

## ***Immunization and Nutritional Status Survey of Children in selected Rural Communities of Sokoto State***

SN Okolo\*, OA Adeleke\*\*, GA Chukwu\*†, NH Egbuaba\*\*†, A Hassan\*\*\*†, C Onwuanaku\*\*\*†

### **Summary**

**Okolo SN, Adeleke OA, Chukwu GA, Egbuaba NH, Hassan A, Onwuanaku C. Immunization and Nutritional Status Survey of Children in selected Rural Communities of Sokoto State. Nigerian Journal of Paediatrics 2003; 30; 123.**

**Objectives:** Immunization coverage and anthropometry of a community constitute a good index for measuring child-health status for that community. We therefore, studied the anthropometry, and the coverage of the Expanded Programme on Immunization (EPI) vaccines in randomly selected rural communities of Sokoto State.

**Design:** Cross-sectional randomized study.

**Method:** One hundred and fifteen mothers of children present at the randomly chosen sites on the days of the study were interviewed using pre-tested questionnaires. Information on the immunization status was based on parental recall, and this was mostly confirmed by a review of individual immunization cards, while nutritional assessment was based on weight-for-age data.

**Results:** The 115 children (56 males, 59 females) were aged less than six years [mean age, 4.71 ± 1.24 years]. Fully, partially, and not immunized proportions of the 115 were seven percent, 73.9 percent and 19.1 percent, respectively. Male immunization rate was significantly higher than the female ( $P < 0.05$ ). 62.5 percent, 85.9 percent and 86.4 percent respectively, of fully, partially, and non immunized children were malnourished. The immunization coverage for all the vaccines was low compared to the national and other published data. All the mothers were full-time housewives with only 3.5 percent having elementary/Koranic education while 96.5 percent had no formal education. All the 22 children that had not received any immunization were offsprings of mothers with no formal education.

**Conclusion:** The study showed that the paediatric preventive services as represented by the immunization coverage and nutritional status in these communities, are poor. Therefore, in order to achieve health for all in these communities, there is a need to further evaluate the possible causes and machineries to tackle them.

**Key words:** Childhood, Immunization status, Anthropometry, Rural communities.

---

Jos University Teaching Hospital, Jos.

Department of Paediatrics

\* Senior Lecturer

---

The Intercountry for Oral Health (ICOH) for Africa  
P.M.B. 2067, Jos.

\*\* Community Health Physician

\*\*† Dental Surgeon/Research Fellow

---

P. O. Box 10349, Jos

\*\* Research Assistant

Noma Children's Hospital, Sokoto

\*\*\* Consultant Surgeon

---

Federal School of Laboratory Science, Jos

\*\*\* Research Assistant

---

Correspondence: Dr. SN Okolo.

e-mail: [selineokolo@yahoo.com](mailto:selineokolo@yahoo.com)

### **Introduction**

NUTRITIONAL status as measured by anthropometry is an important determinant of child health and survival. Undernutrition in childhood usually results from inadequate food intake, recurrent infections and/or inadequate maternal care. The impact on morbidity and mortality rates of most of the vaccine preventable infectious diseases has long been documented.<sup>1</sup> The Expanded Programme on Immunization (EPI) was started as a pilot study in Oyo State of Nigeria in 1976, and was officially launched throughout the country in 1979.<sup>2</sup> Between 1979 and 1984, only 5-10 percent of children were vaccinated and by 1984, about 200,000 children were still dying annually from these vaccine preventable diseases.<sup>3</sup> This initial minimal impact was due to problems with cold chain technology, irregular

supply of vaccine and other materials, as well as inadequate logistical support. A revised National Plan of Operation was launched in 1984 with the major objective of achieving 60 percent and 90 percent coverage respectively, of eligible children aged 0-2 years by 1987 and 1990.

In 1987, the country adopted the Primary Health Care (PHC) programme as a strategy to achieve Health for all Nigerians by the year 2000.<sup>3</sup> The Expanded Programme on Immunization (EPI) was a vital part of the strategy. The EPI aimed at providing immunization to all children in the world against a number of infectious diseases by the year 1990.<sup>4</sup> In Nigeria, the target was to achieve a coverage rate of 80 percent by 1990.<sup>5</sup> The National Programme on Immunization (NPI) was established as a result of a steady decline in routine immunization data even after addressing the problems of logistics, the cold chain, supervision, vaccine supply and community mobilization. There was a significant improvement in coverage by 1989 as the rate had increased to about 55 percent.<sup>3</sup> However, in 1988, the EPI Global Advisory Group stressed the need to increase the immunization level of all children to at least, 80 percent by 1990 and to at least, 90 percent by the year 2000.<sup>6</sup> Nigeria took up this challenge and by 1991, according to crude data, 95.5 percent of eligible children had received vaccines against tuberculosis, 81.1 percent against poliomyelitis, diphtheria, pertussis and tetanus, while nearly 85 percent had been immunized against measles.<sup>3</sup> Factors identified as important in achieving and maintaining high coverage include adequate supply of vaccine, accessibility of vaccination sites, convenient hours of vaccination, short waiting times and low rates of missed opportunities for vaccination.<sup>7-13</sup>

Infection and malnutrition interact in a vicious cycle. The presence of one easily leads to the development of the other and they have a biological synergism that causes the effects of either to be increased.<sup>14</sup> In order

to determine the nutritional and immunization status of the paediatric population in the rural areas of Sokoto State, the present study was designed to evaluate the anthropometry and immunization coverage of children aged, 2-6 years in three selected rural communities.

### Subjects and Methods

This study was carried out in July 2001 in three Local Government Areas (LGAs) of Sokoto State, namely Ilela, Gada, and Gwadabawa. Ilela is on the outskirts of Sokoto State about 78km from Sokoto town towards Niger Republic, while Gada and Gwadabawa are 138km and 30km respectively, from Sokoto town. Three rural communities were randomly selected from each of these LGAs, for adequate representation of every district. The 115 children who were present either in the market place or at the primary health centres (PHC) in these communities at the time the study was carried out, and whose mothers consented to the study, were recruited consecutively. Interview of the mothers in their local language was carried out by two of the authors using a pre-tested questionnaire. Among the information sought were age, sex, mother's education and occupation and immunization status of the children. The data on the immunization status of the children was obtained by means of parental recall and confirmed where possible, by review of the immunization card. The other authors recorded each child's weight, to the nearest 0.1kg and height, to the nearest 0.1cm. The weight-for-age data was used to determine the nutritional status of the children. The extent of malnutrition in the population was measured by the percentage of the population with weight less than two standard deviations below that expected on the basis of the international growth references for the child's age and sex.

The data obtained was analysed using the SPSS Statistical package. Descriptive analysis was carried out, and where necessary, chi-squared test was used to

**Table I**

*Immunization and Nutritional Status of the Surveyed Population*

<i>Immunization Status</i>	<i>No of Children (%)</i>	<i>Weight for Age</i>		<i>Total (%)</i>
		<i>Malnourished (%)</i>	<i>Well Nourished (%)</i>	
Fully immunized	8 (7.0)	5 (62.5)	3 (37.5)	8 (100.0)
Partially immunized	85 (73.9)	73 (85.9)	12 (14.1)	85 (100.0)
Not immunized	22 (19.1)	19 (86.4)	3 (13.6)	22 (100.0)
<b>Total</b>	<b>115 (100.0)</b>	<b>97 (84.3)</b>	<b>18 (15.7)</b>	<b>115 (100.0)</b>

**Table II**

*Immunization Status and Sex Distribution*

<i>Immunization Status</i>	<i>Male (%)</i>	<i>Female (%)</i>	<i>Total (%)</i>
Fully immunized	6 (10.7)	2 (3.4)	8 (7.0)
Partially immunized	44 (78.6)	41 (69.5)	85 (73.9)
Not immunized	6 (10.7)	16 (27.1)	22 (19.1)
Total	56 (100.0)	59 (100.0)	115 (100.0)

$X^2 = 6.578$ ;  $df = 2$ ;  $P = 0.037$

**Table III**

*Immunization Coverage in the Surveyed Population*

<i>Vaccine</i>	<i>Not Immunized</i>	<i>Total Eligible</i>	<i>Percent</i>
BCG	48	115	41.7
OPV <sup>0</sup>	40	115	34.8
OPV <sup>1</sup>	62	115	53.9
OPV <sup>2</sup>	55	115	47.8
OPV <sup>3</sup>	42	115	36.5
DPT <sup>1</sup>	18	115	15.7
DPT <sup>2</sup>	17	115	14.8
DPT <sup>3</sup>	15	115	13.0
Measles	13	115	11.3

BCG = *Bacille-Calmette-Guerin*; OPV = *Oral polio vaccine*; DPT = *Diphtheria, pertussis and tetanus vaccine*

ascertain the level of significance of differences, which was set at  $P < 0.05$ .

**Results**

One hundred and fifteen children (56 males and 59 females) aged 2–6 years [mean age,  $4.71 \pm 1.24$  years] were studied. Immunization status of the studied population showed that seven percent, 73.9 percent and 19.1 percent were fully, partially and not immunized, respectively. The weight-for-age data of the fully immunized, partially immunized and not immunized children showed that 62.5 percent, 85.9 percent, and 86.4 percent respectively, were malnourished. The difference showed a trend, with those not immunized being more malnourished, followed by the partially immunized. Overall, 84.3 percent of the children were malnourished (Table 1). Using height-for-age, 25 percent, 27 percent and 22.7 percent of the fully, partially and not immunized children respectively, were stunted. Overall, 26.1 percent of the children were stunted. With regard to gender, 10.7 percent of the 56

males and 3.4 percent of the 59 females were fully immunized. The male immunization rate was significantly higher than the female ( $P = 0.037$ ). Only 10.7 percent of the males and 27.1 percent of the females had not received any immunization (Table II).

Table III shows the percentage coverage for the individual vaccines. BCG and oral polio vaccines given earlier in life, recorded the highest (41.7–53.9 percent) frequency of administration when compared with a vaccine such as measles (11.3 percent), which is usually given later in infancy.

**Discussion**

The immunization coverage of children in nine communities randomly selected from three LGAs in Sokoto State is by far, lower than the current national coverage level for each of the vaccines. The reason for this difference is not obvious. However, among possible reasons are poor community mobilization and health campaign by the health personnel. This is in keeping with findings by Ekerete<sup>15</sup> who reported that

32 percent of the reasons for failure to immunize was lack of information. Another probable reason may be a lack of logistical support in the procurement and storage of vaccines since there is no electricity supply in these rural communities.

In this study, only seven percent of the children were fully immunized. This level is very poor compared to 84 percent reported by Cutt *et al*<sup>10</sup> among children in Maputo, the capital of Mozambique. The EPI Global Advisory Group<sup>6</sup> had advised the attainment levels of 80 percent by 1990 and 90 percent by the year 2000. The great difference between the rate attained in the present study and that reported by Cutt *et al*,<sup>10</sup> could be due to the fact that Maputo is an urban centre that probably had many health facilities and frequent health campaigns. The partially immunized children were 73.9 percent, while 19.1 percent were not immunized at all. The possible implications and/or potentials of this high partial coverage include a lack of sustained immunity or loss of partially acquired immunity in the individual child and decreased herd immunity and epidemic risk for the community. This high level of partially immunized children is similar to that reported in an earlier study<sup>16</sup> in which there was 91 percent partial immunization rate. The reasons for such drawbacks in immunization coverage in these communities deserve further studies. The male immunization status was significantly higher than the females. This may be due to the preference of male to female children in African societies, whereby more care and attention are paid to male offsprings.

A large proportion of the mothers in the present series had no formal education. This lack could have contributed to such poor level of immunization in these communities. Desai and Alva<sup>17</sup> in their meta-analysis of maternal education and child health, using data from the first round of Demographic and Health Surveys for 22 developing countries, noted that maternal education remains statistically significant for children's immunization status in about one-half of the countries even after individual-level and community-level controls were introduced.

The total BCG coverage of 41.7 percent in this study was much lower than corresponding figures of 96.5 percent, 94 percent, and 84 percent, reported in a Nigerian national study,<sup>3</sup> and in studies by Robertson *et al*,<sup>18</sup> and Rafi *et al*,<sup>19</sup> respectively. Similarly, the percentage coverage rates of 15.7 percent and 11.3 percent for DPT and measles respectively, in these rural communities are very low when compared with the 1989 figures of 18 and 21 percent from Rivers State of Nigeria.<sup>20</sup> This and other findings in this study indicate that the paediatric preventive services in these communities are grossly deficient. This is also reflected

in the nutritional status of these children, 84.3 percent of whom were malnourished.

The present study has thus shown that the immunization and nutritional status of the children in the three rural communities surveyed in Sokoto State are nowhere near the projections for "The Health For All" by the year 2000, even in year 2001. There is, therefore, a need for prompt and adequate intervention in paediatric preventive services in these communities in order to meet the immunization and nutritional needs of the children. This can succeed when there is adequate political and financial support, effective planning and management, commitment, skill, and persistence at every level.

### Acknowledgements

We acknowledge the co-operation of the Sokoto State Government, the three Local Government Areas (Ilela, Gada and Gwadabawa), and the community heads and staff of the Primary Health Care Departments. We also acknowledge the assistance of Dr. Toney Ngog-Nasoah and Mr. Nasiru Uba of Noma Children Hospital Sokoto, and Messrs Jalo H Philip and Steve J Pam of ICOH Jos, for their statistical and secretarial assistance.

### References

1. UNICEF Immunization. The State of the World's Children 1985, UNICEF Publication:93.
2. Federal Ministry of Health. Towards UCI 1990 NIDs. The Nigerian experience. FMOH Lagos, 1988.
3. Epidemiological Division, Disease Control and International Health Department, Federal Ministry of Health and Human Services, Lagos. *Nigerian Bull Epidemiol* 1992; 2: 1-7.
4. Grant JP. Towards Universal Immunization. The State of the World's Children 1987. UNICEF Publication:45-6.
5. The Expanded Programme on Immunization (EPI). Report of in-depth programme review of EPI and control of diarrhoeal diseases. Federal Ministry of Health, 1989: 7-10.
6. Expanded Programme on Immunization: Global Advisory Group. *Wkly Epidemiol Rec* 1989; 64:5-10.
7. Subramanyam K. Vaccine distribution: an operations research study. *Rev Infect Dis* 1989; 11 (Supp 3): S623-8.
8. Friede AM, Wateraux C, Guyer B, de Jesus A, Filipp LC. An epidemiological assessment of immunization programme participation in the Philippines. *Int J Epidemiol* 1985; 14: 135-42.
9. Cutts FT, Rodrigues LC, Colombo S, Bennett S. Evaluation of factors influencing vaccine uptake in Mozambique. *Int J Epidemiol* 1989; 18: 427-33.

10. Cutts FT, Soares A, Jecque AV, Cliff J, Kortbeek S, Colombo S. The use of evaluation to improve the Expanded Programme on Immunization in Mozambique. *Bull WHO* 1990; **68**: 199-208.
11. Unger JP. Can intensive campaigns dynamize frontline health services? The evaluation of an immunization campaign in Thies health district, Senegal. *Soc Sci Med* 1991; **32**: 249-59.
12. Leovinsohn BP. Missed opportunities for immunization during visits for curative care: Practical reasons for their occurrence. *Amer J Trop Med Hyg.* 1989; **41**: 255-8.
13. Cutts FT, Glik DC, Gordon A, Parker K, Diallo S, Haba F, Stone R. Application of multiple methods to study the immunization programme in an urban area of Guinea. *Bull WHO* 1990; **68**: 769-76.
14. Scrimshaw N, Taylor C, Gordon J. Interactions of nutrition and infection. *Monogr Ser World Health Organ* 1968; **57**: 3-329.
15. Ekerete PP. Promotional model: A new direction for the National Programme on Immunization (NPI) and Oral Rehydration Therapy (ORT) in Nigeria. *Health Mark Q* 2000; **18**: 115-33.
16. Dwelle TL. Inadequate basic preventive health measures: survey of missionary children in sub-Saharan Africa. *Pediatrics* 1995; **95**: 733-7.
17. Desai S, Alva S. Maternal education and child health: is there a strong causal relationship? *Demography* 1998; **35**: 71-81.
18. Robertson A, Fronczak N, Jaganjac N, Hailey P, Copelend P, Duprat M. Nutrition and immunization survey of Bosnian women and children during 1993. *Int J Epidemiol* 1995; **24**: 1163-70.
19. Rafi S, Shah IA, Rao MH, Billoo AG. Expanded programme of immunization in Karachi. *J Pak Med Assoc* 1995; **45**: 34-7.
20. Immunization records of the Epidemiology Unit, Rivers State Ministry of Health, Port Harcourt 1985-1989.