Clinical Presentation, Demographics and Outcomes of Cases of Tuberculosis at Princess Margaret Hospital, Nassau, The Bahamas 2014–2016

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ABSTRACT

Objectives: To determine incidences of cases, demographics, clinical presentation, diagnostic methods and outcomes of cases of tuberculosis (TB) in The Bahamas, 2014–2016.

Methods: A retrospective chart review of cases of Tuberculosis diagnosed at the Princess Margaret Hospital, Nassau, The Bahamas. One hundred and eighty-nine cases of active tuberculosis diagnosed between 2014–2016 and all cases were evaluated for demographics, risk factors, clinical manifestation, method of diagnosis, symptoms and treatment outcomes

Results: Of the 189 cases of notified tuberculosis between 2014–2016, 46 cases were reported in 2014, 60 cases in 2015 and 83 cases in 2016. The mean age was 37.96 (± 18.20) years old. One hundred and sixty-four (86.8%) presented with symptoms, 19 (10.1%) were diagnosed by routine screening and 6 (3.2%) cases were diagnosed by contact tracing. One hundred and nine (59.9%) were HIV negative and 73 (40.1%) were HIV positive. One hundred and forty-four (76.2%) presented with cough, 84 (44.7%) weight-loss, 80 (42.3%) fever, 44 (23.3%) night sweats, 43 (22.8%) chills, 32 (16.9%) fatigue and 25 (13.2%) hemoptysis. One hundred and twenty-six (66.7%) completed the full course of antibiotic therapy, 29 (15.3%) patients expired before completing treatment and 18 (9.5%) of patients defaulted.

Conclusions: HIV is a major risk factor for Tuberculosis in The Bahamas and it is advised that all patients diagnosed with TB be tested for HIV. We also advise screening HIV positive patients for TB. Beneficially, screening other high risk groups such as migrant populations would also reduce the amount of latent TB cases which may progress to active TB.

Keywords: Clinical presentation, treatment outcome, tuberculosis, The Bahamas

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INTRODUCTION

Tuberculosis (TB) is one of the oldest diseases known to man, yet the World Health Organization (WHO) reports that Tuberculosis is one of the top ten causes of death worldwide. (1). Despite research efforts and numerous initiatives to control the disease, Worldwide, TB has resulted in the death of 1.8 million people and 10.4 million new cases in 2015 (1). The Bahamas which is considered a country of intermediate burden for TB has not been exempted from this public health issue. According to the World Bank, the incidence of tuberculosis in The Bahamas for 2015 was 18 per 100 000 persons and over the past ten years has fluctuated from 21 per 100 000 in 2006 to 9.9 per 100 000 in 2012 (2). Various factors have made the eradication of tuberculosis in The Bahamas difficult such as high rates of HIV-infection and immigrants migrating from countries with high TB prevalence. In understanding the epidemiology and risk factors of TB cases in The Bahamas, the development of protocols can improve screening procedures and decrease disease burden.

METHODS

This study was a retrospective chart review conducted at the Princess Margaret Hospital (PMH), Nassau, The Bahamas. Ethical approval was given by the local Ethics Committee. Data was collected from the patients' medical records in the medical records department as well as the admissions log book at the PMH Chest Clinic. Here, 189 cases of active tuberculosis diagnosed at PMH between 2014─2016 and all cases were evaluated. Cases of TB are defined as patients who presented with clinical and/or radiologic signs suggestive of TB for who the clinical decision was made to treat with standard anti-TB therapy regardless of *Mycobacterium tuberculosis* culture

positivity.

Variables extracted for analysis included age, gender, year of diagnosis, nationality, HIV status (including CD4, viral load and medication history of HIV positive patients), street address (for GPS mapping), risk factors (diabetes mellitus, cigarette smoking, alcohol (ETOH) use, history of travel to an endemic area, ill/TB contact), clinical manifestation, method of diagnosis, symptoms, radiologic findings and tuberculin skin test results.

Data was inputted into a spreadsheet and imported into a current version of the IBM SPSS Statistics application software for descriptive and inferential data analysis.

RESULTS

There were 201 cases of tuberculosis reported in The Bahamas between 2014 and 2016 and 189 of these cases were reported at the PMH, Nassau, The Bahamas. Eleven other cases were reported at Doctors Hospital, Nassau, The Bahamas and RAND Memorial Hospital Freeport, The Bahamas. Of note, 46 cases were reported in 2014, then 60 in 2015 and 83 in 2016. Each incidence per 100 000 for these years was 12.5, 16.1 and 22.0 cases per 100 000, respectively.

Demographics and risk factors are summarized in Table 1.0.

Table 1 Sociodemographic profile and risk factors of study participants

Parameter	**n (%)**	**Parameter**	**n (%)**
Age (years)		**Gender**	
< 20	33 (17.5)	Male	106 (56.1)
20-40	65 (34.4)	Female	83 (43.9)
40-60	70 (37.0)	**HIV**	
> 60	21 (11.1)	Status known	182
Mean (SD)	37.96 (± 18.20)	HIV Negative	109 (59.9)
Nationality		HIV Positive	73 (40.1)
Bahamian	115 (60.8)	Status not known	7
Foreign Born	74 (39.2)	**Diabetes Mellitus**	18 (9.7)
Haitian	67 (35.4)	**Cigarette Smoker**	35 (18.5)
Jamaican	5 (2.6)	**ETOH use**	24 (12.7)
Other	2 (1.1)	**Travel to Endemic area**	14 (7.4)
		Ill/ TB contact	24 (12.7)

Method of diagnosis

Of the 189 cases in this study, 164 (86.8%) presented with symptoms, 19 (10.1%) of the cases were diagnosed by routine screening and 6 (3.2%) by contact tracing.

Clinical Presentation

In this study, 182 (96.3%) had Pulmonary TB and 7 (3.7%) patients had extra-pulmonary manifestations of TB; 4 TB lymphadenitis, 2 TB meningitis and 1 Disseminated TB. clinical presentation ranged from six symptoms to none of the typical symptoms for tuberculosis. Table 2 summarizes frequency of symptoms as well as the number of presenting symptoms of patients. The median number of symptoms was 2 (IQR: 1, 4).

Table 2: Frequency and number of symptoms in the study's participants.

Symptom	**n (%)**	**Number of symptoms**	**n (%)**
Cough	144 (76.2)	0	30 (15.9)
Weight loss	84 (44.7)	1	28 (14.8)
Fever	80 (43.3)	2	49 (25.9)
Night sweats	44 (23.3)	3	33 (17.5)
Chills	43 (22.8)	4	21 (11.1)
Fatigue	32 (16.9)	5	25 (13.2)
Hemoptysis	25 (13.2)	6	3 (1.6)

Treatment Outcomes

Of the 189 cases studied, 126 (66.7%) completed the full course of antibiotic therapy for TB, 29 (15.3%) patients expired before completing treatment, 18 (9.5%) of patients defaulted from treatment. Four (2.1%) of the cases were reported to have returned to their home country before

completing treatment, 1 (0.5%) patient was still receiving antibiotic therapy due to MDR TB and treatment outcome was not found for 11 (5.8%) patients.

GPS Mapping of Cases

Coordinates of cases from New Providence were plotted on google map using GPS visualizer website and are seen in Figure.

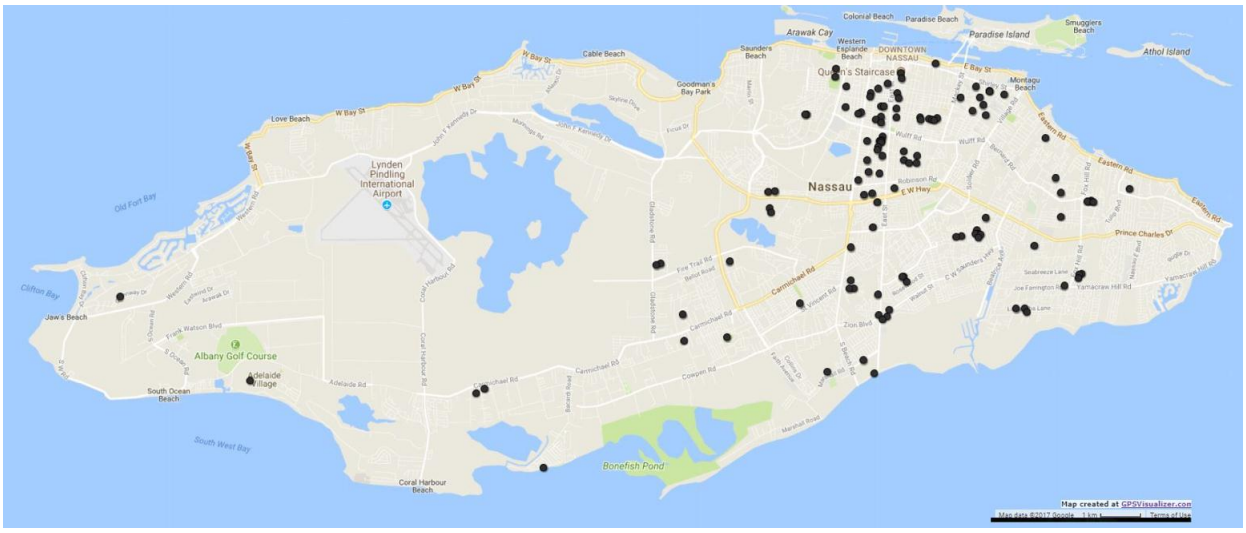

Fig. 1: GPS Mapping of cases of TB 2014─2016 in New Providence, The Bahamas.

DISCUSSION

There were 106 (56.1%) males and 83 (43.9%) females in this study. Other studies reviewed also demonstrated a male predominance ranging from 53.8─77.3% (3–10). In these studies it was suggested that males may have a higher rate of TB infection due to increase prevalence of risk factors such as smoking and HIV coinfection. This study showed that it was statistically significant that males were more likely to present with having a history of cigarette smoking ($p < 0.001$), ETOH abuse ($p < 0.001$), and night sweats ($p = 0.028$).

The mean age of the 189 cases was 37.96 (± 18.20) years old. One hundred and thirty-five (71.4%) of the patients in this study were in the young and middle age group ages 20–59. There were fewer cases seen in the < 20 and > 60 population. Here, 33 (17.5%) cases were < 20 years and 21 (11.1%) cases were ≥ 60 years of age. In this study, some statistically significant factors that likely contribute to this include HIV positivity, having Diabetes Mellitus, having an ill/TB contact and a history of consuming > 40 g of ETOH per day with the mean ages being 42.64 (± 1.67) years, 51.44 (± 2.70) years, 28.50 (± 4.47) years and 45.13 (± 3.02) years, respectively. With respect to nationality it was shown that 115 (60.8%) patients were Bahamian and 74 (39.2%) were foreign born with the majority of the foreign-born patients being form Haiti. Immigrant populations have been regarded as potential carriers of diseases depending on the prevalence of the disease within the country of origin. In some countries such as Switzerland and United States of America it was reported that the majority of patients reported to have TB were foreign born being 74% (9) and 51.2% (11), respectively. Where as in other report which evaluated 58 008 cases of TB in the European union showed that in 2014, 27% of cases of TB were from patients of foreign origin which was a 7% increase from 2005 (12).

In this study 18 (9.7%) patients were documented to be diabetic. Diabetes mellitus is considered a risk factor for tuberculosis due to its suppressive effects on the immune system (13). A population based study in the United Kingdom found DM to be an independent risk factor for tuberculosis with the prevalence of 16.5 in diabetics and 13.5 in non-diabetics per 100 000.**Error! Bookmark not defined.** A study by Magee *et al* the prevalence of DM was 11.6% [of 318 patients] (7).

In this study HIV status for 182 (96.3%) of patients was documented. This was a significant number considering that in other studies that were reviewed, the HIV testing rate for patients with

TB ranged from 38.1−87.1% (5, 14−16) and 73 (40.1%) of the 182 patients tested in this study were HIV positive. Numerous studies assessed TB-HIV coinfection rates and these percentages varied. Gao *et al* did a systematic review and meta-analysis of "Prevalence of TB/HIV Co-Infection in Countries Except China". They evaluated 46 studies with a combined population of 272 466. The estimated prevalence of TB/HIV coinfection ranged from 2.93% to 72.34% (17). In this study, the most common symptom was cough (76.2%), followed by weight-loss (44.7%), fever (42.3%), night sweats (23.3%), chills (22.6%) fatigue (16.9%) and hemoptysis (13.2%). It was noted that most patients presented with three signs/symptoms (25.9%) and 30 (15.9%) of the cases did not present with any of the classic signs/symptoms of tuberculosis. In various studies that were reviewed, cough was the most common complaint ranging from 46.7−100% (8, 10, 18). In other studies the frequency of other symptoms were varied, in one study of 372 patients night sweats was seen in 127 (34.1%) and fever was seen in 123 [33%] (10). In another study by Rathman *et al* of 340 patient's frequency of symptoms reported included cough (100%), weight-loss (97.4%), fever (94.4%), night sweats (77.9%) and hemoptysis [35.9%] (8).

In this study, of the 189 cases 66.7% complete the full course of treatment, 15.3% expired before completing treatment and 9.5% of patients defaulted. It should be noted that for expired patients it was not specified whether cause of death was due to tuberculosis or other causes. Faustini, Hall and Perucci conducted a systematic review of TB cases in Europe to assess outcomes. They reported that of 26 studies reviews 74.4% of cases had a successful outcome, 12.3% of cases had an unsuccessful outcome (treatment failure, defaulters, lost to follow-up, transferred-out) and 6.8% of patients died (19). Antoine evaluated outcomes for TB cases in France for 2009. Outcomes were available for 2316 out of 3667 cases; they reported successful treatment for 70% of cases. The remaining 30% who did not complete treatment 32% died, 32% were lost

to follow-up, 17% transferred out, 14% were still receiving treatment and 5% had treatment stopped prior to completion (20).

CONCLUSION

This study shows that HIV remains to be a major risk factor of Tuberculosis in The Bahamas and it is advised that all patients suspected or diagnosed with TB be tested for HIV as well as screening HIV positive patients for TB. In addition, screening other high risk groups such as migrant populations would also be of benefit to reduce the amount of latent TB cases which may progress to active TB.

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Author Contributions

JH M^{c}Intosh conceived paper, collected data, conducted data analysis and interpretation, wrote manuscript and approved final version. KM Moss provided oversight to study, participated in study design, data interpretation and revision of manuscript, and approved final version. NM Forbes participated in study design, data interpretation and revision of manuscript, and approved final version. MA Frankson participated in study design, data analysis and interpretation, critically revised manuscript and approved final version. The authors declare that they have no conflicts of interest.

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