

# Determine the Level of Knowledge of Mothers and Caregivers on Vaccine Preventable Diseases among Children in Bauchi Metropolis

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## **Abstract**

*The study is determining the level of knowledge of mothers and caregivers on vaccine preventable diseases among children in Bauchi metropolis. The specific objectives are to assess the level of knowledge of mothers and caregivers on vaccine preventable diseases in children in Bauchi Metropolis, and identify the factors influencing the implementation of Immunization programmes in Bauchi Metropolis. The design for this study was the descriptive survey. The population was 6427 mothers and care givers of which 361 were sampled using simple random sampling technique. The instrument for data collection is a 45 item structured questionnaire designed to elicit responses to answer the research questions that guided the study. The instrument was validated by three experts in terms of face and content validity while test re-test was use to establish the reliability coefficient of the instrument which yielded a coefficient of 0.84. Data for the study were personally collected by the researcher and 3 trained research assistants while mean statistics was employed to analyzed the data relating to research questions 1-4. Based on the findings of the study, the following recommendation were made: Government should re-strategize methods of creating awareness to change bad perceptions and practices on RI among people of the state, Bauchi State Ministry of Education and Agency for Mass Education should collaborate to improve the literacy level of the people, State Ministry of Education should create convenient adult education classes to improve educational status of mothers and Bauchi State government should divert resources specially for girl-child education in the state.*

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**Keyword:** Knowledge, factors influencing; Immunization programmes; Bauchi Metropolis

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## Introduction

It is believed that some form of inoculation was developed in India or China before the 16th century (Lombard, Pastoret, & Moulin, 2021). Scholar Ole Lund comments: "The earliest documented examples of vaccination are from India and China in the 17th century, where vaccination with powdered scabs from people infected with smallpox was used to protect against the disease. Smallpox used to be a common disease throughout the world and (20%) to (30%) of infected persons died from the disease. Smallpox was responsible for 8% to (20%) of all deaths in several European countries in the 18th century. The tradition of inoculation may have originated in India in 1000 BCE (Lombard, et al., 2021). Since then vaccination campaigns have spread throughout the globe, sometimes prescribed by law or regulations. Vaccines are now used against a wide variety of diseases besides smallpox. Louis Pasteur further developed the technique during the 19th century, extending its use to killed agents protecting against anthrax and rabies. The method Pasteur used entailed treating the agents for those diseases so they lost the ability to infect, whereas inoculation was the hopeful selection of a less virulent form of the disease, and Jenner's vaccination entailed the substitution of a different and less dangerous disease for the one protected against. Pasteur adopted the name *vaccine* as a generic term in honor of Jenner's discovery.

In 2000, the Global Alliance for Vaccines and Immunization was established to strengthen routine vaccinations and introduce new and under-used vaccines in countries with a per capita GDP of under US\$1000. GAVI is now entering its second phase of funding, which extends through 2014 (WHO, UNICEF, World Bank, 2019).

The success of routine immunization programmes has been measured by the coverage achieved with the third dose of diphtheria, tetanus, pertussis vaccine (DPT) among children aged 12-23 months, (World Health Statistics, 2019). Immunization currently averts more than 2.5 million deaths every year in all age groups from diphtheria, tetanus, pertussis (whooping cough), and measles (WHO, 2019)

Considering that more than 130 million children are born each year worldwide and need to be immunized, over 27 million children, who live mainly in disadvantaged rural communities, are not reached by routine immunization services and significant variations in coverage exist between and within regions and countries. Unless this gap is closed, 2 million children under five years of age will continue to die annually from preventable diseases for which vaccines are available or will be available in the near future (UNICEF Nigeria, 2019). Nearly one million adults die each year from liver cancer in part because they were not vaccinated against hepatitis B during childhood (WHO, UNICEF, World Bank, 2019).

They team up to plan, implement and monitor immunization activities. They collate activity reports from the sub-districts for onward transmission on monthly basis. World Health Organization (W.H.O) has described the commonest childhood killer diseases as poliomyelitis, tetanus, diphtheria, whooping cough, measles, yellow fever, and tuberculosis. In 1974, United Nations International Children's Emergency Fund (UNICEF) and (W.H.O) developed the E.P.I. to combat the six (6) childhood vaccine-preventable diseases, which was aimed at achieving universal childhood immunization (U.C.I) by 1990 with at least 80 percent of infants fully immunized by their first birthday. Success was measured by vaccine coverage levels in children aged 12 to 23 months.

Immunization, also called vaccination or inoculation, a method of stimulating resistance in the

human body to specific diseases using microorganisms-bacteria or viruses that have been modified or killed. These treated microorganisms do not cause the disease, but rather trigger the body's immune system to build a defense mechanism that continuously guards against the disease. If a person immunized against a particular disease later comes into contact with the disease-causing agent, the immune system is immediately able to respond defensively (UNICEF Nigeria, 2019). In other words, it is the administration of antigenic material (a vaccine) to stimulate the immune system of an individual to develop adaptive immunity to a disease.

Immunization has dramatically reduced the incidence of a number of deadly diseases. For example, a number of cases of *Haemophilus influenzae* type b meningitis in the United States have dropped 95 percent among infants and children since 1988, when the vaccine for that disease was first introduced. In the United States, more than 90 percent of children receive all the recommended vaccinations by their second birthday. About 85 percent of Canadian children are immunized by age two (UNICEF Nigeria, 2019).

### **Routine Immunization Schedule**

<b>Nos</b>	<b>Types of vaccines</b>	<b>Schedules Time</b>
<b>1</b>	BCG/OPV0/HBV0	At Birth to 2 Weeks
<b>2</b>	DPT1/HBV1/OPV1	4 Weeks
<b>3</b>	DPT2/HBV2/OPV2	6 Weeks
<b>4</b>	DPT3/HBV3/OPV3	10 Weeks
<b>5</b>	M/V & YF	9 Months

**Source:** National Population Commission, ICF Marco (2014).

The World Health Organization (WHO) started the global effort to use vaccination as a public health intervention in 1974 when it launched the EPI. Since then, immunization has remained one of the most cost-effective public health interventions for reducing global child morbidity and mortality (Fatiregun , et al., 2019). The EPI program is a blueprint of how to manage the technical and managerial functions required to routinely vaccinate children with a limited number of vaccines, providing protection against diphtheria, tetanus, whooping cough, measles, polio, and tuberculosis, and to prevent maternal and neonatal tetanus by vaccinating women of childbearing age with tetanus toxoid ((Lombard, et al.,2017).The original intent of EPI was to deliver multiple vaccines to all children through a simple schedule of child health visits. This was challenging because at that time the health systems in most poor and developing countries were frail and in some cases nonexistent (Fatiregun , et al., 2019).

The World Health Organization (WHO) started the global effort to use vaccination as a public health intervention in 1974 when it launched the EPI. Since then, immunization has remained one of the most cost-effective public health interventions for reducing global child morbidity and mortality (Fatiregun , et al., 2019). There have been several efforts over the years to increase EPI coverage globally, such as the Global Alliance for Vaccines and Immunization, universal childhood immunization; millennium development goals (MDGs); Global Immunization Vision and Strategy; and most recently, the Global Vaccine Action Plan (Fatiregun ,et al., 2019). These efforts, combined with specific regional efforts, such as the WHO African regional office EPI strategic plans of action, implemented in the periods 2001-2005 and 2006-2009, and the Reaching Every District approach, plus individual national EPI efforts, have raised global immunization coverage. For example, three doses of the diphtheriatetanus-pertussis (DTP3) vaccine at 12 months of age rose from (5%) coverage in 1974.

In a study in Bungudu, Zamfara state, North West Nigeria (Mushtaq, et al.,2018), on determinants of routine immunization coverage, it was found that five factors were significantly associated with full immunization coverage; these included satisfactory level of knowledge on RI, having at least secondary education, receiving ante-natal care (ANC), having received information on RI 12 months preceding the study, and delivery at health facility by mothers. Among these factors, having a satisfactory level of knowledge on RI and at least attaining secondary education were the only independent determinants of full immunization after performing logistic regression (Mushtaq, et al.,2018). However, it was also the case that this study, through community-based, was limited by geographical scope and acknowledged the fact that if it had been conducted even in the entire state, the result could have been different; hence the result cannot be generalized to the North West zone.

Additionally, this study did not take into account the role of socioeconomic status (place of residence, closeness to the routine immunization services, income levels, and educational level of respondents) of parents and caregivers, apart from their level of education, their biological characteristics (age, sex, parity, birth order), cultural factors (ability to take decision independently, religious affiliation, and tribe/ethnicity), place of residence (rural and urban), distance and cost of transport, session plan and cost of immunization services. Itimi ,et al.,( 2020) looked at the reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children in Awe Nasarawa state. However, Itimi ,et al.. did not find any significant differences with respect to vaccination completeness due to factors such as mothers' age, marital status, schooling level and gender of the child, though one of the limitations of the study was the fact that the sample population was from a homogenous rural community and participants were mainly poor women and children. This might have resulted in an underestimation of the role of socio-demographic factors such as educational levels, gender and marital status (Itimi ,et al.,2020).

WHO (2017) conducted a similar study in Ibadan, during which they attempted to identify factors influencing compliance with the immunization regimen among nursing mothers in Moniya Community. They found the health workers' attitude, long waiting for time, and cost of immunization were factors hindering compliance with immunization schedules (Itimi ,et al.,2020). In addition, Age, occupation, education, religion and time spent at the centers also were found to have a significant relationship with compliance with immunization regimen In Nigeria, Nasiru, et al., (2022) found that, beliefs about the causes and supposed alternative source of preventing diseases, and the literacy level of mothers influence their acceptance or non acceptance of vaccination. The emerging challenge is how to change the behaviour of the health workers since the incinerators are not being used by some health workers for various reasons, (WHO, 2019). It is therefore clear that health workers' attitudes can significantly influence mothers' attendance. Improving of staff attitudes and greater community mobilization will be the key approaches to increasing the immunization coverage, (Itimi ,et al.,2020). WHO, UNICEF, World Bank. (2019) found that the major factors hindering attendance of EPI services were; poor knowledge about immunization, lack of suitable venues and furniture at outreach clinics financial difficulty, long waiting times transport difficulties, poorly motivated service providers and intersectoral collaboration. Lack of vaccination, largely due to lack of confidence in immunization and lack of clean deliveries seem to be the major factors contributing to neonatal tetanus deaths.

In response to existing and anticipated challenges to immunization and the call for comprehensive policy guidance on vaccine preventable diseases and others linked interventions, WHO and UNICEF have drafted a 10-year plan (2006-2015), the global immunization vision and strategies to curtail this anomaly.

Studies in many communities in Nigeria and other African countries have suggested that satisfactory maternal knowledge of RI is an independent determinant of immunization coverage. In a study in Bungudu LGA of Zamfara state (Mushtaq, et al.,2018), on the determinants of routine immunization coverage, it was found that maternal knowledge of the benefit and schedule of RI services has a positive influence on the mother's decision to get her child fully immunized (Mushtaq, et al.,2018).

In a study on maternal determinants of immunization status of children aged 12-23 months in urban slums of Varanasi, India Itimi ,et al.,(2020), and a similar study on the factors affecting acceptance of complete immunization coverage of children under five years in rural Bangladesh. Fatiregun , et al.,(2019) found that maternal age, maternal employment status, maternal education, parity of mother, were the most important factors influencing complete immunization. Also found that age of the mother is statistically significant and that middle age mothers are more likely to get their children fully immunized than older women, this could be due to their accumulated knowledge of modern medicine and repeated messages on the importance of immunization services. This study became necessary 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, 2014). 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 (Health Reform Foundation of Nigeria, 2017), there is lower coverage of all antigens in the region compared to other regions in the country (NPCN ICF MACRO, 2014).

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 (Mushtaq, et al.,2018). 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 determine the level of knowledge of mothers and caregivers on vaccine preventable diseases in children in Bauchi Metropolis. Specifically, the study will:

1. Assess the level of knowledge of mothers and caregivers on vaccine preventable



- diseases in children in Bauchi Metropolis.
2. Identify the factors influencing the implementation of Immunization programmes in Bauchi Metropolis.

### **Research Questions**

The following research questions guided this study

1. What is the level of knowledge of mothers/
2. And caregivers on vaccine preventable diseases in children in Bauchi Metropolis?
3. What are the factors influencing the implementation of Immunization programmes in Bauchi Metropolis?

### **Research Hypothesis**

1. There is no significant difference in the level of knowledge of mothers and caregivers on vaccine preventable diseases in children in Bauchi Metropolis based on age
2. There is no significant difference in the level of knowledge of mothers and caregivers on vaccine preventable diseases in children 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 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 multiracial 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 is 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 6,427mothers and caregivers whose children were within the age 12-23months 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 12-23months 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 re-administered 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 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 level of knowledge of mothers and caregivers on vaccine preventable diseases in children 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
HND/BSC/B.A	36	11
Others	11	3
<b>Total</b>	<b>341</b>	<b>100</b>

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 is the level of knowledge of mothers/caregivers on vaccine preventable diseases in children in Bauchi Metropolis?

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



**Table 3: Mean response on the level of knowledge of mothers and caregivers on vaccine preventable diseases**

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
1.	I know the purpose of childhood immunization	121	179	25	30	3.10	Accepted
2.	I know the vaccine preventable diseases	2	2	301	50	1.88	Rejected
3.	I know the number of times a child should be taken to a health facility to complete his/her routine immunization	26	20	134	156	1.66	Rejected
4.	I know the age (or at what time) a child should receive his/her routine immunization	25	55	75	200	1.73	Rejected
5.	Immunization prevents all childhood diseases	47	45	50	213	1.79	Rejected
6.	Childhood vaccines are safe for children	15	20	298	22	2.08	Rejected
7.	Immunizations are for keeping children healthy	10	35	201	109	1.85	Rejected
8.	Childhood vaccines are very effective in preventing diseases that they are supposed to prevent	25	55	75	200	1.73	Rejected
9.	There are local preparations that can serve as substitute for immunization to prevent childhood diseases	301	50	2	2	3.83	Accepted
10.	I can identify the various side effects of vaccines	10	35	201	109	1.85	Rejected

Grand mean = 3.25

The result presented in Table 3 shows the grand mean of 3.38 which indicates general acceptance of the items by the respondents. Individual analysis indicates that the respondents agreed with items 11 and 19 with means of 3.10 and 3.83 respectively and rejected remaining the items with means below 2.5. This shows that the level of knowledge of mothers and caregivers on vaccine preventable diseases in children in Bauchi Metropolis is low.

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

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

**Table 4: Mean response on the factors influencing coverage levels of Immunization programmes**

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
11.	Inadequate understanding of immunization	298	22	15	20	3.68	Accepted

12.	Limited access to immunization services for communities in hard-to-reach areas	50	213	47	45	2.75	Accepted
13.	Inadequate numbers of health staff	201	109	10	35	3.34	Accepted
14.	Education level of parents/caregivers	134	156	26	20	3.03	Accepted
15.	Income level of parents/caregivers	75	200	25	55	2.83	Accepted
16.	Delivery in a health facility	50	213	47	45	2.75	Accepted
17.	Knowledge of parents/mothers of routine immunization (ri) services	101	202	22	30	3.05	Accepted
18.	Distance of parents/caregivers from ri-providing facilities	210	125	5	15	3.49	Accepted
19.	Religious/ethnic affiliation of parents/mothers	98	175	27	55	2.89	Accepted
20.	Women's autonomy	79	121	55	100	2.50	Accepted
21.	Maternal age	298	22	15	20	3.68	Accepted
22.	Maternal parity	201	109	10	35	3.34	Accepted
23.	Child's sex	75	200	25	55	2.83	Accepted
24.	Birth order	301	50	2	2	3.83	Accepted
25.	Attitudes of health workers	50	213	47	45	2.75	Accepted
26.	Competence of health staff	201	109	10	35	3.34	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 factors affecting factors affecting the implementation of 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	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 and care givers since the p-value 0.056 is greater than 0.05, this implies that the response provided on table 5 on factors affecting 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 and 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 of Squares	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 (**Ho<sub>2</sub>**) 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 revealed that the level of knowledge of mothers/caregivers on vaccine preventable diseases in children in Bauchi Metropolis is low. This is as posited by Fatiregun , et al., (2019), 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. Itimi ,et al.,2020) 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, 2008. Less than half (37.2%) of the mothers and 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%) (Itimi ,et al.,2020).

Research question two further revealed that the 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 and caregivers, income level of parents and caregivers, delivery in a health facility among others. This is in conformity with the assertions of Adegboyega, et al., (2015) who asserted that factors such as government employment, child delivered in a government facility, and the knowledge of the caregiver and parents of the age when RI should start and be completed were the independent forecasters of the high vaccination coverage noted in this study, suggesting the need to extend the awareness and health education efforts to private and other hospitals to improve and sustain RI coverage nationwide.

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 (National Population Commission, ICF Marco, 2014). Itimi ,et al.,(2020) reported that considerable barriers to enhancing coverage still exist, including vaccine stock outs and shortages of other supplies.

## **Conclusion**

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

1. The study further revealed that the level of knowledge of mothers/caregivers on vaccine preventable diseases in children in Bauchi Metropolis is low.
2. The 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.

## **Recommendations**

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

1. The Bauchi State Ministry of Education and Agency for Mass Education should collaborate to improve the literacy level of the people
2. State Ministry of Education should create convenient adult education classes to improve educational status of mothers

3. Bauchi State government should divert resources specially for girl-child education in the state
4. Bauchi State government, through the Ministry of Information should intensify sensitization of mothers/caregivers to improve their knowledge on Routine Immunization through Radio and Television jingles

## References

- Adegboyega, O., Abioye, K.(2015). Effects of health-care services and commodities cost on the patients at the primary health facilities in Zaria Metropolis, North Western Nigeria. *Niger J Clin Pract.*) 20:1027–35. doi: 10.4103/njcp.njcp\_61\_16
- Aremu, A. O. and Sokan, B. O. (2018). *A Multi-causal Evaluation of Academic Performance of Nigerian Learners: Issues and Implications for National Development*. Department of Guidance and Counseling, University of Ibadan.
- Fatiregun , A. A., Etukiren, E.E.(2019). Determinants of uptake of third doses of oral polio and DTP vaccines in the Ibadan North Local Government Area of Nigeria. *Int Health.* (2014) 6:213–24. doi: 10.1093/inthealth/ihu027
- Hospital Records,(2019). Bauchi State Specialist Hospital, Bauchi.
- Itimi ,K., Dienye, P.O., Ordinioha, B.(2020) Community participation and childhood immunization coverage: a comparative study of rural and urban communities of Bayelsa State, south-south Nigeria. *Niger Med J J Niger Med Assoc.* (2012) 53:21–25. doi: 10.4103/0300-1652.99826
- Lombard, M, Pastoret, P.P & Moulin, A.M. (2021). "A brief history of vaccines and vaccination". *Rev. - Off. Int. Epizoot.* 26 (1): pp.29–48. PMID 17633292
- National Population Commission, ICF Marco(2014) . Nigeria Demographic and Health Survey 2013. Abuja .
- Nasiru ,S. G., Aliyu ,G.G., Gasasira, A., Aliyu, M.H., Zubair, M., Mandawari ,S.U, (2022). Breaking community barriers to polio vaccination in Northern Nigeria: the impact of a grass roots mobilization campaign (Majigi). *Pathog Glob Health.* ( 106:166–71. doi: 10.1179/2047773212Y.0000000018
- Mushtaq ,M.U., Shahid, U., Majrooh, M.A., Shad, M.A., Siddiqui, A.M., Akram, J..(2018). From their own perspective-constraints in the Polio Eradication Initiative: perceptions of health workers and managers in a district of Pakistan’s Punjab province. *BMC Int Health Hum Rights.* 10:22 doi: 10.1186/1472-698X-10-22
- Sagar, K.S., Taneja, G., & Jain, M (2011). Assessment of routine immunization services in two Districts of the state of Jharkhand (India). *Heal Popul Perspect Issues.* 34:19–36. available online at: <http://medind.nic.in/hab/t11/i1/habt11i1p19>.



UNICEF Nigeria(2019). The Children - Maternal and Child Health. Available online at:  
[http://www.unicef.org/nigeria/children\\_1926.html](http://www.unicef.org/nigeria/children_1926.html)

WHO Regional Office for Africa(2018). Implementing the Reaching Every District Approach: A Guide for District Health Management Teams. (2008). Available online at:  
[http://www.who.int/immunization/programmes\\_systems/service\\_delivery/AFRO-RED\\_Aug2008.pdf](http://www.who.int/immunization/programmes_systems/service_delivery/AFRO-RED_Aug2008.pdf) (accessed December 12, 2019).

WHO Regional Office for Africa(2019). Implementing the Reaching Every District Approach: A Guide for District Health Management Teams. (2008). Available online at:  
[http://www.who.int/immunization/programmes\\_systems/service\\_delivery/AFRO-RED\\_Aug2008.pdf](http://www.who.int/immunization/programmes_systems/service_delivery/AFRO-RED_Aug2008.pdf) (accessed December 12, .

WHO (2019). Nigeria Monthly Bulletin of Preventable Diseases 2 (5) May 2018.

WHO, UNICEF, World Bank.(2019). State of the World's Vaccines and Immunization. (3rd ed). Geneva: World Health Organization . Available online at:  
[https://www.unicef.org/immunization/files/SOWVI\\_full\\_report\\_english\\_LR1](https://www.unicef.org/immunization/files/SOWVI_full_report_english_LR1)

World Health Organization(2017). Global Immunization Coverage Sustained in the Past Five Years. Available online at: [http://www.who.int/immunization/newsroom/press/immunization\\_coverage\\_july\\_2016/en/](http://www.who.int/immunization/newsroom/press/immunization_coverage_july_2016/en/) .