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Perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria

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ABSTRACT

Background: Despite the availability of inexpensive and effective tetanus-toxoid-containing vaccines, elimination of maternal and neonatal tetanus worldwide has become a herculean task, particularly in low-income countries due to poor immunization coverage. This study aimed to assess the perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria.

Materials and Methods: A cross-sectional study was conducted among 254 pregnant women (selected by systematic sampling technique) attending the antenatal clinic of Specialist Hospital, Sokoto, Nigeria. A structured interviewer-administered questionnaire was used to collect data on the research variables. Data were analyzed using IBM SPSS version 20 statistical computer software package.

Results: Most, 221 (87.0%) of the 254 respondents had heard of tetanus toxoid (TT) immunization. Of these, only about half (51.1%) believed that it protects both mother and newborn baby from tetanus. Majority of respondents considered TT immunization to be effective in protecting against tetanus infection (73.3%) and also safe for both mother and baby (79.2%). About two-thirds of respondents (68.8%) had the misconception that a single dose of TT immunization protects from tetanus infection. Less than a quarter of respondents (23.6%) had received two or more doses of the vaccine. The main barriers to utilization of TT immunization were lack of awareness of the vaccine (41.8%), not being aware of its benefits (36.7%), and fear of side effects (21.5%)

Conclusion: Despite high levels of perception of the effectiveness and safety of TT immunization, the respondents in this study had low levels of perception and utilization of the protective doses of the vaccine. Government and healthcare workers should scale-up education of the populace on TT immunization schedule and implement community based vaccination of women of child bearing age in North-West Nigeria.

Keywords: Perception, utilization, tetanus toxoid immunization, pregnant women

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INTRODUCTION

Despite the availability of inexpensive and effective tetanus-toxoid-containing vaccines (TTCV), elimination of maternal and neonatal tetanus (MNT) worldwide has become a herculean task, particularly in low-income countries due to low immunization coverage, and recent data showed that MNT is still a public health problem in 14 of the 59 countries at risk worldwide since year 2000.[1]

While the 34,000 newborns deaths from neonatal tetanus in 2015 is still a high figure, it actually represents a 94% reduction since 1988, and the reduction is believed to be largely due to scaled-up immunization with TTCV following the launching of the global Neonatal Tetanus Elimination and subsequently the Maternal and Neonatal Tetanus Elimination (MNTE) initiative in 1989 and 1999 respectively.[2] Since tetanus cannot be eradicated because the spores are present in the environment worldwide, the MNTE initiative aims to reduce MNT cases to such low levels that the disease is no longer a major public health problem (defined as less than one case of neonatal tetanus per 1000 live births in every district) in all countries. This is to be achieved through provision of at least 2 doses of tetanus toxoid (TT2) to all pregnant women in high risk areas and 3 doses (TT3) to all women of child bearing age, promotion of clean delivery services to all pregnant women

(including clean cord care practices) and ensuring effective surveillance for maternal and neonatal tetanus.[1]

Although, maternal and neonatal tetanus can be easily prevented by hygienic delivery and cord care practices, deliveries take place in unhygienic circumstances (as a result of the prevalent inequity in access to maternal, newborn and child health services) in many low- and middle- income countries (particularly in Asia and sub-Saharan Africa where the 14 countries in which MNT is still a public health problem are located), putting mothers and their newborn babies at risk of a variety of life-threatening infection. Also, whereas immunization of pregnant women and women of child bearing age with TTCV has been found to be very effective in preventing MNT, its utilization remains low in these countries.[1,3] In Nigeria, similar to the situation in other sub-Saharan African countries where MNT is still a public health problem, data from the National Demographic and Health Survey (NDHS) 2013 showed wide variation but generally poor utilization of health facility delivery services across the country, ranging from 11.5% in the North-West geopolitical zone to 78% in the South-East; and with only 38% of deliveries across the country assisted by a skilled provider.[4] The enormity of the danger posed by the poor obstetric care services across the continent is demonstrated by the finding in a study conducted at the Kilifi County Hospital, Kenya, that reported that 98% of the neonatal tetanus admissions at the hospital from 1999 to 2013 were home deliveries.[5]

While evidence from studies has shown that immunization of pregnant women or women of child bearing age with two or more doses of tetanus vaccine (TT2+) protects the mother and the newborn baby from tetanus (with 94% reduction in mortality from neonatal tetanus), and at least 80% TT2+ coverage is needed to achieve MNT elimination,[6,7] data from the Nigeria Demographic and Health Survey (NDHS) 2013 showed wide variation and predominantly low TT2+ coverage rates across the country, ranging from 27.1% in the North-West geopolitical zone of the country (the study area) to 82.0% in the South-East zone; and with a national TT2+ coverage rate of 48%.[4]

Similar to the situation in Nigeria, studies conducted in other sub-Saharan African countries including Ethiopia,[8] Kenya,[9] and Benin Republic,[10] also established a direct association between health facility utilization by pregnant women (particularly antenatal clinic attendance) and acceptance of TTCV by them, as the ANC visits avail the healthcare providers the opportunity to educate them on the benefits of TT immunization and its schedule. While the concomitantly low utilization of health facility delivery services and low TT2+ coverage rate in North-West Nigeria is not surprising, it is alarming as it exposes the vulnerability of women and newborns in the zone to tetanus infection and the dire consequences.

In addition to utilization of health facility delivery services (particularly the number of antenatal clinic visits), maternal socio-demographic characteristics, awareness of vaccine, knowledge of the schedule, access issues, conflicting advice, perception on vaccine efficacy, safety concerns and attitude of healthcare providers have been identified as determinants of acceptance of TTCV in studies conducted in sub-Saharan Africa and other places.[11-16]

It is therefore evident that assessment of perception and utilization of tetanus toxoid immunization by pregnant women is crucial to identifying the barriers to the acceptance of the vaccine, and in developing strategies for facilitating its acceptance by them. Little is known about the perception of tetanus toxoid immunization among pregnant women in Sokoto, Nigeria. This study was conducted to assess the perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria.

MATERIALS AND METHODS

Study Design and Population

A cross-sectional study was conducted among pregnant women attending the antenatal clinic of Specialist Hospital, Sokoto, Nigeria in April and May 2015. The hospital is a tertiary healthcare facility located in Sokoto metropolis with a bed capacity of 270. It caters for the inhabitants of Sokoto metropolis and those referred from the health facilities in the Local Government Areas in Sokoto State, Nigeria. The Obstetrics and Gynaecology Department of the hospital runs the antenatal clinic thrice a week, seeing an average of 200 patients per day. Fresh attendees presenting for booking are seen on Wednesdays, while those presenting for revisits are seen on Tuesdays and Thursdays. Only those presenting for revisits were considered eligible and enrolled into this study.

The sample size was estimated at 245 using the Fisher's formula for calculating sample size for cross-sectional studies,[17] a 20.0% prevalence of women of child bearing age that had received two or more doses of tetanus toxoid vaccine in a previous study,[18] and a precision level of 5%. This was adjusted upwards to 260 based on an anticipated participant response rate of 95%. The eligible participants were selected by systematic sampling technique; 1 of 7 pregnant women presenting consecutively for revisits at the antenatal clinic of the hospital was recruited over a 6-week period until the required sample size was obtained.

Data Collection and Analysis

A standardized, structured, interviewer-administered questionnaire was developed and used to obtain information on the participants' socio-demographic characteristics, and their perception and utilization of tetanus toxoid immunization. It was reviewed by researchers in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria. Corrections were made based on their inputs on content validity. The questionnaire was pretested on 20 pregnant women attending the antenatal clinic of Maryam Abacha Women and Children Hospital, Sokoto, Nigeria; the questions were well understood and no modification was necessary. Five resident doctors 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 for the Social Sciences (SPSS) version 20 statistical computer software package. Quantitative variables were summarized using mean and standard deviation, while categorical variables were summarized using frequencies and percentages; and the results were presented as frequency distribution tables.

Ethical Consideration

Institutional ethical clearance was obtained from the Ethical Committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission to conduct the study was obtained from the management of the hospital, and informed written consent was also obtained from the study participants before questionnaire administration.

RESULTS

Socio-demographic characteristics of respondents

Two hundred and fifty-four of the 260 questionnaires administered were completely filled and retrieved, giving a response rate of 97.7%. The ages of the respondents ranged from 15 to 48 years (mean = 28.76 ± 4.31), but majority of them 137 (53.9%) were aged 20 – 29 years. Almost all, 246 (96.9%) of the 254 respondents were married, and most of them (206, 81.1%) were Muslims. Majority of the respondents were of Hausa/Fulani ethnic group (170, 66.9%), had secondary and tertiary education (176, 69.3%), were housewives (132, 52.0%) and had ≤ 4 children (188, 74.0%) as shown in Table 1.

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency (%) n = 254
Age group (years)	
<20	23 (9.1)
20-29	137 (53.9)
30-39	81 (31.9)
≥40	13 (5.1)
Marital status	
Married	246 (96.9)
Separated	8 (3.1)
Ethnic group	
Hausa/Fulani	170 (66.9)
Igbo	23 (9.1)
Yoruba	33 (13.0)
Others	28 (11.0)
Religion	
Islam	206 (81.1)
Christianity	48 (18.9)
Level of education	
No formal education	58 (22.8)
Primary	20 (7.9)
Secondary	107 (42.1)
Tertiary	69 (27.2)
Occupation	
Housewife	132 (52.0)
Trader / business woman	67 (26.4)
Civil servant / professional	55 (21.7)
Number of children alive	
0-4	188 (74.0)
5-9	66 (26.0)

Awareness of tetanus toxoid immunization by respondents

Most, 221 (87.0%) of the 254 respondents had heard of tetanus toxoid immunization. Of these, majority 137 (62.0%) obtained information on TT immunization from healthcare workers (during antenatal clinic sessions). Other common sources of information on TT immunization among the respondents were friends/relatives (20.8%) and the mass media (12.2%) as shown in Table 2.

Table 2: Awareness of tetanus toxoid immunization by respondents

Variables	Frequency (%)
Ever heard of TT immunization (n = 254)	
Yes	221 (87.0)
No	33 (13.0)
Main source of information (n = 221)	
Mass media	27 (12.2)
Health workers	137 (62.0)
Friends/relatives	46 (20.8)
Others (church, mosque)	11 (5.0)

Respondents' perception of tetanus toxoid immunization

Only about half, 113 (51.1%) of the 221 respondents that were aware of tetanus toxoid (TT) immunization believed that it protects both mother and newborn baby from tetanus. Majority of respondents (150, 67.9%) had the misconception that TT immunization is recommended for pregnant women only. While majority of respondents considered TT immunization to be effective in protecting against tetanus infection (73.3%) and also safe for both mother and baby (79.2%), about a tenth of respondents (10.9%) had the misconception that it is harmful to the baby. About two-thirds of respondents (68.8%) had the misconception that a single dose of TT immunization protects from tetanus for some years, while about half of them (50.7%) had the misconception that two or more doses protect from tetanus for life (Table 3).

Utilization of tetanus toxoid immunization by respondents

Majority, 175 (68.1%) of the 254 respondents had received at least 1 dose of tetanus toxoid (TT) immunization during pregnancy. Of these, only about a third 60 (34.3%) had received two or more doses of the vaccine. This implies that less than a quarter 60 (23.6%) of the 254 respondents had received two or more doses of the vaccine. Of the 79 respondents that had never received the vaccine, the main reasons cited were lack of awareness of the vaccine (41.8%), not being aware of its benefits (36.7%), and fear of harm to self and/or baby (21.5%) as shown in Table 4.

Table 3: Respondents' perception of tetanus toxoid (TT) immunization

Perception of TT immunization	Frequency (%) (n = 221)
Benefits of TT immunization	
Protects only the mother from tetanus	44 (19.9)
Protects only the newborn baby from tetanus	57 (25.8)
Protects both mother and newborn baby from tetanus	113 (51.1)
Don't know	7 (3.2)
Group of women for which TT immunization is recommended	
Women of child bearing age only	27 (12.2)
Pregnant women only	150 (67.9)
Both pregnant women and women of child bearing age	35 (15.8)
Don't know	9 (4.1)
Effectiveness of TT immunization in protecting from tetanus	
Effective	162 (73.3)
Not effective	6 (6.7)
Don't know	53 (24.0)
Safety of TT immunization	
Harmful to the baby	24 (10.9)
Harmful to the mother	17 (7.7)
Safe for both mother and baby	175 (79.2)
Don't know	5 (2.3)
Number of dose(s) of TT immunization that offer(s) protection from tetanus for some years	
One	152 (68.8)
Two or more	39 (17.6)
Five	26 (11.8)
Don't know	4 (1.8)
Number of dose(s) of TT immunization that offer(s) protection from tetanus for life	
One	49 (22.2)
Two or more	112 (50.7)
Five	52 (23.5)
Don't know	8 (3.6)

Table 4: Utilization of tetanus toxoid immunization during pregnancy by respondents

Variables	Frequency (%)
Ever had TT immunization during pregnancy (n = 254)	
Yes	175 (68.9)
No	79 (31.1)
Total number of doses received during pregnancy (n = 175)	
One	115 (65.7)
Two	33 (18.9)
Three	19 (10.9)
Four	6 (3.4)
Five	2 (1.1)
Main reason for not receiving TT immunization during pregnancy (n = 79)	
Not aware of the vaccine	33 (41.8)
Not aware of its benefits	29 (36.7)
Fear of harm to self and/or baby	17 (21.5)

DISCUSSION

This study assessed the perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria. While the high level of awareness of tetanus toxoid (TT) immunization among the respondents in this study (87.0%) is in consonance the with high levels of awareness of TT immunization in studies conducted in other cities in Nigeria including Lagos (89.0%),[18] and Benin City (69%),[19] it is substantially higher than the low level of awareness (30.6%) reported in a recent study conducted in Duken

Town, Eastern Ethiopia.[8] This could be due to the efforts being made to eliminate MNT in Nigeria, being one of the countries where MNT is still a problem of public health importance in sub-Saharan Africa, unlike the situation in Ethiopia where the disease has been eliminated, and perhaps less attention is being given to it. It is therefore necessary to make the Government and other stakeholders in the countries where MNT has been eliminated know that promotion of TT immunization should be sustained to achieve at least 80% immunization coverage among pregnant women and women of child bearing age to be able to maintain the MNT elimination they have achieved in their respective countries (as recommended by the World Health Organization).[1]

The finding of only about half (51.1%) of the respondents in this study believing that TT immunization protects both mother and newborn baby from tetanus, and most of them (67.9%) believing that it is recommended for only pregnant women suggests gaps in the sensitization of the populace about the disease, as most of them (62.0%) obtained information about the disease through health workers (during the antenatal clinic visit), who were probably mainly concerned with promoting the vaccine among their clients. Similar to the low level of sensitization of the populace on TT immunization through the mass media in this study (12.2%), only a tenth (10%) of respondents obtained information on TT immunization through the mass media in a study among pregnant women in Benin City,[19] while another study among women in a Niger Delta community[20] reported that none (0%) of the respondents obtained information about TT immunization through the mass media. Contrary to the findings in studies conducted in Nigeria, reports from studies conducted in other sub-Saharan African countries not only showed higher utilization of the mass media in sensitizing the public about TT immunization, but also established an association between owning a radio or television and TT2+ uptake.[8,10] These findings underscore the need for periodic and sustained sensitization of the populace about TT immunization through the mass media.

The finding of most of the respondents in this study believing that TT immunization is effective in protecting from tetanus (73.3%) and safe for both mother and baby (79.2%) is reassuring, and it has serious implications on the acceptance of the vaccine by them considering the fact that doubts about the vaccine efficacy and safety concerns have been identified as barriers to uptake of TT immunization in studies conducted in many sub-Saharan African and Asia countries, particularly those where MNT has not been eliminated.[10,21,22]

The finding of majority of the respondents in this study having the misconception that a single dose of the vaccine offers protection from tetanus for some years and that two or more doses offer protection from tetanus for life shows that they lack accurate information about the schedule for the vaccine. This is of serious concern as an erroneous perception of being protected by a single dose of the vaccine could make them not to complete the doses as specified in the immunization schedule, thus making them and their newborn babies vulnerable to tetanus infection. This is supported by the finding in a review by Wilson et al.[12] that reported low knowledge about vaccines as one of the main barriers against tetanus vaccines acceptance in low-income countries. Similar to the finding in this study, studies conducted in other cities in Nigeria majorly reported poor awareness / knowledge of TT immunization schedule.[18,20,21] A study among women of child bearing age in an urban district of Lagos, Nigeria,[18] reported low awareness regarding the number of doses of vaccine required in pregnancy (14.4%) and for life protection (19.5%). Another study among women in a Niger Delta community of Nigeria reported that only 21.4% of respondents had good knowledge of TT immunization.[20] A similar study among female undergraduate students in a Nigerian university[21] reported that only 18.2% of respondents knew the complete dose of TT immunization.

Although, majority of the respondents in this study (68.9%) have ever had TT immunization, less than a quarter of them (23.6%) had received two or more doses of the vaccine. This could be due to the poor awareness of TT immunization schedule by the respondents as majority of them (68.8%) erroneously believed that a single dose of the vaccine protects from tetanus, and the most common reasons cited by the respondents that never had TT immunization were lack of awareness of the vaccine (41.8%), and not being aware of its benefits (36.7%). These findings suggest the need for health workers to pay sufficient attention to educating pregnant women and women of child bearing age on TT immunization schedule (particularly its protective doses), its effectiveness in protecting mother and newborn baby from tetanus, and its safety in order to facilitate uptake of protective doses of the vaccine by them.

While the 23.6% TT2+ uptake among the respondents in this study is almost twice the 12.6% TT2+ coverage among women of child bearing age in Sokoto State, Nigeria, it is in agreement with the 27.1% TT2+ coverage among women of child bearing age in North-West Nigeria (the study area).[4] This could be due to the fact that the study was conducted in a tertiary health facility in an urban community. This is corroborated by the findings from the Nigeria Demographic and Health Survey (NDHS) 2013 which showed that, while the national prevalence of women that received two or more doses of TT immunization in their last pregnancy was 48%, women in urban areas were almost twice as likely (70%) to have received two or more doses of TT immunization as compared to women in rural areas (36%).[4] The low uptake of TT2+ among the respondents in this study, similar to the situation in the zone (North-West Nigeria), and with the zone having the lowest TT2+ coverage among women of child bearing age in Nigeria underscore the need for Government and healthcare workers to scale-up education of the populace on TT immunization schedule (particularly through the mass media) and implement community based vaccination of women of child bearing age in the zone.

CONCLUSION

Despite high levels of perception of the effectiveness and safety of TT immunization, the respondents in this study had low levels of perception and utilization of the protective doses of the vaccine. Government and healthcare workers should scale-up education of the populace on TT immunization schedule and implement community based vaccination of women of child bearing age in North-West Nigeria.

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