

The African Journal of Medicine and Medical Sciences

Editors: T.A. Junaid
O. Bademosi and D.D.O. Oyebola

Editorial Board:

A.K. Addae
S.A. Adebajo
O.O. Adekunle
A. Adeloye
B. Adelusi
A.F. Aderounmu
C.O. Adesanya
A. Adetugbo
A.A. Adeyokunnu
A. Agboola
O.O.O. Ajayi
E.O. Akande
O.O. Akinkugbe
O.O. Akinyemi
T. Atinmo
O. Ayeni
E.A. Ayoola
E.A. Bababunmi
E.A. Badoe
T.O. Cole
O.A. Dada
A.B.O. Desalu

L. Ekpechi
R.A. Elegbe
G. Emerole
J.G.F. Esan
E.M. Essien
G.O. Ezeilo
A. Fabiyi
A.O. Falase
J.B. Familusi
D. Femi-Pearse
K.A. Harrison
P.A. Ibeziako
A.C. Ikeme
A.O. Iyun
F. Jaiyesimi
A.O.K. Johnson
T.O. Johnson
T.M. Kolawole
O.A. Ladipo
S.B. Lagundoye
D.G. Montefiore
E.O. Nkposong

N.C. Nwokolo
H.O. Obianwu
S.A. Oduntan
E.O. Ogunba
O. Ogunbode
M.O. Olatawura
D.A. Olatunbosun
E.O. Olurin
Oyin Olurin
A. Omololu
B.O. Onadeko
G. Onuaguluchi
A.O. Osoba
B.O. Osotimhin
B.O. Osunkoya
B.O. Osuntokun
A.B.O.O. Oyediran
L.A. Salako
T.F. Solanke
O. Tomori
F.A.O. Udekwu
A.O. Uwaifo

Volume 17
1988

BLACKWELL SCIENTIFIC PUBLICATIONS
Oxford London Edinburgh Boston Palo Alto Melbourne

Measles and childhood mortality in semi-urban Nigeria

'DOYIN FAGBULE AND F. ORIFUNMISHE

Department of Paediatrics and Child Health, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Summary

Two hundred and sixty-nine children who presented with measles between April 1983 and March 1986 at the University of Ilorin Teaching Hospital, were studied. The peak age incidence was during the second half of the first year (40.5%). A positive history of measles vaccination was indicated in only 11.5%, and there was no significant difference in the immunization status 18 months pre- and post-Expanded Programme on Immunization (EPI). Respiratory complications accounted for 88.5% of all the complications, and 92.8% of the deaths. Overall mortality was 26%. The majority of deaths (52.9%) occurred in the age group 6-12 months. Lack of vaccination, high vaccination failure rate, early age of contracting the disease, malnutrition, prevalent bacterial infections and a delay in seeking medical attention were the main factors identified as the probable causes of high morbidity and mortality in measles in Ilorin.

Résumé

Cette étude s'occupe des cas de 269 enfants souffrant de la rougeole, qui s'étaient présentés entre avril 1983 et mars 1986 au centre hospitalo-universitaire d'Ilorin. La plus haute fréquence d'incidence en termes d'âge s'est située dans la seconde moitié de la première année (40.5%) des enfants. Les tests de vaccination antérieure contre la rougeole ne se sont avérés positifs que chez 11.5% d'eux et aucune différence significative dans leur status d'immunisation 18 mois avant et après le Programme Etendu sur l'Immunisation (PEI) n'a été constatée. Des complications au niveau du

système respiratoire ont constitué 88.5% de toutes les complications constatées et 92.8% des décès. Le nombre des décès a été de 26%. La majorité des décès (52.9%) s'est située dans le groupe d'âge de 6-12 mois. Le manque de vaccination, un taux élevé de vaccination inefficace, attraper la maladie dans sa première enfance, la malnutrition, des infections bactériennes prévalentes et le retard pour solliciter de l'attention médicale ont tous été identifiés comme étant les causes probables du haut degré de morbidité et de mortalité entraîné par la rougeole à Ilorin.

Introduction

In spite of an improved vaccine, measles remains a major public health problem in developing countries [1,2]. In developed countries, it is now regarded as a minor childhood disease with relatively low morbidity [3,4]. This difference in public health importance is due to prevalent ignorance, malnutrition, lack of immunization and delay in seeking medical attention [4-8] in the developing countries. Recent work in this hospital showed that measles is the third commonest cause of childhood death, accounting for 12.8% of the deaths between January 1983 and December 1984 [9]. This combined retrospective and prospective study was, therefore, conducted to review the pattern of a highly preventable, but major public health problem. An attempt is also made to give a preliminary evaluation of the Expanded Programme of Immunization (EPI), as seen in hospital practice in Ilorin.

Ilorin is the capital of Kwara State, a mid-land state between the generally dry and hot Northern States and the humid Southern States. The Expanded Programme of Immunization (EPI) was launched in Kwara State in October, 1984.

Correspondence: Dr 'Doyin Fagbule, Department of Paediatrics, University of Ilorin, PMB 1515, Ilorin, Nigeria.

Materials and methods

All children admitted to the University of Ilorin Teaching Hospital (UITH) between April 1983 and March 1986 with a diagnosis of measles were included in the study. The 3-year study represents a period of 18 months pre- and 18 months post-EPI. The data collected from case records (April 1983–August 1984) as well as during hospitalization (September 1984–March 1986) included age, sex, address, social class, history of immunization, clinical presentation and degree of severity, complications, duration of hospitalization, and outcome.

Results

Age and sex distribution

In the 3-year study period, there were 9831 paediatric admissions, of which 269 (2.7%) had measles. There were 141 males and 128 females; a male to female ratio of 1.1:1. The children were aged 3 months to 7 years, with a peak (40.5%) in the second half of the first year. The majority (85.1%) were below 2 years and only two (0.7%) were above 5 years.

Immunization status

Thirty-one (11.5%) children had positive evidence of measles immunization, 213 (79.2%) were not immunized, and the immunization status was unknown in 25 (9.3%) children. Table 1 shows a comparison of the immunization status pre- and post-EPI.

Seasonal distribution

There is a peak incidence in April and a smaller

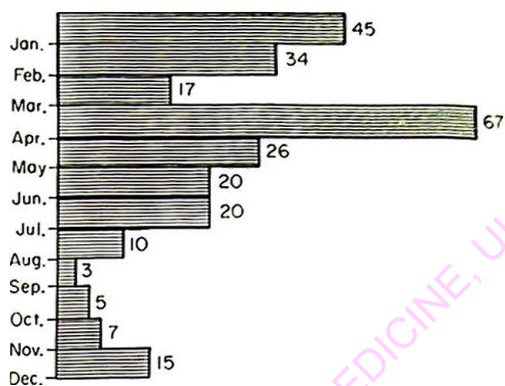


Fig. 1. Seasonal incidence of measles in 269 children.

peak in January (Fig. 1). The period from January to April represents the hot and dry season of the year. There is a low incidence during the rainy season, from August to November.

Severity of infection

The infection was mild in 35 (13.0%) cases, moderate in 140 (44.6%) and severe in 114 (42.4%) cases. Those with uncomplicated measles were considered mild, and those with mild to moderate severity of pneumonia, laryngotracheobronchitis and conjunctivitis were considered to be moderate. Presence of life-threatening complications such as severe pneumonia or laryngotracheobronchitis, heart failure, encephalitis or gastroenteritis with severe dehydration are evidence of severe infection. A positive history of measles vaccination was present in six (17.0%), 15 (12.5%) and 10 (8.8%) of the mild, moderate and severe cases, respectively.

Table 1. Immunization status of 269 children with measles (pre- and post-EPI)

No. children	Pre-EPI	Post-EPI	Total
Immunized	16 (11%)	15 (12.1%)	31 (11.52%)
Not immunized	115 (79.3%)	98 (79%)	213 (79.18%)
Unknown	14 (9.7%)	11 (8.9%)	25 (9.3%)
Total	145 (100%)	124 (100%)	269 (100%)

Complications (Tables 2 and 3)

Pneumonia. This was the commonest complication of measles in this study. It was present in 71.4% of the cases and contributed to 71.4% of the deaths. Seventy-three (38.0%) of the children with pneumonia were admitted with heart failure. Pneumonia developed in the late rash or desquamation stage in all cases. Three children had subcutaneous emphysema concomitant with pneumonia, and two of them died.

Gastroenteritis. Gastroenteritis complicating measles was present in 40.9% of the children, and contributed to 44.3% of the deaths. Twenty-three (20.9%) of the children were severely dehydrated.

Laryngotracheobronchitis. This was present in 17.1% of the children with measles, and contributed to 21.4% of the deaths.

Other complications. Eighty-two (30.5%) patients had purulent conjunctivitis, and two of them had severe keratitis with blindness. Feb-

rile convulsion was present in 19 (7.1%) cases. Severe stomatitis without cancrum oris was present in 14 (5.2%) cases. Thirteen (4.8%) cases of suppurative otitis media were recorded. Severe skin sepsis and encephalitis accounted for 3.3% and 3.0%, respectively. Malnutrition was present in a large number of cases, but severe malnutrition existed in eight cases, all of whom died.

Mortality

There were 70 deaths, giving a case mortality of 26.0%. The majority (52.9%) of deaths occurred in the age group 6–12 months, followed by 13–18 months (22.9%).

Discussion

The study has shown that measles, although

Table 2. Major complications seen in 269 cases of measles

Complications	No. cases	% of total
Pneumonia	192	71.4
Gastroenteritis	110	40.9
Purulent conjunctivitis	82	30.5
Laryngotracheobronchitis	46	17.1
Febrile convulsion	19	7.1
Heart failure secondary to other causes	15	5.6
Severe stomatitis	14	5.2
Otitis media	13	4.8
Encephalitis	8	3.0
Severe keratitis	2	0.7

Table 3. Complications most commonly associated with death

Complications	No. cases	% of deaths
Bronchopneumonia	50	71.4
Gastroenteritis	31	44.3
Laryngotracheobronchitis	15	21.4
Malnutrition	8	11.4
Febrile convulsion	6	8.6
Subcutaneous emphysema	2	2.9

highly preventable, is a major public health problem in Ilorin. The peak age of admissions was in the age group 6–12 months. This follows the pattern of other studies carried out in other parts of Nigeria [5,7,8,10]. Earlier workers in Ilesha [11] and in Ibadan [6] had reported a peak age of admission between 12 months and 23 months. We would agree with Joiner *et al.* [8] that in recent times there seems to be a change in the epidemiology of the infection.

Only 11.5% of our patients had a positive history of measles vaccination, and there is as yet no significant difference between the pre-EPI (11%) and post-EPI (12.1%) immunization status. This is higher than 4.8% reported by Asindi [10]. Williams [12] reported a 20% immunization failure rate from Lagos, while Asuzu & Onadeko [13] reported 30–50% from Ibadan. These figures, as well as ours, raise the possibility of poor vaccine potency and a breakdown in the cold chain, or inappropriate age of vaccination. The Expanded Programme on Immunization (EPI) recommends measles vaccination at 9 months with no booster doses, but we would suggest that local patterns of the disease be taken into consideration to decide on the ideal age of immunization. Future studies would be required to evaluate the effect of the EPI programme on measles infection in Ilorin.

The peak incidence of measles during the hot and dry season of the year is similar to the pattern in other parts of the country [5,7,8,10]. The majority (87.0%) of children had moderate to severe disease, a similar experience with that in Ilesha [8] and Ibadan [5]. The severity of measles is multi-factorial — early age of contracting the infection, prevalence of ignorance and malnutrition, lack of immunization (79% in this study) and an environment that promotes secondary bacterial infection.

Multiple complications were present in many patients, with pneumonia contributing to 71.4% of the deaths. This is higher than 28% and 10% reported earlier [8,11, respectively] from Ilesha, but lower than 80% from Calabar [10]. Recent studies on childhood pneumonia in Ilorin showed that measles is the third commonest morbid condition [14]. The high incidence of pneumonia in the late rash or desquamation phase is similar to reports from Benin [7], where only 5% of the patients had pneumonia in the early stage of the disease. In Calabar [10], 53% of the patients had detect-

able signs of pneumonia early in the disease. Delay in seeking medical attention is a likely explanation in Ilorin and Benin.

Another respiratory complication, laryngo-tracheobronchitis, contributed to 21.4% of the deaths; probable evidence of delay in seeking medical attention. Diarrhoea and vomiting are known symptoms of measles, but could occur as complications associated with dehydration. As a complication, dehydration contributed to a significant number of deaths (44.3%), while in Calabar [10] and Ilesha [8] gastroenteritis made a minor impact on the death rate.

Measles is a major cause of blindness in children in the third world. Animashaun [15] reported 29 cases of blindness secondary to measles, of which 25 (86.2%) were due to severe keratitis. Two children in this study developed blindness secondary to keratitis. In Dakar [16], ocular complications of measles constitute the major cause of blindness in childhood. A similar report from Ibadan [17] showed that keratitis was the commonest cause of blindness, secondary to measles.

Overall mortality of 26.0% is much higher than 2.8% and 10% reported from Calabar [10] and Ilesha [8], respectively, but comparable with 25.3%, 18.9% and 14.4% from Ilesha [11], Ibadan [5] and Benin [7], respectively. Mortality was higher in the second half of the first year of life than at any other period, and the majority of deaths occurred below 2 years. Such high mortality from an otherwise preventable disease calls for more effective strategies of implementation of the EPI programme. A greater public awareness, creation of more EPI centres at primary health-care levels, and an improvement in the cold chain transport are positive steps towards a reduction in morbidity and mortality. Measles vaccination remains the best method of eradicating the disease.

Acknowledgments

We are grateful to Dr M. C. C. Mann for the French translation and Mr 'Kunle Ojo for the secretarial assistance.

References

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

2. Morley DC. Paediatric Priorities in the Developing World. London: Butterworth and Co., 1977.
3. Miller DL. The public health importance of measles in Britain today. *Proc R Soc Med* 1964;57:843-6.
4. Morley DC, Martin WJ, Allen I. Measles in West Africa. *W Afr J Med* 1967;17:24-30.
5. Effiong CE. Immediate prognosis of severe cases of measles admitted to University College Hospital, Ibadan. *J Natl Med Assoc* 1977; 67:455-60.
6. Hendrickse RG, Sherman PM. Morbidity and mortality from measles in children seen at University College Hospital, Ibadan. *Arch Pur Dic Gesamte Virusforschung* 1965;16:27-34.
7. Obi JO. Measles in hospital practice in Nigeria. *J Trop Paediatr* 1979;25:35-8.
8. Joiner KT, Oyedeji GA, Olamijulo SK. Severe measles and its prevention in semi-urban area. *Nig J Paediatr* 1983;10:113-20.
9. Fagbule 'D, Joiner KT. Pattern of childhood mortality in Ilorin. *Nig J Paediatr* 1987; in press.
10. Asindi AA, Ani OEO. The pattern of measles in Calabar. *Nig J Paediatr* 1984;11:115-9.
11. Morley DC, Woodland M, Martin WJ. Measles in Nigerian Children. *J Hyg Cam* 1963;61:115-9.
12. William GA. Measles infection following immunization: a report on forty-nine cases in Lagos, Nigeria. *Afr J Med med Sci* 1971;2:159-63.
13. Asuzu MC, Onadeko MO. Immunization status of children with measles: experience with the Oyo State Expanded Programme on Immunization. *Nig J Paediatr* 1984;11:13-7.
14. Fagbule 'D, Adedoyin MA, Nzeh DA. Some clinical aspects of childhood pneumonia in the University of Ilorin Teaching Hospital. *Nig J Paediatr* 1987; in press.
15. Animashaun A. Measles and blindness in Nigerian Children. *Nig J Paediatr* 1977;4:10-13.
16. Quere MA. Aetiology of blindness in childhood in Dakar. *Ophthalmologica* 1946;148:107-11.
17. Olurin O. Etiology of blindness in Nigerian Children. *Am J Ophthal* 1970;70:533-40.

(Accepted 24 August 1987)

DIGITIZED BY E-LATUNDE ODEKU LIBRARY