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Comparative Analysis of Measles Morbidity and Mortality in Calabar during the Expanded Programme on Immunization and the National Programme on Immunization Eras

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Summary

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Background: In an apparent desire to improve the routine immunization coverage in the country, the Nigerian Government in 1997, launched the National Programme on Immunization (NPI) in place of the existing Expanded Programme on Immunization (EPI).

Aim: The aim of the present retrospective study was to determine whether the desired goal was achieved, by comparing the hospital incidences, morbidities and mortalities from measles infection during the EPI (January 1992 to December 1996) and NPI (January 1997 to December 2001) eras.

Subjects and Methods: The subjects were children admitted with measles infection to the University of Calabar Teaching Hospital, Calabar, during the period. Data were extracted from the relevant case files.

Results: One hundred and twenty cases (representing 24 cases per year), and 36 cases (representing 7.2 cases per year) were admitted during the NPI and EPI eras, respectively ($P<0.001$). Measles contributed 5.1 percent of the total paediatric admissions during the NPI period and 1.5 percent in the EPI period. The incidence of complications (86.6 percent) was significantly higher in the NPI era than that recorded (52.8 percent) in the EPI era ($P<0.001$), with bronchopneumonia being the most common. Measles contributed 5.5 percent to the total mortality during the NPI period with a case fatality rate of 6.7 percent; these were significantly higher ($P<0.05$) than the 0.83 percent and 2.8 percent respectively, obtained in the EPI period.

Conclusion: There was an upsurge in the incidence, morbidity and mortality from measles during the NPI era. Adequate health education, intensification of the National Programme on Immunization, and house-to-house contact for measles vaccination are advocated.

Introduction

MEASLES is an important child health problem and a major cause of morbidity and mortality in sub-Saharan Africa.[1-3] Studies on measles in different parts of the world in the pre-Expanded Programme on Immunization years revealed high incidence and mortality rates.[2,4-6] In 1974, the World Health Organisation (WHO) launched the Expanded Programme on Immunization (EPI),[7] and this witnessed a significant reduction in morbidity and mortality from measles worldwide.[8,9] Nigeria, like most other nations, adopted the EPI programme and formally launched it in 1984.[7] This too, led to a significant reduction in the incidence, morbidity and mortality from measles in the country.[8,9] This was not surprising because along with the EPI programme, was

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the introduction of the Vitamin A Prophylaxis and Oral Rehydration Therapy programmes, while emphasis was placed on appropriate feeding practices.[9-11] In an apparent desire to improve the existing situation, Nigeria shifted emphasis from EPI to a National Programme on Immunization (NPI) in 1997.[12]

With the launching of the NPI, National Immunization Days (NIDs) were created for outreach programmes, in an effort to achieve wider immunization coverage. The procurement of vaccines was taken over from UNICEF by the Federal Ministry of Health; this unfortunately, soon resulted in scarcity and in some cases, non-availability of vaccines.[12] Whether the desired goals of this change have been delivered to the community is yet to be established. In order to determine this, the present study was designed to establish the current incidence, morbidity and mortality from measles infection during the NPI period and compare these with those recorded during the previous five years (January 1992 -December 1996) of the EPI era.

Patients and Methods

Records of all children with measles admitted to the main paediatric ward of the University of Calabar Teaching Hospital from January 1992 to December 2001, were reviewed. Data extracted from the records included age, sex, immunization status, nutritional status, associated complications, details of management and outcome of each child. These children were managed in the measles isolation room. They received prophylactic vitamin A at a dose of 50,000 IU - 200,000 IU, according to WHO recommendation.[13] They were fed with diet from the ward kitchen, while oral rehydration salt solution was given to those with diarrhoea. Other complications were managed according to standard protocol in the department. The total number of admissions to the ward during the period and the total number of deaths were also obtained.

Comparison was made between the data obtained for the period, January 1992 to December 1996 (the EPI period) and that obtained for the period, January 1997 to December 2001, (the NPI period). Level of significance of differences between means was taken as $P<0.05$.

Results

During the EPI period, 2,347 patients, including 36 children with measles were admitted; corresponding figures for the NPI period were 2,376, and 120, respectively. Thus, an average of 7.2, and 24 cases were admitted per year, in the EPI and NPI eras, respectively. Measles contributed 1.5 percent of total admissions during the EPI period, and this was significantly lower than the 5.1 percent in the NPI period ($P<0.001$).

Analysis of the yearly distribution of cases shows that three cases of measles were admitted in 1992; corresponding numbers in subsequent years were seven (1993), seven (1994), 13 (1995), six (1996), 12 (1997), 34 (1998), 26 (1999) 23 (2000), and 25 cases in 2001. The distribution of the cases by age, is shown in Figs. 1 and 2. Twenty-one (58.3 percent), and 28 (23.3 percent) of the respective total number of cases during the NPI and EPI periods, were aged one year and below. Thereafter, the numbers dropped with increasing age

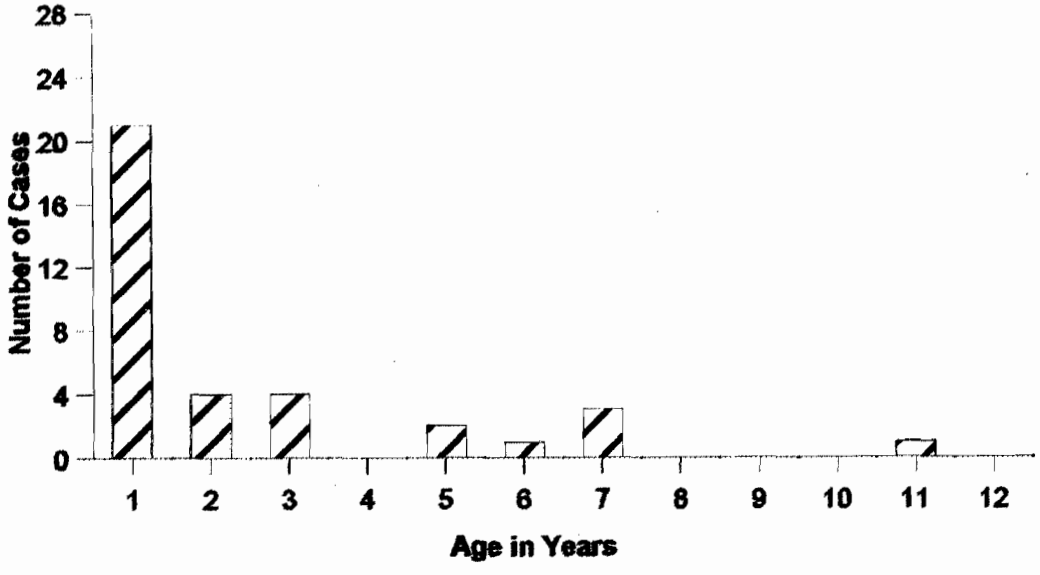

Fig. 1. Age Distribution of Cases of Measles (Jan 1992 – Dec 1996)

Fig. 2. Age Distribution of Cases of Measles (Jan 1997- Dec 2001)

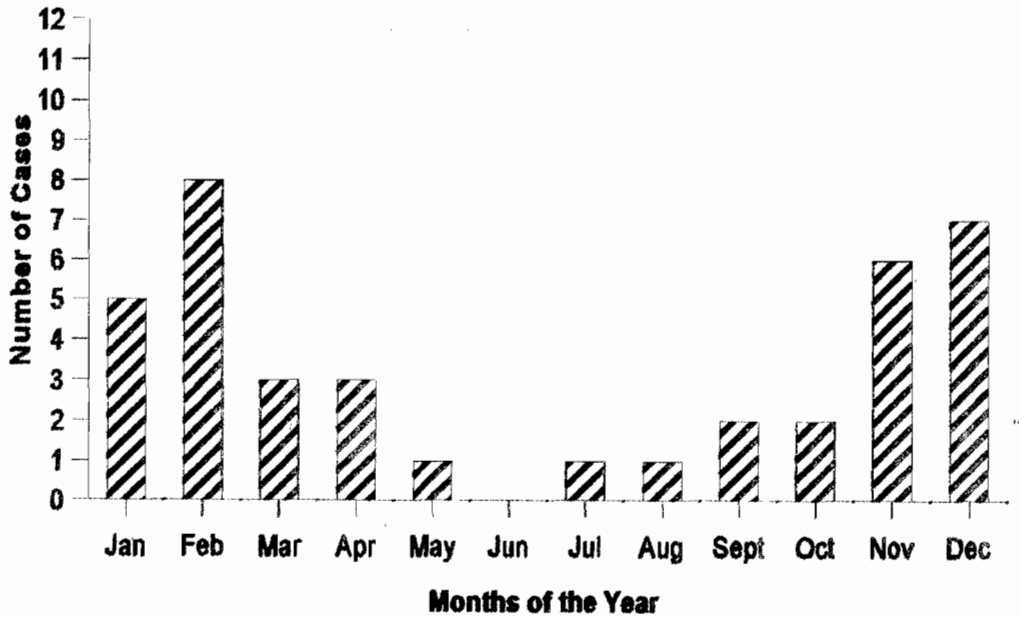

Fig. 3. Monthly Distribution of Cases of Measles (Jan 1992-Dec1996)

in the two groups. Measles was seen throughout the year with peak incidence during the dry season in the two periods (Figs. 3 and 4). Ninety-eight (82.0 percent) of the measles cases were not immunized against measles in the NPI period. The difference was however, not statistically significant when compared with the EPI period. Eleven (35.5 percent) of the children were aged below nine months, and could not be immunized in the EPI period, as against 20 (16.7 percent) in the NPI period.

One hundred and four (86.6 percent) of the patients in the NPI period had complications of measles as compared with a significantly lower percentage (19; 52.8 percent) in the EPI period ($P<0.001$). Bronchopneumonia occurred in 80.8 percent of the patients in the NPI period as against 50.0 percent in the EPI period. No difference was observed with the other complications. Case fatality rates of 6.7 percent and 2.8 percent were recorded in the NPI and EPI periods, respectively ($P<0.05$). Measles contributed 5.5 percent to the total mortality during the NPI period and 0.83 per cent in the EPI period; this difference was significant ($P<0.05$). Table I compares various data obtained for the two periods under study.

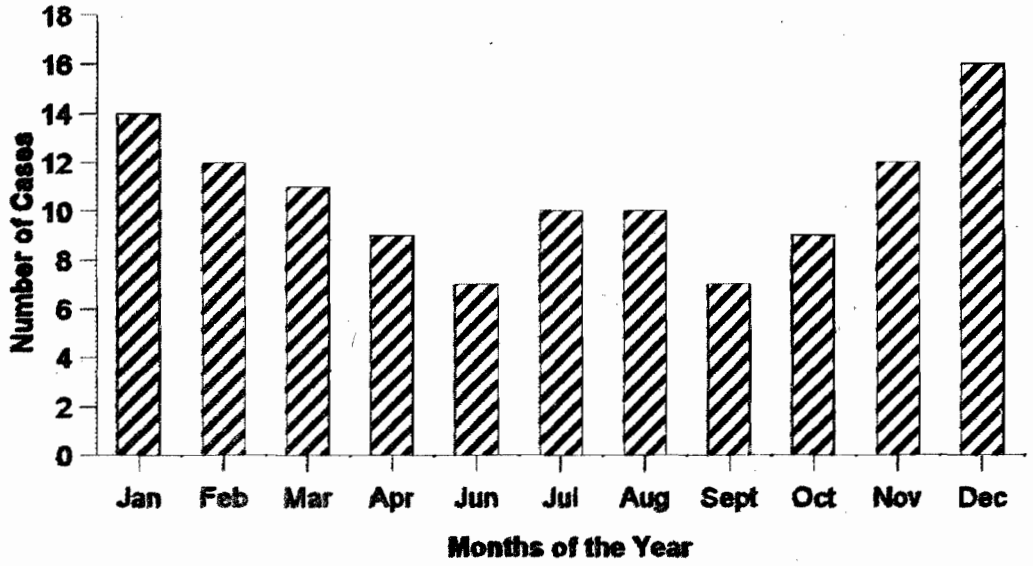

Fig. 4. Monthly Distribution of Cases of Measles (Jan 1997-Dec 2001)

Table 1

Comparison of Immunization Status, Complications and Outcome of Measles Cases during the EPI and NPI Eras

	1992-1996[+] *[n = 36 (%)]*	*1997-2001*[++] *[n = 120 (%)]*	X^2	*P*
Proportions of total admissions	36/2,347(1.5)	120/2,376(5.1)	39.77	< 0.001*
Number immunized	5(13.9)	22(18.3)	0.29	> 0.05
Number not immunized	31(86.1)	98(81.7)	0.01	>0.05
Number aged < 9 months	11(35.5)	20(16.7)	0.01	>0.05
Number aged > 5 years	5(13.9)	17(14.1)	0.001	>0.05
Number with complications	19(52.8)	104(86.6)	14.23	<0.001*
Bronchopneumonia	18(50.0)	97(80.8)	10.65	<0.001*
Dehydration	0	3(2.5)	0.35	>0.05
Laryngotracheobronchitis	0	3(2.5)	0.35	>0.05
Oral sepsis	1(2.8)	5(4.2)	1.66	>0.05
PEM	1(2.8)	5(4.2)	1.66	>0.05
Otitis media	0	2(1.7)	0.17	>0.05
Surgical emphysema	0	2(1.7)	0.17	>0.05
Number of deaths	1(2.8)	8(6.7)	0.78	>0.05
% of total mortality due to measles	1 in 1210.83%	8 in 1455.5%	4.42	<0.05*

[+] EPI period
[++] NPI period
* Statistically significant

Discussion

Measles infection, if controlled in sub-Saharan African, would be a major achievement of the child survival strategy. In the early and mid-90s, Ekanem *et al*,[9] and other workers reported a reduction in the incidence of measles in Nigeria and other parts of the world.[8,9,11,14] The present study has surprisingly shown an upsurge in the incidence of measles and its associated morbidity and mortality in the NPI era. This rise was as high as 70 per cent when compared with the previous report by Ekanem *et al*,[9] from the same institution. Similar increase in incidence has been reported in other parts of sub-Saharan Africa.[11-16] With the launching of the National Programme on Immunization,[12] the procurement of the vaccines

changed hands and became political and bureaucratic resulting in scarcity of the vaccines. A large proportion of the children were therefore, not immunized, resulting in low herd immunity and hence, a comparatively high incidence of measles and its complications. Besides, emphasis was concentrated on polio vaccines during the National Immunization Days (NIDs) when children were immunized at homes schools, churches and markets. Parents assumed that their children were fully immunized and hence, paid no attention to other routine immunizations.

The study also shows that in keeping with findings in other parts of the country,[15,16] bronchopneumonia remains an important complication of measles infection. The high incidence of this complication was aided by the high prevalence of protein energy malnutrition noted in this series. The peak age incidence of measles infection remains at 0-2 years, an observation made by other workers.[6,8,15-17] It is noteworthy that children aged less than nine months were seen with measles; this was also the case in previous studies.[6,8,9,15] The reason that may be adduced for this is the early waning of transplacentally acquired immunity which made the pre-vaccination-age infants more vulnerable. Interestingly too, keratomalacia was not seen among these children; a situation that was probably due to the routine vitamin A prophylaxis practised in this centre.

Measles case fatality rate increased from 2.8 percent in the EPI period to 6.7 per cent in the NPI period. Although this was not significant, it nevertheless, suggests that the improved case management previously in existence had collapsed in view of the prevailing economic circumstances. Measles contributed significantly (5.5 per cent) to the total mortality during the NPI period as against 0.83 per cent in the EPI period. Studies elsewhere have reported similar increase in measles mortality.[14-16] In the present study, this may mean that more severe forms of measles were seen in the NPI period.

The increased incidence of measles along with its associated morbidity and mortality in Calabar, indicates that there may be a loss of the little gains in child survival achieved a few years ago. To reverse this trend, there is need for a restructuring of the National Programme on Immunisation with the aim of improving measles vaccine coverage along with other vaccines. While encouraging home immunization, other routine immunizations including measles, should still be emphasised in order to stamp out all the childhood killer diseases. This underscores the need for a population survey on measles immunization in this environment as this will help determine other interventional measures.

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References

1 Morley DC, Martin WJ, Allen I. Measles in West Africa. *W Afr Med J* 1967; **17**:24-30.

2 Effiong CE. Immediate prognosis of severe cases of measles admitted to University College Hospital, Ibadan. *J Nat Med Ass* 1975; **67**:455-60.

3 Morley DC. Severe measles in the tropics. *Br Med J* 1969; **1**:297-300.

4 Obi JO. Measles in hospital practice in Nigeria. *J Trop Paediatr Environ Child Health* 1979; **25**:30-3.

5 Ogunmekan DA, Braken P, Marshal WC. A seroepidemiological study of measles infection in normal and handicapped persons in Lagos, Nigeria. *J Trop Med Hyg* 1981; **84**:175-8.

6 Asindi AA, Ani OEC. The pattern of measles in Calabar. *Nig J Paediatr*, 1984; **11:** 115-9.

7 Okeahialam TC. Expanded Programme on Immunization as a child survival strategy in Nigeria. In: Proceedings of a National Workshop on pre-service training and child survival strategies (EPI/ORT) in medical schools toward primary health care delivery in Nigeria, PAN/UNICEF, 1986:19-23.

8 Ibia EO, Asindi AA. Measles in Nigerian children in Calabar during the era of Expanded Programme on Immunization. *J Trop Geogr Med* 1990; **42**:226-32.

9 Ekanem EE, Ochigbo SO, Kwagtsule JU. Drammatic decline in measles morbidity and mortality in Calabar, South-Eastern Nigeria. *Trop Doc* 2000, **30**:207-9.

10 Hussey G. Preventing measles deaths. *Child Health Dialogue* 1996:**3-4**:14.

11 WHO. Expanded Programme on Immunization. Meeting on advances in measles elimination : conclusions and recommendations. *Wkly Epidemiol Rec* 1996; **71**:305-9.

12 Julo SA, The State of the Nation. In: The Progress of Nigerian Children, POS/UNICEF, 1996:17-20.

13 WHO. The child, measles and the eye. WHO/EPI/TRAM : 193-5.

14 WHO. Measles. Progress towards global control and regional elimination, 1998-1999. *Wkly Epidemiol Rec* 1999; **74**:429-34.

15 Ibadin MO, Omoigberale AI. Current status of measles in Benin City. *Nig J Paediatr* 1997; **24**:66.

16 Ojuawo A, Bello M Measles in Ilorin. *Nig J Med* 2000: **9**:101-3.

17 Osinusi K, Oyejide CO. Measles at the University College Hospital, Ibadan: an update. *Nig J Paediatr* 1986; **13**:53-7.