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Clinical and Epidemiological Features of Childhood Tuberculosis in Ibadan

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Summary

Osinusi K. Clinical and Epidemiological Features of Childhood Tuberculosis in Ibadan. *Nigerian Journal of Paediatrics* **1998; 25: 15.** A prospective study of the clinical and epidemiological features of childhood tuberculosis (Tb) in 193 children seen at the University College Hospital, Ibadan, over a four-year period has shown that 43 percent and 46 percent of the patients were in the age groups 1-5 years and 6-10 years, respectively. Although a history of contact was obtained in 21 percent of the cases, only four percent were diagnosed as a result of family contact tracing. The duration of symptoms ranged from nine days to two years with a mean duration of 16 months. The disease was disseminated in 25 percent of cases while localized pulmonary Tb occurred in 42 percent. There was no difference in the occurrence of the severe forms of Tb among patients in whom BCG scars were seen and those who had not received BCG immunization. Chemotherapy default rates were 62% and 36% among patients on standard and short course chemotherapy, respectively. Post-mortem examination showed that 73 percent of 11 patients had the severe forms of the disease namely, meningitic, miliary and disseminated. Our findings indicate that neonatal BCG immunization did not protect against severe forms of tuberculosis while other key control activities were poorly implemented. The high incidence of the severe forms of the disease may not be unrelated to the emerging HIV/AIDS pandemic, hence, routine screening of children with tuberculosis and their family contacts for HIV infection is recommended.

Introduction

IN the last 15 years, tuberculosis (Tb) has re-emerged as a major worldwide public health hazard with increasing incidence among adults and children.[1] The incidence of childhood tuberculosis was reported to have increased by 40 percent in the United States between 1987 and 1993.[2] In addition to a rising incidence, there have been reports [3 4] of changes in the clinical profile and epidemiology of the disease. Factors implicated in these changes include global economic difficulties, HIV/AIDS pandemic, lack of effective national tuberculosis control programmes and increased prevalence of multidrug resistant strains of *Mycobacterium tuberculosis*.[2 5] Although various aspects of tuberculosis have been studied extensively in Nigeria,[6-8] the present study sought to provide some more recent information on the disease. A cohort of newly diagnosed patients with tuberculosis was studied in order to review the clinical and epidemiological features of the disease and highlight some of the problems of management.

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Patients and Methods

Patients seen at the paediatric tuberculosis clinic or admitted into the paediatric wards at the University College Hospital, Ibadan, with the diagnosis of tuberculosis during the period, February 1988 to March 1992, were studied prospectively. Diagnosis of tuberculosis was based on one or more of the following criteria:

a. Acid fast bacilli identified in direct smears of sputum and/or gastric washings.
b. *Mycobacterium tuberculosis* cultured from sputum, gastric washing, pleural fluid,

ascitic fluid or cerebrospinal fluid.

c. Granulomatous lesion with caseous necrosis found on histological examination of aspirate or biopsy of lymph nodes.
d. Chest and vertebral column radiographic changes compatible with those of tuberculosis, plus a positive Mantoux test of at least, 10mm in diameter.
e. Clinical and radiological improvement of presenting features on anti-tuberculous drug therapy.

Following diagnosis, the patients were commenced on standard anti-tuberculous regimen comprising intramuscular (im) streptomycin, oral isoniazid and oral thiacetazone daily for 2 months, after which the latter two drugs were continued for 10 to 16 months. A short course regimen was used in patients with the more severe forms (disseminated, miliary and meningitis) of tuberculosis who were able to purchase the drugs; this regimen comprised im streptomycin, oral isoniazid and oral rifampicin daily for 2 months, after which the last two drugs were continued for 4-7 months. Initiation and continuation of therapy were on outpatient basis in most cases. Indications for admission included the presence of associated problems such as anaemia and severe malnutrition; those adjudged to be very ill were also admitted for the initiation of therapy. For those managed on outpatient basis, follow-up evaluation was carried out at two-to-four-weekly intervals depending on the clinical state of the patients. For those who completed the treatment, follow-up was continued for at least, one year after they had been considered cured.

For the purpose of analysis of the results, the following forms of tuberculosis were regarded as being severe: tuberculous meningitis, miliary tuberculosis and disseminated tuberculosis. Statistical analysis where relevant, was by means of the chi square test.

Results

During the study period, 193 children (45 percent males and 55 percent females), were diagnosed as having tuberculosis. The mean age of the patients was 6.3 years (range, three months to 14 years); there were two peaks at five years and 10 years. Two (one percent) of the 193 patients were less than one year old, 43 percent were in the age group, one to five years, 46 percent were in the age group, six to 10 years, while the remaining 10 percent were older than 10 years. Diagnosis resulted from investigation of an ill child in 185 (96 percent) of the 193 cases and from contact tracing of other family members with diagnosed tuberculosis in only 8 (4 percent) cases. A positive history of contact with an adult with tuberculosis was obtained in 41 (21 percent) patients. Contacts identified were mothers (16), fathers (14), grandmothers (8), older siblings (2) and neighbour (1). Actual screening of family contacts of the patients was carried out in only 31 (16 percent) patients with positive results in two instances.

Table 1

Presenting Symptoms in 193 Children with Tuberculosis

Symptoms	*No. of Cases*	*Percent of Total*
Cough	142	74
Fever	129	67
Weight loss/failure to gain weight	120	62
Anorexia	64	33
Swelling of the neck	35	18
Difficulty /inability to walk	10	5
Swelling at the back	8	4
Abdominal swelling	8	4
Abdominal pain	7	4
Lethargy	4	2
Recurrent diarrhoea	2	1
Convulsion	1	0.5

The presenting symptoms (Table 1) to a certain extent, reflected the sites of involvement. Cough, fever and weight loss were the commonest symptoms occurring in 74 percent, 67 percent and 62 percent, respectively. The mean duration of symptoms was 16 months (range, nine days - two years); it was less than three months in only 40 percent and greater than one year in 10 percent of cases. Pulmonary tuberculosis alone was present in 82 (42 percent) cases; 63 patients (33 percent) had extrapulmonay disease involving individual organs, while 48 (25 percent) had disseminated disease (Tabel II) which was considered to be present when the disease affected at least, two different organs simultaneously.[8] Thirty-seven (77 percent) of the

48 children who had disseminated disease, had associated pulmonary disease: thus, 119 (62 percent) had pulmonary tuberculosis alone or in combination with extrapulmonary lesions.

Table II
Specific Clinical Diagnoses in 193 Patients with Tuberculosis

Diagnosis	*No of Patients*	*Percent of Total*
Pulmonary tuberculosis	82	42.5
Tuberculous adenitis	38	19.7
Spinal tuberculosis	13	6.7
Abdominal tuberculosis	10	5.2
Tuberculous meningitis	1	0.5
Miliary tuberculosis	1	0.5
Disseminated tuberculosis	48*	24.9
Total	193	100.0

*This included 3 patients with associated tuberculous meningitis.

There was a history of neonatal BCG immunization in 100 cases, 59 had no immunization and information was not available in 34. Of the 100 who were reported to have been immunized, BCG scar was seen in 68. Table III compares the sites involved by tuberculosis in patients who had BCG scars with those in children who had not received BCG immunization. There was no significant difference in the incidence of the severe forms of tuberculosis between the two groups (P>0.05).

Twenty-five (50 percent) of the 50 patients who had severe forms of the disease and were able to buy the drugs, received short course regimen while the remaining 25 with severe disease and all the 143 with milder forms received standard regimen. Therapy was not directly observed except during periods of admission in 35 patients who were admitted for part of the treatment. They constituted 1.2 percent of total admissions into the paediatric wards during the study period. Seventeen patients comprising 16 on standard regimen and one on short course regimen did not attend for follow-up after the initial diagnosis and commencement of therapy. One hundred and thirty-six (70 percent) patients attended for at least, six months but only 80 (41 percent) successfully completed the therapy, an overall default rate of 59 percent. Further analysis shows that the default rate varied according to the type of therapy received, being 36 percent in those who were receiving the short course and 62 percent in those on standard therapy.

Fifteen patients who were among those admitted, died, giving a mortality rate of 5.7 percent which constituted 1.5% of all paediatric deaths during the study period. Table IV shows the autopsy diagnosis in the 11 patients on whom the examination was performed; four of the 11 had disseminated tuberculosis.

Table III

Comparison of the Types of Tuberculosis in Patients with BCG scars and those who did not receive BCG

Type of Tuberculosis	*Patients with BCG scar (n=68)*	*Patients who had no BCG (n=59)*	*P value*
Pulmonary	35 (52)	23 (39)	0.219
Adenitis	13 (19)	10 (17)	0.932
Spinal	3 (4)	5 (8)	0.471
Abdominal	1 (1.5)	6 (10)	0.249
Meningitis (TBM)	1 (1.5)	1 (2)	1.000
Miliary	-	1 (2)	0.465
Disseminated	*15 (22)	13 (22)	0. 833

*Included 2 patients with TBM
Figures in parenthesis represent percentages.

Table IV

Post-mortem Diagnosis in 11 Patients with Tuberculosis

Age (yrs)	*Sex*	*Post-mortem Diagnosis*
3	M	Tuberculous meningitis with Tuberculoma
4	M	Pulmonary tuberclosis with miliary involvement of the liver
5	M	Miliary tuberculosis
7	M	Gastrointestinal tuberculosis
8	M	Gastrointestinal tuberculosis
9	F	Gastrointestinal tuberculosis
11	M	Disseminated tuberculosis with basal meningitis
11	M	Disseminated tuberculosis
12	M	Disseminated tuberculosis
13	F	Disseminated tuberculosis
13	F	Tuberculous meningitis

Discussion

Although the age range of the patients in the present study was similar to those reported in earlier series, the age of peak incidence and age distribution were dissimilar.[2] It is worthy of note that only four percent of the patients in the present series were diagnosed as a result of family contact tracing while actual screening of family contacts of the patients after diagnosis of tuberculosis was carried out in only 16 percent. These findings indicate that active case-finding through family contact tracing of patients with tuberculosis was poorly pursued. The importance of contact tracing in the control of tuberculosis has been well documented.[10] Investigation of child contacts of adults with tuberculosis is useful in early identification of children with the disease and conversely, investigation of adult contacts of children with tuberculosis may yield valuable information needed to guide therapy of the disease in children.[10] The percentage of patients with the severe forms of tuberculosis in the present study was higher than previously reported from other centres.[11,12] This difference might be due in part, to late presentation of health care facilities. In this connection, it is pertinent to note that the mean duration of symptoms before presentation in this series was, at 16 months, significantly longer than previously reported.[7] Furthermore, although no HIV screening was undertaken in this study, it is conceivable that the relatively high occurrence of the severe forms may also be connected with the HIV/AIDS pandemic since tuberculosis has been reported to be more severe in patients in whom it co-exists with HIV infection.[4,13]

Although the degrees of protection against tuberculosis afforded by BCG vaccination have been reported to vary from 0 percent to 80 percent,[14-16] it is nevertheless, generally believed that the vaccine protects against the severe forms of the disease.[17] The finding in the present study would appear to be at variance with this belief, as BCG immunization did not seem to affect the occurrence of the severe forms of tuberculosis. This finding suggests that there may be a need to review the BCG immunization policy; this would include ensuring that the vaccines used are of adequate potency, as the potency of those available on the international market varies. Recommended vaccine schedules are not identical in various countries, and although the World Health Organisation recommends the administration of a single dose during infancy, repeat vaccination is carried out in some countries.[2]

High default rate was shown to be a major problem of drug therapy in this study, especially among the patients on the standard or "long" therapy. As found in this study, default rate has been reported to be lower in patients treated with short course regimen,[18] which, as recommended by the American Thoracic Society, is known to be effective;[19] this, in combination with directly observed therapy (DOT) improves compliance and reduces the risk of emergence of multi-drug resistant strains of tubercle bacilli.

There is a need to improve the implementation of key tuberculosis control activities. It might be useful to review the BCG immunization policy and ensure contact tracing at no cost to the patients. Although the national tuberculosis control programme has adopted a 4-drug, 8-month regimen,[20] the drugs should be available to patients free of charge and mechanisms put in place for proper treatment supervision to improve compliance and prevent the emergence of multidrug resistant strains of tubercle bacilli. A closer collaboration between the national tuberculosis control programme and the national AIDS control programme is desirable to stem the effect of HIV/AIDS pandemic on the burden of tuberculosis.

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