

## UPTAKE OF IMMUNIZATION AND ASSOCIATED FACTORS AMONG 0-11 MONTHS INFANTS IN A RURAL COMMUNITY OF EKITI STATE.

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### ABSTRACT

**Background:** Immunization is one of the most effective public health interventions, leading to reduced infant and childhood mortality caused by vaccine preventable diseases worldwide. Rates of vaccine preventable diseases have been observed to be decreasing in many parts of the world in the past few decades with many children still remain unvaccinated. Studies have shown that factors that are associated with immunization rates include; low family income, lack of health insurance, low level of parental education, religion, young age of parents, presence of other siblings in the household, lack of source of health care, distance to health facilities, place of delivery etc. The aim of this study is to determine the uptake of immunization and its associated factors among infants of a rural community in Ekiti State.

**Methods:** A systematic random sampling techniques was used to select 360 respondents from the rural Local Government Area whose mothers or caregivers were interviewed and vaccination cards observed to gather information on their immunization status. An interviewer administered semi-structured questionnaire and observational check-list were used to collect needed information. Descriptive analysis of findings was done using SPSS version 16.

**Results:** Uptake of immunization by 0-11months children is relatively high in rural communities of Ekiti State (88.9%). The immunization card retention rate is also high (90%) and this is very good for authentic data gathering on routine immunization. The high uptake rate was found to be significantly associated with level of education, marital status and occupation. Healthcare workers and radio announcement still remain major sources of information on immunization; therefore attitude of health workers to clients is an important factor for uptake. Unavailability of vaccines, attitude of health workers and having no faith in immunization are important reasons for non-immunization.

**Conclusion:** Uptake of immunization by children less than one year is relatively high in rural communities of Ekiti State (88.9%). The immunization card retention rate is also high (90%) and this is very good for authentic data gathering on routine immunization.

**Recommendation:** Government to ensure regular, uninterrupted supply of vaccines to all points of vaccination to curb stock out, expand vaccination sites and centres to improve access and provide incentives to mothers/caregivers/families who completed their childhood immunization.

**Keywords:** Uptake, Immunization, Infants, Rural Community, Ekiti State

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### INTRODUCTION

Immunization is one of the most effective public health interventions, leading to reduced infant and childhood mortality caused by vaccine preventable diseases worldwide.<sup>1</sup> Full immunization during infancy is essential to ensure protection against childhood life threatening

infections.<sup>2</sup> The goal of Expanded Program on Immunization (EPI) established by the world Health Organization (WHO) in 1974 is to provide vaccination to all children globally against six initially targeted vaccine preventable diseases (severe infant tuberculosis, poliomyelitis, diphtheria, tetanus, pertussis and measles).<sup>3</sup>

The recognition of immunization as an important tool in reducing child mortality has led to the development of Global Vaccine Action Plan (GVAP); a framework to help countries achieve universal child

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immunization by 2020 with the target of ending preventable child death by 2030 as stated in the United Nations Sustainable Development Goals.<sup>4</sup> Vaccination has proved to be effective against diseases such as small pox, diphtheria, tetanus, pertusis, haemophilus influenza type B (Hib), pneumococcus infections, hepatitis A, hepatitis B, varicella, measles, rubella, polio and rabies.<sup>5</sup> Rates of vaccine preventable diseases have been observed to be decreasing in many parts of the world in the past few decades though many children still remain unvaccinated.<sup>6</sup>

Nigeria joined other member states of the World Assembly to endorse Global Vaccine Action Plan in May 2012.<sup>7</sup> The Nigeria's National Immunization Programme (NIP) which is being administered by the National Primary Health Care Development Agency (NPHCDA) offers 11 antigens in 8 different single and combination vaccines to children in their first year of life at no cost to the parents.<sup>8</sup> However, despite availability and affordability of vaccination, Nigeria has one of the lowest immunization coverage rate in the world with a national survey reporting 38% coverage rate of DPT<sub>3</sub>.<sup>8</sup> Outbreak of vaccine preventable diseases continue to occur and this may be attributed to unimmunized or under-immunized sub-population.<sup>1,8</sup>

Vaccination protects through induction of antibodies in the serum or on mucosa which helps protect against infection or interfere with microbial invasion of the blood stream (Active Immunization). Vaccination can also protect one by passively administering antibodies injection (Acquired Passive Immunization) or by passage of antibodies from the mother to the newborn (Natural Passive Immunization).<sup>5</sup>

Immunization coverage is a major indicator for vaccination programmes.<sup>9</sup> Vaccination

coverage by vaccine dose was defined as the percentage of children whom a vaccination date was registered on their vaccination document for that dose at the time of the study.<sup>9</sup> A complete schedule is the intake of all the required doses for age while a partial schedule is lack of at least one of the vaccines.<sup>9</sup>

Studies have shown that factors associated with immunization rates include; low family income, lack of health insurance, low level of parental education, religion, young age of parents, presence of other siblings in the household, lack of source of health care, distance to health facilities, place of delivery, healthcare workers attitude, perceived barrier, parental health belief, access to media etc.<sup>1,6,7,10,11,12</sup>

Incomplete immunization coverage is a cause of preventable illnesses and death in developing and even the developed countries.<sup>6</sup>

The World Health Organization (WHO) and UNICEF reported that in 2012, about 22million children younger than 1year had not completed the 3rd dose of Diphtheria, Pertusis and Tetanus (DPT) immunization with similar number not receiving a single dose of measles vaccine.<sup>6,13</sup>

However, in 2014 there were about 18.7million incompletely vaccinated children worldwide and out of this population, 75% live in ten countries of Africa and Asia while 53% lives in only three countries vis a vis India (32%), Nigeria (14%) and Indonesia (7%).<sup>3,4</sup>

Though the global coverage of vaccination was 84% (2014), there are pockets of unimmunized children with continuous spread of diseases and should this trend continue, the goal of providing

immunization for all children by year 2020 and ending vaccine-preventable deaths by 2030 will not be achieved and the cost of such failure would be close to 26million deaths.<sup>4</sup>

A survey in 2013 revealed that 21% of eligible children in Nigeria whose vaccination ought to have been completed by their first birthday received no vaccination at all and in spite of several vaccination programme including campaigns; vaccination coverage in Nigeria is still as low as 38%.<sup>8</sup>

Nigeria after keying in into the Expanded Programme on Immunization (EPI) in 1979, had a major success between 1988 and 1990 with a coverage rate (DPT) of 81%. However, the rate has been worsening drastically since then with a value of 13% in 2003, 23% in 2008 and 38% in 2014.<sup>7,8</sup>

With the global coverage of vaccine increase between 2000 (74%) and 2014 (86%), annual death rate of children within this period also decreases from 9.6million to 5.9million and it has been estimated that if the coverage rate can increase to 90% in the poorest countries over the next 10years, about 426million cases of illness and 6.4% of death in children worldwide will be averted.<sup>4, 12</sup> Despite this and other benefits of vaccination, vaccination rates in low income countries still vary widely.<sup>12</sup>

With outbreak of vaccine preventable diseases despite intensive vaccination campaigns, it is essential to monitor vaccine coverage regularly and identify reasons that contribute to delay and non-vaccination at local levels in order to develop appropriate strategies in addressing the needs of susceptible population.<sup>1</sup>

Identification of clusters of non-vaccinated through monitoring of local immunization

rates has been identified as a key public health challenge for outbreak prevention.<sup>6</sup>

Identification of factors that might modulate coverage could inform effective immunization programmes and policies needed to address the problems.<sup>6,10</sup>

Also, in the last decades, immunization schedule has become more complex with the introduction of new vaccines (Penta, Hib, Rota) and recommendation of more doses of the existing ones. However, compliance with newly recommended vaccines and associated factors has not been well documented.<sup>1</sup>

### **General Objective**

The aim of this study was to determine the uptake of immunization and its associated factors among 0-11months infants in a rural community of Ekiti State.

### **Specific Objectives**

1. To determine the uptake of immunization among 0-11months infants in Ilejemeje Local Government Arrear of Ekiti State.
2. To assess the immunization card retention rate among 0-11months infants in Ilejemeje Local Government Arrear of Ekiti State.
3. To identify factors affecting the uptake of immunization among 0-11months infants in Ilejemeje Local Government Arrear of Ekiti State.

## **METHODOLOGY**

### ***Study Location***

This study will be carried out in Ekiti State which is one of the thirty-six states in Nigeria. It is located in the south-western part of the country. It lies south of Kwara and Kogi states, and east of Osun state, while it is bounded in the east and in the south by Ondo State. Ekiti state has three senatorial districts: Ekiti Central, Ekiti

South and Ekiti North senatorial districts.

Ilejemeje Local Government Area (LGA) is a predominantly rural LGA and one of the sixteen local governments of Ekiti State. Its headquarter is the town of EdaOniyo. It has an area of 95km<sup>2</sup> and a 2019 projected population of 60,942. It has 10 wards with about 83 settlements. The local government is located close to the north axis of Ekiti and it shares boundaries with Ido-osi, Oye and Moba LGAs. The indigenous people of Ilejemeje are predominantly Yoruba (and speak the Ekiti dialect). They co-exist peacefully with other ethnic groups such as Hausa, Igbos, Ebiras, etc. The major occupations of inhabitants are farming and artisans. There are 25 primary health facilities, registered private hospitals and four school health clinics within the LGA. Vaccines are stored at the LGA cold chain and are transported to the rural communities on the day of vaccination via vaccine carriers. The rural communities are mostly reached through motorcycles and bicycles.

### **Study Population**

The study population comprises of infants age 0-11months in Ilejemeje LGA; a rural Local Government Area of Ekiti State.

### **Study Design**

This is a descriptive cross-sectional study to determine the uptake of immunization and its associated factors among 0-11months infants in a rural community of Ekiti State

### **Sample Size**

Sample size of 374 infants was gotten using Fischer's formulae of proportion.

### **Criteria for Inclusion**

Infants age 0-11months in Ilejemeje Local Government Area of Ekiti State whom their parents or caregivers gave oral consent to participate in the research were recruited.

### **Criteria for exclusion**

Infants age 0-11months not living in the Local Government Area, who are visitors and not with their immunization cards.

### **Sampling Techniques**

A multi-stage sampling technique was employed in selecting participants for the study.

Stage one entails selection of seven (7) wards from the the sampling list of all the wards (10) in the LGAs (obtained from the Ekiti State branch of the National Population Commission). Stage two entails selection of two settlements from each of the seven wards selected in stage one. In each of the fourteen (14) settlements selected in stage two, equally allocation of sample size was used to apportion the number of respondents (27 per settlement) at stage three. Stage four involves selection of households in the settlement. Household were selected using systematic random sampling at a sample interval. Sample interval was gotten by dividing the total number of household in each settlement by the number of allocated questionnaire.

### **Data Collection**

An interviewer administered, pre-tested, semi-structured questionnaire and observational check-list of card immunization status were used to gather information on socio-demographic characteristics, uptake of immunization, possible risk factors and caregiver's health seeking behavior. The questionnaire was pre-tested at Gbonyin LGA of Ekiti State using 10% (38) of the entire questionnaire (which will not be included in the study). Where necessary, corrections were made to the questionnaires. Face and content validity was conducted by some experts on the field.

Six Research Assistants were trained on

data collection using a pre-tested semi structured interviewer administered questionnaire.

### Ethical Consideration

Permission was sought and obtained for the study from Medical Officer of Health of the LGA after carefully explaining the objectives of the study to him.

### Data Analysis

Data collation and editing was done

manually to detect omissions and to ensure uniform coding. The data was entered into a computer and analysis was done using Statistical Package for Social Sciences (SPSS ) version 20 software package. Categorical variables (e.g religion, ethnicity etc) were summarized as proportions, tables and charts. Chi-square was used to determine the level of significance at P value of 0.05.

## RESULT:

**Table 1a: Socio-Demographic Characteristics of Infants**

Variable	Frequency N = 360	Percentage (%)
<b>Age group</b>		
<b>Age group (in months)</b>		
1 – 3	49	13.6
2 – 3	93	25.8
4 – 6	70	19.4
7 – 8	78	21.7
9 – 11	70	19.4
	5.3 ± 2.2	
<b>Gender</b>		
Male	162	45.0
Female	198	55.0

**Table 1b: Socio-Demographic Characteristics of Mothers/Caregivers**

Variable	Frequency N = 360	Percentage (%)
<b>Age group (in years)</b>		
16 – 25	120	33.3
26 – 35	176	48.9
36 – 45	64	17.8
	28.5 ± 6.4	
<i>Range</i>	16 - 44	
<b>Marital Status</b>		
Single	29	8.1
Married/ Cohabiting	311	86.4
Separated/ Divorced	16	4.4
Widowed	4	1.1
<b>Religion</b>		
Christianity	272	75.6
Islam	88	24.4

### Highest Education Level

None	24	6.7
Primary	95	26.4
Secondary	143	39.7
Tertiary	98	27.2

### Occupation

Housewife/ Unemployed	83	23.1
Civil Servant	87	24.2
Farmer	30	8.3
Artisan	104	28.9
Trader	56	15.2

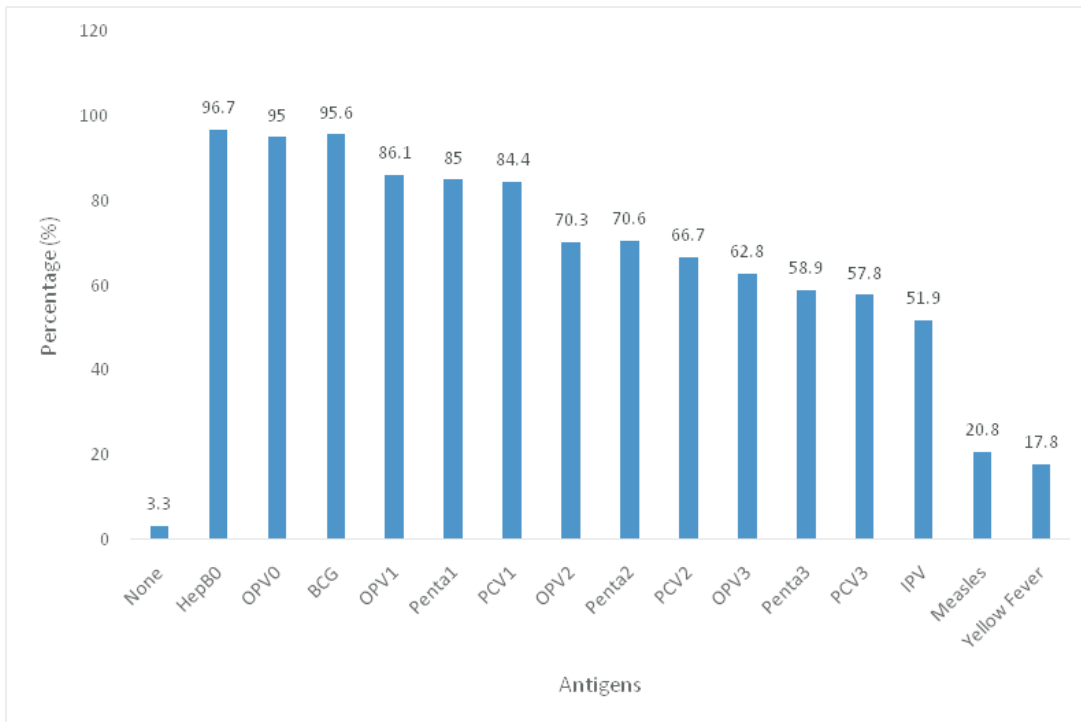
Table 1 showed that majority of the infants accounting for 25.8% of sampled infants were between the ages of 3-4months. The Mean age  $\pm$  SD of the infants is  $5.3 \pm 2.2$ . A larger percentage of 55% were females as against 45% males.

Table 1 also revealed a Mean age  $\pm$  SD of  $28.5 \pm 6.4$  for the mothers/caregivers. Majority of the caregivers accounting for 86.4% of the respondent are married. About three quarter of the respondents (75%) are Christians while majority (66.9%) has at least secondary education (39.7% secondary and 27.2% tertiary). Majority of the women are artisans (28.9%), closely followed by those in civil service (24.2%) while unemployed/full time housewife accounts for 23.1%.

**Table 2:** Uptake of Immunization by the Infants

Variable	Frequency N = 360	Percentage (%)
<b>Immunization Status</b>		
Fully immunized	320	88.9
Partially immunized	28	7.8
Not immunized	12	3.3

Majority of the infants (88.9%) were fully immunized as evident from their immunization cards, 7.8% were partially immunized while 3.3% were not immunized at all.



**Figure 1:** Antigens taken based on card evidence

Figure 1 is a bar chart showing various antigens taken by the infants.

**Table 3:** Immunization Card Retention Rate and Reasons for Non-Retention.

Variable	Frequency N = 360	Percentage (%)
<b>The information was from child immunization card</b>		
Yes	324	90.0
No	36	10.0
<b>Reason for non-availability of child immunization card (n=36)</b>		
Lost/ Destroyed/ Misplaced	22	61.1
Not issued	2	5.6
Child never gone for immunization	10	27.8
Other	2	5.6
No	36	10.0

Table 3 showed the immunization card retention rate by the mothers/caregivers. Majority of the mothers/caregivers (90%) were able to produce their immunization cards on request. The remaining 10% who do not have were those who misplaced that card and those whose infants are not taking routine immunization.

**Table 4:** Reasons for Non-Immunization of Children by Mothers or Caregivers / Source of immunization information

Variable	Frequency N = 360	Percentage (%)
<b>Reason for child not immunized (n=40)</b>		
Unaware of need for immunization	2	5.0
Place/ time of immunization unknown	2	5.0
Fear of side reactions	4	10.0
No faith in immunization	2	5.0
Dissatisfied with health worker	8	20.0
Vaccine not available	8	20.0
Mother/ caregiver forgot	2	5.0
No reason	10	25.0
Other	2	5.0
<b>Main sources of information about routine immunization*</b>		
Health worker	339	94.2
Polio campaign vaccinators	20	5.6
Loud speaker/ town announcer	175	48.6
Poster/ banner	20	5.6
Radio	248	68.9
Television	12	3.3
Mobile telephone/ SMS	8	2.2
Internet	2	0.6
Newspaper/ magazines	4	1.1
Family members	8	2.2
Neighbours/ Friends	52	14.4
Women group	4	1.1
Community leader	26	7.2
Community mobilizer/ VCM	12	3.3
Not heard of routine vaccination before	26	7.2
Don't know	5	1.4

*\*Multiple responses*

Table 4 showed reasons for not fully immunized and source of information for immunization.

Major reasons are unavailability of vaccines, dissatisfaction with attitude of health workers, fear of side effect, not remembering time of immunization while some are still unaware of the need for immunization.

Major sources of immunization to mothers and caregivers are through the health workers, announcement on radio, town announcers and friends.



**Table 5:** Socio-Demographic Factors affecting Uptake of Immunization

Variable	Immunization Status			Chi square	p - value
	Full n (%)	Partial n (%)	None n (%)		
<b>Age group (in years)</b>					
16 – 25	102 (85.0)	14 (11.7)	4 (3.3)	5.334	0.255
26 – 35	162 (92.0)	8 (4.5)	6 (3.4)		
36 – 45	56 (87.5)	6 (9.4)	2 (3.1)		
<b>Marital Status</b>					
Single	21 (72.4)	6 (20.7)	2 (6.9)	28.205	< <b>0.001</b>
Married/ Cohabiting	285 (91.6)	18 (5.8)	8 (2.6)		
Separated/ Divorced	13 (81.2)	2 (12.5)	1 (6.2)		
Widowed	1 (25.0)	2 (50.0)	1 (25.0)		
<b>Ethnicity</b>					
Yoruba	243 (90.3)	20 (7.4)	6 (2.2)	6.635	0.356
Igbo	35 (89.7)	2 (5.1)	2 (5.1)		
Hausa	24 (80.0)	4 (13.3)	2 (6.7)		
Others	18 (81.8)	2 (9.1)	2 (9.1)		
<b>Religion</b>					
Christianity	244 (89.7)	19 (7.0)	9 (3.3)	0.984	0.611
Islam	76 (86.4)	9 (10.2)	3 (3.4)		
<b>Level of Education</b>					
None	16 (66.7)	6 (25.0)	2 (8.3)	21.895	<b>0.001</b>
Primary	80 (84.2)	12 (12.6)	3 (3.2)		
Secondary	131 (91.6)	6 (4.2)	6 (4.2)		
Tertiary	93 (94.9)	4 (4.1)	1 (1.0)		
<b>Occupation</b>					
Housewife	79 (95.2)	2 (2.4)	2 (2.4)	25.110	<b>0.001</b>
Civil Servant	84 (96.6)	2 (2.3)	1 (1.1)		
Farmer	22 (73.3)	6 (20.0)	2 (6.7)		
Artisan	91 (87.5)	8 (7.7)	5 (4.8)		
Trader	44 (78.6)	10 (17.9)	2 (3.6)		

Table 5 showed that marital status, level of education and occupation are significantly related to uptake of immunization.

**Table 6:** A Multiple Regression for the Predictors Immunization Uptake in this Study

Model	Unstandardized Coefficients		Standardized Coefficients		t	p-value	95.0% Confidence Interval for B	
	B	Std. Error	Beta				Lower Bound	Upper Bound
(Constant)	1.129	0.136		8.306	<b>0.000</b>	0.862	1.397	
MaritalStatus	0.072	0.055	0.068	1.322	0.187	-0.035	0.180	
Education	-0.096	0.025	-0.195	3.793	<b>0.000</b>	-0.146	-0.046	
Occupation	0.051	0.016	0.168	3.265	<b>0.001</b>	0.020	0.082	

Table 6: shows a multiple regression which was run to predict immunization uptake from marital status, education and occupation. It was however found that only educational level and occupational status of mothers statistically significantly predicted immunization uptake at 0.05 level.

## DISCUSSION

Uptake of Immunization appears to be high (88.9%) in the studied rural community of Ekiti State. The uptake is higher than the global coverage of 84% and national coverage of 54%.<sup>4,15</sup> This uptake is also higher than 65.5% value found in a study done in rural district of Uganda a.<sup>16</sup> This study is in wide contrast to findings in a rural community of northwest Nigeria where the uptake immunization by last born of respondents was found to be 7.6%.<sup>17</sup> This might be due to the higher level of education of the mothers/caregivers, good occupational status and support from husband as many are married. Incomplete/non-immunization rate of 10.1% in this study is far less to the national rate of 21% documented in 2013.<sup>8</sup>

The card retention rate is very high making information gathering more reliable.

This study revealed that factors that favour the uptake of immunization include maternal education, being married and good occupation. While reasons for partial or non-immunization are unavailability of vaccines, dissatisfaction with attitude of healthcare workers, fear of side effect, not remembering time of immunization and unaware of the need for immunization. These findings are in line with various studies that have shown that low family income, lack of health insurance, low level of parental education, religion, young age of parents, presence of other siblings in the household, lack of source of health care, distance to health facilities, place of delivery, healthcare workers attitude, perceived barrier, parental health belief, access to media.<sup>1,6,7,10,11,12</sup>

## CONCLUSION

Uptake of immunization by 0-11 months children is relatively high in rural communities of Ekiti State (88.9%). This has

been found to be significantly associated with level of education, marital status and occupation. The immunization card retention rate is high (90%) and this is very good for authentic data gathering on routine immunization. Healthcare workers and radio announcement still remain major sources of information on immunization; therefore attitude of health workers to clients is an important factor for uptake. Unavailability of vaccines, attitude of health workers and having no faith in immunization are important reasons for non-immunization.

It is thereby recommended that Government should ensure regular, uninterrupted supply of vaccines to all points of vaccination to curb stock out and also expand vaccination sites and centres to improve access. Introduction of incentives to mothers/caregivers/families who complete their childhood immunization and are able to keep their children immunization cards will help maintain and improve this present rate. Healthcare workers should be trained on interpersonal relationship with patients as this will give positive impact on uptake.

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