

Factors Affecting the Uptake of Childhood Immunization among Mothers In Umueze, Osisiomangwa Local Government Area, Abia State, Nigeria

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ABSTRACT

BACKGROUND: Childhood immunization is an effective public health initiative aimed at reducing the burden of vaccine preventable diseases (VPDs) and deaths among children, particularly under-fives. It averts an estimated 2.5 million deaths per year in all age groups from VPD. Childhood immunization is an act of inducing immunity to a child by applying a vaccine that almost guarantees protection from many major diseases.

OBJECTIVE: To determine the factors affecting childhood immunization among mothers in Umueze in OsisiomaNgwa Local Government Area of Abia State.

METHODS AND MATERIALS: A cross-sectional study performed in Umueze Community in OsisiomaNgwa Local Government Area in ABA, Abia State, Nigeria. Self/interviewer questionnaires were administered to 470 women for the study.

RESULT: A total of 470 women (with children aged below 2 years) selected by systematic sampling methods with non-response rate of 40 (8.0%), 388 (90.3%) were fully immunized while 42 (9.7%) children were not fully immunized. Mean age was 34 ± 8.246. Negative factors: distant location of the immunization centre, which is far from the mothers, time to get to the immunization centre, which takes hours, ignorance, lack of confidence in the safety and quality of the vaccines, availability of vaccines, health workers reaction due to delay of vaccination, adverse effects following immunization.

Positive factors: Immunization being free, Mother's good knowledge level of immunization, adequately built facility level. and good wealth status of mothers.

CONCLUSION: Childhood Immunization is an inevitable practice that every family should be involved in, and mothers should always see to the completion of their children's immunization, in order to avert impending dangers which can result from it. In this study, there were so many positive and negative factors that affect the uptake of childhood immunization.

Keywords: Factors, Affecting, Uptake, Childhood, Immunization, Mothers, Osisiomangwa.

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I. Introduction

Childhood immunization almost guarantees protection from many major diseases, it is widely considered to be 'overwhelmingly good' by the scientific community.^{1,2} Childhood immunization is an effective public health initiative aimed at reducing the burden of vaccine preventable diseases (VPDs) and deaths among children, particularly under-fives. It averts an estimated 2.5 million deaths per year in all age groups from Diphtheria, Tetanus, Pertussis (whooping cough) and Measles.³ Other VPDs include: Tuberculosis, Measles, Meningitis, Polio, Hepatitis B and Yellow fever. These are sources of morbidity and mortality especially in developing countries, mainly in Africa and Asia^{1,2} Vaccination coverage has now reached a plateau in many

developing countries, and even where good coverage has been attained, reaching children not yet vaccinated had proved difficult.⁴

Nigeria has low immunization coverage of (25%), it was also found out that there are marked variations across states in the percentage of children aged between 12 and 23 months who were fully immunized, ranging from a low of 1% to a high of nearly 63% in Imo state. It is 50% in Abia State where this study was conducted⁵ It was noted the percentage of unimmunized children in Nigeria is 20.9% with Abia state having 5% unimmunized children with a marked variation across states in the percentage of children aged between 12 and 23 months who were unimmunized ranging from 0% in Ekiti state to 73.2% in Borno State.⁵

In Nigeria, VPDs are known to account for 22% of childhood death amounting to over 200,00 children per annum.⁶ Even though vaccine is provided free of charge by government, but coverage rates for routine immunization antigens in many part of the country still fall below 63%^{5,6}. According to the National Demographic and Health Survey 2013 report, only 50% of children under 2 years in Abia State were fully immunized, far below the WHO target of 80%⁵. The situation is worse in the rural areas as children in these areas were twice unlikely to receive full doses of routine immunization than those in the urban areas.⁵ Previous studies have shown that uptake of immunization services depends not only on provision of these services but other factors related to maternal knowledge, geographical accessibility and many other socio-demographic characteristics^{5,7}

Childhood immunization is an act of inducing immunity to a child by applying a vaccine that almost guarantees protection from many major diseases. These vaccines are financed by the GAVI, the National and subnational Government, UNICEF, and WHO and are given without payment in immunization clinics nationwide.⁸ However, several factors are related to low immunization status. Rural residence, wealth status, availability of safe needles and syringes and the opportunity cost incurred by mothers, child sex and age, long-distance to a health facility, low access to immunization service, poor health infrastructure, inadequate awareness of mothers/caregivers, mothers' perception to the accessibility of vaccines, missed opportunity, place of delivery, living altitude, lower number of trained manpower, and high staff turnover^{9,10,11}

Most mothers support immunization for their children, while some do not because they believe that administration of too many vaccines may negatively affect their children.

Child mortality has fallen significantly in many medium and low-income countries due to introduction of appropriate vaccine for routine use in infants; however, Sub-Sahara African countries experience the slowest fall in mortality rate among children due to vaccine preventable disease. Measles is the leading cause of vaccine preventable diseases among children. 1-5% of children with measles die from complications of the disease.¹²

Tuberculosis is one of the most important infectious diseases globally. Estimation shows that thirty percent of the world populations are infected with tuberculosis. Annually, eight to ten million people develop the disease throughout the world and over three million of these are from sub-Saharan Africa. Though the incidence on tuberculosis is not known definitely, but it has been estimated that over twenty-five thousand new cases are reported annually.¹²

Neonatal tetanus is a completely preventable disease by immunizing females before or during pregnancy or by ensuring clean delivery, proper care of the umbilical cord in the days following birth, as estimated value of two hundred and eight-nine thousand cases of neonatal tetanus continue to occur annually with the case of fatality rate averaging to seventy percent¹². Tetanus is responsible for fourteen percent of all neonatal mortality in developing countries. The incidence in Nigeria ranges from 14.6 to 20 per 100 live births, and remain a contributor to neonatal mortality in the countries.¹²

The historical success of eradicating these dreaded diseases prompted WHO to launch the Expanded program on immunization (EPI) globally in May 1974 with the focus on reducing drastically the number of deaths among children from preventable diseases by 80% by the year 1990.¹² WHO also instructed its member countries to launch immunization against these diseases in their National Immunization Schedule. EPI was launched in Nigeria in 1971 and revised in 1984. It successfully attained the Universal Child Immunization (UCI) target of 80% by 1990 in Nigeria as in many countries. Unfortunately, this coverage could not be sustained and there was a decline in coverage and increase in number of reported cases of the target diseases. As a way of reawakening national consciousness and demonstration of ownership of the program by Nigeria Government, EPI was renamed as National Program on Immunization (NPI) in 1996. The NPI employed the use of the four traditional EPI vaccines: Bacille Calmette Guerin vaccine (BCG), Diphtheria Pertussis Tetanus (DPT), Oral Polio virus Vaccine (OPV) and Measles containing Vaccine (MCV).¹² The vaccines currently employed in Nigeria includes Bacille Calmette Guerin vaccine (BCG), Oral Polio virus Vaccine (OPV) and Measles containing Vaccine (MCV). Pentavalent vaccine which includes: Hepatitis B, Diphtheria Pertussis Tetanus (DPT) and Haemophilus Influenza B (HiB), meningitis.¹²

Nigeria routine immunization schedule stipulates that infants should be vaccinated according the National Program on Immunization schedule starting from birth. This however have been characterized by

intermittent failures and successes since its initiation in 1996 due to individual, community and systemic factors affecting the inequitable intake of children immunization in Nigeria and other sub-Sahara African countries.

TABLE A: NATIONAL PROGRAMME ON IMMUNIZATION (NPI) SCHEDULE

Vaccine	When To Give	Dose	Route	Site
BCG	At birth or as early as possible till one year of age	0.1ml (0.05ml until 1 month age)	Intra-dermal	Left upper arm
Hepatitis B - Birth dose	At birth or as early as possible within 24 hours	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
OPV-0	At birth or as early as possible within the first 15 days	2 drops	Oral	Oral
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (OPV can be given till 5 years of age)	2 drops	Oral	Oral
Pentavalent 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Rotavirus	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	5 drops	Oral	Oral
IPV	Two fractional dose at 6 and 14 weeks of age	0.1 ml	Intra dermal two fractional dose	Intra-dermal: Right upper arm
Measles /MR 1st dose	9 completed months - 12 months (can be given till 5 years of age)	0.5 ml	Sub-cutaneous	Right upper arm
JE - 1	9 completed months - 12 months	0.5 ml	Sub-cutaneous	Left upper arm
Vitamin A (1st dose)	At 9 completed months with measles - Rubella	1 ml (1 lakh IU)	Oral	Oral

The table A above is the current National programme on immunization (NPI) schedule, which is scheduled from birth to 9 completed months.

Despite notable improvement, about three million children are permanently disabled each year due to poor coverage of immunization.¹² Wide spread inequalities persists in immunization coverage among the children of lowest socioeconomic status, parents with no educational background and in northern Nigeria, where lack of immunization has been attributed to fear and confusion.

The knowledge, attitude and practice of childhood immunization among mothers is very important in our present society, in that they can help to protect and prevent their children from many diseases out there.^{12,13}

II. Materials and methods:

STUDY AREA

The study was carried out in Umueze Community in OsisiomaNgwa Local Government Area in Aba, Abia State, South Eastern Nigeria. It is bounded by Abayi village, Osisioma town and Umuimo Villages¹⁴. The indigenous dwellers of the community are Igbo's whose occupation is farming. They produce yam, cassava, maize, palm oil and plantain. They are Christians of different denomination but dominated by the Seventh Day Adventist Church and orthodox churches. It has 3 wards, one primary health centre and a central market. This community is located in Aba.

OsisiomaNgwa is a city found in Abia State, Nigeria. It is located 5.11 Latitude and 7.37 Longitude, and it is situated at elevation 64 meters above sea level¹⁰. The LGA has an area of 198 Square Kilometer and a population of 220,662 as per 2006 census data of Nigeria projected to 289,100 at 2.7% in 2016 annual growth rate. Its residents are made up of civil servants, business people and farmers.¹⁵

The town is made up of a tertiary health facility- Abia State University Teaching Hospital, with several Government and private owned primary, secondary, and tertiary institutions including a few banks, churches, industries, hotels, hospitals, etc. Notable among these are: Abayiumuocham girls secondary school, Ngwa high school, St. Bridget primary and secondary school, Living word primary and secondary school, Early learning/Dority Int'l secondary school, Amazing grace academy, Abia State university primary school, Abia

State Polytechnic, Covenant polytechnic, Rhema university, Udeagbala holdings limited, Sumez gas plant, The Adventist church, Living faith church, Redeemed Christian church of God, Dominion city church, Believer love world, Victoria city hotel, Binez hotel, Benidon hotel, Firapur hotel, Simeon hospital, Living word hospital, Embassy hospital, First bank PLC, Union bank, May fresh bank, Keystone bank, United Bank of Africa, etc. The notable markets in this town include: Ariaria, Ahiaohuru, Cemetary, Ahiankwo, Ahiaumungasi, ahiaafule.

The inhabitants of this city are mainly the Ngwas, which constitute the largest and most populous sub-ethnicity or clan in southeastern Nigeria. Majority of the residents are traders while the minority engage in vocations such as civil service, commercial bus driving, tailoring, shoe making, farming, patent medicine, etc. The religion mainly practiced by these people is Christianity.

Abia State is one of the eastern states in Nigeria created on the 27th of August 1991 from the Old Imo State. Its administrative capital is located in Umuahia. Abia State is bordered northwards by Anambra, Enugu, and Ebonyi states, to the west by Imo State, to the east and southeast by Akwa Ibom and Cross Rivers States and to the south by Rivers State. The tribe is the Igbo tribe and the most common spoken language is the Igbo language followed by English

STUDY DESIGN

This study is a cross-section on the level of knowledge of childhood immunization among mothers in Umueze Community in OsisiomaNgwa Local Government Area of Abia State. The study adopted a survey design and this is considered suitable for the study because the study is intended to investigate into an existing phenomenon and data will be collected from only a fraction considered to be a representative of a population.

STUDY POPULATION

This comprised of all women of Umueze Autonomous Community in OsisiomaNgwa Local Government Area of Abia State of child bearing age irrespective of their children's age.

INCLUSIVE CRITERIA

Women from Umueze Autonomous Community of child bearing age who have children and women who gave their consent for the study.

EXCLUSIVE CRITERIA

Women who are not from Umueze Autonomous Community, those who are not up to the child bearing age and those who did not give consent for the study.

SAMPLE SIZE DETERMINATION

The sample size will be determined using the formula¹⁶

$$N = \frac{Z^2 \cdot P \cdot Q}{D^2}$$

Where,

N = Minimum sample size

Z = Standard normal deviate, usually set at 1.96 which corresponds in 95% confidence level.

P = Proportion with deserved characteristics = 50%

Q = I.P (Proportion in the target population not having the deserved characteristics)

D = Degree of accuracy usually set at 0.05

$$N = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2}$$

$$N = \frac{384.16 \times 0.25}{0.0025}$$

$$N = 0.96004 - 384.16 \\ = 0.025$$

Therefore, minimum sample size (N) = 384

Adjustment for non-response, $N_s = N/\text{response rate}$

Assumed response rate = 82% i.e. $0.82 \ 384/.82 = 469.38$

$$N_s = 384/.82 \\ = 469.67 \\ = 470$$

Therefore, sample size used = 470

SAMPLING TECHNIQUES

The simple random technique was used. Out of 17 Local Government in Abia State, OsisiomaNgwa Local Government was selected by a simple method of balloting. The questionnaire was administered consecutively to consenting women till the sample size was reached.

STUDY INSTRUMENT

Self /Interviewer administered questionnaires were used for the study.

The instruments used in this study are paper, pen and participants

DATA COLLECTION METHOD

Data was collected using self/interviewer administered questionnaire which were given to all the eligible mothers of Umueze Autonomous Community within the study period.

DATA MANAGEMENT

MEASUREMENT OF VARIABLES

Variables where duly measured.

STATISTICAL ANALYSIS

Data collected were entered into and analyzed using Statistical Package for Social Science [SPSS], Version 26.0. Continuous/numerical variables were summarized using mean and standard deviation, categorical variables were summarized using frequency and proportions. Chi-Square test was used to test the relationship between sociodemographic variables of the participants and level of practice on childhood immunization at statistically significant level of p-value of < 0.05

ETHICAL CONSIDERATIONS

Ethical approval for this work was sought for and obtained from the ethics and research committee of Abia State University Teaching Hospital, Aba. Permission was obtained from the Umunze community Abayi, OsisiomaNgwa and informed consent was obtained from the participants. All information received from our respondents was handled with utmost confidentiality.

LIMITATIONS

During the interview, some women were not willing to participate in the study, gathering of participants, and collecting their responses were of great challenges, but we ensured we had a successful field work by following up the women and adequate explanations where made.

III. Result

A total of 470 questionnaires were distributed to the study participants but 430 participants (with children aged below 2 years) returned their questionnaires giving 92% recovery which was the response rate and the findings are presented below in tables. Mean age of the respondents was 34 ± 8.246 .

Table 1: socio-demographic characteristics of children

Variables		Frequency	Percentage (%)
Child's age in years	<1	288	65.1
	≥1 – 2	142	34.9
Total		430	100.0
Gender	Male	208	48.4
	Female	222	51.6
Total		430	100.0
Birth weight	≥2.5Kg	320	74.4
	<2.5Kg	110	25.6
Total		430	100.0
Immunization completeness and compliance	Fully immunized	388	90.3
	Not fully immunized	42	9.7
Total		430	100.0

Table 1 shows children's age in years, 288 (65.15) of the children were below 1 year while 142 (34.9%) were ≥1 – 2 years, 208 (48.4%) were male while 222 (51.6%) were female, 320 (74.4%) had birth weight of ≥2.5Kg while 110 (25.6%) had birth weight < 2.5Kg, 388 (90.3%) children were fully immunized while 42 (9.7%) children were not fully immunized.

Table 2: Socio-demographic characteristics

Variables		Frequency	Percentage (%)
Age group	<21	8	2.0
	21 – 27	107	24.9
	28 – 35	137	31.9
	36 – 43	76	17.6
	>44	102	23.6
Total		430	100.0
Marital status	Single	7	1.6
	Married	378	87.9
	Divorced	16	3.7
	Widowed	20	4.7
	Separated	9	2.1
Total		430	100.0
Occupation of the respondents	House wife	59	13.7
	Teaching	78	18.1
	Civil servant	43	10.0

	Farming	196	45.6
	Trading	54	12.6
Total		430	100.0
Religion	Christianity	361	84.0
	Islam	40	9.3
	Traditional religion	16	3.7
	Others	13	3.0
Total		430	100.0
Highest level of education	None	18	4.2
	Primary	206	47.9
	Secondary	75	17.4
	Tertiary	141	32.7
Total		430	100.0
Spouse's level of education	None	35	8.1
	Primary	209	48.6
	Secondary	66	15.3
	Tertiary	120	28.0
Total		430	100.0
Spouse's occupation	Farming	177	41.2
	Teaching	44	10.2
	Civil servants	113	26.3
	Trading	74	17.2
	Others	22	5.1
Total		430	100.0
Monthly family income	#50,000.00	220	51.2
	#51,000 - #60,000	60	14.0
	#61,000 - #70,000	58	13.5
	#71,000 - #80,000	57	13.3
	#81,000 - #90,000	35	8.0
Total		430	100.0
Number of living children	1	33	7.7
	2	71	16.5
	3	200	46.5
	4	99	23.0
	>4	27	6.3
Total		430	100.0

In table 2 of socio-demographic characteristics: Age group of the respondents shows that women of less than 21 years constituted 8 (2.0%). Women of age group from 21 to 27 years were 107 (24.9%), women of age group from 28 to 35 years were 137 (31.9%) and they were the highest in number, those from 36 to 43 years were 76 (17.6%) and those above 44 were 102 (23.6%).

Marital status of the participating women shows that single women were 7 (1.6%), These 7 women did not marry but had children on their own without attachment to any man. Married women 378 (87.9%) which was the highest, divorced women were 16 (3.7%) are women who were married but legally separated, widowed women were 20 (4.7%) were women who lost their spouses by death and separated women were 9 (2.1%) and are women who are not living with their spouses but not legally separated which was the lowest.

Occupation of the respondents showed the women who were housewife were 59 (13.7%), women who were teachers were 78 (18.1%), Women who were civil servants were 43 (10%) which were the lowest, women who were farmers were 196 (45.6%) which was the highest. And trading 54 (12.6%).

Religion of the respondents shows that women who were Christians were 361 (84.0%) which was the highest, Islam was 40 (9.3%), traditional religion was 16 (3.7) and women of other religion were 13 (3.0%) which was the lowest.

Highest level of education attained by the women shows 18 had none which was the lowest, women with primary education were 209 (47.9%) which was the highest, women with secondary education were 66 (15.3%), tertiary were 120 (28%).

Spouse's level of education attained shows 35 spouses had none, spouses with primary education were 209 (48.6%) which was the highest, spouses with secondary education were 66 (15.3%) and tertiary education 120 (28.0%).

Spouses' occupation shows that spouses who were farmers were 177 (41.2%) which was the highest, spouses who were teachers were 44 (10.2%), those who civil servants were 113 (26.3%), those who were traders were 74 (17.2%), those with other occupation were 22 (5.1%) which was the lowest.

On monthly family income, women with #50,000.00 were 220 (51.2%) which was the highest, women with #51,000.00 – 60,000.00 were 60 (14%), those with #61,000.00 – 70,000.00 were 58 (13.5%), those with #71,000.00 – 80,000.00 were 57 (13.3%), those with #81,000.00 – 90,000.00 were 35 (8%) which was the lowest.

On the number of children the participants had, women who had a child were 33 (7.7%), those who had two children were 71 (16.5%), those who had three children were 200 (46.5%) which was the highest, those with four children were 99 (23%) and those with more than four children were 27 (6.3%) which was the lowest.

Result:

Factors affecting the uptake of childhood immunization among the mothers

Table 3: Causes lack of child immunization

Variables		Frequency	Percentage (%)
Causes lack of child immunization?	Lack of immunization centre	330	76.7
	Child's refusal	17	4.0
	Poor health infrastructure.	46	10.7
	Lack of good roads	37	8.6
Total		430	100.0

Table 3 shows the possible causes of child immunization which include lack of immunization centre 330 (76.7%) which is major cause from the respondents followed by Child's refusal of immunization services, 17 (4.0%), Poor health infrastructure 46 (10.7%) and lack of good motorable roads 37 (8.6%)

Table 4: Time required to get to the immunization centre.

Variable		Frequency	Percentage (%)
Time required to get to the immunization centre.	Few minutes	132	30.7
	Some hours	267	62.1
	One day	31	7.2
Total		430	100.0

Table 4 shows mothers' responses on required time for bringing their children to health for immunization, Highest response was on hours 267 (55.7%), followed by few minutes 132 (30.7%) and least response was one day 31 (7.2%).

Table 5: Cost of immunization at the health centre

Variables		Frequency	Percentage (%)
Cost of immunization at the health centre	Free	335	77.9
	Not costly	45	10.5
	Costly and affordable	30	7.0
	Costly and not affordable	12	1.7
	Five hundred naira	8	1.9
Total		430	100.0

Table 5 shows the responses of the Mothers on cost of immunization, 335 (77.9%) which is the highest responded that immunization was free followed not costly 45 (10.5%) and the least response was Five hundred Naira only 8 (1.9%).

Table 6: Lack of trust by mothers for immunization services

Variable		Frequency	Percentage (%)
Lack of trust by mothers for immunization services	Unavailability of vaccines	98	22.8
	Lack of confidence on the safety and quality of vaccines	100	23.3
	Fear of the use of expired drugs	112	26.0
	Adverse effects following immunization	120	27.9
Total		430	100.0

Table 6: shows reasons for lack of trust by mothers for immunization services, adverse effects following immunization was 120 (27.9%) which was the highest response followed by the fear of the use of expired drugs, next was lack of confidence on safety and quality of vaccines 100 (23.3%) followed by unavailability of vaccines 98 (22.8%).

Table 7: Healthcare workers' role to immunization services and nursing mothers

Variables		Frequency	Percentage (%)
Healthcare workers' role to immunization services and nursing mothers	Delays in attending to mothers	50	11.7
	Use of insulting words on mothers and high staff turnover	68	15.8
	Reuse of injection needles	61	14.2
		53	12.3

	unavailability of safe needles and syringes	56	13.0
	Unfriendliness of healthcare workers	80	18.6
	lower number of trained manpower	62	14.4
Total		430	100.0

Table 7 shows healthcare workers’ role to immunization services and nursing mothers and various reasons and their proportions hold against hospital services and healthcare providers as a cause for poor uptake of childhood immunization services.

Table 8: Mothers position on immunization services:

Variables		Frequency	Percentage (%)
Mothers position on immunization services	Rural residence	55	12.8
	wealth status	57	13.3
	child sex and age	60	14.0
	long-distance to a health facility	65	15.1
	mothers’ perception to the accessibility of vaccines	70	16.3
	inadequate awareness of mothers/caregivers	73	17.0
	place of delivery	50	11.5
Total		430	100.0

Table 8 shows reasons which may affect mothers on the uptake of childhood immunization, inadequate awareness, that ignorance of mothers and caregivers 73 (17%), followed by Mother’s perception to the accessibility of vaccine 70 (16.3%), next is long-distance to a health facility 65 (15.1%) followed child sex and age 60 (14.0%), next is the wealth status of mothers 57 (13.3%) followed by mothers in rural residence 55 (12.8%) and place of delivery by mothers 50 (11.5%).

Table 9: Level of Knowledge of childhood immunization

Variables		Frequency	Percentage (%)
Level of knowledge	Good knowledge	355	78.9
	Poor knowledge	95	21.1
Total		450	100.0

Table 9 showed that 355 (78.9%) of mothers had good knowledge of immunization, greater number of the women had good knowledge, which is 78.9%, while only 21.1% had poor knowledge on childhood immunization. The reason may be that they are in urban area with many educational institutions.

Table 10: The relationship between the socio-demographic variables and level of knowledge

Variables		Odds ratio	df	Sign	Exp	95% C.I for EXP (B)	
						Lower	Upper
The relationship between the socio-demographic variables and level of knowledge	Maternal level of education ≥ Primary = None	5.210 1	1	0.002	18.210	3.024	87.531
	Marital status Married Unmarried	4.223 1	1	0.03	24.100	1.264	451.561
	Spouse’s level of education ≥ Primary = None	2.309 1	1	0.012	8.236	1.043	63.045
	Mothers’ age ≤ 35 >36	2.415 1	1	.001	11.184	2.025	61.784

Table 9 shows the odds ratio of mother (95% CI: 3.024 – 87.531, p = 0.002) with educational level ≥ Primary were five times more likely to be knowledgeable to childhood immunization than mothers with none, which is statistically significant.

The adjusted odds ratio of married mothers (mothers living with their spouses) were 4 times more likely to be knowledgeable than unmarried mothers (mothers living without their spouses) (95% CL: 1.264 – 451.561), P = 0.03, which is statistically significant. The adjusted odds ratio of Spouse’s level of education level ≥ Primary

(95% CI; 1.043 – 63.045 $p = 0.012$) were two times more knowledgeable to childhood immunization than Spouse's level of education level of none (95% CI 1.043 – 63.045), $p = 0.012$ but this was statistically significant. The adjusted odds ratio of mothers ≤ 35 years (95% CI; 2.025 – 61.784 $p = 0.001$) were 2 times more likely to be knowledgeable to childhood immunization than mothers with age >36 years which is statistically significant.

IV. Discussion

Four hundred and seventy study participants enrolled in the study with response rate 92%. This is lower in a study by Fisha Alebel GebreEyesus et al in Ethiopia¹⁷ where they recorded 100% response rate. The immunization incompleteness rate observed in this study was (9.7%) which was higher than the Abia State average of (5 %) and lower than Nigeria average rate of (20.9%) In a study carried out in Barah Iraq where Jhood A S & Molan¹⁸ reported immunization incompleteness rate of (29.8%) which is higher than our study rate. Theirs is comparable to the rate (24.2%) observed in Jeddah, Saudi Arabia¹⁹ which is also higher than our study rate. A study conducted in Mosul-Iraq²⁰ revealed that the percentage of children with partial immunization was (54.2%) in 2017. In a rural community of Bangladesh,²¹ the rate of complete immunization was (90.87%) and their rate is comparable our study rate of (90.3%). The similarity may be due to similar health services system, vaccine series and immunization schedule. The highest proportion of the participants 137 (31.9%) were in the age group of 28 – 35, with mean age of 34 ± 8.246 . and that of Ethiopia study recorded highest proportion of respondent 128 (30.6%) in the age group of 25 - 29 with a median age of 28.0. and the difference may be due to younger age population of the study in Ethiopia¹⁷. All the participants were mothers with married mothers constituting the highest 378 (87.9%) and this is similar with study in Ethiopia 362 (86.6%) were married.¹⁷ majority of the participants were farmers 196 (45.6%), Christians constituted the majority 361 (84.0%), participants with primary education were in majority 206 (47.9%). Majority of the participants 220 (51.2%) had monthly income of #50,000.00 and below.

In our study, it discovered that lack of immunization centre, child refusal to immunization, lack of good roads and poor health infrastructure were possible causes of poor immunization uptake, Time required to get to the immunization was another to uptake of childhood immunization in our study mothers spend varying time from minutes to hours to days and week to get to immunization centre. Some mothers still believed that money is being paid to get immunization, however majority of mothers 335 (77.9%) believe that the services are free, those who believed that money is required abstain from immunization services and therefore leads to reduction in uptake. Eisenberg & Power, 2000 observed that the free immunization policy in the country may not be enough to ensure equitable access and use of these services as there are other salient factors that may limit the use of the seemingly free services²² This view was also held by Adeyinka et al (2009)²³; Diaz et al., 2013;²⁴ Hjortsberg, (2003)²⁵ when they deposited that even where services are offered free, there are other important barriers and indirect costs, such as travel times and transportation when the nearest public health facility providing these services is not within a short distance. In addition, Adeyinka et al., 2009 reported that private facilities, where available, typically charge a fee for services, thus posing a financial barrier to women who may, otherwise, find them more conveniently located.²³

Lack of trust by mothers for immunization services resulting from fear of the use of expired drugs, adverse effects following immunization, unavailability of vaccines and lack of confidence on the safety and quality of vaccine leads to reduction in uptake. This is similar with a study by Ophori and colleagues (2014) who reported that mistrust of vaccinations was linked to poor utilization of immunization services, they further opined that devastating effect of the mistrust of vaccinations is an issue that needs to be addressed. Contrary to our expectation, they reported that there was no association between female literacy at the state level and child immunization²⁶

Healthcare workers' roles in immunization services by delays in attending to mothers, use of insulting working on mothers, frequent high staff turnover, reuse of injection needles, unfriendliness of healthcare workers to mothers and lower number of trained manpower were varying factors that affect reduction in immunization uptake.

Mothers' positions on immunization services such as those who live in the rural areas, wealth status of the mother, child's sex and age of mothers, Long-distance to health facilities, ignorance, inadequate awareness of mothers and mothers' perception to the accessibility of vaccines were likely factors that results in reduction of childhood immunization.

Increase level of knowledge of childhood immunization increase uptake of immunization, in our study, participants had good level of knowledge of 355 (78.9%). It is also higher than in study carried out in Ethiopia¹⁷, Addis Ababa (55%),²⁷ Egypt (31.2%),²⁸ Alma Dinah, Saudi Arabia (50.5%),²⁹ south India (50.43%),³⁰ Kerala, India (39.5%)³¹ and Lithuania (36.3%)³² Nigeria, Lagos state (72%).³³ Nepal (72.7%)³⁴

The adjusted odds ratio of mother (95% CI: 3.024 – 87.531, $p=0.002$, with educational level \geq Primary were five time more likely to be knowledgeable to childhood immunization than mothers with none, which is

statistically significant. This is similar with a study in Ethiopia¹⁷ where literate parents who attended primary and secondary and higher education were about two times (AOR=2.513, 95% CI: 1.526 – 4.136), two times (AOR=2.546, 95% CI: 1.159 – 5.9590) and twelve times (AOR=11.988, 95% CI: 4.470 – 32.147), respectively, more knowledgeable than illiterate respondents.

The adjusted odds ratio of married mothers (mothers living with their spouses) were 4 times more likely to be knowledgeable than unmarried mothers (mothers living without their spouses) (95% CL: 1.264 – 451.561), $P = 0.03$, which is statistically significant. The adjusted odds ratio of Spouse's level of education level \geq Primary (95% CI; 1.043 – 63.045 $p = 0.012$) were two times more knowledgeable to childhood immunization than Spouse's level of education level of none (95% CI 1.043 – 63.045), $p = 0.012$ and this was statistically significant. The adjusted odds ratio of mothers ≤ 35 years (95% CI; 2.025 – 61.784 $p = 0.001$) were 2 times more likely to be knowledgeable to childhood immunization than mothers with age >36 years which is statistically significant.

V. Conclusion

Childhood Immunization is an inevitable practice that every family should be involved in, and mothers should always see to the completion of their children's immunization, in order to avert impending dangers which can result from it. In this study, there were so many positive and negative factors that affect the uptake of childhood immunization.

VI. Recommendations

There should be an extensive awareness campaign in primary health care centers towards childhood immunization. Involvement of mothers who were already oriented and experienced in immunization activities should be encouraged in the awareness programs. Massive public health education must be intensified through the provision of information, education, and communication materials to enhance the uptake, provision of good access roads, adequately built and furnished health facility, reduction of negative factors and improvement of positive factors affecting childhood immunization, in order to encourage childhood uptake of immunization.

Conflicts of Interest

I declare that no conflicts of interest regarding the publication of this paper.

Reference

- [1]. GIVS. Global immunization vision and strategy 2006-2015. Geneva: WHO/UNICEF; 2005. Cited in [http://whqlibdoc.who.int/hq/2005/WHO_IVB_05.05 .pdf](http://whqlibdoc.who.int/hq/2005/WHO_IVB_05.05.pdf)[accessed on 23 April 2008].
- [2]. Wright PF. Global immunization: a medial perspective. *Soc Sci Med* 1995; 14: 609-16.
- [3]. World Health Organization Data. October 2012. Available from: http://www.who.int/immunization_monitoring_Data.pdf. [accessed on 15th January 2011].
- [4]. Expanded Programme on Immunization Research project. *Wkly Epidemiol Rec* 1998; 73: 285-8.
- [5]. : Comfort Z. Olorunsaiye & Hannah Degge (2016) Variations in the Uptake of Routine Immunization in Nigeria: Examining Determinants of Inequitable Access, *Global Health Communication*, 2:1, 19-29, DOI: 10.1080/23762004.2016.1206780 To link to this article: <http://dx.doi.org/10.1080/23762004.2016.1206780>
- [6]. Tagbo BN, Uleanya ND, Nwokoye IC, Eze JC, Omotowo IB. Mothers' knowledge, perception and practice of childhood immunization in Enugu. *Nigerian J Paediatrics*. 2012;39(3):90-6.
- [7]. Adebayo BE, Oladokun RE, Akinbami FO. Immunization coverage in a rural community in South Western Nigeria. *J Vaccin*. 2012;3(4):1-6.
- [8]. Yu H, Luo S, Lou L, Zhang B, Li Q. Knowledge, attitude and practice on immunization among migrant mothers: a questionnaire development and field application. *Int J Vaccine Immunization*. 2016;2(1). doi:10.16966/2470-9948.106
- [9]. Yenit MK, Assegid S, Abrha H. Factors associated with incomplete childhood vaccination among children 12–23 months of age in Machakel Woreda, East Gojjam Zone: a case-control Study. *J Pregnancy and Child Health*. 2015;2(4). doi:10.4172/2376-127X.1000180
- [10]. Animaw W, Taye W, Merdekios B, Tilahun M, Ayele G. Expanded program of immunization coverage and associated factors among children age 12–23 months in Arba Minch town and Zuria District, Southern Ethiopia, 2013. *BMC Public Health*. 2014;14(1):464. doi:10.1186/1471-2458-14-464
- [11]. Ebrahim T, Salgado W. Childhood immunization coverage in tehulederie district, northeast of Ethiopia: a Community-Based Cross-Sectional Study. *Int J Curr Res*. 2015;7(09):20234–20240.
- [12]. World Health Organization. Immunization Schedule in Nigeria 2010. Available from childsurvivalnetwork.info/resources/immunizations+factsheet.pdf. [accessed on 20th January 2022]
- [13]. World Health Organization Geneva. Behavioral factors in Immunization. Available from : www.who.int/entity/mental_health/evidence/learningmodules/en/-22k. [accessed on 15th January 2022]
- [14]. Federal Republic of Nigeria 1992 Boundary Official Gazette, No 2 Abuja- 2nd February 1992 vol. 96 Pg B20 -21
- [15]. Federal Republic of Nigeria 2006 Population Census Official Gazette, No 2 Abuja- 2nd February 2009 vol. 96 Pg B20 -21 projected up to 2016 (inclusive Osisioma Ngwa Local Government Area)
- [16]. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? *Indian Journal of Psychological Medicine*. 2013;35(2):121
- [17]. Fisha Alebel GebreEyesus et al; Knowledge, Attitude, and Practices of Parents About Immunization of Infants and Its Associated Factors in Wadla Woreda, North East Ethiopia, 2021, *African Journal Online*, volume 2021:12 pages 223 – 238

- [18]. Jhood A.S. Molan (2020). Factors influencing compliance with immunization regimen among mothers in Basrah, Iraq. *The Medical Journal of Basrah University Iraq* 38(1):
- [19]. 16. Banjari M, Alamri A, Algarni A, Abualjadayel MH, Alshardi YS, Alahmadi TS. How often do children receive their vaccinations late, and why?. *Saudi Med J.* 2018; 39(4):347-353.
- [20]. 17. Al-lela O, Bahari M, Baderden S, Basher A, Hamoodi H. Factors Affecting on Immunization Compliance: Iraq. *Journal of Pharmacy Practice and Community Medicine.* 2017; 3 (4): 246-253.
- [21]. 19. Salam M, Uddin S, Khan F, Mazumdar PK, Huq E, Yousuf R, et al. Maternal awareness on under-5 child immunization in a rural community of Bangladesh. *International medical journal.* 2013; 20(6):681-684. 20. Lakew Y, Bekele A
- [22]. 2218. Eisenberg, J. M., & Power, E. J. (2000). Transforming insurance coverage into quality health care: Voltage drops from potential to delivered quality. *Journal of the American Medical Association,* 284(16), 2100–2107. doi:10.1001/jama.284.16.2100
- [23]. 2319. Adeyinka, D., Oladimeji, O., Adeyinka, F., & Aimakhu, C. (2009). Uptake of childhood immunization among mothers of under five in south western Nigeria. *The Internet Journal of Epidemiology,* 7(2), 1–15.
- [24]. 2420. Diaz, T., George, A. S., Rao, S. R., Bangura, P. S., Baimba, J. B., McMahon, S. A., & Kabano, A. (2013). Healthcare seeking for diarrhoea, malaria, and pneumonia among children in four poor rural districts in Sierra Leone in the context of free health care: Results of a cross-sectional survey. *BMC Public Health,* 13(1), 157–168. doi:10.1186/1471-2458-13-157.
- [25]. 2521. Hjortsberg, C. (2003). Why do the sick not utilise health care? The case of Zambia. *Health Economics,* 12(9), 755–770. doi:10.1002/hec.839
- [26]. 2622. Ophori, E. A., Tula, M. Y., Azih, A. V., Okojie, R., & Ikpo, P. E. (2014). Current trends of immunization in Nigeria: Prospects and challenges. *Tropical Medicine and Health,* 42(2), 67–75. doi:10.2149/tmh.2013-13
- [27]. Birhanu S, Anteneh A, Kibie Y, Jejaw A. Knowledge, attitude and practice of mothers towards immunization of infants in health centres at Addis Ababa, Ethiopia. *Am J Health Res.* 2016;4(1):6–17.
- [28]. Ramadan HA, Soliman SM, El-kader RGA. Knowledge, attitude and practice of mothers toward children's obligatory vaccination. *IOSR-JNHS.* 2016;5(4):22–28. doi:10.9790/1959-0504022228
- [29]. Lharbi KM. A parents' knowledge, attitude and practice towards childhood vaccination, Al Madinah, Saudi Arabia. *Neonat Pediatr Med.* 2017;3: 126.
- [30]. Sankar BK, Rameh S, Sunny A. A study to assess and correlate the knowledge, attitude, and practices of vaccination among mothers with educational status in a teaching hospital in South India. *Prim Health Care.* 2018;8(01):290. doi:10.4172/2167-1079.1000290
- [31]. Aslami AN, Athira TK, Salim AK, et al. Assessment of knowledge about immunization of under five children among mothers attending outpatient department of pediatrics in a tertiary care hospital in Kollam, Kerala. *Int J Evid Based Healthc.* 2015;2(29):4191–4200. doi:10.18410/jebmh/2015/595
- [32]. Šeškute M, Tamulevičiene E, Levine G. Knowledge, and attitudes of postpartum mothers towards immunization of their children in a Lithuanian Tertiary Teaching Hospital. *Medicine.* 2018;54(2). doi:10.3390/medicina54010002
- [33]. Adefolalu OA, Kanma-Okafor OJ, Balogun M. Maternal knowledge, attitude, and compliance regarding immunization of under-five children in primary health care centers in Ikorodu Local Government Area, Lagos State. *J Clin Sci.* 2019;16(1):7–14. doi:10.4103/jcls.jcls_55_18
- [34]. Devkota S, Simkhada P, vanTeijlingen E, Rai LD. Parents' knowledge and practices to childhood immunisation in Nepal: implications for health policy. *Health Sci J.* 2013;7(4)

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