

## **Factors Influencing Routine Immunization Uptake among Nursing Mothers Attending Primary Health Centres in Ibadan Southeast Local Government**

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**Abstract:** Immunization is essential for preventing infectious diseases and lowering death and disability, especially in young children. Low vaccination coverage rates do, however, continue to exist in many areas, underscoring the significance of knowing what causes less-than-ideal uptake.

A total of 302 nursing mothers were recruited for this study. A structured semi- questionnaire was used to assess the respondents' knowledge of routine immunization, Attitudes towards immunization and factors influencing uptake were also explored.

The findings revealed that 93.0% of the nursing mothers had heard about immunization, with the majority acquiring information from friends and family (69.9%). Knowledge regarding specific vaccines and their timing varied, with 45.0% correctly identifying BCG as the first immunization at birth. While 51.0% believed that a child receives the measles vaccine at 9 months, other responses varied. Compliance with the infant immunization schedule was suboptimal, as 46.0% of the respondents had poor compliance. Significant associations were found between sociodemographic factors (age, marital status, education, religion, occupation, husband's education, and family income) and both knowledge levels and compliance

The findings suggest the need for targeted interventions to improve knowledge and awareness among nursing mothers regarding routine immunization. Efforts should focus on addressing barriers such as long distances to immunization Centre's and the cost. Additionally, involving husbands in promoting immunization can enhance acceptance and uptake. Policymakers and healthcare providers should collaborate to develop strategies that enhance the accessibility, affordability, and acceptability of immunization services.

**Keywords:** Vaccination, Immunization coverage, Nursing mothers, Compliance with immunization schedule.

## INTRODUCTION

Immunization, which is defined as the process of making a person immune or resistant to an infectious disease, is one of the most effective therapies in contemporary public health practice. By enhancing the body's natural defenses, (WHO, 2017) .vaccines assist the immune system in fighting off infection or illness when the body is exposed to molecules or substances that are foreign to it. Immunization has continuously been identified as one of the most cost-effective health interventions with enormous direct and societal benefits in several cost-benefit evaluations. About 2–3 million lives are saved by vaccination each year, and in some high-income countries, illnesses like polio, diphtheria, and pertussis have been successfully eradicated<sup>3</sup>.

By reducing cases of vaccine-preventable diseases (VPDs) such measles, tetanus, tuberculosis, poliomyelitis, pertussis, diphtheria, yellow fever, and hepatitis B<sup>4</sup>, vaccination successfully lowers mortality among children under the age of five. VPDs are responsible for 22% and 17%, respectively, of under-five mortality and morbidity in Nigeria<sup>5</sup>. An estimated 2 million people die each year in the world, of whom 1.5 million—or 15%—are children under the age of five. The immunization of children against diseases that can be prevented by vaccines is one of the most crucial strategies for lowering childhood mortality in poor countries (Abdulraheem & Onajole, 2011).

Nigeria was one of the ten countries (including Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Mexico, Nigeria, Pakistan, and the Philippines) where more than 60% of the children in 2019<sup>7</sup> who did not receive DTP3 did not receive it. DTP3 coverage serves as a gauge for how well-run a nation's routine immunization (RI) program is. Nigeria was home to 20% of the world's infants who lacked the DPT vaccine as of 2017<sup>8</sup>. Of the 8.9 million infants in the WHO African Region who were not immunized against the measles in 2015, 3 million were born in Nigeria. Nigeria thus accounted for more than 40% of the 28 279 confirmed measles cases reported from the WHO African Region in 2016.

The WHO launched the Expanded Programme on Immunization (EPI) in 1974, recommending that every nation adopt it and create plans to ensure that it is fully implemented, leaving no child unprotected. In Nigeria, EPI was launched in 1979 and re-launched in 1984 (NPCN & ICF MACRO, 2014). The main EPI service delivery strategies are; the static services/routine immunization services at health facilities (public and private), outreach services to communities without access to health facilities, mass campaigns in high-risk populations, reaching every district approach targeting hard-to-reach districts, generalized periodic national immunization days (NIDs), supplemented immunization activities (SIAs) organized for missed opportunities and drop-outs, and home visits. According to the current schedule, a child is considered fully vaccinated if he has received a BCG vaccination, 3 doses of pentavalent vaccines, (diphtheria, tetanus, pertussis, hepatitis B and Haemophilus influenza type b (Hib)), at least 3 doses of the oral polio vaccine, 1 dose of Inactivated Polio vaccine (IPV), 1 dose of measles vaccine and 1 dose of yellow fever vaccines.

Since the launch of EPI, developing countries like Nigeria, have struggled to meet the various immunization coverage targets and deadlines set by WHO, there was an encouraging coverage, which later became unsustainable, especially in rural places (Ayinde et al., 2014). The Millennium Development Goal (MDG) 4, whose target was to reduce by two-thirds, between 1990 and 2015, the under-five mortality rate (U5MR), was 191 deaths per 1000 live births in 1990 but this was reduced to 89 deaths per 1000 live births in 2014, though this is still short of the 2015 target of 64 deaths per 1000 live birth by 28%, MDG12. The infant mortality rate was estimated at 91 deaths per 1000 live births in 1990 and stood at 58 deaths per 1000 live birth in 2014, this is still short of the 2015 target of 30 deaths per 1000 live births (Ayinde, 2016).

The current infant mortality rate for Nigeria in 2023 is 54.740 deaths per 1000 live births, a 2.63% decline from 202216. The infant mortality rate for Nigeria in 2021 was 57.701 deaths per 1000 live births, a 2.5% decline from 2020. The infant mortality rate for Nigeria in 2020 was 59.181 deaths per 1000 live births, a 2.44% decline from 2019. The infant mortality rate for Nigeria in 2019 was 60.662 deaths per 1000 live births, a 2.38% decline from 2018 (Ayinde et al., 2014). A decrease in the number of under-5 deaths and infants deaths caused by vaccine-preventable diseases in every WHO region would result in a corresponding decline in the global under-five mortality rate, this would in turn contributes towards the achievement of Sustainable Development Goal (SDG) 3, with target 3.2 being to end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births by 2030.

Many studies have reported various reasons for the difficulty in immunization coverage in Nigeria. Adedokun et al.,2015 identified health system factors such as the nature of health facilities and maternal knowledge as reasons for low coverage in a study on incomplete childhood immunization in Nigeria: a multilevel analysis of individual and contextual factors. Inadequate levels of immunization against childhood diseases also remain a significant public health problem in resource-poor areas of Nigeria. It is therefore important to determine why many women in some developing countries like Nigeria do not complete the routine immunization schedule for their children, even though these vaccines are the safest method of primary prevention of childhood deadly diseases. This is why this study seeks to find out the factors influencing routine immunization among nursing mothers in Ibadan South East Local Government.

Findings from this study if made public by publishing could benefit policymakers at the federal ministry of health as it would ensure effective and efficient planning in the healthcare industry by providing adequate recommendations for the best allocation of resources toward improving immunization programs, such as increased staff training, electricity supply, cold chain system equipment, adequate vaccine and outreach vehicles, etc. It would also enable them to plan and implement programs that ensure improved immunization uptake among caregivers of children. The study's findings will assess the relationship between parental knowledge practices and children's immunization completeness, and they will reaffirm the usage of educational programs to enhance immunization rate knowledge and practice as well as the periodic measurement of the immunization rate. Findings from this study can also have relative implications for healthcare service providers in PHC centers in Ibadan South East LGA, as they can be encouraged to regularly sensitize and health educate caregivers about the importance of complete immunization among caregivers. Findings from this study can also serve as a valuable point of reference for future researchers carrying out similar studies and also contributed positively to the existing body of knowledge on the subject of immunization coverage among caregivers

### **Main Objective**

The main objective of the study is to determine the factors influencing routine immunization among nursing mothers in Ibadan South East Local Government.

### **Specific Objectives**

1. To assess the level of knowledge of nursing mothers on routine immunization in Ibadan South East Local Government
2. To assess the attitude of nursing mothers toward the uptake of routine immunization
3. To determine the level of compliance with the infant immunization schedule
4. To determine the factors influencing routine immunization uptake among nursing mothers in Ibadan South East Local Government

### **Research Questions**

The following questions will be asked in this study

1. What is the level of knowledge of nursing mothers on routine immunization in Ibadan South East Local Government?
2. What is the attitude of nursing mothers towards routine immunization?
3. What is the level of compliance with the infant immunization schedule?
4. What are the factors influencing routine immunization uptake among nursing mothers in Ibadan South East Local Government

### **Hypothesis Testing**

H01 - There is no significant association between the socio-demographics and the level of knowledge of the respondents

H02 - There is no significant association between the level of knowledge of respondents and the factors influencing routine immunization uptake

H03 - There is no significant association between the socio-demographics and the level of compliance to routine immunization uptake

## **MATERIALS AND METHODS**

### **Study Location**

The study was conducted in Ibadan South East LGA, Ibadan South East Local Government Area of Oyo State. Ibadan South East Local Government Area (LGA) is one of the 33 local government areas in Oyo State, Nigeria. The headquarter of the LGA is at Mapo Hall. It has an area of 17 km<sup>2</sup> and a population of 266,046 at the 2006 census. The Local Government enjoys a tropical climate, with double maxima of rainfall between April and July {short dry season in August} and from September to October. The long dry season start in November thus, the land is suitable for agriculture.

The people of the local government are predominantly Yorubas. Ibadan South East LGA is basically rural, lacking social amenities such as standard medical facilities, electricity and, access roads, and schools.

### **Study Design**

The research design for this study was a descriptive cross-sectional study design. The descriptive design was preferred because it provides further insights into the research problem by unfolding the variables of interest, estimating, predicting, and examining associative relationships. It also involves direct contact with the population and sample that has characteristics, personal qualities or attributes which are relevant to the investigation.

## Population

The population of this study will comprise all nursing mothers having children aged 3 – 24 months within Ibadan South East Local Government in Ibadan South East LGA.

## Sampling Technique

A two-stage sampling procedure was used in this study:

At stage one simple random sampling technique was used to select five (5) health centres out of the health centers in and around Ibadan South East LGA. Health Centers selected are Molete PHC, Felele PHC, Orita Challenge PHC, Eyin Grammer PHC, Orita Aperin PHC.

At stage two purposive sampling technique was used to select 55 mothers of children 3 - 24 months from the health centres to make a total of 275 mothers.

## Method of Data Collection

On the days selected for data collection, the researcher administered the questionnaires to the nursing mothers at the primary health Centre. Participants were informed about the study's purpose and provided with a brief explanation of the questionnaire. They were assured that their participation was voluntary, and their responses would remain anonymous. Mothers were given the questionnaires to complete them independently.

## Method of Data Analysis

The data collected was coded and entered into SPSS (Statistical Package for Social Sciences) software package version 26. Descriptive statistics were used and data were presented in tables, frequencies and percentages, also an inferential statistic such as chi-square was used to determine the level of association between selected independent and dependent variables with p-less than 0.05.

## Ethical Consideration

The following ethical considerations would be paid attention to: A letter of introduction from the Department was presented to the Health Centres earmarked for the study to obtain the necessary approval. Strict Confidentiality was observed throughout the entire study period. No Information concerning the individual information would be released to any unauthorized third party.

## RESULTS

*Table 4.1 Knowledge of nursing mothers on routine immunization in Ibadan South East Local Government*

Variables	Frequency (N)	Percent (%)
Have you heard about immunization		
Yes	281	93.0
No	21	7.0
How did you hear about immunization		
Media/Social Media	71	23.5
Family/Friends	211	69.9
Health Worker/Hospital	20	6.6
Does vaccination prevent infectious diseases		
Yes	281	93.0
No	21	7.0
Does vaccination reduce death and disability		
Yes	260	86.1
No	42	13.9
Which is the first immunization a child takes at birth		
BCG	136	45.0
OPV	75	24.8
Measles	19	6.3

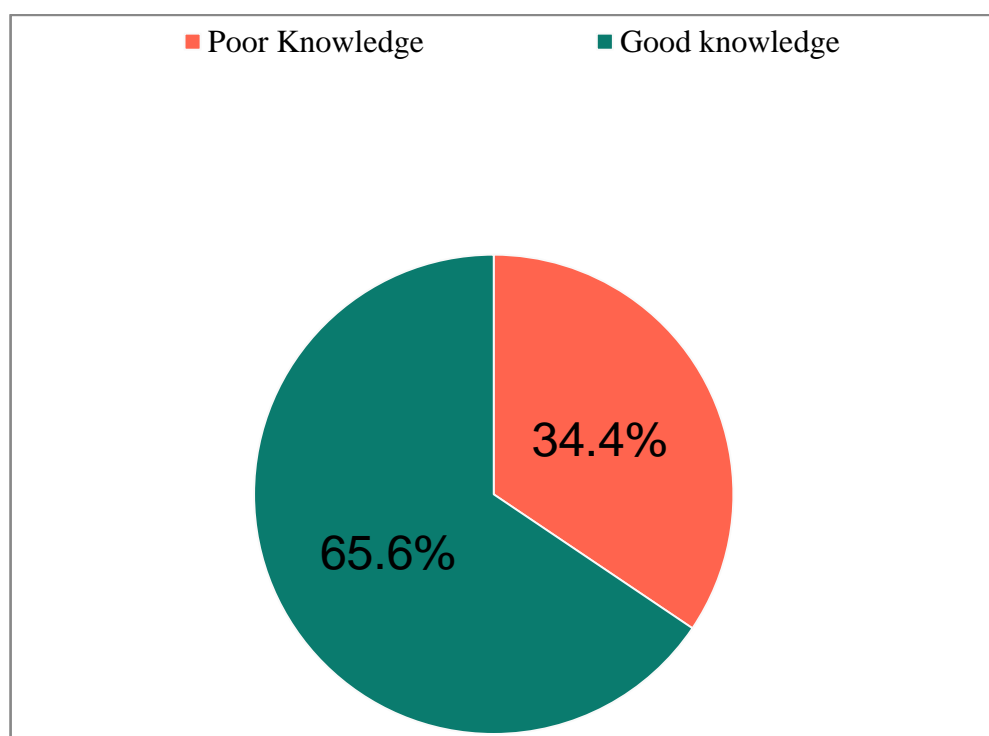
Penta	50	16.6
I don't know	22	7.3

*Table 4.1 Knowledge of nursing mothers on routine immunization in Ibadan South East Local Government (cont'd)*

Variables	Frequency (N)	Percent (%)
When does a child takes measles vaccine		
3 months	47	15.6
9 months	154	51.0
4 weeks	11	3.6
4 months	68	22.5
I don't know	22	7.3
Where does the child receive OPV vaccine		
the right thigh	66	21.9
Orally	32	10.6
upper right arm	65	21.5
buttocks	51	16.9
I don't know	88	29.1

Most of the respondents (93.0%) had heard about immunization, with majority (69.9%) indicating they heard about it from friends and families, followed by media/social media (23.5%) and health worker/hospital (6.6%), 93.0% indicated it prevented infectious diseases, 86.1% indicated it reduced death and disability. 45.0% of the respondents indicated that BCG was the first immunization a child takes at birth, 24.8% indicated OPV, 6.3% indicated measles, 16.6% indicated penta and 7.3% indicated they didn't know. 51.0% of the respondents indicated a child takes measles vaccine at 9 months, 15.6% indicated 3 months, 3.6% indicated 4 weeks, 22.5% indicated 4 months and 22 (7.3)% indicated they didn't know. When respondents were asked where a child received OPV vaccine, 21.9% indicated the right thigh, 10.6% indicated orally, 21.5% indicated the upper right arm, 16.9% indicated the buttocks and 29.1% indicated they didn't know (Table 4.2)

Level of knowledge of respondents



**Figure 4.1: Level of knowledge of infant immunization**

The mean aggregate score for the questions related to the level of knowledge on routine immunization was  $3.79 \pm 1.372$ . Therefore, those respondents who scored below the mean were categorized to have poor knowledge while those who scored above the mean were categorized to have good knowledge. Figure 4.1 above reveals that 104 (34.4%) had poor knowledge while 198 (65.6%) had good knowledge.

*Table 4.2 Attitude of nursing mothers toward the uptake of routine immunization*

Attitude items	Strongly Agree N (%)	Agree N (%)	Disagree N (%)	Strongly Disagree N (%)
Even when my husband says I should not go I still take my child for immunization for his/her wellbeing	213 (70.5)	42 (13.9)	23 (7.6)	24 (7.9)
I consider vaccinations to be beneficial?	193 (63.9)	97 (32.1)	0 (0.0)	12 (4.0)
I ensure i take all immunization available in the health center for my child	180 (59.6)	101 (33.4)	9 (3.0)	12 (4.0)
I am ready to take immunization for my child even if it requires payment	204 (67.5)	66 (21.9)	9 (3.0)	23 (7.6)
I advise my friends and relative to take immunization for their children	139 (46.0)	128 (42.4)	23 (7.6)	12 (4.0)
I am ready to accept immunization that are given on immunization plus days	229 (75.8)	61 (20.2)	0 (0.0)	12 (4.0)

The table above reveals that 70.5% of the respondents strongly agreed that even when their husband says they should not go they still took their child for immunization for his/her wellbeing, 13.9% agreed, 7.6% disagreed and 7.9% strongly disagreed, 63.9% of respondents strongly agreed they considered vaccinations to be beneficial, 32.1% agreed and 4.0% strongly disagreed, 59.6% of the respondents strongly agreed that they ensured they took all immunization available in the health center for their child, 33.4% agreed, 3.0% disagreed and 4.0% strongly disagreed. 67.5% of respondents indicated they were ready to take immunization for their child even if it required payment, 21.9% agreed, 3.0% disagreed and 7.6% strongly disagreed. 46.0% of the respondents indicated they advised their friends and relatives to take immunization for their children, 42.4% agreed, 7.6% disagreed and 4.0% strongly disagreed. 75.8% strongly agreed they were ready to accept immunization that were given on immunization plus days, 20.2% agreed and 4.0% disagreed (Table 4.3).

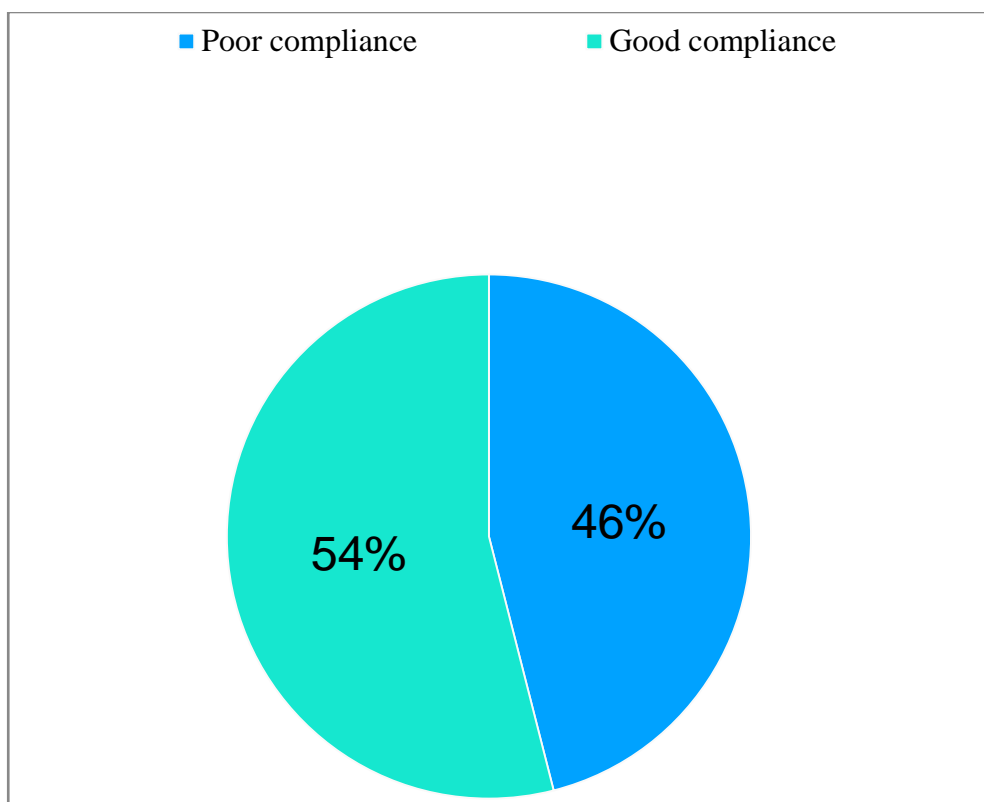
*Table 4.3 Level of compliance with the infant immunization schedule*

	Yes N (%)	No N (%)
Have you ever delayed your child's immunization for any other reason apart from illness or allergy?	124 (41.1)	178 (58.9)
Have you ever decided not to have your child vaccinated for any other reason apart from illness or allergy?	157 (52.0)	145 (48.0)
Is the recommended immunization schedule good for your child?	279 (92.4)	23 (7.6)
Do you trust the information you receive about vaccination of your children	278 (92.1)	24 (7.9)
Only very serious circumstances would prevent me from bringing my child for Immunization	267 (88.4)	35 (11.6)

Less than half of the respondents (41.1%) indicated they had delayed their child's immunization for other reasons apart from illness or allergy while 58.9% indicated they had not, 52.0% indicated they decided not to have your child vaccinated for other reasons apart from illness or allergy while 48.0% indicated otherwise. Most of the respondents (92.4%) indicate the recommended immunization schedule was good for their child, 92.1% indicated they trusted the information they received about the vaccination of their children and 88.4% indicated that only

serious circumstances would prevent them from bringing their child for immunization (Table 4.4).

Level of compliance with the infant immunization schedule



**Figure 4.2: Level of compliance with the infant immunization schedule**

The mean aggregate score for the questions related to the level of compliance with the immunization schedule was  $3.80 \pm .993$ . Therefore, those respondents who scored below the mean were categorized to have poor compliance while those who scored above the mean were categorized to have good compliance. Figure 4.1 above reveals that 139 (46.0%) had poor compliance while 163 (54.0%) had good compliance.

*Table 4.4 Factors influencing routine immunization uptake among nursing mothers in Ibadan South East Local Government*

<i>Factor that influences the compliance with infant immunization schedule in Ibadan South East LGA</i>	Yes N (%)	No N (%)
My religion prohibits children immunization	76 (25.2)	226 (74.8)
I live very far from the immunization centre	158 (52.3)	144 (47.7)
The healthcare staff are not friendly and welcoming	157 (52.0)	145 (48.0)
A lot of my time is wasted at the health care centre	128 (42.4)	174 (57.6)
Immunization charges are costly	102 (33.8)	200 (66.2)
Vaccines are not usually available in the health care centre	137 (45.4)	165 (54.6)
My husband prohibits children immunization	85 (28.1)	217 (71.9)

When respondents were asked about the factors that influenced immunization uptake for their children, around one quarter (25.2%) of the respondents indicated that their religion prohibited children immunization, more than half (52.3%) indicated they lived very far from the immunization center, 52.3% indicated the healthcare staff were not friendly and welcoming, 42.4% indicated a lot of their time was wasted at the health care centre, 33.8% indicated immunization charges were costly, 45.4% indicated vaccines were not usually available in the health center and 28.1% indicated their husband prohibits children immunization (Table 4.5)



## Hypothesis Testing

Table 4:5 Association between respondent's demographics and level of knowledge

Variables	Poor knowledge	Good Knowledge	X <sup>2</sup> value	p-value
Age				
20 years and below	10	0	57.420	<0.001*
21 - 25 years	0	44		
26 - 30 years	53	65		
31 - 35 years	32	44		
36 - 40 years	9	45		
Marital Status				
Single	11	65	66.950	<0.001*
Married	65	133		
Divorced	18	0		
Separated	10	0		
Level of Education				
No formal Education	30	11	33.277	<0.001*
Primary	10	20		
Secondary	23	46		
Tertiary	41	121		
Family Type			21.416	<0.001*
Monogamous	60	163		
Polygamous	44	35		
Religion			5.239	0.073
Christianity	53	120		
Islam	39	68		
Traditional	12	10		
* significant at p-value ≤ 0.05				

Table 4:5 Association between respondent's demographics and level of knowledge (cont'd)

Variables	Poor knowledge	Good Knowledge	X <sup>2</sup> value	p-value
Occupation				
Stay at home	11	45	41.172	<0.001*
Civil servants	9	0		
Traders	75	97		
Private Establishment Workers	9	56		
Husband's Level of Education			44.446	<0.001*
No formal Education	21	0		
Primary	10	23		
Secondary	21	65		
Tertiary	52	110		
Estimated Family Income per month			12.823	0.005*
N50,000 and below	0	11		
N50,000 - 100,000	30	32		
N100,000 - N150,000	33	57		
N150,000 and above	41	98		
N150,000 and above	41	98		

Chi square analysis was used to test for association between demographics of respondents and their level of knowledge of infant immunization, significant association was found between the age of respondents, their marital status, level of education, family type, occupation, husband's level of education and estimated family income per month and knowledge at p-value ≤ 0.05.

Therefore, we reject the null hypothesis that there is no association between the socio-demographics and knowledge of the respondents.

Table 4:6 Association between knowledge of respondents and the factors influencing routine immunization uptake

Variables	Poor knowledge	Good Knowledge	X <sup>2</sup> value	p-value
My religion prohibits children immunization			10.895	0.001*
Yes	38	38		
No	66	160		
I live very far from the immunization centre			5.239	0.073
Yes	43	115		
No	61	83		
The healthcare staff are not friendly and welcoming			30.903	<0.001*
Yes	77	80		
No	27	118		
A lot of my time is wasted at the health care centre			0.999	0.317
Yes	40	88		
No	64	110		
Immunization charges are costly			23.358	<0.001*
Yes	54	48		
No	50	150		
Vaccines are not usually available in the health care centre			5.708	0.017*
Yes	57	80		
No	47	118		

Chi square analysis was used to test for association between knowledge of respondents and factors affecting routine uptake of immunization, significant association was found at p-value  $\leq$  0.05. Therefore we reject the null hypothesis that there is no association between the level of knowledge and factors affecting routine immunization uptake by the respondents.

Table 4:7 Association between respondents demographics and level of compliance

Variables	Poor compliance	Good compliance	X <sup>2</sup> value	p-value
Age				
20 years and below	2	8	9.588	0.048*
21 - 25 years	14	30		
26 - 30 years	60	58		
31 - 35 years	33	43		
36 - 40 years	30	24		
Marital Status				
Single	44	32	9.038	0.029*
Married	83	115		
Divorced	10	8		
Separated	2	8		
Level of Education				
No formal Education	25	16	10.417	0.015*
Primary	12	18		
Secondary	22	47		
Tertiary	80	82		

Family Type			0.128	0.721
Monogamous	104	119		
Polygamous	35	44		
Religion			19.258	<0.001*
Christianity	73	100		
Islam	46	61		
Traditional	20	2		
* significant at p-value $\leq 0.05$				

Table 4:7 Association between respondents demographics and level of compliance (cont'd)

Variables	Poor compliance	Good compliance	X <sup>2</sup> value	p-value
Occupation				
Stay at home	33	23	13.201	0.004*
Civil servants	8	1		
Traders	74	98		
Private Establishment Workers	24	41		
Husband's Level of Education			11.299	0.010*
No formal Education	13	8		
Primary	22	11		
Secondary	31	55		
Tertiary	73	89		
Estimated Family Income per month			31.082	<0.001*
N50,000 and below	9	2		
N50,000 - 100,000	45	17		
N100,000 - N150,000	36	54		
N150,000 and above	49	90		
Knowledge			11.791	0.001*
Poor Knowledge	62	42		
Good Knowledge	77	121		
* significant at p-value $\leq 0.05$				

Chi square analysis was used to test for association between demographics alongside knowledge of respondents and their compliance to infant immunization schedule, significant association was found between the age of respondents, their marital status, level of education, religion, occupation, husband's level of education estimated family income per month and knowledge at p-value  $\leq 0.05$ . Therefore we reject the null hypothesis that there is no association between the socio-demographics and level of compliance of the respondents.

## Discussion

### Socio-demographics:

The majority of the respondents in this study are young mothers, according to the mean age and standard deviation of the respondents (30.1 $\pm$ 5.28 years), which highlights the need to target this particular age cohort with pertinent educational and awareness programs. Given the high proportion of married respondents (65,6%), it is likely that both the mother and her partner have an impact on the decision to receive immunizations. Therefore, it is important to involve husbands in immunization education and campaigns to ensure a supportive environment for vaccination.

More than half (53.6%) of respondents had tertiary education suggesting that the sample consists of relatively educated mothers. This education level may positively influence their knowledge and understanding of immunization, which can contribute to better immunization rates. It emphasizes the importance of disseminating accurate information and addressing any misconceptions through educational interventions. The respondents predominantly coming from

monogamous families (73.8%) and being Christians (57.3%) reflect the cultural and religious context in which immunization decisions are made. Understanding and addressing cultural and religious beliefs, as well as incorporating religious leaders into immunization advocacy, can help improve acceptance and uptake rates. A significant portion of respondents (57.0%) identified as traders suggesting that interventions should consider their unique circumstances, such as flexible immunization schedules or outreach programs that accommodate their work responsibilities. The finding that 46.0% of respondents indicated a monthly estimated family income of N150,000 and above highlights the need to consider financial barriers. Although not explicitly stated, it is possible that the cost of immunization could be a deterrent for families with lower incomes. Efforts should be made to provide affordable or free immunization services to ensure equitable access for all socio-economic groups.

#### **Knowledge of nursing mothers on routine immunization:**

The high awareness level of immunization (93.0%) suggests that information dissemination campaigns have been effective in reaching nursing mothers. However, the sources of information vary, with friends and families being the most common source (69.9%). Most of the respondents (93.0%) understood that immunization prevents infectious diseases, this reflects a good understanding of the primary purpose of immunization. This knowledge is essential for promoting positive attitudes and behaviours towards vaccination. This however was not in line with Almutairi et al<sup>1</sup> and Adefolalu et al<sup>2</sup> as the majority of their respondents, 60.1% and 46.8% respectively obtained their information from the primary health center/antenatal clinic. However, there are some gaps in knowledge regarding specific vaccines and their timing. For example, only 45.0% correctly identified BCG as the first immunization at birth, and 51.0% accurately identified the measles vaccine at 9 months. These knowledge gaps highlight the need for targeted education campaigns that focus on the correct vaccine schedule and timing. Health workers and the media should play a crucial role in disseminating accurate and up-to-date information. The findings from this study are in line with another Oladepo et al.,<sup>3</sup> that showed that respondents' knowledge of the order and timing for immunization of children was low. Furthermore, the lack of knowledge regarding the administration site of the oral polio vaccine (OPV) is concerning, with 29.1% of respondents not knowing where the vaccine should be given. The significant associations found between sociodemographic factors and knowledge ( $p\text{-value} \leq 0.05$ ) suggest that these factors play a role in shaping immunization knowledge. Strategies aimed at improving level of knowledge should consider the specific characteristics of the target population, such as age, education level, religion, occupation and income. This finding suggests the need for better counselling and guidance from healthcare providers to ensure proper administration and avoid errors. Overall, the findings from this study are not in agreement with Oladepo et al.,<sup>3</sup> that showed that 66.5% of respondents had low knowledge of routine immunization.

#### **Attitude of nursing mothers toward the uptake of routine immunization:**

The positive attitudes expressed by the respondents towards immunization indicate a favourable disposition towards vaccinating their children. The high percentage of respondents (70.5%) strongly agreeing that they would take their child for immunization despite their husband's objections demonstrates their commitment to their child's well-being. This finding highlights the potential influence of maternal autonomy and decision-making power in ensuring immunization uptake. Encouraging and supporting mothers to take an active role in immunization decisions can further strengthen their attitudes and behaviours. Majority of respondents (63.9%) strongly agreeing that they considered vaccinations to be beneficial reflects a positive perception of the overall value and importance of immunization. This positive perception can serve as a motivating factor for continued immunization uptake. The finding that 75.8% of respondents strongly agreed that they were ready to accept immunization on immunization plus days suggest that such campaigns can be effective in increasing vaccination coverage. Leveraging these special immunization events and optimizing their impact through community mobilization and awareness campaigns can help improve immunization rates. It is worth noting that a small

proportion of respondents (7.6%) strongly disagreed that they would take their child for immunization, indicating the presence of a subset of mothers who may hold strong objections or misconceptions about vaccination. Understanding the concerns and barriers of this group is important to tailor interventions and address their specific needs. Overall, mothers in this study had a positive attitude towards routine immunization, this is in line with Oladepo et al.,<sup>3</sup> and Bofarraj et al.,<sup>4</sup> whose findings revealed that 73.6% and 80.5% of the respondents had a positive attitude towards routine immunization.

#### **Level of Compliance with the infant immunization schedule:**

The finding that 54.0% of respondents had good compliance with the infant immunization schedule indicates a relatively positive adherence rate. However, it is concerning that 46.0% had poor compliance. Identifying the reasons behind this non-compliance is crucial for designing targeted interventions. Findings from this study are a bit similar to the findings of Adefolalu et al.,<sup>2012</sup> as the majority of their respondents (86.4%) had a good level of compliance

The significant associations found between sociodemographic factors and knowledge ( $p\text{-value} \leq 0.05$ ) of compliance suggest that these factors play a role in shaping immunization behaviours. Strategies aimed at improving compliance should consider the specific characteristics of the target population, such as age, education level, religion, occupation, income, and knowledge gaps. Findings are similar to Konwea et al.,<sup>2015</sup> whose findings indicate an association between mothers' knowledge of immunization and educational status and their compliance with routine immunization.

The high level of trust (92.1%) in the information received about the vaccination of their children suggests that healthcare providers and information sources are generally perceived as reliable. This finding highlights the importance of ensuring accurate and evidence-based information is provided to nursing mothers to build and maintain trust.

#### **Factors influencing routine immunization uptake among nursing mothers:**

Several factors emerged from the study that can influence immunization uptake. The finding that religion prohibited children's immunization for 25.2% of respondents suggests the need for targeted engagement with religious leaders and communities to address misconceptions and facilitate acceptance of vaccination within the religious framework.

A significant proportion (52.3%) of respondents indicating long distances to immunization centres suggests that geographic barriers may hinder access to immunization services. To overcome this, strategies such as mobile immunization units or community outreach programs can be implemented to bring immunization services closer to these populations. Findings from this study are in line with Taiwo et al.,<sup>2016</sup>, as 37.0% did not complete immunization because it was too far.

The perception of unfriendly and unwelcoming healthcare staff reported by 52.3% of respondents underscores the importance of improving the quality of care and provider-patient interactions. Enhancing healthcare staff training on communication, empathy, and creating a welcoming environment can positively influence mothers' experiences and, consequently, their willingness to seek immunization services. The perception of wasted time (42.4%) and costly charges (33.8%) at healthcare centres highlights the need for streamlined and efficient service delivery, as well as addressing financial barriers. Efforts to reduce waiting times and improve the affordability of immunization services can help overcome these challenges. The reported unavailability of vaccines in health centres (45.4%) points to supply chain issues and stockouts, which can undermine immunization efforts. Ensuring a consistent and reliable supply of vaccines at all healthcare centres is essential for maintaining trust and maximizing immunization coverage. Findings were similar to Taiwo et al.,<sup>2016</sup> as 4.0% of respondents indicated they didn't complete vaccination for their child because the vaccine was not available. The finding that some husbands prohibit children's immunization (28.1%) highlights the importance of

engaging husbands and promoting shared decision-making within families. Education programs targeting fathers and involving them in immunization discussions can help address these barriers.

## **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **SUMMARY**

This study was carried out to determine the factors influencing routine immunization among nursing mothers in Ibadan South East Local Government. A multi-stage sampling technique was employed for this study. At stage one, a simple random sampling technique was used to select 5 health centres out of the health centres in and around Ibadan South East LGA. At stage two purposive sampling technique was used to select mothers of children 3 - 24 months from the health centres to make a total of 302 mothers. All questionnaires were administered and duly retrieved. Obtained data from the fieldwork of this study were analyzed using a statistical software package for social sciences and frequency count and percentages were used to present the research questions of this study while descriptive tools of bar charts and pie charts were used to present the demographic information of respondents. The analysis was used to answer the four research questions

### **Conclusion and Recommendation**

The findings of this study highlight both positive aspects and areas for improvement in routine immunization among nursing mothers. Overall, the respondents demonstrated a good level of knowledge although there were knowledge gaps regarding specific vaccines and their administration. However, respondents had positive attitudes towards immunization, compliance with the infant immunization schedule was however suboptimal, and significant associations were found between sociodemographic factors and compliance. Several factors were identified as influencing immunization uptake, including religious beliefs, geographical barriers, healthcare staff attitudes, cost, vaccine availability, and spousal influence.

According to this study, massive public health education must be intensified through the provision of Information, Education, and Communication materials to enhance the knowledge, attitude, and practice of parents about immunization and vaccine-preventable diseases.

It is also recommended to improve the accessibility of general care provided at the units, especially the service waiting time. The role of media in the form of advertisements on radio and television should take the lion's share to encourage people for immunization activities.

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