












Research Article

# An Appraisal of Routine Immunization Coverage Among Children 0-2 Years in Akure South Local Government Area of Ondo State

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## Abstract

Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases such as Tuberculosis, Poliomyelitis, Haemophilus Influenza type b (HIB), Diphtheria, Pertussis, Tetanus and Hepatitis B, neonatal tetanus yellow fever, measles, cerebrospinal meningitis and is estimated to avert between 2 and 3 million deaths each year. The objective of this study is to appraise routine immunization coverage among children 0-2 years in Akure South Local Government Area of Ondo State. This is a descriptive cross-sectional study, designed to appraise routine immunization coverage among children 0-2 years in Akure South Local Government Area of Ondo State. The study focused on children 0-2 years. Majority 102 (25.2%) of the respondents were within the age range of 25-29 years, 82 (20.5%) were >39 years. 314 (78.5%) were Yorubas. 385 (96.2%) had good knowledge while 15 (3.8%) had poor knowledge. 374 (93.5%) of the women have positive attitude while 26 (6.5%) of them have negative attitude. Most of the respondents, 391 (97.8%) of the respondents reported that they have taken their child to the health facility for immunization and 232 (58%) have taken their child to 4-5 immunization sessions. Based on the findings of the present study, it could be concluded that very few of the women had poor knowledge of childhood immunization, majority of the women had positive attitude score and practice of childhood immunization, practice of childhood immunization is quite high, and the uptake of childhood immunization is quite high.

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## Keywords

Immunization, Coverage, Knowledge, Attitude, Practice

## 1. Introduction

Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases such as Tuberculosis, Poliomyelitis, Haemophilus influenzae type b (Hib), Diphtheria, Pertussis, Tetanus, Hepatitis B, neonatal tetanus, yellow fever, measles, and cerebrospinal meningitis. It is estimated to avert between 2 and 3 million deaths each year, making it one of the most economical health interventions available [1]. Immunization programs are designed to reach even the most hard-to-reach and exposed populations, with clear target groups and efficient distribution methods that do not require major lifestyle changes.

Nigeria, as a signatory to the Declaration of the Survival, Protection, and Development of Children, articulated at the 49th World Health Assembly and reinforced by the World Summit for Children in 1990, has committed to addressing global immunization challenges [2]. The United Nations Convention on the Rights of the Child, which includes rights to survival, development, and the highest attainable standard of health, further underscores this commitment [3]. In line with these commitments, Nigeria's National Programme on Immunization (NPI) collaborates with state and local governments, as well as international partners, to implement sustainable immunization strategies. Ensuring that children receive complete routine immunizations is critical for the health and prosperity of the nation.

Despite these efforts, the epidemiological data reveal significant challenges. Approximately 2.5 million deaths occur annually from vaccine-preventable diseases, predominantly in Africa and Asia among children under five years old [4]. Immunization services are provided through routine immunization (RI) and supplementary immunization activities (SIAs). However, the evidence guiding public health actions in preparedness and response to disease outbreaks remains limited and uneven [5]. The Expanded Programme on Immunization (EPI), introduced in Nigeria in 1978, aimed to provide routine immunization to children under two years but has faced intermittent success [6]. The current immunization schedule includes vaccines such as BCG, Hepatitis B, OPV, Pentavalent, PCV, IPV, Measles, Yellow Fever, Vitamin A, and Meningitis, administered during the first year of life over five visits [7].

Despite these structured efforts, immunization coverage in Nigeria remains suboptimal, particularly among specific demographic groups. Reports indicate that routine immunization rates have declined, with significant disparities between different ethnic and racial groups [8]. For example, the WHO Demographic Health Survey in Nigeria revealed that the percentage of children fully immunized before their first birthday dropped

from 14.3% in 1999 to 11.3% in 2003, with dropout rates between the first and third doses of Pentavalent vaccine increasing [9]. This decline in immunization uptake poses a significant risk to child health, especially in regions like Southwestern Nigeria where coverage remains low despite the availability of numerous immunization centers and mass campaign opportunities [10].

This study investigates the adoption of routine immunization services in Akure South L.G.A, Ondo State, where low uptake and rejection of these services have been observed. Given the critical role of immunization in ensuring child health and survival, understanding the factors contributing to this low uptake is essential. This research aims to identify the socio-demographic correlates influencing the adoption of routine immunization services in this region, contributing to the broader efforts of improving immunization coverage and protecting children from vaccine-preventable diseases.

## 2. Method

### 2.1. Study Design

This descriptive cross-sectional study aimed to assess routine immunization coverage among children aged 0-2 years in Akure South Local Government Area of Ondo State, Nigeria. The study focused on children in this age group to evaluate immunization practices and coverage comprehensively.

### 2.2. Sampling Technique

A multistage sampling technique was employed for this study. Akure South LGA comprises 11 wards, including Aponmu, Gbogi/Isikan I, Gbogi/Isikan II, Ijomu/Obanla, Ilisa, Oda, Odopetu, Oke/Aro, Irowo, Oshodi/Isolo, and Owode/Imuagun. The sampling process involved:

1. First Stage: From the list of wards, one community was selected through simple random sampling (balloting).
2. Second Stage: The desired sample size, determined using Leslie Fischer's formula, was proportionally allocated to each community based on population size.
3. Third Stage: Within each selected community, one major settlement was chosen.

This sampling technique ensured a representative sample of the population, focusing on children directly involved in immunization programs. The minimum sample size calculated was 384 children, based on a confidence interval of 95%

and an error margin of 5%.

### 2.3. Data Collection

Data collection involved using a structured questionnaire. The questionnaire was previously validated in similar studies globally. To ensure its relevance and accuracy, the draft instrument was reviewed by the researcher's supervisor, who provided necessary corrections and suggestions. These modifications were carefully incorporated to improve the instrument's quality in relation to the research questions. The questionnaire was pre-tested in a different community within Akure North LGA to identify and rectify any areas of ambiguity before the actual data collection. This pre-testing ensured the reliability of the instrument. Trained interviewers administered the questionnaire in a self-administered mode, ensuring that the data collected was accurate and unbiased. The collected questionnaires were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, such as frequency counts, percentages, and bar charts, were used to analyze demographic information, while inferential statistics, including chi-square tests, were used to test hypotheses at a 0.05 significance level.

### 2.4. Ethical Consideration

Ethical considerations were rigorously observed throughout the study. The purpose of the study was explained to the caregivers of the participating children, and informed verbal

consent was obtained before administering the questionnaire. Participation was entirely voluntary, with no form of coercion or undue influence exerted on the participants. Confidentiality of all information provided by the participants was strictly maintained. The respondents' names were not recorded on the questionnaire to ensure anonymity. This approach ensured that the privacy and rights of the participants were respected throughout the study. Additionally, participants were assured that they could withdraw from the study at any time without any consequences. This ethical approach fostered a sense of trust and willingness among the participants, contributing to the reliability and validity of the collected data.

## 3. Results

### 3.1. Socio-demographic Characteristics of Respondents

As shown in Table 1, a majority 102 (25.2%) of the respondents were within the age range of 25-29 years, 82 (20.5%) were >39 years. 314 (78.5%) were Yorubas, 342 (85.5%) of the respondents were Christians while 44 (11%) were Muslims. About 295 (73.8%) respondents were married while 189 (47.3%) respondents completed secondary education, 113 (28.3%) had tertiary education, about 59 (14.8%) had primary education and 39 (9.8%) had no formal education. 345 (86.3%) respondents have 1-5 children.

**Table 1.** Socio-demographic characteristics of Respondents.

VARIABLES	FREQUENCY (n=400)	PERCENTAGE (%)
AGE		
<25	78	19.5
25-29	102	25.2
30-34	78	19.5
35-39	60	15
>39	82	20.5
ETHNICITY		
YORUBA	314	78.5
IBO	57	14.3
HAUSA	19	4.8
OTHERS	10	2.5
RELIGION		
CHRISTIANITY	342	85.5
ISLAM	44	11.0
TRADITIONAL	13	3.3

VARIABLES	FREQUENCY (n=400)	PERCENTAGE (%)
OTHERS	1	0.3
MARITAL STATUS		
MARRIED	295	73.8
WIDOWED	27	6.8
DIVORCED	27	6.8
SEPARATED	51	12.8
EDUCATIONAL LEVEL		
NO FORMAL EDUCATION	39	9.8
PRIMARY	59	14.8
SECONDARY	189	47.3
TERTIARY	113	28.3
TYPES OF OCCUPATION		
FARMING/ARTISAN/PETTY TRADING	149	37.3
BUSINESS	108	27.0
CIVIL SERVANTS/PROFESSIONALS	104	26.0
OTHERS	39	9.8
NUMBER OF CHILDREN		
0	9	2.3
1-5	345	86.3
>5	46	11.5

### 3.2. Child's Bio Data

Table 2 shows the child's bio data. 246 (61.5%) of the children are between 1-2 years old, 293 (73.3%) are female while 166 (41.5%) are between 1-2 position.

*Table 2. Child's Bio Data.*

VARIABLES	FREQUENCY (n=400)	PERCENTAGE (%)
AGE OF LAST CHILD		
No child	9	2.3
<1 years	145	36.3
1-2 years	246	61.5
SEX		
Female	293	73.3
Male	107	26.8
Position of Child		
1-2	166	41.5
3-4	154	38.5

VARIABLES	FREQUENCY (n=400)	PERCENTAGE (%)
>4	80	20

### 3.3. Immunization Knowledge

Table 3 shows the knowledge of women of childbearing age about childhood immunization. The majority, 329 (82.3%) think immunization prevents diseases/infection, 394 (98.5%) think immunization protect babies against serious diseases and 368 (92%) of them agree prevention of disease is the major benefit of immunization.

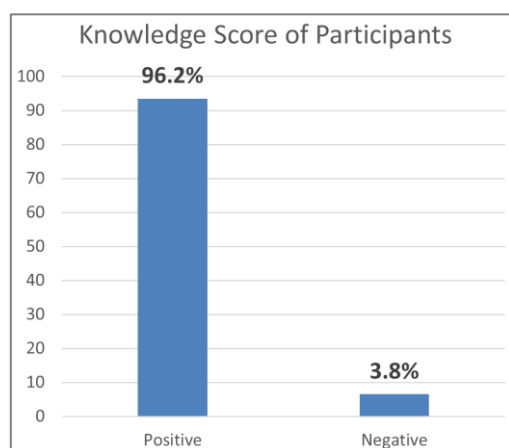
*Table 3. Knowledge about Immunization.*

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
What is immunization?		
Means of preventing diseases/infections	314	78.5
Means of treating diseases/infections	71	17.7
No response	15	3.8
What type of vaccines do you know?		
OPV and IPV	381	95.3
Measles	396	99
HBV	274	68.5
PCV	142	35.5
Yellow fever	370	92.5
Td	56	14
Penta	129	32.3
BCG	357	89.3
Do immunizations protect babies against serious diseases.		
Yes	394	98.5
No	6	1.5
What are the benefits of immunization?		
It prevents diseases.	368	92
It improves the body antigens.	310	77.5
It improves living.	254	63.5
It serves as a balanced diet.	54	13.5
None of the above	5	1.3

### 3.4. Knowledge Score of Respondents

Figure 1 presents the knowledge scores of the respondents regarding immunization practices. Out of the total sample, an overwhelming majority of 385 respondents, representing 96.2%, demonstrated good knowledge. This indicates a high

level of awareness and understanding of immunization among most of the participants. In contrast, only 15 respondents, accounting for 3.8% of the total sample, exhibited poor knowledge. This minority group highlights a small, yet significant, gap in knowledge that may require targeted educational interventions to ensure comprehensive understanding and participation in immunization programs.



**Figure 1.** Knowledge Score of Respondents.

### 3.5. Respondents' Attitudes on Immunization Practices

Table 4 shows the attitude of respondents towards immunization. 317 (79.3%) of the respondents disagree that they would not take their child for immunization, 191 (47.3%) said they strongly disagree that their spouse doesn't support immunization, 198 (49.5%) said they also strongly disagree that they prefer traditional medicine to immunization. Also, majority of the respondents 397 (99.3%) reported that they disagree that Immunization is not completely safe for their baby, 302 (75.5%) said they disagree that health workers reaction towards pregnant mother is good while 385 (96.3%) agree that vaccine is effective in preventing diseases.

**Table 4.** Attitude of Respondents towards immunization.

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
I may not take my child for immunization.		
Agree	38	9.5
Strongly agree.	14	3.5
Disagree	317	79.3
Strongly disagree	31	7.8
My spouse doesn't support immunization.		
Agree	24	6
Strongly agree	10	2.5
Disagree	157	39.3
Strongly disagree	191	47.3
I prefer traditional medicine to immunization.		
Agree	2	0.5
Strongly agree	0	0
Disagree	200	50
Strongly disagree	198	49.5
Immunization is not completely safe for my baby		
Agree	3	0.8
Strongly agree	0	0
Disagree	397	99.3
Strongly disagree		
Health workers reaction towards pregnant mother is good		
Agree	47	11.8
Strongly agree	19	4.8
Disagree	302	75.5

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
Strongly disagree	32	8
Vaccine is effective in preventing diseases		
Agree	385	96.3
Strongly agree	5	1.3
Disagree	10	2.5
Strongly disagree	0	0

### 3.6. Attitude Score to Childhood Immunization

Table 6 shows the attitude to childhood immunization. 374 (93.5%) of the women have positive attitude while 26 (6.5%) of them have negative attitude.

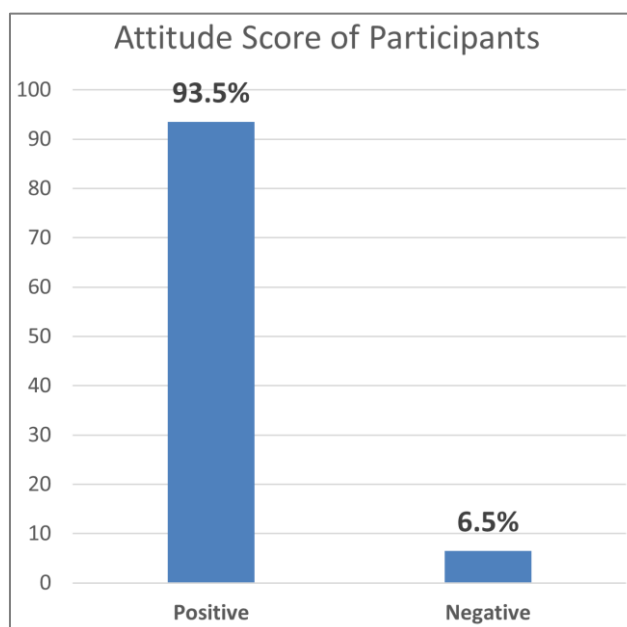


Figure 2. Attitudes of Women Towards Childhood Immunization.

### 3.7. Practice of Childhood Immunization Among Respondents

Table 5 shows the practice of childhood immunization. Majority of the respondents, 391 (97.8%) of the respondents reported that they have taken their child to the health facility for immunization and 232 (58%) have taken their child to 4-5 immunization sessions.

Table 5. Practice of Childhood Immunization.

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
Have you ever taken your child for immunization in a health facility		
Yes	391	97.8
No	9	2.3
How many sessions of immunization has your child had		

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
1-3 sessions	140	35
4-5 sessions	232	58
>5 sessions	28	7

### 3.8. Practice of Childhood Immunization by Antigen

Table 6 shows the practice of Childhood Immunization by antigen. Majority of the respondents 378 (94.5%) reported that their children have completed BCG, 209 (52.3%) completed HBV, 390 (97.5%) completed OPV 0, OPV 1, OPV 2 and OPV 3. However, 298 (74.5%) reported that their child did not complete PCV 1, 304 (76%) PCV2 and 387 (96.8%) PCV 3. 254 (63.5%) of the respondents said their child completed Penta 1, 218 (54.5%) completed Penta 2. 231 (57.8%) did not complete Penta 3. 384 (96%) completed both measles and yellow fever.

**Table 6.** Practice of Childhood Immunization by Antigens.

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
BCG		
COMPLETE	378	94.5
INCOMPLETE	22	5.5
HBV		
COMPLETE	209	52.3
INCOMPLETE	191	47.5
OPV 0		
COMPLETE	390	97.5
INCOMPLETE	10	2.5
OPV 1		
COMPLETE	390	97.5
INCOMPLETE	10	2.5
OPV 2		
COMPLETE	390	97.5
INCOMPLETE	10	2.5
OPV 3		
COMPLETE	390	97.5
INCOMPLETE	10	2.5

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
PCV 1		
COMPLETE	102	25.5
INCOMPLETE	298	74.5
PCV 2		
COMPLETE	96	24
INCOMPLETE	304	76
PCV 3		
COMPLETE	13	3.3
INCOMPLETE	387	96.8
PENTA 1		
COMPLETE	254	63.5
INCOMPLETE	146	36.5
PENTA 2		
COMPLETE	218	54.5
INCOMPLETE	182	45.5
PENTA 3		
COMPLETE	169	42.3
INCOMPLETE	231	57.8
IPV		
COMPLETE	175	43.8
INCOMPLETE	225	56.3
MEASLES		
COMPLETE	384	96
INCOMPLETE	16	4
YELLOW FEVER		
COMPLETE	384	96
INCOMPLETE	16	4

### 3.9. Constraints to Childhood Immunization

Table 7 shows the constraints to Childhood Immunization. Most of the respondents 350 (87.5%) agreed that they are willing to complete prescribed immunizations. Out of the 50



(12.5%) of the respondents that are not willing to complete immunization, 37 (74%) gave their reason as the adverse effect on the child.

**Table 7.** Constraints to Immunization.

VARIABLE	FREQUENCY (n=400)	PERCENTAGE (%)
Did you always complete the prescribed series of immunizations for your child or children that you immunized before?		
Yes	350	87.5
No	50	12.5
If No, what are your reasons?		
Husband do not agree	5	10
I do not have time for vaccination	7	14
Health facility is far to my house	1	2
Adverse effect	37	74

## 4. Discussion

Immunization has made a significant impact on global public health, but to maximize its benefits, coverage must uniformly reach critical levels for various diseases. This requires both the provision and optimum utilization of immunization services by the target population. Mothers of children under five, the primary targets for childhood immunization, need to be well-informed about these services and benefits, which necessitates a minimum literacy level [11].

Nigeria, the most populous nation in Africa with an estimated population of about 210 million, is divided into 36 states and the Federal Capital Territory (FCT) [12]. Customarily, Nigeria is divided into six geopolitical zones: north-central, north-west, north-east, south-east, south-west, and south-south. The southern regions are generally more developed, populous, and educated than the northern regions. These regional differences, along with varying cultural and religious practices—Christianity in the south and Islam in the north—significantly influence immunization coverage and uptake in the country [13].

The present study assessed routine immunization coverage among children aged 0-2 years in Akure South Local Government Area of Ondo State. The majority (25.2%) of respondents were aged 25-29 years, 47.3% had completed secondary education, and 86.3% had 1-5 children. Most respondents were married (73.8%), Yoruba (78.5%), and Christian (85.5%). Overall, 96.2% of the women had a good knowledge of immunization, which consistent with several studies on immunization knowledge and coverage. For instance, a study conducted in Ibadan, Nigeria, found high

levels of awareness about immunization among mothers, with 92% demonstrating good knowledge about the importance of vaccines [14]. This suggests that educational initiatives in some parts of Nigeria are effective in increasing immunization awareness. However, contrasting findings have been reported in other regions. A study in northern Nigeria revealed that only 48% of mothers had adequate knowledge about immunization [15]. The disparity between these findings and those of the present study could be attributed to regional differences in educational outreach, socioeconomic factors, and access to healthcare services. Northern Nigeria has historically faced more challenges related to healthcare infrastructure and educational opportunities, which might explain the lower knowledge scores observed in that region.

A study conducted in rural Pakistan found that only 60% of mothers had a good understanding of immunization [16]. The differences can be attributed to various factors, including educational level, cultural beliefs, and the effectiveness of public health campaigns. In regions with less access to education and healthcare services, knowledge about immunization tends to be lower.

The study found that 93.5% of respondents exhibited a positive attitude towards infant immunization and the health personnel administering vaccines. This finding is consistent with a 2020 study in China, where a majority of parents also showed favorable attitudes towards vaccination due to perceived importance, safety, and efficacy [17]. Positive parental attitudes are crucial as they significantly influence vaccination uptake and adherence to schedules, further supported by trust in healthcare providers, which is essential for maintaining high vaccination rates. However, 9.5% of women indicated they might not take their child for immunization, and 6% reported a lack of spousal support, reflecting the complexity of vaccination behaviors.

Similar contradictions were found in a 2021 study in India, where socio-cultural factors and familial influences led to vaccine hesitancy despite high awareness and positive attitudes [18].

The study also revealed that 97.8% of respondents had taken their child for immunization at a health facility, aligning with findings from Ethiopia, where high immunization rates were observed in communities with good healthcare access and positive health-seeking behaviors [19]. However, there were significant gaps in the completion rates of specific vaccines, such as PCV and Penta series, with logistical challenges and lack of awareness contributing to lower completion rates, as highlighted by a 2020 study in Pakistan [20]. These findings emphasize the need for targeted interventions, including reminders and follow-up systems, to ensure complete vaccination schedules are followed.

The study also found that 87.5% of respondents always completed the prescribed series of immunization for their children, higher than rates in other regions of Nigeria. For instance, the northwest had a vaccination uptake rate of 6%, while the southeast had 44.6% [21]. Religion significantly impacts education and vaccination uptake, with high levels of illiteracy and low vaccination uptake even in southern regions with strong Islamic influence. Studies have also linked vaccine hesitancy to religious beliefs, with some parents avoiding vaccinations due to cultural and religious reasons [15]. Some parents believe vaccines can cause deformities or death or see them as a means of population control by "white men," preferring traditional medicine instead [22].

Rumors about vaccines further contribute to vaccine hesitancy. Favorable parental perceptions about vaccines are linked to increased vaccine uptake, doubling the likelihood of vaccination [22].

## 5. Conclusion

In conclusion, this research has identified critical insights into the knowledge, attitudes, and practices of caregivers regarding childhood immunization in Akure South Local Government Area of Ondo State, Nigeria. The study revealed that most caregivers possess a good level of knowledge (96.2%) about immunization, and most have a positive attitude (93.5%) and proactive practice (97.8%) towards it. Despite these encouraging findings, immunization coverage still faces challenges due to factors such as cultural beliefs, religious influences, and socio-economic conditions. For instance, the study highlighted discrepancies in vaccination uptake linked to these factors, similar to patterns observed in other regions like Kinshasa and Iran. Future research should focus on addressing these socio-cultural barriers and enhancing education and outreach programs to ensure more comprehensive immunization coverage. Additionally, exploring the impact of targeted interventions in low-coverage areas and involving fathers more in immunization efforts could further improve the outcomes.

## 6. Recommendation

To further enhance immunization coverage, targeted health education campaigns should be implemented, particularly focusing on mothers in rural areas, slums, and villages, with an emphasis on those with lower levels of education. Additionally, organizing immunization sessions for mothers with children under one year old and facilitating social group meetings at maternal and child health centers could promote the exchange of information and support among mothers. Providing vaccination booklets that explain the importance of vaccines, how to manage side effects, and continuous educational programs about additional vaccinations not included in the mandatory health ministry schedule would further empower mothers with the knowledge necessary to ensure their children's health and wellbeing.

## Abbreviations

HiB	Hemophilus Influenza Type b
WHO	World Health Organization
LGA	Local Government Area
NPI	National Programme on Immunization
RI	Routine Immunization
SIAs	Supplementary Immunization Activities
SPSS	Statistical Package for Social Sciences

## Conflicts of Interest

The authors declare no conflicts of interest.

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