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Full Length Research Paper

Clinical profile of children presenting with measles in a Nigerian secondary health-care institution

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The prognosis of measles is determined largely by host factors. The objective of this study is to document the clinical profile (host factors) of children presenting with measles in a Nigerian secondary health-care institution. In this case-series study, 77 children with measles (diagnosed clinically), admitted into St Philomena Catholic Hospital, Benin City were recruited over a 4-year period. The age, sex, presenting symptoms/ signs, immunization status, duration of symptoms before presentation, complications and outcome were recorded for each patient according to the month and year of presentation. The relevant paediatric admission registers were examined. Measles accounted for 3.1% of all paediatric admissions. Majority (47.8%) of the cases were presented between the ages of 13 and 24 months. Fourteen of 77 (18.1%) of children with measles were less than nine months old. Seventeen (22.1%) of all cases of measles had been previously vaccinated against measles while the remaining 60 (77.9%) were not. Significantly more cases of measles occurred in the dry season (80.5%) compared to the wet season (19.5%) p< 0.001. Measles occurred most frequently in the month of March. The two main reasons given by mothers for failing to immunize their children against measles were that the child was ill (35.0%) and the child was less than 9 months old (23.3%). Bronchopneumonia (55.1%) and diarrhoea with dehydration (13.0%) were the two leading complications. Disease-specific burden of measles remains high in our communities due to non-immunization status, occurrence of measles in both immunized children and in those less than 9 months old.

Key words: Age, childhood measles, seasonal variation, vaccination.

INTRODUCTION

Worldwide, among the burden of vaccine-preventable diseases, measles ranks first with 38% disease burden (Dubey and Choudhury, 2009).In developing countries, measles is a major cause of childhood morbidity and mortality due to underlying malnutrition and over-crowding (Levin and Weinberg, 2011; Aaby et al.,1983). A rapid increase in measles immunization coverage is known to produce changes in the epidemiology of the disease, indicating that strategies for control of measles may also require constant review (Kambarami et al., 1991; Marufu and Siziya, 2001)

Although population-based prevalence of measles in Nigeria is not known, tertiary hospital-based studies have shown that measles accounted for 1.3 to 5.1% of all paediatric admissions (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya, 1999). The reported case fatality rates for measles varied from 1.9 to 12.4% (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya,1999). All these studies involved tertiary health-care institutions (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya, 1999). Is it possible that the finding from a secondary health-care institution will be different? It has been documented that the outcome of measles is largely determined by the host factors (Lucas ad Gilles, 2003). In this regard, there is the need to study the host factors by examining the clinical profile of children presenting with measles.

The present study sought to document the clinical profile of children presenting with measles in a non-

Table 1. Age and sex distribution of 77 children with measles.

Age groups in months	No. of male	No. of female	Cases both sexes	Percentage
<12	9	12	21	27.3
12 – 23	14	12	26	33.7
24 – 35	5	5	10	13.0
36 – 47	4	1	5	6.5
48 – 59	2	2	4	5.2
60 – 71	1	3	4	5.2
72 – 83	1	2	3	3.9
84 – 95	1	0	1	1.3
≥96	2	1	3	3.9
Total	39	38	77	100

teaching-hospital health facility, specifically:

(i) To determine the frequency of non-immunization in the hospitalized patients.
(ii) To determine the frequency of occurrence of measles among immunized patients.
(iii) To determine the reasons for non-immunization.
(iv) To highlight trend in age of patients and calendar effect. Availability of some of these epidemiological indices will form the basis for planning and executing measles control measures to improve outcome in our society.

MATERIALS AND METHODS

Between 1st January, 2006 and 31st December, 2009, all children presenting at St Philomena Catholic Hospital (SPCH), Benin City with fever, cough, catarrh, conjunctivitis associated with a generalized maculopapular rash and diagnosed clinically by the Medical Officer (confirmed by the Consultant Paediatrician) as measles were recruited into the study. This case-series study was designed to include all children presenting with measles over a 4-year period in the hospital. The study protocol was approved by the hospital authority and an informed consent was obtained from the parents /guardians of each of the children. SPCH is a large secondary health-care institution that provides care for all categories of patients and is centrally located in the capital city of Edo state, Nigeria.

Using an interviewer-administered questionnaire, the following data was obtained for each patient, namely: age, sex, home address, presenting symptoms and signs, immunization status (confirmed by examination of the immunization cards where available), duration of symptoms before presentation, history of contacts and complications. Information on duration of hospital stay and the final outcome (recovery or death) was also obtained. The parents/guardians of each of the patients were interviewed by the author within 24 h of their admission. The weights (using appropriate scale for age) of the patients were recorded at the time of admission. Weight-for-age on the Boston centile charts was used in assessing the nutritional status of all the children presenting with measles. Information concerning the total number of paediatric admissions was obtained by examining the relevant paediatric admission registers. Each patient was treated as deemed fit, depending on his/her clinical status, using chloramphenicol eye drop, antipyretics and intravenous fluid. Vitamin A 100,000 units were administered on Days 1 and 3 to all patients with measles. The patients were reviewed daily and their clinical conditions noted.

In the present study, the seasons were defined as dry season (November to April) and wet season (May to October). Statistical analysis involved calculation of ratios, percentages and confidence intervals. The significance of the differences between two proportions were determined using the Z-test. The level of significance was set at $P< 0.05$.

RESULTS

During the 4-year study period, a total of 2,522 children were admitted into the hospital and typical measles accounted for 77 (3.1%) of these admissions, corresponding to an average of 19 cases per year. The age of the patients ranged between 7 months and 10 years, with a mean of 2.3 ± 1.8 years (95% confidence interval, CI = 1.9 to 2.7). Male-to-female ratio was 1.03:1. Of the 77 children with measles, 14 (18.2%) were less than 9 months old (Table 1). Fifty two (67.5%) of the 77 children with measles lived in the urban areas while the remaining 25 (32.5%) lived in the rural areas. Concerning history of contact with a patient with measles, it was positive in 23 (29.8%) and negative in 54 (70.2%) of cases. The contacts were family members in 19(82.6%) of cases while the remaining four (17.4%) were either a schoolmate or a neighbour. Seventeen (22.1%) of the children with measles had received measles vaccination, while the remaining 60 (77.9%) did not. Figure 1 shows that 80.5 and 19.5% of all cases of measles occurred in the dry and wet seasons respectively Z-statistic = 5.351 $p< 0.001$. The two main reasons given by the mothers for failing to immunize their children were child was ill and child was less than 9 months old (Table 2). However, after the child has recovered from the illness none of the mothers took the child to the immunization centre for measles vaccination because they thought the child has passed the age for administration of measles vaccine. The overall duration of symptoms before presentation in hospital ranged from 2 to 8 days with a mean of 4.9 ± 2.2 days (95% CI = 4.4 to 5.4). The mean duration of

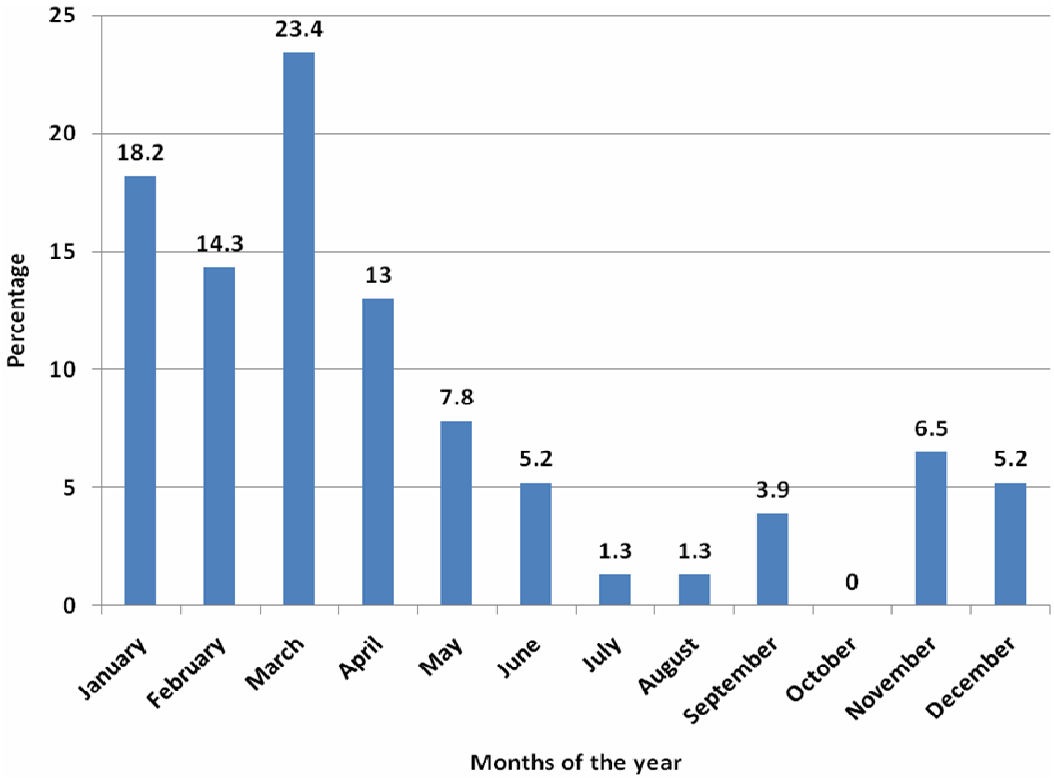

Figure 1. Monthly distribution of 77 children with measles.

Table 2. Reasons given by 60 mothers for failing to vaccinate their children against measles.

Reason	No. of respondents	Percentage
Child was ill[+]	21	35.0
Child was not old enough (< 9 months old)	14	23.3
Non-availability of measles vaccine on the immunization day	7	11.7
No specific reason	6	10.0
Health workers*	5	8.3
Child had a previous measles-like illness	4	6.7
Mother was ill/ bereaved	3	5.0
Total	60	100

+ None of the mothers took their child to the immunization clinic for immunization after child has recovered.* Minor ailment such as cough, catarrh or both wrongly perceived as contraindication by health worker.

individual symptoms at the time of admission were fever 5.4 days, catarrh 5.2 days, cough 5.2 days and conjunctivitis 4.0 days. A total of 6 children with measles died, giving a case fatality rate of 7.8%, with measles accounting for 5.5% (109/2522) of all paediatrc deaths. Bronchopneumonia was the commonest complication (58.0%) as well as the commonest cause of death (66.7%) in children with measles (Figure 2). All the children with measles who died had poor nutritional status (weight-for-age in the third centile or below) and were aged between 7 and 18 months.

DISCUSSION

Measles accounted for 3.1% of all paediatric admissions. This figure is higher than the 2.3% reported in 1998 at the University of Benin Teaching Hospital (Ibadin and Omoigberale, 1998). Similarly, a rise in prevalence of measles has been reported at the teaching hospitals in Calabar (Etuk et al., 2003) and Ilorin (Ojuawo and Bello, 2000). The reason for this finding is not clear. However, in the present study, non-availability of measles vaccine on scheduled immunization day was the reason given by

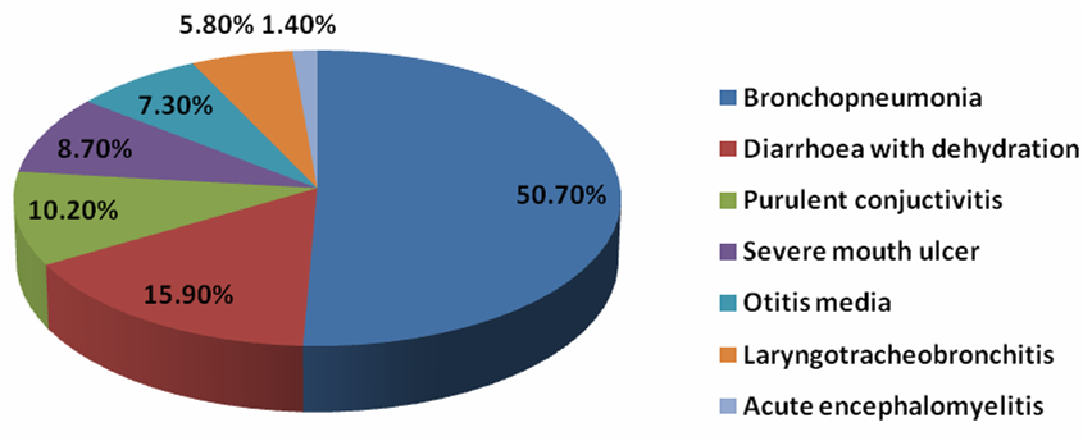

Figure 2. Distribution of complications in children with measles.

mothers in 11.7% of all cases for failing to vaccinate their children against measles. In view of this, it is possible that poor measles vaccination coverage may contribute to the observed increase in prevalence. As in previous studies, (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Ibrahim and Jiya, 1999) the peak age of presentation of measles was in the second year of life. This is in contrast to studies in 1980s in Nigeria (Osinusi and Oyejide, 1986; Ogunmekan et al., 1981; Akande, 2007) which showed that majority of children with measles were aged 12 months and below. The reason for this upward shift in the peak age of occurrence of measles is not entirely clear. The high proportion (18.1%) of infants less than 9 months old who developed measles before they were due for immunization against measles, according to the current national policy, is worrisome. Previous studies in Nigeria (Osinusi and Oyejide, 1986; Ogunmekan et al., 1981; Akande, 2007) have reported a similar finding. A phenomenon attributed to a rapid decline in maternally-acquired antibodies among Nigerian children. The authors postulated that in poor families children acquire many infections, resulting in rapid decline in transplacentally-acquired antibodies (Fetuga et al., 2007). The early age of occurrence of measles poses a serious challenge to measles immunization. The problem is that during this interim period, between the age of six and nine months, the child's measles antibody levels may be high enough to resist current attempts at immunization, but may be too low to provide adequate resistance to natural infection. The clinical implication is that there is the need for evaluation of new methods of measles vaccination among infants less than 9 months old.

Although cases of measles occurred throughout the year, majority (68.8%) occurred during the dry season. An observation that has been previously reported by other investigators in Nigeria (Ojuawo and Bello, 2000; Ogunmekan et al., 1981; Akande, 2007) and Zimbabwe (Kambarami et al., 1991).This seasonal variation in prevalence of measles may be partly explained by the fact that the dry period enhanced droplet transmission and the increased festivities promoted social interaction and consequently, spread of measles. This view was further reinforced by the sharp increase in incidence observed in this study from the month of January following the festivities in the month of December. The implication is that health planners should anticipate increase in number of cases of measles and prepare for their management during the dry season.

The commonest reason given by mothers for failing to immunize their children against measles was that the child was ill at the time he was due. Unfortunately, none of the mothers brought the child for immunization after he has recovered because they believed the child has past the age for administration of measles vaccine. Obviously, there is the need to educate mothers that children older than nine months could still be vaccinated against measles.

In consonance with previous report, (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Fetuga et al., 2007; Audu et al., 2004; Ahmed et al., 2010), 22.1% of children with measles were vaccinated against the disease at the age of nine months but still developed measles. This observation may be accounted for by the low seroconversion rates to measles vaccine among Nigerian children, as reported by Adu et al. (1992) and which they attributed to low vaccine titres. In addition, it has been documented that in some patients transplacentally-acquired antibodies from the mother may persist up to the age of 12 months, (Dubey and Choudhury, 2009) interfering with seroconversion.

Unacceptable high number (77.9%) of children with measles was not vaccinated against the disease in the present study. Similar finding, though with different percentages, has been reported by other investigators (Ibadin and Omoigberale,1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya,1999).

This observation is worrisome in that it further confirms

the persistence of low measles vaccination coverage in our communities. Indeed, a previous study in the same centre had shown that measles vaccine was the most defaulted on among the EPI vaccines (Onyiriuka, 2005).

In the present study, as in previous ones, (Olowu and Obasa, 1991; Ibadin and Omoigberale, 1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya, 1999) bronchopneumonia was the leading complication seen in children with measles. The clinical implication is that special care should be taken to evaluate all children with measles for this complication to reduce further morbidity, and ultimately, mortality. The case fatality rate (7.8%) found in this secondary health-care facility was in tandem with case fatality rates (1.9 to 12.4%) reported from several Nigerian tertiary health-care facilities, (Ibadin and Omoigberale, 1998; Etuk et al., 2003; Ojuawo and Bello, 2000; Ibrahim and Jiya, 1999) suggesting that whether the health facility was secondary or tertiary made no significant difference if the right caliber of health care provider is available.

Conclusion

There is persistence of a high disease-specific burden of measles in our communities due to non-immunisation status and occurrence of measles in both immunized children and those less than 9 months old.

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