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REVIEW OF CHILDHOOD MEASLES ADMISSIONS AT THE NATIONAL HOSPITAL, ABUJA

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ABSTRACT
Background: The global disease burden from measles as a vaccine preventable disease remains high despite decades of interventions by various organs and agencies.

Objectives: To determine the prevalence and outcome of childhood cases of measles admitted into the children's emergency ward of the National hospital and highlight the possible contributing factors.

Design: Retrospective.

Subjects: A total number of 43 children with measles presenting at the National Hospital Abuja, seen over a 40 months period; January 2002 and April 2005.

Methods: Cases-folders of patients seen at the Emergency Paediatric Unit (EPU) of the National Hospital Abuja during the period under review with the clinical diagnosis of measles were reviewed.

Results: The children were aged between seven to 12months, with 25 (58.1%) age 24months and below. Twenty three (53.5%) of the subjects had received prior measles vaccination. History of contact with cases of acute measles was present in 26 (60.5%). Associated protein energy malnutrition (PEM) was found in 30 (69.8%) with 28 (65.1%) parents of these children being of lower social economic classes (III, IV &V).
Recorded complications included gastroenteritis, bronchopneumonia, laryngo-tracheo-bronchitis as part of croup syndrome, tuberculosis, and otitis media.
Three fatalities (7.0%) were record in this review, all in association with bronchopneumonia.

Conclusion: Measles with its complications still present as a fatal illness even among vaccinated children.

Key Words: Measles, vaccinated *(Accepted 30 November 2009)*

INTRODUCTION
Measles, also called rubeola, caused by an RNA virus, remains a highly contagious and fatal disease. With the availability of a safe, effective and inexpensive vaccine for about 40years, measles has remained a major cause of under 5 morbidity and mortality in association with underlying malnutrition and secondary bacterial infections. [1,2]
World Health Organization (WHO) Global burden of disease (GBD) project in 2000, estimated that of 1.7million deaths associated with vaccine preventable disease, measles accounted for 777,000 (46%) of these. [3] Currently numerous outbreak of measles are ongoing world-wide, including an outbreak in Japan, resulting in imported cases into the United State(US). [4] More than 20million people have been reported to get measles each year; of these 345000 were fatal. [4]
The first live attenuated vaccine was licensed for use in the US in 1963, (Edmonston B strain). Currently, the Moraten strain, a derivative of the Edmonston strain, is the only licensed vaccine administered in the United States and other countries, including Nigeria. [5] This vaccine however requires very stringent handling requirements.
Reports from developing countries show that 20-80 percent of children who developed measles had received previous measles vaccination. [6-16]
Vaccine failure (VF) has been implicated as being a possible cause. [15-17] Vaccine failure (VF) could be primary vaccine failure (PVF) or secondary vaccine failure (SVF). Primary vaccine failure (PVF) occurs when the subject does not make detectable antibodies in response to vaccination. This is the case when vaccines are administered at an age when the chances for maternal antibody neutralization are high, as in younger children, mostly below 6 months. Secondary vaccine failure (SVF) results when the subject initially makes detectable antibodies in response to vaccination but these titer fall with time from decline in immunity. [17]

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In Nigeria, the National Programme on Immunization (NPI) recommends vaccination at 9 months. There has being a recent call for immunization at an earlier age of between 4 and 6months with a second dose at 9months.[18] The repeat vaccination helps overcome the chances of maternal antibody neutralization that is associated with too early vaccination. It is therefore important that vaccination should aim to establish a strong sense of cell mediated immunity over a long term.

The National Population Commission (NPC) of Nigeria [13] reported a decline in measles vaccination coverage rate of 31.4 percent by 12months of age for Nigeria children in 2004 compared to a 1995 United Nations children emergency fund (UNICEF) report of 45 percent. [14]

The present report was undertaken to determine the prevalence and outcome of the children admitted with measles into the children's emergency ward of the hospital and to ascertain the possible contributing factors.

SUBJECTS AND METHODS

All patients cases folders from January 2002 to April 2005 with a clinical diagnosis of measles as recorded on the EPU register were retrieved from the hospital records department.

The following information was extracted from the case-folders; age, sex, weight at admission, dates of admission and discharge, immunization and nutritional status, socioeconomic class [19] of parents based on mother's education and occupation with father's occupation, contact history, complications and outcome. Clinical features, that is; fever, conjunctivitis, cough with runny nose (coryza), and the record for typical appearance and distribution of maculo-papular eruptions were noted.

Information relating to complications such as bronchopneumonia, laryngo-tracheobronchitis (LTB), tuberculosis, middle ear infection (otitis media), gastroenteritis, and convulsions were noted.

Data was analyzed using the SPSS version 14 to calculate the Paerson chi-square test and a p value < 0.05 was considered statistically significant.

RESULTS

During the 40- months period under review (January 2002 to April 2005), 2650(4.6%) of the 57574 post neonatal patients seen at the children emergency room were hospitalized. Forty-three of the hospitalized patients had a clinical diagnosis of measles, constituting 1.6% of admitted cases.

The patients with measles were aged seven to 120 months, with a mean

age of 23.4 + 12.11 months. There were 24 (55.8percent) males and 19 (44.2percent) females, with a male ratio of 1.3:1. Twenty five (58.1percent) of the patients were aged 24months and below, with 10 (23.3percent) being 12months and less as shown in Table 1.

Table 2 shows the major symptoms and signs in the study subjects. Fever and typical skin eruptions were present in all patients (100percent), with cough and coryza in 40 (93.0percent), conjunctivitis in 30 (69.8percent), diarrhea and vomiting in 20 (46.9percent), ear discharge and convulsions in 5(11.6percent) and 2(4.7percent) respectively.

More than half, 23 (53.5percent) of patients had received prior measles vaccination, out of which only 13(30.2%) were subjects 24 months and below as shown in Table 3.

Amongst both the vaccinated and unvaccinated subjects, a total of 23 (53.5percent) had a history of contact with measles before onset of illness.

Complications recorded in the subjects included gastroenteritis and bronchopneumonia in 20(46.5 percent) respectively, malnutrition 15 (34.9percent), tuberculosis, LTB and otitis media(OM), 5 each (11.6percent) as shown in Table 4. Both the measles vaccinated and not vaccinated had complications of measles and the distribution of the various complications amongst both groups was not significant. The p value 0.091 as shown in Table 4.

Fifteen (34.9percent) of the malnourished subjects were classified to be underweight as defined by the modified Wellcome trust party classification. [20]

Over 70 percent (31) of the subjects parents' were of socio- economic classes 111, IV and V, while 12 (27.9percent) were in the social classes I and II as shown in Table 5.

Three patients died giving a case fatality rate of 7.0 percent. All three subjects had bronchopneumonia. Amongst these 3 deaths, 2(66.6%) were under 18months old while the third was a 26month old patient. They were all (100%) underweight and 2 (66.6%) of them had prior measles vaccination.

Table 1: **Age and Sex Distribution of Patients.**

Age (Months)	Male (%)	Female (%)	Total %
0-12	6(25.0)	4(21.1)	10(23.3)
13-24	10(41.7)	5(26.3)	15(34.9)
25-36	4(16.7)	4(21.1)	8(18.6)
37-48	2(8.3)	1(5.3)	3(7.0
49-60	1(4.2)	4(21.1)	6(14.0)
61-120	1(4.2)	1(5.3)	1(2.3)
Total	**24 (100.0)**	**19 (100.0)**	**43 (100)**

Table 2: **Distribution of major Symptoms and Signs.**

Symptoms/Signs	No.	Percentage
Fever	43	100
Skin eruptions	43	100
Cough	40	93.0
Coryza	40	93.0
Conjunctivitis	30	69.8
Diarrhoea	20	46.5
Vomiting	20	46.5
Bronchopneumonia	20	46.5
Malnutrition	15	34.9
Ear Discharge(OM)	5	11.6
Convulsions	2	4.7

• Some subjects presented with more than one clinical feature

Table 3: **Distribution of Vaccination Status in Relation to Age.**

Age(months)	N	Vaccinated (%)	Not vaccinated
0-6	0	0(0.0)	0(0.0)
7-12	10	4(40.0)	6(60.0)
13-24	15	9(60.0)	6(40.0)
25-36	8	4(50.0)	4(50.0)
37-48	3	2(66.7)	1(33.3)
49-60	2	2(100.0)	0(0.0)
61-120	5	2(40.0)	3(60.0)
Total	**43**	**23(53.5)**	**20(46.5)**

Pearson chi x2
3.340;10.913 ; P value 0.648

Table 4: **Distribution of various Co-morbidities according to vaccination status.**

	Number of patients N=43		
Complications	No. (% of total)	Vaccinated (%)	Not vaccinated (%)
Gastroenteritis	20(46.5)	12 (60.0)	8(40.0)
B/pneumonia	20(46.5)	5(25.0)	15(75.0)
Malnutrition	15(34.9)	5(33.3)	10(66.6)
LTB	5(11.6)	2(40.0)	3(60.0)
Tuberculosis	5(11.6)	2(40.0)	3(60.0)
Otitis media	5(11.6)	4(80.0)	1(20.0)
Convulsions	2(4.7)	2(100.0)	0(0.0)

• Some subjects presented with more than one clinical feature
Pearson chi x^2 10.913 ; P value 0.091

Table 5: **Distribution of social c lass of parents.**

Social Class	Numbers (%)
I	7(16.3)
II	5(11.6)
III	12(28)
IV	10(23.3)
V	6(14)
Undetermined	3(6.8)
Total	**43(100)**

DISCUSSION

Measles is a contagious, but vaccine preventable disease. In the current review forty three cases of measles were seen over a 40 months period, compared to earlier Nigeria reports from Zaria and Ilorin of 94 cases over a 5months period(1998) and 52 cases over a 12months period(2004) respectively.[10, 11.] The prevalence of measles in this review was less than 2 percent when compared to the recent 10year review from Sagamu, Nigeria (2007), in which measles accounted for 6.1 percent of paediatric admissions.[12] Possible reasons for fewer cases of measles seen could be due to the higher cost of treatment services at the National hospital, hence only those that could afford cost and also as the hospital served as a referral centre. The urban nature of the Federal Capital Territory (FCT) of Abuja, also provided more opportunities for patients to be seen at other health facilities to explain the fewer patients that came for admission compared to the mixed rural-urban cities of Zaria and Ilorin.

The diagnosis of measles was clinical, based on history and physical findings in all cases. Younger aged children from seven to 48months were particularly at risk of acute measles infection and its complication, with those 24months and below even at a greater risks. This is similar to other reports[7-10, 12] where majority of the children were under two years old. Protection from maternally acquired antibodies could explain the absence of children under 6months. However, the Ilorin report[11] showed an upward shift involving mainly those of age 3-5years.

Measles infection among vaccinated children was observed in 53.5% of cases in this review. However the age at which the subjects in this study were vaccinated could not be determined as this information was not recorded. Similar cases of measles in previously vaccinated children has been reported.[6-12,16] Protection against measles with vaccination is effected by a number of factors among which are cold chain that require vaccine storage at 8^{0C}, host immune status, techniques of vaccination, and in the West African sub region,[17] the presence of different strains of measles virus which in effect means the same vaccine may not offer full protection.

Forty six percent of patients in this review did not get prior measles vaccination. Possible reasons for the missed opportunities for vaccination could be due to non-availability of vaccines at health centres, refusal by parents to accept vaccines, refusal of health worker to give vaccination due to febrile illness when child visits health facilities, or just share ignorance on the part of parents and health workers. There is the need for continuous health education of parents and health workers to reduce missed opportunities. The Government and all health care providers should take full responsibilities for making vaccines available, and accessible.

The high contact history is also an indication of the continuing presence in the environment of high disease burden and low herd immunity for measles. Since the year 2000, WHO and UNICEF have recommended that in addition to achieving high coverage with the first dose of measles vaccine, all children be offered a second opportunity for measles vaccination to maximize both individual and population immunity.[18]

This will hopefully present a second chance opportunity for measles immunization for children who did not receive the measles vaccine from routine program and for those who did not develop immunity to measles after the first dose.

Case fatality of measles was associated with complications of bronchopneumonia, malnutrition and amongst younger patients and those whose parents were of lower socioeconomic groups.

It is recommended that continuous surveillance be in place to identify and review reasons for disease burden despite presence of a safe and effective vaccine.

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