

Determinants Of Missed Opportunities For Immunization Among Under-five Children In Ilorin Metropolis

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Abstract

Missed opportunities in immunization had been a global public health obstacle to the attainment of the Millennium Development Goal of reducing child mortality by two-thirds by 2015. Studies have also shown that missed opportunities in both routine and supplementary immunization contribute significantly to the low immunization coverage rates in many parts of Nigeria. This study set out to determine the reasons of missed opportunities in routine immunization among under-five year old children in Ilorin metropolis.

This descriptive cross sectional survey was carried out in the second quarter of 2014 among under-five year old children in Ilorin metropolis. A pretested, semi-structured, interviewer-administered questionnaire was used to recruit 500 respondents into the study using multistage sampling method. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0. Frequency tables and simple percentages were used to present the descriptive statistics generated. Cross tabulation of important variables was also done. Chi-square test was used to determine the statistical significance of differences in variables observed. The level of statistical significance was predetermined at p-value of less than 0.05 at 95% confidence interval.

Majority of the (95.2%) of respondents were aware of immunization even though, 59.0% of them had actual knowledge of it. The prevalence of missed opportunities was 24.4%. Yellow fever and measles vaccines often missed compared to others. Factors responsible for the missed opportunities included the attitude of the health worker, prolonged time of waiting to receive vaccine, immunization clashing with other schedules and transportation problem. Respondents' level of knowledge on immunization and educational background were significantly associated with the prevalence of missed opportunities.

Missed opportunities in immunization are still widespread in the study area. Female education and women empowerment should be given more attention and priority.

Key words: immunization, Ilorin, missed opportunity.

Introduction

Immunization is said to be the most successful and cost-effective public health intervention of the 20th century in terms of number of deaths averted per year. In the developing world, it does not only prevent about 3 million child deaths per year but also has the potential to avert additional 2 million deaths if immunization programs are expanded and fully implemented. Childhood immunization has been established to indirectly prevent infectious diseases even in adults through herd immunity. Immunization could be routine or supplemental (immunization campaign); routine immunization refers to the nationally scheduled regular administration of vaccine dosages to infants at specified ages. Children are usually taken to the health facility by their parents or care givers to receive age-appropriate doses of antigens. In most developing countries, this is only done on specific days of the week to reduce vaccine wastage since the vaccines are supplied in multi-dose vials to reduce cost. The main aim of routine immunization is to deliver a complete number of doses of potent vaccines in a timely, safe and effective way to all children and women¹, ultimately inducing immunity against targeted diseases². The result is to be a drastic reduction in the burden of childhood vaccine preventable diseases³.

On the other hand, supplemental immunization - also known as immunization campaign - is organized occasionally by governments for the purposes of catch-up immunization, disease eradication/elimination and to avert epidemics. Immunization campaigns became more frequent in the last two decades when WHO launched the polio eradication program. Immunization campaigns against polio and measles have yielded tremendous results globally and in Nigeria. This has reduced global polio cases from 350,000 in 1988 to 1643 in 2009 (>99% reduction), and measles from 871,000 in 1999 to 454,000 in 2004 (48% reduction).⁴ Some mothers/fathers are known to accept routine immunization but reject campaigns while others reject both due to ignorance which is one of the major factors

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that cause missed opportunities.⁵ Despite the success of expanded programs on immunization (EPI), such as eradication of small pox^{2,4} and global lowering of incidence of polio by 99%,⁷ many vaccine-preventable diseases remain prevalent especially in developing countries.²

Vaccine preventable diseases are known to account for approximately 22% of child deaths in Nigeria, amounting to over 200,000 deaths per year. However, in Nigeria, as in some other third world countries, immunization coverage is low.⁶ Nigeria recorded an abysmal national routine immunization coverage of 12% in 2003⁷, and 36% in 2006.⁸ In 2009, Nigeria accounted for about 3.5 million (14%) of the 23.2 million children worldwide who did not receive 3 doses of DPT vaccine during the first year of life.⁴ This not only impedes disease control, but may consequently diminish public support for vaccination, which may lead to a resurgence of vaccine preventable diseases.³

In Nigeria, universal childhood routine immunization is provided free of charge as in some countries of the world. This situation of the low immunization coverage has been attributed to missed opportunity which is defined as any contact with health service that does not result in an eligible child or woman receiving the needed vaccine. Missed opportunity is a global public health obstacle to the achievement of the targets of Expanded Program on Immunization and in the long run achievement of Millennium Development Goals (MDG).⁸ For example, routine immunization is a key strategy in the polio eradication program, both in Nigeria and globally.⁷ Previous studies also established that missed opportunities occur in both routine and supplementary immunization in every part of Nigeria which explains the low coverage in majority of states in the country. For Nigeria to achieve the millennium development goal of reducing child mortality by two-thirds by 2015, routine immunization coverage must be optimal which implies that missed opportunities need to be combatted.⁷

Furthermore, quite a number of studies have identified certain factors associated with missed opportunities in immunization which include failure to administer vaccines simultaneously; false contraindications to immunization; negative health worker attitudes; logistical problems; and refusal by the patient or family. The importance of some of these factors as they influence the occurrence of missed opportunity was measured as the overall prevalence of missed opportunities due to the specific reason. It was proposed that there are potential gains in coverage that could be achieved if that specific missed opportunity was eliminated.^{9,10}

This study was set out to assess these determinants of missed opportunities with a view to explaining how they influence and contribute to the

prevalence of missed opportunities and propose strategies to combat such determinants which will immensely contribute to the improvement in immunization coverage.

Methodology

Ilorin, the capital city of Kwara State was created in 1967. It is located at the geographical and cultural confluence of the North and South of Nigeria (in the North Central geopolitical zone) with a landmass of 32,500km². It hosts a projected population of 854,737 based on the 2006 National Census and annual growth rate of 3.2%.

Ilorin is made up of three Local Government Areas (LGAs), namely: Ilorin East LGA, Ilorin West LGA and Ilorin South LGA; with their headquarters at Oke-Oyi, Wara and Fufu respectively. Ilorin East and South LGAs have 11 Wards each, while Ilorin West LGA has 12 Wards. The indigenous people are mainly Yoruba and Hausa-Fulani. The major religions are Islam and Christianity. The occupations of the residents in Ilorin include civil service, commercial driving, trading, farming, artisans, organized private sector and weaving of traditional attires. The town is popularly known for processing of soft cheese called "wara".

The study was a descriptive cross sectional survey carried out in the second quarter of 2014. The subjects for this study were the under-five children in Ilorin metropolis. This population group cannot respond themselves hence their mothers or guardian or care-giver who is in position to give an accurate health details were interviewed.

The sample size was estimated using the Fisher's formular¹¹ using 33.4% as the prevalence of missed opportunities in childhood immunization in a previous study done in Nigeria¹². A minimum sample size of 342 was obtained but 500 respondents were recruited into the study. Multistage sampling was used in selecting respondents for the study with proportionate allocation done at each stage. A semi-structured interviewer-administered questionnaire was used to collect information from the subjects. The questionnaire contained relevant information on determinants of missed opportunities. The research instrument was pre-tested in Afon in Asa LGA, a town located about 15 kilometers from Ilorin. This was to ensure validity and reliability of the instrument. Respondents were anonymous and informed consent was obtained from respondents. Research assistants (4) were trained for the purpose of data collection. All the open-ended portions of the questionnaire were reviewed; codes were also developed for all open-ended responses. Data entry and management was carried out using the Statistical Package for Sciences (SPSS) version 16.0. Frequency tables and simple percentages were used to present the descriptive statistics generated. Cross tabulation of important

variables was also done. Chi-square test was used to determine the statistical significance of differences in variables observed. The level of statistical significance was predetermined at p-value of less than 0.05 at 95% confidence interval.

Results

Majority (63.6%) of the respondents (care-givers) were of the age group 20-29 years. About two-thirds (63.0%) of the children in this study were aged 12 months. Three quarters of the households (75.2%) had only one under-five year old as household member. The Yoruba ethnic group was found to be predominant (71.2%). Islam (50.8%) and Christianity (47.7%) were the main religions practiced by respondents. Slightly more than one third (36.4%) of the respondents attained tertiary education while 10.8% had no formal education, (table 1a).

The respondents were also found to be predominantly government employees (37.2%) and those that engage in trading as the major source of income (38.2%). The place of delivery of child has been implicated to influence the prevalence of missed opportunities and acceptance of immunization. The mothers that delivered their children at health centers where immunization services can be assessed are postulated to be likely to accept and complete their immunization. Most of the mothers in this study delivered their children at the government health center while those that delivered their children at home and religious centers accounted for 12.8% and 5.2% of the respondents (table 1b).

A high proportion (95.2%) of respondents was aware of immunization but this proportion dropped to

59.0% when actual knowledge was assessed. The prevalence of missed opportunities was found to be 24.4% while yellow fever and measles were the vaccines more frequently missed compared to other vaccines. Among several factors implicated to be responsible for the missed opportunities, immunization clashing with other schedules (table 2), attitude of the health worker (table 2), prolonged time of waiting to receive vaccine (table 2) and transportation problem were found to be relatively prevalent (as more than 34% of respondents alluded to this).

Discussion

Immunization is not a new intervention and has become popular over the years. The level of awareness found in this study was 95.2%. The high level of awareness and knowledge of immunization observed in this study were in keeping with finding from similar studies.^{13, 14, 15, 16, 17}

The media has always been an effective source of passing health messages to the populace. More than half of the respondents (50.8%) in this study heard about immunization through the media; and similar trend had been observed in previous studies.^{13, 11, 18}

Regarding the determinants of knowledge on immunization, this study found that the age of the child, educational level of the mothers, occupation, place of child's delivery, availability of immunization card and immunization card being filled up-to-date will likely influence the level of knowledge of mothers on immunization. It is logical to suggest according to the findings of this study which is in consonance with previous studies¹⁸ that mothers with older babies (12 months and above) have better knowledge on

Table 1a: socio-demographic characteristics of respondents

Variables	Frequency	Percentage (%)
Age of Respondents		
<=19	2	0.4
20-29	318	63.6
30-39	164	32.8
>=40	16	3.2
Age of Child		
<=12 Months	185	37.0
>12 Months	315	63.0
Marital Status		
Single	12	2.4
Married	482	96.4
Separated	4	0.8
Widowed	2	0.4
Religion		
Christianity	237	47.4
Islam	254	50.8
Traditional	7	1.4
Others	2	0.4

Table 1b: socio-demographic characteristics of respondents

Variables	Frequency	% frequency
Tribe		
Hausa	31	6.2
Igbo	43	8.6
Yoruba	356	71.2
Others	70	14.0
Tertiary	182	36.4
Number of under-five in the household		
1	376	75.2
>=2	124	24.8
Occupation		
Housewife	110	22.0
Government Employee	186	37.2
Business	191	38.2
Others	14	2.8
Household size		
<=4	218	43.6
<4	282	56.4
Place of Delivery		
Home	64	12.8
Government Health Centre	320	64.0
Private Health Centre	90	18.0
Religious Centre	26	5.2

Table 2 : Respondents' perceived factors responsible for missed opportunities

Factors (Multiple Response) N=116	Frequency	Percentage (%)
My Religion is against immunization	4	3.5
Immunization dates clash with my other schedules	36	31.0
I was busy during immunization time	18	15.5
Family or spouse is against immunization	4	3.5
Baby was sick during immunization	28	24.1
Vaccine will have adverse effect on my child	6	5.2
Health worker not available	2	1.7
The attitude of health worker is bad	34	29.3
Health worker's poor vaccination skill	18	15.5
Health worker too busy or not ready to vaccinate	16	13.8
Too long waiting	26	22.4
No health facility in the area	10	8.6
Lack of equipments	6	5.2
Required vaccine is out of stock	6	5.2
Vaccine Vial could not be opened due to few clients	8	6.9
No seats or shed at the health facility	4	3.5
Poor state of health facility makes immunization uncomfortable	10	8.6

immunization while those mothers with younger babies (less than 12 Months old) have poor knowledge on immunization. This study also suggests that when mothers have immunization card for their children and such card are filled up-to-date, they are likely to have better knowledge on immunization as the card provide and give better opportunity for getting more than just basic knowledge on immunization.

Missed opportunities were strongly implicated to be responsible for the relatively low level of coverage found in most of the African communities. The prevalence of missed opportunities found among respondents in this study was 24.4% and out of this proportion, the most frequently missed vaccines were yellow fever (77.6%) and measles (53.3%). This prevalence of missed opportunities conforms to previous findings which presented that most states in Nigeria had immunization coverage lower than 50%.¹³ Such low coverage can be traced to the relatively higher than expected prevalence of missed opportunities in this part of the world. A Nigerian study found the prevalence of missed opportunities to be 17% and also emphasized that the immunization coverage in most states of the country was lower than 50%.¹⁶ Another study that examined some states in Nigeria found that the prevalence of missed opportunities were 16.9%, 27.6% and 39.1% in three southern states of the country. These are relatively close to the prevalence found in this study and relatively lower compared to the 57.1% found in India.^{11,17,19} Another study in Mozambique found a similar prevalence of missed opportunities among similar group of people with a

prevalence of 25.7%¹⁷ while another study found a relatively higher prevalence of 33.4%.¹⁸ Missed opportunities are prevalent in most communities though the causes may differ from place to place. Also, a study in the US presented that the prevalence of missed opportunities was 27% and the most frequently missed vaccines were *Haemophilus Influenzae*, measles, mumps and rubella accounting for a combined proportion of 25% of all missed vaccines.

Several factors have been implicated to predispose to missed opportunities. Immunization date and time clashing with other schedules (31.0%) and baby being sick at the time scheduled for immunization (24.1%) are the prominent factor that arose from

the patient which was also found in previous studies reviewed especially those done in similar environment. Studies established that most mothers prefer to wait for a convenient time to take their babies to the health center for immunization giving rise to missed opportunities.^{18,19} Other factors that were well identified under the patient factors are the religious and cultural belief (3.5%) and fear of side effects (5.2%). All these factors were presented in other studies to not only predispose to missed opportunities but also influence the acceptance of immunization. Some of the studies reviewed identified religious and cultural belief and fear of side effects as major factors that have long being combated as an obstacle to acceptance of immunization in sub-Saharan Africa.^{11,18} Furthermore, a study also revealed that some mothers visit the health center at the wrong day which also contribute to the prevalence of missed opportunities.¹⁷

Also, factors that generate from health workers as revealed by previous studies include the attitude of health workers, time wasting by the health worker and the busy schedule of the health workers. A similar trend was also observed in this study. Particularly, it was established by a previous study that in the case whereby the health workers in such health facility are too busy, little preference is given to immunization. Mothers in such case either have to wait for a very long time or are asked to come back which affects their already laid down schedule.^{11,17,18} The state of the health facilities also plays a significant role in the prevalence of missed opportunities in immunization according to previous studies. These finding were corroborated by this study.

The other factors inferred from this study as regards the health facility were lack of seats during waiting time (3.5%), poor state of the health facility (8.6%) and lack of vaccine (5.2%). The problem of the health facility or worker deciding not to open the vaccine vials due to the low number of children that are to receive the vaccine at that particular time has been identified and found to be common. In most cases, the vaccine vials are not opened to avoid wastage and mothers are rescheduled for another date or are asked to keep coming back until the day they are 'fortunate' to have enough number of children that will exhaust a vial. This problem is particularly prevalent in health facilities with lack or poor storage equipment. These underscores the poor financial and political support from the government in this part of the world.^{11,18} It is also significant to note that a previous study identified that most of the occurrence of missed opportunities in immunization were due to problems in the immunization system and they are usually found at the Primary Health Care Centres.¹⁸

Accessibility factors cannot be ruled out in the list of factors that influence missed opportunities. Some of the respondents (9.5%) complained of health facility being too far as the reason for the missed opportunities while some others (13.9%) claimed that the reason was the total cost of accessing the immunization service. Transportation problem was indicated by 36.2% of the respondents.

Also, the level of knowledge of mothers was found to significantly influence the prevalence of missed opportunities. Among those who had experienced missed opportunities there were more mothers with low level of knowledge on immunization. This conforms with previous studies that also identified the level of knowledge on immunization as part of the major determinants of missed opportunities in immunization.^{13,14,17,18}

Conclusion and Recommendation

Immunization has been one of the health intervention that has attained a significant level of effectiveness over years but there are still grounds to cover in order to achieve the set goal of making sure that all eligible children access and utilize immunization services on schedule. Missed opportunities have been one of the major challenges of attaining the goals and target of immunization and the schemes and program formed around it. Missed opportunities in immunization are still significantly prevalent in this part of the world and there is need to intensify strategies to combat them. Such strategies need be directed towards major determinants such as the level of knowledge of mothers on immunization and possession of up-to-date immunization cards by mothers who keep the records of immunization of the child.

Mothers should make immunization priority as

it prevents diseases with damaging consequences on the child. Therefore, they are to ensure that their children access immunization services on schedule. Health workers should develop positive attitude to service delivery to patients. Government should improve the health infrastructures in order to make immunization services accessible to every mother regardless of the location. Female education and women empowerment should be given more attention and priority to ensure that their goals are achieved as this will indirectly reduce the prevalence of missed opportunities in immunization.

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