

KNOWLEDGE, PERCEPTION, AND AWARENESS OF IMMUNIZATION OF CHILDREN AGED 9-23 MONTHS AMONG NURSING MOTHERS IN A GENERAL HOSPITAL, ILORIN

BY

Bolaji Ibatullahi Bimbo
Department of Public Health, Al-Hikmah University, Ilorin, Nigeria
Email: hibatullahb@gmail.com

Abstract

Immunization is a crucial public health intervention preventing infectious diseases among children. This study evaluated immunization status and determinants among 310 caregivers of children aged 9-23 months. Results showed 87.7% understood immunization's purpose, 98.7% knew the first dose is at birth, and 83.9% recognized the last dose at 18 months. Respondents demonstrated confidence in the immunization schedule (99.4%), but concerns persisted about vaccine numbers per visit (49.7%). Misconceptions were evident, with 17.1% believing local concoctions replace routine immunization. Statistical analysis revealed significant associations between education level and immunization knowledge ($p=0.033$), occupation and immunization knowledge ($p=0.02$). Education level and accessibility to clinics significantly influenced immunization adherence ($p<0.05$). The study highlights the need for targeted education, accessible services, and effective communication to address gaps and misconceptions. By addressing concerns and promoting awareness, healthcare providers and policymakers can develop strategies to improve public health outcomes and protect vulnerable populations.

Keywords: Knowledge, perception towards immunization, education, occupation, SPSS, immunization.

Introduction

Immunization is one of the most effective and cost-efficient public health interventions that has significantly contributed to the reduction of childhood mortality and morbidity across the globe. Vaccination prevents the spread of infectious diseases and saves millions of lives each year, particularly in low and middle-income countries. The World Health Organization (WHO) recognizes immunization as a cornerstone for achieving the Sustainable Development Goals (SDGs), particularly SDG 3, which aims to ensure healthy lives and promote well-being for all at all ages. Despite global efforts, many children, especially in sub-Saharan Africa, still do not receive the full course of recommended vaccines. According to the 2018 Nigeria Demographic and Health Survey (NDHS), childhood immunization coverage in Nigeria remains suboptimal, with large variations between regions. Inadequate awareness, cultural beliefs, accessibility to healthcare services, and misinformation continue to impede the achievement of universal immunization coverage (National Population Commission [Nigeria] & ICF, 2019).

In Nigeria, vaccine-preventable diseases remain a major cause of illness and death among children under five years of age. Diseases such as measles, polio, tuberculosis, and diphtheria continue to pose significant threats, particularly in rural and underserved areas. The WHO's Expanded Programme on Immunization (EPI) was launched to combat these diseases, yet challenges persist in achieving full vaccination coverage. In Kwara State, the immunization rates remain below national targets, particularly among children aged 9-23 months. Nursing mothers, who are key decision-makers in the immunization of their children, play a critical role in ensuring the success of immunization programs. Their knowledge, perception, and awareness of immunization directly influence their children's health outcomes (Awodele et al., 2010; Etana & Deressa, 2012).

Despite numerous efforts to increase immunization coverage in Nigeria, many children do not receive the complete series of vaccines required for protection against life-threatening diseases. In Kwara State, there is a gap in both knowledge and practice of routine immunization, particularly among nursing mothers. Studies have shown that a lack

of awareness, misconceptions about vaccine safety, and logistical barriers such as distance to healthcare facilities contribute to low vaccine uptake. The consequences of low immunization coverage are dire, as outbreaks of preventable diseases continue to occur, leading to increased morbidity and mortality rates among children. This problem is further compounded by cultural and religious beliefs, which in some cases, hinder the acceptance of vaccines (Gidado et al., 2014). Addressing these issues requires an in-depth understanding of the factors influencing nursing mothers' decisions regarding immunization, as well as targeted interventions to improve knowledge and awareness.

Understanding the knowledge, perception, and awareness of immunization among nursing mothers is critical for improving vaccination rates in Kwara State. Nursing mothers are the primary caregivers and decision-makers regarding the health of their children, and their attitudes toward immunization can significantly impact vaccine uptake. By examining their knowledge levels, perceptions, and factors influencing their decisions, this study will provide valuable insights into the barriers to achieving full immunization coverage (Chris-Otubor et al., 2015). This research is further justified by the need to identify specific gaps in knowledge and awareness that can be addressed through public health education programs. Findings from this study can guide the development of culturally appropriate interventions aimed at dispelling myths and misconceptions about vaccines. By targeting nursing mothers, healthcare providers can improve communication strategies, increase trust in the immunization system, and ultimately reduce the burden of vaccine-preventable diseases. The study also has the potential to inform policymakers about the necessary improvements in immunization services, such as increasing access to vaccines and tailoring healthcare delivery to meet the needs of the local population. Ensuring that all children receive their full course of immunizations is essential for protecting public health and achieving sustainable health outcomes (Ariyibi et al., 2023).

Research Questions

1. What is the level of knowledge of immunization among nursing mothers with children aged 9-23 months
2. What are the perceptions of immunization among nursing mothers with children aged 9-23 months
3. What is the level of awareness of immunization among nursing mothers with children aged 9-23 months
4. What are the factors influencing immunization among nursing mothers with children aged 9-23 months

Objectives

General Objective

Knowledge, perception and awareness of immunization of children age 9-23 months among nursing mothers in a general Hospital Ilorin. Specific objectives are:

1. To assess level of knowledge of immunization among nursing mothers with children aged 9-23 months
2. To explore the perceptions of immunization among nursing mothers with children aged 9-23 months
- To evaluate the level of awareness of immunization among nursing mothers with children aged 9-23 months
3. To determine the factors influencing immunization among nursing mothers with children aged 9-23 months

Hypothesis

Null Hypothesis

There is no relationship between the socio-demographic characteristics and the level of knowledge of immunization among nursing mothers with children aged 9-23 months.

Alternative Hypothesis

There is a relationship between the socio-demographic characteristics and the level of knowledge of immunization among nursing mothers with children aged 9-23 months.

Methodology

Study Area

This study was conducted at the General Hospital, Ilorin, Kwara State, Nigeria. The hospital is situated in the Ilorin West Local Government Area and serves a large population from both urban and rural areas of Kwara State. The hospital provides a range of healthcare services, including routine immunization, which is offered daily. The facility is a primary health center for many nursing mothers, making it an ideal location for assessing immunization practices.

Population of the Study

The target population for this study comprised nursing mothers with children aged 9-23 months who attended the General Hospital, Ilorin, for immunization services. This age group was selected because children within this range are expected to receive several doses of routine vaccines, including those for polio, tuberculosis, measles, and diphtheria.

Inclusion Criteria

The study included:

1. Nursing mothers with children aged 9-23 months who were accessing immunization services at the General Hospital, Ilorin.
2. Other caregivers who have been responsible for the child since birth and consistently brought the child for immunization.

Exclusion Criteria

Nursing mothers who were staff of the hospital were excluded to avoid any bias, as they may have different experiences or access to immunization services compared to the general population.

Study Design

This research employed a descriptive cross-sectional study design using quantitative data collection methods. A structured, interviewer-administered questionnaire was utilized to gather information from the respondents about their knowledge, perception, and awareness of routine immunization. The cross-sectional design was chosen to provide a snapshot of the current situation regarding immunization practices among nursing mothers in the study area.

Sample Size Determination

The sample size was calculated using the Leslie Fisher formula ($n = Z^2pq/e^2$), where:

n = required sample size

Z = standard normal deviate corresponding to a 95% confidence interval (1.96)

p = assumed proportion of nursing mothers attending immunization (50%, or 0.5)

e = margin of error (5%, or 0.05)

Using this formula, the minimum sample size was calculated as:

$$n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384.6.$$

Given that the population of nursing mothers attending General Hospital, Ilorin, is less than 10,000, a finite population correction was applied:

$$nf = n / (1 + n/N),$$

where $N = 1,000$ (approximate population size).

The sample size was adjusted to:

$$nf = 385 / (1 + (385/1,000)) = 278.$$

To account for non-response and ensure robustness, the sample size was rounded up to 310.

Sampling Technique

Systematic random sampling was used to select participants. Nursing mothers attending the immunization clinic were selected by choosing every *n*th person on the hospital's immunization register. This method ensured that every eligible mother had an equal chance of being included in the study.

Instrument for Data Collection

Data were collected using a semi-structured questionnaire designed by the researcher. The questionnaire was divided into five sections: socio-demographic information, knowledge of immunization, perceptions about immunization, awareness of immunization, and factors influencing immunization. The questionnaire was pre-tested at the Cottage Hospital, Adewole, Ilorin, using 10% of the total sample size (31 participants) to ensure validity and reliability.

Method of Data Collection and Analysis

Data collection was conducted over a period of four weeks. The completed questionnaires were checked for accuracy and completeness before being coded for analysis. Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including frequency distributions and percentages, were used to summarize the socio-demographic characteristics and knowledge levels of the respondents. Inferential statistics, including chi-square tests, were used to explore associations between the socio-demographic variables and the respondents' knowledge of immunization. A *p*-value of less than 0.05 was considered statistically significant.

Ethical Consideration

Ethical approval for this study was obtained from the Research Ethics Committee of the General Hospital, Ilorin, Kwara State. Verbal consent was obtained from each respondent before administering the questionnaire, and participants were informed of the study's purpose and assured of the confidentiality of their responses. Participation was voluntary, and respondents were free to withdraw from the study at any point.

Limitations of the Study

This study is limited by its focus on a single hospital, which may not fully represent the broader population of Kwara State. Additionally, the study relied on self-reported data, which may introduce recall bias or inaccuracies in the responses of the participants. Language barriers were addressed by employing research assistants fluent in the local language, but this may still limit the generalizability of the findings.

Results

In this study, three hundred and ten (310) questionnaires were distributed to the respondents, of whom all completed the questionnaire, resulting in a 100% response rate. Consequently, the analysis was conducted based on the total number of respondents, with the findings detailed below.

Sociodemographic Characteristics

From the total of three hundred and ten respondents (310) with the mean age and standard deviation of 30.36 ± 14.81 , almost all 284 (91.6%) are married, half 155 (50%) of the respondents have tertiary education, close to half are 152 (49%) are self-employed and majority 263 (84.8%) of the respondents have 1-3 children with the mean number and standard deviation of 2.44 ± 1.191 .

Table 1

Respondent sociodemographic characteristics

Sociodemographic characteristics	Frequency (N=310)	Percentage (%)
Age		
less than 20	5	1.6
20-25	78	25.2
26-30	95	30.6
31-35	86	27.7
36 and above	46	14.8
Mean $\pm$ SD	30.36 $\pm$ 14.81	
Marital status		
Single	20	6.5
Married	284	91.6
Divorced	3	1
Widowed	3	1
Educational level		
None	7	2.3
Primary	16	5.2
Secondary	116	37.4
Tertiary	155	50
Postgraduate	14	4.5
Quranic	2	0.6
Occupation		
Employed	86	27.7
Full housewife	13	4.2
Self-employed	152	49
Unemployed	59	19
Number(s) of Children		
1-3.	263	84.8
4-7.	47	15.2
Mean $\pm$ SD	2.44 $\pm$ 1.191	

Knowledge of Immunization among Nursing Mothers

Table 2

Knowledge of immunization among nursing mothers

Knowledge of immunization		Frequency (N=310)	Percentage (%)
What is the purpose of immunization?	All of the above	272	87.7
	To boost the immune system	24	7.7
	To improve overall health	10	3.2
	To prevent the spread of infectious diseases	4	1.3
At what age is the first dose of immunization typically given?	1 month	2	0.6
	1 year	1	0.3
	6 weeks	1	0.3
	Birth	306	98.7
At what age is the second dose of immunization usually administered?	2 months	5	1.6
	3 months	1	0.3
	6 weeks	304	98.1
At what age is the last dose of immunization typically given?	1 year	14	4.5
	18 months	260	83.9
	2 years	35	11.3
	9 months	1	0.3
What is the recommended number of visits to a health facility for routine immunization	2 times	1	0.3
	3 times	2	0.6
	4 times	2	0.6
	5 times	1	0.3
	6 times	304	98.1

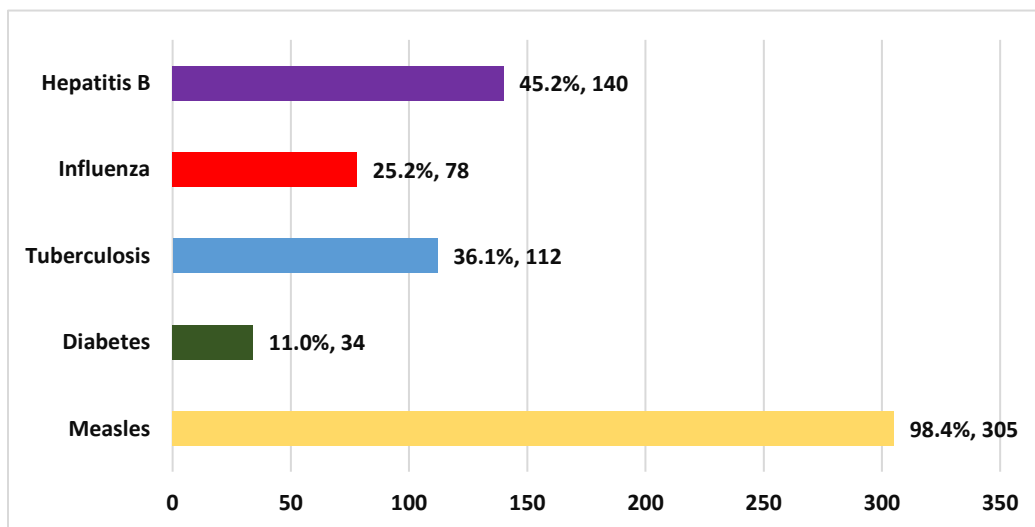


Figure 1: Knowledge of the types of vaccine-preventable diseases

The figure above shows that the most commonly known vaccine-preventable disease by the respondents is measles (305, 98.4%), followed by hepatitis B (140, 45.2%) and tuberculosis (112, 36.1%), while one-tenth 34 (11%) of the respondents wrongfully believed that Diabetes is a vaccine preventable disease.

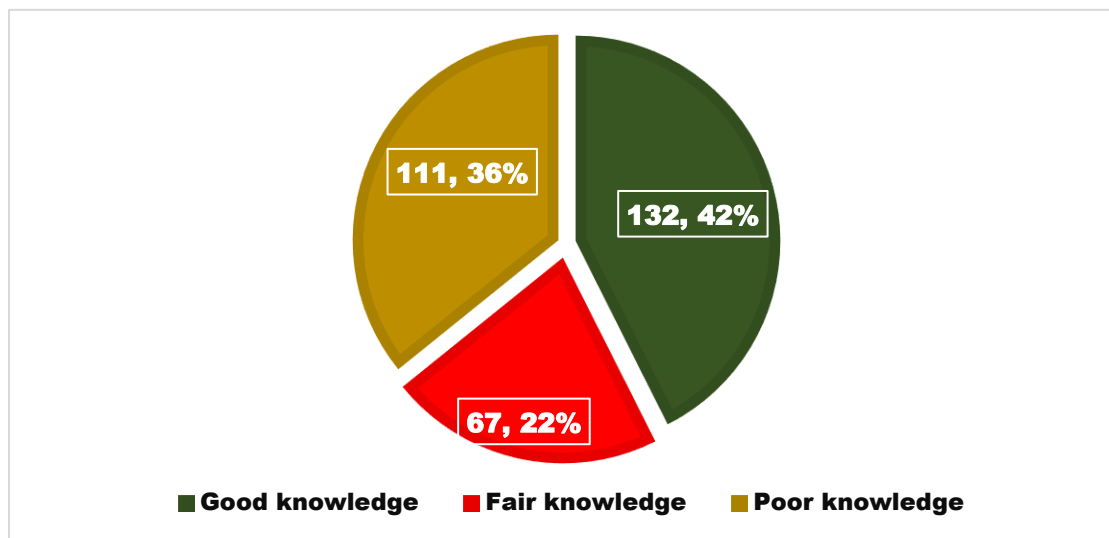


Figure 2: Knowledge of the symptoms of vaccine-preventable diseases

The figure above shows that fever (306, 98.7%) is the most common symptoms of vaccine preventable disease. Moreso, rashes (212, 68.4%), cough (188, 60.6%), muscle weakness (185, 59.7%) and headache (178, 57.4%) were also mention by more than half of the respondents as a known symptoms of vaccine-preventable disease.

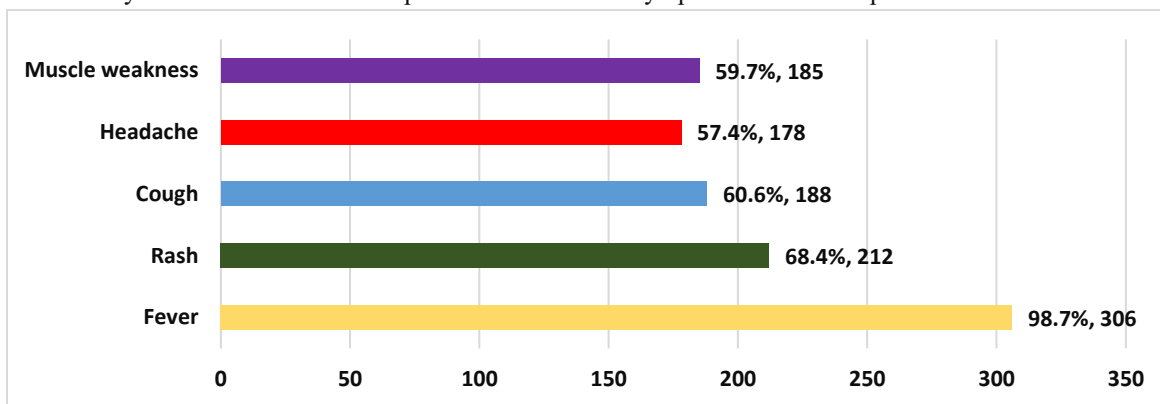


Figure 3: Level of knowledge of immunization among respondents

The figure above shows that most 132 (42%) of the respondents have good knowledge of routine immunization.

Perceptions of Immunization Among Nursing Mothers

The result shows that almost all 304 (98.1%) of the respondents believed that the recommended immunization schedule for children is easy to understand and follow, almost all 308 (99.4%) feel confident in knowing when my

child should receive each vaccine according to the schedule, a little less than one-fifth 58 (18.7%) feels immunization schedule is overwhelming and confusing to keep track of, more than one-fifth 75 (24.2%) believe that spacing out vaccines is a better approach than following the recommended schedule, half 154 (49.7%) of the respondents are concerned about the number of vaccines given at each immunization appointment and more than two-thirds 213 (68.7%) believed that the immunization schedule could be improved by offering more personalized options for families.

Table 2

Perceptions of immunization among nursing mothers (N=310)

Perception statements	Yes (%)	No (%)	I don't know (%)
The recommended immunization schedule for children is easy to understand and follow.	304 (98.1)	3 (1)	3 (1)
I feel confident in knowing when my child should receive each vaccine according to the schedule.	308 (99.4)	2 (0.6)	0 (0)
The immunization schedule feels overwhelming and confusing to keep track of.	58 (18.7)	235 (75.8)	17 (5.5)
I believe that spacing out vaccines is a better approach than following the recommended schedule	75 (24.2)	206 (66.5)	29 (9.4)
I trust that the recommended schedule is based on scientific research and expert recommendations.	294 (94.8)	16 (5.2)	0 (0)
I have concerns about the number of vaccines given at each immunization appointment.	154 (49.7)	136 (43.9)	20 (6.5)
I believe that following the immunization schedule protects my child from serious diseases at the right time.	298 (96.1)	9 (2.9)	3 (1)
The immunization schedule could be improved by offering more personalized options for families.	213 (68.7)	57 (18.4)	40 (12.9)

Awareness of Immunization Among Nursing Mothers

The result shows that almost all 308 (99.4%) are aware of childhood immunization programmes, almost all 305 (98.4%) are also aware of the schedules of routine immunization, almost all 294 (94.8%) of the respondents aware that routine immunizations are provided free of charge, majority 253 (81.6%) of the respondents disagree that the vaccines used for immunization are designed by the government and foreigners to reduce the population of the people and little less than one-fifth 53 (17.1%) believed that local concoction can serve as a substitute for routine immunization.

Table 3

Awareness of immunization among nursing mothers.

Awareness statements	Agree (%)	Disagree (%)	Undecided (%)
I am aware of the childhood immunization programmes	308 (99.4)	2 (0.6)	0 (0)
I am aware of the schedules of routine immunization	305 (98.4)	1 (0.3)	4 (1.3)
I am aware that routine immunization is beneficial	307 (99)	3 (1)	0 (0)
I am aware that routine immunization childhood vaccines are safe	304 (98.1)	6 (1.9)	0 (0)

I am aware that routine immunizations are provided free of charge	294 (94.8)	10 (3.2)	6 (1.9)
I am aware that immunization can cause infertility later in life	17 (5.5)	272 (87.7)	21 (6.8)
I am aware that the vaccines used for immunization are designed by the government and foreigners to reduce the population of the people	39 (12.6)	253 (81.6)	18 (5.8)
I am aware that local concoction can serve as a substitute for routine immunization	53 (17.1)	238 (76.8)	19 (6.1)

Factors Influencing Immunization among Nursing Mothers

The result shows that almost all 299 (96.5%) of the respondent believed that the accessibility of immunization clinics or healthcare facilities influences their decision to utilize routine immunization services, almost all 308 (99.4%) believe that their understanding of the benefits of immunization influences how regularly they take their child for vaccinations, almost all 289 (93.2%) indicated that the concerns about potential side effects of vaccines affect their willingness to follow the recommended immunization schedule. Majority 276 (89%) indicated that the convenience of scheduling immunization appointments plays a role in how often they take their child for vaccinations, majority 264 (85.2%) disagreed that cultural or religious beliefs influence their decision-making process regarding immunization for their child, almost all 281 (90.6%) indicated that the availability of accurate and easily understandable information about vaccines and the immunization schedule influences their choices and most 235 (75.8%) indicated that past experiences with immunization, either positive or negative, shape their attitudes toward routine vaccination.

Table 4

Factors influencing immunization among nursing mothers

Factors influencing immunization	Agree (%)	Disagree (%)	Undecided (%)
The accessibility of immunization clinics or healthcare facilities influences my decision to utilize routine immunization services.	299 (96.5)	5 (1.6)	6 (1.9)
I believe that vaccines provided through the routine immunization program are affordable for most families.	297 (95.8)	2 (0.6)	11 (3.5)
My understanding of the benefits of immunization influences how regularly I bring my child for vaccinations.	308 (99.4)	1 (0.3)	1 (0.3)
Concerns about potential side effects of vaccines affect my willingness to follow the recommended immunization schedule.	289 (93.2)	15 (4.8)	6 (1.9)
Recommendations from trusted healthcare professionals significantly influence my decision to utilize routine immunization services.	302 (97.4)	2 (0.6)	6 (1.9)
The convenience of scheduling immunization appointments plays a role in how often I bring my child for vaccinations.	276 (89)	12 (3.9)	22 (7.1)
Peer influence or discussions with other parents impact my views on routine immunization programs and schedules.	48 (15.5)	238 (76.8)	24 (7.7)

Cultural or religious beliefs influence my decision-making process regarding immunization for my child.	20 (6.5)	264 (85.2)	26 (8.4)
The availability of accurate and easily understandable information about vaccines and the immunization schedule affects my choices.	281 (90.6)	13 (4.2)	16 (5.2)
Past experiences with immunization, either positive or negative, shape my attitudes toward routine vaccination.	235 (75.8)	53 (17.1)	22 (7.1)

Association between the sociodemographic characteristics and the level of respondent's knowledge

Using chi-square Pearson test at significant association threshold at p-value of 0.05, the result shows a significant association between the educational level and respondents' occupation on the level of knowledge of routine immunization among nursing mothers at p-value of 0.033 and 0.02 respectively. Therefore, the null hypothesis which posits no significant association between the sociodemographic characteristics and the level of knowledge is rejected and the alternative hypothesis which posit a significant association between the sociodemographic characteristics and the level of knowledge is accepted.

Table 5

Association between the sociodemographic characteristics and the level of respondent's knowledge

Sociodemographic characteristics	Level of knowledge			X	p-value
	Good (%)	Fair (%)	Poor (%)		
Age					
less than 20	2 (40)	1 (20)	2 (40)	5.516	0.701
20-25	36 (46.2)	14 (17.9)	28 (35.9)		
26-30	41 (43.2)	18 (18.9)	36 (37.9)		
31-35	30 (34.9)	23 (26.7)	33 (38.4)		
36 and above	23 (50)	11 (23.9)	12 (26.1)		
Marital status					
Single	12 (60)	2 (10)	6 (30)	5.014	0.542
Married	117 (41.2)	63 (22.2)	104 (36.6)		
Divorced	1 (33.3)	1 (33.3)	1 (33.3)		
Widowed	2 (66.7)	1 (33.3)	0 (0)		
Educational level					
None	1 (14.3)	3 (42.9)	3 (42.9)	19.633	0.033
Primary	4 (25)	4 (25)	8 (50)		
Secondary	41 (35.3)	27 (23.3)	48 (41.4)		
Tertiary	78 (50.3)	26 (16.8)	51 (32.9)		
Postgraduate	7 (50)	6 (42.9)	1 (7.1)		
Quranic	1 (50)	1 (50)	0 (0)		
Occupation					
Employed	41 (47.7)	18 (20.9)	27 (31.4)	15.052	0.02
Full housewife	3 (23.1)	5 (38.5)	5 (38.5)		

Self-employed	55 (36.2)	30 (19.7)	67 (44.1)		
Unemployed	33 (55.9)	14 (23.7)	12 (20.3)		
Number(s) of Children					
1-3	113 (43)	52 (19.8)	98 (37.3)	3.808	0.149
4-7	19 (40.4)	15 (31.9)	13 (27.7)		

Discussion

This study, which surveyed 310 nursing mothers in Nigeria, sheds light on their knowledge and attitudes towards routine immunization. The findings reveal a remarkably high awareness of immunization's importance (87.7%), comparable to levels reported in similar studies (Abeje et al., 2019; Adamu et al., 2018). Notably, 98.1% of respondents understood immunization schedules, and 99.4% recognized its benefits, with measles, hepatitis B, and tuberculosis being widely identified as vaccine-preventable diseases (Gidado et al., 2014; Taiwo et al., 2017). The most commonly recognized symptoms were fever (98.7%), rashes (68.4%), cough (60.6%), muscle weakness (59.7%), and headache (57.4%). While concerns were raised regarding immunization schedules and side effects, accessibility, correct information, and past experiences significantly influenced immunization decisions (Awodele et al., 2010; Etana & Deressa, 2012).

Moreover, the study highlights the importance of education in shaping immunization knowledge, with a significant correlation between education level, occupation, and knowledge of routine immunization (Balbir Singh et al., 2019; Uwaibi & Akhimienho, 2020). The majority of respondents (96.5%) considered accessibility of immunization clinics a critical factor in service utilization. Additionally, 99.4% believed that awareness of immunization benefits promotes regular vaccine adherence, reinforcing the findings of Taiwo et al. (2017). Conversely, vaccine side effects concerned 93.2% of respondents, and 89% considered scheduling convenience crucial.

Interestingly, cultural or religious views did not significantly influence immunization decisions for most respondents (85.2%). However, correct information (90.6%) and past experiences (75.8%) played pivotal roles in shaping attitudes towards immunization. A minority (17.1%) believed local concoctions could replace routine immunization, echoing findings from Ariyibi et al. (2023). Overall, the study underscores the need for targeted interventions addressing concerns and promoting education to enhance immunization knowledge and uptake among nursing mothers in Nigeria.

Conclusion

The study reveals a high level of awareness and understanding of routine immunization among Nigerian nursing mothers. Key findings indicate strong recognition of immunization's importance in preventing infectious diseases and improving health, as well as accurate knowledge of immunization schedules and vaccine-preventable diseases. However, concerns persist regarding overwhelming schedules, vaccine side effects, and scheduling convenience, alongside misconceptions about diabetes prevention and local concoctions replacing immunization. To address these challenges and improve vaccination rates, targeted public health education is crucial to dispel misconceptions and address concerns. Additionally, enhancing accessibility and scheduling convenience, strengthening healthcare provider-community relationships, and implementing tailored educational interventions for demographic groups can significantly promote routine immunization among nursing mothers.

Recommendations

General Recommendations

- **Enhance Public Health Education:** Launch public health education campaigns to address misconceptions about vaccines and emphasize their importance in preventing infectious diseases

- **Increase Funding and Resources:** Boost funding and resources for immunization programs to ensure clinics are easily accessible and well-equipped.
- **Flexible Immunization Schedules_:** Implement policies allowing for flexible immunization schedules to accommodate individual preferences and reduce perceived burdens.

Health Facilities Recommendations

- **Clear Information:** Provide clear and detailed information about the immunization schedule and the importance of each vaccine.
- **Personalized Scheduling:** Offer personalized scheduling options to accommodate individual needs and preferences.
- **Effective Communication:** Train healthcare providers to communicate effectively with patients, addressing concerns about vaccine side effects.

Society Recommendations

- **Promote Health and Wellness:** Encourage open discussions about the benefits of immunization and dispel myths and misconceptions.
- **Support Public Health Initiatives:** Support public health initiatives and campaigns educating the community about routine immunization.
- **Advocate for Accessibility:** Advocate for immunization services accessibility, ensuring clinics are within reach for all community members.

Individual Recommendations

- **Seek Accurate Information:** Seek accurate information about routine immunization from trusted healthcare providers and verified sources.
- **Adhere to Immunization Schedules:** Adhere to recommended immunization schedules and ensure children receive necessary vaccines on time.
- **Open Communication:** Communicate openly with healthcare providers about concerns or questions regarding vaccinations.

References

- Abeje, G., et al. (2019). "Assessment of knowledge, attitude, and practice of mothers towards childhood immunization in Bahir Dar city, Ethiopia." *Journal of Vaccines and Vaccination*, 10(2), 1-9.
- Adamu, M., et al. (2018). "Knowledge, attitude and practice of mothers regarding childhood immunization in Kano State, Nigeria." *Journal of Public Health and Epidemiology*, 10(3), 34-42.
- Ariyibi, S. O., Ojuawo, A. I., Ibraheem, R. M., Afolayan, F. M., & Ibrahim, O. R. (2023). Mothers/caregivers' knowledge of routine childhood immunization and vaccination status in children aged 12-23 months in Ilorin, Nigeria. *African Health Sciences*, 23(4), 582-591. <https://doi.org/10.4314/ahs.v23i4.61>
- Awodele, O., Oreagba, I., Akinyede, A., Awodele, D., & Dolapo, D. (2010). The knowledge and attitude towards childhood immunization amongst mothers attending antenatal clinic in Lagos University Teaching Hospital. *Tanzania Journal of Health Research*, 12(3), 172-177.
- Balbir Singh, et al. (2019). "Assessment of immunization coverage and its determinants among children in Punjab, India." *Journal of Family Medicine and Primary Care*, 8(6), 2089-2095.
- Chris-Otubor, G., Dangiwa, D., Ior, L., & Anukam, N. (2015). Assessment of knowledge, attitudes, and practices of mothers in Jos North regarding immunization. *IOSR Journal of Pharmacy*, 5(6), 2250-3013.

- Etana, B., & Deressa, W. (2012). Factors associated with complete immunization coverage in children aged 12-23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health*, 12(1), 566.
- Gidado, S., Nguku, P., Biya, O., Waziri, N. E., Mohammed, A., Nsubuga, P., Akpan, H., Oyemakinde, A., Nasidi, A., & Suleman, I. (2014). Determinants of routine immunization coverage in Bungudu, Zamfara State, northern Nigeria, May 2010. *Pan African Medical Journal*, 18(Suppl 1).
- National Population Commission (NPC) [Nigeria] & ICF. (2019). *Nigeria Demographic and Health Survey 2018*. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF.
- Taiwo, O. A., et al. (2017). "Knowledge, attitude and practice of healthcare workers regarding childhood immunization in Lagos State, Nigeria." *Journal of Public Health and Epidemiology*, 9(2), 20-28.
- Uwaibi, N. E., & Akhimienho, O. (2020). "Immunization coverage and its determinants among children aged 12-23 months in Edo State, Nigeria." *Journal of Infectious Diseases and Epidemiology*, 6(2), 1-10.
- Yalcin, S. S., Kocabas, E., Ozkaya, E., et al. (2018). Evaluation of vaccination coverage and factors affecting vaccination status among children aged 12-59 months in Turkey. *Journal of Pediatric Infectious Diseases*, 13(2), 143-148.