DETERMINANTS OF CHILDHOOD IMMUNIZATION IN IDOHA COMMUNITY

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DR NNABUCHI OKWUDILI EVERNTUS
PG/MPH/09/54204

DEPARTMENT OF COMMUNITY MEDICINE
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TITLE PAGE

DETERMINANTS OF CHILDHOOD IMMUNIZATION IN IDOHA COMMUNITY

DECLARATION

I DR NNABUCHI OKWUDILI EVERNTUS, of Department of Community Medicine hereby declare that apart from references which I duly acknowledged and credited, this project titled ñDETERMINANTS OF CHILDHOOD IMMUNIZATION IN IDOHA COMMUNITYò is the result of my own original research work.

I also declare that this work has not been used in any other examination body for degree or to any other journal for publication in parts or full

…… **……**

DR NNABUCHI OKWUDILI EVERNTUS **DATE**

CERTIFICATION

I DR Nnabuchi Okwudili Everntus a post graduate student of Department of Community Medicine University of Nigeria Enugu Campus with registration number PG/MPH/09/54204 has satisfactorily completed the requirements of the course and research work for the award of Masters Degree in Public Health

…… **……..**
Prof M.N. Aghaji **Date**
Supervisor

…… **……**
Prof (MRS) C.N. Onwasigwe **Date**
Head of Department

DEDICATION

This research is dedicated to God Almighty for his protection and grace throughout the process of this work.

ACKNOWLEDGEMENT

I wish to acknowledge everyone that contributed in one way or the other for the progress of this work. I wish to appreciate my supervisor Prof M.N. Aghaji for her patience and guidance I canôt conclude without appreciating Dr. Aninwada A.N. for his advice and help. I also appreciate Mrs. Justina and all the staff in the department, my family and God Almighty.

ABSTRACT

This study is a cross sectional study aimed at evaluating practice and determinants of child hood immunization in Idoha. This study is focused on identifying why children donôt receive immunization, and factor that encourage or deter immunization practice in the community. A total of 400 respondents were systematically selected from five villages in the community. Analysis showed that372 (98.2%) of babies had BCG. 354 (93.2%) had OPV and 348 (91.6%) had HBVO. Majority of mothers knows that immunization is for protection against child hood illness. Most families in this village live below one dollar per month income. This however didnôt affect immunization status as most mothers with good knowledge and positive perception have their children complete their immunization. There is no known religious or cultural factors that deter immunization rather they encourage immunization practice.

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ACRONYMS

ANC	Antenatal care
BCG	Bacille Calmate Guarine
DNA	Deoxyribo Nucleic Acid
DPT	Diphtheria Pertusis and Tetanus
EPI	Expanded Programme on Immunization
GAV-	Global Alliance Vaccine
HIV	Human Immuno Virus
MDG	Millenium Development Goal
NDHS	National Demogaphic Health Survey
NPI	National Programme on Immunization
OPV	Oral Polio Vaccine
PENT	Pentavalent vaccine
SIAS	Supplements Immunization Activities
TOPV	Trivalent Polio Virus
UNTH	University of Nigeria Teaching Hospital
UNICEF	United Nations International Childrenôs Emergency Fund
USA	United States of America
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION

Immunization remains one of the most important public health interventions and a cost effective strategy to reduce both the morbidity and mortality associated with infectious diseases. An estimated three million deaths are prevented through immunization each year worldwide[1] . In spite of this measures, vaccine preventable diseases remain the most common cause of childhood mortality in an estimated three million deaths each year.

Uptake of vaccination services is dependent not only on provision of these services but also on other factors including knowledge and attitude of mothers,[3,4] density of health workers,[5] accessibility to vaccination clinics and availability of safe needles and syringes.

Assessing immunization practice and coverage help to evaluate progress in achieving programme objectives and in improving service delivery.[7] Such positive evidence is required for continuing support from donor-supported initiatives like global alliance for vaccine and immunization GAVI[7]

National programme on immunization aims at delivering the primary immunization series to at least 90% of infants.[8] However, inadequate levels of immunization against childhood diseases remain a significant public health problem and reasons for non-uptake of immunization services are poorly understood. Immunization coverage is non uniform throughout the country with rural area presenting significantly lower coverage[9] and thus contributing to the circulation of wild measles and other immunization preventable disease[10]. The effectiveness of immunization programme in resource-poor setting can be influenced by factors such as coverage of health workers, the existence and quality of outreach services, the quality of the cold chain, the liaison of communities with health

services, the existence of population movements and several other factors that are related to the vaccines in use, to health services or to communities. The relative effect of each factor may vary according to geographical area.[8,11-13] In the immunization programme exercise, the understanding of the local customs, believe and tradition is crucial to develop and implement appropriate solutions.

The growing slum population in the developing world is an increasing challenge. Reports show that 60% of individual who reside in most cities in the developing countries live in the urban slum.[10] Most slum lack good access roads and are denied adequate health care due to unavailability of proper health care services.

New estimates in *"Levels and trends in child mortality report 2015 UNICEF DATA*,ò that although the global progress has been substantial, 16 000 children under 5 still die every day. It equally shows that under-five deaths have dropped from 12.7 million per year in 1990 to 5.9 million in 2015. This is the first year the figure has gone below the 6 million mark.[16]

Vaccine preventable disease have caused more than 20 percent of death for children under the age of five years. From international comparative data Nigeriaôs immunization coverage rates are among the worst in the world .[17]

A report revealed that in 2013, only 76% of Nigeria < 24 months receive all recommended vaccines while 24% of children in Nigeria were not vaccinated at all. This lead to a lot of children in Nigeria at risk of dying from vaccine preventable diseases.[18]

In 2009 Nigeria was listed among countries with the highest incidence of poliovirus cases in the world.

STATEMENT O PROBLEM

One of the important ways to reduce child morbidity and mortality from common vaccine presentable diseases is through immunization. Despite the immunization programme, vaccine preventable disease remain the most common cause of childhood mortality with estimated three million deaths each year.[2]

According to the centre for disease control and prevention, immunity to disease is achieved through the presence of antibodies to that disease in a personôs system. This in fact is the main justification for using vaccines to boost immunity and a primary focus of vaccine research and development.[2]

JUSTIFICATION

Child mortality rates plunge by more than half since 1990 but global MDG target was missed by wide margin asthe 53% drop in under-five mortality is not enough to meet the Millennium Development Goal of a two-thirds reduction between 1990 and 2015.[16]

Evaluating the determinants of immunization coverage provides evidence whether substantial progress towards achieving vaccination targets is being made. Such positive evidence is required for continuous support from donor-support initiative like global alliance for vaccine and immunization (GAVI).[7]

The routine immunization coverage against vaccine preventable disease are below targets of national level. It is important to identify the factors influencing full childhood immunization among children less than 5 years in Nigeria in order to reduce child mortality and morbidity.[19]Equally findings from this study will help policy makers in the planning and policy making on immunization and averting the menace of vaccine preventable disease in the state. Several reports have also shown that immunization

rates in urban slums rural areas and inner cities are lower than urban cities.[14, 15] The serious implication of low and unstable immunization coverage in Africa necessitate a closer look at immunization programmes among rural dwellers in our environment since their peculiar problems might contribute strongly to this low coverage.[14] More so immunization as an important component of child care, yet children around the world are commonly not fully immunized. The goal of this research was to assess current immunization practices, perceived factors influencing immunization practice and identify strategies that might improve immunization rates.

1.4.1 General Objective

To ascertain the determinants of childhood immunization in Idoha

1.4.2 Specific Objective

(1) To find out immunization status of children 0-5years in Idoha

(2) To determine mothers reasons for uptake and non uptake of immunizationin Idoha

(3) To identify factors influencing uptake of immunization in Idoha

(4) To ascertain mothers knowledge of immunization in Idoha and its effect on immunization status

(5) To deduce the perception of mother on immunization in Idoha and its effect on status.

(6) To describe mothers suggestions on how to improve uptake of immunization in the community

CHAPTER TWO

LITERATURE REVIEW

2.1 HISTORY OF IMMUNIZATION

Before the modern era of childhood immunization parents would have been surprised at the thought that future generations will be able to protect their children from many of serious childhood diseases. After all, there was a time when diphtheria was one of the most feared childhood diseases claiming more than 1000 lives in a year in USA 1920s. In the 1940s and 1950s, polio paralysed and even killed children in the thousands. At one point in time, the measles affected nearly half a million US children every year. Almost everyone in the US got it at some point during childhood and its sometimes caused complication such as pneumonia and encephalitis.[20,21] Today most children in the United states live much healthier lives and parents live with much less anxiety and worry over infections during childhood. Even though vaccines are relatively recent developments, more than 200 years ago in United Kingdom, Edward Jenner noticed that some dairymaids seemed protected from small pox if they had already been infected by the much less dangerous virus fluid caused cowpox in the same child. In 1976, Jenner conducted an experiment, scratching the arm of an 8 year ï old boy named James Philips using materials from a cowpox sore. He later repeated the experiment but added a small amount of small pox into the same child. He hoped that the procedure would be used to immune the child against the deadly small pox infection. In fact it was Jennerôs experiment that began the immunization age.[22] The next advancement occurred 100 years later when Louis Pasteur showed that disease could be prevented by infecting humans with weakened germs. In 1885 Dr. Louis Pasteur used vaccine to successfully prevent Rabies. Jonas Salk and Albert Sabin both doctors developed an inactivated polio

vaccine and live polio vaccine respectively. Today immunization is one of the success stories of modern medicine. Through Immunization Small pox was eradicated from the world in 1977.[22] The childhood vaccines under expand programme of immunization are Bacille calmate guarin (BCG), diphtheria, pertusis, and tetanus (DPT), measles oral polio, hepatitis B and yellow fever. Their schedule of visits are

- BCG, OPVO, HBVO, first at birth

  PENTAVALENT1, OPVI, at 6 weeks
- $PENTAVALENT_2$, OPV_2 at 10 weeks.
- $PENTAVALENTT_3$ OPV_3, IPV at 14 weeks.
- Measles and yellow fever at 9 months.

2.2 TYPES OF VACCINE

Scientist use many approaches in designing vaccines against microbe. The choices are typically based on fundamental information about microbe, such as how it infects cells and how the immune system responds to it, as well as practical consideration such as regions of the world where the vaccine would be used.

2.2.1 Live Attenuated Vaccines

Live attenuated vaccines contain a version of the living microbe that has been weakened in the laboratory so that it cannot cause disease. Because live attenuated vaccines are the closest thing to a natural infection these vaccines are good. They elicit strong cellular and antibody response and confer life-long immunity with only one or two doses. These live alternated vaccine are stored in the refrigerator. It could become virulent and cause disease in some people thus those with HIV are not good candidates for live attenuated vaccination. Life attenuated virus are attenuated through virus mutants that antigenically

overlap with wild-type virus but are restricted in some step in the pathogenesis of the disease. This hostile environment takes the fight out of the viruses. Live attenuated vaccines are more difficult to create for bacteria. Bacteria have thousands of genes and thus are much harder to control. Live attenuated vaccines are relatively easy to create for certain virus e.g. vaccines against Measles, Mumps and Chicken pox.[23,24]

2.2.2 Inactivated Vaccines

Scientist produce inactivated vaccine by killing the disease-causing microbe with chemicals, heat, or radiation. Such vaccines are more stable and safer than live vaccines. The dead microbes cannot mutate back to their disease causing state. Inactivated vaccines usually donôt require refrigeration and they can be easily stored and transport in a freeze-dried form which makes them accessible to people in developing countries. Most inactivated vaccines, however stimulate a weaker immune system response than do live vaccines. Thus they need additional doses or booster shots to maintain personôs immunity. Eg Pertussis, Typhoid, Inactivated Polio and hepatitis A [23,24]

2.2.3 Subunits Vaccines

Instead of the entire microbe, subunit vaccines include only the antigens that best stimulate the immune system. In some cases these vaccines use epitopes-the very specific parts of the antigens that antibodies or T cell recognize and bind to. They have low chance of adverse reaction. Subunit vaccines contain anywhere from 1 to 20 or more antigens. Eg Hepatitis B[23,24.]

2.2.4 Toxoid Vaccine

For bacteria that secrete toxins, or harmful chemicals, a toxoid vaccine might be the answer. These vaccines are used where a bacteria is the main cause of illness. Scientists have found that they can inactivate toxins by treating them with formalin. Such detoxified toxins called toxoids are safe for use in vaccines. When the immune system receive a vaccine containing a harmless toxoid it learns how to fight off the natural toxins. Eg. Tetanus, Diphtheria, botulism and cholera.[23,24]

2.2.5 Conjugate Vaccines

If a bacteria possesses an outer coating of sugar molecules called polysaccharides, as many harmful bacteria do, researchers may try making a conjugate vaccine for it. Polysaccharides coating disguise antigens to the immature immune system of infants and younger children so it can't recognize or respond to them. Conjugate vaccines a special type of subunit vaccine get around this problem when making a conjugate vaccine, scientist link antigens or toxoids from a microbe that an infant's immune system can recognize to the polysaccharides. The linkage helps the immature immune system react to polysaccharides coating and defend against the disease causing bacterium or organism. Eg *Haemophilus influenzae* type b, *N.* meningitides.[23,24]

2.2.6 DNA Vaccines

Once the gene from a microbe have been analysed, scientist could attempt to create a DNA vaccine against it. Though still in experiment stages, these vaccines show great promise and several types are being tested in humans. DNA vaccines take immunization to a new technological level. These vaccines disperse with both the whole organism and its parts and get right down to the essentials; the microbe's genetic material. DNA vaccines use the genes that code for those all important antigens. Researchers have found that when the genes for a microbe's antigen are introduced into the body some

cells will take up that DNA. The DNA then instruct those cells to make the antigen molecules. The cell secrete the antigens and display them on their surfaces. In other words the bodyôs own cells become vaccine-making factories creating the antigens necessary to stimulate the immune system.

A DNA vaccine against a microbe would evoke a strong antibody response to the free floating antigen secreted by the cells and the vaccine also would stimulate strong cellular response against the microbial antigen displayed on the surface. Naked DNA vaccines being tested in humans include those against the viruses that cause influenza and herpes.[23,24]

2.2.7 Recombinant Vector Vaccines

This is experimental vaccine with similarities with DNA vaccines. They use an attenuated virus or bacterium to introduce microbial DNA to cells of the body. Vector refers to the virus or bacterium used as carrier. In nature virus latch on to cells and inject their genetic material into them. In the laboratory, scientist have taken advantage of this process. They have figured out how to take the roomy genomes of certain harmless or attenuated viruses and insert portions of the genetic material from the microbes into them. The carrier viruses will then ferry that microbial DNA to cells. Recombinant vector vaccines closely mimic a natural infection and therefore do a good job of stimulating the immune system. Researchers are working on both bacterial and viral-based recombinant vector vaccines for HIV.

2.3 TYPES OF IMMUNIZATION

There are two main forms of immunization. They are active immunization and passive immunization. Both types of immunization prepare the body to fight against certain

diseases, in case we come into contact with them in future. Vaccination is the act of giving vaccine while immunization is the ability of the body to develop immunity against the intended disease causing organism . A wide range of vaccines are available to protect against different infectious diseases and through varying routes of administration.

2.3.1 Active Immunization

This is when a substance known as a vaccine is introduced into the body (usually by injection) to encourage the bodyôs immune system to produce antibodies against a particular disease. Antibodies are proteins that are produced by the body to neutralize/destroy disease carrying organism and toxins. Active vaccines may be made from tiny amounts of disease organism that have been killed or weakened. They may also be created artificially from genetic material (Recombitant). After receiving active immunization against disease your immune system should have the antibodies that are needed to fight it passively.

2.3.2 Passive Immunization

This is when the body is given a vaccine containing ready-made antibodies against disease. Passive immunization only provides short term protection from disease. it is equally the form of immunity acquired by babies from their mothers.

2.4 SITUATION IN NIGERIA AND ENUGU

Expanded programme on immunization (EPI) was initiated in Nigeria based on the premises of the same programme by the WHO. Aim was to immunize 0-2 years old children and achieve >85% coverage, integrate immunization into routine activities of all Primary Health Centres and Immunize against preventable diseases which is seen as common cause of infant morbidity and mortality.[25]

The name EPI was changed to National Programme of Immunization (NPI) to further show government commitment to individualize the scheme. Currently immunization coverage is 80% in 2014 from just above 15% in 1979. There is progress though at slow pace.[25]

Centrally, NPI is managed with policies at the federal level through the federal ministry of health, then the state NPI co-ordinators and field workers carry out from states level to the local government level. It follows the three tier system of the constitution of government in the country. However there is some level of semi autonomy in each state with states having their immunization days. The programme is financed majorly by the public funding from the government budgetary expenditure on health, and other sources from international donor organization like the WHO especially during disease outbreak.[26]

Currently immunization is carried out in a fixed facilities particularly primary healthcare centres in each ward in the localities, with adjuncts from frequent outbreaks, outdoor sessions done on certain days either on a national level, state, or local government level. This is done to increase immunization coverage.[25].

Vaccines are stored via cold chain storage and reverse cold chain for unused vaccines and this is done at each local government level up to the state and finally at national government. Private sector also plays a role largely in conjunction with the local government in which it is situated. Currently the programme is led by the national coordinator of NPI and there is sub-co-ordinators at the state and local government level. The work is conjunction with corresponding ministry of health to deliberate health policies, implement programmes and give feedback to the government and the people either ways. The short comings of these programme are at the post as occupied by politicians those who have connections with powers that be hence corruption seems

inevitable in this situation leading to poor programme implementation, monitoring and evaluation.[25] Central control of the programme from the national level allows for better coordination.

Adjustment of community outreaches on specific days allows for wider awareness and coverage of the populace in the immunization plan. The financing of the programme is still not adequate as funds are disbursed from national level and the budgeting allocations on health as a whole is still small 3.5% of the entire budget with education, security and growth leading the lot.[25]

2.5 DETERMINANTS/FACTORS AFFECTING IMMUNIZATION

Although rates of seroconversion following administration of trivalent oral polio virus vaccine (TOPV) approach 100% in industrialized countries only 73% range (36% - 99%) and 70% range (40-99%) of children in developing countries have detectable antibody to polio virus type I and 3 respectively after three doses. Type of vaccine and entire pathogens often interfere with responses to type I and 3 vaccine viruses. [25]

Some of the reasons of the partial immunization and missed opportunities includes non administration of simultaneous injections for instance longer interval between DPT 4 and measles vaccines, three and a half months gap compared to that between other vaccines in the schedule (four weeks). It is also observed that as the number of weeks/months postpartum increases mothers begin to be engaged in other activities such that they may forget and or may not have time to make schedule visits to immunization. Parentôs beliefs about immunization risks and benefits may be the most common reasons for partial vaccination. Quality of outreach services, cold chain as well as linking community with

health services are among the influencing factors of effectiveness of immunization programmes in resources poor setting like Nigeria.[16]

Other reason adduced by mother includes long waiting time at the health facility, lack of vaccine on the appointment day, absence of personnel at the health facility, child ill-health at the time of immunization, lack of information about days of immunization forgetting the days of immunization, long distance in walking, mothers illness on the days of immunization, social engagements, lack of money, schooling mothers, parents objection, disagreement or concern, about immunization, safety, war, natives, disasters and other mischievousness reasons.[26-27]

Understanding of the importance of the importance of vaccination education and occupational status showed significant differences with respect to children with complete and incomplete vaccination status. Factors such as mothers age, marital status, schooling level and gender of the child showed no significant differences with respect to vaccination and completeness. [28]

Similarly, factors such as transportation need, physical accessibility, religious affiliation and knowledge about vaccination contradiction were confounders for incomplete vaccination status of the children and were fund to be statistically non significant. Educating parents as well as the vaccines themselves may be one way to impact important of vaccines themselves to the health of child. [28]

Other factors that still need be considered are the attitude of health care worker. There are many stories of poor attitudinal disposition staff administering vaccinations to children and mother. Such poor attitudes here acted as reasons why some parents do not commence or complete immunization schedule of their children. While such unprofessional attitudes are unacceptable and inexcusable parents who fail to immunize

their children for such reasons are infringing on the right of their children. Would such parents refuse to collect their salaries because the paymaster is rude.[29] Other reasons include the single health worker available at work may be for reasons of ill health or some other exigencies not be available. Poor training of the health worker, lack of continuing medical education is important that communication skills are every important when dealing with clients. Some of these health care workers have not received any training in communication skills. Other factors include poor remunerations of health care staff and poor conditions of services especially in rural areas also result in low staff morale. Such low moral finds expression in rudeness and unfriendliness towards clients.

One of the recognize contributors of poor immunization coverage in Nigeria is the conduct of supplemental immunization activities. So much emphasis and funds have been utilized to supplements immunization activities (SIAS) to the detriment of routine immunization. Some parents seem to believe that the SIAS are more important than routine immunization and would prefer to receive immunization at home rather than take their children to immunization clinic for routine immunization.[29,30]

Community/religious leaders play very important roles in immunization utilization. There are some religious that do not accept immunization. Access to some communities is through community leaders who may not be favourably disposed to immunization activities.[19]

2.6 WAYS TO IMPROVE IMMUNIZATION COVERAGE AND UPTAKE

National Programme on Immunization should be reformed first of all such that the programme should have its own means of funding directly from the government and this funding should be controlled and disbursed by the programme itself, thereby allowing for

availability of funds readily. More community involvement in planning and implementation is needed. The leadership of NPI should be selected through transparent means and based on (suitability for the job). However, this will prove very difficult in the current political terrain of the country. Current problems of unstable supply of electricity leading to vaccines going bad, and losing potency should be addressed. There should be more intersectoral collaboration between ministries of education, finance, transport, power et al to ensure a wider coverage and implementation of the programme on immunization. Facilities should be upgraded and recruitment of more workforce to ensure proper implementation of the programme. Modern technique of data collection and record keeping should be instituted allowing for adequate monitoring and evaluation of the programme.

The leadership and management of NPI can be modified, with better selection criteria and methods ensuring programme implementation performance. Corruption which is a hydra headed monster has to be tackled at the national level. Modifying the absolute and relative doses of three sabin type in the case of polio vaccine will improve the coverage. Increasing the interval between does beyond 30 days may also be important in view of prolonged excretion of vaccine viruses and the potential for interference with response to subsequent doses.[31]

Advances in molecular biology may ultimately lead to the development of more immunogenic vaccine candidates. Good and quality communication training to the caregivers. The religious leaders should be well informed on the advantages of immunization. Supplementary immunization should be abolished so that the proper immunization be properly funded.[31]

Most mothers reasons for rejection of immunization during campaigns were that they preferred going to hospitals for immunization with full evaluation of their children, felt there was no need for additional doses outside the routine doses and they had no confidence in campaign vaccinators. Religious denomination and mothers educational level were no significantly associated with rejection of immunization during campaign.[30]

Apart from operational factors relating to policies,vaccine funding,vaccine availability and health workers related factors some authors have identified awareness, attitude and perception of parents/caregivers as major obstacles to high immunization coverage. It was also noted that progammes to increase immunization rates have been developed and implemented based on untested hypothesis about why parents do not immunize their children.[30,31,72, 73]

Several factors have been implicated in causing low vaccination coverage in developing country including Nigeria.These factors includes lack of political will, poor work attitude, mal-orientation of health worker ,poor health infrastructure,religious insurgence,cultural/religious average aversion to vaccine acceptance and use, misconception about safety of vaccine and lack of awareness about availability of vaccine services, inadequate cold chain facilities and vaccine stock ï outs among other things.[30,72,73]

National immunization coverage rate for vaccinations suggested by the EPI still falls short of WHOôs goals approximately69% of children nationwide are fully immunized thoughcoverage rates vary according to geographic region. Furthermore,tuberculosis remains the third leading cause of death in Filipinos,while measles is among the top ýve causes of death in childrenunder 5 years of age.[32] As a result of various immunization campaigns and other efforts, the Philippines has been polio-free since2000,[33] though it is

imperative to continue vaccinations againstthis disease as re-entry of the virus into the country via neighbouring countries may occur.[33] Research has been undertaken in a number of developedand developing countriesto identify the determinants of child-hood immunization coverage. In developed countries, childrenfrom low income families[34ï36] with a greater number of siblings,[35,37] with higher birth orders,[35,38] whose parents areunmarried[35,37,38] whose parents are lacking private healthinsurance,[35,38] and whose mothers are less educated[35,37,39]are at greater risk of not being fully immunized. In developingcountries, lower maternal[40,41]and parental [42,43]education,lower household wealth [40,42] and area of residence [40,41]areall risk factors for lower immunization rates. There are studies[44,45]which have been conducted to examine patterns of vaccination acceptance in the Philippines. There are studies which indicate the gender discrimination against girl children aged between 1 to 2 years compared to the boys of same age group in the area of full immunization. Other researchers have also noted such discriminating behaviour of families against girl children[46,47,48] Other studies has also showed that this bias declines with motherós education.[6,49,50,51]Higher immunisation coverage in urban areas is confirmed by many researchers. For instance, a study on determinants of full child immunization among 12-23months old in documented an association but, after controlling for other variables, the rural-urban disparity is not statistically significant.[52]

CHAPTER THREE

METHODOLOGY

Study Area

The town Idoha is a rural community in Igbo Etiti Local Government Area and is made up of two main villages i.e. Ugwu-AguIdoha and Ezi-Idoha with these two main villages, having smaller villages of six for Ugwu AguIdoha and five for EziIdoha. The smaller villages that make up ugwuaguIdoha are; Uwani, Amaebor, Amaudara, Umuonyika, Amaibule, Umuefoke. While Ezi-Idoha is made up of Umuikpagu, Umu-Okwor, Umu ï Ewoke Ogele, Amugwu, Umuodeke Omaga. Idoha has one traditional ruler (IgweChristanEze). This town has boundaries with Onyohor community in the north and Ukehe in the other boundaries (south, east, west). It is almost surrounded by Ukehe. Ezi-Idoha is in upland areas with four hills and two streams while Ugwuagu Idoha is in a low /level land area. Idoha has one electoral ward with a population of nine thousand five hundred peoples.[53] Most of the populates are wine tappers, farmers, artisans, traders and few civil servants. There is one Health centre in Ezi-Idoha and two traditional birth homes, one in Ezi-Idoha and one in Ugwuagu Idoha. There is no pharmacy shop in the community however, there are three chemist shops. There is no hospital in the community manned by a qualified medical doctor except occasionally that medical services are rendered by four indigenous doctors when they are around. There are three native doctors in the community. One is a bone setter while two are herbalists. One of them (Ogbuoja) is popular and used to be part in a radio programme in Enugu broadcasting service. I used Idoha for this study because it is my Town , there was cost reduction since I stayed in my house and finally, I want to know the level of immunization participation in my community.

3.2. Study population

Mothers/Caregivers of children aged 0-5years

Inclusion criteria

All children within the age bracket of 0-5 years whose mothers in Idoha consented to be studied

Exclusion criteria

All children whose mother refused to participate

3.3 Study design

It was a cross-sectional study and a semi- structured interview administered questionnaire was used to obtain the data. The questionnaires collected information on the socio-demographic characteristics of caregivers,theirknowledge,and perception about vaccine preventable disease, history of vaccines received by children and reasons for vaccination, and non vaccination.

3.4 SAMPLING PLANS

3.41 Sample size estimation

The minimum sample size was determined using the formula[54]

$$\frac{Zx^2 \, XP \, (100-P)}{d^2}$$

ZX = 1.96

d = margin of error (5% error ï 0.05)

P = percentage of Immunization uptake in Enugu State=68% (source Enugu state ministry of health immunization unit.[55]

$$n = \frac{1.96^2 \times 0.68 \, (.32)}{0.05^2}$$

n = 334.4 = 335

Then adding 10% due to non-response, we have **369** respondents. A final sample size of 400 under fives and their mothers was interviewed.

3.42 Sampling Technique

A cluster sampling method was used with villages serving as clusters. From list of the eleven villages in Idoha, five villages were selected by balloting and all household with respondents that meet the inclusion criteria were studied and when the mothers is dead or absent on two occasions care givers were studied

3.5 Data Collection

Six research assistants (undergraduates) were trained for 3 hours for two days in Idoha community primary school class room to assist in administration of the interview administered questionnaire. The questionnaire was pretested in a local community Ituku in Enugu west senatorial zone This data collection took place in the house of the respondents. Visits was on non local market days and in the evenings. Childrenôs weights were measured and clinical examinations of sick children was done by me as incentives .

3.7 Data/Statistical Analysis

Data were entered and analysed using statistical packages for social sciences version 20. Frequency and contingency table were used to show the distribution of data. Quantitative data were summarized using mean and standard deviation and qualitative analysis with proportion and percentages. Statistical analysis using Chi-square were done to determine the effect of the different variable on the vaccination of children. Multivariate analysis in form of regression was done. The level of significance was at 0.05 level.

3.9 Ethical consideration

Ethical clearance for the study was obtained from the Ethical Committee of University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla. Permission was also obtained from the traditional head of the community or town. Furthermore, verbal informed consent was obtained from the respondents after explaining to them the importance and advantages of the study. The disadvantages of the study was equally explained to them. They were also informed that they can decide not to participate in the study without any consequence. Confidentiality of history and personal data of the respondents were ensured throughout the study and even beyond.

CHAPTER FOUR

RESULTS

Table 1: Socio-demographic data of respondents and their children

Variable	Frequency (n=380)	Percent
BABY		
Age in groups (months)		
<25	168	44.2
Ò25	212	55.8
Mean (SD)	***30.0(12.8)***	
Sex		
Female	216	56.8
Male	164	43.2
MOTHER		
Age in groups (years)		
<30	227	59.7
Ò30	153	40.3
Mean(SD)	***32.2(7.1)***	
Marital status		
Married	368	96.8
Others	12	3.2
Educational level		
Primary and below	144	37.9
Secondary	129	33.9
Tertiary	107	28.2
Mother Income		
15000 and below	293	77.1
>15000	87	22.9
Father Income		
25000 and below	279	73.4
>25000	101	26.6
Both(Family} Income		
45000 and below	287	75.5
>45000	93	24.5

Table 1 shows that majority of the babies were females (56.8%) aged 25 months and above (55.8%) with mean age of 30.0 months.

Most mothers were aged < 30 years (59.7%), married (96.8%), had primary education and below (37.9%). Higher proportion of mothers earn 15,000 and below naira (77.1%), fathers 25,000 and below (73.4%) and family income 45,000 and below (75.5%)

Table 2: Vaccines taken by the children

Vaccine	Yes Freq (%)	No Freq (%)
BCG	373(98.2)	7(1.8)
OPV0	354(93.2)	26(6.8)
HBV0	348(91.6)	32(8.4)
PENTA1	316(83.2)	64(16.8)
OPV1	316(83.2)	64(16.8)
PENTA2	296(77.9)	84(22.1)
OPV2	332(84.7)	58(15.3)
PENTA3	311(81.8)	69(18.2)
OPV3	310(81.6)	70(18.4)
Measles	331(87.1)	49(12.9)
Yellow Fever	310(81.6)	70(18.4)
Vit A	284(74.7)	96(25.3)
Immunization status		
Complete	230	60.5
Incomplete	150	39.5

Table 2 shows that 372(98.2%) of babies had BCG, 316(83.2%) had PENTA 1, 296(77.9%) had PENTA 2, 311(81.8%) had PENTA 3, 284(74.7%) had Vitamin A. About 230(60.5%) said that they completed immunization.

Table 3: Knowledge and perception on Immunization

Variable	Yes Freq (%)	No Freq (%)
Immunization of a child should start in the first week of life	349(91.8)	31(8.2)
Benefits		
To prevent certain illnesses in children	376(98.9)	4(1.1)
To prevent death in children	352(92.6)	28(7.4)
Prevent frequent illness in a child	370(97.4)	10(2.6)
Reduce the chances of a child dying early	359(94.5)	21(5.5)
Make a child grow healthy and strong	370(97.4)	10(2.6)

Table 3 shows that 349(91.8%) admitted that immunization should start in first week of life. The stated benefits include: 376(98.9%) to prevent illness, 352(92.6%) to prevent death, 370(97.4%) to prevent frequent illness, 395(94.5%) reduce chances of dying early and 370(97.4%) to make child grow healthy and strong.

Table 4: Reasons for receiving and missing Immunization doses

Variable	Frequency (n=380)	Percent
Main reason for receiving each immunization dose		
Prevention of illness/protection of child	330	86.8
To stay healthy	36	9.5
To boost immunity	18	4.7
To have a stronger child	6	1.6
Main reason for each missed immunization dose	**n = 69**	
Drug issues(unavailability)	22	31.9
Bad road/transport issues	13	18.8
Baby or mother not healthy	10	14.5
Busy	8	11.6
Others (bereaved, forgot, no chance, far distance)	16	23.2

Table 4 shows that that main reason for receiving each immunization dose was for prevention of illness/protection of child 330(86,8%) while main reason for each missed immunization dose was unavailability of drugs22(31.9%) followed by bad road/transport issues 13(18.8%).

Table 5: Social Cultural and religious reasons that hinder and encourage Immunization

Variable	Frequency (n=380)	Percent
Social, Cultural & religious reasons(Hinder)		
Social		
Availability of drugs	148	39.0
Ignorance	76	20.0
Accessibility to facility	65	17.1
Other contending issues	61	16.1
Finance	47	12.4
Religious (Church activities)	31	8.2
Cultural Beliefs	22	5.8
Social, Cultural & religious reasons(Encourage)		
Availability of drugs	204	53.7
Mass media/Broadcasting	198	52.1
Health education	67	17.6
Attitude of health workers	45	11.8
Community mobilization	36	9.5
Non routine Immunization eg NIPDs	32	8.4

Table 5 shows that socio-cultural and religious reasons that hinder immunization includes: non availability of drugs 148(39.0%), followed by ignorance 76(20.0%), religious 31(8.2%) and cultural beliefs 22(5.8%). socio-cultural and religious reasons that encourage immunization includes: availability of drugs 204 (53.7%), followed by mass media broadcasting 198(52.1%) and community mobilization 36(9.5%).

Table 6: Ways mothers in this community be helped and encouraged to present their children for immunization and on time

Variable	Frequency (n=380)	Percent
How mothers can be helped and encouraged		
Regular availability of drugs	123	32.4
Health education/enlightenment	110	29.0
Locating health facility close to residence	82	21.6
Availability of dedicated and well trained staff	78	20.5
Manpower improvement	72	19.0
Improved transport and road	45	11.8
Making time of immunization flexible	37	9.7
Incentives/rewards	28	7.4
Home visits	23	6.1

Table 6 shows that suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes: regular availability of drugs 123(32.4%), Health education/enlightenment 110(29.0%), availability of dedicated and well trained staff 78(20.5%) and Incentives/rewards 28(7.4%).

Table 7: Factors influencing uptake of immunization (PENTA 3)

Variable	Immunization status (n= 380) Complete Freq(%)	Incomplete Freq(%)	χ^2	p-value
BABY				
Age in groups (months)				
<25	135(80.4)	33(19.6)	0.447	0.504
Ò25	176(83.0)	36(17.0)		
Sex				
Female	176(81.5)	40(18.5)	0.044	0.834
Male	135(82.3)	29(17.7)		
MOTHER				
Age in groups (years)				
<30	180(79.3)	47(20.7)	2.461	0.117
Ò30	131(85.6)	22(14.4)		
Marital status				
Married	302(82.1)	66(17.9)	0.390	0.532
Others	9(75.0)	3(25.0)		
Educational level				
Primary and below	111(77.1)	33(22.9)		
Secondary	103(79.8)	26(20.2)	8.132	0.017
Tertiary	97(90.7)	10(9.3)		
Mother Income				
15000 and below	236(80.5)	57(19.5)	1.447	0.229
>15000	75(86.2)	12(13.8)		
Father Income				
25000 and below	229(82.1)	50(17.9)	0.040	0.842
>25000	82(81.2)	19(18.8)		
Both(Family} Income				
45000 and below	235(81.9)	52(18.1)	0.001	0.972
>45000	76(81.7)	17(18.3)		

Table 7 shows that there were statistically significant association between Educational level of mother and uptake of immunization (using PENTA 3) ($G2 = 8,132$, $p = 0.017$) but not statistically significant for age of mother ($G2 = 2.461$, $p = 0.117$), marital status ($G2 = 0.390$, $p = 0.532$), mother monthly income ($G2 = 1.447$, $p = 0.229$), father income ($G2 = 0.040$, $p = 0.842$), family income ($G2 = 0.001$, $p = 0.972$), age of baby ($G2 = 0.447$, $p = 0.504$) and sex of baby ($G2 = 0.044$, $p = 0.834$).

Table 8: Regression on factors influencing uptake of immunization (PENTA 3)

Variable	OR	Sig	95% CI for OR Lower	Upper
Age in groups (mother)				
<30 (R)				
Ó30	1.658	0.090	0.924	2.975
Educational level				
Primary and below (R)				
Secondary	2.811	0.008	1.314	6.012
Tertiary	2.781	0.012	1.253	6.170

Table 9 shows that mother aged Ó30 years were about 1.6 times likely (AOR 1.66; 95% CI 0.924 -2.975) to uptake complete immunization than those aged < 30 years. Those that had completed secondary education were about 2.8 times likely (AOR 2.811; 95% CI 1.314 ï 6.012) and tertiary education 2.8 times likely (AOR 2.781; 95% CI 1.253 ï 6.170) to uptake complete immunization than those that completed primary education and below.

CHAPTER FIVE

DISCUSSION

Despite the fact that childhood vaccinations are available free of cost and with growing awareness, the childhood immunization rate in Nigeria is not yet satisfactory. Childrenôs immunization status against several childhood diseases gives an indication on how much priority the childrenôs health is given in a country as Immunization programme is the essential interventions for protection of children from life threatening diseases.

Findings from this study identified that over 75% of participants had their babies immunized with all the vaccines. This though encouraging but higher percentage is needed owing to the importance of immunization to lives of these babies. This is in contrast to results from determinants of full child immunization among 12-23 months old in Nigeria using NDHS 2008 which showed that only about 22% of the children received full immunization.[49]Also 2006 national immunization coverage survey reported only 18% of children fully immunized aged 12-23 months at survey time.[56]

Other studies found that routine immunization coverage in Nigeria is one of the lowest national coverage rates in the world with 38% for 2005 and 50% 2006.[57] Equally UNICEF documented that about three quarters of the worldôs child population is reached with the required vaccines, only half of the children in Sub-Saharan Africa get access to basic immunization. This is even worse in poorer remote areas of developing countries, where only one in twenty children have access to vaccination.[58]A similar study in China showed that general immunization coverage for DPT, OPV and HepB among migrants were 57.6%, 64.0% and 52.2%, respectively.[49]

Almost all the respondents in the study admitted that immunization should start in first week of life. Some of the stated benefits of immunization include; preventing illness and death, reducing chances of dying early and to make child grow healthy and strong. The main reason for receiving each immunization dose was for prevention of illness/protection of child.This is an indication that even though the study was in rural area, they still have a good knowledge about immunization. This is encouraging and commendable. Also it may be responsible for the high uptake of immunization. A study on parentsNknowledge and attitudes on Childhood Immunization, Taif, Saudi Arabia had a similar finding. The majority of parents 672 (91.9%) knew the role of routine vaccination in protecting children from some infectious diseases and its complications. A considerable number of 635 (86.9%) parents knew the timing of the first dose in vaccination schedule.[59]Another study in Lagos, South west Nigeria found that almost all (93.8%) the respondents were aware of immunization and that immunization could prevent childhood illness (98.1%).[60]

The population of Nigeria is largely rural, and the geographical distance of most rural areas tends to influence the availability and effectiveness of immunization campaigns across the country.[42] Also accessibility to vaccination facilities, provision of childhood immunization services, and demand-related factors, such as the knowledge and attitude of mothers influence immunization uptake especially in rural areas.[46] Equally, parents may not be willing to walk long distances due to regular absence of health workers or unavailability of vaccine at the health facility.[52] These are in line with some of the main reason given by respondents in this study for the missed immunization doses including unavailability of drugs and bad road/transport issues.

Factors determining childhood vaccination uptake is complex. It is dependent on socioeconomic, demographic as well as supply and demand factors.[61] Supply-related

factors though important however, adequate supply of vaccines does not essentially translate into children immunization uptake. A study suggests that factors associated with vaccination uptake and acceptance is multi-dimensional emphasizing the need to eliminate the unnecessary inequities associated with norms and structural factors that may hinder increased vaccination uptake.[62]

This study identified social reasons that hinder immunization to include: non availability of drugs, burial engagements, masquerades that disturb free movement of people, business/farming engagements and ignorance .No known religious and cultural beliefs that deter immunization. On the other hand the identified socio-cultural and religious reasons that encourage immunization includes; availability of drugs followed by prior community mobilization.

A study on determinants of Childhood Immunization in India had a similar finding of mass media promoting immunization uptake. According to the study media exposure (Radio and TV) has a significantly positive effect on immunization as chance of full immunization is higher when mothersô have regular media exposure compared to children whose mothers are not.[50,63] Finding from other studies indicate that mothers who attend ANC and give birth at health facility are more likely to fully vaccinate their children as antenatal clinic is a means for women to be aware of immunization programme.[49-51,64,65]A study done in Niger Delta area of Nigeria also revealed that there was an association between the place of delivery and immunization status of a child.[66] In a study conducted in Nigeria most of the mothers interviewed (65.7%) got their awareness of immunization at the antenatal clinics.[57]This collaborates our finding that Ignorance hinders immunization uptake.[66]Misconception on immunization in Northern Nigeria led to decrease in immunization uptake in 2003 in the area. They tagged

immunization a plan by outsiders (enemies of Islam) to reduce the Muslim population through fortification of vaccine. Also they thought it is another strategy to transmit HIV virus, which would reduce the population of Muslims.[66]

The current study showed that there was statistically significant association between mothers age and uptake of immunization but not statistically significant for age of child, marital status, family income. This is supported by some studies but contrast to findings from a host of other studies: mothers education,[49-51,67] region of residence,[50,67] number children aged less than 5 years,[50] religion,[52,68] residence,[52] motherôs occupation,[49,52] motherôs age,[52,67,] household wealth,[49,67,69] Distance to facility.[51,60,67,70] Other studies have found no difference in vaccination rates with respect to socio-economic status.[71] Sex of baby.[56,70] Sex of the child predict the immunization status of the child in societies where gender inequality is prevalent. For instance in Bangladesh, females are 0.84 times less likely to be fully vaccinated than male children.[48] But in a study done in Nigeria in 2009, there was no significant relationship between sex and full immunization status.[46]

Other identified factors includes; Skepticism on medical information, inadequate support from healthcare providers, poor health structures, poor transportation means and poor accessibility to immunization facilities.[72] Moreover,some people lack access to vaccination as a result of social barriers, lack of information or inspiration to get vaccinated

The study identified maternal education as a predictor of immunization uptake as that had completed secondary education were about 2.8 times and tertiary education 2.8 times

likely to uptake complete immunization than those that completed primary education and below. Mother aged 30 and above years were about 1.6 times likely to uptake complete immunization than those aged < 30 years. The influence of age on mother to child immunization could be because older mothers knows the effect and importance of immunization than young mothers.

A study using data from NDHS 2008 had it that children of mothers aged 45 and above about 1.8are more likely to be fully immunized compared to children born to mothers aged 15-24. The same study documented that motherôs level of education had a significant positive influence on the odds of the child being fully immunized.. Children born to parents with primary level of education are about 1.4 times more likely to receive full immunization than children born to mothers with no education, while children born to mothers with secondary and higher are about 1.8 times more likely to receive full immunization than children of mothers with no education. Immunization uptake increases as the motherôs education increases. This is expected as this empowers the mothers both in knowledge and economically. It will help influence their decisions about health of their children ignoring the cultural and religious deterrents. Equally barriers like transportation fare can be taken care of by such mothers.[52]

Some of the suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes regular availability of drugs, health education/enlightenment, manpower improvementsand Incentives/rewards. These are not quite strange as they are some of the factors identified from this study and other previous studies as militating against uptake of immunization. These suggestions if well addressed will improve immunization uptake and ultimately promote lives of our children

CONCLUSION AND RECOMMENDATION

CONCLUSION

There was over two third complete immunization uptake and almost all the respondents admitted that immunization should start in first week of life. Some benefits of immunization include; preventing illness, death and to make child grow healthy and strong. The main reason for receiving each immunization dose was for prevention of illness/protection of child while for the missed immunization doses including unavailability of drugs, bad road/transport issues, mother or baby being sick , ignorance. Educational level of mother was a predictor of complete immunization uptake. Some of the suggested ways mothers in this community be helped and encouraged to present their children for immunization and on time includes regular availability of drugs, health education/enlightenment, availability of dedicated and well trained staff(man power improvements) and Incentives/rewards. These suggestions if well addressed will improve immunization uptake and ultimately promote lives of our children

RECOMMENDATION

1. There is need for educational empowerment of mothers since it has been identified as a predictor of complete immunization uptake. Equally it will address the problem of ignorance.
2. Mass mobilization and mass media sensitization need to be enhanced to achieve the desired immunization uptake
3. Drugs (Vaccines) should always be made available since it a major identified reason for missed doses of immunization.

4. Social amenities like good roads and other good means of transport should be made readily available to address the issues arising from such.
5. Religious issues and cultural issues like beliefs should be supported since they donôt deter immunization
6. Incentives like Insecticide Treated Nets can be provided as incentive or gift for those that complete immunize their babies
7. Dedicated and well trained staff should be employed and used in administering of Immunization/vaccination

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