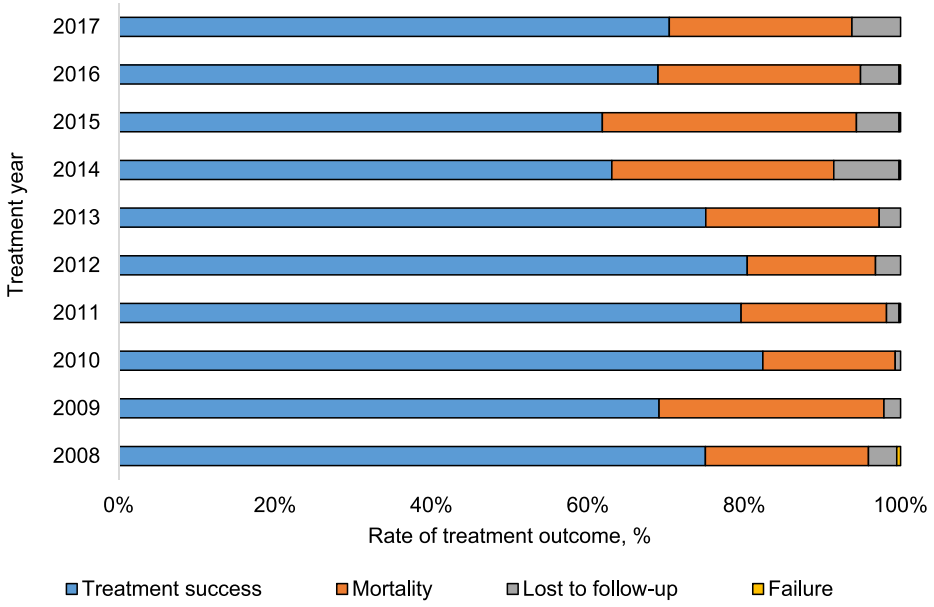


FIGURE 3 Trends in treatment outcomes of EPTB patients at three teaching hospitals in Ghana, 2008–2017. Treatment success rate = proportion of EPTB patients who completed (finishing treatment without bacteriological result at the end of treatment) or cured (finishing treatment with negative bacteriological result at the end of treatment; mortality rate = proportion of EPTB patients who died from any cause during the course of treatment; lost to follow-up rate = proportion of EPTB patients who interrupted treatment for two consecutive months after registration; failure rate = proportion of EPTB patients remaining smear-positive at Month 5 despite correct intake of medication.

TABLE 3 Association of demographic and clinical factors with mortality among EPTB patients at three teaching hospitals in Ghana, 2008–2017 (n = 4607)

Variable	Total *N*	Died *n* (%)	OR	95% CI	*P* value
Sex					
Female	1928	448 (23.2)	Reference		
Male	2679	632 (23.6)	1.11	0.95–1.26	0.168
Age group, years					
<15	638	81 (12.7)	Reference		
15–24	534	77 (14.4)	1.18	0.83–1.67	0.363
25–34	895	205 (22.9)	1.63	1.20–1.29	0.001
35–44	970	245 (25.3)	1.64	1.22–2.20	0.001
45–54	707	209 (29.6)	2.38	1.75–3.23	<0.0001
55–64	462	133 (28.8)	2.63	1.89–3.66	<0.0001
⩾65	401	130 (32.4)	3.84	2.76–5.36	<0.0001
Patient category					
New	4477	1051 (22.8)	Reference		
Relapse	111	26 (26.4)	1.15	0.72–1.84	0.56
Treatment after lost to follow-up	7	2 (28.6)	1.98	0.36–10.89	0.432
Other	12	1 (8.3)	0.3	0.03–2.53	0.27
Type of EPTB					
Pleural TB	1021	215 (21.1)	Reference		
Disseminated/miliary TB	779	359 (46.1)	2.9	2.33–3.61	<0.0001
Spinal/Potts TB	589	92 (15.6)	0.74	0.56–0.98	0.034
Abdominal TB	531	72 (13.6)	0.75	0.55–1.00	0.056
TB meningitis	526	189 (35.9)	2.14	1.67–2.73	<0.0001
TB lymphadenitis	517	64 (12.4)	0.62	0.45–0.84	0.003
Unspecified	354	42 (11.9)	0.56	0.39–0.81	0.002
TB pericarditis	176	35 (19.9)	1.07	0.71–1.60	0.759
Other	114	10 (12.5)	0.53	0.28–0.99	0.046
HIV status					
Negative	2374	410 (17.2)	Reference		
Positive	1317	515 (39.1)	2.27	1.90–2.69	<0.0001
Unknown	916	155 (16.9)	1.1	0.89–1.37	0.361

EPTB = extrapulmonary TB; OR = odds ratio; CI = confidence interval.

the culture of the people in the communities served by these health facilities, especially in the northern regions, where livestock farming and dairy production are the main occupations for most people and the consumption of raw milk and undercooked meat is very common. The relatively high number of abdominal TB cases could thus be attributed to a possible infection by *Mycobacterium bovis*. Disseminated/miliary TB and TB meningitis were more common in children than in adults, as reported elsewhere.[22–24] In children, TB is often disseminated due to rapid, systemic spread of the mycobacterium after primary pulmonary infection compared to adults.[25] Overall, the linear increasing trend in disseminated/miliary TB, which is also associated with HIV infection, necessitates the need to improve TB-HIV control programmes. Alternatively, the decreasing trend in TB meningitis commonly associated with children and HIV-positive individuals could be attributed to the high coverage of bacille Calmette-Guérin (BCG) vaccination in Ghana.[26]

About 84% of EPTB patients received WHO Category I treatment (6 months) compared to 86% for PTB, highlighting the need to adhere to the standard PTB drug regimen for all new cases in Ghana: 2 months isoniazid (H), rifampicin (R), pyrazinamide (Z), ethambutol (E), plus 4 months isoniazid (H), rifampicin (R) in most EPTB cases. Although the TSR of 72.2% was slightly higher than 70.1% reported by Ohene et al.,[5] this fell below the WHO-recommended target of 85%, achieved for PTB patients in Ghana in 2017.[13]

In consonance with previous studies, our study found death to be the major unfavourable treatment outcome.[18,27,28] We found that disseminated/miliary TB and TB meningitis—two of the most severe forms of EPTB—were associated with mortality. Early initiation of anti-TB medication and adherence to the required regimen may minimise the progression to severe forms and death. On the other hand, the finding that HIV is a risk factor for death among EPTB patients are in line with previous reports;[5,18,29,30] this highlights the need for screening for early detection of HIV among EPTB patients, as well as prompt initiation of antiretroviral therapy for those who may be co-infected with HIV. Although the odds for mortality were higher in males than females, patients aged 15–24 years than in those aged <15 years, and in relapse and lost to follow-up cases than in new cases, these observations could not be supported by statistical evidence.

Our study had some limitations. First, due to the retrospective nature of the study, there may be possible issues with the information recorded. However, some of the minor issues such as under recording of data or data entry errors were addressed in the course of the exercise. Second, the trends identified in this study represent cases managed in three teaching hospitals, which may be less generalizable, although the study sites receives patients

from all over the country. Despite these limitations, findings from the study are useful for NTP planning and implementation, particularly the need to focus on EPTB and to address diagnostic and therapeutic challenges. Furthermore, this study provides valuable information that could be used by clinicians and public health practitioners for patient care and research.

In conclusion, our study shows that there is a male preponderance for both EPTB and PTB in Ghana. EPTB mortality is associated with increasing age, miliary/disseminated TB, TB meningitis and HIV. This emphasises the need for public education on the risk factors for EPTB and on preventive strategies, as well as the reinforcement of TB-HIV control activities.

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CONTEXTE : Trois centres hospitalières universitaires au Ghana.

OBJECTIF : Elucider les tendances démographiques, les caractéristiques cliniques et les résultats du traitement de patients atteints de TB extrapulmonaire (EPTB) au Ghana.

SCHEMA : Ceci est une étude rétrospective de revue et de comparaison des données de EPTB et de TB pulmonaire (PTB) du 1e janvier 2008 au 31 décembre 2017 dans les registres de TB et les cartes de traitement.

RESULTATS : Sur 15 392 cas de TB, 4607 (30%) étaient des EPTB dont 4477/4607 (97%) étaient de nouveaux cas. Les hommes représentaient 2679/4607 (58%) et leur âge allait de 0,3 à 96 ans. Une TB pleurale 1021/4607 (22%) était la plus fréquente. Le taux de réussite du traitement de la EPTB et de la PTB a été de 72% et 84%, respectivement. La positivité au VIH était élevée parmi les patients atteints de TB disséminée/miliaire (429/779 ; 55%) et de méningite tuberculeuse (242/526 ; 46%). Il est significatif que la TB disséminée/miliaire ($\chi 2$ = 33,53 ; $P < 0,0001$) a augmenté tandis que la méningite TB ($\chi 2$ = 19,43, $P < 0,0001$) a diminué au long de la période de 10 ans. La mortalité des patients EPTB a été associée à un âge croissant (≥25 ans), une forme disséminée/miliaire, à une méningite TB et à la positivité au VIH.

CONCLUSIONS : Il y a une prépondérance masculine à la fois de la EPTB et de la PTB au Ghana. Un âge croissant, une forme disséminée/miliaire, une méningite TB et le VIH sont des facteurs de risque de mortalité pour les patients EPTB. Ceci met l'accent sur le besoin d'éducation du public relative aux facteurs de risque et aux stratégies de prévention.

Public Health Action (PHA) welcomes the submission of articles on all aspects of operational research, including quality improvements, cost-benefit analysis, ethics, equity, access to services and capacity building, with a focus on relevant areas of public health (e.g. infection control, nutrition, TB, HIV, vaccines, smoking, COVID-19, microbial resistance, outbreaks etc).