e-ISSN 3050-9629
p-ISSN 2795-3212

10.5281/zenodo.18014618 Volume 8, Issue 2 (July-December 2025) Manuscript ID: #02196

DETERMINANTS OF IMMUNIZATION SERVICES UTILIZATION AMONG NURSING MOTHERS IN BAYELSA CENTRAL SENATORIAL DISTRICT, NIGERIA

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Abstract

Aim/Objective: This study investigated the determinants of immunization services utilization among nursing mothers in Bayelsa Central. The study adopted a descriptive cross-sessional research design. A total of 530 nursing mothers were sampled out of which 22 were discarded, hence 508 respondents were adopted for this study. **Methods:** A cross sectional descriptive approach was adopted for this study. The instrument used for data collection was a structured qquestionnaire titled, Determinants of Immunization Services Utilization among Nursing Mothers Questionnaire. The validity of the instrument was established by 3 community health experts in the Department of Human Kinetics, Health and Safety Studies. The research questions were tested using means, standard deviations, and analysis of variance at 0.05 significant. **Results:** The results shows high extent, proximity to health care facility (mean value: 2.88±0.68), availability of immunization materials (2.68±1.07), attitude of health care provider (3.35±0.49), mothers' level of knowledge (2.81±0.65 among others, constituted determinants of immunization services utilization among nursing mothers in Bayelsa Central Senatorial District. **Conclusion:** It was concluded that lack of awareness creation, non-adherence to immunization protocol, adverse events following immunity are key to optimal vaccine utilization and immunization coverage. Based on the findings, it was recommended among others that Governments of Bayelsa State should make efforts to promote the sensitization of mothers/caregivers to improve their knowledge on routine immunization services.

Keywords:

Children, immunization, mothers, mortality, nursing..

***How to cite*:** Eyidenghabofa, O., Orisa-Ubi, C., Uvoh, S., & Leziga, K. (2025). DETERMINANTS OF IMMUNIZATION SERVICES UTILIZATION AMONG NURSING MOTHERS IN BAYELSA CENTRAL SENATORIAL DISTRICT, NIGERIA. *GPH-International Journal of Health Sciences and Nursing*, 8(2), 96-109. https://doi.org/10.5281/zenodo.18014618

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INTRODUCTION

Mortality and morbidity rate increase have affected infants and children for some decades and has drawn the attention of the global community. This led to the meetings of the international bodies on how to curb these deaths among children. It therefore necessitated the emergence of the public health intervention strategies known as immunization and vaccination. The incidence of communicable and vaccine prevention diseases since the twentieth century considers immunization and vaccination as cost effective public health intervention strategies to prevent vaccine-preventable diseases (Cui & Gofin, 2017). Immunization as an intervention strategy is aimed at introduction of vaccines to a non-immune host to produce the desired capacity to resist communicable diseases. It is believed to be one of the cost effective public health intervention towards bringing solution to this upsurge of communicable and vaccine preventable disease. Immunization is aimed at protecting recipients from vaccine preventable diseases which are responsible for about 25% deaths among under-5 year's old children in developing countries (Adedokun *et al.,* 2017).

However**,** there is an improved immunization rates thereby a reduced incidence rate of vaccine-preventable diseases in advanced nations. Decision to whether a child will receive a vaccine rested on the parents, who must obtain information about immunization and its benefits (Musa & kitoye,2024). Although Africa is undergoing health transitions with movements from predominantly communicable childhood killer diseases to non-communicable ones already recorded in most countries. However, infectious diseases still pose a huge burden to most populations in the region. With reference to World Health Organization , communicable diseases burden, such as malaria, tuberculosis, measles, Hepatitis B and HIV/AIDS in Africa seems to be the highest in the world (Adedin *et al.,* 2021).

The majority of these communicable diseases are vaccine-preventable diseases , such as tuberculosis, tetanus, poliomyelitis, measles, diphtheria, pertussis, hepatitis B and yellow fever which contribute substantially to reduce mortality and morbidity among children below five years in developing countries. In Nigeria, they are responsible for 22% and 17% of under-five mortality and morbidity respectively. This is in spite of the fact that there has been a global decline in under-five mortality and morbidity. For instance, as at 2015, under-five mortality (U5MR) in the region was 83 deaths per 1000 live births .Communicable disease control involves mainly vaccination against viral and bacterial diseases. This does not only reduce the incidence of communicable disease but also reduce the economic and social disease burden of the communities, as it confers herd immunity on the population (Adedokun *et al.,* 2017).

Many vaccine preventable diseases transmission can be blocked by providing high immunization coverage to specific diseases. Two excellent examples to this are the certification of Nigeria for eradication of polio and the worldwide eradication of smallpox from many countries. The National Programme on Immunization guidelines, the World Health Organization, and the United Nations Children's' Fund , stipulated that a child should receive four doses of Oral Polio Vaccine . One dose of Hepatitis B Vaccine, three doses of

Penta, three doses of Pneumococcal Conjugate Vaccine and Tetanus vaccine and a dose of Bacillus Calmette Guerin , measles and yellow fever vaccines.

WHO (2018) report in Nigeria adopts the immunization schedule expressed by the Expanded Programmed on Immunization (EPI) which prescribes five visits to receive one dose of Bacillus Calmette Guerin and Yellow fever, four doses of oral polio vaccines, three doses of pentavalent, three doses of pneumococcus conjugate vaccine and tetanus vaccine, and a dose of measles vaccine. Additionally, doses of Vitamin A supplements are given at 6 and 12months respectively. These are aimed at protecting recipients from vaccine preventable diseases which are responsible for about 25% deaths among under-5 years. About a quarter of these resultant deaths are preventable by immunization (Adedokun *et al.,* 2017).

MATERIALS AND METHODS

Study Area

The area of this study was Central Senatorial District of Bayelsa State in the South-South region of Nigeria.

Study Population

The Population for this study included all nursing mothers with their children of age zero to five years. However, there is no available data for the said population in the study area from the office of the NPC as well as the LGAs.

Sample size

The Sample size for this study was 508 nursing mothers. The double population proportion formula was used to calculate the sample size of the participants.

Instrument and data collection

The instrument for data collection for this study was a self-structured with the ddeterminants of immunization services utilization among nursing mothers following an extensive literature review on the topic. A total of 530 copies of the questionnaire were administered and 508 copies were retrieved as 22 copies were discarded because they were not properly filled by the respondents. Hence, correctly filled 508 returned questionnaires were used for data analysis which yielded return rate of 95.8.

Data analysis

Data collected was coded and analyzed with the aid of SPSS version 25.0.

RESULTS

The results are presented in frequency distributions, percentage, mean and standard Deviation while the analysis of variance regression was to test the hypotheses at 0.05 level of significance.

Table 1: Socio-demographic Characteristics of the Study Population

Variables	Frequency(n)	Percentages (%)
Age		
15–20	229	45.08
21–30	37	7.29
31–40	51	10.04
41 and Above	191	37.59
Level of Education		
None	242	47.64
Primary	15	2.95
Secondary	51	10.04
Tertiary	200	39.37
Occupation		
Farming/Fishing	206	40.55
Housewife	163	32.09
Civil Servant	139	27.36
Location		
Remote Area	66	12.99
Rural	62	12.21
Semi-Urban	180	35.43
Urban	200	39.37
Marital Status		
Married	300	59.06
Single	208	40.94
Children		
1	210	41.34
2–3	155	30.51

4–5	143	28.15
Religion		
Christianity	285	56.10
Islam	100	19.69
Others	123	24.21

The findings from table1 reveal key demographic trends among the respondents. Age distribution shows 45.08% are 15–20 years old, while 37.59% are 41 and above. Education levels indicate 47.64% have no formal education, though 39.37% attained tertiary education. Occupation is dominated by farming/fishing (40.55%) and housewives (32.09%). Geographically, 39.37% reside in urban areas, while 35.43% live in semi-urban regions. Marital status shows 59.06% are married, and 41.34% have one child. Religiously, Islam is the least (19.69%), while Christianity dominate (56.10%). The data highlights a young, largely uneducated population engaged in agriculture, with significant urban presence. These insights can guide targeted interventions in education, employment, and social services to address demographic-specific needs.

Table 2: Mean responses of extent to which proximity to health care facility constitutes a determinant of immunization services utilization among nursing mothers

S/N	Mothers Proximity to Health facility	SA	A	D	SD	Mean	Std. D	Decision
1	Living close to health facility enhanced immunization uptake	217	168	82	41	3.10	0.95	High Extent
2	living far from the health facility does not affect immunization uptake	158	123	165	62	2.74	1.03	High Extent
3	High cost of transportation affects utilization of immunization services	202	123	120	63	2.91	1.06	High Extent
4	Proximity to health care facility facilitate completion of child's immunization	129	201	154	24	2.86	0.85	High Extent
5	Being far from the health facility make one to go late for immunization programme	175	134	109	90	2.78	1.10	High Extent
	Grand mean					**2.88**	**0.68**	**High Extent**

Table 2: present the mean responses of the extent to which proximity to health care facility constitutes a determinant of immunization services utilization among nursing mothers in Bayelsa Central. The table reveals the mean responses of item1- 5 are 3.10, 2.74, 2.91, 2.86, and 2.78 respectively while the corresponding SD scores are 0.95, 1.03, 1.06, 0.85 and 1.10. These mean values were found to be above the decision mean score of 2.50, hence the respondents accepted that living close to health facility enhanced immunization uptake, living far from the health facility does not affect immunization uptake, High cost of transportation affects utilization of immunization services, proximity to health care facility facilitate completion of child's immunization, and being far from the health facility make one to go late for immunization programme. The grand mean score of 2.88 and standard deviation score of 0.68 were obtained. This result shows that to a high extent proximity to health care facility constitutes a determinant of immunization services utilization among nursing mothers.

Table 3: Mean responses of the extent to which availability of immunization materials constitutes a determinant of immunization services utilization among nursing mothers.

S/N	**Availability of immunization material**	SA	A	D	SD	Mean	Std. D	**Decision**
6	The presence of working materials(vaccines) enhances immunization uptake	294	70	34	110	3.08	1.23	High Extent
7	Lack of working materials (vaccines) hampers immunization uptake	199	54	83	172	2.55	1.31	Low Extent
8	Absence of required immunization material(vaccine) can reduce immunization uptake	191	74	118	125	2.65	1.21	High Extent
9	Borrowing of immunization materials(vaccines) from other facility can stop the continuous patronage to immunization uptake	191	43	78	196	2.45	1.33	Low Extent
10	Late arrival of immunization materials(vaccines) can reduce the attendance of mothers to immunization	204	76	95	133	2.69	1.24	High Extent
	Grand mean					**2.68**	**1.07**	**High Extent**

From the result above, the mean responses and standard deviation score of items 6-10 are 3.08 and 1.23, 2.55 and 1.31, 2.65 and 1.21, 2.45 and 1.33, 2.69 and 1.24 respectively. The mean responses of item 6-8 and 10 are above the decision mean while item 9 is less than the decisions mean score of 2.50. It means the respondents agreed that the presence of vaccines enhances immunization uptake, lack of vaccines hampers immunization uptake, absence of

required immunization material can reduce immunization uptake and late arrival of immunization materials can reduce the attendance of mothers to immunization, meanwhile they disagreed that borrowing of immunization materials from other facility can stop the continuous patronage to immunization uptake. The grand mean score was found to be 2.68. This value of the grand mean indicated that to a high extent availability of immunization materials constitute determinants of immunization services utilization among nursing mothers.

Table 4: Mean responses of the extent to which attitude of health care provider constitutes a determinant of immunization services utilization among nursing mothers.

S/N	Attitude of health care providers	SA	A	D	SD	Mean	Std. D	Decision
11	Welcoming of clients by greeting enhances immunization uptake	334	131	33	10	3.55	0.70	High Extent
12	Putting on smiling face to clients enhances immunization uptake	263	214	31	0	3.46	0.61	High Extent
13	Health workers shouting at clients for not paying money for consumables hampers immunization uptake	226	151	81	50	3.09	1.00	High Extent
14	Health workers fighting with mothers hinders immunization uptake	295	152	50	11	3.44	0.76	High Extent
15	Health workers slapping a mother during immunization can hamper immunization uptake	275	102	90	41	3.20	1.00	High Extent
	Grand mean					**3.35**	**0.49**	**High Extent**

The mean responses of item 11-15 were 3.55, 3.46, 3.09, 3.44 and 3.20 respectively. Judging from the mean values of the above items that are above the decision mean of 2.50 suggested that the respondent's agreed to the fact that welcoming of clients by greeting enhances immunization uptake, putting on smiling face to clients enhances immunization uptake, health workers shouting at clients for not paying money for consumables hampers immunization uptake, health workers fighting with mothers hinders immunization uptake and health workers slapping a mother during immunization can hamper immunization uptake. The result also reveals a grand mean score of 3.35 which shows that to a high extent attitude of health care provider constitutes a determinant of immunization services utilization among nursing mothers'.

Table 5: Mean responses of the extent to which mothers' level of knowledge constitutes a determinant of immunization services utilization among nursing mothers.

S/N	Mothers' Level of Knowledge	SA	A	D	SD	Mean	Std. D	Decision
16	Immunization is the world's safest method to protect children from life threatening illness	212	141	136	19	3.07	0.91	High Extent
17	Immunization can be given to both adults and children	144	52	200	112	2.45	1.12	Low Extent
18	Immunization keeps my children free from vaccine preventable diseases	204	118	167	19	3.00	0.94	High Extent
19	Immunization is most cost-effective ways to protect children against death	160	94	215	39	2.74	0.99	High Extent
20	Children always fall sick when they are immunized	140	105	213	50	2.66	0.99	High Extent
	Grand mean					**2.81**	**0.65**	**High Extent**

The mean responses of item 16-20 are 3.07, 2.45, 3.00, 2.74, and 2.66. Observationally, mean value of item 16, 18, 19 and 20 are above the decision mean score of 2.50 whereas the mean value of item 17 is less than the decision mean score. From the result, the respondents agreed that immunization is the world's safest method to protect children from life threatening illness, immunization keeps my children free from vaccine preventable diseases, immunization is one of the most cost-effective ways to protect children against death and children always fall sick when they are immunized while they strongly disagreed that immunization can be given to both adults and children. The grand mean score was found to be 2.81. This indicated that to a high extent mothers' level of knowledge constitutes a determinant of immunization services utilization among nursing mothers.

DISCUSION

Proximity to health care facility and immunization services utilization

Regarding the influence of health facility proximity on the utilization of immunization services, it was identified in this study that staying close to the healthcare facility significantly affected the level of utilization of immunization services among mothers. It was reported to account for 13.3% of the utilization of immunization services. This finding is also shared by the reports of previous authors, who have reported the influence of health facility proximity on the utilization of immunization services among other health care services provided in conventional health care settings (Fikiri *et al.*, 2016; Gao *et al.*, 2021). The proximity to healthcare facilities is a critical determinant of access to and uptake of preventive health interventions, including childhood immunizations. This relationship underscores the importance of geographical accessibility as a cornerstone of effective primary healthcare (Kurayi, 2022). When health facilities are located closer to communities, individuals, especially mothers and caregivers, find it easier to reach them for routine immunization schedules, thereby improving coverage rates. Conversely, long distances, poor transportation infrastructure, and high travel costs can deter families from completing immunization schedules, leading to increased vulnerability to vaccine-preventable diseases. Thus, the finding reinforces the need to ensure the equitable distribution of health facilities and the decentralization of immunization services to ensure no child is left unvaccinated due to physical barriers (So Yoon Sim, *et al.*, 2022).

With regards to health system strengthening, this finding highlights the need to incorporate spatial accessibility into national immunization and primary healthcare strategies. Policymakers should prioritize the establishment of more primary health centres in underserved and rural areas where distance remains a key obstacle. Additionally, outreach programs and mobile vaccination clinics can bridge service gaps in remote communities. Integrating Geographic Information Systems (GIS) into health planning can further guide the optimal placement of health facilities to maximize population coverage within reasonable travel times (Gao *et al.*, 2021). By addressing geographic inequities, the health system not only increases immunization uptake but also enhances trust, satisfaction, and engagement between communities and healthcare providers. Such interventions align with the principles of Universal Health Coverage, which emphasize that everyone should have access to essential health services without geographical or financial hardship (Abubakar *et al.*, 2021).

The finding also highlights important implications for maternal and child health outcomes. Immunization is one of the most cost-effective interventions for preventing morbidity and mortality in children. When proximity facilitates higher immunization rates, communities' benefit from herd immunity, reduced disease outbreaks, and overall improved child survival rates. Moreover, the frequent contact between caregivers and healthcare providers during immunization visits can strengthen health education, promote better maternal health-seeking behaviors, and encourage the use of other preventive services such as antenatal care, growth monitoring, and family planning. Therefore, improving accessibility to immunization services contributes not only to vaccination coverage but also to broader maternal and child health

goals, including the prevention of vaccine-preventable diseases, and zero-dose issues (Kurayi *et al.*, 2022). It is also necessary that governments and development partners should invest in rural health infrastructure, transportation networks, and community-based health programs to mitigate disparities in health care provision. Local government authorities and health managers should also explore innovative community-based solutions, such as engaging community health workers to deliver vaccines through door-to-door or outreach services in hard-to-reach areas. By bringing services closer to the people, health systems can reduce missed opportunities for immunization and enhance overall service utilization (Abubakar et al., 2021; Gao et al., 2020).

Availability of immunization materials and immunization services utilization

The availability of immunization materials and services was another determinant factor identified to be associated with immunization service utilization among nursing mothers. This is a finding that is corroborated by the findings of other studies. One of such studies reported by Kurayi, (2022) examined determinants responsible for zero dose children and identified the availability of vaccines as a determinant of childhood vaccine uptake (Kurayi, 2022). The unavailability of vaccines when needed or when scheduled to be available, as well as the inadequacy of cold chain equipment, have also been reported in other studies to affect the utilization of immunization services among mothers (Doctor, *et al.*, 2011). Various factors can be said to contribute to this disruption of health systems and hinder the sustainable delivery of immunization services. These can include conflicts, inadequate investment in national immunization programs, shortages of vaccines as well as disease outbreaks. Among the children who remain unvaccinated or under vaccinated, approximately 10 million infants (49%) reportedly live in fragile or humanitarian settings, including countries impacted by conflict. Children, residing in such challenging circumstances, are the most vulnerable to disease outbreaks and require urgent attention and support (Kurayi, 2022).

The finding that availability of immunization materials and services is significantly associated with the utilization of immunization services has crucial implications for healthcare delivery and health system performance. The consistent availability of vaccines, syringes, cold chain equipment, and other logistics is essential for maintaining public trust and ensuring uninterrupted immunization coverage (Yahaya *et al.*, 2024). When vaccines or related supplies are frequently unavailable, caregivers lose confidence in the reliability of the health system, leading to missed opportunities and declining attendance for subsequent immunization visits. Therefore, ensuring a steady supply of immunization materials is fundamental to sustaining high coverage rates, preventing vaccine-preventable diseases, and achieving national immunization targets (WHO/UNCEF, (2022). From a health system management perspective, this finding emphasizes the importance of effective logistics and supply chain systems. Health authorities must strengthen vaccine forecasting, procurement, distribution, and cold chain maintenance to guarantee that all facilities are adequately stocked all year round. Proper coordination between national, regional, and local levels is vital to prevent stockouts and wastage (David & Oyarebu, 2016).

The establishment of real-time vaccine tracking systems and periodic supervision can help monitor stock levels, identify gaps early, and ensure accountability. Additionally, healthcare facilities must be equipped with functional storage facilities and adequately trained staff to manage vaccines and maintain quality standards. Furthermore, the availability of immunization services, such as having trained personnel, regular immunization sessions, and outreach programs, can contribute in enhancing community participation and continuity of care. When immunization services are consistently provided, communities perceive the health system as reliable and responsive, which enhances utilization. Policymakers and health managers should therefore invest in strengthening human resources, expanding outreach services, and ensuring that immunization activities are delivered as scheduled (Fikiri *et al.,* 2016; Kurayi *et al,* 2022).

Attitude of health care provider and immunization services utilization

Still on determinant factors that could play contributory roles in affecting the uptake of immunization services among nursing mothers in this study, it was identified that the attitude of health care providers was also significantly associated with immunization services utilization among the nursing mothers. This factor was identified to account for 64.9% of the immunization services utilization among them, and is a modifiable factor that has also been reported in other studies to influence immunization service utilization (Afiong *et al.,* 2017; Fikiri, et al., 2016; Galadima *et al.,* 2021). The finding has also been reported to have various implications for healthcare practice, service delivery, and patient engagement. The behavior, communication style, and interpersonal approach of healthcare workers greatly influence caregivers' willingness to seek and continue immunization for their children. When healthcare providers display positive attitudes, such as respect, empathy, patience, and clear communication, caregivers are more likely to trust the health system, adhere to vaccination schedules, and recommend services to others. Conversely, negative attitudes such as rudeness, neglect, or poor communication can discourage caregivers, leading to missed appointments, incomplete immunization, and reduced community participation in public health programs (Afiong *et al.,* 2017)

This finding underscores the need for continuous training and capacity building of healthcare providers, not only in technical expertise, but also in interpersonal and communication skills. Health authorities should integrate patient-focused care principles into immunization programs, emphasizing empathy, respect, and cultural sensitivity. Supportive supervision, regular feedback, and recognition of good performance can motivate healthcare workers to maintain a positive attitude toward clients. Furthermore, addressing workload, burnout, and resource shortages can improve job satisfaction and, consequently, provider behavior toward clients. When healthcare workers feel supported and valued, they are more likely to extent the same positive energy to service users. From a broader health system and policy perspective, this finding shows that improving immunization uptake requires both structural and human-centred interventions. While adequate vaccines and facilities are crucial, the quality of interaction between providers and clients ultimately determines the success of immunization programs (Ngozi *et al.,* 2019).

Mothers' level of knowledge and immunization services utilization

The knowledge of nursing mothers about immunization services and protocols was also identified in this study to significantly affect the utilization of immunization services among the mothers. This is an important finding considering its capacity in influencing the capacity of the mothers to make informed decisions regarding immunization of their children. It is a finding that is also in line with the findings of other authors who have reported the knowledge of mothers to play a contributory role in the utilization of immunization services (Assefa *et al.*, 2020; Galadima *et al.*, 2021; Ngozi *et al.*, 2019). It has also been reported as a factor to consider for improving the utilization of immunization services by the National Primary Health Care Development Agency (NPHCDA, 2013). Taiwo *et al.*, (2017) also reported that poor access to necessary information, as well as poor maternal knowledge of routine immunization, played contributory roles in promoting low vaccination coverage in the study area (Taiwo *et al.*, 2017). Another study has also reported that through multivariate analyses, caretakers of children who had high knowledge of immunization protocols were 2.24 times more likely to vaccinate their children than those who did not.

This finding bears vital implications for healthcare delivery and public health promotion. Mothers with adequate knowledge about the benefits, schedules, and safety of immunization are more likely to ensure that their children receive all recommended vaccines. Conversely, limited understanding or misinformation often leads to vaccine hesitancy, missed appointments, and incomplete immunization (Gbadebo *et al.*, 2020; Ngozi *et al.*, 2019). This underscores the importance of health education as a key strategy for improving immunization coverage. Health systems must therefore prioritize sustained awareness campaigns that inform mothers about the purpose of vaccines, the diseases they prevent, and the risks associated with non-compliance (Oboh *et al.*, 2024). From an immunization programme perspective, this finding emphasizes the need for healthcare providers to integrate health education into every immunization encounter. Antenatal and postnatal clinics, community health outreaches, and child welfare visits should serve as platforms for educating mothers and caregivers. Visual aids, community dialogue sessions, and culturally appropriate messages can enhance comprehension and retention of information. Strengthening the role of community health workers in delivering door-to-door education can also help reach mothers in remote areas who may have limited access to formal healthcare facilities (Galadima *et al.*, 2021).

CONCLUSION

The study concluded that proximity to health care facility, availability of immunization materials, and attitude of health care provider, constitute a determinant of immunization services utilization among nursing mothers in Bayelsa Central.

CONFLICT OF INTEREST: None declared

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