

VACCINATION STATUS OF CHILDREN IN UMUEBLE COMMUNITY IN RIVERS STATE, SOUTHERN NIGERIA AND FACTORS INFLUENCING IT

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ABSTRACT

Background; Vaccination is one of the most important cost effective interventions of our time, it has saved millions of lives of under-five children globally and brought about a reduction in the incidence of vaccine preventable diseases all over the world but especially in sub-Saharan Africa and also in Nigeria. Despite all of these, vaccination of children has remained low especially amongst the children that need it most. **Aim;** The aim of this study was to determine the vaccination status of children at Umuebele community and factors influencing it. **Methods;** This was a descriptive community-based study carried out over a period of two months June-July 2019. Data was collected using a structured interviewer administered questionnaire which was designed by researchers, consisting of three sections. Information obtained included socio-demographic characteristics, vaccination status and characteristics, reasons for not completing immunisation, place of immunisation **Results;** There were 438 respondents, mean age 31.96 ±5.626, most were aged 26-30years 150(34.2%), 437(99.8%) of the respondents were married, only 1(.2%) had no formal education, while 340(77.6%) were farmers. 270(61.6%) of the children were fully vaccinated. Twenty (4.6%) of the children were not vaccinated at all. 391 (89.3%) of the children received their vaccination at the health center. 8(1.8%) of the respondents did not own a vaccination card while BCG scar could not be sighted in 73(16.7%) of the children. Twenty (11.9%) of the respondents did not vaccinate their wards because they forbid vaccination, with PCV3 being the least received vaccine 66.9% and BCG was the most received 93.8%. There was a statistically significant relationship between vaccination status and respondents age, education and place of vaccination P=.000,.001 and .000 respectively while sex of the children and marital status did not significantly affect vaccination status P=.447 and P=.375 respectively In conclusions, vaccination status of children at umuebele community is still low, improving universal primary education, and support routine vaccination at the primary health care centers would impact positively on vaccination status and reduce mortality and morbidity from vaccine preventable diseases.

Keywords: Vaccination status, children, community, immunisation

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INTRODUCTION

Vaccination is said to be one of the most beneficial part of health promotion [1] It is among the most profitable intervention for upgrading the health of children that is available to children that reside in difficult to reach and susceptible communities, WHO [2] and lower the incidence of vaccine-preventable illnesses by

over 95% for each paediatric vaccine endorsed for regular use prior to 1990. Gust et al [3] Immunisation is considered as one of the most important, if coverage advances, of saving the lives of an added 1.5 million children every year WHO [2] Vaccines can prevent illnesses in more children than most strategies Almost one-

third of mortalities among children less than five years are avoidable by vaccines WHO [2] The world health organization (WHO) initiated the Expanded program on immunisation (EPI) in 1974 with the aim of vaccinating every child in the globe at a time when in developing countries as low as less than 5% of children were being vaccinated globally. Miller et al [4] Over a period of thirty years immunisation was increased from 5% to 30% globally among the world's children with children in the developed world benefiting more Mapatano et al. [5]. The operation of the EPI has already been shown to be a huge accomplishment globally. This is evidenced by the significant improvement in child immunisation coverage and the eradication of poliomyelitis in many countries including Bangladesh Mik S et al. [6] Bangladesh has witnessed remarkable progresses in increasing immunisation coverage and a noteworthy contribution to the decrease of childhood morbidity, mortality and also maintaining its polio-free status EPI Bangladesh 2017 [6] Immunisation currently predicts a projected two to three million deaths annually, in all age groups from vaccine preventable diseases (VPD's), also immunisation contributes a lot to a given nation by reducing the ill health from infectious diseases such as poliomyelitis .WHO 2013[7] Despite the above children are dying each twenty seconds that passes from vaccine preventable disease UNICEF 2018 [8] Globally nine million children die from VPD and 4.4 million of these are children from sub-saharan Africa [9] Three hundred and sixty-seven children die daily from measles despite the presence of a harmless effective and cheap vaccine that can prevent measles which is one of the diseases covered by the EPI [10] In Nigeria, EPI program was launched in 1978 by WHO and Unicef with the goal of controlling six killer diseases of children polio, measles, tuberculosis, diphtheria, tetanus and pertussis. Endurance et al [11] High vaccination coverage is usually related

to reduction in levels of illnesses among the people in a particular community. As such a high vaccination coverage is a vital goal in all programmes concerning child survival in Nigeria. WHO guidelines recommend that children receive a BCG vaccination against tuberculosis, three doses of DPT vaccine to prevent diphtheria, pertussis (whooping cough) and tetanus, three doses of polio vaccine and a vaccination against measles. WHO recommends that children receive all these vaccines before their first birthday and that the vaccinations be recorded on health card given to parents Nigerian NDHS 1999[12] In May 2012, Nigeria started the phased replacement of diphtheria, pertussis and tetanus (DPT) vaccine with the pentavalent vaccine, which contains more antigens (DPT, Haemophilus influenzae type B and hepatitis B) National Primary Health Care Development Agency (NPHCDA), 2012 [13]. Many children in hard to reach rural regions and poor areas of cities in developing countries including Nigeria are not being vaccinated. VPD's contribute to over seventy percent of under-five mortality UNICEF [14] Nigeria like other countries in sub-Saharan Africa is putting policies in place to strengthen its health system so as to achieve adequate routine immunization to decrease the load of VPDs. Factors, such as lack of political will, lack of enthusiasm, illiteracy and ignorance and lack of adequate infrastructure, poor health seeking behavior, poorest households, parents with no access to social media have contributed to the low level of immunisation coverage in Nigeria and other developing countries Russo et al [15] Although vaccination coverage in Nigeria is said to have become better in the last ten years according to the report of NDHS 2018,[16] as percentage of children aged 12-23months who were fully vaccinated moved up from 23% in 2008 to 31% in 2013 and the percentage of children with no vaccination at all declined from 29% in 2008 to 19% in 2018, while these tendency show

advancement, Nigeria still falls below the target for the sustainable development goal 3 of achieving over 90% coverage of all basic vaccinations for children aged 12-23months NDHS 2018 [16] Nigeria has continued to strengthen its routine immunisation and strengthen its focus on polio eradication. Campaigns such as Cerebrospinal meningitis, measles, yellow fever and maternal neonatal tetanus elimination (MNTE) initiatives were introduced which targeted maternal and new born survival. NDHS 2018,[16] In May 2006, Nigeria began to carryout polio vaccination campaigns (Immunisation Plus Days). In 2012 alone, for example, Nigeria directed two national and five subnational polio immunisation campaigns NPHCDA, 2012[13]. Measuring the knowledge and attitudes toward childhood immunisations (KATCI) is a vital step in the direction of understanding the factors that influence vaccine rejection in particular settings. Vonasek et al [17] Policies need to be established to advance vaccine coverage rates aided by the understanding of the relationship between KATCI and actually vaccinating children adequately. Vonasek et al [17] With the current high level of unvaccinated children in Nigeria 19%, NDHS 2018[16] and our low vaccination coverage 31% NDHS 2018[16] for all vaccines, it's important to find out the Vaccination status of children in a rural community like Umuebule as it may be lower than the national value of 31% and also to determine the factors responsible for the low vaccination. The aim of this study therefore is to find out vaccination status of children at Umuebule community in Rivers state, southern Nigeria and to determine factors influencing it.

MATERIALS AND METHODS

This was a community based descriptive cross-sectional study carried out over a period of two

months June-July 2019 at Umuebule community of Etche local government area of Rivers state, Southern Nigeria. There are 16 communities in Etche local government area with an area of 805km² and a population of 249,939 as at population census of 2006 National population commission of Nigeria and National Bureau of statistics [18]. Over 60% of the population are aged 15-64 years old. The people of Umuebule community are mostly farmers and petty traders. The study participants were mothers of under-five children in the community. Study participants were recruited using a cluster sampling technique. The study area was grouped in to four clusters using the four main streets as a frame and numbers 1-4 assigned to each cluster. The cluster where the participants were drawn from was randomly selected by balloting. Data was collected using a structured interviewer administered questionnaire which was designed by researchers, consisting of three sections. Information obtained included socio-demographic characteristics, vaccination status and characteristics, reasons for not vaccinating at all or not completing vaccination, place of vaccination etc. Data collection continued until desired sample size was met, and entered into an excel spread sheet, analysis was done using statistical package for social sciences version 20. The results were presented in tables and simple frequencies. The level of significance was set at P< 0.05 and at 95% confidence interval. The minimum sample size was calculated using the Cochran formula (Cochran 1963) [19]

$$N = Z^2pq/e^2$$

Where N = minimum sample size

$$z = 1.96 \text{ at } 95\% \text{ confidence limits, so that } z^2 = 3.8416$$

p = prevalence of 15.1% of children who had missed immunisation opportunity. (Tagbo & Onwuasigwe ; 2005) [20]

$$= 0.151$$

$$q = 1 - p = 0.849$$

$$e = \text{error margin tolerated at } 5\% = 0.05, \text{ thus } e^2 = 0.0025$$

$$= \frac{3.8416 \times 0.151 \times 0.849}{0.0025} = 196.99$$

With a cluster design effect, a minimum sample size of 393, approximately 438 mothers of under-five children were recruited for the study.

RESULTS

There were 438 respondents, Table 1. shows the demographic characteristics of the respondents, the mean age was 31.96 \pm 5.626 standard deviation, most were aged between 26-30years 150(34.2%), 437(99.8%) of the respondents were married, only 1(.2%) had no formal education, most 394(90%) had secondary education while 340(77.6%) were farmers. Table 2 shows the characteristics of the vaccination status. Two hundred and seventy (61.6%) of the children were fully vaccinated. Twenty (4.6%) of the

children were not vaccinated at all. 391 (89.3%) of the children received their vaccination at the health center. 8(1.8%) of the respondents did not own vaccination card while BCG scar could not be sighted in 73(16.7%) of the children. Twenty (11.9%) of the respondents did not vaccinate their wards because they forbid vaccination. Table 3. Shows the vaccination status of the individual vaccines with PCV3 being the lowest 66.9% and BCG was the highest 93.8% Tables 4-7 show the relationship between sex of the children, level of education of respondents, marital status, place of vaccination, age category of respondents with vaccination status of the child. There was a statistically significant relationship between vaccination status and respondents age, education and place of vaccination $P=$.000,.001 and .000 respectively while sex of the children and marital status did not significantly affect vaccination status $P=$.447 and $P=$.375 respectively.

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS $N=438$

DEMOGRAPHIC CHARACTERISTICS	NUMBER (%)
AGE IN YEARS	
16-20	7(1.6)
21-25	46(10.5)
26-30	150(34.2)
31-35	115(26.3)
36-40	91(20.8)
41-45	24(5.5)
>45	5(1.1)
TOTAL	438(100)
MARRITAL STATUS	
SINGLE	1(.2)
MARRIED	437(99.8)
DIVORCED	0(0)
OTHERS	0(0)
TOTAL	438(100)
EDUCATION	
NO FORMAL	1(.2)
PRIMARY	2(.5)
SECOUNDARY	394(90)
TERTIARY	41(9.4)

TOTAL	438(100)
OCCUPATION	
NURSE	2(.5)
SEAMSTRESS	4(.9)
STUDENT	4(.9)
FARMER	340(77.6)
BUISNESS	62(14.2)
CIVIL SERVANT	15(3.4)
MINDER	1(.2)
UNEMPLOYED	10(2.3)
CHURCH MINISTER	0(0)
TOTAL	438(100)

TABLE 2. VACCINATION CHARACTERISTICS

CHARACTERISTICS	NUMBER (%)
VACCINATION STATUS	
Fully Vaccinated	270(61.6)
Partially Vaccinated	148(33.8)
Not Vaccinated	20(4.6)
Total	438(100)
PLACE OF IMMUNISATION	
NO RECORD	22(5)
GENERAL HOSPITAL	12(2.7)
COTTAGE HOSPITAL	4(.9)
PRIVATE HOSPITAL	3(.7)
MARTERNITY	6(1.4)
HEALTH CENTER	391(89.3)
TOTAL	438(100)
CARD OWNERSHIP	
NON	8(1.8)
YES(SEEN)	414(94.5)
YES (NOT SEEN)	16(2.7)
TOTAL	438(1000)
BCG SCAR SEEN	
NO	73(16.7)
YES	365(83.3)
TOTAL	438(100)
REASON FOR INCOMPLETE OR NO VACCINATION n= 168	
FORBIDS VACCINATION	20(11.9)
NO MONEY	3(1.79)
TRAVELLED	4(2.38)
DID NOT WANT	4(2.38)
OTHERS	137(81.55)
TOTAL	168(100)

TABLE 3. VACCINATION STATUS OF INDIVIDUAL VACCINES

VACCINE	NUMBER (%)
BCG	
No record	4(.9)
Yes	411(93.8)
No	23(5.3)
Total	438(100)
OPV3	
No record	4(.9)
Yes	406(92.7)
No	28(6.4)
Total	438(100)
PENTA 3	
No record	4(.9)
Yes	322(73.5)
No	112(25.6)
Total	438(100)
PCV3	
No record	4(.9)
Yes	293(66.9)
No	141(32.2)
Total	438(100)
MEASLES	
No record	5(1.1)
Yes	395(90.2)
No	38(8.7)
Total	438(100)
YELLOW FEVER	
No record	5(1.1)
Yes	395(90.2)
No	38(8.7)
Total	438(100)
MEASLES BOOSTER	
No record	6(1.4)
Yes	316(72.1)
No	116(28.5)
Total	438(100)

TABLE 4. VACCINATION STATUS AND RESPONDENTS LEVEL OF EDUCATION

IMMUNISATION STATUS	REPODENTS LEVEL OF EDUCATION				
	NONE	PRIMARY	SECONDARY	TERTIARY	TOTAL
FULL	0	1	241	28	270
PARTIAL	0	1	134	13	148
NONE	1	0	19	0	20
TOTAL	1	2	394	41	438

Chi square value 23.486^a p-value .001 Statistically significant

TABLE 5. VACCINATION AND MARITAL STATUS

IMMUNISATION STATUS	MARITAL STATUS		
	YES	NO	TOTAL
FULL	270	0	270
PARTIAL	147	1	148
NONE	20	0	20
TOTAL	437	1	438

Chi square 1.964^a p value .375 not significant

TABLE 6. SEX AND VACCINATION STATUS OF CHILDREN

SEX	FULLY VACCINATED	PARTIALLY VACCINATED	NOT VACCINATED	TOTAL N (%)
MALE	134	71	7	212
FEMALE	136	77	13	226
TOTAL	270	148	20	438

Chi-square 1.612^a P -value .447 not significant

TABLE 7. VACCINATION STATUS AND PLACE OF VACCINATION

VACCINATION STATUS	PLACE OF VACCINATION						total
	no record	cottage	general	private	health center	MATERNITY	
full	1	3	9	2	253	2	270
partial	6	1	1	1	135	4	148
none	15	0	2	0	3	0	20
total	22	4	12	3	391	6	438

Chi square 22.919^a p value .000

TABLE 8. AGE CATEGORY OF MOTHERS/CARE GIVERS AND VACCINATION STATUS

AGE CATEGORY	VACCINATION STATUS			
	FULL	PARTIAL	NONE	TOTAL
16-20	7	0	0	7
21-25	36	5	5	46
26-30	117	27	6	150
31-35	63	48	4	115
36-40	37	51	3	91
41-45	10	13	1	24
≥46	0	4	1	5
TOTAL	270	148	20	438

Chi- Square 72.101^a statistically significant P- value .000

DISCUSSION

The aim of this study was to determine the vaccination status of children at Umuebele community and factors influencing it. The mean age of the respondents was 31.96±5.626 with 34.2% of them being in the age category 26-30years this comparable to the range of 29.4-

30.96 reported by Adefolalu et al[21] in Lagos, Mapatano et al [5]in Kinshasa DRC, and Abdulraheem et al [22] Nasarawa, Nigeria, this studies were all in African region. Majority of the respondents in this study were married 99.8% and only 9.4% had tertiary education, this is

similar to the study done in Lagos by Odia et al [23] where 93.9% of their respondents were married and less than 47.8% of their respondents had postsecondary education. The low level of postsecondary education may be a contributing factor for not seeking vaccination for their children.

Over sixty percent of the children in this study were fully vaccinated this was higher than the report of Al-lela et al in Iraq [24] and Melako et al in Ethiopia [25] where they reported full vaccination rates of 54.2% and 42.2% respectively. Forbidding vaccination 11.9%, travelled 2.38%, did not want 2.38% and no money 1.79%, were reasons why mothers or caregivers in this study did not vaccinate their children or failed to complete it. This differs from the report of Melako et al [25] in Ethiopia where fear of side effects of the vaccines (44.8%) and restrictions by religion and customs where reasons for not vaccinating children in Ethiopia. Also, Melako et al [25] reported forgetting appointment date (41.8%), lacked awareness (34.2%) and absence of health workers at vaccination centers (1.2%) as reasons for not completing vaccination. In Iraq on the other hand two reasons were reported for not completing or failing to vaccinate children and they were primarily, lack of vaccination information among parents or health care workers and secondarily failure of vaccination card or clinical records to provide clear and complete vaccination record. Al-lela et al [24] In this study however, majority of the respondents 94.5% presented their vaccination cards while researchers sighted BCG scar on 83.3% of the children This is much higher than the report of Melako et al [25] in Ethiopia where only 35.2% of the respondents could show their child's vaccination card. Also in Somalia [26] only 18% could show their vaccination card. The importance of the vaccination card cannot be over emphasized as it is necessary for the health

worker to know which vaccination is due on child's visit and for the parent or caregiver to know and check their child's vaccination status Ba'amer A [27]

This study found a statistically significant relationship between vaccination status and respondents age, educational status of respondents and place of vaccination $P=.000, .001$ and $.000$ respectively while marital status and sex of the children did not significantly affect vaccination status $P= .375$ and $P=.447$ respectively. The younger mothers were more likely to vaccinate their children, also we found that none of the mothers with tertiary education had any child that had no vaccination at all. Primary health center was key as a place of vaccinating children. This is similar to the report of Melako et al [25] in Ethiopia where maternal educational status was one of the factors that influenced child's vaccination status positively among others such as antenatal care followup during pregnancy, place of delivery of index child, occupation of the mother. Mothers who delivered at health institutions were more likely to fully vaccinate their children and also those who attended antenatal care. Similarly, Odia et al in Lagos [23] also reported religion $p=0.020$, education= 0.001 , knowledge of childhood immunisation $p=0.018$, attitude towards childhood immunisation $p=0.001$ to significantly affect vaccination of children. Educated women and Christians were said to be more likely to vaccinate their children. In contrast to the findings of this study however Odia et al [23] reported that married women were more likely to vaccinate their children than singles and widows. $P=0.013$. Similar to the finding in this study Melako et al [25] did not find any statistically significant relationship between sex and birth order of children and full vaccination. In some cultures where female children are discriminated against male children are more likely to be vaccinated than females.

Perry et al [28] had reported sex and birth order as influencing vaccination status in Bangladesh. In this study, 93% of the children received BCG vaccination, OPV3 (92.7%), Penta3(73.5%), PCV3(66.9%), Measles (90.2%) Yellow fever(90.2%) and Measles booster(72.1%) This is comparable to the report of Melako et al [25] in Ethiopia where 96.4% of the children in their study received BCG vaccination and over 85% of the children in their study received Penta3 and OPV3. However, their report did not include PCV3 and this study had a lower value of Penta 3 of 73.5% the reason for this is not very clear as most of the other vaccines were above 85% but for PCV which was the lowest 66.9%. The findings in current study is also much higher than what was reported by Mohammed et al in Oromia region [29] and in Somalia [26] where BCG coverage by card only was 40.9% and OPV3 9% this very low value may be as a result of the difference in region and also the fact that they reported only those who possessed vaccination cards while present study reported both those who possessed vaccination cards and those who though could not show their vaccination cards but had a history of vaccination and also had BCG scar.

CONCLUSIONS/ RECOMMENDATIONS

This study found a low full vaccination of children is at Umuebule community, Age of respondents, educational status and place of vaccination positively impacted on child's vaccination status while marital status and sex of child did not impact on vaccination status. PCV3 was the least received vaccine. The health center was where most of the children received their vaccination. We therefore recommend that routine vaccinations at the primary health centers be strengthened along with universal primary education in order to improve on the vaccination status of our children and as such reduce

morbidity and mortality from Vaccine preventable diseases.

CONFLIT OF INTEREST

The Authors declare that there are no conflict of interests in the publication of this article.

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