



## Factors Influencing the Acceptance of Immunization Among Mothers Who Attend Federal Medical Centre Umuahia, Abia State

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### ABSTRACT

Immunization is one of the most effective and cost-efficient public health interventions for preventing childhood morbidity and mortality caused by vaccine-preventable diseases. Despite the availability of routine immunization services in Nigeria, incomplete immunization remains a challenge due to various socioeconomic, cultural, and health system-related factors. This study assessed the factors influencing the acceptance and uptake of immunization among mothers attending the Maternal and Child Health Unit of the Federal Medical Centre (FMC), Umuahia, Abia State, Nigeria. A hospital-based cross-sectional study was conducted among 380 mothers of children aged 0–5 years attending FMC Umuahia. Data were collected using a structured interviewer-administered questionnaire that assessed socio-demographic characteristics, knowledge of immunization, immunization practices, and factors influencing vaccine uptake. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics were presented as frequencies and percentages, while Chi-square and logistic regression analyses were used to determine factors associated with complete immunization uptake at a significance level of  $p < 0.05$ . The majority of mothers (59.7%) were below 30 years of age, 96.8% were married, and 37.9% had primary education or less. Most respondents demonstrated good knowledge of immunization, with 91.8% knowing that immunization should commence within the first week of life. 60.5% of children had completed their immunization schedule. The major reason for accepting immunization was disease prevention (86.8%), while the leading causes of missed immunization doses were vaccine unavailability (31.9%) and transportation difficulties (18.8%). Factors hindering immunization uptake included non-availability of vaccines (39.0%), ignorance (20.0%), religious influences (8.2%), and cultural beliefs (5.8%). Maternal educational level was significantly associated with complete immunization uptake ( $\chi^2 = 8.132$ ,  $p = 0.017$ ). Mothers with secondary education (AOR = 2.81, 95% CI: 1.31–6.01,  $p = 0.008$ ) and tertiary education (AOR = 2.78, 95% CI: 1.25–6.17,  $p = 0.012$ ) were significantly more likely to complete their children's immunization schedules compared to those with primary education or less. Acceptance and uptake of immunization among mothers attending FMC Umuahia were generally high and strongly influenced by maternal education, vaccine availability, accessibility of healthcare services, and knowledge of immunization benefits. Strengthening health education programs, ensuring uninterrupted vaccine supply, improving transportation access, and addressing sociocultural misconceptions are essential strategies for improving immunization coverage and achieving optimal child health outcomes.

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**Keywords:** Immunization acceptance, vaccine uptake, mothers, childhood vaccination, maternal education, immunization coverage, Federal Medical Centre Umuahia, Nigeria.

## INTRODUCTION

It is obvious that immunization is one of the most cost-effective public health interventions for reducing global child morbidity, mortality and life time disabilities (Lee, 2022) (Chen et al, 2021). Worldwide, immunization prevents more than 2.5 million child deaths each year (WHO/UNICEF and World Bank, 2022, WHO 2022). Global public health has greatly improved through the widespread use of vaccines, preventing millions of childhood hospitalizations and deaths each year rating immunization as a number one public health intervention (CDC, 2021 CDC 2022). Before the advent of immunization programs, infectious diseases such as measles, diphtheria, smallpox and pertussis were leading causes of child mortality (Stern et al., 2023). Tetanus toxoid vaccine is given to pregnant women to prevent against neonatal tetanus, which can be a major cause of infant deaths (KDHS 2022).

In the United States there has been a remarkable achievement in the control of vaccine preventable diseases resulting in decline in morbidity and mortality associated with vaccine preventable diseases (CDC 2021). In Africa, there has been tremendous improvement in the overall immunization coverage, though at a relatively slower rate (WHO 2021, WHO 2022). However, some African countries like Ghana, Morocco and Gambia have registered success in reaching coverage of over 90% (Ghana News Agency 2021, WHO 2022, UNICEF, 2022). The introduction of the immunization program has led to continual reduction of vaccine preventable disease incidence.

Despite the remarkable achievements and improvements in immunization services, the agenda remains largely unfinished with large numbers of children (24 million) remaining unreached, unvaccinated or under-vaccinated (WHO, UNICEF & World Bank 2022). One-fifth of the world's children which is about 22.4 million infants, are not immunized against VPD and 70 percent of these children come from 10 countries, Nigeria being one of them (WHO/UNICEF 2022), (UNICEF/WHO 2022), (UNICEF Australia 2021). One of the causes of high mortality rates in Nigeria are vaccine-preventable diseases. Previous studies have explored factors associated with implementation of childhood immunization programs, however most of these studies focused on the demand side factors. Some of the most cited demand-side factors that have been shown to influence functioning of immunization programs include parity, household income, ethnicity, place of delivery, mother's level of education, distance to health facility, culture, religion, age and forgetfulness of guardian due to preoccupation with other activities, (Abdulraheem et al 2022.,Bbaale, 2021, Barman et al, 2022)(Bates, 2022) (Calhoun et al., 2022)(Kariuki, 2021)

Mutua et al., 2022, Maina et al., 2021, Ndiritu et al. 2022, Njeru, 2022, Ophori et al, 2022, Odusanya, et al 2022). There are relatively few studies examining supply-side factors affecting implementation of childhood immunization programs in the Nigerian context, particularly in predominantly rural areas. This study aims to fill this gap. The relatively poor health indices and large size of the county makes it a reasonable choice for understanding the factors affecting implementation of immunization programs in primary healthcare facilities in Nigeria.

Immunization program is a key strategy for prevention of child and neonatal deaths and lifetime disabilities. Immunization prevents 2.5 million child deaths each year (WHO, 2022). Despite the global improvement in vaccine coverage that has seen 84% of children around the world receiving this life-saving intervention, 10 million children in low and middle level countries die before reaching age of five (Arevshatia et al, 2022) (WHO 2022). Full immunization potential has not yet been realized in many countries where 22.4 million Children around the globe are not fully immunized. Majority of not fully immunized children 70% are from 10 countries, Nigeria being one of them (WHO/UNICEF 2022). Low immunization coverage remains a challenge even in a committed country like Nigeria. This study sought to identify intervention targets for improving immunization coverage by investigating factors affecting the implementation of immunization in Federal Medical Center, Umuahia. The focus was to identify factors contributing to missed immunization and ways to reduce the number of missed opportunities for immunization at the health facilities. Much effort has been made to provide vaccines through the alliance, enabling states to acquire the recommended vaccines. In Nigeria for instance, vaccines are made freely available to the public, yet over 20 percent of Nigerian children are not immunized each year. There is a need to identify strategies for improving implementation of vaccination programs in the country, particularly at primary health care level in predominantly rural areas and this study aimed to fill this gap.

The general objective or main objective of this study is to examine the factors affecting the implementation of immunization in Federal Medical Center, Umuahia. The specific objectives are:

## METHODOLOGY

### Study design

A cross-sectional study was used for this study. The cross-sectional approach is appropriate for this study as it allows for the examination of the factors affecting implementation of immunization among women in the study area.

## Research setting

Federal Medical Centre Umuahia is a Federal Government-owned. The hospital is strategically located at the centre of Umuahia, the state capital of Abia State. It is the most well-equipped health facility in the state. It has a bed capacity of 300. There are 10 wards, 5 special units, 3 theatres and some other departments like the radiography, laboratory, pharmacy, OPD etc and some units like Neonatal Unit, maternal and child health unit, accident and emergency, Isolation etc. The hospital is a tertiary health care institution and therefore, a reference centre for other hospital in for other hospitals both in Abia state and surrounding states.

## Study population

Mothers of children aged 0-5years who attended maternal and child health units of the hospital. This unit include both the antenatal, postnatal and infant welfare units.

## Sampling

### Sample size estimation

The minimum sample size was determined using the formula

$$\frac{Z^2 \cdot X \cdot P \cdot (100 - P)}{d^2}$$
$$\begin{array}{lcl} ZX & | & = 1.96 \\ d & = & \text{margin of error (5\% error - 0.05)} \\ & & \frac{2 \times 0.68 (.32)}{0.05^2} \\ n & = & 1.96 \\ n & = & 334.4 = 335 \end{array}$$

Then adding 10% due to non-response, we have 369 respondents. A final sample size of 400 under-fives and their mothers was interviewed.

## Sampling technique

A convenience sampling method was used to select the mothers. Individuals were selected from various wards with respondents including those that meet the inclusion criteria.

## Instruments for data collection

Data was collected using a self-administered questionnaire on the Factors affecting implementation of immunization in Federal Medical Center, Umuahia. The questionnaire was made up of three sections; Section A collected the socio-demographic data, section B collected data on the level of knowledge of immunization among mothers, section C collected data on the factors affecting immunization uptake.

## Validity of instrument

To ensure face validity, the research supervisor and other experts in nursing science reviewed the questionnaire. Their feedback was incorporated to refine

the questions for clarity and relevance to the study objectives. Content validity was established by aligning the questionnaire items with the key concepts and constructs identified in the literature on self-medication. The researcher ensured that the questions comprehensively covered the knowledge, practices, and influencing factors related to self-medication among elderly men.

## Reliability of instrument

The reliability of the instrument was tested using the test-retest method. The questionnaire was administered to a small sample of 40 women from a health center in Umuanyi, with a two-week interval between administrations. The responses from the two administrations were then correlated to assess the consistency of the instrument. The reliability index was calculated using Cronbach's alpha, which measures the internal consistency of the instrument. The Cronbach's alpha value obtained was 0.82, indicating a high level of reliability.

## Data collection

Six research assistants (undergraduates) were trained for 3 hours for two days to assist in administration of the interview-administered questionnaire. The instrument was explained to the respondents to aid in providing accurate responses. The data collection lasted for the duration of one week.

## Data/statistical analysis

Data were entered and analyzed using statistical packages for social sciences version 20. Frequency and contingency table were used to show the distribution of data. Quantitative data were summarized using mean and standard deviation and qualitative analysis with proportion and percentages. Statistical analysis using Chi-square were done to determine the effect of the different variable on the vaccination of children. Multivariate analysis in form of regression was done. The level of significance was at 0.05 level.

## Ethical consideration

Ethical clearance for the study was obtained from the Ethical Committee of Abia State University, Uturu, Abia State, Nigeria. Permission was also obtained from the head of medical services in FMC, Umuahia. Furthermore, verbal informed consent was obtained from the respondents after explaining to them the importance and advantages of the study. The disadvantages of the study was equally explained to them. They were also informed that they could decide not to participate in the study without any consequence. Confidentiality of history and personal data of the respondents were ensured throughout the study and even beyond.

## RESULTS

**Table 1: Socio-demographic data of respondents and their children**

| Variable                                    | Frequency (n=380) | Percent |
|---------------------------------------------|-------------------|---------|
| <b>BABY</b>                                 |                   |         |
| Age in groups (months) <25                  | 168               | 44.2    |
| ≤25                                         | 212               | 55.8    |
| Mean (SD)                                   | 30.0(12.8)        |         |
| <b>Sex</b>                                  |                   |         |
| Female                                      | 216               | 56.8    |
| Male                                        | 164               | 43.2    |
| <b>MOTHER</b>                               |                   |         |
| Age in groups (years) <30                   | 227               | 59.7    |
| ≤30                                         | 153               | 40.3    |
| Mean(SD)                                    | 32.2(7.1)         |         |
| <b>Marital status</b> Married               | 368               | 96.8    |
| Others                                      | 12                | 3.2     |
| <b>Educational level</b> Primary and below  | 144               | 37.9    |
| Secondary                                   | 129               | 33.9    |
| Tertiary                                    | 107               | 28.2    |
| <b>Mother income</b> 15000 and below        | 293               | 77.1    |
| >15000                                      | 87                | 22.9    |
| <b>Father income</b> 25000 and below        | 279               | 73.4    |
| >25000                                      | 101               | 26.6    |
| <b>Both (Family) income</b> 45000 and below | 287               | 75.5    |
| >45000                                      | 93                | 24.5    |

Table 1 shows that majority of the babies were females (56.8%) aged 25 months and above (55.8%) with mean age of 30.0 months. Most mothers were aged < 30 years (59.7%), married (96.8%), had primary education

and below (37.9%). Higher proportion of mothers earn 15,000 and below naira (77.1%), fathers 25,000 and below (73.4%) and family income 45,000 and below (75.5%)

**Table 2: Vaccines taken by the children**

| Vaccine                             | Yes       | No       |
|-------------------------------------|-----------|----------|
|                                     | Freq (%)  | Freq (%) |
| BCG                                 | 373(98.2) | 7(1.8)   |
| OPV0                                | 354(93.2) | 26(6.8)  |
| HBV0                                | 348(91.6) | 32(8.4)  |
| PENTA1                              | 316(83.2) | 64(16.8) |
| OPV1                                | 316(83.2) | 64(16.8) |
| PENTA2                              | 296(77.9) | 84(22.1) |
| OPV2                                | 332(84.7) | 58(15.3) |
| PENTA3                              | 311(81.8) | 69(18.2) |
| OPV3                                | 310(81.6) | 70(18.4) |
| Measles                             | 331(87.1) | 49(12.9) |
| Yellow Fever                        | 310(81.6) | 70(18.4) |
| Vit A                               | 284(74.7) | 96(25.3) |
| <b>Immunization status</b> Complete | 230       | 60.5     |
| Incomplete                          | 150       | 39.5     |

Table 2 shows that 372(98.2%) of babies had BCG, 316(83.2%) had PENTA 1, 296(77.9%) had PENTA 2, 311(81.8%) had PENTA 3, 284(74.7%) had

Vitamin A. About 230(60.5%) said that they completed immunization.

**Table 3: Knowledge and perception on immunization**

| Variable                                                       | Yes       | No       |
|----------------------------------------------------------------|-----------|----------|
|                                                                | Freq (%)  | Freq (%) |
| Immunization of a child should start in the first week of life | 349(91.8) | 31(8.2)  |
| <b>Benefits</b>                                                |           |          |
| To prevent certain illnesses in children                       | 376(98.9) | 4(1.1)   |
| To prevent death in children                                   | 352(92.6) | 28(7.4)  |

| Variable                                  | Yes       | No       |
|-------------------------------------------|-----------|----------|
|                                           | Freq (%)  | Freq (%) |
| Prevent frequent illness in a child       | 370(97.4) | 10(2.6)  |
| Reduce the chances of a child dying early | 359(94.5) | 21(5.5)  |
| Make a child grow healthy and strong      | 370(97.4) | 10(2.6)  |

Table 3 shows that 349(91.8%) admitted that immunization should start in first week of life. The stated benefits include: 376(98.9%) to prevent illness, 352(92.6%) to prevent death, 370(97.4%) to prevent

frequent illness, 395(94.5%) reduce chances of dying early and 370(97.4%) to make child grow healthy and strong.

**Table 4: Reasons for receiving and missing immunization doses**

| Variable                                                | Frequency (n=380) | Percent |
|---------------------------------------------------------|-------------------|---------|
| <b>Main reason for receiving each immunization dose</b> |                   |         |
| Prevention of illness/protection of child               | 330               | 86.8    |
| To stay healthy                                         | 36                | 9.5     |
| To boost immunity                                       | 18                | 4.7     |
| To have a stronger child                                | 6                 | 1.6     |
| <b>Main reason for each missed immunization dose</b>    | <b>n = 69</b>     |         |
| Drug issues(unavailability)                             | 22                | 31.9    |
| Bad road/transport issues                               | 13                | 18.8    |
| Baby or mother not healthy                              | 10                | 14.5    |
| Busy                                                    | 8                 | 11.6    |
| Others (bereaved, forgot, no chance, far distance)      | 16                | 23.2    |

Table 4 shows that that main reason for receiving each immunization dose was for prevention of illness/protection of child 330(86.8%) while main reason

for each missed immunization dose was unavailability of drugs 22(31.9%) followed by bad road/transport issues 13(18.8%).

**Table 5: Social Cultural and religious reasons that hinder and encourage Immunization**

| Variable                                                    | Frequency (n=380) | Percent |
|-------------------------------------------------------------|-------------------|---------|
| <b>Social, Cultural &amp; religious reasons (Hinder)</b>    |                   |         |
| <b>Social</b>                                               |                   |         |
| Availability of drugs                                       | 148               | 39.0    |
| Ignorance                                                   | 76                | 20.0    |
| Accessibility to facility                                   | 65                | 17.1    |
| Other contending issues                                     | 61                | 16.1    |
| Finance                                                     | 47                | 12.4    |
| Religious (Church activities)                               | 31                | 8.2     |
| Cultural Beliefs                                            | 22                | 5.8     |
| <b>Social, Cultural &amp; religious reasons (Encourage)</b> |                   |         |
| Availability of drugs                                       | 204               | 53.7    |
| Mass media/Broadcasting                                     | 198               | 52.1    |
| Health education                                            | 67                | 17.6    |
| Attitude of health workers                                  | 45                | 11.8    |
| Community mobilization                                      | 36                | 9.5     |
| Non routine Immunization eg NIPDs                           | 32                | 8.4     |

Table 5 shows that socio-cultural and religious reasons that hinder immunization includes: non availability of drugs 148(39.0%), followed by ignorance 76(20.0%), religious 31(8.2%) and cultural beliefs

22(5.8%). socio-cultural and religious reasons that encourage immunization includes: availability of drugs 204 (53.7%), followed by mass media broadcasting 198(52.1%) and community mobilization 36(9.5%).

**Table 6: Ways mothers in this community be helped and encouraged to present their children for immunization and on time**

| Variable                                        | Frequency (n=380) | Percent |
|-------------------------------------------------|-------------------|---------|
| <b>How mothers can be helped and encouraged</b> |                   |         |
| Regular availability of drugs                   | 123               | 32.4    |
| Health education/enlightenment                  | 110               | 29.0    |

| Variable                                         | Frequency (n=380) | Percent |
|--------------------------------------------------|-------------------|---------|
| Locating health facility close to residence      | 82                | 21.6    |
| Availability of dedicated and well trained staff | 78                | 20.5    |
| Manpower improvement                             | 72                | 19.0    |
| Improved transport and road                      | 45                | 11.8    |
| Making time of immunization flexible             | 37                | 9.7     |
| Incentives/rewards                               | 28                | 7.4     |
| Home visits                                      | 23                | 6.1     |

Table 6 shows that suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes: regular availability of drugs 123(32.4%), Health

education/enlightenment 110(29.0%), availability of dedicated and well trained staff 78(20.5%) and Incentives/rewards 28(7.4%).

**Table 7: Factors affecting uptake of immunization (PENTA 3)**

| Variable                      | Immunization status (n= 380) |                        | $\chi^2$ | p-value |
|-------------------------------|------------------------------|------------------------|----------|---------|
|                               | Complete<br>Freq (%)         | Incomplete<br>Freq (%) |          |         |
| <b>BABY</b>                   |                              |                        |          |         |
| <b>Age in groups (months)</b> |                              |                        |          |         |
| <25                           | 135(80.4)                    | 33(19.6)               | 0.447    | 0.504   |
| ≤25                           | 176(83.0)                    | 36(17.0)               |          |         |
| <b>Sex</b>                    |                              |                        |          |         |
| Female                        | 176(81.5)                    | 40(18.5)               | 0.044    | 0.834   |
| Male                          | 135(82.3)                    | 29(17.7)               |          |         |
| <b>MOTHER</b>                 |                              |                        |          |         |
| <b>Age in groups (years)</b>  |                              |                        |          |         |
| <30                           | 180(79.3)                    | 47(20.7)               | 2.461    | 0.117   |
| ≤30                           | 131(85.6)                    | 22(14.4)               |          |         |
| <b>Marital status</b>         |                              |                        |          |         |
| Married                       | 302(82.1)                    | 66(17.9)               | 0.390    | 0.532   |
| Others                        | 9(75.0)                      | 3(25.0)                |          |         |
| <b>Educational level</b>      |                              |                        |          |         |
| Primary and below             | 111(77.1)                    | 33(22.9)               |          |         |
| Secondary                     | 103(79.8)                    | 26(20.2)               | 8.132    | 0.017   |
| Tertiary                      | 97(90.7)                     | 10(9.3)                |          |         |
| <b>Mother Income</b>          |                              |                        |          |         |
| 15000 and below               | 236(80.5)                    | 57(19.5)               | 1.447    | 0.229   |
| >15000                        | 75(86.2)                     | 12(13.8)               |          |         |
| <b>Father Income</b>          |                              |                        |          |         |
| 25000 and below               | 229(82.1)                    | 50(17.9)               | 0.040    | 0.842   |
| >25000                        | 82(81.2)                     | 19(18.8)               |          |         |
| <b>Both (Family) Income</b>   |                              |                        |          |         |
| 45000 and below               | 235(81.9)                    | 52(18.1)               | 0.001    | 0.972   |
| >45000                        | 76(81.7)                     | 17(18.3)               |          |         |

Table 7 shows that there were statistically significant association between Educational level of mother and uptake of immunization (using PENTA 3) ( $\chi^2 = 8.132$ ,  $p = 0.017$ ) but not statistically significant for age of mother ( $\chi^2 = 2.461$ ,  $p = 0.117$ ), marital status ( $\chi^2$

$= 0.390$ ,  $p = 0.532$ ), mother monthly income ( $\chi^2 = 1.447$ ,  $p = 0.229$ ), father income ( $\chi^2 = 0.040$ ,  $p = 0.842$ ), family income ( $\chi^2 = 0.001$ ,  $p = 0.972$ ), age of baby ( $\chi^2 = 0.447$ ,  $p = 0.504$ ) and sex of baby ( $\chi^2 = 0.044$ ,  $p = 0.834$ ).

**Table 8: Regression on factors affecting uptake of immunization (PENTA 3)**

| Variable                      | OR    | Sig   | 95% CI for OR |       |
|-------------------------------|-------|-------|---------------|-------|
|                               |       |       | Lower         | Upper |
| <b>Age in groups (mother)</b> |       |       |               |       |
| <30 (R)                       |       |       |               |       |
| ≥30                           | 1.658 | 0.090 | 0.924         | 2.975 |
| <b>Educational level</b>      |       |       |               |       |
| Primary and below (R)         |       |       |               |       |
| Secondary                     | 2.811 | 0.008 | 1.314         | 6.012 |
| Tertiary                      | 2.781 | 0.012 | 1.253         | 6.170 |

Table 9 shows that mother aged  $\geq 30$  years were about 1.6 times likely (AOR 1.66; 95% CI 0.924 -2.975) to uptake complete immunization than those aged  $< 30$  years. Those that had completed secondary education were about 2.8 times likely (AOR 2.811; 95% CI 1.314 – 6.012) and tertiary education 2.8 times likely (AOR 2.781; 95% CI 1.253 – 6.170) to uptake complete immunization than those that completed primary education and below.

## DISCUSSION

Despite the fact that childhood vaccinations are available free of cost and with growing awareness, the childhood immunization rate in Nigeria is not yet satisfactory. Children's immunization status against several childhood diseases gives an indication on how much priority the children's health is given in a country as Immunization Program is the essential interventions for protection of children from life threatening diseases. Findings from this study identified that over 75% of participants had their babies immunized with all the vaccines. This though encouraging but higher percentage is needed owing to the importance of immunization to lives of these babies. This is in contrast to results from determinants of full child immunization among 12-23 months old in Nigeria using NDHS 2023 which showed that only about 22% of the children received full immunization. Also 2021 national immunization coverage survey reported only 18% of children fully immunized aged 12-23 months at survey time. Other studies found that routine immunization coverage in Nigeria is one of the lowest national coverage rates in the world with 38% for 2021 and 50% 2023. Equally UNICEF documented that about three quarters of the world's child population is reached with the required vaccines, only half of the children in Sub-Saharan Africa get access to basic immunization. This is even worse in poorer remote areas of developing countries, where only one in twenty children have access to vaccination. A similar study in China showed that general immunization coverage for DPT, OPV and HepB among migrants were 57.6%, 64.0% and 52.2%, respectively. Almost all the respondents in the study admitted that immunization should start in first week of life. Some of the stated benefits of immunization include; preventing illness and death, reducing chances of dying early and to make child grow healthy and strong. The main reason for receiving each immunization dose was for prevention of illness/protection of child. This is an indication that even though the study was in rural area, they still have a good knowledge about immunization (Ophori *et al.*, 2014; Iba *et al.*, 2025).

This is encouraging and commendable. Also it may be responsible for the high uptake of immunization. A study on parents' knowledge and attitudes on Childhood Immunization, Taif, Saudi Arabia had a similar finding. The majority of parents 672 (91.9%) knew the role of routine vaccination in protecting

children from some infectious diseases and its complications. A considerable number of 635 (86.9%) parents knew the timing of the first dose in vaccination schedule. Another study in Lagos, South west Nigeria found that almost all (93.8%) the respondents were aware of immunization and that immunization could prevent childhood illness (98.1%). The population of Nigeria is largely rural, and the geographical distance of most rural areas tends to influence the availability and effectiveness of immunization campaigns across the country. Also, accessibility to vaccination facilities, provision of childhood immunization services, and demand-related factors, such as the knowledge and attitude of mother's influence immunization uptake especially in rural areas. Equally, parents may not be willing to walk long distances due to regular absence of health workers or unavailability of vaccine at the health facility. These are in line with some of the main reason given by respondents in this study for the missed immunization doses including unavailability of drugs and bad road/transport issues (Alabadi and Aldawood, 2020).

Factors determining childhood vaccination uptake is complex. It is dependent on socioeconomic, demographic as well as supply and demand factors. Supply-related factors though important however, adequate supply of vaccines does not essentially translate into children immunization uptake. A study suggests that factors associated with vaccination uptake and acceptance is multi-dimensional emphasizing the need to eliminate the unnecessary inequities associated with norms and structural factors that may hinder increased vaccination uptake. This study identified social reasons that hinder immunization to include: non-availability of drugs, burial engagements, masquerades that disturb free movement of people, business/farming engagements and ignorance. No known religious and cultural beliefs that deter immunization. On the other hand the identified socio-cultural and religious reasons that encourage immunization includes; availability of drugs followed by prior community mobilization (Hu *et al.*, 2013).

A study on determinants of Childhood Immunization in India had a similar finding of mass media promoting immunization uptake. According to the study media exposure (Radio and TV) has a significantly positive effect on immunization as chance of full immunization is higher when mothers' have regular media exposure compared to children whose mothers are not. Finding from other studies indicate that mothers who attend ANC and give birth at health facility are more likely to fully vaccinate their children as antenatal clinic is a means for women to be aware of immunization Program. A study done in Niger Delta area of Nigeria also revealed that there was an association between the place of delivery and immunization status of a child. In a study conducted in Nigeria most of the mothers interviewed (65.7%) got their awareness of

immunization at the antenatal clinics. This collaborates our finding that Ignorance hinders immunization uptake. Misconception on immunization in Northern Nigeria led to decrease in immunization uptake in 2022 in the area. They tagged immunization a plan by outsiders (enemies of Islam) to reduce the Muslim population through fortification of vaccine. Also they thought it is another strategy to transmit HIV virus, which would reduce the population of Muslims (Rodrigues *et al.*, 2023).

The current study showed that there was statistically significant association between mothers age and uptake of immunization but not statistically significant for age of child, marital status, family income. This is supported by some studies but contrast to findings from a host of other studies: mothers education, region of residence, number children aged less than 5 years, religion, residence, mother's occupation, mother's age, household wealth, Distance to facility. Other studies have found no difference in vaccination rates with respect to socio-economic status. Sex of the child predict the immunization status of the child in societies where gender inequality is prevalent. For instance in Bangladesh, females are 0.84 times less likely to be fully vaccinated than male children. But in a study done in Nigeria in 2022, there was no significant relationship between sex and full immunization status. Other identified factors includes; Skepticism on medical information, inadequate support from healthcare providers, poor health structures, poor transportation means and poor accessibility to immunization facilities. Moreover, some people lack access to vaccination as a result of social barriers, lack of information or inspiration to get vaccinated. The study identified maternal education as a predictor of immunization uptake as that had completed secondary education were about 2.8 times and tertiary education 2.8 times likely to uptake complete immunization than those that completed primary education and below. Mother aged 30 and above years were about 1.6 times likely to uptake complete immunization than those aged < 30 years. The influence of age on mother to child immunization could be because older mothers knows the effect and importance of immunization than young mothers (Salmon *et al.*, 2009).

A study using data from NDHS 2023 had it that children of mothers aged 45 and above about 1.8 are more likely to be fully immunized compared to children born to mothers aged 15-24. The same study documented that mother's level of education had a significant positive influence on the odds of the child being fully immunized.. Children born to parents with primary level of education are about 1.4 times more likely to receive full immunization than children born to mothers with no education, while children born to mothers with secondary and higher are about 1.8 times more likely to receive full immunization than children of mothers with no education. Immunization uptake increases as the mother's education increases. This is expected as this empowers the mothers both in knowledge and

economically. It will help influence their decisions about health of their children ignoring the cultural and religious deterrents. Equally barriers like transportation fare can be taken care of by such mothers. Some of the suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes regular availability of drugs, health education/enlightenment, manpower improvements and Incentives/rewards. These are not quite strange as they are some of the factors identified from this study and other previous studies as militating against uptake of immunization. These suggestions if well addressed will improve immunization uptake and ultimately promote lives of our children (Salmon *et al.*, 2009).

## CONCLUSION

This study was carried out on the factors affecting the implementation of immunization. There was over two third complete immunization uptake and almost all the respondents admitted that immunization should start in first week of life. Some benefits of immunization include; preventing illness, death and to make child grow healthy and strong. The main reason for receiving each immunization dose was for prevention of illness/protection of child while for the missed immunization doses including unavailability of drugs, bad road/transport issues, mother or baby being sick, ignorance. Educational level of mother was a predictor of complete immunization uptake. Some of the suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes regular availability of drugs, health education/enlightenment, availability of dedicated and well-trained staff (man power improvements) and Incentives/rewards. These suggestions if well addressed will improve immunization uptake and ultimately promote lives of our children.

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