

## ***Socio-demographic Factors affecting the Immunisation Status of Hospitalized Pre-school Children***

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### **Summary**

**Angyo IA, Lawson JO, Okpeh ES, Pam SD. Socio-demographic Factors affecting the Immunisation Status of Hospitalized Pre-school Children.** *Nigerian Journal of Paediatrics* 1998; 25:57. A study was conducted to determine the socio-demographic factors affecting the immunisation status of 303 children aged 1-59 months admitted over a 12-month period to the Jos University Teaching Hospital. The factors studied included the age, sex, place of delivery, gestational age at birth, birth weight, number of siblings, birth order and immunisation status of the children. Maternal data including age, educational level, occupation and antenatal care received were also obtained. Other factors studied included ethnic group, religion, domicile, socio-economic status and whether polygamous or monogamous family. One hundred and ninety-six of the 303 children were males and 107 females. The overall immunisation rate was 62.4 per cent. Inadequate immunisation was associated with male sex ( $P = 0.007$ ), lack of maternal education ( $P = 0.0000196$ ), lack of antenatal care ( $P = 0.00000025$ ), home delivery ( $P = 0.000006$ ), ethnic group ( $P = 0.00029$ ), religion ( $P = 0.007$ ), rural domicile ( $P = 0.00025$ ) and low socio-economic status ( $P = 0.00036$ ). The present study has shown that there are still adverse factors (both within the health care delivery system and socio-cultural factors) preventing adequate utilization of immunisation services. More aggressive mobilization to create demand and education of parents on the benefits and importance of childhood immunisation need to be vigorously pursued and sustained. Adverse socio-cultural factors that encourage home delivery such as the "purdah" system need to be discouraged through health education and community involvement. The need for political and economic stability, and establishment of an autonomous body responsible for vaccine procurement/production and other immunisation services is also advocated.

### **Introduction**

IMMUNISATION has long been recognised as one of the cheapest and most cost effective child health services, yet it is under-utilized, particularly in developing countries with poor health infrastructures like Nigeria. Despite several revisions and re-launching of the expanded programme on immunisation (EPI) in Nigeria, immunisation coverage against the six childhood killer diseases

(namely, tuberculosis, measles, diphtheria, pertussis, poliomyelitis and tetanus) has remained unacceptably low and outbreaks of vaccine preventable diseases still occur, accounting for significant morbidity and mortality among our children.<sup>1-4</sup> In an effort to address this deplorable situation, the EPI was re-launched under the name "National Programme on Immunisation" (NPI), in July 1996.<sup>5</sup> This was to among other things ensure its sustenance. Previous studies both from Nigeria and other parts of the world have shown that socio-cultural factors such as religion, lack of maternal education, young maternal age, low socio-economic status (SES) and large family size are associated with inadequate immunisation in childhood.<sup>6-8</sup> In order to sustain the current momentum on childhood immunisation by the NPI, adverse factors within

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the health care delivery system as well as socio-cultural factors affecting the utilization of available vaccines by parents need to be constantly reviewed. This is important if the goal of Universal Childhood Immunisation (UCI) by the year 2000 of the NPI is to be achieved.<sup>2</sup> The present prospective study was therefore designed to determine some socio-demographic factors affecting the immunisation status of hospitalised pre-school children at Jos University Teaching Hospital (JUTH), Nigeria. To the best of our knowledge, no previous study on this vital aspect of preventive child health has been reported from the Northern part of Nigeria.

### Subjects and Methods

This was a prospective study carried out between June 1996 and June 1997 at the JUTH. Approval of JUTH Ethical Committee was obtained for the study.

**Table I**  
*Variables of Hospitalized Pre-school Children*

Variable	Number of Cases	Percentage of Total
<b>Age (Month)</b>		
1-11	100	33.0
12-13	82	27.1
24-59	121	39.9
<b>Birth Weight (Kg)</b>		
<2.5	42	13.9
2.5-3	196	64.7
>3kg	65	21.4
<b>Gestational Age at birth (weeks)</b>		
<37	67	22.0
≥ 37	236	78.0
<b>Number of siblings</b>		
0-3	164	54.0
>3	139	46.0
<b>Birth Order</b>		
1-3	188	62.0
>3	115	38.0

All children aged between 1 and 59 months admitted into the paediatric wards at JUTH and whose parents gave consent to participate were consecutively recruited for the study. Information was obtained from the parents/guardians using a prepared

questionnaire. The information obtained included immunisation history and some socio-demographic variables. Immunisation history of the children was obtained from the parents or guardian and confirmed from immunisation cards where available. Information on immunisations received with dates, whether up-to-date (appropriate-for-age) or not and reasons for incomplete immunisations were obtained. Up-to-date (appropriate-for-age) immunisation was defined according to the current NPI schedule.

**Table II**

*Family/Maternal Variables of Hospitalized Pre-School Children*

Variable	Number of Cases	Percent of Total
<b>Ethnic Group</b>		
Hausa-Fulani	121	39.9
Igbo	24	7.9
Berom	23	7.6
Yoruba	17	5.6
Others	118	38.9
<b>Domicile</b>		
Urban	266	87.8
Rural	37	12.2
<b>Religion</b>		
Christian	113	43.9
Muslim	170	56.1
<b>Polygamous Family</b>		
Yes	165	54.5
No	138	55.5
<b>SES</b>		
High	42	13.9
Middle	68	22.4
Low	193	63.7
<b>Maternal Level of Education</b>		
Nil	106	35.0
≤Primary	77	25.4
Secondary	107	35.3
Tertiary	13	4.3
<b>Maternal Occupation</b>		
Housewife	156	51.5
Self employed/		
Petty trader	63	20.8
Civil Servant	58	19.1
Professional/		
Top civil servant	13	4.3
Student	13	4.3

Although yellow fever, cerebrospinal meningi-

tis and Hepatitis B vaccines are included in the current NPI schedule. they were excluded in the present study because these vaccines have not been incorporated into the immunisation schedule and are not routinely given. Other child variables studied included the age, sex, place of delivery (whether hospital/clinic, home, church etc), gestational age at birth, birth weight, number of siblings and birth order. The maternal variables studied included age, educational level attained, occupation and antenatal care received. Family variables studied included ethnic origin, religion, domicile, socio-economic status (SES) and whether the family is polygamous or monogamous. SES was assessed using father's occupation and maternal level of education as proposed by Olusanya *et al.*<sup>9</sup> The information obtained was fed into a computer and analysed using EPI-INFO version 6.0. Univariate analysis was used to assess the relationship between each variable and immunisation status of the child. The Students 't' test or X<sup>2</sup> test was used as appropriate. Odds ratio at 95% C.I. was calculated for each variable

**Table III**  
*Age-appropriate Immunisation Rates among Hospitalized Pre-School Children*

Age Group	Number of Cases	No Adequately Immunised for Age	Percent of Total
1 month*	5	5	100.0
6 weeks (2 months)**	6	6	100.0
10 weeks (3mth)***	8	7	87.5
14 weeks (4-8mth)	36	25	69.4
9 months*****	51	39	63.6
>9 months+	197	107	54.3
Total	303	189	

\* Schedule 1 OPV<sub>0</sub> BCG  
 \*\* Schedule 2 OPV<sub>1</sub> DPT<sub>1</sub>  
 \*\*\* Schedule 3 OPV<sub>2</sub> DPT<sub>2</sub>  
 \*\*\*\* Schedule 4 OPV<sub>3</sub> DPT<sub>3</sub>  
 \*\*\*\*\* Schedule 5 Measles  
 + Schedule 6 same as schedule 5 (completed immunisation)

## Results

During the study period, a total of 303 children (196 males and 107 females, M:F = 1.8:1) were studied. Table I shows the variables of the children studied. The ages of the children ranged between 1 and 59 months. Thirty-three percent of the children were aged 1-11 months and 39.9 percent were aged 24-59 months. Forty-two (13.9 percent) of the children were delivered low birth weight (<2.5kg) and 67 (22 percent) were delivered preterm (gestational age <37 weeks).

Fifty-four percent had 0-3 siblings and the birth order of 62 percent of the children was between 1 and 3. Table II shows the family/maternal variables. The ages of the mothers ranged between 16 and 55 years (mean 27.9 ± 6.2 years). The predominant ethnic group was the Hausa-Fulani (39.9%) and majority of the study population (87.8%) were urban dwellers from Jos or other surrounding towns. One hundred and sixty-five (54.5%) out of the 303 children came from polygamous families. Sixty-four percent of the children came from families with low socio-economic status and 35% of the mothers had no formal education.

Fifty-two percent of the mothers were full-time housewives. Table III shows the age-appropriate immunisation rates among the hospitalised children, using the NPI schedule of immunisation. Although the total number of children under 9 months was small, there was progressive decline in immunisation rates with subsequent doses from 100% at 1 month (BCG, OPV<sub>0</sub>) to 54.3% after 9 months (completed immunisation schedule). One hundred and eighty-nine (62.4%) of the children were fully immunised for age (up-to-date immunisation), 97 (32%) had incomplete or inadequate immunisation for age and 17 (5.6%) had no immunisation.

Table IV shows the factors affecting the immunisation status of the children. Home delivery, lack of antenatal care, rural domicile and muslim religion were each significantly associated with inadequate or lack of immunisation (P = 0.000006, 0.0000025, 0.00075 and 0.007, respectively at 95% C.I). Male children were also more likely to receive inadequate immunisation compared to females (P = 0.007).

Table IV  
Factors affecting Immunization Status of Hospitalized Pre-school Children

Factor	Number	% Inadequate Immunisation for Age	Odds Ratio	95% C.I	P value
Sex					
Male	195	43.6	0.52	0.27,1.01	0.007
Female	108	28.7			
Birth Order					
0 - 3	187	35.3	1.39	0.74,2.59	NS
>3	116	43.1			
Number of Siblings					
0 - 3	130	37.7	0.73	0.39,1.37	NS
>3	173	30.6			
Place of delivery					
Hospital/					
Clinic	192	29.7	3.11	1.64,5.89	0.000006
Home	111	56.8			
Maternal Age					
<20	33	48.5	0.63	0.24,1.64	NS
≥20	270	37.5			
Antenatal Care					
Yes	285	34.4	-	-	0.0000025
No	18	100.0			
Polygamous Family					
Yes	165	40.0	1.26	0.69,2.30	NS
No	138	45.7			
Religion					
Christian	133	9.3	2.0	1.69,2.30	NS
Muslim	170	45.3			
Domicile					
Urban	266	34.6	3.49	1.35,9.0	0.00075
Rural	37	64.9			

Table V  
Ethnic Group and Immunisation Status of Hospitalized Pre-school Children

Ethnic Group	Number of cases	No with Inadequate Immunisation.	Percent of Total
Hausa-Fulani	121	59	48.8
Igbo	24	6	25.0
Yoruba	17	0	0
Berom	23	12	52.2
Others	113	39	33.1

$X^2 = 21.20$ ;  $df = 4$ ;  $P = 0.00029$ .

Fifty-seven (53.8%) out of the 106 children whose mothers had no formal education had inadequate immunisation for age, while 30 (39.0%) out of 77, 29 (27.1%) out of 107 and nil out of 13 children whose mothers had primary or less, secondary and tertiary education respectively, had inad-

equated immunisation for age ( $X^2 = 24.5$ ,  $df = 3$ ,  $P = 0.0000196$ ). Other factors significantly associated with inadequate immunisation included ethnic group ( $P = 0.00029$ ) and low SES of the family ( $P = 0.00036$ ) (Tables V and VI). Birth order, number of siblings, maternal age, polygamous family and maternal occupation were not associated with inadequate immunisation.

Table VI

Socio-economic Status of Families of Hospitalized Pre-school Children and Immunisation Status.

SES	Number of cases	No with Inadequate Immunisation.	Percent of Total
High	42	5	11.9
Middle	63	24	35.3
Low	193	86	44.6

$X^2 = 15.88$ ;  $df = 2$ ;  $P \text{ value} = 0.00036$ .

Table VII shows the reasons given by mothers for inadequate/lack of immunisation among their children.

**Table VII**  
*Reasons for Inadequate/Lack of Immunisation among Hospitalized Pre-school Children*

<i>Reason</i>	<i>Number of cases</i>	<i>Percent of Total</i>
No reason/lack of awareness	35	30.7
Child ill	25	21.9
Vaccine not available	23	20.2
Mother travelled	10	8.8
Mother not aware of need for subsequent doses	7	6.1
Distance	5	4.4
Mother ill	3	2.6
Others	6	5.3
<b>Total</b>	<b>114</b>	<b>100.0</b>

Thirty-one percent gave no reason/lack of awareness as the reason for inadequate/lack of immunisation. The child was ill in 21.9% and vaccine was not available in 20.2% of the children with inadequate/lack of immunisation. Other reasons given for inadequate/lack of immunisation included mother travelled (8.8%), mother was not aware of need for subsequent doses of vaccines (6.1%), distance (4.4%) and mother ill (2.6%). In 6 (5.3%) of the children with inadequate/lack of immunisation, the father either refused to allow the mother take the child for immunisation, mother claimed she had no time or she had no money to pay for the vaccines because she thought she had to pay. Twelve (4.0%) out of the 303 children in the study contracted measles before the age of 9 months and did not receive the measles immunisation. Fifteen (88.2 percent) out of the 17 children with no immunisation were delivered at home.

## Discussion

Immunisation coverage in Nigeria has remained low due to a number of factors within the health care delivery system as well as some socio-cultural/demographic factors which have affected the utilization of available vaccines by parents.<sup>1,2</sup>

The overall immunisation rate of 62.4% ob-

tained in the present study is higher than some previous studies from Nigeria.<sup>2,6</sup> This might reflect the study population as the present study was hospital based. The higher immunisation rate observed may also be due to the fact that the present study coincided with the re-launching of the EPI under the new name NPI, which has resulted in increased community mobilisation and awareness. The re-launching has also involved political commitment at the highest level of government, thus ensuring availability of funds and vaccines. Unstable political and socio-economic environment has been a major factor in the decline of immunisation coverage in Nigeria. It is hoped that the present level of political commitment and community mobilisation will be sustained.

Factors significantly associated with inadequate or lack of immunisation in the present study included male sex, lack of antenatal care, home delivery, ethnic group, religion and rural domicile. Other factors identified include lack of maternal education and low socio-economic status. These findings are similar to results of previous studies by Nte from Nigeria<sup>6</sup> and Bobo *et al*<sup>10</sup>, Kum-Nji *et al*<sup>7</sup> and Guendelman *et al*<sup>11</sup> from the United States. Mothers who do not receive antenatal care are more likely to deliver at homes and are also less likely to seek orthodox health care services.

The National Demographic and Health Survey (NDHS) of 1990<sup>12</sup> revealed that one-third of mothers received no antenatal care in Nigeria between 1985 and 1990 and over 60 percent of babies in the northern parts of the country were delivered at home without the assistance of a trained birth attendant. The lack of antenatal care and home delivery may either be due to obstacles in the health care system, distance or ignorance of the benefits of orthodox health care services. The "purdah" practice among the muslim religion group which tend to discourage married women from going out of their marital homes may also be responsible for the lack of antenatal care and the high rate of home delivery. Babies delivered at home are less likely to be immunised and 88.2 percent of all children who had never been immunised in the present study were delivered at home. Every effort should therefore be made to educate pregnant women on the benefits of antenatal care through the involvement of community and religious groups and leaders. The association between lack of maternal education, low socio-economic status and inadequate immunisation

observed in the present study is not surprising. Previous studies<sup>7,8,10</sup> have shown that babies born to mothers with no formal education are less likely to receive immunisation compared to babies born to educated mothers. Lack of maternal education is associated with ignorance and such women are less likely to utilize available health care services including immunisation services. The present global effort on the girl-child education therefore need to be encouraged and sustained. Low SES is associated with social disadvantages including lack of access to health care facilities. Lack of accessibility due to poor road networks or difficult geographical terrain and absence of health care facilities may be some of the factors associated with lack of immunisation among children from the rural areas. The provision of access roads and clinics including other social infrastructures to rural areas is necessary in order to reach these "hard to reach" group.

Unless concerted efforts by government and other non-governmental organisations (NGOs) and agencies are made towards improving and sustaining immunisation coverage in Nigeria, vaccine preventable diseases will continue to account for significant morbidity and mortality among our children. The current momentum on childhood immunisation by the NPI therefore need to be encouraged and sustained.<sup>25</sup> The establishment of an autonomous immunisation agency (such as the NPI Board) to be responsible for vaccine procurement/production and other immunisation services is long overdue and should be done as a matter of urgency.

A stable political and socio-economic environment is necessary for sustainability of immunisation services. The need to create vaccine demand by health education of parents (particularly mothers with no education) on the benefits of immunisation, removal of obstacles within the health care delivery system and increased community mobilization and awareness programmes need to be vigorously pursued. Health education and involvement of community and religious groups and leaders will also be necessary to change some adverse socio-cultural and religious beliefs and practices that discourage pregnant women from seeking orthodox health care services and encouraging home delivery. The cooperation of fathers whose wives are in "purdah" is crucial in this regard.

In conclusion, the present study has identified some socio-demographic variables associated with

inadequate or lack of immunisation among children in our environment. By using these as screening variables, children at risk for inadequate or lack of immunisation could be identified and intervention programmes targeted at them to ensure that they are adequately immunised. This is necessary if the goal of UCI by the end of the decade is to be achieved.

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