

## FACTORS THAT AFFECT COMPLIANCE TO UNDER FIVE IMMUNIZATIONS AMONG MOTHERS OF AHIAZU MBAISE LOCAL GOVERNMENT AREA, IMO STATE, NIGERIA

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### **Abstract**

*Under-five mortality remains high in sub-Saharan Africa despite global decline. One quarter of these deaths is preventable through interventions such as immunization. Immunization has been one of the most significant and cost-effective public-health interventions to decrease childhood morbidity and mortality. Reasons for the low coverage of immunization vary from logistic ones to those dependent on human behaviour. This study aimed to examine factors that affect compliance to under-five children immunizations among mothers of Ahiazu Mbaise local government area, Imo state, Nigeria. This study employed the descriptive cross-sectional research design. Systematic sampling method was used to select the households while the women were purposively selected. In all, 160 houses were sampled. The instrument of data collection was the questionnaire and the method of data analysis was quantitative with simple percentage employed for measurement. Formulating strategies to break down the barriers to immunization compliance are not beyond our reach. Maternal education about the concept and value of immunization and improving health worker motivation can significantly contribute to enhance vaccination status. This study serves as an eye opener to the government to continue promoting National Programme on Immunization (NPI) for it could save and protect the precious lives of our future generations.*

**Keywords:** Ahiazu Mbaise LGA, Compliance, Immunization, Mothers, Under-5 Children

### **Introduction**

Immunization has been one of the most significant and cost-effective public-health interventions to decrease childhood morbidity and mortality. Approximately three million children die each year of vaccine-preventable diseases. Recent estimates suggest that approximately 34 million children are not completely immunized, with almost 98% of them residing in developing countries. In 1974, The World Health Organization (WHO) launched the “Expanded Programme on Immunization” (EPI) now National Programme on Immunization (NPI) aiming at reducing the incidence and mortality due to vaccine preventable disease by promoting the expansion of immunization activities around the world. Unfortunately, according to the latest estimate, UNICEF reported that 9.7 million under-5 yrs. old and an estimated 4 million neonates (first 28 days) worldwide are either killed or disabled by vaccine-preventable disease (UNICEF, 2009).

Although the world witnessed a tremendous reduction in child mortality between 1990 and 2015, sub-Saharan Africa (SSA) is still characterized by high under-five deaths. As at 2015, under-five mortality (U5MR) in the region was 83 deaths per 1000 live births (UN report, 2015). One-quarter of these deaths are preventable through interventions such as immunization. Reports have indicated that the available vaccines today could prevent an estimated 25% deaths of children under the age of 5 (UNICEF report, 2012). It is in view of this that the World Health Organization (WHO) and United Nations Children’s Fund (UNICEF report, 2012) developed the Global Immunization Vision and Strategy with the objectives

of increasing the number of children being immunized against preventable diseases, incorporating other interventions with immunization and managing immunization programmes based on global interdependence.

This effort was also mirrored in Nigeria as the Expanded Programme on Immunization (EPI) and was introduced in the country in 1979. The aim of EPI included reduction of vaccine-preventable diseases and improvement of primary health care delivery in different localities. In Nigeria, the EPI targets eight diseases, namely tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus, hepatitis B, yellow fever and measles. Nigeria operates the immunization schedule of the Expanded Programme on Immunization which prescribes five visits to receive one dose of Bacille Calmette Guerin (BCG), four doses of oral polio vaccine, three doses of diphtheria, pertussis and tetanus vaccine, and one dose of measles vaccine (Federal Ministry of Health, 1995). In 2004, the country included hepatitis B and yellow fever vaccines in its schedule, recommending the receipt of three doses of hepatitis B at birth, at six weeks of age, and at 14 weeks of age while yellow fever should be given at nine months of age, along with measles vaccine (World Health Organization, 2005). Previous assessments of full immunization did not include hepatitis B and yellow fever (Adeiga et al., 2005; Onyiriuka, 2005). The standard measure of vaccination coverage is the percentage of children who have received the requisite number of vaccine doses irrespective of the age at receipt of the vaccine (Luman et al., 2005). However, to maximal protection against vaccine-preventable diseases, a child should receive all immunizations within recommended intervals (Glauber, 2003). The programme recorded a major success between 1988 and 1990 when diphtheria-tetanus-pertussis (DTP) 3 coverage reached 81.5% (Federal Ministry of Health Nigeria, 2011). A decline, however, set in around late 1990s, but there have been renewed efforts to revitalize the programme in recent years.

Receipt of vaccines at recommended ages and intervals ensures that the child is adequately protected from target diseases at all times. A previous study (Ayebo and Charles, 2009) from Nigeria provided some explanations for partial immunization and missed opportunities and these include late reporting for immunization, non-administration of simultaneous injections, longer interval between DTP3 and measles vaccine (three and a half months) compared to that between the other vaccines in the schedule (four weeks). It is also suggested that, as the number of weeks/months postpartum increase, mothers begin to be engaged in other activities such that they may forget and/or may not have time to make scheduled visits for immunizations. The prevention of child mortality through immunization is one of the most cost-effective public interventions in use in resource-poor settings like Nigeria. The Expanded Programme on Immunization (EPI) aims at delivering the primary immunization series to at least 90% of infants (Challenges in global immunization and the Global Immunization Vision and Strategy, 2006 to 2015). However, inadequate levels of immunization against childhood diseases remain a significant public health problem in resource-poor areas of the globe (Mayinbe et al., 2005).

The reasons for incomplete vaccination and non-uptake of immunization services are poorly understood. However, the proportion of children that completed the immunization schedule (that is, those who received BCG against tuberculosis, 3 doses of vaccine against DTP, at least 3 doses of vaccine against polio and 1 dose of vaccine against measles) is still very low; 30% in 1990, 13% in 2003 and 23% in 2008 (*Nigeria Demographic and Health Survey, 1990, 2003, 2008*). Nigeria like many countries in the African region is making efforts to strengthen its health system in general and routine immunization services in particular to reduce disease burden from vaccine preventable diseases (VPDs). This is against a backdrop of poor routine immunization coverage (12.7% National Average). Through previous studies, the low immunization uptake has been attributed to factors such as maternal education, age, occupation, marital status, residence, and access to media, fear of side effects, household wealth and place of delivery (Brown & Oluwatosin, 2012). Most of these studies have concentrated on individual level factors; it is against this background that this study examined factors that affect Compliance to under five Immunizations among mothers of Ahiazu Mbaise local government area, Imo state, Nigeria.

## Conceptual and Theoretical Considerations

**Concept of Compliance:** Compliance can be defined in many ways. The meaning of the concept is directly dependent upon the discipline and the context in which it is used. Though compliance to therapy has received a great deal of attention by the majority of literature, however deep understanding of the term is not fully achieved. Interestingly, 'compliance' is a multi-dimensional term involving a self-perception which is different between therapist and patient (Kyngäs, Duffy, and Kroll, 2000). For instance, many scientists claim that 'compliance' means obedience to doctors' authority. The term 'compliance' is held as 'treatment adherence', 'therapeutic alliance', or 'agreement' (Bissonnette, 2008). This definition also put emphasis on patients' responsibility to disease management in collaboration with health professionals and their active participation to the therapeutic regimen (Bissonnette, 2008). Both the patient and the health-care provider affect compliance, and a positive physician-patient relationship is the most important factor in improving compliance (WHO, 2003), although the high cost of prescription medication also plays a major role. Compliance is cooperative performance and adherence to prescribed therapy as recorded in the clinic record at a given period (Adeolu, 2001) and that compliance criteria included among other things frequency of keeping clinic appointments. According to (Ajayi, 2004) compliance is the client's physical presence at the health unit or hospital on the appointment day to receive the prescribed care. In the context of this study, the term compliance is defined or conceptualized as receiving the required number of doses of vaccines at the appropriate age as shown on the immunization schedule table and recorded in the child's record card. Nurses are encouraged to take a patient-centered approach to patient care, thereby forming alliances and empowering patients and family members to take an active role in their health care.

**The Health Belief Model** The health belief model (HBM) is adopted in this study. The Health Belief Model (HBM) is one of the most widely used conceptual frameworks for understanding health behaviour. According to Glanz & Bishop (2010) it was developed in the early 1950s. The Health Belief Model (HBM) posits that six constructs predict health behaviour: risk susceptibility, risk severity, benefits to action, barriers to action, self-efficacy, and cues to action (Becker, 1974; Champion & Skinner, 2008). Originally formulated to model the adoption of preventive health behaviours in the United States, the HBM has been successfully adapted to fit diverse cultural and topical contexts (e.g., Griffin, 2012; Scarinci et al., 2012). The model explains reasons for compliance behaviour. The Health Belief Model is a framework for motivating people to take positive health actions that uses the desire to avoid a negative health consequence as the prime motivation. The model is known to be most successful when applied to preventive health services such as immunization. It has been used extensively to organize theoretical predictors of preventive health actions including individual perceptions of diseases, individual perception of preventive actions and modifying factors such as social and demographic and structural characteristics

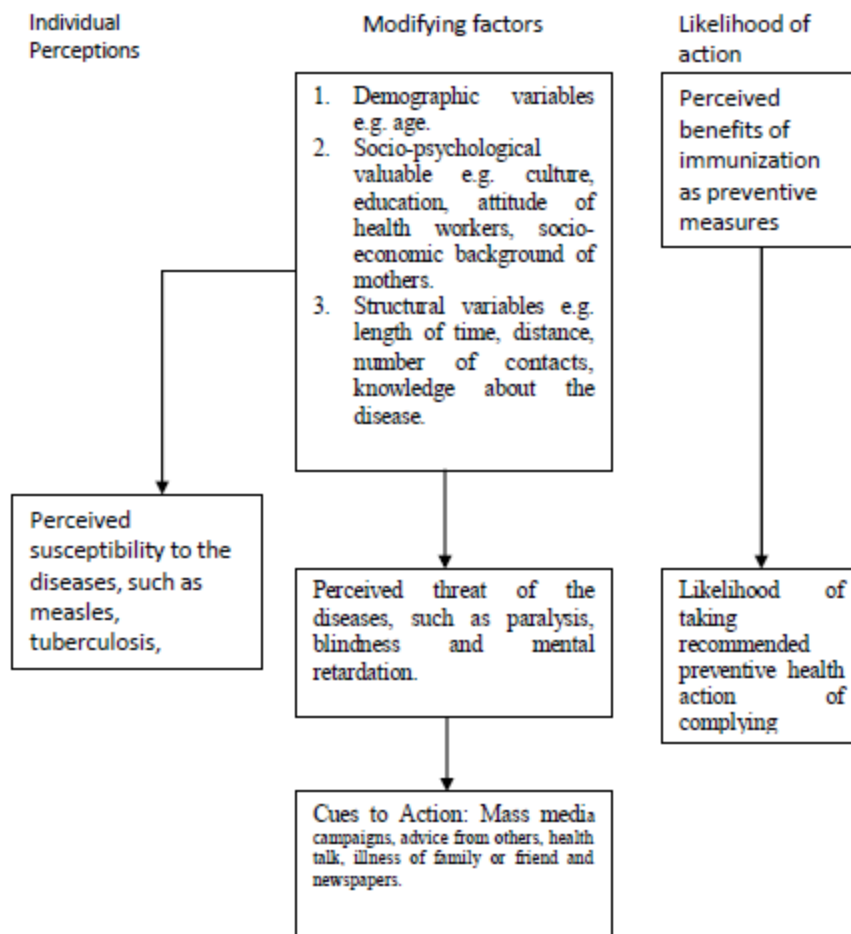
The model states that individuals engage in preventive health behaviour based on three main factors. These factors are perceived vulnerability, perceived severity and perceived benefits. This means that a person would have to believe that he or she is susceptible or vulnerable to a disease in order to take any action. The value of compliance is therefore based on the probability that in the client's view, compliance will reduce the perceived threat and not be too costly in money, time and emotional energy (Becker, 1979). Hence, the preventive action taken by an individual depends on the individual's perception that he or she is personally susceptible and that occurrence of the disease would have at least some severe implication of a personal nature. The assumption here is that taking action reduces susceptibility. The perception of threat is also affected by modifying factors. These include demographic, social, psychological and structural variables. These can influence both perception and corresponding cue necessary to instigate action.

The health belief model is selected because it has helped to explain some factors responsible for compliance with immunization. The elements of the model can assist the researcher in designing the health education interventions that could influence mother's readiness to take their children to

immunization centers. This is by emphasizing the benefits of compliance and by removing obstacles that might prevent compliance.

In the context of this study, perceived susceptibility means a high probability of susceptibility to the child killer diseases. The threat posed by these diseases plus the emphasis on the value of prevention by various information sources are assumed to stimulate individuals to take preventive action provided the modifying factors are favourable. That is, there is the availability of resources to aid the action at affordable cost, accessibility to the resources and even distribution of the resources.

**Figure 1: SCHEMATIC FLOW OF THE THEORETICAL FRAMEWORK ADOPTED FOR THE STUDY**



**National Programme on Immunization Policy and It's Implementation Survey** Immunization is coordinated by the National Programme on Immunization (NPI), a parastatal of the Federal Ministry of Health in collaboration with the State Ministries of Health and local government health centres, UNICEF and WHO. It was established by the Federal Government of Nigeria in 1997 (Folliden, 2005). The National Programme on Immunization (NPI) is one of the components of Child Survival Programmes. NPI was designed to ensure that vaccination facilities are distributed to wider community coverage, using various means such as health education, provision of vehicles, the cold chain technique etc (Akinsola, 2006). Since immunization programs were launched in low- and middle-income countries worldwide in the mid-1970s, most countries have been using the same standard package of six vaccines. Later, hepatitis B vaccine was added to the list (Akinsola, 2006). With a view to improving child health, the Nigerian government has introduced pentavalent vaccine into her routine immunization schedule. Pentavalent vaccine is a combination of five vaccines-in-one that prevents diphtheria, tetanus, whooping cough, hepatitis b and haemophilus influenza type b, all through a single dose; The Pentavalent vaccine will

replace the DPT vaccine in Nigeria’s routine immunization schedule. Pentavalent vaccines come in two separate formulations that is Liquid based and Liquid +lyopolyzied.

**The new routine immunization schedule is:**

AGE	ANTIGENS (VACCINES) GIVEN
Birth	BCG, OPVo, HepBo
6 weeks	OPV1, Pentavalent 1, OPV 1
10 weeks	OPV2, Pentavalent 2, OPV 2
14 weeks	OPV3, Pentavalent 3, OPV 3
9 months	Measles, Yellow Fever
9 months	Vitamin A (First Dose)
15 months	Vitamin A (Second Dose)

**Source:** Akinsola (2006).

Nigeria has 774 local government areas subdivided into 5,450 districts, within which there are villages and 9,555 wards. These vast areas are expected to be covered for immunization programmes. Previously, the programme was coordinated by Expanded Programme on Immunization with multinational donor agencies. According to Folliden (2005), immunization coverage in Nigeria has become a major challenge in the context of child survival strategy, and the Nigerian immunization coverage is far below some countries in conflict. The DPT<sub>3</sub> immunization coverage varied from 5% in 1984 to 29% in 2000 with peak coverage of 57% attained in 1990. A dramatic decline to 28% was observed in 2001. A target of 95% immunization coverage against vaccine preventable diseases is necessary for sustained control of vaccine preventable diseases.

The national average for children who received all the basic immunization was 25 percent which was very low given that A World Fit for Children goal is to ensure full Immunization of children less than one year of age at 90 percent nationally, with at least 80 percent coverage in each state. Even among states that had coverage above the national average, none was able to reach this target of 80 percent coverage in all basic immunization (NDHS, 2013).

World Health Organization argues that drop-out rate of more than 10% is not acceptable and is dangerous for any country. The national immunization coverage reported in 2003 was 12.7% indicating further decline from 28% reported in 2001. Sources of immunization in 2003 were as follows: government 75.6%, private 8.4%, non-governmental agencies 1.7%. Reasons for non immunization were non availability of vaccines, distant and unknown immunization sites, fear of adverse reactions from vaccines, rumours, lack of trust in immunization and mother not having time for immunization. Folliden (2005) has it that about 23% of children was fully immunized in 2008, while those without any immunization were 29%. The fully immunized children were highest in south-eastern zone (43%) and least in north-western zone (6%).

Significant variations were noted between urban and rural areas, with more coverage observed among urban population (38% versus 16% respectively). UNICEF reported coverage of 69% for DPT<sub>3</sub> in 2010 but insisted Nigeria must intensify her campaign, as some states had poor coverage (World Health Organization, 2011). NPI has been faced with the challenge of storage, distribution of vaccines, monitoring and evaluation of immunization activities, along with the submission of its annual report on

immunization coverage to World Health Organization (WHO). It was reported that cold chain facilities at the state levels were poorly equipped and managed, with over half of the refrigerators being worn-out in 2005. Collaboration of staff at different levels has also been a major challenge. Migration was implicated as a risk factor for non-immunized affected children. Outbreaks of poliomyelitis were reported in Europe and were linked to importation from endemic countries (Antai, 2010).

From 2006 to 2010, Nigeria nearly tripled the proportion of children covered by routine immunization, according to the National Immunization Coverage Survey (NICS), conducted in October 2010. The increase took place against the backdrop of aggressive Supplementary immunization campaigns to eradicate polio. The results of the 2010 NICS indicate that 52% of Nigerian children aged 12-23 months are reported to be fully immunized, compared with just 18% in 2006. In 2003, when the first baseline study was undertaken, the corresponding figure stood at just 13%.

The NICS aims to estimate the levels of immunization coverage at national, regional and state levels. The survey is regarded by the Nigerian Government and international partners as the most accurate measure of routine immunization services, providing important insights into community and individual attitudes towards immunization. More than 19,000 households in selected settlements of every state were visited in October 2010 by trained representatives of an independent research company. Coverage was determined by vaccination card and the child's history as recounted by the family at 52 weeks of age. Coverage of DPT<sub>3</sub> – a measurement of the number of children who are fully protected against three killer diseases Diphtheria, Pertussis and Tetanus and the most common measurement of basic routine services – increased nationally from 25% in 2006 to 68% in the 2010 study. Advances were recorded in all regions of the country.

The national average distribution of children between 12-23 months who received all basic immunization and those who did not receive as at 2013 was 25 percent. This is very low given that A World Fit for Children goal is to ensure full Immunization of children less than one year of age at 90 percent nationally, with at least 80 percent coverage in each state. No state was able to reach this target of 80 percent coverage in all basic immunization (State of Nigerian children report 2015).

According to NDHS (2013) between year 2008 and 2013, almost one in four children does not receive any routine immunization. Overall, 25 percent of children ages 12-23 months were fully vaccinated at the time of the survey. This represents a 9 percent increase from the figure reported in the 2008 NDHS and is nearly double the figure reported in 2003. Twenty-one percent of eligible children received no vaccination at all. While this figure represents a 28 percent improvement over that recorded in the 2008 NDHS. As for coverage of specific vaccines among children age 12-23 months, 51 percent had received the BCG vaccine, and 42 percent had received the measles vaccine. While 51 percent received the first dose of the DPT vaccine, only 38 percent went on to receive the third dose, reflecting a dropout rate of 25 percent. Although only 47 percent of children received their commended polio 0 dose at birth, 77 percent received the first dose, 70 percent received the second dose, and 54 percent received the third dose. The wide difference in DPT and OPV coverage is accounted for by the national and sub-national immunization day campaigns during which the polio vaccine is administered. Overall, only 21 percent of children age 12-23 months had received all of the recommended vaccinations before their first birthday, this is by far very low compare with WHO target of at least 80% NDHS (2013).

### **Barriers to Childhood Immunization Compliance in Nigeria**

Nigeria is making efforts to strengthen its routine immunization so as to reduce the burden of vaccine preventable diseases, especially in Northern Nigeria. Babalola (2005) stated that one of the barriers to immunization in Nigeria is the frequent undersupply of vaccines and the need for repeated visits often led to incomplete immunization of children in those that have no easy access to a Primary Health Care.

According to Babalola (2005) myths, rumors, ignorance and suspicion are major factors found to hinder immunization. In the sample, 16% believe that the diseases are caused by evil spirit, witchcraft and heat. Some 25% have never heard of measles immunization. Another 27% did not believe

immunization was effective while 4% were not allowed to go for immunization by their husbands. Some women believed their children had received some vaccine; many women felt that immunization was not necessary because the child was not sick. In the same vein, In another study by Babalola (2011) which she conducted on Northern Nigeria to compare mother's reasons for non-immunization and partial immunization of children under five years in Northern Nigeria, to determine the association between specific reasons and future intention to immunize children. Most common reasons for non-immunization were lack of knowledge about childhood immunization schedule and where to sources for it. Other reasons include lack of awareness about health benefits of immunization

The most common reasons for incomplete immunization were inadequate vaccine supply in health facilities (Babalola, 2011). About one-fifth of the women gave reasons that revealed their lack of knowledge about immunization benefits, routine immunization schedule and the required number of doses. Some women believed that their children were too young to receive specific vaccines, particularly those involving the use of needles and syringes. More over few women believed that their child had received some vaccines and were apparently well and thriving there was no need for additional vaccines. Some women also believed that too many vaccines could be harmful to the child. Large percentage of women gave reasons that showed total reliance on immunization campaigns for child immunization. Excuses tendered such as waiting for immunization Officers to come back and lack of availability of other vaccines during the exercise revealed lack of understanding of the routine immunization as a source of child immunization.

Some women gave reasons related to mother's unavailability, including sickness, travel time and time constraints. A few mentioned purdah. Provider's attitudes and long waiting period were cited by few mothers as their reason for not taking additional immunization for their children. Indeed a few women were frustrated because they had visited the facility more than one time with no vaccines on ground, absence of service providers or disrespectful providers. A study by Anah, Etuk & Udo (2006) compared the immunization cards of all the children aged five years and below admitted into the pediatric wards of the University of Calabar Teaching Hospital, Calabar, Nigeria with the mothers' history of their children immunization status. The results of the study showed that only 560 (60.9%) were fully immunized for age. 244 (26.6%) partially immunized and 115 (12.5%) had no form of immunization. The prevalence rate of missed opportunity was 39.1%. Most of these patients were in the low lower socio-economic groups. The commonest reason for missing immunization was illness of the child at the time of immunization.

This is an indication that health workers should intensify their efforts in educating mothers on contraindications for immunization. In a study by Sadoy & Eregie (2009) which evaluated for timeliness in receiving vaccines and the completion rates of the schedule, about 30% of the children presented after four weeks of age for their first immunization; 18.9-65% of the children were delayed in receiving various vaccines compared to the recommended ages for receiving the vaccines. Only 44.3% children were fully immunized. This is an indication that health workers should intensify their efforts in educating mothers on benefits of immunization. Study on compliance rates in Kern County, California and found that parents sited non-compliance as being due mainly to child's illness, procrastination and lack of knowledge about immunization and where to obtain services (Goodman, Wiu & Frerichs, 2000). This study is in support of findings by Babalola 2011.

In addition, Bundt & Hu (2004) found that non-minority children with parents of higher socio-economical background were far more likely to have complete immunization. Another study to identify with vaccination barriers in children 12-24 months found that of the parents who were surveyed, only 20% reported that their children were currently up-to-date with their immunizations (Parve, 2004).

## **Methodology**

**Study Area** Ahiazu Mbaise is a Local Government Area of Imo state, Nigeria. Its headquarters are in the town of Afororu (or Afor Oru). There are fourteen (14) towns that make up Ahiazu Mbaise. They are:

Mpam, Ihitte Afor, Opara-Nadim, Akabor, Ogwuama/Amuzi, Obodo-Ujichi, Otulu/Aguneze, Umuo-Kirika, Obohia, Ekwereazu, Obodoahiara, Lude/Nnara-Mbia, Ogbe, Oru Ahiara. Ahiazu Mbaise has an area of 114 km<sup>2</sup> and a population of 170,902 at the 2006 census comprising 86, 326 of males and 84, 498 of females. Imo is one of the 36 states of Nigeria. Located in the South-Eastern region of Nigeria, it occupies the area between the lower River Niger and the upper and middle Imo River. Imo State is bordered by Abia State on the East, River Niger and Delta State to the West, Anambra State on the North and Rivers State to the South. The state lies within latitudes 4°45'N and 7°15'N, and longitude 6°50'E and 7°25'E with an area of around 5,100 sq km.

**Design and Methods** A cross sectional survey was carried out to determine factors that affect mother's compliance with immunization of under-5 children in Ahiazu Mbaise Local Government Area Imo state, Nigeria. This study area was purposively selected as a first stage in the sampling process. Systematic sampling method was used to select the households while the women were purposively selected. 123 houses were counted to be in the area. 40 houses selected at an interval of five houses for a total of 160. In all, 160 houses were sampled. This constitutes the second stage of sampling. In the third stage of sampling a mother was purposively selected in each house. However, where there was only one nursing mother she was automatically interviewed. A Post data collection analysis indicated that seven of the questionnaires contained mismatched information and so were discarded. A sample size of 153 respondents was finally used for the subsequent analysis.

**Method of Data Analysis** Descriptive statistical technique was used to analyze the data. Initial analysis involved the generation of frequency tables, while further analysis involved cross tabulation to explore statistical relationships between variables. The data were also subjected to chi-square analysis. The statistical significance was set at  $P < 0.05$ . The respondents were grouped into two: compliers and non-compliers. This was done to make comparison and to find out if the identified factors actually affected compliance with immunization of under-5 years old children. The SPSS software was used in the analysis of the data.

## Results and Discussion

**Table 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS**

Variables	Frequency N= 153	Percentage
<b>Age (years)</b>		
15-25	69	45.1
26-35	78	50.9
36-45	6	4.0
<b>Marital Status</b>		
Married	141	92.2
Single	6	3.9
Divorced/Separated	6	4.0
<b>Educational qualification</b>		
Primary	33	21.6
Secondary	93	60.8
Polytechnic	18	11.8
University	9	5.8
<b>Religion Affiliation</b>		
Islam	127	83.00
Christianity	3	2.0
Traditional	23	15.0
<b>Occupation</b>		
Farming	3	2.0
Housewife	30	19.6



Civil servant	15	9.8
Trading	78	51.0
Students	3	2.0
Combined (trading and civil service)	24	15.6

Table 1 shows that 69 (45.1 %) respondents were within the age range of 15-25 years. In addition to this, (50.9%) of the respondents were within the age range of 26-35 years. Only (4.0 %) were aged 36-45 years. This implies that about 96 % of the respondents were within their active reproductive age. Marital status shows that (92.2%) respondents were married, While 3.9 percent of the sample were single parent while 2.0 % were divorced and the remaining 2.0 % were separated.

The table also shows, that (60.8%) of the respondents were secondary school graduates. 21.6 % have primary school education. It also shows that the respondents were predominantly Christians (83.00%) while African traditional believers represent about (15.0%) of respondents. Muslim believers were only 2.0 % respondents. Also (51.0%) were traders. Only (9.8%) were civil servants while (19.6%) of the respondents were full time housewives.

**TABLE 2: COMPLIANCE RATINGS OF THE RESPONDENTS**

Item	Yes	%age	No	%age
Taken vaccines at least once	123	80.4	30	19.6
Last child fully immunized	96	62.8	57	37.2
Aware of information on child's card	96	62.8	57	37.2
worry over side effect	150	98.0	3	2.0
Work allows me	150	98.0	3	2.0
Aware of service points	100	65.4	53	34.6
Vaccine availability	147	96.1	6	3.9

Table 2 shows the compliance ratings of the respondents based on Yes or No answers. About 80.4 % affirmed that they have taken at least one vaccine while 19.6 % claimed they have not taken any vaccine for their children. More so, 62.8 % have fully immunized their last child while the remaining 37.2 % of the respondents did not immunize their children fully. Some 98.0 % of the respondents contended that they worry about the side effects of immunization. Only 2.0 % did not worry over the side effects. Furthermore, 98.0 % claimed that their occupations allow them to take their children for immunization. Only 2.0 % said that their occupations did not give them much time to take their children for immunization. Also 98.0 % of respondents stated that their religious beliefs did not affect their decision to immunize their children. Only 2.0 % of them said that their religion did not allow them to take immunization. All the 100 % of the respondents were conscious of where to get immunization. Lastly only 96.1 % claimed that vaccines were available but some 3.9 % said vaccines were not available.

Table 3 shows ten factors that are explored as affecting mother's compliance with immunization of children of under-5 years in Ahiazu Mbaize LGA, Imo state. Majority of 60.8% agreed with the factor that health workers' behaviour discouraged compliance. About 22% of the respondents cited the cost of obtaining immunization as barrier to compliance. Some 83.7% of the mothers agreed that immunization is highly effective for the diseases and this encourages them to comply. 72.6% of the respondents disagreed with the notion that mothers' occupations constituted obstacle to their participation and compliance. 55% of them agreed that time spent for immunization was too long. While 65.4% of respondents cited child illness as a factor discouraging compliance with vaccines, about 71.9% of them agreed with contact period as a factor discouraging compliance.

**TABLE 3: FACTORS AFFECTING MOTHER'S COMPLIANCE WITH IMMUNIZATION OF UNDER-5 CHILDREN**

Factors	SA	A	U	D	SD	SA+A	D+SD	U
Health workers' behaviour discourage mothers	60	33	6	27	27	93 (60.8)	54 (35.3)	6 (3.9)
Cost of immunization scary	21	12	3	6	78	33 (22.0)	84 (54.9)	6 (3.9)
Immunization highly effective	98	30	9	12	9	128 (83.7)	21 (13.7)	9 (5.9)
Mothers' work prevent participation	24	18	12	48	63	30 (19.6)	111 (72.6)	12 (7.8)
Vaccination centres are far from abode.	63	24	12	9	12	87 (56.9)	21 (13.7)	12 (7.8)
Time spent too long.	54	30	6	27	36	84 (55)	63 (41.1)	6 (3.9)
Payment of some items discourage participation	30	4	4	35	80	34 (22.2)	115 (75.2)	4 (2.6)
Lengthy Contact period. (Number of visits)	105	5	9	7	27	110 (71.9)	34 (22.2)	9 (5.9)
Child been ill.	70	30	3	23	27	100 (65.4)	50 (32.7)	3 (1.9)

Figures in parentheses are percentages.

### Hypotheses Testing

#### Hypothesis 1

**Null Hypothesis:** There is no significant relationship between age of respondents and compliance with immunization of children under-5 years' old.

**Alternative Hypothesis:** There is significant relationship between age of respondents and compliance with immunization of children under-5 years' old.

**TABLE 4: THE RELATIONSHIP BETWEEN THE AGE OF THE RESPONDENTS AND COMPLIANCE WITH IMMUNIZATION OF UNDER-5 CHILDREN**

	Compliance		X <sup>2</sup> cal	X <sup>2</sup> tab	DF	p-value	Remark
	YES	NO					
Age (Years)			64.36	5.991	.2	0.05	Significant
15-25	51	18					
26-35	66	12					
36-45	6	0					
-	123	30					

X<sup>2</sup> cal = 64.36      X<sup>2</sup> tab, 0.05, 2 = 5.991.

The Decision Rule states that If X<sup>2</sup> cal > X<sup>2</sup> tab, then reject Ho and accept Hi. Based on the results in Table 3, the alternative hypothesis was accepted. This implies that there is a significant relationship between age of the respondents and compliance with immunization of under-5 children. This means that compliance is dependent on age of the respondents.

## Hypothesis 2

**Null Hypothesis:** There is no significant relationship between respondent occupation and compliance

**Alternative Hypothesis:** There is significant relationship between respondent occupation and compliance

**TABLE 5: THE RELATIONSHIP BETWEEN RESPONDENT'S OCCUPATION AND COMPLIANCE WITH IMMUNIZATION OF UNDER-5 CHILDREN**

	Compliance		X <sup>2</sup> cal	X <sup>2</sup> tab	DF	p-value	Remark
	YES	NO					
<b>Occupation</b>							
Farming	3	0	163.8975	11.070.	5	0.05	Significant
House wife	30	0					
Civil servant	12	3					
Trading	59	18					
Students	3	0					
Combined	16	9					
<b>Total</b>	<b>123</b>	<b>30</b>					

$$X^2 \text{ cal} = 163.8975$$

$$X^2 \text{ tab, } 0.05, 5 = 11.070.$$

The alternative hypothesis was accepted on the basis of the results in Table 4. This indicated that there is a significant relationship between the respondents' occupation and compliance with immunization of children under-5 years' old. This indicated that compliance is dependent on respondents' occupation. Compliance depends on the occupations of the respondents.

## Hypothesis 3

**Null Hypothesis:** There is no significant relationship between educational background and compliance.

**Alternative Hypothesis:** There is significant relationship between educational background and compliance.

**TABLE 6: THE RELATIONSHIP BETWEEN EDUCATION OF RESPONDENTS AND COMPLIANCE WITH IMMUNIZATION OF CHILDREN UNDER 5 YEARS' OLD**

	Compliance		DF	X <sup>2</sup> cal	X <sup>2</sup> tab	p-value	Remark
	YES	NO					
<b>Educational level</b>			3	109.361	7.815	0.05	Significant
Primary	33	3					
Secondary	69	21					
Polytechnic	12	6					
University	9	0					
<b>Total</b>	<b>123</b>	<b>30</b>					

X<sup>2</sup>

$$X^2 \text{ cal} = 109.361$$

$$\text{tab } 0.05, 3 = 7.815$$

The alternative hypothesis was not rejected based on the results in Table 5. There is thus a significant relationship between education of respondents and compliance with immunization of children under 5 years old in Ahiazu Mbaize LGA, Imo state. This implies that compliance is dependent on educational backgrounds of the respondents

## Discussion

The study was carried out to examine factors affecting compliance with immunization of children under 5 years among mothers in Ahiazu Mbaise local government area, Imo state, Nigeria. The majority, 80.4 % of respondents affirmed that they have taken at least one vaccine while 19.6 % claimed they have not taken any vaccine for their children. More so, 62.8 % have fully immunized their last child while the remaining 37.2 % of the respondents did not immunize their children fully. This is consistent with study by (World Health Organization, 2005) that compared the immunization cards of all the children aged five years and below admitted into the paediatric wards of the University of Calabar Teaching Hospital, Calabar, Nigeria with the mothers which reported that only 560 (60.9%) were fully immunized for age, 244 (26.6%) partially immunized and 115 (12.5%) had no form of immunization. The prevalence rate of missed opportunity was 39.1%. Most of these patients were in the low lower socio-economic groups.

This study has revealed that the commonest reason for missing immunization was illness of the child at the time of immunization as stated by 65.4% of the respondents. This was similar to the findings by Goodman, Wu, and Frerich, (2000) conducted a study on compliance rates in Kern County, California and found that parents sited non-compliance as being due mainly to child's illness, procrastination and lack of knowledge about immunization and where to obtain services. Also Babalola (2011) supported this finding.

Other reasons include worry about the side effects of immunization (98.0 %). Their work, religious belief and cost did not really affect their compliance negatively. Furthermore, 98.0 % claimed that their occupations allow them to take their children for immunization. Some 60.8% agreed with the statement that health workers behaviour discouraged compliance. This is in line with findings by Babalola and Adewuyi (2005) that cited Provider's attitudes and long waiting period as few reasons by mothers for not taking additional immunization for their children. Indeed a few women were frustrated because they had visited the facility more than one time with no vaccines on ground, absence of service providers or disrespectful providers.

About 22% of the respondents cited the cost of obtaining immunization as barrier to compliance. Some 83.7% of the mothers agreed that immunization is highly effective for the diseases and this encourages them to comply. Also 52.9% of them stated that time spent for immunization was too long. This study is in support of findings of Ekumwe (2004) who hypothesized that shortening the waiting time for patients to be immunized increased the compliance rate. About 71.9% of them agreed with the contact period as a factor discouraging compliance. This is relevant to the study by Babalola and Adewuyi (2005) which stated that one of the barriers to immunization in Nigeria is the frequent undersupply of vaccines and the need for repeated visits often led to incomplete immunization of children in those that have no easy access to a Primary Health Care services. Only 96.1 % claimed that the necessary vaccines were available.

The hypotheses which were tested showed some associations between various variables. The relationship between age of the respondents and compliance with immunization of children under-5 years' was significant. This showed that poor compliance was higher in the younger age groups. The results also showed that there is a significant relationship between the respondent's occupation and compliance with immunization of children under-5 years' old. This indicated that compliance is dependent on respondents' occupation. Compliance depends on the occupations of the respondents. The analysis showed that there is a significant relationship between education of respondents and compliance with immunization of children under-5 years' old. This implies that compliance is dependent on the educational backgrounds of the respondents. The result of the chi square analysis also confirmed a significant relationship between time spent at the immunization centers by the respondents and compliance with immunization of children under-5 years' old. This implies that compliance is dependent on time spent at immunization centers.

## Conclusion

This study attempted to identify factors affecting compliance with immunization of children under 5 years old among mothers in Ahiaazu Mbaise local government area, Imo state, Nigeria. The study revealed that, majority of respondents took at least one vaccine, have worry over a side effect of vaccines. Occupations and religions did not constitute barriers to their participation in the scheme. Health workers behavior discourage compliance .Cost of immunization was found to be a barrier to compliance. The respondents claimed that the time spent for immunization was too long. Age, occupation, education, religion and time spent at the centers were found to have significant relationship with compliance with immunization of children under-5 years' old. Compliance therefore depends on these socio-demographic factors. These thus constitute the major factors affecting compliance with immunization of under-5 children in the area of study.

## Recommendations

There is the need to encourage mothers to comply fully with the scheme through rigorous immunization awareness/campaigns workshops and seminars on benefits of immunization. Health workers should be tutored on sound work ethics and behaviour to their client. They should be client-friendly as this variable indicated positive contribution to compliance by the respondents. There is the policy need to find a way of reducing the cost of immunization. The clients claimed the high cost constitute a barrier to their compliance with the immunization of under-5 children. The cost of immunization should be reduced so as to allow many more clients into the scheme

Respondents claimed that the time spent at the centers was too long thus, a reduction in the time is expected to further encourage not only participation but also compliance with immunization of children under 5 years' old. Finally, the immunization status needs to be improved by education, increasing awareness, and counseling of parents and caregivers regarding immunizations and associated misconceptions as observed in the study.

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