Original Article

Acceptance of Immunization by Caregivers of Children Attending a Tertiary Health Facility in Northwestern Nigeria

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Abstract

Introduction: Immunization against childhood diseases is well received in most developed countries; also, countries in the Caribbean and Latin America have attained over 90% immunization coverage unlike the most sub-Saharan African countries, such as Nigeria, which have a dismally low coverage. Our objective is, therefore, to determine the acceptance and willingness to complete immunization of children by caregivers seen in our health facility. **Materials and Methods:** This study was cross sectional involving caregivers attending the pediatric outpatient clinic of Aminu Kano Teaching Hospital, Kano, Nigeria, during the month of December 2017. This was questionnaire based and was administered by the researchers and trained assistants. It contained 20 questions consisting of both open- and close-ended questions. **Results:** All respondents were aware of the childhood immunization program and were willing to accept all vaccines for their children. They all believed that immunization was beneficial to their children; 126 (79.7%) respondents could correctly state the advantages of childhood immunization. However, only 18 (11.4%) of the respondents could correctly list the names of the childhood vaccines in the National Programme of Immunization. About 33.5% of respondents reported six visits as the total number of visits for childhood immunization; higher proportion of health workers and those with tertiary educational qualification could correctly list the names of the vaccines given to their children, and these observations were statistically significant (Chi-squared test = 27.786, df = 1, $P = 0.000$; Fisher's exact test = 12.421, $P = 0.004$). **Conclusion:** This study showed that most respondents were willing to accept and complete the immunization schedule; however, there was a significant knowledge gap, especially in listing the names of the vaccines and the expected number of immunization visits.

Keywords: Children, immunization, National Programme of Immunization, vaccine-preventable diseases

Introduction

Immunization against preventable major childhood killer diseases has been established in most developed countries; countries in the Caribbean and Latin America had attained over 90% immunization coverage.[1] However, the story is different in most sub-Saharan African countries, with Nigeria having only 13%–23% coverage reported in 2005.[2] The history of childhood immunization in Nigeria dates back to 1974, following the establishment of the Expanded Programme on Immunization; Nigeria received significant funding from the World Health Organization, UNICEF, and Rotary International;[1] however, this was domesticated in 1985 with the establishment of the National Programme of Immunization (NPI). Earlier gains in immunization coverage in Africa have been overtaken by progressive decline in immunization acceptance, therefore resulting in resurgence of previously controlled diseases such as poliomyelitis and pertussis. Nigeria, India, Afghanistan, and Pakistan are among countries where poliomyelitis is still reported despite huge contributions and investments in vaccine supply and distribution, by Belinda and Gate Foundation and Dangote Foundation.[3] Furthermore, these countries constitute about 66% of the burden of measles death worldwide.[3] Common hindrances to improving vaccine coverage among other factors include wars – which results in limited accessibility to vaccine recipients, ignorance on the part of the caregivers on the advantages of immunization, religious beliefs, and the fear of side effects of vaccination.[4] Over the years, efforts have been made to improve the acceptance rate of vaccination

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through multiprone approaches[5,6] such as education programs through the mass media, house-to-house mobilization, and use of religious and community leaders, but the maximal benefits seem elusive, especially in remote communities, where disease outbreaks are prevalent. This study, therefore, sought to determine the disposition of caregivers seen in our hospital toward childhood immunization.

Study objective

The objective of this study was to determine the acceptance and completeness/willingness to complete childhood immunization for children by caregivers seen in our health facility.

Materials and Methods

Study design

This study was cross-sectional involving caregivers attending the pediatric outpatient clinic of Aminu Kano Teaching Hospital, Kano, Nigeria. It was conducted over a 1-month period in December 2017. The sample size was calculated using the statistical formula for prevalence studies ($Z^2 \times pq/d^2$).[7]

Z = standard normal deviation, set at 1.96, which corresponds to 95% confidence level

p = the proportion of population estimated to have elimination disorder (enuresis) was previous reports as $P = 76.9\%$ based on a previous from Igbo-Ora, Oyo state[8]

q = 1.0– p, and d = degree of accuracy desired was set at 0.05

$N = (1.96)^2\ (0.769)\ (0.231)/(0.05)^2$

$= 272$

For population <10,000, the sample size was $nf = N/1 + N/n$

Where n = estimated population of caregivers attending the pediatric outpatient clinic during the study period was 400.

Therefore, nf = 272/1+ (274/500). The minimum sample size was 161, and purposive sampling method was adopted.

Inclusion criteria

- All caregivers seen at the pediatric outpatient department during the study period.

Exclusion criteria

- Those that declined consent were excluded
- Those whose last child was more than 5 years of age
- Those who had forgotten the immunization history of their last child.

Ethical consideration

Ethical approval was obtained from the Ethics Committee of Aminu Kano Teaching Hospital, Kano, Nigeria.

Consent

Informed consent was obtained from the study individuals in their own language explaining the purpose of the study and the right to withdraw from it. The respondents were also assured of confidentiality.

Survey tool

The questionnaire was developed in English and administered by the researchers and trained assistants. It contained 20 questions consisting of both open- and close-ended questions. This questionnaire was pretested on 15 volunteers, and an internal consistency was obtained from a Cronbach's alpha value of 0.80. Information such as age, sex, educational status of the caregiver, ethnicity, their perception and understanding of usefulness of immunization, caregiver's attitude, and acceptance of immunization were obtained from the questionnaire.

Data analysis

The data generated from the questionnaire were analyzed using the Statistical Package for the Social Sciences version 16 (SPSS Inc. Chicago, Illinois, USA). Categorical data were presented as frequencies and percentages. Quantitative variables were summarized as the mean and standard deviation. Chi-square test for categorical variables was deployed, and $P < 0.05$ was considered statistically significant.

Results

A total of 158 respondents were recruited for this study, making a response rate of 98.1%. There were 19 (12.0%) males and 139 (88.0%) females.

Most respondents had a higher educational qualification (62.7%), and majority had between 1 and 3 children [Table 1].

There were 27 (17.1%) health workers and 131 (82.9%) nonhealth workers.

All respondents were aware of the childhood immunization program and were willing to accept all vaccines for their children. They all believed that immunization was beneficial to their children; 126 (79.7%) respondents could correctly state the advantages of childhood immunization, but 19 (12.0%) could not list the benefits while 13 (8.3%) were incorrect. However, only 18 (11.4%) of the respondents could correctly list the childhood vaccines in the NPI while 140 (88.6%) respondents were incorrect. Furthermore, 24 (15.2%) respondents were correct in the timing schedules of immunization visits, whereas 134 (84.8%) respondents were incorrect.

Many respondents (33.5%) reported six visits as the total number of visits for childhood immunization; 43 (27.2%) of the respondents lived within health center that could administer vaccines [Table 2].

Higher proportion of health workers, respondents with tertiary education, and the male respondents could correctly list the names of the vaccines given to their children, and these observations were statistically significant (Chi-squared test = 27.786, df = 1, $P = 0.000$; Fisher's exact test = 12.421, $P = 0.004$; Chi-squared test = 4.765, df = 1, $P = 0.045$). However, equal proportion of respondents with 1–3 children and 7–10 children could correctly list the names of the vaccines given to their children, though majority were incorrect but

Table 1: Educational status and the number of children of the respondents

	Frequency (%)
Education	
Primary	3 (1.9)
Secondary	41 (25.9)
Tertiary	99 (62.7)
None	15 (9.5)
Total	158 (100.0)
Children	
1-3	104 (65.8)
4-6	42 (26.6)
7-10	9 (5.7)
>10	3 (1.9)
Total	158 (100.0)

Table 2: Respondent's response on the expected number of immunization visits and their proximity to immunization center

	Frequency (%)
Number of visits	
1	13 (8.2)
2	12 (7.6)
3	7 (4.4)
4	23 (14.6)
5	50 (31.6)
6	53 (33.5)
Total	158 (100.0)
Proximity to center (km)	
<1	26 (16.5)
2-3	43 (27.2)
4-6	41 (25.9)
7-10	23 (14.6)
>10	25 (15.8)
Total	158 (100.0)

this observation was statistically insignificant (Fisher's exact test = 2.877, $P = 0.363$) [Table 3].

Table 4 showed that more proportion of health workers when compared to nonhealth workers were correct in listing the timing of immunization visit, and this observation was statistically significant (Chi-squared test = 21.634, df = 1, $P = 0.000$); furthermore, none of those without formal education could correctly list the timing of the immunization schedules, and this observation was statistically significant (Fisher's exact test = 7.575, $P = 0.037$). More proportion of males were correct on the timing of the immunization schedules than females; however, this was not statistically significant (Chi-squared test = 2.075, df = 1, $P = 0.137$). Higher proportion of respondents with 1–3 children were correct on the timing of the immunization schedules when compared to other subgroups, while none in the >10 children subgroup were correct; however, this observation was not statistically significant (Fisher's exact test = 5.106, $P = 0.138$).

Table 3: Comparing the occupation, educational status, gender, and number of children with the ability to list the vaccines

	List immunization		
	Correct	Incorrect	Total
Occupation			
Health worker	11	16	27
Nonhealth worker	7	124	131
Total	18	140	158
Education			
Primary	0	3	3
Secondary	0	41	41
Tertiary	18	81	99
None	0	15	15
Total	18	140	158
Gender			
Male	5	14	19
Female	13	126	139
Total	18	140	158
Number of children			
1-3	15	89	104
4-6	2	40	42
7-10	1	8	9
>10	0	3	3
Total	18	140	158

Chi-squared test=27.786, df=1, P=0.000, Fisher's exact test=12.421, P=0.004, Chi-squared test=4.765, df=1, P=0.045, Fisher's exact test=2.877, P=0.363

Table 4: Comparing the occupation, educational status, gender, and number of children with the ability to correctly mention the number of immunization visits

	Visitation						
	1	2	3	4	5	6	Total
Occupation							
Health worker	0	1	0	4	10	12	27
Nonhealth worker	13	11	7	19	40	41	131
Total	13	12	7	23	50	53	158
Education							
Primary	0	0	0	0	3	0	3
Secondary	5	6	1	6	11	12	41
Tertiary	6	6	5	14	31	37	99
None	2	0	1	3	5	4	15
Total	13	12	7	23	50	53	158
Gender							
Male	0	3	1	5	3	7	19
Female	13	9	6	18	47	46	139
Total	13	12	7	23	50	53	158
Children							
1-3	9	8	6	15	30	36	104
4-6	4	3	1	6	15	13	42
7-10	0	1	0	2	4	2	9
>10	0	0	0	0	1	2	3
Total	13	12	7	23	50	53	158

Fisher's exact test=5.309, P=0.350, Fisher's exact test=12.732, P=0.564, Fisher's exact test=7.536, P=0.134, Fisher's exact test=5.956, P=0.993

Most health workers and nonhealth workers reported five and six as the number of immunization visits; however, this observation was not statistically significant (Fisher's exact test = 5.309, $P = 0.350$). Majority of respondents with secondary and tertiary qualification reported six as the number of scheduled immunization visits, and this observation was not statistically significant (Fisher's exact test = 12.732, $P = 0.564$). More males reported six as the number of scheduled visits in the NPI while most females reported five and six as the number of visits; however, this observation was not statistically significant (Fisher's exact test = 7.536, $P = 0.134$). Most respondents with >10 children remembered that there were six visits in the immunization schedule, although this observation was not statistically significant (Fisher's exact test = 5.956, $P = 0.993$) [Table 5].

Discussion

Childhood immunization is cost-effective in reducing childhood morbidity and mortality.[9,10] Vaccination acceptance and coverage have witnessed an unacceptable decline over the years in Nigeria; with the commencement of the Expanded Programme on Immunization, 81.5% coverage was recorded in the early 1990s, this dropped to <30% in 1996, and by 2003, a dismal 12.9% coverage was reported.[2] This is worrisome, considering the magnitude of deaths attributable to vaccine-preventable diseases; measles is estimated to account for 44% of the 1.7 million deaths due to vaccine-preventable diseases.[2]

Table 5: Comparing the occupation, educational status, gender, and number of children with the ability to correctly mention the immunization schedule

	List timing of immunization		
	Correct	Incorrect	Total
Occupation			
Health worker	12	15	27
Nonhealth worker	12	119	131
Total	24	134	158
Education			
Primary	1	2	3
Secondary	3	38	41
Tertiary	20	79	99
None	0	15	15
Total	24	134	158
Gender			
Male	5	14	19
Female	19	120	139
Total	24	134	158
Children			
1-3	21	83	104
4-6	3	39	42
7-10	0	9	9
>10	0	3	3
Total	24	134	158

Chi-squared test=21.634, df=1, P=0.000, Fisher's exact test=7.575, P=0.037, Chi-squared test=2.075, df=1, P=0.137, Fisher's exact test=5.106, P=0.138

The respondents in our study were aware and willing to accept the routine childhood vaccination program and majority of them (79.7%) could correctly mention the advantages; this observation was similar to that of Al-Zahrani in Saudi Arabia[11] and Tagbo *et al*. in Nigeria[12] but differed from that of Birhanu *et al*.[13] and Abdulraheem *et al*.[14] who reported 23.8% and 20.1%, respectively; differences in educational qualification among the respondents may explain the observed variations. All respondents knew that immunization should begin at birth; this observation was similar to that reported by Hamid *et al*. in India[15] and Birhanu *et al*. in Ethiopia,[13] but it differed from that of Etana and Deressa[5] who reported only 6.7% of respondents reporting awareness of the need to commence routine immunization at birth. Birhanu *et al*.[13] in their submission stated that the observed disparity may be attributed to differences in their source of information, their educational status (majority of our respondents had more than secondary school qualification), and accessibility to health-care facility because 73% of the respondents in Ambo were from the rural areas. Furthermore, most of the respondents who could correctly list the names of the vaccines given to their children were health workers and also those with tertiary educational qualification.

However, majority of respondents in our study were incorrect on the number of scheduled vaccination visits required to complete the routine immunizations. This observation was similar to that reported by Birhanu *et al*.;[13] this may mean that caregivers are not completely attentive or comprehend all instructions during immunization visits and probably do not read the content of the immunization card; this is further substantiated by the observation that just 15% could correctly mention the expected dates of subsequent immunization visits and only 11.4% of the respondents could correctly list the names of the various vaccines contained in the routine immunization program. Therefore, health workers and immunization campaigners should teach caregivers on all aspects of immunization and also encourage caregivers to also read immunization pamphlets, thereby improving their knowledge base on childhood immunization.

An amazing finding in this study was that relatively more male respondents knew the correct time schedule and number of immunization visits to complete the routine vaccination program; the reason for this difference was not completely understood; however, the possibility of males having the tendency to read the information contained in the immunization card is possibly higher. Furthermore, males constituted only 12% of the respondents; therefore, the possibility of sampling bias may not be completely ruled out. However, their occupation and educational qualification showed statistically signification relationship with their ability to correctly mention the dates and schedules of immunization. This observation was similar to that of Widsanugorn *et al*.[16] who reported that 55%

of health workers in their study could correctly mention the immunization schedule; but, it was lower than that reported by Swarnkar *et al*.[17]

Conclusion

There was a significant knowledge gap among the respondents in this study. Relatively, health workers and respondents with tertiary educational qualification performed better than nonhealth workers and respondents with primary/secondary school certification. Therefore, there is an obvious need for a general enlightenment on childhood immunization and active participation by caregivers.

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Conflicts of interest

There are no conflicts of interest.

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