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TRANSNATIONAL JOURNAL OF EDUCATION AND SCIENTIFIC DEVELOPMENT
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Volume 2, Issue 5, August 2026 - ISSN: 3092-9431
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Maternal Socio-Economic Variables and Immunization Uptake among Nursing Mothers at Health Facilities in Akwa Ibom North-East Senatorial District, Nigeria

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DOI: https://doi.org/10.67487/tjesd.v2i5.316

Citation: Akpan, E. E. & Akpan, G. E. (2026). Maternal Socio-Economic Variables and Immunization Uptake among Nursing Mothers at Health Facilities in Akwa Ibom North-East Senatorial District, Nigeria. *Transnational Journal of Education and Scientific Development, 2(5).* https://doi.org/10.67487/tjesd.v2i5.316

Abstract

The aim of this study was to examine the influence of maternal socio-economic variables on immunization uptake among nursing mothers at health facilities in Akwa Ibom North-East Senatorial District. Three research questions were raised, and three hypotheses were formulated to guide the study. The study adopted the descriptive survey research design. The population of the study was all 75,348 nursing mothers attending the antenatal clinic in health facilities in the Akwa Ibom North-East Senatorial District. A sample of 382 nursing mothers was selected for the study. The sample was selected using a purposive technique. A researcher-developed questionnaire, titled "Maternal Socioeconomic Variables and Immunization Uptake Questionnaire (MSVIUQ)," was the main instrument for data collection in the study. The instrument was scored using a four-point Likert scale. The instrument was face validated by three experts in the

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Departments of Human Kinetics and Health Education, Psychological Foundations of Education, and Sociological Foundations of Education. The internal consistency reliability was conducted for the instrument using Cronbach's alpha, which yielded a coefficient of .82. Data collected for the study were analyzed using mean and standard deviation to answer the research questions, while an independent t-test and analysis of variance were used to test the hypotheses. All the hypotheses were tested at the .05 level of significance. The findings indicated that place of residence, educational level, and health insurance have significant influence on the uptake of immunization amongst nursing mothers at health facilities in the Akwa Ibom North-East Senatorial District. Based on the findings of the study, it was concluded that maternal socio-economic variables play an important role in shaping immunization uptake among nursing mothers at health facilities in Akwa Ibom North-East Senatorial District. It was recommended among others that health educators should intensify community-based health education programs that focus on the importance of childhood immunization, especially among mothers with lower educational backgrounds and those living in rural communities.

Keywords: Maternal Socioeconomic Variables, Immunization Uptake, Place of Residence, Educational Level, Health Insurance

Introduction

Immunization is a critical public health intervention aimed at preventing infectious diseases and reducing child mortality worldwide. It involves the administration of vaccines to stimulate the immune system to recognize and fight specific pathogens, thereby conferring immunity to vaccinated individuals and contributing to community herd immunity. Globally, immunization programs have been recognized as one of the most cost-effective strategies for disease prevention, significantly decreasing the burden of diseases such as polio, measles, diphtheria, and tetanus. Universal immunization coverage emphasized that achieving high coverage levels is essential for the eradication and control of vaccine-preventable diseases. Despite these efforts, disparities in immunization uptake persist across regions, particularly

in developing countries, where socio-economic and cultural factors influence maternal decisions regarding child immunization.

At the national level in Nigeria, immunization coverage remains below the World Health Organization's recommended threshold of 90 percent. According to the Nigeria Demographic and Health Survey (NDHS, 2021), only approximately 35 percent of children aged 12 – 23 months are fully immunized across the country. This low coverage is attributed to various factors, including inadequate health infrastructure, limited awareness, vaccine hesitancy, and socio-economic barriers faced by mothers (Nwachukwu & Eze, 2021). Nigeria's immunization program faces persistent challenges, especially in rural and underserved communities, where access to healthcare services is often limited (Akinyemi *et al.*, 2022). The Nigerian government, in collaboration with international partners, has initiated multiple campaigns aimed at increasing immunization uptake; however, persistent gaps remain, underscoring the need to understand underlying maternal factors influencing immunization practices.

Focusing specifically on Akwa Ibom North-East Senatorial District, recent reports indicate that immunization coverage remains suboptimal. Immunization uptake in this region is hampered by socio-economic disparities, cultural beliefs, and logistical challenges (Akwa Ibom State Ministry of Health, 2026). A community health survey by Udo *et al.* (2023) highlighted that only 42 percent of children in the district are fully immunized, far below the national average. Many mothers in this region face barriers such as poverty, low educational attainment, and limited access to health facilities, which hinder their ability to adhere to immunization schedules. The district's health facilities often grapple with resource constraints, affecting the delivery and outreach of immunization services. This situation underscores the importance of investigating maternal socio-economic variables that influence immunization uptake within this context. Maternal socio-economic variables, including place of residence, educational level, and health insurance status, have been considered in this study.

Place of residence in this study refers to the geographical location where the nursing mothers reside. According to Adebayo *et al.* (2022), nursing mothers living in urban areas generally have greater access to modern healthcare facilities, which can positively influence their level of immunization uptake. Conversely, nursing mothers residing in rural areas may face challenges such as limited infrastructure and reduced access to healthcare services,

which may hinder their participation in immunization programs for their children. Similarly, those living in urban settings tend to have better access to health information, social services, and community health initiatives, which may facilitate higher immunization awareness and uptake among them. People in urban areas exposed to diverse health campaigns and social networks often enhance their participation in health-promoting behaviors, including immunization (Olaleye & Adeyemi, 2021). On the other hand, people residing in rural areas may encounter barriers such as inadequate health infrastructure, limited dissemination of health information, and cultural beliefs that may discourage immunization practices. These challenges may lead to lower immunization rates in rural communities as compared to urban ones. Moreover, the place of residence plays a crucial role in shaping health-related social behaviors, including immunization uptake, by affecting access to services, exposure to health information, and social influence within communities. Apart from place of residence, educational level is another important variable in this study.

Educational level is the level of formal education attained by the mother and is widely regarded as a key determinant of health-seeking behaviors. Mothers with higher educational attainment could be more aware of the benefits of vaccines, better informed about immunization schedules, and more likely to access health services regularly. Education enhances health literacy, enabling mothers to comprehend health messages, dispel myths, and make informed decisions regarding their children's health. Similarly, Oladipo *et al.* (2022) emphasized that maternal education positively influences immunization coverage, with those having secondary or higher education levels more likely to fully immunize their children.

Another variable considered in this study is health insurance status. Health insurance status in this study refers to whether nursing mothers have active health insurance coverage. According to Adebayo *et al.* (2022), individuals with health insurance are more likely to access healthcare services because insurance coverage reduces financial barriers and increases the likelihood of seeking preventive health services. Conversely, those without health insurance may face out-of-pocket costs that discourage them from utilizing immunization services, leading to lower immunization uptake. Furthermore, health insurance status often correlates with increased awareness and health literacy. Insured individuals tend to receive more health education and reminders about immunization schedules through healthcare providers, which can enhance their participation in

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immunization programs. On the other hand, uninsured individuals may have limited interactions with healthcare providers and less exposure to health promotion messages, thus reducing their likelihood of immunizing their children or themselves (Olaleye & Adeyemi, 2021). Additionally, health insurance may facilitate easier access to immunization services by covering associated costs, transportation, and related healthcare expenses, thereby improving immunization coverage.

In sum, maternal socio-economic variables such as age, educational qualification, income level, occupation, parity, and marital status, are deeply intertwined factors that could influence immunization uptake among nursing mothers. Each variable presents unique challenges and opportunities for intervention, especially in regions like Akwa Ibom North-East, where socio-economic disparities are pronounced. Therefore, there is a need to conduct this study in order to examine the influence of maternal socio-economic variables on immunization uptake among nursing mothers at health facilities in the Akwa Ibom North-East Senatorial District.

Statement of the Problem

In an ideal situation, all nursing mothers attending antenatal clinics in Akwa Ibom North-East Senatorial District should have access to accurate and timely information on immunization, enabling them to make informed decisions about vaccinating their children. Furthermore, healthcare providers would be equipped with the necessary skills and resources to deliver high-quality care, addressing the unique needs of each mother. Additionally, the healthcare system would be designed to remove barriers to immunization uptake, such as financial constraints, geographical location, and cultural beliefs.

However, according to National Primary Health Care Development Agency (NPHCDA, 2026), the problems in some health facilities in Akwa Ibom North-East Senatorial District include low immunization coverage rates among nursing mothers, with many not fully completing the recommended vaccination schedule. This is often due to misconceptions about vaccine safety and effectiveness, as well as concerns about the financial burden of vaccination. Moreover, healthcare providers may not be adequately trained to address the social and cultural determinants of health, leading to inadequate care and support for mothers.

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The choice of Akwa Ibom North-East Senatorial District for this study is motivated by its unique socio-economic and cultural context within Nigeria. Akwa Ibom State, located in the South-South geopolitical zone, is characterized by a predominantly rural population with diverse socio-economic challenges. Despite being rich in oil resources, the district has struggled with equitable healthcare delivery, with disparities in immunization coverage. The district's health infrastructure has seen improvements, yet the coverage gap persists, especially among mothers in low-income brackets or with limited formal education. Furthermore, the district exhibits high maternal mortality rates, partly attributable to preventable diseases that could be controlled through effective immunization programs. These factors make Akwa Ibom North-East a pertinent setting for exploring how maternal socio-economic variables influence immunization uptake. Understanding these dynamics can inform targeted interventions to improve immunization coverage, ultimately reducing child morbidity and mortality.

Efforts have been made to address these problems, including the implementation of immunization education programs and the provision of free or low-cost vaccines. However, these efforts have been insufficient to significantly improve immunization uptake as the problem persists. Despite these efforts, the researcher is motivated to carry out this study because of the significant impact that maternal socio-economic variables have on immunization uptake among nursing mothers. The researcher believes that a more nuanced understanding of the complex relationships between socio-economic factors, such as place of residence, education level, household income, employment status, health insurance status, and marital status, and immunization practices can inform the development of targeted interventions to improve immunization coverage rates. Furthermore, the researcher is concerned about the potential consequences of low immunization rates, including the increased risk of vaccine-preventable diseases and the social and economic costs associated with untreated illnesses. This study, therefore, would fill the gap in the area of factors that influence immunization uptake among nursing mothers, as it aims to examine the influence of maternal socio-economic variables on immunization uptake among nursing mothers at health facilities in the Akwa Ibom North-East Senatorial District.

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Objectives of the Study

The purpose of this study was to examine the influence of maternal socioeconomic variables on immunization uptake among nursing mothers at health facilities in Akwa Ibom North-East Senatorial District. The study specifically seeks to**:**

i. examine the influence of place of residence on immunization uptake among nursing mothers at the health facilities.

ii. determine the influence of educational level on immunization uptake among nursing mothers at the health facilities.

iii. determine the influence of health insurance status on immunization uptake among nursing mothers at the health facilities.

Research Questions

The following research questions were formulated to guide the study:

i. What is the influence of place residence on immunization uptake among nursing mothers at the health facilities?

ii. What is the influence of educational level on immunization uptake among nursing mothers at the health facilities?

iii. What is the influence of health insurance status on immunization uptake among nursing mothers in the health facilities?

Research Hypotheses

The following hypotheses were formulated to guide the study and were tested at .05 level of significance:

i. There is no significant influence of place of residence on immunization uptake among nursing mothers at the health facilities.

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ii. There is no significant influence of educational level on immunization uptake among nursing mothers at the health facilities.

iii. There is no significant influence of health insurance status on immunization uptake among nursing mothers at the health facilities.

Research Method

A descriptive survey design was adopted for the study. Descriptive survey design is a methodological approach used to systematically gather data that characterize specific populations, behaviors, or phenomena at a particular point in time, without manipulating variables (Johnson and Turner, 2021). This design aims to provide an accurate depiction of the current situation by collecting quantifiable information through structured questionnaires or interviews, which are then analyzed statistically to identify patterns, frequencies, and relationships (Miller *et al.,* 2022). It works on the premise that a given population is too large for any research to realistically observe all the elements in the population, and what a researcher does in this type of research is to use a particular sampling technique to select a sample from the whole population and use the outcome of the sample to generalize on the entire population. This design was therefore considered appropriate for this study.

This study was conducted in the Akwa Ibom North-East Senatorial District, Nigeria. Akwa Ibom North-East lies between latitudes 4^0 49' and 5^0 22' North and longitude 7^0 48' and 8^0 14' East and covers approximately 2,045,109km^2 with a population of 784,736, being respectively 28.2 per cent and 33.3 per cent of the State's total land area and population. The senatorial district headquarters is Uyo Local Government Area, which is also the capital of Akwa Ibom State.

The population of this study comprised all the nursing mothers at health facilities in the Akwa Ibom North-East Senatorial District, with the total number of 75,348 nursing mothers (Akwa Ibom State Ministry of Health, 2026). A sample size of 382 nursing mothers was selected for the study based on Krejcie and Morgan's (1970) table for determining sample size. A purposive sampling technique was used to select the respondents for the study. The purposive sampling technique involves deliberately selecting participants or cases based on specific characteristics or criteria relevant to the research objectives (Palinkas

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et al., 2020). This non-probability sampling method is widely used when researchers need to focus on particular subgroups or individuals who possess particular expertise or experience that are critical for the study. However, because it relies on the researcher's judgment rather than random selection, it can introduce bias and limit the ability to generalize findings to the broader population. Therefore, the criteria for selecting the respondents include:

i. The respondent must be a nursing mother of a child aged 0 – 5 months.
ii. The respondent must attend an antenatal clinic at any health facility in the Akwa Ibom North-East Senatorial District.
iii. The respondent must be willing to take part in the study.

A researcher-developed questionnaire, titled **"**Maternal Socio-economic Variables and Immunization Uptake Questionnaire (MSVIUQ)," was the main instrument for data collection in the study. The instrument comprised 35 structured items with four points of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The questionnaire was divided into two sections, namely, A and B. Section A consists of five items dealing with demographic variables (age, educational qualification, household income, occupation, parity, and marital status). Section B comprised 30 items on the immunization uptake (see Appendix II for details). The respondents were required to place a tick (√) as it applied to them based on their level of agreement with each item. The items in the questionnaire were organized to reflect the purpose of the study as well as research questions and hypotheses.

For the face validation, copies of the instrument were submitted to three experts in the Faculty of Education: one from the Departments of Human Kinetics and Health Education, one from Psychological Foundations of Education, and one from the Department of Sociological Foundations of Education at the University of Uyo for validation. The researcher asked the validators to assess the instrument to see if the items were clear and relevant to elicit data required, to what extent the instrument was related to the content of the objectives, research questions, and hypotheses, and if the instrument would adequately measure the concept it is expected to measure. Their corrections in the number of items per research question and contents of the items were effected before the instrument was shown to the research supervisor, who gave approval before the final version of the questionnaire

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was to be produced for the fieldwork. To ascertain the reliability of the instrument, 30 copies of the questionnaire were given to the nursing mothers who did not take part in the main study but were part of the population. This was done through the split-half method. Data obtained were analyzed using the Cronbach Alpha statistical tool to calculate the reliability coefficient of the instrument, which yielded a 0.76 reliability coefficient. This reliability coefficient made the instrument considered suitable for the study.

With the letter of introduction, the researcher visited the selected health facilities to obtain permission to carry out the study. After obtaining permission to carry out the study, the researcher proceeded with the help of two research assistants to distribute copies of the questionnaire to the respondents during the antenatal clinic. The days of distribution were the same as the days of retrieving the instrument. Care was taken that copies of the questionnaire administered to the respondents were retrieved at the spot so as to ensure a high return rate. Out of 382 copies of the questionnaire administered, 379 copies were valid and used for data analysis.

The data collected from the questionnaires were coded, scored, summarized, and analyzed statistically. The collated data was analyzed using mean and standard deviation to answer the research questions, while an independent t-test was used to test the hypotheses at the .05 level of significance using a computer software program called the Statistical Package for Social Sciences (SPSS) Version 25.

Results

Research Question 1: What is the influence of place of residence on immunization uptake among nursing mothers at health facilities in North-East Senatorial District?

Table 1: Mean Influence of Place of Residence on Immunization Uptake among Nursing Mothers

Place of Residence	n	Mean	SD	Remark
Rural	119	52.45	5.98	Influenced
Urban	260	60.91	6.76	

***Source**: Fieldwork (2026)*

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The result in Table 1 indicated the mean influence of place of residence on immunization uptake among nursing mothers at health facilities in Akwa Ibom North-East Senatorial District. As shown in the table, nursing mothers attending the antenatal clinic whose place of residence was rural had a mean immunization uptake of 52.45, while those whose place of residence was urban had a mean immunization uptake of 60.91. The mean difference between the two groups is 8.46 in favor of mothers whose place of residence was urban. This indicates that place of residence influences immunization uptake among mothers in the Akwa Ibom North-East Senatorial District, with urban areas having a higher immunization uptake.

Research Question 2: What is the influence of educational level on immunization uptake among nursing mothers in the North-East Senatorial District?

Table 2: Mean Influence of Educational Level on Immunization Uptake among Nursing Mothers

Education Level	n	Mean	Std. Deviation	Remark
No formal Education	12	52.17	8.37565	
Primary	60	56.43	7.80345	Influenced
Secondary	161	58.19	6.67160	
Tertiary	146	59.57	8.09845	

***Source**: Fieldwork (2026)*

The result in Table 2 indicated the mean uptake of immunization among nursing mothers in the Akwa Ibom North-East Senatorial District based on education level. As shown in the table, the lowest mean, 52.17, on uptake of immunization was obtained by nursing mothers who had no formal education, while those who attended tertiary education had the highest mean of 59.57. The differences in the mean of uptake of immunization among the groups are indications of the influence of educational level on immunization uptake among nursing mothers in Akwa Ibom North-East Senatorial District, with nursing mothers whose education level is tertiary having the highest level of immunization uptake.

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Research Question 3: What is the influence of health insurance status on immunization uptake among nursing mothers in the North-East Senatorial District?

Table 3: Mean Influence of Health Insurance on Immunization Uptake among Nursing Mothers

Health Insurance Status	n	Mean	SD	Remark
Family Insurance	143	61.1189	7.61253	Influenced
No Insurance	236	56.5212	7.08036	

***Source**: Fieldwork (2026)*

The result in Table 3 indicated the mean influence of health insurance status on immunization uptake among nursing mothers in the Akwa Ibom North-East Senatorial District. As shown in the table, nursing mothers with family health insurance had a mean immunization uptake of 61.12, while those without family health insurance had a mean immunization uptake of 56.52. The mean difference between the two groups is 8.46 in favor of mothers with family health insurance. This indicates that family health insurance influences immunization uptake among mothers in the Akwa Ibom North-East Senatorial District, with family health insurance having a higher immunization uptake.

Hypothesis 1: There is no significant influence of place of residence on immunization uptake among nursing mothers in the North-East Senatorial District.

Table 4: Independent t-test Analysis of the Influence of Place of Residence on Immunization Uptake among Nursing Mothers

Place of Residence	n	Mean	SD	t-cal.	df	p-value	Decision
Rural	119	52.45	5.98	11.71	377	.000	Significant
Urban	260	60.91	6.76				

***Source:** Fieldwork (2026)*

The result in Table 4 indicated that the calculated t-value of 11.71 for the influence of place of residence on immunization uptake among nursing mothers in the North-East Senatorial

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District is significant. This is because the p-value of .000 is less than the .05 level of significance at 377 degrees of freedom. Therefore, the null hypothesis, which stated that there is no significant influence of place of residence on immunization uptake among nursing mothers in the North-East Senatorial District, is rejected. Hence, there is significant influence of place of residence on immunization uptake among nursing mothers in the North-East Senatorial District.

Hypothesis 2: There is no significant influence of educational level on immunization uptake among nursing mothers in the North-East Senatorial District.

Table 5: Analysis of Variance of the Influence of Educational Level on Immunization Uptake among Nursing Mothers

Sources of Variance	Sum of Squares	df	Mean Square	F	Sig.	Decision
Between Groups	896.319	3	298.773	5.336	.001	
Within Groups	20995.855	375	55.989			Significant
Total	21892.174	378				

***Source**: Fieldwork (2026)*

The result in Table 5 indicated that the calculated F-value of 5.336 for the influence of educational level on immunization uptake among nursing mothers in the North-East Senatorial District is significant. This is because the p-value of .000 is less than the .05 level of significance at 3 and 375 degrees of freedom. Therefore, the null hypothesis, which stated that there is no significant influence of educational level on immunization uptake among nursing mothers in the North-East Senatorial District, is rejected. Hence, there is significant influence of educational level on immunization uptake among nursing mothers in the North-East Senatorial District.

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Table 6: Bonferroni Post Hoc Test for the Influence of Educational Level on Immunization Uptake among Nursing Mothers

(I) Educational Level	(J) Educational Level	Mean Difference (I-J)	Std. Error	Sig.
No formal Education	Primary	-4.26667	2.36620	.433
	Secondary	-6.03209*	2.23909	.044
	Tertiary	-7.40183*	2.24705	.006
Primary	No formal Education	4.26667	2.36620	.433
	Secondary	-1.76542	1.13177	.718
	Tertiary	-3.13516*	1.14745	.040
Secondary	No formal Education	6.03209*	2.23909	.044
	Primary	1.76542	1.13177	.718
	Tertiary	-1.36974	.85513	.660
Tertiary	No formal Education	7.40183*	2.24705	.006
	Primary	3.13516*	1.14745	.040
	Secondary	1.36974	.85513	.660

*. The mean difference is significant at the 0.05 level.
***Source**: Fieldwork (2026)*

The result in Table 6 indicated the Bonferroni post hoc test for the influence of educational level on uptake of immunization among nursing mothers in the North-East Senatorial District. As shown in the table, groups that indicated significant differences were those without formal education and secondary education, those without formal education and tertiary education, and those who had primary education and tertiary education. However, those who had primary education did not differ significantly from those with secondary education, and those with secondary education did not differ significantly from those with tertiary education.

Hypothesis 3: There is no significant influence of health insurance status on immunization uptake among nursing mothers in the North-East Senatorial District.

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Table 7: Independent t-test Analysis of the Influence of Health Insurance Status on Immunization Uptake among Nursing Mothers

Health Insurance	n	Mean	SD	t-cal.	df	Sig.	Decision
Family Insurance	143	61.12	7.61	5.95	377	.000	Significant
No Insurance	236	56.52	7.08				

***Source**: Fieldwork (2026)*

The result in Table 7 indicated that the calculated t-value of 5.95 for the influence of family insurance on immunization uptake among nursing mothers in the North-East Senatorial District is significant. This is because the p-value of .000 is less than the .05 level of significance at 375 degrees of freedom. Therefore, the null hypothesis, which stated that there is no significant influence of family insurance on immunization uptake among nursing mothers in the North-East Senatorial District, is rejected. Hence, there is significant influence of family insurance on immunization uptake among nursing mothers in the North-East Senatorial District.

Discussion of Findings

This study revealed that there is a significant influence of place of residence on the uptake of immunization among nursing mothers in the North-East Senatorial District of Akwa Ibom State, with mothers residing in urban areas having a higher mean uptake of immunization than those living in rural areas. This finding suggests that where a mother's life plays an important role in determining whether she completes the recommended immunization schedule for her child. The higher uptake among urban mothers may indicate that they have better opportunities and conditions that encourage the utilization of immunization services. One possible reason for this finding may be the availability and accessibility of healthcare facilities in urban areas. Mothers residing in towns and cities are more likely to live closer to hospitals, primary healthcare centers, and immunization clinics. As a result, they may find it easier to attend routine immunization appointments without spending much time or money on transportation. In contrast, mothers living in rural communities may face challenges such as poor road networks, long distances to health facilities, and irregular transportation systems, which may discourage consistent attendance at immunization clinics.

This finding is in agreement with the study of Adeyemi and Oladipo (2021), who reported that mothers residing in urban areas had higher immunization completion rates than those in rural areas and found a significant association between place of residence and immunization uptake. The authors explained that better access to health facilities and health information in urban areas contributed to this outcome. Similarly, the finding of this study is also in line with that of Adebayo *et al.* (2022), who found that urban mothers demonstrated higher immunization rates than rural mothers in Oyo State, concluding that urban residence improved access to healthcare services and encouraged positive health-seeking behavior. Furthermore, the finding of this study is equally supported by that of Eze and Nwosu (2023), who reported a significant relationship between place of residence and immunization adherence, with urban mothers showing higher completion rates because of improved access to healthcare facilities and health education. The agreement between the present study and previous studies strengthens the view that place of residence remains an important factor influencing immunization uptake among nursing mothers.

The finding of this study revealed that there is a significant influence of educational level on the uptake of immunization among nursing mothers in the North-East Senatorial District of Akwa Ibom State, with mothers who attained tertiary education having the highest mean uptake of immunization. This finding implies that the level of education attained by mothers plays an important role in determining whether they comply with recommended immunization schedules for their children. It suggests that mothers with higher educational qualifications are more likely to understand, appreciate, and utilize immunization services than mothers with lower levels of education. One possible reason for this finding may be that education improves awareness and understanding of health-related issues. Mothers who attained tertiary education are more likely to understand the importance of immunization and the dangers associated with vaccine-preventable diseases. Through education, such mothers may better understand medical instructions, immunization schedules, and health messages provided by healthcare workers during antenatal and postnatal visits. This understanding may encourage them to ensure that their children complete all required vaccinations.

The finding of this study is in line with the study conducted by Ahmed et al. (2024), which found that mothers with at least secondary and tertiary education had higher immunization completion rates compared to mothers with lower educational qualifications. The study concluded that higher educational attainment significantly increased the

likelihood of mothers immunizing their children on schedule because of improved knowledge and understanding of health issues. Similarly, the finding of this study is supported by Nwachukwu *et al*. (2022), who reported a significant positive relationship between maternal educational level and immunization compliance in rural communities, showing that mothers with higher educational qualifications recorded better immunization adherence than those with little or no formal education. The researchers attributed this outcome to better health literacy and increased awareness among educated mothers. Furthermore, the finding of this study agrees with Eze *et al.* (2021), who found a statistically significant relationship between educational attainment and childhood immunization among women attending antenatal clinics in Anambra State. According to the study, mothers with tertiary education had the highest immunization completion rate, while those with little or no formal education had the lowest. The researchers explained that educated mothers were more likely to exhibit positive health-seeking behaviors and better understanding of vaccine importance.

The finding of this study revealed that there is a significant influence of health insurance status on the uptake of immunization among nursing mothers in the North-East Senatorial District of Akwa Ibom State, with mothers who had health insurance showing the highest mean uptake of immunization. This finding suggests that having health insurance plays an important role in encouraging mothers to access healthcare services, including childhood immunization. It implies that mothers who are covered by health insurance may be more likely to comply with immunization schedules and make better use of available maternal and child healthcare services compared to mothers without insurance coverage. One possible reason for this finding may be that health insurance reduces financial barriers to healthcare access. Mothers who have health insurance may feel more comfortable visiting hospitals and healthcare centers regularly because they know that many healthcare costs are covered or reduced. Even though routine immunization services are often provided free of charge, mothers with health insurance may still benefit from easier access to antenatal care, postnatal services, transportation support in some cases, and other child healthcare services that encourage regular contact with health professionals. Such regular hospital visits may increase awareness of immunization schedules and improve compliance.

TJESD
TRANSNATIONAL JOURNAL OF EDUCATION AND SCIENTIFIC DEVELOPMENT
A PUBLICATION OF WORD ASTRA
wordastrajournals@gmail.com
www.wordastrajournals.com
Volume 2, Issue 5, August 2026 - ISSN: 3092-9431

The finding of this study is consistent with the study carried out by Oyibo (2020), who found a significant relationship between health insurance status and childhood immunization among Nigerian mothers in Lagos State. The study reported that mothers with full health insurance coverage had higher immunization rates compared to uninsured mothers. The author explained that health insurance reduced financial barriers and improved mothers' adherence to immunization schedules. Similarly, the finding of this study is in agreement with that of Okorodudu (2018), who found a significant association between health insurance status and immunization compliance among nursing mothers in rural communities of Oyo State. The study revealed that mothers with full insurance coverage recorded higher immunization rates than partially insured or uninsured mothers. The researcher concluded that better health insurance coverage improved access to healthcare services and reduced challenges associated with immunization compliance. Also, the finding of this study is in line with that of Olukanni (2023), who reported a significant relationship between health insurance status and childhood immunization among women attending antenatal clinics in Anambra State. According to the study, mothers with full health insurance coverage had better immunization uptake than uninsured mothers.

Conclusion

Based on the findings of this study, it can be concluded that maternal socio-economic variables play an important role in shaping immunization uptake among nursing mothers in the North-East Senatorial District of Akwa Ibom State. However, the influence of these variables is not uniform, as some socio-economic factors appear to have a stronger connection with immunization uptake than others. The findings of the study suggest that mothers' access to healthcare services, exposure to health information, family support systems, and connection to formal healthcare structures are important conditions that influence decisions regarding childhood immunization.

Recommendations

Based on the findings of this study, the following recommendations are made:

i. Nursing mothers should be encouraged to actively participate in antenatal and postnatal health education programs to improve their understanding of childhood

immunization and its benefits. Mothers should make conscious efforts to follow immunization schedules and seek accurate information from healthcare providers to ensure full immunization uptake for their children, regardless of their personal or socio-economic background.

ii. Health educators should intensify community-based health education programs that focus on the importance of childhood immunization, especially among mothers with lower educational backgrounds and those living in rural communities. Greater emphasis should be placed on providing simple, clear, and culturally appropriate information that can help mothers better understand immunization schedules and vaccine benefits.

iii. Community health workers should strengthen grassroots sensitization and home-based follow-up services for nursing mothers, particularly in underserved and rural communities. Through regular visits and awareness campaigns, they can help reduce misconceptions about vaccines and improve mothers' compliance with immunization schedules.

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