Clinical Presentation of Childhood Tuberculosis in a Nigerian Hospital: What Are The Implications?

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Abstract

The difficulty with diagnosis of Tuberculosis in children is well known. However, there have been advances in various diagnostic techniques for tuberculosis. Despite improved multiple approaches used for diagnosis of paediatric tuberculosis, estimates point to many undetected childhood cases. With advancement in diagnostics, the expected better case detection in paediatric tuberculosis can be realised only if patients present early at appropriate points for care. This prospective study is aimed at investigating clinical presentation, interventions sought and diagnosis between January 2014 and December, 2015 among 70 children with tuberculosis. The age range of patients was 3 months-17 years with mean age of 6.7 years (SD 4.2 years); 5-9 years old were 30 (42.9%); cough in 61.4%, fever in 44.3% and weight loss/failure to thrive in 41.4% were the three major symptoms found. Chest X-ray showed abnormalities in 60 (85.7%), 22 had reactive Mantoux tests, and 13 had Acid-Fast Bacilli seen; 62 (88.6%) presented to a patent medicine vendor or shop owner, 40 (57.1%) went to private facilities. Average duration of symptoms was 5.2 months. Pulmonary Tuberculosis was the commonest form of disease seen. and the mortality rate was 7.1%.

Widening the net of those who are involved in the tuberculosis care will be required if more cases are to be detected. Engaging those who are frequently consulted is necessary so that people can be referred to where tests and care are available. The patent medicine vendors, pharmacy shop-owners as well as private hospital/clinic owners need to be strategically engaged in our setting as they are frequently consulted by the people.

Key words: Tuberculosis, children, case detection

Introduction

According to World Health Organization (W.H.O) about 1 Million children below 15 years suffer from tuberculosis (TB) globally and 136,000 die from the disease annually. An estimated 67 million children worldwide have latent TB and 850,000 go on to have active disease every year.[1] Nigeria is the third highest burden country with respect to TB and 15-20% of the cases are expected to be in children.[1] According to the National TB control programme (NTCP) data, over 5,000 childhood TB cases were notified in 2014 representing just 6% of notified cases.[2] This is an indication that many cases of childhood TB are still being missed and never reach treatment points. The National Strategic Plan for TB, 2015-2020, has a goal to ensure universal access to high-quality patient-centred TB prevention, diagnosis and treatment services.[3]

The challenges of childhood TB stems mainly from the difficulty with diagnosis. Many childhood diseases and disorders- e.g. pneumonia, malnutrition, HIV infection, have clinical similarities with TB.[4,5] Furthermore, obtaining appropriate specimens for microbiologic testing is difficult and the yield from such testing is low. Gastric aspirate for AFB testing yields the organism in about 30% of cases only. In addition, there is no gold standard for the diagnosis of TB in children.[4-7] In order to improve case detection, there has to be an increase understanding of the clinical presentation as well as investigation findings in patients with TB. Symptom-based approach and other diagnostic tests have been used for more than a decade. This multiple approach to diagnosis is emphasized in the International Standard for TB Care (ISTC).[8] These approaches have not increased case detection. This study was therefore designed to provide an understanding of symptoms, point of presentation (s) before our centre and methods of diagnosis in children with TB. The hypothesis is that using this information will help improve case detection and management.

In a prospective cross-sectional study over a period of two years in the University of Ilorin Teaching Hospital, socio-demographic data, symptoms, points where patients went seeking for interventions before presentation and investigation findings were documented for patients diagnosed and managed for TB. The centre has a Directly Observed Treatment, Short-course (DOTS) centre linked to the National Tuberculosis Programme. Investigations and treatment for TB are free for patients but screening of contacts attracts charges.

Materials and methods

This was a prospective cross-sectional study among all patients with tuberculosis managed in the

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paediatric Pulmonology and Infectious diseases unit of University of Ilorin Teaching Hospital (UITH). University of Ilorin Teaching Hospital is a tertiary centre located in Ilorin East Local Government Area of Kwara State, Nigeria. The centre has a DOTS facility and provides care for adults and children with TB. The study followed ethical standard for biomedical researches as contained in Helsinki Declaration.

Between January 1st, 2014 and December 31st, 2015 using a study proforma, data was prospectively collected on socio-demographics, clinical symptoms, immunization status, history of contact, intervention points before presentation, investigations, diagnosis, and HIV status of the child. Oyedeji scheme for social classification was used to assign all patients into one of 5 social classes.[9] Classes I and II were put together as high; class III middle; and classes IV and V belonged to the low social class.

Diagnosis of tuberculosis was based on one or more of the following: identification of acid fast bacilli (AFB) in specimens from patients; other bacteriologic identification of mycobacterium tuberculosis (GeneXpert and culture were not available at our centre at the time of the study); chest and or other radiologic investigations that are consistent with TB; evidence of caseous necrosis and granulomatous changes on histology; clinical features suggestive of TB and response to anti-TB. All patients were screened for HIV.

All patients in the study received anti-tuberculosis therapy according to the NTCP guidelines using the fixed dose combination (FDCs). Pulmonary TB and other extrapulmonary forms except meningitis and osteoarticular disease received treatment for 6 months (2RHZ +E)/ 4(RH). The treatment for meningitis and osteoarticular disease has the continuation phase prolonged to 10 months. Drug dosages for FDC are R 10-20mg/kg; H 7-15mg/kg; Z 30-40mg/kg and E 15-25mg/kg.[10] All patients were followed up through the clinic until completion of therapy, death, transfer or loss to follow-up.

Data was entered into a microcomputer and analysis was done using SPSS version 20.0. Simple frequency counts and proportions were generated. Means and standard deviations were calculated. Appropriate cross-tabulations were done between variables and results displayed using appropriate tables.

Results

Socio-demographic variables

Over the two year period a total of 70 patients were diagnosed with tuberculosis from our unit. The total number of patients seen by the unit over the period was 242, thus TB patients were 28.9% of all those managed in the unit. The age ranged from 3months to 17 years with a mean age of 6.7 (SD 4.2) years. The age distribution of patients was as follows: 0-4 years, 22 (31.4%); 5-9 years, 30 (42.9%); ⩾10 years, 18 (25.7%). Males were 32 (45.7%) and females 38(54.3%). Social class distribution into the classes was thus: low, 48 (68.5%); middle, 16 (22.9%); high, 6 (8.6%). A total of 5 deaths with a case fatality of 7.1% occurred; 62 (88.6%) completed treatment and 1(1.4%) was transferred to another centre; 2 (2.9%) were lost to follow up over the 2 years. Table 1 contains socio-demographic information of the 70 patients.

Symptoms at presentation

A total of 13 main symptoms were found at presentation. Cough, fever, weight loss/failure to thrive, difficulty in breathing, fast breathing, night sweats, production of sputum, haemoptysis, back

Table 1: Socio-demographic variables of the TB cases

Age distribution	No. (%)
0-4 years	22 (31.4)
5-9 years	30 (42.9)
=10 years	18 (25.7)
Total	70 (100.0)
Sex distribution	
Male	32(45.7)
Female	38(54.3)
Total	70 (100.0)
Social classes	
Low	48 (68.5)
Middle	16 (22.9)
High	6 (8.6)
Total	70(100.0)

Table 2: Symptoms among TB cases

Symptoms	**No. (%)**
Cough	43 (61.4)
Fever	31 (44.3)
Weight loss /failure to thrive	29 (41.4)
Difficulty in breathing	15 (21.4)
Fast breathing	7 (10.0)
Night sweats	5 (7.1)
Production of sputum	16 (22.9)
Haemoptysis	7 (10.0)
Back swelling	7 (10.0)
Neck swelling	5 (7.1)
Abdominal pains	2 (2.9)
Generalized lymph node swelling	4 (5.7)
Abdominal swelling	3 (4.3)

Table 3: Investigations and Diagnosis

Diagnosis (N-%)	Investigation results						
	CXR findings present	Mantoux reactive	Sputum/gastric aspirate AFB present	Histologic changes present	Other X - rays/USS	HIV	Liver enzymes deranged
PTB (43-61.4)	43	12	8			4	12
Miliary TB (2-2.9)	2	-	1		2	1	1
Disseminated TB (11 - 15.7)	11	5	3		4	1	8
TB spine (7-10.0)	2	3		1	7		
TB adenitis (5-7.1)	2	1		5	5		
Abdominal TB (2-2.9)	nil	1	1	1	2		1
Total (70-100.0)	60	22	13	7			22

swelling, neck swelling, abdominal pain, generalized lymph node swelling and abdominal swelling. The duration of symptoms ranged from 3 weeks to 19 months with an average of 5.2 months. The top five symptoms among patients were as follows: cough, 61.4%; fever, 44.3%; weight loss/failure to thrive, 41.4%; production of sputum, 22.9%; difficulty in breathing, 21.4%. Seven patients, 10%, presented with haemoptysis. Table 2 shows the frequency of occurrence of these symptoms in the cases.

BCG vaccination status

Thirty-seven (52.9%) had received BCG and had BCG scar or certificate; the immunization status was unknown in 7(10%), and 26 (37.1%) were not immunized.

Contact history

Seven patients, 10%, were referred to our unit from the adult pulmonology unit as contacts of adult cases. Six (8.6%) others also had history of contact obtained. Ten (14.3%) of the contacts were household contacts. Ten (10) of the contacts were 0-4 years of age, while others were 5-9 years.

Intervention points before presentation

All the patients went seeking care in one or more points before presentation. Sixty-two (88.6%) attended a patent medicine store or bought one or more drug from a patent medicine vendor. Forty (57.1%) went to a private hospital and 21 (30.0%) went to a lower level health centre. Home remedies were used by 33 (47.1%) and 21 (30.0%) also bought herbal concoction from hawkers.

Investigations and diagnosis

Sputum/gastric aspirate/cerebrospinal fluid (CSF)

Thirty-three (33) sputum specimens were collected from 16 patients. Eight (24.2%) were AFB positive.

Fifty-two patients had 100 gastric aspirate samples sent. Five (5%) were AFB positive. Thirteen (18.6%) had AFB seen on microscopy for sputum and gastric aspirate. The two CSF samples sent to the laboratory yielded no AFB.

Mantoux test

Forty-two (60.0%) had mantoux done. Twenty-two (52.4%) were reactive. Six (6/37=16.2%) patients who received BCG were non-reactive.

Imaging studies

Chest radiograph was taken in all patients. Chest X-ray findings included bilateral patchy opacities, 42 (60%), consolidation, 15 (21.4%), hilar adenopathy, 21 (30%), apical consolidation, 15 (21.4%), pleural effusion, 4 (5.7%), pleural effusion with bronchopleural fistula, 1 (1.4%), lung fibrosis, 2 (2.9%), cavitations, 9 (12.9%). Sixty (85.7%) patients had one or more chest X-ray findings. One patient had pericardial effusion. CX-ray was reported as normal in 10 (14.3%) patients. Other investigations done were vertebral X-ray in 7, neck X-ray in 7 and abdominal ultrasonography in 6 patients.

Erythrocyte sedimentation rate (ESR)

ESR ranges between 25-73mm/hr (average 45mm/hr) in 35 (50%) of the patients seen.

HIV testing. This was done routinely for all patients. Only 6 (8.8%) were HIV positive.

Histology

A patient had mesenteric node biopsy because he had surgery for suspected peritonitis. Others had cervical nodes examined. Twelve (12) samples were taken and 7 showed granulomatous changes with caseous necrosis. These constituted 10% of all patients diagnosed. Table 3 shows the methods used in diagnosis and the diagnosis.

Discussion

Tuberculosis (TB) has been a disease of public health importance for more than a century and it remains so today despite medical and technological advancements. The scientific community has in its arsenals answers to the TB scourge. These include preventive and curative interventions.[1, 6,7] Central to TB control and care is detection of cases. Evidence abounds that the paediatric TB cases detected are a tip-of-the iceberg compared to the magnitude of the

problem.[1,2]

The most frequent age group diagnosed in this study was 5-9 years. This is consistent with documentation by other workers and also the NTBLCP.[2,4] The 0-4 year's age group were about a quarter of cases seen. The referral from the adult physicians boosted this group as all the 7 referred were in this age group. The 3 month old (youngest case) was an infant of a diagnosed smear positive TB case who had relapsed. This is an important issue since this age group are usually the least diagnosed and thus form part of the missed cases. In a centre where 424 cases of adult TB were managed over the period of this study (DOTS Unit, UITH), referring 7 cases, and mostly after symptoms had appeared are inadequate. There needs to be a better form of collaboration between the adult physicians, community physicians and the paediatricians caring for TB cases. This will aid contact tracing and detection of both active and latent TB cases among children. Part of this collaboration will be for the NTLCP to hold meetings where all stakeholders in TB can be in attendance to share ideas.

The three top symptoms of cough, weight loss or failure to thrive, and fever are simple enough for health workers at all levels to assess. Appearing together, these symptoms have to be treated with a high index of suspicion as being indicative of TB. When either fever or cough occurs with weight loss, such a patient also needs evaluation for TB. These simple symptoms can be used to improve case detection if the first contacts refer to centres where tests can be done. This is to be irrespective of time frame for symptoms.
The likelihood of those affected not to seek care early at appropriate points is remarkable. Many of the cases seen went to patent medicine stores and vendors for care several weeks before presenting. Private hospitals are the next points where care was sought. These patent medicine vendors and store owners have not been integrated into the TB control programme. If all hands must come on deck to improve case detection, these categories have to be engaged. They can be linked to primary health care centres where they can send patients. The common symptoms of TB are simple enough to be taught to these caregivers. If this is done, the long duration of symptoms before presenting in the hospital will be shortened; more cases will be detected early; and transmission, illness and death can be reduced.

Pulmonary TB was the most frequent form of TB seen among cases and it is not surprising that cough was the most frequent symptom among the cases.[11-14] Disseminated TB was a distant second, followed by TB of the spine and TB adenitis. Abdominal TB and miliary TB cases were the least seen. Pulmonary, miliary and disseminated TB cases can transmit the mycobacterium. Therefore, in tracing contacts, the source of the organism as well as possible persons who could have been exposed need to be traced.[4,5]

Chest radiographs are central to the diagnosis of TB and close to 90% had one or more findings on the investigations. Together with microscopy, even when culture and GeneXpert are not available, these two tests are able to unveil more than 90% of cases. While international standards are desirable, the realities of a weak health system and inadequate equipments and power supply always stare clinicians in the face in our setting. These cases were diagnosed and managed without culture of any sort. Only one patient was sent to a reference laboratory for suspected drug resistance. He came back as negative and later discovered to have asthma. Until Xpert machines become widely available, accessible and universally applicable, the reliance on chest radiographs and microscopy will continue.

There is no doubt that task shifting has to be employed to improve case detection among children. While this may not be popular among paediatricians, it is the reality of our health systems that are weak and have been weakened further by dwindling resources and incessant strikes especially at the secondary and tertiary levels. Other care providers such as the patent medicine vendors/ shop owners, and private practitioners have to be integrated into the TB control network. How and where they will be situated in the network can be worked out programmatically with support of health systems experts.

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