



Prevalence of vaccine preventable diseases and utilization of routine immunizations services by parents of under-one children in a semi-urban community of Sokoto State, Nigeria

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ABSTRACT

Introduction

Vaccine preventable diseases are categories of diseases that could be prevented by immunization. They affect children of less than five years of age. This study was conducted to determine the prevalence of vaccine preventable diseases and utilization of routine immunization services among parents/caregivers of under-one children in Bodinga town of Sokoto State, Nigeria.

Methods

The study was community based and a descriptive cross sectional epidemiological study design was used. Four hundred households participated in the survey and were selected using a two stage sampling technique. A structured interviewer administered questionnaire with closed and some open-ended questions was used to collect the survey data through face-to-face interview. Data collected were entered into computer and analyzed using the SPSS version 23. Results were presented in simple tables for clarity.

Results

Measles was found to be the most prevalent vaccine preventable diseases in the community, while Hepatitis B has the least prevalence and mortality from these diseases was found to be 3%. Majority of the respondent were aware of Poliomyelitis as vaccine preventable disease and only few were aware of Hepatitis B vaccination. The percentage of fully vaccinated children was very low (4.75%) while about one-third of the children were not immunized at all. The socio-cultural factors found to affect the utilization of routine immunization services includes: place of delivery (more for the hospital delivery), educational level and occupation of child's parent affect positively more especially the mother. The major reason for not taking the children for immunization was Father's refusal.

Conclusion

The study revealed that measles is the most prevalent vaccine preventable disease in the study area. The awareness of vaccine preventable diseases was found to be low except for poliomyelitis. Strengthening routine immunization including demand creation programmes is highly recommended.

Keywords: Vaccine Preventable Diseases, Prevalence, Under-One, Parents, Sokoto

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INTRODUCTION

Vaccine preventable diseases (VPDs) belong to the portion of disease burden that could be prevented by immunization of entire target population with hypothetical vaccine 100% effective against the strain included in it.¹ However in Nigeria diseases with available vaccine currently are: Tuberculosis, Pertussis, Measles, Hepatitis, Diphtheria, Tetanus, Yellow fever, Poliomyelitis.² VPDs contribute substantially to morbidity and mortality among children less than five years in developing countries.³ It is estimated that about two (2) million deaths occur globally each year from VPDs with approximately 1.5 million occurring in children under five years of age and constituting 15% of under five deaths.⁴

In Nigeria, they account for 22% and 17% of under-five mortality and morbidity respectively.⁵ The World Health Organization (WHO), United Nations Children's Fund (UNICEF), and National Programme on Immunization (NPI) guidelines stipulate that a child should receive four doses of Oral Polio Vaccine (OPV), three doses of Hepatitis B Vaccine, three doses of Diphtheria, Pertussis and Tetanus (DPT) vaccine and one dose each of Bacilli Calmette Guerin (BCG), Measles and Yellow fever vaccines.⁶ Routine immunization with these vaccines is a cost effective way of reducing childhood morbidity and mortality in developing countries.⁷ The prevention of these diseases in one child also has a positive ripple effect on the population as the immunized child will not transmit the disease to another child (herd immunity).

The findings of the National Demographic Health Survey along with UNICEF from Nigeria showed a decline in the immunization coverage between 1990 and 1999 from about 30% to 17% and a further gradual decline to 13% in 2003.⁸ The reasons adduced for this included poor coordination and planning, political instability, and continuing economic recession.⁹ Effective monitoring and evaluation of childhood immunization programs are necessary as in their absence, vaccination rates may dwindle unnoticed for some time before increased incidence of target diseases are observed.¹⁰

The study aimed to determine the prevalence of vaccine preventable diseases and assess utilization of routine immunization services amongst parents/caregivers of under-one children in Bodinga LGA of Sokoto State, northwestern Nigeria.

MATERIAL AND METHODS

The study was conducted in a semi urban community of Sokoto state, northwestern Nigeria. The town has population of 175,406 people and is served by one general hospital and six primary health care centers.¹¹ The study population comprised of all mothers, fathers, or caregivers of under-one children in the community.

The study was a community based and a descriptive, cross-sectional survey design was used. Sample size was determined using the standard formula ($n = Z^2(pq)/d^2$) for determining sample sizes of a cross sectional survey.¹² An estimate of 0.5 was used as the general prevalence in the formula as recommended by standard statistical text.¹² Four hundred and twenty-six households participated in the survey and were selected using a two-stage random sampling technique. Survey data was collected via face-to-face interview using a structured, interviewer-administered questionnaire by the trained research assistance. The questionnaire was pre-tested in small survey of five (5) respondents conducted in a different community. Data collected were entered into computer and analyzed using the SPSS version 23. Results were summarized using mean and standard deviation, frequency and percentage and finally presented with simple tables

Ethical clearance to conduct the study was sought and obtained from Sokoto State Health Research and Ethics committee. Permission for community entry was obtained from Ministry or Local Government affairs, the LGA chairman and district head of the community. Consent was obtained from the respondents at household level after explaining the purpose of the survey and method of data collection.

RESULTS

Majority of the study respondents interviewed were Mothers of the children 308(77%). All the study respondents were Muslims and almost all (99.3%)

were Hausa/Fulani while the remaining are Yoruba, Ibo and other smaller ethnic group of Nigeria. The largest proportion of the child mothers of 245 (62.3%) had only informal education, whereas the largest proportion among the fathers of 155 (41.8%)

had Tertiary education 155. Females accounted for 278 (69%) of the study participants. The characteristics of the study participants were as shown in Table 1.

Table 1 Socio-Demographic Characteristics of the Households

Variables	Frequency	Percentage
Study Respondents		
Mother	308	77.0
Father	71	17.8
Care giver	7	1.8
Grand parent	12	3.0
Elder sibling	2	0.6
Sex		
Male	122	30.5
Female	278	69.5
Educational level of child's Mother		
Informal only	245	62.3
Primary	59	15.0
Secondary	80	20.4
Tertiary	9	2.3
Occupation of Child's Mother		
House wife	168	43.4
Business/trading	129	33.3
Government employee	9	2.3
Private employee	1	0.3
Farming	2	0.5
Artisan	78	20.1
Educational level of Child's Father		
Informal only	82	22.1
Primary	40	10.8
Secondary	93	25.1
Tertiary	155	41.8
Occupation of Child's Father		
Business/petting trading	98	26.4
Government employee	138	37.2
Private employee	16	4.3
Farming	33	8.9
Artisan	55	14.9

Table 2 summarizes the delivery and immunization status of under one in the household. Out of a total of the 400-household surveyed, 944 under five were reported out which under one were 481 which amounted to 51%. The largest proportion of the under one; 324 (81%) were reported to be delivered

at home while the least of 7 (1.8%) were delivered by the traditional birth attendants (TBAs) home. Out of the 331 (83%) of the under one that were delivered at home (mothers and TBAs home), only 200(60.4%) had received some form of vaccination. Of these; largest proportion of 96 (48%) were vaccinated

during house to house immunization campaigns at home. Out of the 69 (17%) delivered at the health facility; 71 (35.5%) were vaccinated before being discharge from health facility. Two third of those delivered at the health facility received both BCG and OPVo. Majority of 42 (85.7%) of those delivered at

health facility were informed by health workers to come back for the remaining vaccines. However, only 3 (27.3%) of the mothers went back to immunize their children.

Table 2 Delivery and Immunization Status of Under One in the Household

Variables	Frequency	Percentage
Place of delivery of index child (under 1)		
Home	324	81
TBA's home	7	1.8
Health facility	69	17.3
Children delivered at home been vaccinated?		
Yes	200	60.4
No	131	39.6
If yes, where was he/she given the vaccine?		
Health facility	71	35.5
Outreach spot	23	11.5
Home	96	48
Both home and health facility	10	5
Does the child have a vaccination card?		
Yes	108	54
No	92	46
Was the child born in the health facility given vaccine before discharge		
Yes	49	71
No	20	29
If yes, which one was the child given		
BCG only	8	16.3
OPVo only	8	16.3
BCG and OPV.	33	67.3
Informed by health worker to come for the remaining vaccines?		
Yes	42	85.7
No	7	14.3
Were you told by the health worker to bring back the child for immunization?		
Yes	11	55
No	9	45
If yes, did you go back?		
Yes	3	27.3
No	8	72.7

Table 3 shows the acceptance of routine immunization services by households. Half of households surveyed have had their children given OPVo followed by BCG by 146(37%) of households. The least antigen accepted by household were PCV3

and yellow fever while proportion showed a decline PENTA₁ to PENTA₃. When compared between home delivery and health facility, OPVo/ OPV₁ and BCG consecutively were most accepted while similar pattern was obtained among facility delivery. The

result shows coverage of less than 80% any antigen and dropout rate greater than 10% amounting to bad

access and bad utilization of routine immunization services in the study area.

Table 3 Acceptance of Routine Immunization Services by Households

Variables	Delivered at home		Delivered at Health facility		Total	%
	Freq.	%	Freq.	%		
BCG	103	51.5	43	62.3	146	36.5
OPV ₀	151	75.5	47	68.1	198	49.5
OPV ₁	125	62.5	44	63.8	169	42.3
PENTA ₁	62	31	35	50.7	97	24.3
PCV ₁	40	20	28	40.6	68	17
OPV ₂	81	40.5	38	55.1	119	29.8
PENTA ₂	48	24	30	43.5	78	19.5
PCV ₂	34	17	25	36.2	59	14.8
OPV ₃	68	34	36	52.2	104	26
PENTA ₃	38	19	28	40.6	66	16.5
PCV ₃	28	14	25	36.2	53	13.3
Measles	61	30.5	25	36.2	86	21.5
Yellow fever	34	17	22	31.9	56	14

Freq= frequency; % = percent

Table 4 shows the awareness and source of information about vaccine preventable diseases. Majority; 356(89%) have heard of the vaccine preventable diseases and radio was predominant source of their information by 241(43.8%). Nearly all

the respondents 340(95.5%) have heard of poliomyelitis, while the least disease with public awareness was Hepatitis B infection where only 51(14%) that have heard of it.

Table 4 Awareness and Source of Information about Vaccine Preventable Diseases

Characteristics	Frequency	Percentage
Aware of Vaccine Preventable Diseases		
Yes	356	89
No	44	11
What was your source of information		
Health workers	164	29.8
Radio	241	43.8
Television	59	10.7
Workshop/seminars/training	15	2.7
Newspaper	7	1.3
Friends/relative	63	11.5
Lectures from school	1	0.2
Which of the Vaccine Preventable Disease are you aware of?		
Tuberculosis	145	40.7
Measles	310	87.1
Poliomyelitis	340	95.5
Diphtheria	115	32.3
Tetanus	142	39.9

Yellow fever	234	65.7
Pertussis	202	56.9
Pneumonia	143	40.2
Hepatitis B	51	14.3

Table 5 shows the prevalence and outcome of vaccine preventable diseases in the community. Out of 400-household surveyed 264(66%) had children who suffered from one or more of the diseases. Most prevalent vaccine preventable disease was Measles

by 187(55%) followed by Pertussis 72(21%) while the least prevalent was Hepatitis B infection, which was reported in only 1(0.3%) household. Almost all the cases; 246(92.8%) recovered fully from the diseases in question.

Table 5 Prevalence and Outcome of Vaccine Preventable Diseases in the Community

Characteristics	Frequency	Percentage
Child in the household suffered from any of the diseases		
Yes	264	66.0
No	136	34.0
Which of the Vaccine Preventable Disease did the child suffered		
Tuberculosis	21	6.2
Measles	187	55.3
Poliomyelitis	19	5.6
Diphtheria	11	3.3
Tetanus	4	1.1
Yellow fever	11	3.3
Pertussis	72	21.3
Pneumonia	12	3.6
Hepatitis B	1	0.3
What was the child outcome?		
Recovered fully	246	92.8
Recovered with disability	6	2.3
Did not recover	5	1.9
Died from the disease	8	3.0

Table 6 shows the factors affecting acceptance of immunization. Children of mothers with tertiary education; 80% were immunized as compared to those with informal where; 57.6% of them where

immunized. All; 100% of the children of working class mothers where immunized as opposed to non-working mothers where only; 55.5% were immunized.

Table 6 Cross Tabulation of Mothers Educational and Occupation by Uptake of Routine Immunization

Variables	Percentage of acceptance	
	Yes	No
Educational level of child's mother		
Informal	57.2	42.8
Primary	60.0	40.0
Secondary	74.0	26.0
Tertiary	80.0	20.0
Occupation of child's mother		

House wife	55.6	44.4
Business trader	71.2	28.8
Government employee	100	0.0
Farming	100	0.0

DISCUSSION

Immunization is one of the most successful and cost effective public health interventions in the constant effort of human beings against diseases that affect our wellbeing. Immunization has prevented more deaths in the past years than any other health intervention globally.²

This study was able to demonstrate that measles was the most prevalent among the vaccine preventable diseases in the study population while Hepatitis B had the lowest prevalence. This is possibly because of low vaccination coverage rate in this community, inappropriate timing of the vaccination and potency of the vaccine among vaccinated children. Another hypothesis is the fact that the clinical manifestation of Measles can be elicited early enough while Hepatitis B runs a chronic latent phase. This is in agreement with the work of Okonko et al¹³ where they highlighted measles as most prevalent vaccine preventable diseases due to its high infectiousness, low vaccination coverage (by increasing non-immune population), population densities and malnutrition among other reasons. Our finding is also similar to the findings of policy project of USAID 2012²⁴ which reported measles as the most prevalent vaccine preventable disease and the leading cause of death among the VPD in children due to failure to deliver at least one dose of the vaccine to all infants and inadequate case management resulting in complications and consequent high measles morbidity and mortality.

Our study revealed that based on awareness of individual vaccine preventable diseases; Poliomyelitis was found to have the highest percentage, followed closely by Measles, Yellow fever and Pertussis. However, the awareness about Tuberculosis, Pneumonia, Tetanus, Diphtheria and Hepatitis B was found to be very low. This finding of high awareness to Poliomyelitis can be easily explained by the continuous house-to-house immunization activities and the constant jingles being aired on television and

radio. The finding is in agreement with the study by Chris-Otubor et al¹⁵ where it was also reported that more than 90% of their study population knew about Poliomyelitis while less than 50% knew about Influenza, Diphtheria and Pertussis. Similarly, Rachna and Sheetal¹⁶ reported that the maximum number of their respondents (85%) knew about Poliomyelitis while awareness of Measles and Tuberculosis were found out to be 40% and 35% by the respondents.

The source of information about vaccine preventable diseases among majority of the respondents was mass media (Radio), however health workers and friends/relative significantly contributed. This can easily be explained by considering the low level of education of majority of the study respondent and the study area (Bodinga) been a rural community in northern Nigeria where majority of people rely on radio as their source of information. This is in contrast to the work of Rachna and Sheetal¹⁶ who reported television as the major source of information about vaccine preventable diseases among majority of the respondents with radio been the least. The variation in educational level between the respondents in their research can be explain by their finding of the fact that majority of their respondent had secondary and tertiary education and were from urban community.

Our study also revealed that the level of acceptance of immunization services as low and varies among various specific vaccine antigens. The proportion of fully immunized children was found to be relatively lower than the WHO recommended 80% for a rural set up. Our findings also show that majority of the study population were partially immunized while the rest were not immunized at all. This finding is in contrast to the findings of Bosede et al¹⁷ in a rural community of south-western Nigeria where 29.5% were fully immunized while 4.8% were not immunized and 65.7% were partially immunized.

However, the NDHS 2013 reported that only 1.4% of under-one children were fully immunized and 24.1% has received no vaccination at all in Sokoto state. The NDHS report also report a wide variation among the geopolitical zones and states in full vaccination coverage. Fifty-two percent of children in the South East and South-South zones were fully immunized, compared with 10 percent in the North West. Among the states, full vaccination is highest in Imo state (62%) and lowest in Sokoto state (1%).⁵

Our study also demonstrated that among the specific vaccines, level of acceptance of BCG and OPV vaccine were found to be high while other vaccines such as PCV₃, Pentavalent₃, Measles and Yellow fever were significantly low. The high uptake of OPV could be attributed to the high level of vaccination campaign and acceptance of house to house polio vaccine. This finding is similar to that of NDHS 2013 which reported more than 50% received BCG while less than 50% received Measles.⁵ Similarly, Kenya demographic health survey (KDHS) found high uptake of BCG and low uptake of Measles vaccines.¹⁸

The sociocultural factors found to affect the acceptance of routine immunization services includes; place of delivery, educational level and occupation of the child's parent. A significant variation was observed between those that were delivered at health facility where more than two-third of them were vaccinated while less than two-third of those delivered at home were vaccinated. Educational level and occupation of the child's parent appeared to significantly affect child immunization status; where children of parent with tertiary education appeared to be high compared to others. However, mother's educational status was the most important determining factor from our study. This is obvious because education empowers a woman to access relevant health services, health information, utilize immunization services, attendance of adequate antenatal and postnatal health care services. This is similar work Funmilayo 2013, where she reported strong positive association between maternal educational and full immunization.¹⁹

The NDHS in 2013⁵ also reported similar finding that children whose mothers have more than a secondary

education are more likely to be fully immunized than those born to mothers with no education (64 percent and 7 percent, respectively). Oladipo in 2013²⁰ also highlighted that the low socioeconomic status of Hausa women, who form the larger population of women in northern Nigeria, is a major reason for the continuing poor indicators of maternal, and by extension, child health in that part of the country. It can be inferred that when the social circumstances of the Hausa women improve; it would likely result in improved indicators of child health also. Yusuf and Sagir²¹ also indicated in their work that majority of the mothers had excellent knowledge of vaccine preventable diseases and that mothers with higher educational background had more knowledge of vaccine preventable diseases than those of lower educational level.

The finding from this study shows that major reason for not taking children for vaccination was due to resistance from the fathers. This showed the role of the husband in the northern family system where both the social environment and cultural practices seems to agree with. Critical decisions in family are usually the sole responsibility of the husband. A similar finding by Njelita²² 2009, in Anambara state showed that the husbands' resistance was the factor that most often prevents a child's immunization.

There are, however, some variations in cases where the woman is well educated or the bread winner of the family. In 2004 Babalola²³ made a survey on the individual and community factors affecting the uptake of immunization in four northern and two southern states of Nigeria; a total of 7200 respondents, mostly women with under-five children, were interviewed. He deduced that the stronger the mothers decision-making power of the mother, the higher the likelihood of full immunization.

CONCLUSION

This study has shown that measles is the most prevalent vaccine preventable disease in the study area. The awareness for vaccine preventable diseases was generally found to be low except poliomyelitis. The acceptance of routine immunization was also found to be very low with about one-third of the children not immunized at all.

We recommend increased awareness and advocacy on vaccine preventable diseases and routine immunization services. This is in addition to measures taken to enlighten the general public about importance of girl-child education and also educating the fathers on how to generally improve the health seeking behavior of their families.

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