Original Research Article

Vaccination timeliness and completeness among mothers of children between 0-1years in South-South Nigeria

Abstract

The incidence of communicable diseases in communities prompted the adoption of vaccination as one of the most cost-effective interventions preventing avoidable sickness, disability and death among under-five children. The purpose of this study was to assess the timeliness and completeness rate of vaccination uptake among children between 0-1years in Ogbia town. A descriptive research design was employed for this study. A sample size of 236 respondents were randomly selected and used for this study. A structured questionnaire was used for data collection and the collected data was analyzed using percentages and means. The results revealed that the mothers had good knowledge of vaccination with a grand mean score of 3.34 out of 4, and the source of information on vaccination for most of them (92%) was from Primary Health Care centres. As much as 72% of the respondents were of the opinion that they complied with the vaccination schedules (timeliness) for their children either to a very high extent or high extent. Majority of the mothers (68%) also opined that they completed their vaccination schedule. Also, factors reported to adversely affect the uptake of vaccination among the mothers included fear of the side effect of vaccine, as well as the attitude of the health personnel when providing care. This study concluded that the mothers' knowledge of vaccination was good, most of them complied with vaccination schedules, completed these schedules and various factors affected their uptake of vaccination. This study thus recommended that efforts by primary health facility workers to improve mothers' knowledge of timely vaccination compliance as this helps in effectively mitigating the extent of occurrence of vaccine preventable diseases.

Keywords: Vaccination, timeliness, completeness, factors affecting uptake

Introduction

The incidence of communicable diseases in developingcountries is a great concern to the survival of children, particularly in rural communities, which called for intervention strategies to mitigate the effect of preventable childhood killer diseasesamong under-five children.[1, 2]One such was vaccination, which is the introduction of a vaccine into a non-immune host to provide specific antibodies to confer immunity to overcome communicable diseases. It is one of the most

cost-effective intervention strategies available to prevent avoidable sickness, disability, and death among under-five children.[3, 4]The Expanded Program on Vaccination (EPI), which was established to ensure equitable access to routine vaccination (RI) services stated that "vaccines have the power not only to save but also to transform lives, giving children a chance to grow up healthy.[3]Vaccine preventable diseases contribute significantly to global morbidity and mortality, with an estimated four million people reported to die each year from diseases for which vaccines are available.[5]An estimated 527,000 children under 5 years, most of whom live in low-income countries, are also reported to die each year from vaccine preventable rotavirus infections.[6] Statistically, the death rate among children and infants in Nigeria has been reported to bealarming based on neonatal, post-neonatal, infant, childhood, and under-5 mortality rates.[7, 8]Women who delivered babies at the age <=18 years (odds ratio (OR): 1.37), were Moslems (OR: 1.35), had no antenatal care (ANC) visit (OR: 1.69), had more than 4 ANC visits (OR: 1.70), as well as the babies being the women's first child (OR: 1.23) were all factors reported to be associated with higher infant mortality rate.[9]

Pneumonia and diarrheal diseases have been reported to account for approximately 34% of the global 10.4 million deaths among children less than 5 years of age (WHO, 2015). Globally, invasive pneumococcal disease has recently been shown to cause the deaths of 826,000 children aged 1 to 59 months, while rotaviruses are the most common cause of severe diarrheal disease in young children.[5, 6] It has been reported that vaccines are capable of preventing up to six million deaths annually worldwide if vaccination protocols are observed in a timely and complete manner, with the child developing immunity against several preventable diseases.[3, 10]. Routine vaccination (RI) of children in Nigeria is carried out using a combination of vaccines to mitigate the effects of infectious diseases.[11]In Nigeria, it has been stated that a child is considered to be completely immunized if he or she has received the following immunizations: Bacille Calmette Guerin (BCG) vaccination against tuberculosis, three doses of pentavalent vaccine against diphtheria, pertussis, tetanus, hepatitis B, and Haemophilus influenza, at least three doses of polio vaccine, one dose of yellow fever and one dose of measles vaccine.[12]

The importance of timely infant vaccination is to ensure that children have a good response, minimize individual vulnerability, and prevent disease outbreaks within communities.[13]

Timeliness and completeness of vaccinationensure optimal immune response and protection from vaccine preventable diseases.[14]Timely receipt of vaccines ensures optimal immune response to the vaccines, when vaccines are taken too early in life or at prolonged intervals, the immune response can be jeopardized either by already existing maternal antibodies or inadequate immune response by the body.[14]Recommendations that have been provided for vaccine administration at certain ages are important because they are based on the estimation of the age at which the child's risk for that particular disease is highest.[15] Timely receipt of vaccines is considered as being important as it ensures that the recipient is protected from the disease as early as possible.[15]It should be noted that good maternal knowledge of routine vaccination (RI) contributes immensely tovaccination uptake among mothers.[16]When mothers are aware of the vaccination schedules, benefits, and schedule of RI services,it has a positive influence on the mother's decision to get their children fully immunized.[17, 18]

Materials and methods

A descriptive research design was utilized in this study to identify mothers' compliance with vaccination for their under-one year old children. This study was conducted in Ogbia main town located in Ogbia Local Government Area of Bayelsa State among 236 nursing mothers' having children aged one year and below and having vaccination cards. Data was obtained using a structured questionnaire that elicited responses on the socio-demographic characteristics of the respondents, their knowledge of vaccination, timely compliance with vaccination, and factors affecting compliance with vaccination. The study questionnaires were distributed to the mothers when they presented at the vaccination clinics of the Primary Health Care facility at Ogbia main town. Collected data was analyzed using percentages and means to provide answers to study objectives. Data was presented in tables and expressed as frequencies, percentages and mean. The data on the knowledge of the mothers on vaccination was responded to on a 4-point likert scale, which was used to compute a weighted mean score for the different responses made. These

mean scores were also summed to generate a grand mean. The weighted mean scores were compared with the criterion mean of 2.5. Scores below 2.5 were regarded as having poor knowledge, while scores above 2.5 were regarded as having good knowledge. Ethical approval for this study was obtained from the Ethical Research Committee of the Bayelsa State College of Health Technology with reference no: BYCHT/REC/23/02-03. Permission to conduct this study was sought and obtained from the Primary Health Care unit of the Ogbia Local Government Area of Bayelsa State. The consent of the women was also obtained before the administration of the study instruments to them for completion.

Results

The assessment of the distribution of age group by respondents shows that majority 92(39%) of the respondents were within the age group of 27-32years, 136(58%) were business persons, with as much as 144(61%) of themreported to have received secondary level of education. Most of the respondents 216(91%) were also Christians, were married 156(66%) and had more than three (3) children 137(58%). (See Table 1).

Table 1: Socio-demographic characteristics of the respondents

	Frequency (n=236)	Percentage (%)
Age group		
- 15-20	48	20
- 21-26	48	20
- 27-32	92	39

- 33-38	35	15
- 39 & above	15	6
Occupation		
- Farming	28	12
- Fishing	28	12
- Civil servant	44	18
- Business	136	58
Education		
- Primary	38	16
- Secondary	144	61
- Tertiary	54	23
Religion		
- Christianity	216	91
- Muslim	15	6
- Traditional	5	3
Marital status		
- Married	156	66
- Single	56	24
- Divorce	4	2
- Separated	20	8
Number of children		
- 0	-	-
- 1	30	13
- 2	69	29
- 3+	137	58

Table 2 shows the knowledge of mothers cornering child vaccination. Majority 144(61%) and 88(37%) of the respondents agreed and strongly agreed respectively, that vaccination was important for children from the first day of birth. Majority 160(67%) and 72(30%) also strongly agreed and agreed that vaccination prevents children from infectious diseases. Furthermore, majority 160(68%) and 64(27%) of them agreed and strongly agreed that vaccinations help in reducing the risk of children having disability or death, 116(49%) and 112(48%) of the respondents also strongly agreed and agreed respectively that vaccination helps in keeping children healthy. The Table also shows that majority 176(75%) and 60(25%) of the respondents agreed and strongly agreed that vaccination helped in protecting children from vaccine

preventable diseases such as diphtheria, pertussis and tetanus. Majority of the respondents 184(78%) and 44(19%), also agreed and strongly agreed respectively that certain diseases could be controlled with the means of vaccination.

Table 2: Knowledge of Mothers Concerning Child Vaccination

Variables	SA	A	D	SD	$\bar{x}$	Criterion $\bar{x}$	Grand $\bar{x}$
Vaccination is important to children from the first day of birth?	88 (37%)	144 (61%)	4 (2%)	-	3.35	2.5	3.34
Vaccination prevents children from developing infectious diseases?	160 (68%)	72 (30%)	4 (2%)	-	3.66		
Vaccinations reduce the risk of children having disability or death?	64 (27%)	160 (68%)	8 (3%)	4(2%)	3.20		
Vaccination keeps children healthy	116 (49%)	112 (48%)	8 (3%)	-	3.45		
Vaccination prevents children from communicable diseases e.g. diphtheria etc?	60 (25%)	176 (75%)	-	-	3.25		
Vaccine preventable diseases can be controlled with the means of vaccination?	44 (19%)	184 (78%)	8 (3%)	-	3.15		

Figure 1 shows the respondents' source of information about vaccination, majority 92(39%) of the respondent had their source of information to be the primary health care centre, 58(24%) through friends/ relatives, 35(15%) through the health promotion activities of the Ministry of Health, 26(11%) from magazine/newspaper and 25(10%) got the information from the internet.

As seen in Table 3, assessment of the mother's compliance of vaccination activities revealed that majority 136 (57%) of the respondents' rated their compliance with the vaccination activities as at when due as being high, and 36(15%) rated their compliance as being very high.

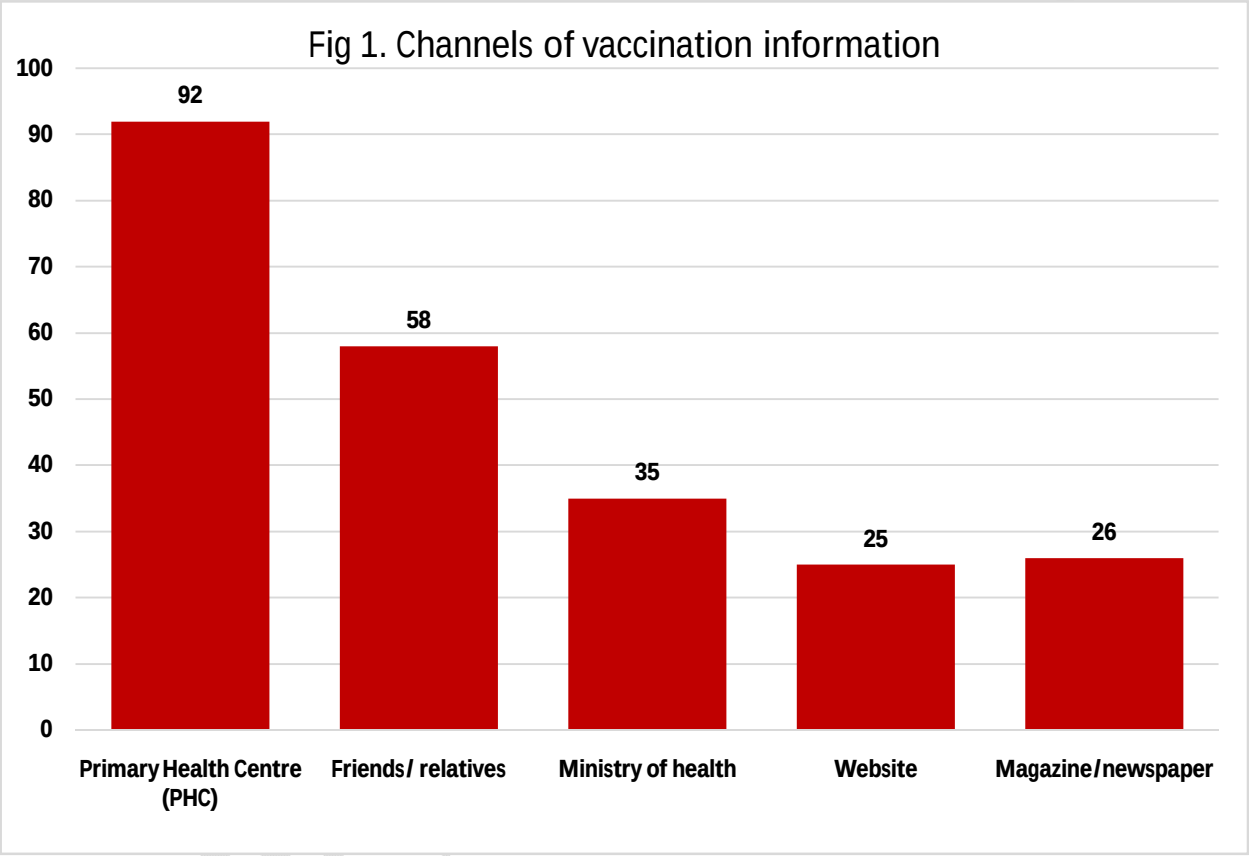

Table 3: Mothers/caregivers compliance with timelyvaccinationof children

Statement	VHR	HR	LR	VLR	$\bar{x}$	Criterion $\bar{x}$	Grand $\bar{x}$
Level of compliance with timely vaccination of	36 (15%)	136 (57%)	56 (25%)	8 (3%)	2.84	2.5	2.84

children

Key: VHR= Very High Rate, HR= high Rate, LR= Low Rate, VLR= Very Low Rate

Table 4: Completion of child vaccination

STATEMENT	CI	PI	NI
Vaccination completeness patterns among the mothers	160 (68%)	56 (25%)	20 (7%)

Key: CI= Completely Immunized, PI= Partially Immunized, NI= Not Immunized

Table 4 shows the completion of child vaccination among the mothers with majority 160(68%) of the respondents having completely immunized their children completely, 56(25%) of the respondents partially immunized their children, while, 20(7%) of the respondents opined their child were not immunized.

The barriers to mothers/ caregivers' uptake of vaccination were also assessed, and it was found that majority 100(42%) and 88(37%) of the respondents respectively strongly agreed and agreed that the fear of side effects, as well as the attitude of most health personnel which the respondents agreed 152(64%) were barriers to vaccination uptake. Also, most of the respondents agreed that lack of mothers/caregivers' knowledge or awareness of the vaccine or disease 112(47%), transportation costs/distance of the facility 116(49%), as well as exposure to misleading information of timelines of vaccination activities, were barriers affecting the uptake of vaccination.

Table 5: Barriers to mothers/ caregivers' uptake of vaccination

Variables	SA	A	D	SD	$\bar{x}$	Criterion $\bar{x}$	Grand $\bar{x}$
Fear of the side effects of vaccine	100 (42%)	88 (37%)	20 (8%)	28 (12%)	2.54	2.5	3.051
Attitude of health personnel	32 (14%)	152 (64%)	28 (12%)	24 (10%)	2.81		
Lack of mothers / caregivers' knowledge or awareness of the vaccine or disease	72 (31%)	112 (47%)	32 (14%)	20 (8%)	3.0		
Transportation, distance or location of the health facility	84 (36%)	116 (49%)	84 (36%)	16 (7%)	3.67		
Misleading information of vaccination activities as at when due	40 (17%)	148 (63%)	20 (8%)	28 (12%)	2.84		

Discussion

This study assessed mother's perceptions ofthe timeliness and completeness of vaccinationschedules for their under-five children. Concerning the mother's knowledge of vaccination, the current findings reveal that the mothers knew that vaccinations could reduce the risk of children having disability or death which is in agreement with the findings of other authors.[19] The current findings also show that the majority of the respondents agreed that vaccination could protect children from communicable diseases e.g., diphtheria, pertussis, and tetanus as identified by another study.[19]This study reported that mothers/ caregivers believed that vaccination couldcontrol diphtheria, tetanus, pertussis. Concerning the mother's source of information on vaccination, the largest proportion of the respondentsreceived this information about vaccination through the primary health care centres. This implied that the mothers/caregivers knew that the vaccine could be obtained at the primary health centre/

clinic.This finding also implies that with mothers now becoming aware of the importance of vaccination, it can tend to spur them to utilize children vaccination healthcare services, which inadvertently helps to protect the child from the precarious effects of vaccine preventable diseases.[20]

In this present study, the completeness ofvaccinationwas also encouraging as most of the respondents had completely immunized their children according to the vaccination schedule.This finding implies that despite the need for further action to boost the level of compliance to complete vaccination, it is a good step in the right direction, considering that most of the mothers had made contact for vaccination at the health care facility. This inadvertently results in protection of the children from the effects of vaccine preventable diseases.[15, 18] These findings corroborate the findings of other studies that reported satisfactory levels of compliance with vaccination among study respondents.[14, 15]It is essential that vaccinations are taken at the right timing when they are due, considering that administering the vaccines at such times helps in protecting the child from diseases which they are usually most susceptible to at that age.[15, 21]Concerning the factors affecting the uptake of vaccination among the respondents in this present study, it was identified thatthe majority of the respondents opined that the various factors including the fear of side effects, transportation costs, as well as distance to the healthcarefacilities, affected their uptake of vaccination for their children. This is in agreement with studies that have reported similar factors including issues surrounding access to vaccination, inadequate knowledge of vaccination composition which can fuel their fear of vaccine side effects among others.[21, 22]It is pertinent that these problems alongside other issues facing optimal vaccination uptake, timeliness and completeness are squarely tackled, so as to ensure that all children are given the opportunity to overcome the dangers of vaccine preventable

diseases. Routinely vaccinating children has been shown all over the world to play a crucial role in significantly reducing the incidence of child mortalitiesassociated with vaccine preventable diseases.

Conclusion

In this study that assessed vaccination timeliness and completeness among mothers/caregivers, it was identified that the mothers had good knowledge of vaccination with most of them complying with vaccination schedules, as well as completing these schedules. Various factors were also found to affect their uptake of vaccination. Based on these findings, certain recommendations were made. These included the need for healthcare stakeholders in primary healthcare in Ogbia and Bayelsa State as a whole, to insistently ensure that quality primary healthcare is made as easily accessible and available to the populace as possible, as this would encourage effective utilization of services rendered. There is also the need for health education action to be reinforced to constantly remind mothers of the benefits of vaccination as well as allay their fears regarding vaccination. Primary Health Care workers should also emphasize the need for adhering to vaccination schedules as well as ensuring that they complete the vaccination schedules for their children.

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