

Knowledge Of Timing And Compliance With Routine Immunization Schedule Among Mothers Of Under Five Attending Immunization Clinic In A Tertiary Hospital, Sokoto State, Nigeria.

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Abstract

Background:

Immunization is the most efficacious and low-cost strategy to save the lives of children and prevent dangerous communicable diseases. In order to develop the highest level of protection against diseases, children should be fully vaccinated as per the schedule and at the right age. Complete vaccination to children is a successful way of reducing the infant mortality rate, and to make zero dropouts and achieve 100% vaccination, vaccines should be administered as per scheduled time.

Aim: The aim of this study is assess the knowledge of timing and compliance with routine immunization schedule among mothers of under five children attending immunization clinic in a tertiary hospital in Sokoto state, Nigeria

Materials and Methods:

This is a descriptive study conducted among 280 mothers of under five children attending immunization clinic in a tertiary hospital in Sokoto state in May and June, 2022. The respondents were selected by multistage sampling technique. A set of pretested, semi-structured interviewer- administered questionnaire was used to collect data on the research variables. Data were analyzed using IBM® SPSS version 25 statistical package.

Results:

The ages of the respondents ranged from 18 to 45 years with a mean age of 29.18 ± 8.16 years. Majority of the respondents 167 (59.5%) were aged 21-30 years. Most of the respondents were married 277 (99.0%) and larger proportion (58.1%) had tertiary education. The proportions of respondents with good knowledge of routine immunization timing as the per schedule was (90.7%) and majority 235(83.9%) complied with timing according to the schedule. About two-third 175 (62.5%) of the respondents were fully vaccinated, some of the reasons mentioned by the respondents for not complying with timing were; waiting time, attitude of the health workers, husband disapproval and sickness of the child among others.

Conclusion and Recommendations:

Most of the respondents demonstrated good knowledge of routine immunization timing and majority complied with the timing according to the scheduled. About two-third of them were fully immunized, some of the reasons for not complying with timing as per the schedule among the respondents were waiting time, attitude of the health workers, husband disapproval and sickness of the child among others. Improving the knowledge of parents about immunization was recommended by providing health education session consistently at every clinic day before the immunization session

Keywords: Knowledge, Compliance, Routine immunization schedule, Mothers of under-five Tertiary institution.

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I. Introduction

Routine childhood immunization is one of the most cost-effective public health interventions and has been estimated to avert approximately 2 to 3 million deaths per year.¹

It is the most efficacious and low-cost strategy to save the lives of children and prevent dangerous communicable diseases. In order to develop the highest level of protection against diseases, children should be fully vaccinated as per the schedule and at the right age.²

According to the UNICEF report, 14 million infants did not received vaccination in the year 2019, and almost 2–3 million deaths could have been prevented if timely vaccinated.³

Worldwide, vaccination programmes has shown a significant impact on the infant mortality rate (IMR), which declined from 65 deaths/1000 live births in 1999 to 29 deaths /1000 births in 2018.⁴

Complete vaccination to children was a successful way of reducing the infant mortality rate in high-income countries.⁵ To make zero dropouts and achieve 100% vaccination, vaccines should be administered as per scheduled time.⁶

Approximately 20 million children globally did not complete the 3-dose DTP series in 2016, 12.9 million (66%) did not receive any DTP doses, a decrease from 79.4 million in 1980, and 6.6 million (34%) started, but dropped out and did not complete the DTP series. The largest proportions of infants who were left out were in the WHO African (17%) and Eastern Mediterranean (15%) Regions.⁷

Among the 19.5 million children worldwide who did not receive 3 DTP doses during the first year of life, 11.8 million (61%) lived in 10 countries including Nigeria.⁸

Of serious concern is the abysmally low full immunization coverage in Nigeria with a concomitant high mortality (largely attributed to vaccine preventable diseases) among children in the country

According to the Nigerian Ministry of Health, a child is considered fully immunized if he/she receives a BCG vaccine against tuberculosis, three doses of DPT to prevent diphtheria, pertussis, and tetanus, at least three doses of polio vaccine and one dose of measles vaccine

Recent statistics revealed the national coverage for full vaccination (all first-year antigens) among children 12–23 months in Nigeria is 35.6%, with sharp regional variation.⁹

The highest coverage in the northern region was reported in the north-central at 32.4%, while the highest coverage in the south was reported in the southeast at 57.3%.⁹

In 2018, only 20 percent of children 12–23 months in northwestern Nigeria were considered fully immunized by one year of age, or who received all basic vaccinations before their first birthday based on data collection among children aged 12–23 months, all these coverages are far below the Global Vaccine Action Plan (GVAP) target of at least 90%.¹⁰

Although, the low immunization coverage in Nigeria has been mostly attributed to poor knowledge, compliance, accessibility and inappropriate attitude among others factors; poor compliance with full immunization is believed to be the most significant reason for low immunization coverage in the country due to socio-cultural obstacles to acceptance of immunization.¹¹

However, several factors have been implicated in low vaccination coverage, especially in the northern regions of the country. Studies examining factors associated with child vaccination have reported several findings including maternal level of education^{11–13}, place of residence, wealth index, postnatal care¹⁴, religion¹⁵, and insecurity^{16,17} among others. The majority of these studies have largely focused on women of reproductive age 15–49 years. Recent studies have reported factors including maternal level of education, place of residence, delivery place, exposure to mass media, partner level of education, wealth index, and postnatal attendance were all significantly associated with full child immunization coverage.^{18,20} Likewise, ownership of health cards, good knowledge of the importance of vaccination, and mothers receiving tetanus toxoid vaccination have been reported to be associated with full child vaccination status.^{21,22}

II. Materials and Methods

Study area, design and population

A descriptive study was conducted among mothers of children under five attending the immunization clinic in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria in May and June, 2022. All mothers of children under five year of age attending the immunization clinic and were present at the time of the study were considered eligible for enrollment into the study.

The sample size was estimated at 280 using the Fisher's formula for calculating sample size for cross-sectional studies²², a 91.8% prevalence of knowledge of timing of national immunization schedule among pregnant mothers in Sokoto from a previous study²³, and an anticipated participant response rate of 90%.

The eligible participants were selected by systematic sampling technique; one of three mothers who presented at the clinic and meets the eligibility criteria were enrolled into the study over a twenty-one clinic day period until the required sample size was obtained.

A standardized, structured, interviewer-administered questionnaire was used to obtain information on participants' socio-demographic characteristics, knowledge of timing on routine immunization schedule, compliance with full routine immunization schedule and reasons for non-compliance with routine immunization schedule. It was reviewed by researchers in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria. The necessary corrections were made based on their inputs to ascertain content validity. The questionnaire was pretested on 40 mothers of under-five children attending immunization clinic in specialist hospital Sokoto, Nigeria. Four nurses and five record officers assisted in questionnaire administration

after being trained on the conduct of survey research, the objectives of the study, and questionnaire administration.

Data were analyzed using IBM Statistical Package (SPSS) version 25 software. Respondents' knowledge of the timing of routine immunization schedule was scored and graded on a 6-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of '0' and a maximum score of '6' points. Those that scored ≥ 3 of 6 points were considered as having 'good' knowledge of timing of routine immunization schedule, while those that scored < 3 of 6 points were graded as having 'poor' knowledge.

Institutional ethical clearance was obtained from the Ethical Committee of the Usmanu Danfodiyo University Teaching Hospital, Sokoto. Permission to conduct the study was obtained from the Head of Department of community medicine, and the Chief Nursing Officer in-charge of the clinic. Informed written consent was also obtained from the participants before questionnaire administration.

Frequency distribution tables were constructed; and cross tabulations were done to examine the relationship between categorical variables.

III. Results

Socio-demographic characteristics of the respondents

All the questionnaires administered to the 280 mothers of the under five years' children enrolled into the study were completely filled and used for analysis giving a response rate of 100 percent. The ages of the respondents ranged from 18 to 45 years with a mean age of 29.18 ± 8.16 years. Majority of the respondents 167 (59.5%) were aged 21-30 years. Most of the respondents were married 277 (99.0%); and a majority of them were Moslems 234 (83.6%), larger proportion (58.1%) had tertiary education followed by those with secondary education 105 (37.5%) and only 6 (2.2%) had no formal education. **(Table 1)**

Respondents' knowledge of timing on routine immunization

Almost all the respondents knew the specific period at which childhood immunization is given at birth 274 (97.9%) and at 6 weeks 275 (98.2%) according to the National Immunization Schedule. Overwhelming majority 264 (88.0%) and 245 (87.5%) stated correctly the timing and specific vaccines given at 10 and 14 weeks of age respectively. A majority 228 (81.4%) of the respondents and about two-third 182 (65.1%) of them mentioned correctly the vaccines that are given at 9 months and 15 months respectively. **(Table 2)**

Respondents' Compliance with routine immunization schedule

Majority of the respondents 235 (83.9%) reported that their children were immunized at the appropriate timing as per the schedule and up to two-third 175 (62.5%) of them had their children fully immunized. Close to one-third 76 (27.1%) mentioned that their children developed AEFI out of which 58(76.3%) reported fever as the common manifestation followed by diarrhoea 11(14.5%). The common reasons mentioned by the respondents for not receiving the immunization at the appropriate timing were: waiting time 11(24.4%), delivered at home 5(11.1%), attitude of health workers 4(8.8%) lack of transport money 3(6.6%), child was sick 7(15.9%) and lack of information about the schedule at 15 months 3(6.6%) among others. **(Table 3)**

Table 1: Socio-demographic characteristics of the respondents

Variable	Frequency (%) n=280
Age (years)	
≤ 20	21 (7.4)
21-30	167 (59.5)
31- 40	85 (30.5)
≥ 41	7 (2.6)
Marital status	
Married	277 (99.0)
Single	3 (1.0)
Educational status	
Tertiary	163 (58.1)
Secondary	105 (37.5)
Primary	6 (2.2)
No formal education	6 (2.2)
Religion	
Islam	234 (83.6)
Christianity	46 (16.4)
Tribe	
Hausa	216 (77.0)
Yoruba	21 (7.6)

Igbo	22 (7.8)
Others (Nupe, Igbra, etc)	21 (7.6)

Table 2: Respondents' knowledge of timing on routine immunization

Variable	Correct Responses Frequency (%) n=280
At birth	
BCG, OPV0 and HBV	274 (97.9)
At 6 weeks	
OPV1, PENTA1, PCV1 and ROTA1	275 (98.2)
At 10 weeks	
OPV2, PENTA2, PCV2 and ROTA2	264 (88.0)
At 14 weeks	
OPV3, PENTA3, PCV3, IPV and ROTA3	245 (87.5)
At 9 month	
First dose of Measles, Yellow fever and Meningitis	228 (81.4)
At 15 month	
Second dose of Measles	182 (65.1)
Knowledge grade	
Good	254 (90.7)
Poor	26 (9.3)

Table 3: Respondents' Compliance with routine immunization schedule

Variable	Frequency n (%)
Child immunized at the appropriate timing for age (n = 280)	
Yes	235 (83.9)
No	45 (16.1)
Child fully immunized (n = 280)	
Yes	175 (62.5)
No	105 (37.5)
Child ever experienced adverse events following immunization (AEFI)	
Yes	76 (27.1)
No	214 (72.9)
Type(s) of AEFI experienced by the child (n = 76)	
Fever	58(76.3%)
Skin rashes	6(7.9%)
Diarrhoea	11(14.5%)
Swelling on the site of injection	1(1.3%)
Reason (s) for not receiving immunization at the appropriate timing (n = 45)	
Delivered at home	5(11.1%)
Waiting time	11(24.4%)
Attitude of the health workers	4(8.8%)
Lack of money for transportation	4(8.8%)
I didn't have time to come	5(11.2%)
Husband couldn't approve it then	3(6.6%)
My child was sick at that time	7(15.9%)
Lack of information about the schedule at 15 months	3(6.6%)
I travelled out of town	3(6.6%)

IV. Discussion:

This study assessed the knowledge and compliance with routine immunization schedule among mothers of children under five years attending immunization clinic in a tertiary hospital in Sokoto state, Nigeria.

The present study showed that a high proportion (59.5%) of the respondents were within the age ranged of 21 -30 years. This is similar to the study which assessed knowledge, attitude and compliance with full immunization of children against vaccine preventable diseases among Pregnant Mothers in Sokoto, Nigeria, where majority (59.5%) of the respondents were within the age range of 20-29 years²³, it is also in agreement with studies done in Osun state south western Nigeria, Ibadan, and in Ethiopia where larger proportions (55.3%), (50.9%) and (30.6%) of the respondents were within the age range of, 20-29 26-30, 25 – 29 respectively.^{24, 25, 26} However, our study is at variance with studies done in Ekiti, India, Saudi Arabia and Uganda, Lagos, where greater proportion of the respondents (46.0%), (51.4%), (56.6%), (37.8%) and (56.4%) were in the older age groups, 31 -38, 27-38, 30-39, ≥ 35 and 25-34 years respectively.^{27,28,29, 30,31}

The current study showed that a high proportion (58.1%) of the respondents had tertiary education. The finding of this study is in consonance with studies carried-out by Titilope et al., Konwea et al. and Giannakou et al., where majority of their respondents were having tertiary education.^{24, 27, 32} However, our study contrasts the findings of studies conducted by Rahji and Ndikom in Ibadan, Mahalingam et al., in India Abidoye and Adeyemi in Lagos and Adedire et al., in Osun where majority of the respondents had secondary education.^{23, 25, 28, 31, 33}

Almost all 277 (99.0%) of the respondents in the current study were married, our finding is supported by a study by Awosan et al., where most of the respondents were married (91.8%), it is also in agreement with findings of studies done in Ibadan, Kossefe, Lagos state, and in Greece and Osun state, where almost all the respondents were married.^{23, 31, 32, 33} Our finding is however, much higher than what was obtained in a study by Titilope et al., where less than two-third (60.4%) of the respondents were reported to be married.²⁴

Knowledge of parents regarding immunization plays a very vital role in getting updated vaccines for their children. In the present study, almost all, 274 (97.9%) of the respondents knew the timing (at birth) of routine childhood immunizations according to the National Immunization Schedule. This corroborate the finding of a study conducted among pregnant women attending ANC in a tertiary hospital in the north western Nigeria by Awosan et al., where 95.9% of the respondents had good knowledge of routine immunization timing at birth, it is also in tandem with the finding in a study by Sowmya et al., which assessed knowledge, attitude, and practice of immunization of mothers of children under 5 years in a rural community, India (99.2%).^{23, 34} The finding of our study is slightly higher than that of a study by Adedire et al., in Osun state where the knowledge of the respondents regarding the immunization timing at birth was 85.3%, and it is also much higher than what was obtained in a study in Lagos state Teaching hospital by Awodele et al., (62.6%).^{33, 35}

The finding of the current study regarding the timing of routine immunization schedule at 6 weeks is 92.1%, this is higher than the value obtained by Adedire et al., (70.7%).³³ However, the present study recorded lower value (62.5%) of respondents' knowledge of routine immunization timing at 9 month compared to what was reported in studies by Awosan et al., and Adedire et al., 92.7% and 93.1%. respectively.^{23, 33} The overall knowledge score of routine immunization timing among the respondents in this study was 90.7%. This finding is consistent with findings of several studies by Awosan et al., Titilope et al., Almutairi et al., Awodele et al., Odusanya et al., Ariyibi et al., and Jeenwal et al.,^{23, 24, 29, 35, 36, 37, 41} our study is however at variance with studies by Eyesus et al., Kumar et al., Gidado et al., Elbert et al. and Jeenwal et al., where much lower values were obtained; 65.1%, 24.0% 16.0%, 46.5%, 23.0% and respectively.^{26, 38, 39, 40, 41}

Overwhelming majority 235(83.9%) of the respondents in the current study had their children immunized at the appropriate timing as per the national immunization schedule and about two-third 175(62.5%) of the children were reported to be fully vaccinated, some of the reasons stated by the respondents for not complying with the timing of the schedule include; Waiting time, Attitude of the health workers, delivered at home, child was sick, husband did not permit and lack of information about the measles vaccine at 15 months among others. The finding of our study regarding the compliance with the timing of routine immunization as per the schedule is similar to what was recorded in studies by Konwea et al., Alumaitari et al., Abor et al., Aribiyi et al., and Jeenwal et al. (80.0%), (80.5%), (80.5%) and (87.0%) respectively.^{27, 29, 30, 37, 41} However, lower values were reported in studies by Rahji and Ndikom, Eyesus et al., Odusanya et al., Ramawat and Goswani, (62.8%), (61.9%), (55.3%), (77.0%) respectively.^{25, 26, 36, 43}

Several studies across the globe reported much higher values of compliance with routine immunization timing compared to the current study; Mahalingam et al. and Giannakou et al., (98.0%) and (95.9%).^{28, 32}

The finding that about two-third 175(62.5%) of the respondents in this study were fully immunized is in agreement with the studies done by Awosan et al., Elbert et al. and Ali et al., (65.5%)²³, (62.8%)⁴⁰, and (61.6%)⁴⁵, but higher values was recorded in a study by Sowmya et al., (98.8%).³⁴ In the same vein, studies by Titilope et al., Alabi et al., and Sadoh and Eregie recorded much lower values compared to the current; (30.2%), (44.3%) and (18%) respectively.^{24, 42, 44}

V. Conclusion And Recommendations

This study showed good knowledge of timing as per the National Immunization Schedule among the respondents with overwhelming majority complying with the timing according to the national immunization schedule. About to-third of the respondents had their children fully immunized, some of the reasons for not complying with timing as per the schedule among the respondents were waiting time, attitude of the health workers, husband disapproval and sickness of the child among others. There is need for sustained health education of the mothers of under - five by the health workers on the National Immunization Schedule at every clinic day. In addition, it is also recommended to improve the accessibility of routine immunization provided at the units to reduce waiting time for the mothers, husbands should be involved in interventions for promoting immunization acceptance.

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