Original Article

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Cross-sectional Survey on Parental Perception and Attitude on Measles Vaccine: Low Hospital Measles Case Presentation in Rural Area in Enugu, Nigeria

Pathology Section

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ABSTRACT

Introduction: The incidence of measles has spiked in recent times despite the efforts to its eradication using a highly effective measles vaccine. Vaccine coverage and underreporting of cases are the major challenges to this effort.

Aim: This study was designed to assess the parental knowledge of measles, attitude to measles vaccine and practice of case notification in a rural area in Enugu Nigeria.

Materials and Methods: A descriptive cross-sectional study was carried out during a house to house campaign on measles in Ogwuagor (a rural area in Enugu, with frequent cases of measles like symptoms) between June to November 2019. A pre-tested self/interviewer's administered questionnaire was used to assess the knowledge of measles while Parental Attitude on Childhood Vaccine (PACV) questions were adopted and used to assess the attitude of parents to the measles vaccine. The participants were parents of at least one child of above 12 months of age. The findings and scores were analysed using IBM SPSS Statistic software for windows (SPSS statistical software V.21 (IBM Corp. 2019). The age of the respondents was grouped, and the simple mean obtained. The associations of variables; number of children, level of education and last antenatal care with respect to knowledge and attitude were analysed using Chi-square and $p<0.05$ was regarded as statistically significant.

Results: Out of 652 households in the area, 213 were assessed. One hundred and ninety three (90.6%) expressed knowledge above average about measles and measles vaccine. The score was higher among mothers who had at least three children in their household (p=0.518), tertiary education (p=0.706) and their last antenatal care in a hospital (p=0.774). Majority of the participants had good knowledge about symptoms, transmission and prevention of measles. Only about half, 114 (53.5%) knew the complication of measles. All the respondents had a positive attitude to the measles vaccine. Forty seven (22.1%) of the respondents delayed having their child get a measles shot while 31 (14.6) had concern on the efficacy of the vaccine. Forty-eight 22.5% were concerned about the side-effects of the measles vaccine. The delays having their child get a measles shot, concern on the efficacy of the vaccine, and concern about the side-effects of the measles vaccine observed were significant (p=0.0001, 0.0001, 0.0001, respectively) among parents of more than two children.

Conclusion: There was adequate knowledge on measles symptoms, transmission and prevention but poor knowledge of the complication. Their attitudes on the measles vaccine were generally good however, the expression of delays having their child get a measles shot, concern on the efficacy of the vaccine, and concern about the side-effects of the measles vaccine were significant among parents of more than two children. Also, few measles cases were treated in hospital. There is a need to educate parents on the complication of measles and the importance of early hospital presentation of suspected cases for confirmation and prompt management. This will help to prevent complications and community transmission.

Keywords: Belief, Confidence, Coverage, Immunisation, Traditional birth attendants, Uptake

INTRODUCTION

In recent times and in many parts of the world especially among nations with a history of elimination, the burden of measles has increased in worrisome proportion despite the vaccine availability and efficiency [1-4]. There is no doubt on the potency of the vaccine because through vaccination the world had considered the disease as another target for potential eradication until recently [5]. Vaccine coverage and issues about vaccine confidence, and the proper storage of the vaccine are some of the factors contributing to the increasing incidence [2,6].

In 2018, the UK lost the measles elimination status they achieved just a year before [3]. And since then the incidence of the disease has increased exponentially. The reason for this setback has been attributed to incomplete vaccine coverage [7]. Since measles virus is highly contagious, small populations of people who are not immunised are seriously at risk when the virus is introduced from endemic regions. It is becoming difficult to achieve 95% coverage essential for herd immunity because of gradual hesitance on vaccine [8]. This is informed by negative information about vaccines and low/no report of the vaccine preventable diseases. The situation is similar in most other developed countries [4,9].

In Nigeria, poor coverage as a result of difficult to access areas such as rural and crisis-ridden areas have been the major bottleneck [10,11]. Those areas lack a good network of roads and power supply for vaccine storage [12-14]. Health workers through the intervention of the Government are improving entrance and bridging the gap [15,16]. More is expected since the outbreak so far as reported in the first half of 2019 has reached over 700% [17]. Many are still under reported and undiagnosed [18,19]. It is believed that some suspected measles cases are not reported, especially those in the rural area; where it is often managed at home [20,21].

Knowledge about measles has improved among the rural dwellers. Also, is their vaccination practice generally owing to house to house vaccination strategies adopted by many states in Nigeria [22]. There is paucity of data on the issues consigning vaccine belief and confidence which many have reported determine uptake [23,24].

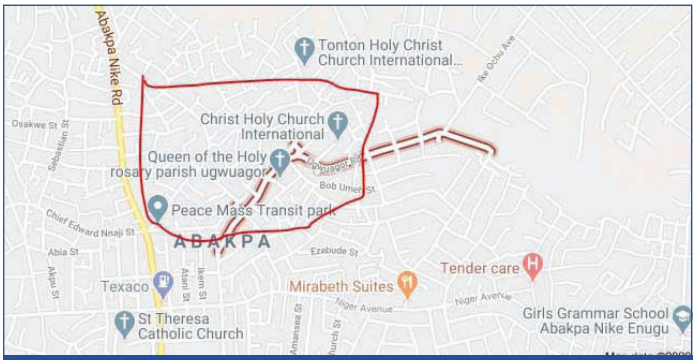
This construct is introduced with intention that it will form the bases to check the changes in attitude about vaccine [23-25]. In Nigeria, there is no aware validated tool to assess the vaccine confidence or hesitance. Even though the confidence is generally reported to be high in the country apart from a few religious and cultural myths, there is a need to have the knowledge of the baseline attitude toward vaccines which will serve as a reference for future evaluation [26].

This study was designed to add to other critical assessment of the knowledge about measles and confidence of measles vaccine among parents, as they are crucial to inform public health policy on measles elimination and formulating a framework approach to further prevent vaccine preventable disease.

MATERIALS AND METHODS

Study design: This study was a descriptive cross-sectional questionnaire based survey conducted at Ogwuagor, a rural area in Abakpa, Enugu State Nigeriat, from June to November 2019. Present study was done to assess the knowledge about measles, vaccine hesitancy and practice of case reporting among the population during a house to house campaign on measles education and prevention. [Table/Fig-1]. An ethical approval was sought for and granted by the local Government Ethical Committee. Also, consent to the study was given by each participant and those that declined consent were not denied the training on measles knowledge and prevention. The area has approximately 652 houses and a population of 2500 with about 45% constituting of children [27]. Ogwuagor was selected among the twelve rural areas in Abakpa by simple random sampling. The targeted respondents were parents of at least one child of above 12 months of age. Parents whose last child was above five years were excluded from the study. Three hundred and eleven households met the criteria and were included. Each household had at least one family unit. A minimum sample size of 151 parents was estimated using Leslie Fischer's formula for sample size calculation with 95% confidence interval, a margin of error of 4.5% and a 91.3% prevalence of non-hospital presentation of measles cases as obtained in similar study [28]. The 311 household were interviewed but only 225 respondents granted consent after explaining the aims and objectives of the study to them.

The study team consisted of the author, immunisation campaign officers and trained research assistants.



[Table/Fig-1]: Ogwuagor, Enugu Nigeria (sourced from google map).

Data collection and management: A 33-item self/assistant administered questionnaire, designed to measure demographics, knowledge about measles, parents' attitude on measles vaccine and practice of measles vaccination was used. The questionnaire comprised of four domain questions. The first domain contained seven questions on the socio-demographical characteristics of the respondents. The second domain was designed to assess the knowledge of measles. The questions (eight in number) in this domain were adapted by the authors from extensive literature review and were also critiqued and corrected by academics who were involved in measles surveillance [28-30]. The questions centered cause, transmission, symptoms, prevention, and complications of measles. The third domain was designed to assess attitude to measles vaccine. The questions (fifteen in number) were adopted from 'Parent Attitudes about Childhood Vaccines' since no available local validated questions on attitude was available [31-33]. The last domain was designed to assess the practice of measles vaccination and hospital presentation of measles cases for confirmation and prompt treatment. The questionnaire was translated to Igbo language and back-translated to ensure that the original meaning of the questions was retained.

Pilot study was done on 34 parents to ensure face validity. This also helped to assess the feasibility of the studies and validate the questionnaire in terms of the logistics of the data collection, the clarity of the questions and the time cost (8-10 minutes) to complete the questionnaire. The questionnaires were analysed by community physician consultants to ensure the validity of the questions. Cronbach's alpha showed the questionnaire to reach acceptable reliability, α=0.78.

Scores on knowledge were calculated by scoring correct response as 1 and scoring incorrect as 0. All 'I don't know' responses were discarded. Total of 12 respondents responded 'I don't know' in either one or more question and they were all removed bringing the total number of valid participants to 213. A scale cut of less than 50% correct responses was regarded less than average, and 50% or more correct responses was regarded as above average.

STATISTICAL ANALYSIS

The findings and scores were analysed using IBM SPSS Statistic software for windows (SPSS statistical software V.21 (IBM Corp. 2019). The age of the respondents was measured using simple means and grouped and other variables were described using simple proportion. The association of the scores with respect to number of children, last antenatal care and level of education were measured using Chi-square.

Scores on the attitude domain were calculated according to 'Parent Attitudes about Childhood Vaccines' survey scoring guide [31-33]. The association of their response to questions; 'have you ever delayed having your child get a shot', 'How concerned are you that your child might have a serious side-effect from a shot' and; 'How concerned are you that a shot might not prevent the disease' with respect to the number of children, last antenatal care and level of education were measured using Chi-square. The p-value <0.05 was regarded as statistically significant.

RESULTS

Characteristics of the participants: All the participants were females with the mean age of 28.79 years SD 5.3. They all had formal education, 68 (31.9%) and 4 (1.9%) of which attained tertiary education and postgraduate education, respectively. Majority of them were married. Twenty two (10.3%) had one child only while 62 (29.1%) had at least four children in their household. The last antenatal care and delivery was attended in a Traditional Birth Attendant (TBA) home in 107 (50.2%) of the participants. Little above half, one hundred and twenty one, 56.8%), were Christian of Roman Catholic denomination. Trading occupation was predominant by 95 (44.6%) followed by house wife with 58 (27.2%) [Table/Fig-2].

Knowledge about measles and measles vaccine: Out of the 213 participants, 193 (90.6%) expressed knowledge above average about measles and measles vaccine [Table/Fig-3]. The score was higher among mothers who had at least three children in their household (p=0.518), tertiary education (p=0.706) and their last antenatal care in a hospital (p=0.774). Almost all the participants, 206 (96.7), knew the symptoms of measles as severe fever and rash but only about half, 114 (53.5%) knew the complication of measles. Although 177 (83.1%) participants knew that it is a childhood killer. Nearly all the respondents, 196 (92.0), knew the contagiousness of

Characteristics	n (%)
Parent age (Years)	
18-29	117 (58.9)
≥30	96 (45.1)
Parent's marital status	
Single	3 (1.4)
Married	209 (98.1)
Divorced	1 (0.5)
Parent education	
No formal education	0 (0)
Primary school	21 (9.9)
Secondary school	120 (56.3)
Tertiary education	68 (31.9)
Masters/PhD	4 (1.9)
Number of children in household	
1	22 (10.3)
2	70 (32.9)
3	59 (27.7)
≥4	62 (29.1)
Religion	
Roman catholic	121 (56.8)
Protestant	76 (35.7)
Muslim	15 (7.0)
Tradition religion	1 (0.5)
Occupation	
Farmer	8 (3.8)
Trader	95 (44.6)
Civil servants	52 (24.4)
House wife	58 (27.2)
Last antenatal care	
Hospital	100 (46.9)
Traditional birth attendants	107 (50.2)
None*	6 (2.3)

[Table/Fig-2]: Characteristics of study participants.
*denotes people who delivered at home

the disease but about half of the participants could tell the etiology. One hundred and ninety-four (91.1%) respondents answered that measles is preventable by vaccine but 59 (27.7%) could not remember the immunisation schedule for measles.

Parent attitudes about childhood vaccines: Generally, 132 (62%) participants had zero hesitance to measles vaccine. None recorded up to hesitant range [Table/Fig-4]. Although, some specific questions are peculiar in the pattern of answers: the question, 'have you ever delayed having your child get a shot'; 47 (22.1%) were in affirmative and they were higher among the respondents who had at least three children (p=0.0001). They were also more among those who attended secondary school and below, and those who attended their last antenatal care in TBA's homes but the differences were not significant. The question 'How concerned are you that your child might have a serious side-effect from a shot'; 31 (14.6) expressed concern. Those expressed concern were significantly more among the respondents with more than three children in their household. They were also more among those who attended secondary school and below, and those who attended their last antenatal care in TBA's homes but the differences were not significant. The third question that attracted hesitant response was; 'How concerned are you that a shot might not prevent the disease'; 48 (22.5%) expressed concern. Those expressed concern were also significantly more among the respondents with more than

Items	Response	n (%)
Measles is a viral infection	Yes	127 (59.6)
	No	86 (40.4)
	Don't know	0 (0)
Measles is a childhood killer	Yes	177 (83.1)
	No	36 (16.9)
	Don't know	0 (0)
Is measles contagious	Yes	196 (92.0)
	No	17 (8.0)
	Don't know	0 (0)
Measles causes severe fever	Yes	206 (96.7)
	No	7 (3.3)
	Don't know	0 (0)
Measles causes rash	Yes	204 (95.8)
	No	9 (4.2)
	Don't know	0 (0)
Pneumonia and unconsciousness are the most severe complications	Yes	114 (53.5)
	No	99 (46.5)
	Don't know	0 (0)
Measles is preventable by measles vaccine	Yes	194 (91.1)
	No	19 (8.9)
	Don't know	0 (0)
Are you aware of the schedule for measles vaccination?	Yes	154 (72.3)
	No	59 (27.7)
	Don't know	0 (0.0)

[Table/Fig-3]: Knowledge of participant about measles and measles vaccination.

Item	Parent response	n (%)
Have you ever delayed having your child get a shot for reasons other than illness or allergy?	Yes	47 (22.1)
	No	166 (77.9)
	Don't know	0 (0)
Have you ever decided not to have your child get a shot for reasons other than illness or allergy?	Yes	0 (0)
	No	213 (100)
	Don't know	0 (0)
If you had another infant today, would you want him/her to get all there commended shots?	Yes	212 (99.5)
	No	0 (0)
	Don't know	1 (0.5)
How sure are you that following the recommended shot schedule is a good idea for your child?	0-5 days	0 (0)
	6-7 days	0 (0)
	8-10 days	213 (100)
Children get more shots than are good for them	Agree	1 (0.5)
	Disagree	212 (99.5)
	Not sure	0 (0)
I believe that many of the illnesses shots prevent are severe.	Agree	213 (0)
	Disagree	0 (0)
	Not sure	0 (0)
It is better for my child to develop immunity by getting sick than to get as hot	Agree	0 (0)
	Disagree	213 (100)
	Not sure	0 (0)
It is better for children to get fewer vaccines at the same time.	Agree	34 (16)
	Disagree	178 (83.6)
	Not sure	1 (0.5)
How concerned are you that your child might have a serious side-effect from a shot?	Concerned	31 (14.6)
	Not Concerned	177 (83.1)
	Not sure	5 (2.3)
How concerned are you that any one of the childhood shots might not be safe?	Concerned	7 (3.3)
	Not Concerned	200 (93.9)
	Not sure	6 (2.8)

How concerned are you that a shot might not prevent the disease?	Concerned	48 (22.5)
	Not concerned	165 (77.5)
	Not sure	0 (0)
Overall, how hesitant about childhood shots would you consider yourself to be?	Hesitant	0 (0)
	Not hesitant	213 (100)
	Not sure	0 (0)
I trust the information I receive about shots	Agree	213 (100)
	Disagree	0 (0)
	Not sure	0 (0)
I am able to openly discuss my concerns about shots with my child's doctor.	Agree	213 (100)
	Disagree	0 (0)
	Not sure	0 (0)
All things considered how much do you trust your child's doctor?	0-5	0 (0)
	6-7	2 (0.9)
	8-10	211 (99.1)

[Table/Fig-4]: Participants response to parent attitudes about childhood vaccines questions.

three children in their household. They were also more among those who attended secondary school and below, and those who attended their last antenatal care in TBA's homes but the differences were not significant [Table/Fig-5].

Items	Number of children		Educational status		Last antenatal care	
	Two children and below n (%)	Three children and above n (%)	Secondary and below n (%)	Tertiary and above n (%)	Hospital n (%)	TBA n (%)
Total knowledge score						
Below 50%	10 (50)	10 (50)	14 (70)	6 (30)	10 (50)	10 (50)
Above 50%	82 (42.5)	111 (57.5)	127 (65.8)	66 (34.1)	90 (46.6)	103 (53.4)
Total	92 (43.2)	121 (56.8)	141 (66.2)	72 (33.8)	100 (46.9)	113 (53.1)
p-value	0.518*		0.706*		0.774*	
PACV 3						
Yes	6 (12.8)	41 (87.2)	30 (63.8)	17 (36.2)	25 (53.2)	22 (46.8)
No	86 (51.8)	80 (48.2)	111 (66.9)	55 (33.1)	88 (53.0)	78 (47)
Total	92 (43.2)	121 (56.8)	141 (66.2)	72 (33.8)	113 (53.1)	100 (46.9)
p-value	0.0001**		0.698*		0.983*	
PACV 10						
Concerned	2 (5.6)	34 (94.4)	25 (69.4)	11 (30.6)	24 (66.7)	12 (33.3)
Not concerned	90 (50.8)	87 (49.2)	116 (65.5)	61 (34.5)	89 (50.3)	88 (49.7)
Total	92 (43.2)	121 (56.8)	141 (66.2)	72 (33.2)	113 (53.1)	100 (46.9)
p-value	0.0001**		0.651*		0.073*	
PACV 12						
Concerned	4 (8.3)	44 (91.7)	29 (60.4)	19 (39.6)	28 (58.3)	20 (41.7)
Not concerned	88 (53.3)	77 (46.7)	112 (67.9)	53 (32.1)	85 (51.5)	80 (48.5)
Total	92 (43.2)	121 (56.8)	141 (66.2)	72 (33.2)	113 (53.1)	100 (46.9)
p-value	0.0001**		0.336*		0.405*	

[Table/Fig-5]: Association between number of children, educational status, last antenatal care and total score on knowledge, and PACV questions.
PACV: Parent attitudes about childhood vaccines; PACV 3: Have you ever delayed having your child get a shot for reasons other than illness or allergy? PACV 10: How concerned are you that your child might have a serious side-effect from a shot? PACV 12: How concerned are you that a shot might not prevent the disease? Chi-square with p<0.05* statistically significant; p<0.001** statistically highly significant

Practice and hospital presentation of measles cases: Majority, 197 (92.5) immunised their children against measles. One hundred and six (92%) respondents have seen a patient with measles-like symptoms and 117 (54.9%) stated that the case they witnessed was not managed at home.

DISCUSSION

The incidence of measles is increasing globally, despite the effectiveness of measles vaccines. The reasons for the increase are attributed to negative beliefs on measles vaccines and poor vaccine coverage, especially in the developing countries. In most rural areas measles cases are under reported owing to poor hospital presentations and home management of measles suspected illnesses.

The study revealed that all the respondents were females mostly within the age range of 23-34 years. This is in consensus with the prevailing reports and studies in Nigeria and other African countries [34,35]. One of such studies, a population and development review shows an increasing trend in the age of women at their first marriage in Africa [35]. In southern Nigeria, the principle reason is formal education; many women wait to graduate from at least secondary school before marriage, as also shown in this study. This educational achievement allows them to delay marriage to their second decade of life [36]. Although, women in the rural area usually do not proceed beyond secondary school because of the economic requirement, gender preference, marriage and high level of unemployment in Nigeria even among highly educated sects [37,38]. Women are often saddled with the responsibility of caring for the children in rural areas [39]. This responsibility which is enormous is their sole duty, as most of them do not attempt searching for any other job or career [40,41]. Some undertake minor trading activities around the household as evident in this study, to enable them ensure that their children are close to them [39]. There is also high patronisation of the TBAs in the area [42-44]. This is highly due to belief and closeness of these centers to the rural dwellers [44]. Government and some NGO's have trained (especially on risk identification and early referral) and supported the TBA to reduce maternal and child mortality, since it is difficult to stop women from patronising them [45,46]. The low hospital choice for antenatal, has also contributed to lack of family planning knowledge and practice as evident in the proportion of mothers with more than three children observed in this study despite the prevailing economic reality in the most rural areas in Nigeria [47,48].

Awareness of measles has improved in the rural area in Enugu owing to a series of campaigns and mobilisations organised by the ministry of health and non-governmental organisation [49]. Most of these sensitisations are on the symptoms, transmission and vaccine prevention especially in recent time of supplementary immunisation [50]. The outcome of these campaigns showed from the response of the participants, as the majority has adequate knowledge about measles. Their level of education, the number of the children they have and the place they seek antenatal care did not affect their level of knowledge about measles. This is in support of most findings and could be explained by the fact that measles is an old and common infection [29,51]. Also, the campaign about measles gets to the glass root. It also shows that the house to house campaign has yielded tremendous results and everyone is aware of measles irrespective of their status. The result also shows that there is higher awareness about the symptoms, transmission and prevention but low knowledge about the complication which many believe has more impact on the uptake of the vaccine [51,52]. In a study done to assess the reason behind the negative attitude towards vaccines in the UK, it was observed that people go for vaccines that prevent serious and complicated illness than less complicated ones [53]. This is important since mortality as a result of the complications is still

high in Nigeria because of malnutrition and late hospital presentation [54]. In another study, low knowledge of the complication has been attributed to one of the causes of home management of measles and measles-like illnesses [54].

In this study, the parental attitude about measles vaccine is very high on the positive scale. This is in agreement with the study done using the Global Vaccine Confidence Scale (GVCS) (no available publication on parental attitude in Nigeria that made use of the tool used for in this study) [55]. In southern Nigeria, there has been consistent positive belief on the efficiency of vaccine in preventing vaccine preventable diseases especially in rural areas where the parents rely on the information from the health officers [56]. There has not been any reported myth or cultural disposition against childhood vaccines generally unlike in the northern part of the country where such negative beliefs have led to difficulty in sustaining a polio free nation [57]. In rural areas, the majority of the parents utilises the health centers and TBAs for ANC services where the importance of childhood immunisation is emphasised. By this means, negative belief about vaccines is minimised unlike in urban communities with diverse sources of information pertaining child's care [15]. As obtained in this study, parents with more than two children are likely to delay measles vaccination and express concern about the efficacy of the shot. They also are more worried about the side-effects. These concerns may not immediately translate to hesitance, but when persist, and spread in the community; it could affect the stand of the parents on vaccines.

Measles is one of the notifiable diseases [19]. The symptoms are classical but there are other differentials necessitating prompt diagnosis in health centers to prevent community transmission and complications [58]. This study observed that many children with suspected measles were managed at home. This supports the findings that the disease is under reported [54,58]. Many have reported the frequent management of measles at home using herbs in many parts of Nigeria [59]. For instance a study done in Ibadan observed that the majority (91.3%) of caregivers whose children had measles gave home treatment, while 24 (8.7%) sought treatment from health facilities alone. This practice will affect confirmation and notification of cases for appropriate action such as targeted immunisation.

Limitation(s)

The study was intended to capture the response of both male and female parents but unfortunately, most males decline consent and referred the interviewers to their wives. Four males that gave consent filled the questionnaires, but their response was discarded because they contained a lot of "I don't know" answers. This study will therefore represent the opinion of the female parents and will stand as basis for future studies and comparison. Another limitation of this study is its inability to access the reasons why parents prefer managing measle cases at home.

CONCLUSION(S)

The study revealed poor knowledge on the complication of measles, which is crucial for appropriate actions towards measles prevention. The attitude of parents to measles vaccination was generally adequate, the more children a parent has, the likelihood of developing negative attitude or hesitant to measles vaccination. It also showed that few suspected measles cases were managed in the hospital hence, reducing reported prevalence of measles. There is a need to educate parents on the complication of measles and the importance of early hospital presentation of suspected cases for confirmation and prompt management. This will help to prevent complications and community transmission.

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