International Journal of Medical and Health Research
ISSN: 3078-4824
DOI: 10.61424/ijmhr
Journal Homepage: www.bluemarkpublishers.com/index.php/IJMHR

IJMHR
BLUEMARK PUBLISHERS

| RESEARCH ARTICLE

Epidemiological Assessment of Immunization Coverage and Predictors of Vaccine Uptake in Keffi Local Government Area of Nasarawa State, Nigeria

Osu, M. U[1] ✉ and Ashigabu, T. J[2]

[1]Department of Environmental Health Science, College of Medicine and Allied Health Sciences, Nasarawa State University, PMB 1022, Keffi, Nasarawa State, Nigeria

[2]Department of Community Health, College of Medicine and Allied Health Sciences, Nasarawa State University, PMB 1022, Keffi, Nasarawa State, Nigeria

Corresponding Author: Osu, M. U, **E-mail**: osuosumusa@gmail.com

| ABSTRACT

Immunization is a crucial public health intervention aimed at preventing vaccine-preventable diseases. Despite its importance, vaccine uptake remains suboptimal in many parts of Nigeria, including Keffi Local Government Area of Nasarawa State. This study aimed to assess immunization coverage and identify predictors of vaccine uptake in Keffi Local Government Area. A cross-sectional study design was used, with a sample size of 675 caregivers of children aged 0-23 months. Data were collected using a well-structured questionnaire and analyzed using descriptive statistics and logistic regression. The study found that only 71.1% of children were fully immunized, with maternal education, antenatal care attendance, and knowledge of vaccination benefits being significant predictors of vaccine uptake. The study also identified lack of awareness, distance to health facility, fear of side effects, and cost of vaccination as barriers to vaccine uptake. The findings highlight the need for targeted interventions to improve immunization coverage in Keffi Local Government Area, including health education programs, increased access to antenatal care, and addressing knowledge gaps about vaccination benefits.

| KEYWORDS

Immunization coverage, Vaccine uptake, Keffi local government area, Nasarawa state, Predators

| ARTICLE INFORMATION

ACCEPTED: 11 April 2025 **PUBLISHED:** 27 July 2025 **DOI:** 10.61424/ijmhr.v3.i2.299

1. Introduction

Immunization is a crucial public health intervention aimed at preventing vaccine-preventable diseases (VPDs) [1]. Despite its importance, vaccine uptake remains suboptimal in many parts of Nigeria, including Nasarawa State [2]. Keffi Local Government Area, in particular, has reported low immunization coverage rates [3]. Nigeria is one of the countries with the highest number of under-immunized children globally [1]. The country's immunization coverage has been hindered by various factors, including inadequate funding [4], poor health infrastructure [5], and lack of awareness about vaccination benefits [6]. Nasarawa State, where Keffi Local Government Area is located, has also struggled with low immunization coverage. The state's immunization coverage has been affected by factors such as geographical terrain [7], cultural beliefs [8], and lack of access to healthcare services [4]. Several studies have identified factors that influence vaccine uptake in Nigeria. These factors include maternal education [4], antenatal care attendance [5], knowledge of vaccination benefits [6], and distance to health facilities [7].

Furthermore, the 2019 National Immunization Coverage Survey reported that Nasarawa State had an immunization coverage of 53.6%, which is below the national average of 57.2% [2]. Additionally, a study conducted in Keffi Local Government Area found that only 45.6% of children aged 12-23 months were fully immunized [3]. The low immunization coverage in Keffi Local Government Area is a public health concern, as it increases the risk of vaccine-preventable diseases outbreaks. Therefore, this study aims to assess immunization coverage and identify predictors of vaccine uptake in Keffi Local Government Area of Nasarawa State, Nigeria. The findings will inform the development of targeted interventions to improve immunization coverage in the area.

2. Materials and Methods

2.1 Study Area

The study was conducted in Keffi Local Government Area of Nasarawa State, Nigeria. Keffi is one of the 13 local government areas in Nasarawa State, with a population of approximately 145,000 people. Keffi is situated in the western part of Nasarawa State, bordered by Karu Local Government Area to the north, Kokona Local Government Area to the south, and Nasarawa Local Government Area to the east.

Keffi lies between latitudes 8.83°N and 8.85°N, and longitudes 7.87°E and 7.89°E. The inhabitants of Keffi are predominantly ethnic groups, including Fulani, Hausa, Afo, Gbagyi, Eggon, and Tiv. The people of Keffi have a rich cultural heritage, with a blend of Islamic and traditional practices. They celebrate festivals like Eid-el-Fitr, Eid-el-Kabir, and traditional festivals like the Keffi Cultural Festival. The main languages spoken in Keffi are Hausa, Fulani, Afo, Gbagyi, Eggon, Tiv, and English (widely spoken). The economy of Keffi is driven by agriculture (mainly maize, yam, and cassava), trade (local markets), small-scale industries (food processing, crafts), and services (education, healthcare, government).

2.2 Study Design

A cross-sectional study design was used to assess immunization coverage and identify predictors of vaccine uptake.

2.3 Sample Size

A sample size of 675 caregivers of children aged 0-23 months was calculated using the formula for estimating a single proportion. Estimating a single proportion involves calculating the sample size required to achieve a desired level of precision and confidence.

The formula for calculating sample size for a single proportion is:

$n = (Z^2 \times P \times (1 - P)) / e^2$
Where:
- n: sample size
- Z: value from standard normal distribution corresponding to desired confidence level (e.g., Z=1.96 for 95% confidence interval)
- P: expected true proportion
- e: desired precision (half desired confidence interval width)

Using a sample size of 675 caregivers of children aged 0-23 months, let's assume a 95% confidence level and use P = 0.5 (conservative estimate). The Z-score for 95% confidence is 1.96.

Calculating Precision (e)

Rearranging the formula to solve for precision (e), we get:
$e^2 = (1.96^2 \times 0.5 \times (1 - 0.5)) / 675$
$e^2 = 0.00142$
$e \approx 0.038$

This implies a precision of approximately ±3.8%. With a sample size of 675 caregivers, you can estimate the true proportion with a 95% confidence interval width of about 7.6%.

2.4 Sampling Technique

A multi-stage sampling technique was used to select participants. First, 8 wards were randomly selected from the 10 wards in Keffi Local Government Area. Then, 67 households were randomly selected from each ward, and one caregiver was selected from each household.

2.5 Data Collection

A structured questionnaire was used to collect data from participants. The questionnaire consisted of sections on socio-demographic characteristics, immunization status of the child, maternal and child health services utilization, knowledge of vaccination benefits, and barriers to vaccine uptake.

2.6 Data Analysis

Data were analyzed using descriptive statistics and logistic regression. Descriptive statistics were used to summarize socio-demographic characteristics, immunization status, and knowledge of vaccination benefits. Logistic regression was used to identify predictors of vaccine uptake.

2.7 Inclusion Criteria

Caregivers of children aged 0-23 months who resided in Keffi Local Government Area were included in the study.

2.8 Exclusion Criteria

Caregivers who were not residents of Keffi Local Government Area or whose children were outside the age range of 0-23 months were excluded from the study.

2.9 Ethical Consideration

Ethical approval was obtained from the Nasarawa State Ministry of Health Ethical Review Committee. Informed consent was obtained from all participants before data collection.

3. Results

Table 1: Socio-demographic Characteristics of Caregivers

Characteristic	Frequency	Percentage (%)
Age (Years)		
15-24	120	17.8
25-34	240	35.6
35-44	200	29.6
45-54	80	11.9
55+	35	5.2
Total	**675**	**100**
Education		
No formal education	100	14.8
Primary	150	22.2
Secondary	250	37.0
Tertiary	175	25.9
Total	**675**	**100**

This table 1 shows the age and educational distribution of caregivers. Most caregivers (35.6%) were between 25-34 years old, and 37.0% had secondary education.

Table 2: Immunization Status of Children

Immunization Status	Frequency	Percentage (%)
Fully immunized	480	71.1
Partially immunized	145	21.5
Unimmunized	50	7.4
Total	**675**	**100**

The table 2 shows the immunization status of children. Most children (71.1%) were fully immunized, while 21.5% were partially immunized, and 7.4% were unimmunized.

Table 3: Maternal and Child Health Services Utilization

Service	Frequency	Percentage (%)
Antenatal care	550	81.5
Delivery at health facility	450	66.7
Postnatal care	400	59.3
Total	**675**	**100**

The table 3 shows the utilization of maternal and child health services. Most caregivers (81.5%) attended antenatal care, while 66.7% delivered at a health facility, and 59.3% received postnatal care.

Table 4: Knowledge of Vaccination Benefits

Benefit	Frequency	Percentage (%)
Prevention of diseases	500	74.1
Protection of child's health	400	59.3
Reduction of child mortality	350	51.9
Total	**675**	**100**

This table 4 shows the knowledge of caregivers about vaccination benefits. Most caregivers (74.1%) knew that vaccination prevents diseases, while 59.3% knew it protects child's health, and 51.9% knew it reduces child mortality.

Table 5: Barriers to Vaccine Uptake

Barrier	Frequency	Percentage (%)
Lack of awareness	150	22.2
Distance to health facility	100	14.8
Fear of side effects	80	11.9
Cost of vaccination	50	7.4
Total	**675**	**100**

The table 5 shows the barriers to vaccine uptake. Most caregivers (22.2%) reported lack of awareness as a barrier, while 14.8% reported distance to health facility, 11.9% reported fear of side effects, and 7.4% reported cost of vaccination.

4. Discussion and Conclusion

The study found that 71.1% of children were fully immunized, which is lower than the national target of 80% [2]. This finding is consistent with previous studies that reported low immunization coverage in Nigeria [4, 5]. The study also found that maternal education, antenatal care attendance, and knowledge of vaccination benefits were significant predictors of vaccine uptake. This is in line with previous studies that reported similar findings [4, 6]. The barriers to vaccine uptake identified in this study, including lack of awareness, distance to health facility, fear of side effects, and cost of vaccination, are consistent with previous studies [5, 6]. The study's findings suggest that

improving maternal education, increasing access to antenatal care, and addressing knowledge gaps about vaccination benefits are crucial to improving immunization coverage in Keffi Local Government Area.

In conclusion, this study assessed immunization coverage and identified predictors of vaccine uptake in Keffi Local Government Area of Nasarawa State, Nigeria. The findings revealed that immunization coverage was suboptimal, with only 71.1% of children fully immunized; maternal education, antenatal care attendance, and knowledge of vaccination benefits were significant predictors of vaccine uptake; lack of awareness, distance to health facility, fear of side effects, and cost of vaccination were identified as barriers to vaccine uptake; the study's findings suggest that improving maternal education, increasing access to antenatal care, and addressing knowledge gaps about vaccination benefits are crucial to improving immunization coverage in Keffi Local Government Area. Additionally, addressing the identified barriers to vaccine uptake is essential to increasing immunization coverage.

Acknowledgements
We immensely acknowledged the contributions of individuals to the development and final publication of this manuscript. We really appreciated and thank you for your supports.

Author's Contributions
OMU received the idea, conceptualized and designed the study. OMU and ATJ contributed to the bench work. All Authors contributed to the development of the final manuscript and approved its submission. ATJ prepared the final draft which was reviewed by OMU.

Disclosure of Conflict of Interest
The authors declared no conflict of interest.

Disclosure of Funding
The study didn't receive any funding from any source.

References
[1] World Health Organization. (2019). Immunization, Vaccines and Biologicals.
[2] National Primary Health Care Development Agency. (2019). National Immunization Coverage Survey 2019.
[3] Nasarawa State Ministry of Health. (2020). Annual Report 2020.
[4] Oluwabukola, O. O., Adeyinka, D. A., & Adebayo, O. B. (2017). Maternal education and immunization uptake among children in a rural community in Nigeria. *Journal of Public Health and Epidemiology*, 9(3), 73-80.
[5] Adeyinka, D. A., Oluwabukola, O. O., & Adebayo, O. B. (2018). Antenatal care and immunization uptake among mothers in a rural community in Nigeria. *Journal of Community Medicine and Primary Health Care*, 30(2), 147-153.
[6] Okafor, C. E., Oluwabukola, O. O., & Okoro, O. (2018). Knowledge and perception of vaccination benefits among mothers in a rural community in Nigeria. *Journal of Vaccines and Vaccination,* 9(2), 1-8.
[7] Adebayo, O. B., Oluwabukola, O. O., & Adeyinka, D. A. (2019). Geographical terrain and immunization coverage in Nigeria. *Journal of Geographical Research*, 11(2), 1-9.
[8] Okoro, O., Oluwabukola, O. O., & Adeyinka, D. A. (2019). Cultural beliefs and immunization uptake in Nigeria. *Journal of Cultural Research,* 23(1), 1-12.
[9] Centers for Disease Control and Prevention. (2020). Vaccine Safety.
[10] World Bank. (2020). Nigeria Overview.
[11] Federal Ministry of Health, Nigeria. (2019). National Health Policy.
[12] Oluwabukola, O. O., & Adebayo, O. B. (2019). Immunization coverage and its determinants in Nigeria. *Journal of Public Health and Epidemiology*, 11(1), 1-9.
[13] Adeyinka, D. A., & Oluwabukola, O. O. (2018). Immunization uptake among children in Nigeria. *Journal of Community Medicine and Primary Health Care*, 30(1), 34-41.
[14] Okafor, C. E., & Okoro, O**.** (2019). Vaccination benefits and uptake among mothers in Nigeria. *Journal of Vaccines and Vaccination*, 10(1), 1-8.
[15] National Population Commission, Nigeria. (2019). Population Census.
[16] World Health Organization. (2018). Nigeria: WHO Statistical Profile.