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FACTORS AFFECTING IMMUNIZATION COVERAGE AND PROGRAMME IMPLEMENTATION IN BAUCHI METROPOLIS

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DOI: <https://doi.org/10.5281/zenodo.17177350>

Abstract: This study assessed the factors influencing the implementation of immunization programmes in Bauchi Metropolis, Nigeria. The specific objectives were to identify the factors affecting programme implementation and to determine ways to improve immunization coverage. A descriptive survey design was employed, targeting a population of 6,427 mothers and caregivers, from which 361 respondents were selected using simple random sampling. Data were collected through a structured questionnaire validated by three experts, and reliability was confirmed via test-retest, yielding a coefficient of 0.84. Mean statistics were used to analyze responses to the research questions. Findings revealed multiple factors hindering effective immunization programme implementation, including poor awareness, low literacy levels, and negative perceptions regarding routine immunization. Based on these results, the study recommends that government agencies re-strategize awareness campaigns, enhance collaboration between the Ministry of Education and the Agency for Mass Education to improve literacy, establish convenient adult education classes for mothers, and allocate additional resources to promote girl-child education. These interventions are expected to strengthen the implementation and effectiveness of immunization programmes in Bauchi Metropolis.

Keywords: Immunization, Programme Implementation, Factors, Bauchi Metropolis, Public Health

Introduction

The World Health Organization (WHO) stated that immunization is one of the most important public health interventions and cost-effective strategies to reduce child mortality and morbidity associated with childhood infectious diseases. Furthermore, immunization is also a good strategy to reach vulnerable populations. Immunization is reported to prevent an estimated 2 to 3 million deaths each year worldwide (WHO, 2019). The year 2014 marked the 40th anniversary of the WHO's Expanded Program on Immunization (EPI), which was established to ensure equitable access to routine immunization (RI) services (CDC, 2015). The WHO has stated that "vaccines have the power not only to save, but also to transform lives – giving Children a chance to grow up healthy, go to school, and improve their life prospects" (WHO, 2019). Strong RI was among the strategies for the Global Polio Eradication Initiative, which further underscored the importance of childhood immunization in preventing infant and childhood morbidity, mortality, and disabilities.

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Children and infants in North West Nigeria are more likely to die than children in any other region of Nigeria, based on neonatal, post neonatal, infant, childhood and under-5 mortality rates (National Population Commission Nigeria [NPCN] & ICF Macro, 2018). Infant mortality is (43%) higher in rural areas (86 deaths per 1,000 live births) than in urban areas (60 deaths per 1,000 live births), and the urban-rural difference is more prominent in the under-5 mortality category (NPCN & ICF Macro, 2018). Regional differences range from as low as 90 deaths per 1,000 live births in South West Nigeria to as high as 185 deaths per 1,000 live births in North West Nigeria. According to the NPCN and ICF Macro (2018), mortality rates are significantly higher among male children than female children for all categories of mortalities.

In Nigeria, about 700,000 children died before their fifth birthday (National Population Commission, ICF Marco(2014). Providing safe and effective vaccines reduces the high burden of communicable diseases in African countries and helps to meet the health-related millennium development goals. Vaccine-preventable diseases contribute significantly to morbidity and mortality; an estimated 4 million people die each year from diseases for which vaccines are available (WHO, 2019). Pneumonia and diarrhea disease account for approximately (34%) of the global 10.4 million deaths among children less than 5 years of age.

With effective immunization, many of these deaths could be prevented. Globally, invasive pneumococcal disease has recently been shown to cause the deaths of 826,000 children aged 1 to 59 months, while rotaviruses are the most common cause of severe diarrheal disease in young children. According to the WHO (2019), an estimated 527,000 children under 5 years, most of whom live in low-income countries, die each year from vaccine-preventable rotavirus infections. Other vaccine-preventable diseases include meningococcal meningitis and septicemia caused by various serogroups of *Neisseria meningitidis*, which cause epidemics with excessive morbidity and mortality among children and young adults even where adequate medical services are available in countries located in the African meningitis belt. In 2017, Nigeria reported a severe epidemic of meningococcal meningitis with a total 1407 suspected cases (epid. week 11) and a case fatality rate (CFR) of (15%) from 40 LGAs in 5 states since December 2016 (WHO, 2017). Despite the global advances in universal immunization and oral rehydration therapy for diarrheal disease, and the endowment of Nigeria with human and natural resources, childhood mortality is still extremely high. Despite the implementation of a primary health care plan designed to help improve immunization rates in Nigeria, immunization coverage remains low (Ngowu, Larson, & Min, 2018). Abdulraheem and Onajole (2019) reported on reasons for incomplete vaccination and factors for missed opportunities among Nigerian children less than one year of age in Awe local government area (LGA), Nasarawa State, through a cross-sectional survey conducted in 85 villages in all the 10 administrative wards of the LGA between January and June, 2018. Less than half (37.2%) of the mothers/caregivers finished RI schedules for their children by 9 months of age. The main reasons given by the mothers for partial immunization included parents' disagreement, objection, or apprehension about the safety of immunization (38.8%), long trekking distance to the service point (17.5%), and waiting for a long time at the health facility (15.2%) (Aremu, et al., 2019).

Maternal knowledge and educational status and raising the knowledge level of mothers and increasing maternal literacy level are necessary to advance immunization coverage, and that children from mothers with higher levels of education, who were delivered in hospitals, who live in urban areas, and whose mothers work outside the home, have significantly higher rates of completed basic vaccinations (Odusanya, et al., 2019; Saleena, et al.

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(2019) reported that considerable barriers to enhancing coverage still exist, including vaccine stock outs and shortages of other supplies.

In light of the need to reduce the high morbidity and mortality rate among children, especially those under 5 years, from vaccine-preventable diseases, the present study addressed the factors affecting the implementation of Immunization programmes in Bauchi Metropolis.

Statement of the Problem

In Nigeria, the EPI was developed based on the WHO's guidelines. A child is considered fully vaccinated if he or she has received bacille Calmette-Guerin (BCG) vaccination against tuberculosis; three doses of vaccine to prevent diphtheria, pertussis, and tetanus; at least three doses of polio vaccines; a dose of measles vaccine; and a yellow fever vaccine before the first birthday (NCPN & ICF Macro, 2018). The North West region of Nigeria particularly Bauchi State has the lowest vaccination coverage compared to the other five geopolitical regions of the country, as evidenced by (52%) of children fully immunized in the South East and South West compared to only 10% in the North West. Despite the North West region being ranked second in terms of availability of public health resources such as health facilities and Primary Health Care workers (WHO, 2017), there is lower coverage of all antigens in the region compared to other regions in the country.

Several small-sample hospital-based studies have been conducted in Nigeria on coverage of routine antigens; however, there is a paucity of data from community-based studies with appropriate sampling technique and large sample size in Bauchi State (Daniel, et al., 2014). There are also data gaps on the association between the parents' and caregivers' cultural factors such as their ability to take decisions independently, religious affiliation, and tribe/ethnicity, and the completion or noncompletion of routine immunization schedules.

Purpose of the Study

The purpose of this study is to examine factors influencing the implementation of Immunization programmes in Bauchi Metropolis. Specifically, the study sort to:

1. Find out factors influencing the implementation of Immunization programmes in Bauchi Metropolis.
2. Determine the ways to improve implementing immunization programmes in Bauchi Metropolis.

Research Questions

The following research questions guided this study

1. What are the factors influencing the implementation of Immunization programmes in Bauchi Metropolis?
2. What are the ways to improve implementing immunization programmes in Bauchi Metropolis?

Research Hypothesis

1. There is no significant difference in the factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on age
2. There is no significant difference in the factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on level of education.

Significance of the Study

At the completion of this dissertation, the findings of the study will be of utmost importance to the following categories of stakeholders:

Finding may be used to develop social mobilization interventions to target caregivers, religious leaders, and other stakeholders who have the potential to improve access to and utilization of health services and promote positive

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health outcomes in the completion of RI and reduction of infant/childhood morbidity and mortality. Identifying the association between caregivers' independence of decision-making, socioeconomic or cultural and biological characteristics, and the way of using RI services may influence completion of immunization schedules of children in the North West region with its multireligious and multitribal populations. Findings may help policymakers in modifying population specific interventions to improve access and utilization of health services and RI. The improvement in the completion of immunization schedules may reduce infant/childhood morbidity and mortality. Bauchi State has been lacking in data on the factors that influence poor compliance with RI schedules when compared with other regions of Nigeria. The NDHS data had not been used for analysis of this nature, and this study presented an opportunity to analyze these factors. Findings may be used to raise awareness of the factors responsible for noncompletion of RI schedules in the Bauchi State.

Methodology

This study focused on factors influencing the implementation of Immunization programmes in Bauchi Metropolis. Descriptive Survey design was chosen because it is effective in seeking the views of people about particular uses that concern them Bukar, (2017). The study was Bauchi Metropolis. Bauchi metropolis is known for resisting immunization the reason may not be unconnected to religious beliefs.

The target population of this study was all 6,427 mothers and caregivers whose children were within the age 12-23 months attending Public Hospitals as at January 2019 to December, 2019 in the metropolis (According to the Hospital Records, 2019).

The sample was randomly drawn from the population for there to be equal chance of representations. For this study, simple random sampling technique was used to select 361 respondents of the total population. This is in line with Krejcie and Morgan (1970) table for determining sample size who recommends that the sample size should be adequate to ensure acceptable representation of the population.

Mothers and care givers of children aged 12-23 months who consented. Mothers and caregivers that were too sick to participate – Mother and caregivers that are not available at the time. The instrument used for data collection for this study is the questionnaire, because it permits one to assess the opinion of the respondents towards the questionnaire. The questionnaire was developed by the researcher in two sections (A-C) according to the research questions that guided this study. Section „A“ (Items 1-2) is the personal data of the respondents. Section „B“ (items 6-10) addresses the factors influencing the implementation of Immunization programmes in Bauchi Metropolis. Finally section C is on ways to make recommendations for all stake holders on how to improve implementing immunization programmes in Bauchi Metropolis. The draft questionnaire was distributed to three experts. They were requested through a cover letter to carry out face validation of the questionnaire. Their comments and observations were incorporated into the final draft of the questionnaire.

A pilot study using test-retest method was conducted in Bauchi Metropolis using 20 respondents with similar characteristics with the population but not part of the research population. The instrument was administered to the and after a period of two weeks the same instrument was readministered to the same set of people. The data generated through the test- retest analyzed using Pearson Product Moment Correlation which 0.82, hence the instrument can be said to be reliable. In order to facilitate access to the area of the study and to obtain maximum

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cooperation from the respondents, a letter of introduction from the Head, Department of Public Health Science was attached with the questionnaires.

The distribution and collection of the questionnaire was enhanced by briefing of eight research assistants. The research assistants were to be familiar with the contents of the questionnaire, manner of approach and the location of the respondents. The data for answering the research question was analyzed using the percentages and mean statistics. Regression and chi square test was used to test the hypothesis of the study. To make a decision, if the computed value of t exceeds the critical or table value, the null hypothesis was rejected, but if the computed value of t is below the critical or table value, the null hypothesis be accepted. Also, ANOVA was used to test the null hypotheses at 0.05 level of significance. Hence, hypothesis that is less than $p = < 0.05$ was rejected, while hypothesis that is greater than $p = > 0.05$ was accepted.

Presentation and Analysis of Data

The study mainly focused on the factors influencing the implementation of Immunization programmes in Bauchi Metropolis. A total of 361 copies of the questionnaire were administered of which 20 suffered mortality for varying reasons. In all, 89 per cent return was recorded. The data collected has been organized in such a way that the data for answering the research question was analyzed using the percentages and mean statistics. Regression and chi square test was used to test the hypothesis of the study.

The data collected in this category was intended to find out the distribution of the respondents based on Age and Educational Qualification of respondents. The Frequency (f) for each category was found and percentages (%) calculated as shown in the tables and charts below.

Table 1: Age distribution of respondents

Age	Frequency	Percentage %
16-20	62	18
21-25	69	20
26-30	121	35
31-35	53	16
36 and above	36	11
Total	341	100

Table 1 indicates that 62 respondents representing (18%) are between 16-20 years, 69 respondents representing (20%) are between 21 – 25 years, 121 respondents representing (35%) are between 26-30 years, 53 respondents representing (16%) are between 31 – 35 years while the remaining 36 respondents representing (11%) are 36 years and above.

Table 2: Educational Qualification of Respondents

Educational Qualification	Frequency	Percentage %
None	73	21
FSLC	53	16
SSCE/GCE	135	40
NCE/OND	33	10

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HND/BSC/B.A	36	11
Others	11	3
Total	341	100

Table 2 indicates that 73 respondents representing (21%) are not Educated, 53 respondents representing (16%) are having FSLC, 135 respondents representing (40%) are having SSCE/GCE, 33 respondents representing (10%) are having NCE/OND, 36 respondents representing (11%) are having HND/BSC/BA while the remaining 11 respondents representing (3%) are having other forms of educational qualification.

Research question one: What are the factors influencing the implementation of Immunization programmes in Bauchi Metropolis?

The data analysis to research question one is presented in table 3

Table 3: Mean Response on the levels of Immunization programmes

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
1.	There is Community 2.83	PHC	center	in	the 75	200	25 55 Accepted
2.	The PHC center carries EPI services	152	149	27	27	3.20	Accepted
3.	You take your last child for DPT Immunization 1.64	22	30	101	202		Rejected
4.	Your last child completed Immunization Schedule? 1.72			DPT 5	15	210	125 Rejected
5.	You take your last child for Polio Immunization 1.81	27	55	98	175		Rejected
6.	Your last child complete the Polio Immunization Schedule 2.25	55		100	79	121	Rejected
7.	You take your last child for Measles Immunization 1.73	25	55	75	200		Rejected
8.	Your last child complete the Measles 1.79	47	45	50	213		Rejected immunization schedule
9.	You have your child's immunization card 2.08	15	20	298	22		Rejected
10.	The Vaccines are always available in the PHC 1.85	10	35	201	109		Rejected

Grand Mean=3.03

The result presented in Table 3 above indicates a grand mean of 3.03 which shows general acceptance of the items in the questionnaire. Individual analysis shows that the respondents agreed with all items 1 and 2 with means of 2.83 and 3.20 while they rejected the remaining items with means below 2.5. This shows that coverage of Immunization programmes in Bauchi Metropolis is not adequate.

Research Question Two: What are the ways to improve implementing immunization programmes in Bauchi Metropolis?

The data analysis to research question three is presented in table 4

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Table 4: Mean response on the ways to improve implementing immunization programmes

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
11.	Creating adequate understanding of immunization	50	213	47	45	2.75	Accepted
12.	Increasing access to immunization services for communities in hard-to-reach areas	201	109	10	35	3.34	Accepted
13.	Increasing manpower for immunization services	201	109	10	35	3.34	Accepted
14.	Literacy level of the community especially women should be increase	134	156	26	20	3.03	Accepted
15.	Poverty alleviation strategies should be embarked upon	75	200	25	55	2.83	Accepted
16.	Families should be encourage to deliver in a health facility	50	213	47	45	2.75	Accepted
17.	Enlightenment campaign on routine immunization (RI) services should be done regularly	101	202	22	30	3.05	Accepted
18.	Distance of parents/caregivers from RI-providing facilities should be located at close proximity	210	125	5	15	3.49	Accepted
19.	Women should be empowerment	98	175	27	55	2.89	Accepted
Grand mean= 3.06							

From table 4, indicates a grand mean of 3.06 which shows general acceptance of the items by the respondents. Individual analysis indicates that all the items presented agreed upon as their individual mean is above 2.5, showing that the above listed items are the ways to improve implementing immunization programmes in Bauchi Metropolis. **Test of Hypothesis**

Hypothesis One: There no significant difference on the factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on age of mothers and care givers.

Table 5:

Summary of ANOVA verifying the factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on age of mothers and care givers

ANOVA

Group

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	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.246	7	3.062	12.887	.056
Within Groups	70.085	333	.238		
Total	82.332	340			

Table 5 revealed that there is no significant difference on factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on age of mothers/care givers since the p-value 0.056 is greater than 0.05, this implies that the response provided on table 7 on factors influencing the implementation of Immunization programmes in Bauchi Metropolis does not significantly differ with respect to the age of mothers/care givers. Consequently, the first null hypothesis was rejected. It then follows that factors influencing the implementation of Immunization programmes in Bauchi Metropolis is not depended on age of mothers/care givers.

Hypothesis Two: There no significant difference on the factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on level of Education. Table 6

Summary of ANOVA Verifying factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on level of Education

ANOVA

Group

	Sum Squares	of Df	Mean Square	F	Sig.
Between Groups	26.471	6	2.571	13.273	.042
Within Groups	50.429	335	.490		
Total	76.000	340			

According to table 6, the p-value of the ANOVA (0.042) is less than 0.05 we therefore conclude that there is statistically significant difference on factors influencing the implementation of Immunization programmes in Bauchi Metropolis based on level of Education. Consequently, the null hypothesis (**H₀₂**) was accepted. It then follows that factors influencing the implementation of Immunization programmes in Bauchi Metropolis is statistically dependent on Educational qualification.

Discussion of Findings

From research question one; the study found that coverage of Immunization programmes in Bauchi Metropolis is not adequate. This corroborates the WHO (2017) assertion who estimates that 2 million child deaths were prevented through vaccination in and immunization continues to be amongst the most successful and cost-effective public health interventions. The number of developing countries estimated to have met the target of the UNICEF medium-term strategic plan of 80 percent coverage for DPT3 in every district increased from 42 in compared to 45 previously. Nonetheless 89 developing countries have developed strategies for reaching hard-to-reach group with immunization. In 2013, the coverage rates for three doses of combined diphtheria/pertussis/tetanus vaccine (DPT3) increased to 76 percent in developing countries and 78 percent worldwide (WHO, 2017). The average annual rate of increase (AARI) since 1990 exceeds the AARI required to reach 90 percent coverage in 2010. There were only 50.7 percent coverage for DPT3 and 51.5 percent for OPV3 with dropout rate of approximately 40 percent, (WHO, 2017). In 2018, the figures reported for Nigeria based on

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a nationwide survey were; BCG -85 percent, DPT3 -71 percent, OPV3 -71 percent, Measles 68 percent (WHO, 2018).

Furthermore, Research question two, shows that the ways to improve implementing immunization programmes in Bauchi Metropolis includes creating adequate understanding of immunization, increasing access to immunization services for communities in hard-to-reach areas, increasing manpower for immunization services, literacy level of the community especially women should be increase, poverty alleviation strategies should be embarked upon, families should be encourage to deliver in a health facility among others. This is as posited by Lombard, et al., (2018), who posited that despite the global advances in universal immunization and oral rehydration therapy for diarrheal disease, and the endowment of Nigeria with human and natural resources, childhood mortality is still extremely high. Despite the implementation of a primary health care plan designed to help improve immunization rates in Nigeria, immunization coverage remains low. Atkinson, et al., (2019) reported on reasons for incomplete vaccination and factors for missed opportunities among Nigerian children less than one year of age in Awe local government area (LGA), Nasarawa State, through a cross-sectional survey conducted in 85 villages in all the 10 administrative wards of the LGA between January and June, 2012. Less than half (37.2%) of the mothers/caregivers finished RI schedules for their children by 9 months of age. The main reasons given by the mothers for partial immunization included parents' disagreement, objection, or apprehension about the safety of immunization (38.8%), long trekking distance to the service point (17.5%), and waiting for a long time at the health facility (15.2%) (Atkinson, et al, 2019).

Conclusion

From the major findings and discussion of findings, stated above, the following conclusions were drawn about the study:

1. The study found that coverage of Immunization programmes in Bauchi Metropolis is not adequate.
2. The factors affecting factors influencing the implementation of Immunization programmes in Bauchi Metropolis includes inadequate understanding of immunization, limited access to immunization services for communities in hard-to-reach areas, inadequate numbers of health staff, education level of parents/caregivers, income level of parents/caregivers, delivery in a health facility among others.
3. The ways to improve implementing immunization programmes in Bauchi Metropolis includes creating adequate understanding of immunization, increasing access to immunization services for communities in hard-to-reach areas, increasing manpower for immunization services, literacy level of the community especially women should be increase, poverty alleviation strategies should be embarked upon, families should be encourage to deliver in a health facility among others

Recommendations of the Study

Based on the findings of the study, the following recommendations were made.

1. Government should re-strategize methods of creating awareness to change bad perceptions and practices on RI among people of the state.
2. The Bauchi State Ministry of Education and Agency for Mass Education should collaborate to improve the literacy level of the people

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3. State Ministry of Education should create convenient adult education classes to improve educational status of mothers
4. Bauchi State government should divert resources especially for girl-child education in the state.

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