

Childhood Immunization Uptake and Perceived Barriers among Childbearing Mothers in Igbo-Eze North Local Government Area, Enugu State, Nigeria

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Abstract

The general purpose of the study was to investigate the issues relating to childhood immunization uptake for children 0-2 years among childbearing mothers in Igbo-Eze North Local Government Area, Enugu State. Specifically, it determined: level of childhood immunization uptake; and perceived barriers to uptake. It tested one null hypothesis at 0.5 level of significance. A cross-sectional survey design was adopted. Population comprised of 1,926 childbearing mothers (CBMs) in Igbo-Eze North LGA who registered their children for immunization from September 2023 to February 2024 and 158 healthcare workers (HCWs). Questionnaire was used for data collection. Frequency count, percentage and univariable/multivariable analysis were used for data analysis. Results indicated that childhood immunization uptake for children 0-2 years was low (fully immunized 41.0%). Further findings are eight common barriers to childhood immunization. These include distance, means of transportation and bad roads (72.4%, 80.0%) and lack of reminder (71.8%, 81.1%) respectively among CBMs and HCWs. Education and occupation ($p < .05$) were significantly associated with barriers to childhood immunization among CBMs. Sensitization campaigns by HCWs using local means of communication is necessary to increase childhood immunization uptake and to reduce barriers to childhood immunization uptake.

Keywords: Childhood, Immunization, Uptake, Barriers, Mothers, Health, Care, Vaccines.

Introduction

Childhood immunization is a public health intervention that plays a crucial role in prevention of disease and ensuring the overall health of children. Centre for Disease Control (2021) indicated that immunization is a cornerstone of public health effective approach to preventing infectious diseases. Globally, immunization has prevented over three million deaths yearly (Eze et al. 2021). Vaccine preventable diseases are the leading cause of childhood illness and

deaths particularly in low and middle-income countries (Sakr et al. 2023). Globally, about 20.5 million children were either unvaccinated or under-vaccinated, with about 14.3 million children having not received any immunization (United Nation's Children Fund [UNICEF], 2023). About 6.2 million children in Nigeria have never received vaccination in the past five years (World Health Organization [WHO], 2023). This might have caused great morbidity and mortality among children in Nigeria. Under five mortalities

in Nigeria was 132 deaths per 1000 live births, vaccine preventable diseases (VPD) and infections cause more than 51 percent of these deaths (Afolabi et al. 2021). The authors went further to state that Nigeria had 19.7 million infants who did not receive basic immunizations. At least 64 percent of children aged 12-23 months in Nigeria failed to receive all recommended vaccines by the National Expanded Programme on Immunization (EPI) in the last five decades which has increased the risk of outbreaks and child mortality due to vaccine-preventable diseases (WHO, 2024). The mortality may have resulted from level of childhood immunization uptake.

Childhood immunization is the process or act of vaccinating children against life threatening diseases to build their immunity, protect them to reduce childhood mortality and morbidity. Immunization against polio, as well as rubella, meningitis, measles, diarrhoea, and pneumonia, has considerably reduced the occurrence of disabilities such as mental retardation, hearing loss or deafness, meningitis, intellectual disability, and mobility impairment (Umoke, et al., 2021). Vaccines such as the tetanus, diphtheria and pertussis (DTaP), measles, mumps and rubella (MMR), and routine heomophilus influenzae type B (HIBS) series considerably lower the occurrence of these infections, which can cause serious consequences or death if not treated on time (Centre for Disease Control, 2023). Due to the benefits of immunization, WHO provided global recommendations of 90 percent immunization uptake for children (WHO, 2023). However, mothers may be ignorant of the benefits of vaccine preventable diseases and may not ensure complete

immunization services for their children. Previous researchers reported low immunization uptake for children (Parida et al. 2025, Okunlola et al. 2023, Omonula et al. 2022). The low immunization uptake may be due to some challenges encountered in the course of accessing immunization services. Some studies reported that low immunization uptake was associated with certain barriers (Ochiaka & Nwabueze, (2025); Onoja et al. (2024) & Abisola et al. 2022). Barriers identified by the researchers include distance, means of transportation and bad roads, lack of knowledge about benefits of VPD, forgetting the next vaccination schedule, rumors and misconception, fear of side effects, farness of the health facility among others.

Childbearing mothers (CBMs) in Igbo-Eze North (LGA) are expected to register their children for immunization services in healthcare facilities as well as to ensure full immunization for children. Previous researchers (Parida et al. 2025, Okunlola et al. 2023) reported low immunization uptake for children. Could it be that CBMs are ignorance of the benefits of childhood immunization, unable to access the services or that healthcare workers (HCWs) may not provide the services efficiently? Or could it be that CBMs are hindered from accessing the immunization services by certain factors? Studies have been conducted on immunization uptake and barriers among CBMs and HCWs in various locations. However, such study has been conducted to investigate immunization uptake and barriers among CBMs and HCWs in Igbo-Eze North LGA, Enugu State, hence for this study.

Purpose of the Study

This study investigated issues relating to childhood immunization uptake among childbearing mothers (CBMs) in Igbo-Eze North Local Government Area. Specifically, the study determined:

- (1) level of immunization uptake among the CBMs.
- (2) perceived barriers to childhood immunization uptake,
- (3) socio-demographic factors associated with perceived barriers to childhood immunization uptake among CBMs.

Hypothesis (HO)

HO₁: Socio-demographic factors (age, level of education, occupation, parity and marital status) are not significantly associated with barriers to childhood immunization uptake at 0.05 level of significance.

Methodology

Design of the Study: The study adopted a cross-sectional survey research design.

Area of Study: The study was conducted at Igbo-Eze North Local Government Area (LGA), in Enugu state, South Eastern Nigeria. It is a rural made up of two major towns, Ette and Enugu-Ezike, with Enugu-Ezike being the largest and serving as the administrative headquarter. The area is predominantly Igbo and the major occupations include farming, palm wine tapping, trading and civil service. Healthcare services are provided through both public and private healthcare facilities. The public healthcare facilities include one general hospital, nine primary health centres and eleven health clinics owned and managed by the State and Local government authority. The study was conducted in the general hospital and primary health centres because of

subsidized cost of immunization services, consistent availability of the vaccines, and are staffed with trained health personnel.

Population for the Study: The population comprised 1,926 childbearing mothers (CBMs) of children aged 0-2 who registered for routine childhood immunization in the public healthcare facilities Igbo-Eze North LGA between September 2023 to February 2024. The registered children included those delivered in the public health facilities as well as those born in private hospitals and maternity homes whose mothers and caregivers subsequently accessed routine immunization services in public health facilities. (Office of Monitoring and Evaluation unit, Health Department Igbo-Eze North Local Government Area, September to 2023 to February 2024). Most CBMs are aged 15-45 years, married, engaged in farming or trading and had secondary school education. The study also included 158 healthcare workers (HCWs) involved in immunization service delivery across the public healthcare facilities. These comprised Nurses/Midwives, Community Health Officers (CHOs), Community Health Extension Officers (CHEWs) and Junior Community Health Extension Officers (JCHEWs).

Sample for the Study: A total sample of 410 respondents was selected, comprising 320 childbearing mothers (CBMs) of children aged 0-2 years and 90 healthcare workers. A total of 20 villages were purposively selected from the area of study. Sixteen eligible CBMs were selected from each village using systematic sampling with a sampling interval of six based on the immunization register. Only CBMs of children aged 0-2 years were included. For the HCWs, one general

hospital and nine primary health centres were purposively selected. Nine healthcare workers directly involved in routine immunization services (Nurses/Midwives, Community Health Officers, Community Health Extension Workers and Junior Community Health Extension Workers) were then selected using convenience sampling to obtain a total of 90 participants.

Instrument for Data Collection: Questionnaire was used for data collection. It was developed based on the purposes of the study and literature review. The response options for instrument items were "Yes and No". The instrument was validated by three university experts of Health Education. A trial test was done by administering 20 copies of the instrument to CBMs and HCWs outside the area of the study. Data from the trial test were used to establish reliability index of the instrument using Kuder-Richardson coefficient formula. A reliable coefficient index of .85 and .83 were obtained and for the two sections of the instrument were judged reliable.

Method of Data Collection: A total of 320 and 90 copies of the questionnaire were administered by hand with the help of three researcher assistants to childbearing mothers (CBMs) and Healthcare workers (HCWs) respectively. The CBMs were reached in their homes while the HCWs were reached in the healthcare facilities. Out of the 320 copies of the questionnaire administered to CBMs, only 319 were properly completed giving a return rate of (99.7%), while all the entire 90 copies administered to HCWs were returned giving a return rate of 100% that were used for data analysis.

Method of Data Analysis: Data was analyzed using frequencies, percentages and Univariable and Multivariable Analysis. Percentage scores below (50%) were interpreted as low uptake while (50%) and above was interpreted as high uptake, no barrier (50%) while above (50%) is a barrier. Hypothesis was tested using Univariable and Multivariable Analysis at 0.05 level of significance.

Results

Table 1: Frequency and Percentage Responses on Childhood Immunization Uptake among Childbearing Mothers and Healthcare Workers

S/ N	Childhood immunization uptake indicators	HCWS			
		CBMs Yes f(%)	No f(%)	Yes f(%)	No f(%)
1.	Child has immunization card (card presented).	218(68.3)	101(31.6)	78(86.7)	12(13.3)
2.	Bacilli calmetter guerin (BCG).	200(62.7)	119(37.3)	62(68.9)	28(31.1)
3.	Oral polio vaccine (OPV).	198(62.1)	121(37.9)	62(68.9)	28(31.1)
4.	Pneumococcal conjugate vaccine (PCV).	215(67.3)	114(35.7)	62(68.9)	28(31.1)
5.	Pentavalent vaccine.	213(66.7)	106(33.2)	61(67.8)	30(33.3)
6.	Inactivated polio virus vaccine.	137(42.9)	182(57.1)	43(47.8)	47(52.2)
7.	Measles vaccine.	120(37.6)	199(62.4)	37(41.1)	53(58.9)
8.	Yellow fever vaccine.	117(36.6)	202(63.3)	35(38.9)	55(61.1)
9.	Rotavirus vaccine.	105(32.9)	214(67.1)	32(35.6)	58(66.4)
10	Meningitis vaccine	129(40.4)	190(59.6)	36(40.0)	54(60.0)

Table 1 Continues

11	Do mothers remember to take children to hospital on the immunization dates?	221(69.2)	98(30.7)	59(65.6)	31(34.4)
12	Are vaccines always available at the health facilities?	228(71.4)	91(28.5)	70(77.8)	20(22.2)
Status of Immunization Uptake (summary)					
	Children fully immunized.	131(41.0)	188(58.9)		
	Children partially immunized.	188(58.9)	131(41.0)		

scores below 50% = low uptake while scores 50% and above = high uptake, CBM=Childbearing mothers, HCWs=Healthcare workers (CBMs = 319, HCWs = 90).

Table 1 shows that immunization uptake for children under two years was low as only (41.0%) were fully immunized while (58.9%) were partially immunized. Also, Table 1 shows that CBMs immunization uptake among CBMs was low for vaccines: measles (37.6%), yellow fever (36.6%) and rotavirus (32.9%). Similarly, HCWs reported low immunization uptake for measles vaccine (38.9%) and yellow fever vaccine (37.8%)

Table 2: Frequency and Percentage Responses on Perceived barriers to Childhood Immunization Uptake among Childbearing Mothers and Healthcare Workers.

S/N	Perceived barriers	CBMs Yes f(%)	CBMs No f(%)	HCWs Yes f(%)	HCWs No f(%)
1.	Lack of knowledge of the importance of immunization.	217(68.0)	102(31.9)	67(74.4)	23(25.6)
2.	Fear of safety due to side effects and reactions.	208(65.2)	111(38.8)	65(72.2)	25(27.8)
3.	Distance, means of transportation and bad roads.	231(72.4)	88(27.6)	72(80.0)	18(20.0)
4.	Lack of trust in the healthcare providers or the health system.	125(39.2)	194(60.8)	39(43.3)	51(56.7)
5.	Lack of reminders for the immunization days.	229(71.8)	90(28.2)	73(81.1)	17(18.9)
6.	Misinformation, religious or cultural beliefs.	200(62.7)	119(37.3)	71(78.9)	19(21.1)
7.	Long waiting time at the health facility.	196(61.4)	123(38.6)	54(60.0)	36(40.0)
8.	Cost of immunization services.	115(36.1)	204(63.9)	31(34.4)	59(65.6)
9.	Lack/shortage of vaccines in the health facility.	128(40.1)	191(59.9)	37(41.1)	53(58.9)
10.	Husband's opposition to childhood immunization.	72(22.6)	247(77.4)	50(55.6)	40(44.4)
11.	Lack of trust towards vaccine.	201(63.0)	118(37.0)	64(71.1)	26(28.9)
12.	Unintentional forgetting of the dates of immunization	189(59.2)	130(40.7)	66(73.3)	24(26.7)
13.	Sickness of the child on the immunization day.	140(43.8)	179(56.1)	41(45.6)	49(54.4)

Key: Scores below 50% considered not a barrier, 50% and above considered a barrier.

CBMs=Childbearing mothers, HCWs=Healthcare workers (CBMs = 319, HCWs = 90).

Table 2 shows that both CBMs identified distance, means of transportation and bad roads (72.4%), lack of reminders for the immunization days (71.8%), and lack of knowledge of the importance of immunizations (68.0%), misinformation, religious or cultural beliefs (62.9%), and long times waiting at the health facility

(61.4%) as common barriers to immunization uptake. Also, HCWs indicated means of transportation and bad roads (80.0%), lack of reminders for the immunization days (81.1%) and lack of knowledge of the importance of immunizations (74.4%), misinformation, religious or cultural beliefs (78.9%), lack of trust towards vaccine (71.1%) and unintentional forgetting of the dates of immunization (73.3%) as common barriers to immunization uptake.

Table 3: Univariable and Multivariable Analysis of Factors associated with Barriers to Childhood Immunization among Childbearing Mothers.

Factors	Univariable				AOR(95%CI)	B	Multivariable			
	β	S.E	df	p			S.E	df	p	OR(95%ci)
Mothers age (yrs)			2	.099						
15-24										
25-34	.109	.354	1	.757	1.115(.558-2.231)					
35 and above	-.413	.368	1	.262	.662(.322-1.362)					
Level of education			3	.000*				3	.000*	
No formal										
Primary	-.378	.523	1	.469	.685(.246-1.908)	-.406	.536	1	.449	.666(.233-1.904)
Secondary	-1.008	.462	1	.029*	.365(.148-.903)	-1.052	.470	1	.025*	.349(.139-.877)
Tertiary	-2.708	.557	1	.000*	.067(.022-.199)	-2.814	.591	1	.000*	.060(.019-.191)
Marital status			3	.724						
Married	Ref.									
Single	.182	.310	1	.556	1.200(.654-2.203)					
Divorced	.095	.344	1	.782	1.100(.561-2.158)					
Widowed	-.262	.333	1	.431	.769(.400-1.479)					
Occupation			3	.030*						
Civil servants	Ref.									
Trading	.758	.343	1	.027*	2.133(1.090-4.175)	-.133	.424	1	.754	.876(.381-.2.010)
Farming	.857	.361	1	.018*	2.356(1.160-4.784)	-.179	.443	1	.686	.836(.351-1.991)
Housewives	.113	.427	1	.792	1.119(.484-2.587)	-.707	.500	1	.157	.493(.185-1.313)
Number of children			3	.225						
0-1	Ref.									
2-3	-.490	.285	1	.086	.613(.350-1.072)					
4-5	-.071	.345	1	.839	.932(.474-1.831)					
6 and above	.023	.396	1	.954	1.023(.471-2.224)					

*significant at $p < .05$; Adjusted Odd Ratio (AOR) = $\exp(B)$; OR = Odd Ratio; CI = Confidence interval, β =Beta coefficient, S.E =standard error

Ref. Groups: Age (15-24), Level of education (no formal education), Marital status (married), Occupation (civil servants), Number of children (0-1).

Table 3 consisted of the univariable, and multivariable analysis of factors associated with barriers to childhood immunization among childbearing mothers. The Table 3 shows that level of education and occupation were significantly associated with barriers to childhood immunization in the univariate analysis. Respondents with secondary education were 3.7% (AOR = .365; 95% CI: .148 - 903, $p = .025$) and tertiary education 0.6% (AOR = .067; 95% CI: .022- .199, $p = .000$) less likely to experience barriers to childhood immunization compared with those with no formal education. Those who are traders were 13.3% (AOR = 2.133, 95% CI 1.090-4.175, $p = .027$) and farmers 35.6% (AOR: 2.356; 95% CI: 1.160-4.784, $p = .018$) are less likely to encounter barriers than the civil servants. In the multivariable analysis, only level of education was significantly associated with barriers to childhood immunization, while occupation did not significantly contribute to the model. Those with secondary 3.5% (AOR = 349, 95% CI: .139 - .877, $p = .025$) and tertiary education 0.6% (AOR = .060; 95% CI: .019 -.191, $p = .000$) were less likely to experience barriers to childhood immunization than those with primary education.

Discussion

Table 1 indicates that childhood immunization uptake for children under two years was low as only (41.0%) was fully immunized. This could be attributed to lack of information and knowledge regarding the benefits of childhood immunization. The result is considerably lower than the results of Bayee et al. (2024)

& Orjingere et al. (2021) which reported (50.8% & 60.59%) of full immunization uptake respectively. Table 1 showed that CBMs and HCWs reported high BCG uptake (62.7% and 68.9%) respectively. The high uptake might be that BCG is given at birth and babies are immunized after birth before being discharged home. The result is relatively lower than the findings of (Iba et al. 2025 & Ariyiba et al. 2023) which reported that BCG uptake was (87.7% and 100%) among the respondents. Table 1 also indicated that CBMs and HCWs reported decline in immunization uptake for measles (37.6%, 41.1%) and yellow fever vaccine (32.9%, 35.6%). This could be that those vaccines are scheduled for later dates and CBMs may not remember the immunization dates or HCWs due to their tight duty coupled with poor network coverage may not be able to remind the CBMs. CBMs mothers may not be receiving information or being reminded of their children immunization appointment days through phones (SMS) probably due poor network in the area of study. The result is consistent with the findings of (Ariyiba et al. 2023 & Paul et al. 2022) which reported declined immunization uptake for measles and yellow fever compared to BCG. However, both CBMs and HCWs reported high uptake of pentavalent vaccine (66.7%, 67.8%). This could be that pentavalent vaccine is commenced at 6 weeks of birth and mothers were properly instructed to bring the children at ten weeks for continuity of those vaccines to ensure effectiveness. The result is consistent with the findings of (Eze et al. 2021 & Paul et al. 2022) which reported

high pentavalent vaccine uptake (70.8% & 78.5%).

Table 2 showed that both CBMs and HCWs reported different types of barriers encountered in utilization of childhood immunization services for the children. Table 2 showed that both CBMs and HCWs indicated that distance, means of transportation and bad roads (72.4%, 80.0%) are common barriers. This might be that cost of transportation may be so high due to bad roads in the rural areas, and only the motorbikes (Okadas) can ply the roads and some CBMs cannot afford the cost. Addressing this distance, transportation and bad roads barrier calls for adjustment in policy like mobile clinics or home vaccination which can improve vaccination uptake especially in rural areas. This finding is supported by Guye et al. (2023) & Retna et al. (2024) which reported that geographical location of the respondents is a major barrier to childhood immunization. The result of the study showed that both CBMs and HCWs reported that lack of reminders for the immunization days by the healthcare providers (71.8%, 81.1%), long waiting hours (61.8%, 65.7%) and forgetfulness by the mothers (59.2%, 73.3%) are among the major barriers to childhood immunization uptake. This can be attributed to poor network coverage inside the villages and busy work schedule of HCWs which may have contributed in not reminding the CBMs and long waiting hours of CBMs in the health facilities. This requires the strengthening of the healthcare facilities by employing and retraining of staff to reduce the long waiting hours, involving the community and religious leaders in reminding CBMs about on coming immunization through announcement. This result is consistent with the findings

of (Uwaibi & Omozuwa 2023 & Yiltok et al. 2022) which reported that forgetfulness, lack of reminders, and long waiting hours are barriers to childhood immunization uptake. The result in Table 2 also indicated that both CBMs and HCWs reported that lack of knowledge of the importance of immunizations (68.0%, 74.4%) and misinformation, cultural and religious beliefs about immunization (62.7%, 78.9%) are also among the major barriers to childhood immunization. This could be attributed to the educational status of CBMs as those who are not educated may not know the value of childhood immunization, are most likely to be misinformed about childhood immunization and are not likely to resist cultural and religious beliefs. This finding corroborates with the studies of (Labib & Ahmed 2025, Abisola et al. 2022, Balgvind & Mohammadnezhad 2022) that reported that lack of understanding and knowledge of immunization, and misinformation were the key reasons for not having full immunization of children. This calls for increased awareness about childhood immunization to increase the CBMs knowledge that can help them overcome misinformation, religious and cultural beliefs.

Results of Univariable analysis in Table 3 showed that level of education and occupation were significantly associated with barriers to childhood immunization. Respondents with secondary 3.6% (AOR = .365; 95% CI: .148 - .903, $p = .027$) and tertiary education 0.6% (AOR = .067; 95% CI: .022- .199, $p = .000$) were less likely to experience barriers to childhood immunization compared with those with no formal education. In the multivariable analysis, level of education was significantly associated with barriers to

childhood immunization. Those with secondary 3.5% (OR = 349, 95% CI: .139 - .877, $p = .025$) and tertiary education 0.6% (OR = .060; 95% CI: .019 -.191, $p = .000$) were less likely to experience barriers to childhood immunization than those with primary education. This is because educated women are more likely to understand the values of immunization, likely to resist misinformation, cultural/religious beliefs and rumors and can easily access information about childhood immunization than the uneducated ones. This finding aligns with the studies of (Gebreyesus & Tesfay, 2024 & Ariyibi et al. 2023) which indicated that maternal education is particularly important, as higher levels of education have been associated with greater vaccine awareness, improved health-seeking behaviours and higher immunization uptake. Result of Univariable analysis in Table 3 showed that occupation was significantly associated with barriers to childhood immunization. Those who are traders were 13.3% (AOR = 2.133, 95% CI 1.090-4.175, $p = .027$) and farmers 35.6% (AOR: 2.356; 95% CI: 1.160-4.784, $p = .018$) less likely to encounter barriers than the civil servants and housewives. This can be attributed that CBMs who were traders and farmers are self-employed and can afford costs for vaccines and transportation to access immunization services. This result is supported by the findings of (Budu et al. 2023; Guye et al. 2023) which stated that economic status plays a crucial role as CBMs from wealthier households are more likely to overcome barriers to ensure complete immunization.

Conclusion

The findings indicated that there was low immunization uptake for children 0-2years which was caused by some barriers that hindered immunization uptake. Barriers identified include lack of knowledge of benefits of immunization, distance, means of transportation and bad roads, misinformation, cultural and religious beliefs, unintentional forgetting of dates of vaccination among others. The study also indicated that these barriers are associated with level of education and occupation.

Recommendations

1. Enlightenment campaigns of the CBMs by HCWs via outreach programmes or mobile clinic to raise their awareness of childhood immunization, its benefits and address misinformation.
2. HCWs should establish communication system to reach CBMs to remind them about their next immunization schedules, immunize children in the marketplaces, churches and village meetings.
3. Government should equip the health facilities with human and other necessary resources to ensure that CBMs do not wait for long hours before being attended.

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