DETERMINANTS OF ROUTINE IMMUNIZATION COVERAGE AMONG CHILDREN AGED 12-23 MONTHS IN IZOM DISTRICT, GURARA LOCAL GOVERNMENT AREA, NIGER STATE

BY

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BEING A DISSERTATION SUBMITTED TO THE DEPARTMENT OF COMMUNITY MEDICINE, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER IN PUBLIC HEALTH, FIELD EPIDEMIOLOGY (MPH, FIELD EPID) OF THE AHAMADU BELLO UNIVERSITY, ZARIA

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DECLARATION

I hereby declare that this thesis was written by me. It is a product and record of my own research efforts. It has not to the best of my knowledge, been presented or published anywhere at any time by anybody, institution or organization. To this end, all borrowed ideas, questions and references are dully indicated and acknowledged appropriately.

_____ _____

Ahmad, Muhammad Ozi Date

CERTIFICATION

This thesis entitled "**DETERMINANT OF ROUTINE IMMUNIZATION COVERAGE AMONG CHILDREN AGED 12 – 23 MONTHS IN IZOM DISTRICT, GURARA LOCAL GOVERNMENT AREA, NIGER STATE**" by AHMAD, Muhammad Ozi meets the regulations governing the award of the degree of Master In Public Health (Field Epidemiology) of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge an literary presentation.

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DEDICATION

This work is dedicated to Almighty Allah who has spared my life and guided me throughout the course, my late mother and father who inspired me to seek knowledge and be of assistance to others.

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LIST OF ACRONYMS

AEFIs	-	Adverse Events Following Immunization
BCG	-	Bacille – Calmette Guerin
CI	-	Confidence Interval
cVDPV	-	Circulating Vaccine Derived Poliovirus
DFID	-	UK Department for International Development
DPT	-	Diphtheria, Pertussis and Tetanus
EPI	-	Expanded Program on Immunization
FGN	-	Federal Government of Nigeria
FMOH	-	Federal Ministry of Health
GIVs	-	Global Immunization Vision and Strategy
HepB	-	Hepatitis B
IPDs	-	Immunization plus Days
LGA(s)	-	Local Government Area(s)
MCV	-	Measles Containing Vaccine
MDGs	-	Millennium Development Goals
NGO	-	Non-Governmental Organization
NDHS	-	National Demographic Health Survey
NPHCDA	-	National Primary Health Care Development Agency
NPI	-	National Programme on Immunization
OPV	-	Oral Polio Vaccine
OR	-	Odd Ratio
P	-	P-Value
PHC	-	Primary Health Care
RI	-	Routine Immunization

SIAs	-	Supplemental Immunization Activities
UNICEF	-	United Nations Children's Fund
USAID	-	United States Agency for International Development
VPDs	-	Vaccine Preventable Diseases
WHO	-	World Health Organisation
WPV	-	Wild Polio Virus

SUMMARY

Immunization is one of the most cost effective public health interventions, childhood immunization services is provided free by Nigeria government through the Primary Health Care Development Agency. Despite the successes recorded over the years, routine immunization coverage has remained low in our rural communities and a major challenge in reducing childhood morbidity and mortality in our country. The objective of this study was to assess the routine immunization coverage and its determinants in Izom community, Gurara LGA of Niger state Nigeria.

A cross–sectional community based study conducted between February and May 2015. Cluster sampling technique was used while structured interviewer questionnaire was used to collect data through house to house visit. Vaccination coverage was assessed using immunization card and maternal history and mother's knowledge was graded as good if she scores 3 points out of maximum points of 6. Data analysis was done using Epi info for descriptive, bivariate and logistic regression to identify factors that are independently associated with full immunization coverage.

A total number of 360 mothers or caretakers and their children whose ages were between 12-23 months old, participated in this study. The mean age of the mothers or caregivers was 28.1±7.032. The levels of knowledge of the mothers or caregivers on the various aspects of routine immunization was poor (8.3%) but their attitudes towards immunization was good (86.6%). The full immunization coverage was low (35.5%) and factors that were significantly associated with full immunization of children were maternal education status of mothers. Mothers with lower levels of education (primary) had their children fully immunized, sources of information on routine immunization with those who got their information from health workers had 57.0% (P=0.001) of their children fully immunized and place of child birth with 46.9% of those who delivered at

health centre had their children fully immunized. However, only sources of information on routine immunization were found to be independently associated with full immunization status of children. Mothers or caregivers who got information from health care workers were 0.411 times more likely to fully immunize their children than those who got their information from others sources.

A better health education, appropriate information dissemination and strengthening of communication skills among the health care workers could assist in improving immunization coverage in the community.

CHAPTER ONE

INTRODUCTION

1.1 Background

Immunization is the process whereby a person is made immune or resistant to an infectious disease typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease.[1,2]

The history of vaccination started way back in 1796 when a British physician Edward Jenner performed an experiment and discovered that inoculation of a person with relatively harmless disease agent could protect the person from a more dangerous disease, the process he called vaccination which was derived from the Latin word for cow "vacca". Immunization has been found to be a proven tool for controlling and even eradicating disease and one of the greatest achievements in the field of preventive medicine was intensified Immunization campaign carried out by the World Health Organization (WHO) from 1967 to 1977 that led to eradication of smallpox in 1980.[3,4]

Eradication of poliomyelitis is within reach. Since Global Polio Eradication Initiative in 1988, infections have fallen by 99%, and some five million people have escaped paralysis.

There are two main strategies for administration of vaccines, Routine Immunization (RI) and Supplemental Immunization Activities (SIA). RI is a set of vaccinations in a schedule regimen administered to children in their first year of life. These vaccines, protects against the six childhood diseases (Tuberculosis, Diphtheria, Tetanus, Pertussis, Poliomyelitis and Measles) which is complementary in the reduction of childhood morbidity and mortality occurring from Vaccine Preventable Diseases (VPDs).

The World Health Organization (WHO) established the Global Expanded Program on Immunization (EPI) in 1974 to ensure that all children had access to routinely recommended vaccines (with global focus on the six childhood vaccine preventable diseases) which was endorsed by Nigeria government. The vaccines are Bacille - Calmette Guerin vaccine (BCG), Diphtheria - Pertussis Tetanus - vaccine (DPT), Oral Polio vaccine (OPV) and Measles - Containing vaccine (MCV). Since then, substantial progress has been made in reducing vaccine preventable morbidity and mortality. The global coverage with third dose of DPT (DPT3) increased from less than 5% in 1974 to 79% by 2005.[5]

However, and in spite of the successes recorded, millions of children (1/5 of world children) especially those in less developed countries were found not to be fully vaccinated in their first year of life. Therefore, the WHO and United Nations Children's Fund (UNICEF) developed the Global Immunization Vision and Strategy (GIVS) in 2005 with the goal of reaching a sustained national DPT3 coverage of 90% in all countries[6] and by extension improving the national immunization programs and decrease VPDs associated with morbidity and mortality.

In Nigeria, the Federal Government through the Federal Ministry of Health (FMOH) has pursued an active immunization programme and has given necessary priority to its immunization programme. The EPI was initiated in 1979; it was restructured and re-named National Programme on Immunization (NPI) in 1997 which functioned as an agency under FMOH. However, the health sector reform of May, 2007, merged NPI with the National Primary Health Care Development Agency (NPHCDA). Government provide immunization services and potent vaccines free to all population at risk of VPDs.[7]

This is achieved through the NPHCDA and the other tiers of government (States and Local Government Areas). Currently, there is a level of Federal Government commitment to immunization of children at the presidential, ministerial and at agency levels.[8]

RI is provided through public health system, private or NGO providers. The public sector provision is by health staff based at facilities which are run by LGAs.

Immunization rate in northern Nigeria, is one of the lowest in the world, the percentage of fully immunized infants is said to be less than 1% in Jigawa state.[9,10] The reasons advanced for such low coverage among others are; a highly ineffective and deteriorated primary health care service, limited resources for health services, rumours of the safety of the polio vaccine and subsequent campaigns disrupted routine immunization services.

There is also problem of confidence and trust by the public in the health services resulting from the poor state of the facilities and low standard of delivery and there is low demand for immunization at the family and community level due to lack of understanding of its value. Therefore, socio-demographic factor, knowledge, attitude and practice of mothers/ care givers are important factors to successful routine immunization coverage. This study intends to look at these factors as it affects routine immunization coverage in Izom district rural in Gurara Local Government Area of Niger State, Nigeria.

1.2 Problem Statement

Vaccine preventable diseases (VPDs) such as tuberculosis, poliomyelitis, measles, diphtheria, Pertussis and tetanus still contribute significantly to under-five morbidity and mortality in sub Saharan Africa despite global successes recorded in immunization coverage and in Nigeria, the disease accounted for 872,000 representing 22% of under-five mortality in 2002.[10] The national immunization coverage for children aged 12-23 months that are fully immunized was 25%[11] which is far below the national coverage of

90% and district coverage of 80% recommended by the WHO. The proportion of these children who received all the recommended vaccines (i.e. fully immunized) varied between the geographical zones of the country with the highest coverage of 43% in the south eastern and south western region while the north western zone has the lowest coverage of 9. 6% and the north central zone have coverage of 26 .9%. Niger state has coverage of 23.0% as fully immunized, 10.9% of children aged 12-23 months were not immunized in 2013.[11]

The resultant effects of this low immunization coverage are outbreaks of VPDs (including Measles and diphtheria), persistent transmission of Wild Poliovirus (WPV), emergence and circulation of Vaccine Derived Polio virus (cVDPV) which constitute a significant threat to the attainment of the Millennium Development Goals (MDGs) in Nigeria. Factors that contribute to this low coverage of RI among others, are weakness in the health system, difficulty in delivery of vaccines through an infrastructure and logical support system which is often overloaded, lack of understanding about the importance of vaccines among populations in the community. Others includes failure to actively demand access to immunization services, unsubstantiated rumours about safety, short fall in funding needed to reach the needed immunization goals and overshadowing influence of supplemental immunization activities (SIAs).

Since the establishment of immunization programme in1979, Nigeria has been making efforts to reduce the burden of VPDs through strengthening of its health system in general and routine immunization in particular, outreaches and supplemental immunization activities (SIAs) in form of Immunization plus days (IPDs) for administration of polio vaccine and measles follow up campaigns are been conducted at community levels. The results of these efforts are the improvement in the immunization coverage as reported in NDHS 2013; however the country is still faced with a significant risk of not meeting

MDG4 target. There is still paucity of knowledge on the factors affecting routine immunization in our community particularly in the north.

As result of inadequate knowledge on the factors that affects the uptake of routine immunization in the community, further research is needed to find out the causes of low routine immunization coverage among Izom community in Gurara LGA of Niger State. Findings from the study could help in reducing child morbidity and mortality in our communities and by extension Nigeria.

1.3 Justification for the Study

In spite of the effectiveness of vaccines in the prevention of VPDs, compliance of parents to the schedules of routine immunization has continued to be a problem in many areas leading to low RI coverage. In the North central region, Niger State is reported to be one with least RI coverage in 2013[11] and based on the measles surveillance report for the year 2013, a total of 2,580 of measles cases were reported in the state (all the 25 LGAs involved). All the reported cases in Gurara LGA were from Izom ward, which could be a reflection of poor RI coverage among rural communities. In addition there is paucity of data on routine immunization in the area; the study is undertaking to better appreciate the true routine immunization situation in the community and to also find out some of the factors that are associated with low RI coverage in the community. More so, findings from the study will help policy makers to improve RI services and by extension to reduce the morbidity and mortality associated with VPDs in rural communities.

1.4 Research Questions

1. What are the levels of knowledge of mothers or care givers on RI in Izom Community
2. What are the attitudes of mothers or care givers on RI in the community?

3. What is the coverage for various RI antigens among children 12-23 months old Izom community?
4. What are the socio-demographic factors of mothers or care givers affecting RI coverage in Izom district of Gurara LGA?

1.5 General and Specific Objectives

1.5.1 General objective

To identify the determinants of routine immunization coverage among children aged 12-23 months in Izom community, Gurara LGA.

1.5.2 Specific objectives

1. To assess the levels of knowledge of mothers or care givers regarding RI in Izom community
2. To assess the attitude of mothers or care giver regarding RI in Izom community.
3. To determine coverage for the various RI antigens among children 12-23 months old in Izom community.
4. To determine the socio–demographic factors that affects routine immunization coverage among children aged 12 -23 months in Izom community.

CHAPTER TWO

LITERATURE REVIEW

2.1 National Programme on Immunization

The Expanded Programme on Immunization (EPI) which was launched by the world Health Organization (WHO) in 1974 globally focused on prevention of six childhood vaccine preventable diseases namely tuberculosis, poliomyelitis, measles, diphtheria, Pertussis (whooping cough) and tetanus. However, high prevalence of some vaccine preventable diseases such as hepatitis and yellow fever has necessitated their inclusion in the national immunization programme of some countries including Nigeria. The Federal government of Nigeria which has pursued an active immunization programme through the Federal Ministry of Health (FMOH) introduced the EPI in 1979. In view of the critical need to enhance the effectiveness of immunization which was fast declining and to meet the global challenges of immunization, the EPI was restructured in 1997 and renamed National programme on immunization (NPI).

Following the Health Sector Reform of 2007, the NPI was merged with the National Primary Health Care Development Agency (NPHCDA) which is charged with the responsibility of effectively controlling through provision of vaccines and immunization guidelines, the occurrence of the eight vaccines preventable diseases (VPDs) earlier mentioned. Currently, the country has introduced the Haemophilus Influenzae type b vaccine as Penta-valent vaccine into its EPI programme in order to reduce substantially child mortality from pneumonia and meningitis.

In Nigeria, the government provide vaccines and immunization services free to all eligible populations through the functional Primary Health Care (PHC) centres government and private health facilities. The Target Groups for Immunization in Nigeria are: Children 0 – 11 months, Children 0 – 59 months, Women of child bearing age 15 –

49 years, Other at – risk groups especially in outbreak situation and those travelling to endemic areas and International travellers. The traditional routine immunization vaccines that are administered in Nigeria are nine and they include Bacille-Calmette Guerin (BCG) for tuberculosis, oral polio vaccine (OPV) for poliomyelitis, Penta-valent vaccine for diphtheria, Pertussis, tetanus, hepatitis b and Haemophilus Influenzae type b, measles and yellow fever vaccines.

Nigeria routine immunization schedule is designed to include all children aged 0 – 1 year who are to receive one dose of BCG vaccine which is given at birth, 3 doses of Pentavalent vaccines given as Pentavalent 1 at 6 weeks of age, Pentavalent 2 at 10 weeks of age and Pentavalent 3 at 14 weeks of age, 4 doses of OPV given as OPV0 at birth, OPV1 at 6 weeks, OPV2 10 weeks and OPV3 14 weeks of age, 4 doses of Hepatitis B vaccines given as HepB0 birth while the remaining are given as Pentavalent vaccine at 6 weeks, 10 weeks and 14 weeks of age, one dose of Measles vaccine is given at 9 months of age and one dose of Yellow Fever vaccine also given at 9 months of age.[7,12]

The funding of immunization is a collective responsibility of the Federal, State and Local Governments. However, external donors/development partners such as World Bank, European commission, USAID, WHO, DFID, UNICEF, GAVI are explored for financing immunization services on a sustainable basis.[7]

There are medical incident that take place within one month after an immunization and is believed to be caused by the immunization and they are referred to as adverse events following immunization (AEFIS). They include; hotness of the body, pains and swellings at the injection site, restlessness. Other serious or severe effects are all deaths that are thought by health workers to be related to immunization, that occur within one month of an immunization, all cases requiring hospitalization that are thought by health workers

and/ or the public to be related to immunization, that occur within one month of an immunization and any severe or unusual medical incidents that are thought by health workers and/ or the public to be related to immunization.

2.2 Infant Immunization Coverage

In order to improve national immunization program and decrease the VPDs associated with morbidity and mortality, the WHO and United Nations Children's Fund (UNICEF) in 2005 developed the global immunization vision and strategy (GIVS). The goal is to reach sustained national vaccination coverage of 90% in all countries and at least 80% coverage in every district. According to 2011 vaccination coverage, an estimated 106.8 million (representing 83%) of infants globally received at least 3 doses of DPT. This ranges from 71% in African Region to 96% in Western Pacific Region. The estimated global coverage for BCG, Polio 3, and MCV1 was 88%, 84% and 84% respectively. Among the 194 WHO member states, about 130 (67%) achieved ≥90% national DPT3 coverage and 46 (24%) achieved GIVS goal of ≥80% DPT3 coverage in every district (administrative unit).

Also, in 2011 about 22.4 million children did not receive 3 dose of DPT during the first year of life. Of these, more than half 11.8 million children lived in three countries; India (32%), Nigeria (17%) and Indonesia (7%). Nearly 14 million (62%) these children did not receive the first dose of DPT while 8.4 million (38%) started but did not complete the 3 dose of the DPT series.[5] In 2005, the distribution of children according to their immunization status in Luck now district of India showed that 44.1% of children were fully immunized while 32% and 23.9% were partially and unimmunized respectively[13]. In another study in Etawah India, 40.0% of children were found to be fully immunized, 40.5% partially immunized and 19.5% unimmunized.[14] These studies revealed that the

proportion of children who are fully immunized was far below the national goal, however other studies showed a much higher results.[15,16]

2.3 Immunization Coverage in Nigeria

Nigeria is ranked 16th in the world with infant mortality rate of 74.36 deaths/1,000 live birth. Most of these deaths are due to VPDs that is to say they accounted for 872,000 deaths in 2002 representing 22% of under-five mortality. Immunization coverage in Nigeria has remained a major challenge. The national DPT3 coverage has declined from 56% in 1990 to 41% in 2012 with a peak of 63% in 2009.[17]

Based on the National Demographic Health Survey (NDHS) 2013, only 25% of Nigeria children aged 12-23 months received all the recommended vaccines (fully immunized) compared to 2008 figure of 23%. Though there was slight improvement in the vaccination coverage in 2013, there are variations between the geographical zones of the country. While the highest coverage of 52% was recorded in the South Eastern and South South zones, the north western zone has the lowest coverage of 10%. More so, significant variation was noted between the urban and rural areas with coverage of about 40% and 16% respectively.

According to 2013 NDHS, 21% of children have received no vaccination compared to 27% in 2003 and 29% in 2008. In the north central zone comprising of Abuja, Benue, Kogi, Kwara, Nasarawa, Niger and Plateau, the children age 12-23 months with full immunization coverage is 27%. Abuja has the highest coverage of 61% while Benue and Nasarawa states have the lowest with 20% and Niger state have coverage of 23%.[11] In another study conducted in Nigeria, it was found that only 29.5% children were fully immunized, while 65.7% were partially immunized and 4.8% were not immunized at all.[18]

2.3.1 Reasons for partial immunization or non-immunization of children

Studies have identified several reasons for partial/non-immunization immunization of children against the VPDs. Among the reasons are those related to obstacles such as, unavailability of vaccine, absent of vaccinators, unavailability of parents either as a result of mother being too busy or mother being ill or sickness of elder sibling as a result of vaccination, child ill- not brought, child ill-brought but not vaccinated. Others include place of immunization too far, time of immunization not convenient, and long waiting time. Issues related to lack of information/knowledge regarding immunization e.g. ; lack of awareness of the need for immunization, lack of awareness of the need to return for second or third dose, place and/or time of immunization unknown, fear of reactions, wrong ideas about contradiction were mentioned as reasons for partial or non immunization of children.

Lack of motivation, too frequent postponement, lack of faith on the effectiveness immunization, rumours while in some cases, polio immunization is considered as the only vaccination to be given. Issues related to infertility or population control fuelled by Western Countries was view by parents as the reasons for childhood immunization the consequence of which is partial or non immunization of children.[18,19]

2.4 Mothers Knowledge and Attitude on Routine Immunization

Knowledge and attitudes of parents about childhood immunization are among the factors that can influence the optimal uptake of immunization services. Studies have shown that good and adequate knowledge on routine immunization was found to be associated with full immunization coverage. Likewise, poor knowledge of routine immunization has been identified as one of the factors responsible for partial or non immunization of children. This was found in study on determinants of immunization coverage on 12-23 months in urban slums of Lucknow district of India.[13] Also, incorrect knowledge about preventive

role of routine immunization is wide spread in Nigeria. Diseases such as malaria, diarrhoea, vomiting, pneumonia, and convulsion were believed to be VPDs. Also some decision makers and caregivers in Katsina state believed that polio immunization is all that is required, that is polio immunization protects against any childhood illness.[10]

However, another study in Nigeria revealed that 87% of mothers had satisfactory knowledge about vaccine preventable diseases.[20] and that 99.1% of mothers had very positive attitudes towards immunization. The study also found that knowledge of mothers on immunization and vaccinations at a privately funded health facility were significantly correlated with the rate of full immunization.

In a study on the reasons for incomplete vaccination and factors for missed opportunities among rural Nigerian children, it was found that the main sources of information on immunization were from health workers 72.7%. However, 14.1% of the mothers knew that vaccination against childhood disease should be completed at nine month of age with yellow fever and measles vaccines, while 20.1% knew that immunization is a means of preventing children against killer diseases and only 12.8% of mothers knew that BCG is given at birth.[19]

2.5 Socio-demographic Factors affecting Routine Immunization

The socio-demographic factors of a mother are one of the most determinant factors of childhood immunization. A study conducted on immunization coverage in Etawah a border district of Uttar Pradesh, India, significant association was found between literacy status of mothers and the full immunization of the children. Only 29% of children of illiterate mothers were fully immunized compared to 50% of literate mothers.[14]

Similarly, a study on the determinants of immunization coverage among 12-23 month old children in urban slums of Lucknow district of India showed that “a child with an

illiterate mother had about four times greater chance of being partially immunized than that with 'XII class' passed mother".[13] Findings from a study in Kenya, shows a significant association between maternal education and immunization coverage. The proportion of fully immunized children whose mother/guardians has attained secondary education and above was 81.6% while those with primary education is 76.7% and those without formal education was 42.9%.[15] In Nigeria, factors that were found to be associated with higher rate of immunization against the seven diseases include at least attaining secondary school education. Also, maternal education was found to be significantly associated with child immunization status in another study in Nigeria. Mothers without formal education were less likely to have fully immunized children.[21]

Religion was found to be one of the factors that are militating against immunization. Muslim religion is significantly associated with increased risk of non-immunization. In the North East and West of Ekiti state (Nigeria), a predominantly Muslim area, is noted to have low immunization coverage and also poor educational attainment. The immunization coverage was found to be 24%.2% among Christians compared to 8.8% among Muslim.[22]

2.6 Socio-economic Factors Affecting Vaccination Coverage

Socio-economic factors plays an important role in the vaccination of a child, parent with higher socio-economic status are more likely to take their for vaccination than those with lower socio-economic status. Study has shown the difference in the utilization of immunization services and the type of job the parent holds.[34,35] another study in India has shown that household income plays a major role in accessing health care services.[36]

More so, study has revealed the importance of family support in assessing vaccination service where those with joint family structure has less challenge in taking their children for vaccination than those in mothers in nuclear family.[37]

2.7 Socio-cultural Factors affecting Immunization

Role of traditional healer and its effect on vaccination of children have been documented; a study in Haiti showed that the patronage of traditional healers by mothers as the first treatment option affects vaccination rates negatively.[38]

2.8 Health System and Operational Barriers to Routine Immunization

Both the supply and demand are important factors associated with routine immunization performance in Nigeria. Among the supply issues are, weak primary health care services with poor integration of services, inadequate financing to support recurrent costs at LGA levels. Others include logistic challenges (frequent vaccine stock out, lack of cold chain) and lack of leadership i.e. political leaders who do not consider RI as a priority. Study conducted in DRC highlighted the issue of poor funding and logistic.[44]

There exist some operational barriers to routine immunization. These barriers among others include; poor training of health workers, irregular funding and support for outreach sessions and poor supportive supervision.

Community demand for routine immunization is poor due to sub-optimal community enlightenment, health education and promotion, poor involvement of NGO and COBs in routine immunization activities. There is also poor participation of community in planning and implementation of routine immunization activities.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study area is Izom District in Gurara Local Government Area of Niger state. The district is a rural community with a 2014 population of 10,844 projected from 2006 National Population Census.

It is divided into six villages namely, Abuchi Gwari, Abuchi Koro, Gwale, Izom, Kpou and Wagu (Zhigbodo) and each is being headed by a village head called Sarki.

A total of 46 settlements (clusters) are scattered among these villages (Appendix V).
The district is made up of predominantly Gwari speaking people with farming as the major occupation. About 70% of the inhabitants are Muslims by religion while the remaining 30% are Christians.

The routine immunization services are provided by two public health centres in the communities i.e. Izom Basic Health Centre with staff strength of 14 but only two of them (a vaccinator and a recorder) provides the services on every Thursday of the week. the other is Abuchi Primary Health Care with staff strength of 5, and RI services are provided on every Tuesday of the week. There are also two private health facilities but do not provide RI due to inadequate staff. Outreaches are conducted from time to time to provide RI services in hard to reach areas.

3.2 Study Design

This was cross sectional study.

3.3 Study Population

These are mothers or care givers of eligible children who are permanent resident in the community.

3.4 Inclusion Criteria

3.4.1 Eligibility

1. Mothers of children aged 12-23 months will be eligible for the study.

3.4.2 Exclusion criteria

1. Mothers or care givers who are not permanent resident in the community.

3.5 Sample Size Determination

The minimum sample size was determined using the formula:

$n = [z^2xpq/d^2] \times DEFF$[20]

Where:

n = minimum sample size

z = standard normal deviate at 1.96

p = proportion of children aged 12 -23 months with full immunization coverage in Niger State (12.3%).[11] = 0.123

q = 1 – p (87.7%) = 0.877

d = precision 5%

DEFF = Design effect = 2

$n = (1.96^2 \times 0.123 \times 0.877 / 0.05^2) \times 2$

$n = (3.8416 \times 0.123 \times 0.877/0.0025) \times 2 = 331.51 \approx 332$

n = 332

In accordance with the WHO recommendation, children were sampled from 30 out of 46 clusters available in the community. The number of children per cluster was calculated to be 332/30 = 11.06 which were rounded to 12, therefore, the sample size is 12 x 30 = 360

The final calculated sample size is 360.

3.6 Sampling Technique

For the sampling process, two-stage cluster sampling technique was used:

Stage 1: Selection of the community

At the first stage, 30 clusters were selected from the available 46 clusters based on probability proportionate to size. To select the 30 clusters, the following steps were followed:

i. All the six villages in the community were listed; this list constituted the sampling frame.

ii. The population of each village was indicated and Cumulative population was computed by adding the population of the next village on the list to the sum of the population of the previous villages as shown in the table below. For example, the population of the second village (Abuchi Gwari) which is equal to 810 was added to the population of the first village i.e. Abuchi Koro which is 700 until the total of all the villages were added up to 10,844.

iii. The sampling interval was determined by dividing the total population of the community by the number of clusters to be selected: 10,844/30 = 361. A random number which is less than or equal to the sampling interval, but with the same number of digits was selected using table of random number. The selected number was 277.

iv. To identify the village in which the first cluster is located, the first village with cumulative population that is equals to or exceeds the random number 277 was located and that was Abuchi Koro. Location of the second cluster was done by adding the sampling interval with the selected random number i.e. 361+277 = 638 and the village which cumulative number contained this number (Abuchi Koro) was located. Similarly, the third cluster was located in Abuchi Gwari by adding 638 to

the random number (638+277 = 915), fourth and fifth clusters were equally located in Abuchi Gwari through the same method. This process continued until the last cluster was located in Wagu/Zhigbodo village.

Stage 2: **Selection of Households**: At this stage, 12 households were selected from each of the 30 clusters making a total of 360. The first household was randomly selected and the rest households were selected contiguously till the required number of children was attained. From each of the selected households, one eligible child is randomly selected. In those households with twins, only one of them is selected randomly and in the households where there is no eligible child, the next household was visited and one eligible child selected.

3.7 Study Instruments

A structured, interviewer administered questionnaire was used to elicit information from study participants. The questionnaire was structured into four sections:

A. Knowledge of mothers or care givers on routine immunization
B. Attitude of mothers or caregivers on routine immunization.
C. Immunization Coverage of children aged 12 – 23 months
D. Socio-demographic data of mothers or care givers on routine immunization.

The questionnaire was pre-tested in Gawun Babangida.

3.8 Method of Data Collection

Data was collected using interviewer administered questionnaires. Two trained female health workers and a male supervisor were used as research assistants. They were adequately trained for two days on the use of the questionnaire to collect data. The actual data was collected from March to May, 2015. The main languages used for collection of data are Gbagyi and Hausa. The information on the vaccination status of the sampled

children was ascertained from child's immunization card if available and from mother's history if immunization card is not available.

3.9 Data Management and Analysis

3.9.1 Statistical Analysis

The completed data were reviewed on the field before electronic data entry. The data was checked for accuracy, completeness and consistency. The statistical analysis was done using Epi-info software version 3.4.3. Univariate analysis was performed to obtain the frequency and proportions. The bivariate analysis was performed to identify factors associated with full immunization status of children. Outcome of interest are non-immunized or partially immunized and fully immunized. Chi-square test was used to test for association between statistical significant. Factors that were significant at bivariate analysis were subjected to logistic regression analysis.

3.9.2 Definition of variables

3.9.3 Grading of Knowledge

In assessing the respondent's level of knowledge on routine immunization and vaccine preventable diseases, their knowledge was scored on six-point domains. One point was scored for correct response on each domain while zero was scored for wrong response. The maximum score was six points and the minimum was scored zero. Respondents who scored 3-6 points were graded as having good knowledge, score of 0-2 are graded as having some were graded as having poor knowledge. In order to reduce the possibility of guessing, respondents were asked open ended questions to grade their level of knowledge.

Table 3.1: Grading of knowledge

Knowledge	Score 1	Score 0
Number of Diseases Covered by RI	4	None
Name of Diseases covered by RI	4	None
Symptoms of the diseases mentioned	4 of fever, cough, body rashes, difficulty in breathing, stiffness of body, muscle spasm, paralysis.	None
Number of visit to complete RI	5	Less or More than 5
When to start the first visit	At 6 weeks	Less or more than 6 weeks
When to pay the last visit	At 9 months	Less than 9 months

3.9.4 Grading of attitude

Mothers' attitude was scored on 5 points domains, one point was scored for positive response on each domain while zero was scored for negative response, the maximum point was five points and minimum point was zero. Respondents with 3-5 scores were graded as having good attitude while those with 0-2 scores were graded as poor attitude towards routine immunization.

3.10 Classification of Vaccination Status of Sampled Children

Vaccination status of sampled children was classified into three categories based on the type and doses of antigens they received. The categories were defined as follows:

Fully immunized child: This is defined as child, who had received a dose of BCG, three doses of OPV (excluding the one given at birth), three doses of Pentavalent vaccine, one dose of measles vaccine by 12 months of age.

Partially immunized child: This is a child who missed at least one of the doses as stated above.

Non-immunized child: This is a child who had not received any of the vaccines at 12 months of age.

3.11 Ethical Considerations

The ethical approval for this study was obtained from Niger State Ministry of Health and Hospital Services, Minna (*Appendix vi*). Informed consent was obtained from the participants with the assurance of absolute confidentiality which was maintained throughout the study (*Appendix i*).

3.12 Limitations

Recall bias is possible limitation to this study because accuracy of information on child immunization status given by mothers without immunization card could not be verified.

Another limitation is the wilful misstatement by mothers or care givers as the statement cannot be verified.

CHAPTER FOUR

RESULTS

Three hundred and sixty (360) mothers or care givers participated in the study, the mean age of the respondents was 28.1 ± 7.032 years. 67% of mothers or care givers are aware of routine immunization but their levels knowledge was rated poor 30(8.3%) while their attitude towards the immunization was rated good 308 (85.6%).

Table 4.1: Socio-demographic characteristics of the respondents (n=360)

Variables	Frequency	Percent
Age group (years)		
15 - 19	14	3.9
20 – 24	94	26.1
25 – 29	91	25.3
30 – 34	84	23.3
≥35	77	21.4
Educational level		
Non formal	191	53.1
Primary	103	28.6
Secondary	62	17.2
Tertiary	4	1.1
Marital status		
Married	346	96
Divorce or separated	14	4
Occupation		
Unemployed	291	80.8
Trading	64	17.8
Civil servant	1	0.3
Others (tailoring, firewood, vendors)	4	1.1
Religion		
Islam	280	77.8
Christianity	80	22.2

The age group 20-24 years constitute the highest respondents with of 94(26.1%) while the lowest respondents are those in age group 15-19 years which is 3.9%. Majority of the respondents 191(53.1%) had no formal education while 103(28.6%) of them had primary

education, only 4(1.1%) responded attained tertiary education. Most of the respondents 346(96%) are married while only 14(4%) were divorce or separated and majority of are unemployed 291(80.8%) while 64(17.8%) are traders. Christianity and Islam are the two religion practiced in the community with Islam being the dominant religion 280(77.8%) and Christianity 80(22.2%).

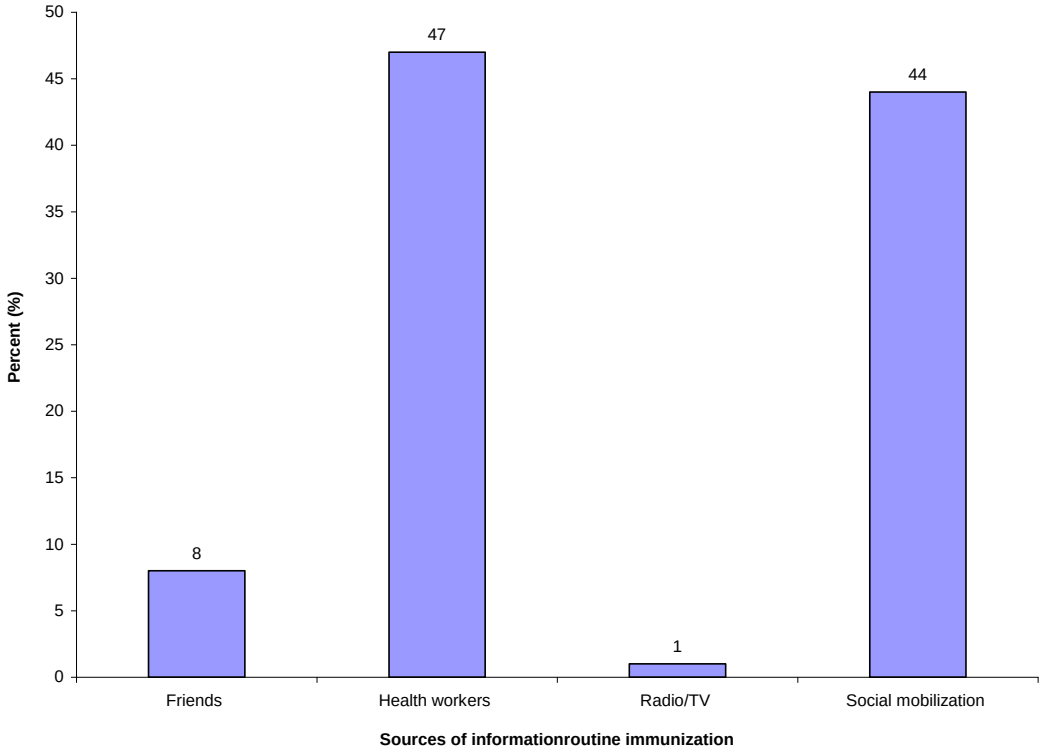


Figure 4.1: Sources of information on routine immunization in Izom community (n=241)

Of the 241 that are aware of RI, 114(47%) got their information from health workers, 107(44%) from social mobilization and 2(1%) from Radio/TV programme.

Table 4.2: Vaccine preventable diseases known by respondents in Izom community (n=360)

Vaccine preventable diseases (VPDs)	Frequency	Percent
Tuberculosis	56	15.6
Poliomyelitis	235	65.3
Diphtheria	9	2.5
Pertussis	4	1.1
Tetanus	48	13.3
Measles	43	11.9
Hepatitis	25	6.9
Malaria	146	40.6
Meningitis	122	33.9
Yellow fever	31	8.6

*Multiple responses

Many of the respondents 235(65.3%) mentioned Poliomyelitis as VPD, 56(15.6%) mentioned TB while Tetanus and Measles were mentioned by 48(13.3%) and 43 (11.9%) respectively. Malaria was mentioned as VPDs by 146(40.6%) and meningitis mentioned by 122 (33.9%) of respondents.

Table 4.3: Symptoms of vaccine preventable diseases known by the respondents in Izom Community (n=360)

Symptoms of vaccine preventable diseases (VPDs)	Frequency	Percent
Weakness of limb(s)	29	8.1
Cough	52	14.4
Hotness of the body	232	64.4
Difficulty in breathing	17	4.7
Yellowness of the eyes	21	5.8
Generalized skin rashes	41	11.4

*Multiple responses

Various symptoms of VPDs mentioned by the respondents, hotness of the body was the only symptom mentioned by the majority 232(64.4%). Cough was mentioned by 52(14.4%) while 41(11.4%) mentioned generalized skin rashes.

Table 4.4: Adverse reactions associated with vaccine preventable diseases mentioned by respondents in Izom community (n=360)

Adverse reactions of vaccine preventable diseases (VPDs)	Frequency	Percent
Hotness of the body	231	64.2
Swelling at injection site	209	58.1
Restlessness	182	50.6
Mild rashes	22	6.1
Pains at injection site	142	39.4

*Multiple responses

The respondent's knowledge on adverse reactions following immunization, majority of respondents 231(64.2%) and 209(58.1%) mentioned hotness of the body and swelling at the injection site while only 22(6.1%) mentioned mild rashes as side effects of immunization.

Table 4.5: Attitude of respondent on routine immunization in Izom community (n=360)

Attitude	Yes	No	Do not know
	Freq.(%)	Freq.(%)	Freq.(%)
Mothers takes their children to PHC for RI	240(66.7)	20(5.6)	100(27.7)
Mothers think immunization is beneficial	310(86.1)	50(13.9)	–
Mothers will advise others to take their children for immunization	307(85.3)	53(14.7)	–
Mothers think local preparations can serve as alternative to immunization	61(17)	84(23)	215(60)

Most of the respondents 240(66.7%) takes their children to Primary Health centre for routine immunization, 310(86.1%) believed immunization is beneficial while 307(85.3%) will advise others to take their children for immunization and 61(17%) believed there are local preparations that can serve as alternative to immunization.

Table 4.6: Child Characteristics in Izom community (n=360)

Characteristics	Frequency	Percent
Sex		
Male	196	54.4
Female	164	45.6
Place of child birth		
Home	232	64.4
PHC	84	23.4
Private Clinic	44	12.2
Child immunization Status		
Fully immunized	128	35.6
Not immunized	124	34.4
Partially immunized	108	30

Many of the respondents 232(64.5%) gave birth at home while 84(23.3%) and 44(12.2%) gave birth at PHC and private clinic respectively. Almost thirty six percent 128(35.6%) were fully immunized while 108(30%) were partially immunized and the remaining 124(34.4%) were not immunized.

Table 4.7: Immunization coverage for various antigens in Izom community (n=360)

RI vaccines (antigens)	Frequency	Percent
BCG	219	60.8
OPV1	212	58.9
OPV2	188	52.2
OPV3	161	44.7
Pentavalent1	212	58.9
Pentavalent2	188	52.2
Pentavalent3	161	44.7
Measles vaccine	123	34.2
Yellow fever vaccine	123	34.2

*Multiple responses

The BCG coverage is 219(60.8%), OPV1 and Pentavalent vaccine1 is 212(58.9%) and 212(58.9%) respectively, also OPV3 and Pentavalent Vaccine3 is 161(44.7%) and 161(44.7%) respectively, and finally, the Measles vaccine and yellow fever vaccine coverage is 123(34.2%) and 123(34.2%) respectively.

Table 4.8: Immunization status of children in Izom community (n=360)

Immunization status	Frequency	Percent
Fully immunized	128	35.6
Not immunized	124	34.4
Partially immunized	108	30

Almost thirty six percent 128(35.6%) were fully immunized while 108(30%) were partially immunized and the remaining 124(34.4%) were not immunized.

Table 4.9: Reasons given for incomplete vaccination by respondents in Izom community (n=165)

Immunization status	Frequency	Percent
Mother too busy	42	25.5
Inconvenient time	53	32.1
Too frequent postponement	31	18.8
Fear of reaction	17	10.2
Place of immunization too far	12	7.3
Long waiting time	10	6.1

Inconvenient time is the highest 53(32.1%) reason given by the respondents for incomplete immunization coverage followed by mother too busy with 42(25.5%) and the least is long waiting time 10(6.1%).

Table 4.10: Relationship between children immunization status and socio-demographic Characteristics of the respondents

Variables	Children Immunization status		Test statistic
	Not Immunize	Immunize	
Age category			
15-19 yrs	21(9.1%)	4(3.1%)	
20-24 yrs	54(23.3%)	36(28.1%)	X^2=8.400
25-29 yrs	56(24.1%)	42(32.8%)	P=0.078
30-34 yrs	49(21.1%)	22(17.2%)	
> 34 yrs	52(22.4%)	24(18.8%)	
Total	**232(100.0%)**	**128(100.0%)**	
Sex			
Male	125(53.9%)	70(54.7%)	X^2=0.022
Female	107(46.1%)	58(45.3%)	P=0.883
Total	**232(100.0%)**	**128(100.0%)**	
Educational Status			
None	139(59.9%)	51(39.8%)	
Primary	59(25.4%)	44(34.4%)	X^2=14.089
Secondary and above	34(14.7%)	33(25.8%)	P=0.001
Total	**232(100.0%)**	**128(100.0%)**	
Occupational Status			
Employed	43(18.5%)	26(20.3%)	X^2=0.168
Not employed	189(81.5%)	102(79.7%)	P=0.682
Total	**232(100.0%)**	**128(100.0%)**	
Religion Status			
Islam	175(75.4%)	105(82.0%)	X^2=2.079
Christianity	57(24.6%)	23(18.0%)	P=0.149
Total	**232(100.0%)**	**128(100.0%)**	
Sources Of Information			
Health workers	41(36.3%)	73(57.0%)	X^2=10.365
Non health workers	72(63.7%)	55(43.0%)	P=0.001
Total	**113(100.0%)**	**128(100.0%)**	
Place Of Birth			
Health center	68(29.3%)	60(46.9%)	X^2=10.365
At home	164(70.7%)	68(53.1%)	P=0.001
Total	**232(100.0%)**	**128(100.0%)**	

The table above shows the relationship between the maternal age and the immunization status of the children. The mother's age group between 15–19 years have the least (2) out of 128 fully immunized children while mother's age group between 25–29 years has the

highest number (41) of children that are fully immunized. However, the difference between maternal age and immunization status was not statistically significant (χ^2=8.400, P=0.078).

On the maternal education, it was found that, out of the 128 children that were fully immunized, only 33 of them had mother who attended secondary school and above and 51(39.8%) of mothers with non-formal education had their children fully immunized (χ^2=6.6072, p=0.0102).

The relationship between the sources of respondents' information regarding RI. Mothers who received information from health workers are more likely to fully immunize their children than those that received information from non health workers. The finding was significant with χ^2=10.365 and P=0.001.

The difference between immunization status of children and their place of delivery. There was an observed difference between children delivered at health centre and those delivered at home. The observed difference was statistically significant (χ^2=10.365, P=0.001).

Table 4.11: Logistic Regression of socio-demographic characteristics of respondents in Izom community

Variables	B	Sig.	OR	95.0% C.I.	
				Lower	Upper
Age		**0.313**			
15-19 yrs	1.385	0.041	3.996	1.061	15.048
20-24 yrs	1.334	0.045	3.798	1.032	13.970
25-29 yrs	1.153	0.105	3.168	0.787	12.751
30-34 yrs	1.410	0.046	4.096	1.026	16.351
> 34 yrs					
Sex					
Male	-0.222	0.425	0.801	0.465	1.381
Female					
Qualification		**0.096**			
None	0.692	0.037	1.998	1.042	3.832
Primary	0.073	0.838	1.075	0.535	2.161
Secondary					
Occupation					
Employed	0.221	0.536	1.247	0.619	2.512
Not employed					
Religion					
Islam	-0.064	0.867	0.938	0.442	1.989
Christianity					
Sources of Information					
Health workers	-0.889	0.002	0.411	0.234	0.721
Non health workers					
Place of birth					
Health center	-0.272	0.361	0.762	0.424	1.367
At home					
Constant	**-0.082**	**0.718**	**0.922**		

The coefficient for age groups 15-19 years and 30-34 years are significant indicating that increasing affluence is associated with increased odds of achieving full child immunization. Mothers of age 30-34 years are 4.1 times more likely to fully immunize their children than the other age group and mothers of age group 15-19 years are 3.996

times more likely to fully immunize their children. Sources of maternal information on routine immunization was found to be a predictor of full immunization coverage of children (OR = 0.411, 95% CI =0.234 to 0.721).

CHAPTER FIVE

DISCUSSION

Researchers have identified the role of maternal knowledge as an important determinant of vaccination coverage.[20,24] In this study, maternal knowledge on routine immunization was rated poor as only 21(5.8%) consistent with the study conducted in Zamfara state, Nigeria.[43] Similarly only (5.8%) of them knew the correct meaning of RI as the immunization given to children at health centres from birth and at various ages till they are nine months old, 30(8.3%) knew the vaccination schedule for BCG at birth and that OPV, Pentavalent at 6, 10 and 14 weeks of age and measles vaccines at nine months. However, 162 (44.7%) of mothers knew the correct number of visits (5) to be made to health centre before a child can be fully immunize. while 211(58.6%) knew the age at which first visit should be made, 213(59.6%) knew the age at which the last visit is made this is consistent with other findings .[27,29] The low levels of mothers or care givers knowledge on routine immunization in this study contrast with the finding,[20] in spite of this poor maternal knowledge on routine immunization, high proportion of has positive attitude towards immunization, 86.6% of mothers believed immunization is beneficial and could advise others to take their children for immunization.

The proportion of fully immunized children (35.5%) though higher than the national coverage of 25%,[11] the immunization coverage in the community is still very low when compared with acceptable national target of 90%. The finding is similar to a study conducted in northern Nigeria and India.[23,43] The coverage for the various antigens shows; BCG has the highest coverage of 60.8% and the lowest is measles vaccine coverage of 34.2% while coverage for both OPV1 and Pentavalent1 was 58.9% (Pentavalent 1 - Pentavalent 3 Drop - out rate was 14.2%). the low coverage for OPV and

Measles vaccines has negative effects on the government efforts to eradicate polio and the fight against measles.

Factors that were found to be significantly associated with full immunization coverage of children in this study are maternal educational status, sources of maternal information on RI and place of child delivery. This study revealed that 50% of mothers who attained secondary school and above had their children fully immunized while 32% of mothers with primary school education and below had their children fully immunized. This is consistent with a study in Kenya.[15] This study revealed that educational status of mothers has no independent bearing on the immunization status of children; this finding is similar to study conducted in India.

Maternal occupation is a factor that researchers found to have influence on the immunization status of a child. Mothers who are professionals and managers were found to be significantly associated with higher likely hood of fully immunizing their children than those who are not working.[30,34,35] This study showed that occupation is not significantly associated with immunization status of children; this could be as a result of homogeneity nature of the community where the majority are unemployed with just a few engaged in petty trading.

Religion as a factor was found to be significantly associated with child immunization status in a study conducted in Nigeria by Babalola.[33] Another study showed that religious affiliation affects immunization status of children with Muslim religion found to be associated with reduced odds of full immunization.[39,40,41] likewise, other studies found that increased childhood morbidity and mortality is associated with Muslims religion.[42] In this study, no significant association was found between religion affiliation of mothers and immunization status of children. Similarly, a report on the study in three states of

northern Nigeria found little effect of religious inclination on the decision of parents to immunize their children.

Maternal sources of information on routine immunization were found to be significantly associated with child immunization status. Mothers whose sources of information were from health care workers were more likely to get their children fully immunized than those whose source of information were from paramedical workers (non health workers). In this study, 64% of mothers who got information on routine immunization from health care workers, had their children fully immunized (OR= 0.4254) i.e. they are 0.4 times more likely to fully immunize their children than mothers who got information from non health care workers. This is finding is consistent with studies carried out in India and Libya.[23,25]

The place of child birth contributed significantly to child immunization status. Studies have shown that mothers who delivered at health centres are more likely to have their children fully immunized than those who delivered at home probably because of the lectures and advice given to mothers on the importance of child vaccination by health workers after delivery. In this study, 47% of mothers who delivered at health centres had their children fully immunized and only 29% of mothers who delivered at home had their children fully immunized. The study revealed that the place of child delivery is significantly associated with immunization status of a child which is similar to a study conducted in Niger Delta Nigeria,[31] finding from this study was contrary to a Kenya study where mothers who delivered at health centres were found to be independently associated with child immunization status i.e. they were 2.26 times more likely to get their children fully immunized.[15]

This study revealed difference in immunization status for sex with 19.4% of fully immunized male and 16.1% of fully immunized female. However, the finding is not statistically significant which is consistent with other studies that revealed that sex of a child did not significantly affect immunization.[20,25,26,30,32] On the contrary, a study in India showed that males have higher immunization rate than females and that the difference was statistically significant.[28]

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The maternal knowledge on the routine immunization was poor (8.3%), however mother's and attitudes towards immunization are good.

More so, and in spite of the successes recorded in the area of childhood Immunization services in Nigeria, the fully immunized children aged 12-23 months in Izom community was still far below the recommended 80% at district level (35.5%).

Among the factors that were significantly associated with full immunization coverage of children in the community are maternal education, sources of maternal information on routine immunization, and place of child delivery.

While only sources of maternal information on routine immunization was found to be independently associated (predictor) with full immunization coverage of children in the community.

6.2 Recommendations

Based on the findings of the study, the following recommendations are proffered

1. The Niger state government through the ministry of health and state primary health care development agency should coordinate and disseminate information on the importance of routine immunization through radio and television messages and jingles.
2. Gurara Local Government Area should create awareness on routine immunization in the community through the social mobilization.
3. In the light of the inconvenient time and busy schedule of the mothers or care giver in the community, the community should be involved in the planning and implementation of routine immunization activities.
4. Gurara Local Government Area should strengthen the communication skills among the health care workers to be able to stress to the mothers and care givers the importance of routine immunization.
5. The Non-Governmental Organization and Community based Organizations should be involved in routine immunization activities.
6. Others scope of the study such as health system and operational barriers and demand barriers against RI should be explore for further research.
7. The Gurara Local Government Area through the health department should advocate and sensitize both the community and religious leaders on the importance of routine immunization in their communities.

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APPENDICES

Appendix I

Informed Consent

Introduction

Good day Madam, my name is_____. We are conducting a study on the determinant of routine immunization (RI) coverage in Izom community. The result of the study will be used to guide appropriate intervention (s) to improve RI coverage in the community and by extension, improve the health of the children in the community.

We seek your permission to ask you some question on RI; this will take some few minutes of your time. We sincerely assure you that all your responses will be treated with utmost confidentiality. Pleases your participation in the study is voluntary; you may decide not to participate. However, your participation will be highly appreciated.

Do you consent to participate in the study? Yes [ ] No [ ]

If yes,

Signature_____ OR

Thumb-printing _____

Cluster number_____

Date_____/_____/_____

Name of settlement_____

Name of the child_____

Child's number in the cluster _____

Appendix II

Questionnaire

Determinant of Routine Immunization Status Among Children Aged 12 – 23 months in Izom Community, Gurara Local Government Area, Niger State; May, 2015.

SECTION A

Infant Immunization History or Coverage

1. Please what is the name of your child? _____

2. How old is he/she (child's name) in months _____

3. Sex (a) Male [ ] (b) Female [ ]

4. Please, where did you give birth to him/her (child's name)?

(a) At home [ ] (b) Primary Health-Care Centre [ ] (c) Private Clinic [ ]

5. What is his/her (child's name) birth order? _____

6. Have you ever taken him/her (child' name) to health facility to receive immunization?

(a) Yes [ ] (b) No [ ]

7. If yes, how many times did you take him/her (name of the child) to health facility to receive immunization?

(a) Once [ ] (b) Twice [ ] (c) Three times [ ] (d) Four times [ ]

(e) Five times [ ] (f) I can't remember [ ]

8. Please do you have his/her (child's name) immunization card?

(a) Yes [ ] (b) No [ ]

9. Please, can i have a look at the card?

(a) Card sighted [ ] (b) Card not sighted [ ]

10. If no card sighted, check for BCG scar at left upper arm

(a) Scar seen [ ] (b) Scar not seen [ ]

11. Which of these vaccines was administered to (child's name) during immunization?

(a) BCG [ ] and OPV0 [ ]

(b) DPT1 [ ], OPV1 [ ] and Hepatitis B1 [ ]

(c) DPT2 [ ], OPV2 [ ] and Hepatitis B2 [ ]

(d) DPT3 [ ], OPV3 [ ] and Hepatitis B3 [ ]

(e) Measles Vaccine [ ]

(f) Yellow Fever Vaccine [ ]

12. Child Immunization status (a) Fully Immunized [ ] (b) Partially Immunized [ ]

(c) Not Immunized [ ]

For children who are not fully immunized

13. Why was (child's name) not fully immunized?

(a) Not aware of the need for 2nd or 3rd dose [ ]

(b) For fear of reactions [ ]

(c) Because of too much postponement [ ]

(d) Because the place of immunization is too far [ ]

(e) Because child was ill (not brought) [ ]

(f) Because chid was ill (brought but not vaccinated) [ ]

(g) Vaccinator absent [ ]

(h) Inconvenient time of immunization [ ]

(i) Non availability of vaccines [ ]

(j) Because of long waiting time [ ]

(k) Mother too busy [ ]

SECTION B

Knowledge of mothers or care-givers on RI

14. Are you aware of routine immunization? (a) Yes [ ] (b) No [ ]

15. If yes, what is your source of information about routine immunization?

(a) Friends [ ]

(b) Health Workers [ ]

(c) Social Mobilization [ ]

(d) Radio/TV Programme [ ]

(e) Others (Specify) _____

16. What is routine immunization?

(a) It is immunization which is given to children at health centres from birth and at various ages till they are nine months old [ ]

(b) It is immunization that is given to children at home [ ]

(c) It is immunization given to children after one year of age [ ]

(d) It is immunization given to children when they are ill [ ]

(e) If don't know

17. Do you know the purpose of childhood immunization? (a) Yes [ ] (b) No [ ]

If no, move to question no. 19

18. What is the purpose of childhood immunization?

(a) It prevent child from getting serious diseases [ ]

(b) It prevents children from serious disability and death from the six childhood diseases [ ]

(c) It saves resources both at family and societal levels

(d) It causes diseases in children [ ]

(e) It is use as treatment for childhood diseases [ ]

19. Please do you know any childhood disease(s) that can be prevented by immunization?

(a) Yes [ ] (b) No [ ]

20. If yes, can you mention the diseases (Please)?

(a) Tuberculosis [ ]

(b) Poliomyelitis [ ]

(c) Diphtheria [ ]

(d) Pertussis [ ]

(e) Tetanus [ ]

(f) Hepatitis B [ ]

(g) Yellow Fever [ ]

(h) Meningitis [ ]

(i) Malaria [ ]

21. What are the symptoms of Vaccine preventable diseases? (Please tick the ones mentioned)

(a) Weakness of limb or limbs (Paralysis) [ ]

(b) Cough [ ]

(c) Hotness of the body (Fever) [ ]

(d) Difficulty in breathing [ ]

(e) Yellowness of the eye [ ]

(f) Generalised skin rashes and red eyes [ ]

(g) Others (Specify) _____

22. Please do you know the various vaccines that are given to children during routine immunization? (a) Yes [ ] (b) No [ ]

If no, go to question no. 26

23. If yes, can please mention the various vaccines that you know

(a) BCG [ ]

(b) OPV [ ]

(c) DPT/Pentavalent [ ]

(d) Hepatitis Vaccine [ ]

(e) Measles Vaccine [ ]

(f) Yellow Fever vaccine [ ]

24. Please do you know the schedule for the vaccines you mention? (a) Yes [ ] (b) No [ ]

25. If yes, at what age is these vaccines given?

BCG – (a) at birth [ ] (b) at 6 weeks [ ] (c) Don't know [ ]

OPV – (a) at birth [ ] (b) at 6 weeks [ ] (c) at 10 weeks [ ] (d) at 14 weeks [ ] (e) don't know [ ]

DPT (Pentavalent) – (a) at birth [ ] (b) at 6 weeks [ ] (c) at 10 weeks [ ]

(d) At 14 weeks [ ] (e) don't know [ ]

Measles vaccine – (a) at birth [ ] (b) at 9 months [ ] (c) at 1 year [ ] (d) at 2 years [ ]

(e) Don't know [ ]

Yellow Fever vaccine – (a) at birth [ ] (b) at 9 months [ ] (c) at 1 yea (d) at 2 years [ ]

(e) don't know [ ]

26. How many times should a child be taken to health facility to complete his/her routine immunization? (a) 2 times [ ] (b) 3 times [ ] (c) 4 times [ ] (d) 5 times [ ]

(e) 6 times [ ]

27. At what age should a child be taken to health facility for his/her first routine immunization? (a) At 4 weeks [ ] (b) At 6 weeks [ ]

(c) 10 weeks [ ] (d) 14 weeks [ ] (e) I don't know [ ]

28. At what age should a child be taken to health facility to take his/her last routine immunization? (a) 6 months [ ] (b) 9 months [ ] (c) 1 year [ ] (d) I don't know [ ]

29. Do you know any common side effect of childhood immunization?

(a) Yes [ ] (b) No [ ]

30. Please, can you mention the side affects you know?

(a) Hotness of the body [ ] (b) Swelling at the injection site [ ] (c) Restlessness [ ]

(d) Mild Rashes [ ] (e) Others (Specify) _____

31. Do you personally know any child that experience serious side effect of immunization? (a) Yes [ ] (b) No [ ]

32. What serious side effect did the child experienced? (a) Death [ ] (b) Paralysis [ ]

(c) Swelling at injecting site [ ] (d) Shock [ ] (e) Don't know [ ]

SECTION C

Attitude of mothers or care givers on RI

33. Do you normally take your children for immunization? (a) Yes [ ] (b) No [ ]

34. Where do you normally take them for immunization?

(a) Primary Health-Care Centre [ ]

(b) Private Clinic [ ]

(c) Village Head Compound [ ]

(d) Other places (Specify) _____

35. Who decides whether or not to immunize your children?

(a) Husband [ ]

(b) Self [ ]

(c) Father in-law [ ]

(d) Mother in-law [ ]

(e) Religious leader [ ]

(f) Joint decision (husband and self) [ ]

36. Do you need your husband permission before you take your child to health facility for immunization? (a) Yes [ ] (b) No [ ]

37. Do you think immunization is beneficial? (a) Yes [ ] (b) No [ ]

38. If no, why?

(a) It can cause HIV [ ]

(b) It can cause infertility [ ]

(c) It is promoted by government for selfish interest [ ]

(d) Child can become infected after immunization with the disease against which he/she was vaccinated [ ]

39. Would you advise mothers to take their children for immunization?

(a) Yes [ ] (b) No [ ] (c) don't know [ ]

40. If no, why?

(a) It is harmful [ ]

(b) It can be harmful [ ]

(c) It is against your religion [ ]

(d) It is against your culture [ ]

41. Do you think there are local preparations that can serve as alternative to immunization for prevention of childhood diseases? (a) Yes [ ] (b) No [ ] (c) Don't know [ ]

42. If yes, can you pleases mention them?

_____

_____

_____

_____

SECTION D

Socio-demographic Data of Respondents (Mothers/Caregivers)

43. Please what is your name? _____

44. How old are you? (In years) _____

45. What is your marital status now? (Please Tick the appropriate)

    (a) Single [ ] (b) Married [ ] (c) Widowed [ ] (d) Separated [ ] (e) Divorced [ ]

46. Please, what is the highest level of formal education that you attended?

    (a) None [ ] (b) Primary [ ] (c) Junior Secondary [ ]

    (d) Senior Secondary [ ] (e) Tertiary [ ]

47. What is your occupation?

    (a) Unemployed [ ] (b) Farmer [ ] (c) Trader [ ]

    (d) Civil Servant [ ] (e) Others (Specify) _____

48. What is your religion?

    (a) Islam [ ] (b) Christianity [ ] (c) Traditional Religion [ ]

49. Please, how many wives does your husband have? (Including you)

    (a) One [ ] (b) Two [ ] (c) Three [ ] (d) Four [ ] (e) Five [ ] (f) ≥ Six [ ]

50. How many children have you?

    (a) ≥ Six [ ] (b) Five [ ] (c) Four [ ] (d) Three [ ] (e) Two [ ] (f) One [ ]

End

Do not forget to thank the respondent for cooperation and sparing her time to answer the questions.

Name of the interviewer _____

Phone Number _____

Signature _____

Date ____/____/_____

Name of the supervisor _____

Phone Number_____

Signature _____

Date ____/____/_____

Appendix III

Routine Immunization Schedule in Nigeria

Contact	Minimum Target Age of Child	Type of Vaccine	Dosage	Route of administration
1st	At birth	BCG	0.5ml	Intra dermal
		OPV0	2 drops	Oral
2nd	6 weeks of age	Pentavalent1(DPT,HBV and Hib)	0.5ml	Intra dermal
		OPV1	2 drops	Oral
3rd	10 weeks of age	Pentavalent2 (DPT, HBV and Hib)	0.5ml	Intramuscular
		OPV2	2 drops	Oral
4th	14 weeks of age	Pentavalent 3 (DPT,HBV and Hib)	0.5ml	Intramuscular
		OPV3	2 drops	Oral
5th	9 month	Measles	0.5ml	Subcutaneous
		Yellow Fever	0.5ml	Subcutaneous

Appendix IV

Structure of Izom Community with their Settlement and Estimated Population

Villages	Settlements	Population
Abuchi Gwari	1. Abuchi Gwari	320
	2. Gape 1	150
	3. Gape 2	180
	4. Gora	60
	5. Rugan Saleh	50
	6. Rugan Wakili Paiko	50
		Total = 810
Abuchi Koro	7. Abuchi Koro	400
	8. Zhinga	150
	9. Rugan Auta	50
	10. Rugan Bello	50
	11.Rugan Amadu	50
		Total = 700
Gwale	12.Gwale Sarki	200
	13. Gwale Madaki	180
	14. Yape/Apule	170
	15. Akwaita	150
	16. Rugan Burdi	50
	17. Pita	350
	18. Rugan Abdullahi	50
		Total = 1,200
Izom	19. Bajinka	80
	20. Dawaki	380
	21. Anguwan Mutunchi	260
	22. Gade 1	150
	23. Gade 2	120

	24. Science Collage 25. Sabon Gari 26. Kaura 27. Anguwan Pmashe 28. Awoebe 29. Ang. Gwandara 30. Sabon Gwoyi	200 150 350 100 440 280 50 Total = 2,910
Kpau	31. Yelwa 32. Kpau 33. Ang. Loko 34. Kokpa 35.Chini 36.Akintola 37. Hausawan Sama 38. Hausawan Kasa	800 974 600 100 200 600 600 350 Total = 4,224
Wagu (Zhigbodo)	39. Wagu 40. Zhigbodo 1 41. Zhigbodo 2 42. Sabon Kaura 43. Bwazera 1and 2 44. Azhata	80 180 140 400 150 50 Total = 1000

Appendix V

Population of the villages in and around Izom community

Villages	Population	Cumulative Population	Cluster Numbers
Abuchi Koro	700	700	1
Abuchi Gwari	810	1,510	2,3
Gwale	1,200	2,710	4,5,6
Izom	2,910	5,620	7,8,9,10, 11, 12, 13, 14, 15,
Kpou	4,224	9,844	16,17,18,19,20,21,22,23,24,25,26,27
Wagu (Zhigbodo)	1,000	10,844	28,29,30

Appendix VI

Ethical Clearance

GOVERNMENT OF NIGER STATE
Ministry of Health & Hospital Services

MOH/CMH/11 17th February, 2014

Dr. Muhammad Ozi Ahmad,
Nigeria Field Epidemiology & Laboratory
Training Programme (NFELTP),
Federal Ministry of Health,
Abuja.

Sir,

ETHICAL APPROVAL TO CARRY OUT COMMUNITY BASED RESEARCH IN IZOM, GURARA LOCAL GOVERNMENT AREA

I write to refer to your letter dated 4th December, 2013 on the above subject matter.

2. This is to grant you approval to conduct the research on "*DETERMINANTS OF ROUTINE IMMUNIZATION COVERAGE AMONG CHILDREN AGED 12-23 MONTHS IN IZOM DISTRICT OF GURARA LOCAL GOVERNMENT AREA, NIGER STATE*".

3. It is expected that you will share the findings of your research with Ministry of Health and Hospital Services.

4. Thank you and good luck.

Dr. Abdullahi U. Imam
Director Medical Services & Training/
Chairman Medical Advisory Board

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