Assessment of the knowledge and uptake of Tetanus Toxoid Vaccine among Pregnant Women in Nguru Town, Nigeria

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Abstract
The aim of this study was to assess the knowledge and uptake of the tetanus toxoid vaccine among pregnant women in General Hospital, Nguru town. A stratified random sampling technique was adopted to cover 152 pregnant women of different categories. A well-structured questionnaire was used to collect data and the test-retest method was used to check the questionnaire's consistency. The obtained data were statistically analysed and the formulated hypothesis was tested using Chi-square. The results show that Hausa/Fulani (50.7%) and the age bracket 21-25 years (46%) constituted the majority. Also, about 97% of the respondents have an awareness of TT and 76.32 % knew that the TT vaccine is for prevention. Though 91.45% of the respondents have ever received the vaccine in their lifetime, only 13.8% could ascertain when to receive it. About 57% were willing to receive the complete 5 doses, 71.2% were willing to receive at least 2 doses during pregnancy and 52.6% are willing to continue the TT regimen after delivery. Also, the study shows a significant association (P value = 0.022) exists between respondents' awareness and TT vaccine uptake; hence the null hypothesis is rejected. However, there is no significant association between the level of knowledge and TT vaccine update (p = 0.99). It can be concluded that many respondents have awareness and are willing to take TT vaccine. However, knowledge of when to take the vaccine is inadequate. Hence, to increase TT vaccine uptake level in the area more awareness is recommended.

Keywords: Awareness, Vaccine, Tetanus toxoid, Pregnant women, Nguru

1. Introduction

Tetanus is a disease caused by a powerful exotoxin produced during the growth lag phase of the anaerobic bacterium *Clostridium tetani* [1]. On the other hand, maternal tetanus is defined as tetanus acquired during pregnancy (whether the pregnancy ended with abortion, miscarriage or live birth) or within 6 weeks after the end of conception [2]. Tetanus is a vaccine-preventable disease; hence, immunization of pregnant women against it with the tetanus toxoid (TT) dose is considered one of the most effective ways of protecting against the disease. Women who are fully vaccinated with TT doses develop protective antibodies against tetanus for about 3 to 30 years [2]. Moreover, the vaccination only provides adequate protection against neonatal tetanus for three months postpartum. This implies that a mother protected against tetanus will pass her immunity on to her newborn child for the first two or three months, who will be considered protected as long as the delivery takes place two or more weeks after the second injection. However, non-uptake or completion of the schedules of the TT vaccination implies that the mother would not be able to develop immunity against tetanus and thus the anti-tetanus immunity would not be passed on to her newborn. Consequently, an infant born of TT non-compliant mothers would be highly susceptible to potential infection and death from tetanus.

Over the decades, maternal immunization has been adopted as a viable technique for the protection of pregnant mothers, and their unborn and newborn child from severe infectious diseases [3]. Though tetanus toxoid seems to be the popular vaccine being recommended for pregnant women in Nigeria, other vaccines used include influenza and pertussis vaccines [4]. The situation is not different in some African countries such as South Africa where tetanus toxoid is the only maternal immunization that is recommended to pregnant women to prevent neonatal tetanus infection [5].

The importance of vaccination to potential mothers or mothers cannot be over-emphasized. [6] asserted that

maternal immunization, in combination with better surveillance and hygienic practices, has attracted a reduction in the global tetanus mortality rate by more than 94%. Considering the enormous benefits of tetanus immunization, low-resource countries had adopted the implementation of vaccination programmes for pregnant women [7].

A deliberate attempt had been made to reduce the burden of child mortality across the globe. The reports of the world health organization showed that under-five mortality has reduced from 12.6 million to 5.3 million between 1990 and 2018 [8] [9]. However, the success achieved varies with continents and nations. For the same 2018, while under-five mortality recorded for Europeans was 9 deaths per 1000 live births, South Africa was 33.8 deaths per 1000 live births; sub-Saharan Africa was 76 deaths per 1000 live births [8] [10]. The poor attitude of developing nations such as Africa towards the vaccine (TT1 - TT5) uptake is worrisome as a declining trend has been reported. For instance, a UNICEF report on Somali women showed that (TT) uptake by 282 mothers with children aged 0 - 11 months indicated that only 39%, 30% 19%, 11% and 7% had received TT1, TT2, TT3, TT4 and TT5 doses, respectively [11]. Aside from the decline in dosage uptake, the non-availability of adequate resources and the unwillingness of pregnant women to take vaccination out of fears of its adverse impact on foetal development and health have been mentioned as major barriers to the achievement of national and international targets on maternal and child health [3] [12]. Other factors that contributed to the vaccine hesitancy and non-achievement of the targets are maternal's knowledge, attitudes and beliefs [3].

An earlier report has shown that neonatal tetanus is a great contributor to the aggravated value of the infant mortality rate in developing countries, particularly in Nigeria. on maternal and neonatal tetanus asserted that Nigeria is one of the twelve (12) countries yet to eliminate the disease [13]. The report claimed that neonatal tetanus still accounts for up to 20% of child mortality in the country. Recently, the report of the UNICEF global newborn mortality rates also ranked Nigeria as the 11th highest in neonatal deaths [14]. This suggests that for the country to have a drastic reduction in child mortality rate there is a need for a reduction in neonatal tetanus cases. More importantly, the report of localities on vaccine non-compliant women and the few women who are initiated on TT vaccination but do not complete the dozes are essential as the problem associated with tetanus originated from that. It is worth mentioning that Nigeria has not been able to achieve neonatal tetanus (NNT) global elimination targets as set by the WHO [15] [16]. This persisting challenge places Nigeria among the 25 remaining countries still reporting NNT as a cause of infant mortality [15].

In Africa and Nigeria in particular, several studies have been carried out on NNT; its prevalence rate and vaccination [17] [18]. For instance, [19] conducted a study on NNT at the University of Maiduguri Teaching Hospital, in the northeastern part of Nigeria and found that NNT has a prevalence rate of 4.9% and a case fatality rate of 66.7%. Their study attributed the high prevalence and mortality rate to poor immunization coverage as only 9.8% of the mother of NNT children had full immunization. They also observed that a high number of neonates with NNT were delivered at home, and had their umbilical cords cared for in an unhygienic way. Based on the available information, the only study conducted on NNT in our area of study was reported by [20]. However, the study was limited to a retrospective review of eighteen cases of post-neonatal tetanus managed within four years (2005-2008). Also, the data used only captured children between 2 and 12 years and the authors could not ascertain the immunization status of the patient. For the proper establishment of the regional or national prevalence of NNT, there is a need for an NNT study at a local scale. This indicates a knowledge gap in the literature that needs to be filled by further study. This will help in achieving the global goal of NNT elimination as set by the WHO and UNICEF. Thus, this study aims to assess the knowledge and uptake of the tetanus toxoid vaccine among pregnant women in Nguru town.

2. Materials and Method Description of the study area

The research was carried out in Nguru town. Nguru is a local government area in Yobe state, a state situated in the northeastern part of Nigeria (Figure 1). Nguru has public and private health Institutions that deliver health care services at different levels (primary, secondary, and tertiary levels). For this study, the antenatal clinic of the General Hospital (GH), Nguru was selected due to the high level of patronage and attendance of antenatal clinics. The general hospital was formerly a primary health centre and operates on 24 hours basis. It was recently upgraded to a general hospital in September 2022. It is a public hospital established on the 1st of January 1952 and located in the Bulabulin area.

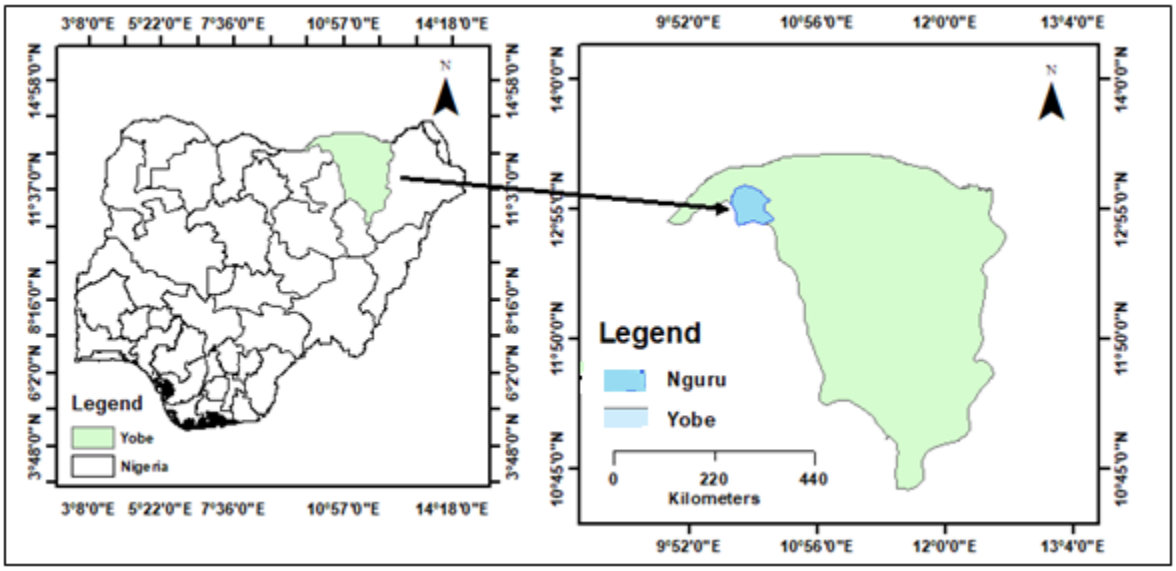

Figure 1: Study area

Methods

Study design and population

In this study, the quantitative descriptive design method was used to collect data on knowledge of the Tetanus Toxoid vaccine and uptake from the participants. The target population was pregnant women attending antenatal clinics in the General Hospital (GH), Nguru. Stratified random sampling techniques were adopted to ensure different categories of the women were covered taking into consideration factors such as the number of their children. A well-structured questionnaire was used to collect different types of data such as the socio-demographic profile of the respondents and the data that allows for the gathering of the research variables. For the reliability test, a few copies of the questionnaires were administered to pregnant women. Test-re- test method was used to analyze the collected data and the questionnaire was judged reliable.

Sample Size Determination

It is practically impossible to recruit all the antenatal attendee and insufficient number of participants may also not be a good representative of the neonatal case in the study area. Hence, for adequate recruitment from the population, appropriate sample size was estimated using the equation reported in [21].

$$S = \frac{n}{(1 + \frac{n}{N})}$$

However, $n = \frac{Z^2(P(1-P))}{d^2}$

Where;
n is the minimum sampling size
z is the Standard normal deviate, usually a constant given as 1.96
p is the population proportion assumed to be 0.5
d is the maximum difference between sample which is given as 0.05
p= true proportion of prevalence in the population which is given as 0.5%
N = 251

$$n = \frac{1.96^2(0.5(1-0.5)}{0.05^2}$$

n = 384.14

Hence;

$$S = \frac{384.14}{(1 + \frac{384.14}{251})}$$

S = 151.77 =152

Ethical clearance

Approval was sought from the Ethical Committee of General Hospital, Minna and correctional facility authority.

Ethical clearance and inclusion criteria

Ethical clearance was obtained from the Department of Nursing science. Subsequently, the proposal was submitted to the GH, Nguru and approval sought from the Ethical Committee of the hospital. Prior to the commencement of data collection informed consent was obtained from each participant.

Hypothesis and statistical analysis

Three hypotheses were formulated, which are that: (i) there is no relationship between knowledge of tetanus toxoid vaccine and uptake of the vaccine regimen among pregnant women in Nguru town; (ii) there is no relationship between the level of tetanus toxoid vaccination and uptake of tetanus toxoid vaccine among pregnant women in Nguru town; and (iii) there is no significant association between Parity and uptake of tetanus toxoid vaccine among pregnant women in Nguru town. The data were analyzed formulated hypothesis were tested using Chi square and results presented in tables and figures.

3.0 Results

Socio-demographic characteristics

This chapter details the analysis of the data obtained from the research respondents. This study was conducted among women of the childbearing age bracket of 15– 49 with 152 respondents. The results of the analysis of the obtained data are presented in tables and charts as shown below. Figure 2 and Table 1 show the socio-demographic data of the participants. While Figure 2 shows the frequency and percentage distribution, the remaining socio-demographic characteristics are presented in Table 1. The ages of the respondents ranged from 16 to 49 years having a mean of 29.68 ± 4.72. The ages are grouped into the class of 15-20 years, 21-25 years, 26-30, 31-35 years, 36-40 years and 41 and above. The majority (70 respondents) fall into the class of 21-25 years and they represent about 46% of the sample population (Figure 2a-b).

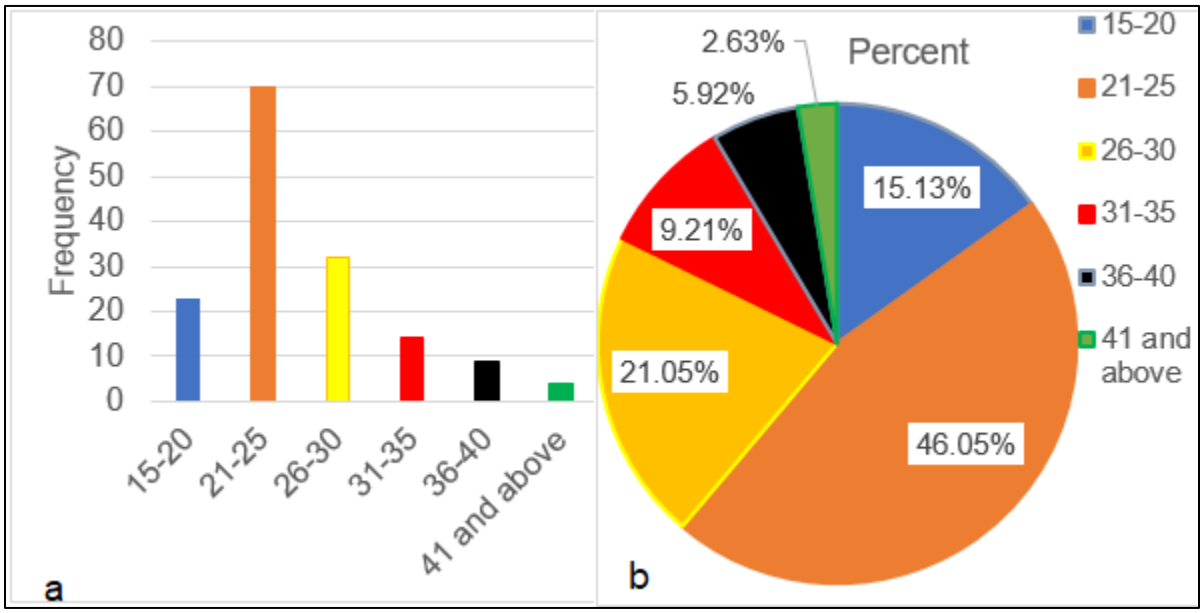

Fig 2: Age groups of respondents (frequency and percentage)

The main religion of the area under study is Islam as 143 (94.08%) respondents are Muslims while 9 (5.92%) are Christians as shown in Table 1. The table also showed that an appreciable number of the respondents are educated while some are not. Those with no formal education are 23 which represent 15.13% of respondents. Among the educated, 34 (22.4%) have acquired primary school leaving certificates, 75 (49.3%) have secondary school certificates and 20 (13.2%) have post-secondary certificates (i.e., diploma and degree certificates). The respondents are of different ethnicities and languages; however, the majority are Hausa/Fulani (77) and they constitute 50.7% of the respondents. Hausa/Fulani are followed by the Kanuri which has 30 respondents representing 19.7% of the total respondents. Other ethnic and sub-ethnic groups which constitute 29.6% having 45 respondents include Yoruba, Igbo, Bade, Karai Karai, Manga and Bolewa. The two major ethnic groups; Yoruba and Igbo have 7 and 2 respondents respectively.

The data on occupation status shows that 114 (75%) of the respondents are unemployed, 16 (10.53%) are employed either in the private or public sector and the remaining 22 (14.5%) are self-employed. Also, 32 (21.05) of the respondents were Primip. 97 (63.82%) were multiparous and the remaining 23 (15.13%) respondents were grand multiparous. On the marital status, the result shows that 150 (98.7%)

of the respondents are married while the remaining 2 (1.3%) were a widow and none of the respondents was a divorcee. The result of the facility used by the respondents shows that 2 (1.32%) use the primary level of health care, 138 (90.8%) utilized the secondary level of health care, and 12 (7.9%) utilized the tertiary level of health care.

Table 1 Socio demographic characteristics of respondents (n =152)

Variable	Frequency (n)	Percentage (%)
Religion		
Islam	143	94.08
Christianity	9	5.92
Level of education		
No formal education	23	15.13
Primary	34	22.37
Secondary	75	49.34
post-secondary	20	13.16
Ethnicity		
Kanuri	30	19.74
Hausa/Fulani	77	50.66
Others	45	29.61
Occupation		
Unemployed	114	75
Employed (public/private)	16	10.53
Self-employed	22	14.47
Parity		
Primip	32	21.05
Multiparous	97	63.82
Grand multiparous	23	15.13
Marital status		
Married	150	98.68
Divorced	0	0
Widow	2	1.32
Facility		
Primary	2	1.32
Secondary	138	90.79
Tertiary	12	7.89

Level of Knowledge of Tetanus Toxoid Vaccine among Respondents

Table 2 shows the knowledge of respondents on the tetanus toxoid vaccine. The result indicates that 148 of the respondents have heard of TT in the past while 4 have never heard of it. This shows that a very high percentage (97.4%) have heard about it. A substantial number of the respondents 128 (84.21%) claimed to have heard TT from health workers, while 20 (13.16%) mentioned other sources (such as media, school, places of worship, posters and brochures, families and friends) as their first source of information

Table 2: Knowledge of Tetanus Toxoid Vaccine Among Respondents (n =152)

Variable	Frequency	Percent
Have you ever heard of TT vaccine?		
Yes	148	97.37
No	4	2.63
What was your first source of information on TT vaccine		
None	4	2.63
Health practitioners	128	84.21
Others	20	13.16
What is the aim of TT vaccine?		
Treatment	7	4.61
Prevention	116	76.32
I don't know	29	19.08
What is the week interval between the first and second dose?		
two weeks	0	0.0
four weeks	14	9.21
six weeks	4	2.63
I don't know	134	88.16
Neonatal tetanus can be prevented by?		
Drugs	5	3.29
ANC visits	4	2.63
Vaccination	100	65.79
I don't know	43	28.28
When can neonatal tetanus be acquired?		
during pregnancy	39	25.66
during delivery	11	7.24
after delivery	8	5.26
all of the above	21	13.82
I don't know	73	48.03
The following is a means of prevention of neonatal tetanus?		
Cow dung on the umbilical cord/Herbs	0	0
Clean delivery	66	43.42
I don't know	86	56.58
How many doses of TT vaccine suffice during pregnancy and how many make a complete dose for pregnant/nursing women when taken as recommended?		
1 or 2	23	15.13
3 or 4	13	8.56
2 and 5	71	46.71
I don't know	45	29.61

A very high number of respondents are aware of the aim of the TT vaccine. About 4.61% asserted the aim of the TT vaccine is for treatment, while 116 respondents (76.3%) knew it is to prevent Tetanus Infection. The remaining 29 (19.1%) admitted to not knowing its aim. Some 105 (69.1%) of the respondents claimed that the TT vaccine prevents Tetanus Infection in adults and neonatal while 6 respondents opined that the vaccine is for the prevention of tetanus and other infection in adults while 41 (26.97%) do not know exactly what disease or infection the vaccine is meant to prevent. Many of the respondents seem to lack knowledge of the weekly interval between the first and second doses. Fourteen (14) respondents opined that the weeks' interval is four, four respondents claimed the interval is six weeks while the majority (134) of the respondents which represent 88.2% of the respondents claimed no knowledge of the week interval. This suggests that the majority of the respondent lack adequate knowledge about the week internal even though they know the reason for the vaccination. The responses of the majority to how neonatal tetanus can be prevented also indicated the respondents possess some level of understanding about tetanus. The majority (100) of the respondents representing 65.8% mentioned vaccination. Nevertheless, some respondents mentioned drugs (5; 3.3%) and regular ANC (4; 2.6%) as a way of preventing it and 43 (28.3%) do not know how it can be prevented.

Though, tetanus Infection can be contracted at any time irrespective of pregnancy, during and after delivery. The responses of the majority suggest inadequate knowledge about the infection. 39 (25.7%) claimed that tetanus can be contracted during pregnancy, 11 (7.2%) opined that it can be acquired during delivery, 8 (5.3%) asserted that it can be acquired after delivery, 21 (13.8%) claimed it can be acquired at any of aforementioned period. However, an appreciable number (73; 48%) of respondents lack knowledge of when it can be acquired. This shows poor knowledge of the respondents on when the disease could be acquired. A follow-up question on a measure to take to prevent contraction of the tetanus infection shows a similar pattern of response as the earlier one. None of the respondents agrees with the traditional concept of the usage of herbs or putting cow dung on the umbilical cord as a way to prevent it. 66 (43.4%) respondents mentioned clean delivery as a better preventive measure, however, the vast majority (86; 56.6%) still did not know of any means of prevention.

The respondents showed poor knowledge as the majority could not identify clean delivery as a preventive measure for Tetanus Infection. Table 2 also shows the diverse view of respondents on the number of doses of TT vaccine that suffice during pregnancy and the number of doses that make a complete dose for pregnant/nursing women when taken at a recommended time interval. While 23 (15.1%) of respondents asserted one and two doses suffice during pregnancy and complete doses respectively. Thirteen (13) respondents (8.6%) mentioned 3 and 4 doses for pregnancy and complete doses respectively. However, many (71; 46.7%) opined that 2 and 5 doses are the respective required number of doses. A large number (45; 29.6%) are still unaware of the number of required doses during pregnancy and for complete doses. If the number of those who picked the wrong options is added to those who expressed a lack of knowledge, a comparatively high percentage (53.3%) of the respondents do not know the required doses. A lack of common knowledge of 2 and 5 for pregnant women and complete suggest a poor knowledge of the respondent.

Level of uptake of Tetanus Toxoid vaccine among respondents

Table 3 shows the level of uptake of the tetanus Toxoid vaccine among respondents and whether or not culture/religion influences the level of its uptake. 139 (91.45%) of the respondents claimed to have ever received TT in their lifetime, while 9 (15.2%) have never been vaccinated with TT while the remaining 4 of the respondents are not sure whether or not they have ever received the vaccine. The number of doses received by respondents however varied. The majority, 107 (70.39%) have received 2 doses or less, 25 (16.45%) have received between 3 and 4 doses, and 20 (13.16%) have been vaccinated received more than five times. The responses to what was responsible for non or partial compliance to the TT vaccine uptake varies from one respondent to other. While none of the respondents attributed it to financial constraints or distance to the health facilities, the majority (107; 70.4%) claimed it was due to pain and fear of side effects. However, quite a large number (45) representing 29.6% of respondents think they do not need it after delivery. Some (4; 2.6%) of the respondents mentioned ascribed refusal to take the vaccine to either culture or negative comments of religious leaders on the

vaccine or believed that only God can offer protection against probable future diseases. However, the majority claimed no correlation exist between non uptake and their culture/ religious belief.

Table 3: Level of uptake of Tetanus Toxoid vaccine among respondents

Variable	Frequency	Percent
Have you ever received Tetanus Toxoid vaccine?		
Yes	139	91.45
No	9	5.92
I don't know	4	2.63
How many doses of tetanus Toxoid vaccine have you received?		
≤ 2	107	70.39
>2 but <5	25	16.45
≥ 5	20	13.16
What is responsible for your non/partial compliance with tetanus toxoid vaccine doses?		
Pain/side effects	107	70.39
financial constraints	0	0
distance to the health facilities	0	0
I don't have need for it after delivery	45	29.61
Does your cultural/religious' belief influence your uptake of Tetanus Toxoid vaccine?		
Yes	4	2.63
No	148	97.37

Respondents' willingness to receive Tetanus Toxoid vaccine

Table 4 below shows the willingness of respondents to receive the Tetanus toxoid vaccines. Most of the responses on the willingness are more in the favour of receiving the vaccine. Thirty-two (32) respondents which represent 21.05% agreed to get the complete dose as it is considered to be the best option to prevent TT and 55 (36.18%) respondents also strongly agreed. In other words, about 57% agree to show willingness for the complete doses. However, an appreciable number also do not agree with completing the dose as 24 (15.49%) and 41 (26.97%) picked the option of disagree and strongly disagree respectively. Many gave preference to taking 2 doses during each pregnancy period over a complete dose while some expressed a lack of willingness to get vaccinated. The majority of the respondents chose between agree (45; 29.6%) and strongly agree (64; 42.1%) to the assertion that taking at least two doses during pregnancy is important. However, some also maintained that taking 2 doses is not a must for prevention as 30 (19.74%) and 13 (8.55%) chose to disagree and strongly agree respectively. Similarly, on the TT vaccine uptake among pregnant women in Nguru town.

25 (16.5%) of respondents agree to continue their doses of TT after pregnancy, while 55 (36.18%) strongly agree to the same after pregnancy. However, many of the respondents indicated otherwise. Forty-five (45) which represent 29.6% chose to disagree with a continuation of vaccination after delivery and in the same vein, 27 (17.8%) respondents also indicated strong disagreement. Some 16 (10.53%) respondents agreed that 1 dose of TT is enough to offer protection against Tetanus Infection, while 9 (5.92%) strongly agreed that 1 dose is enough to achieve protection against the Infection. However, 75 (49.3%) chose to disagree and 52 (34.2%) chose to strongly disagree that 1 dose can is enough to have the required immunity against the TT infection.

Test of Formulated Hypothesis

Tables 6 and 7 present the results of the statistics for formulated hypotheses. The hypotheses were evaluated using frequency statistics and chi-squared tests of independence to test if there exist significant differences in the frequency of those with awareness, uptake of the vaccine and otherwise and socio-demographic characteristics that have an influence

From Table 6 below, 148 respondents know about the Tetanus Toxoid vaccine, while 4 are not aware of the vaccine. This showed that the majority of the respondents have good knowledge about the TT vaccine. The result of the statistical analysis showed that there is a significant difference between those who have awareness and those who are not aware (p = 0.022). From the findings of this research, the null hypothesis, 'There is no significant association between knowledge and uptake of Tetanus toxoid vaccine among pregnant women' is rejected since the P value is less than 0.05 (P value = 0.022), this implies that there is a significant association between knowledge and uptake of TT among pregnant women.

Table 4 Respondents' willingness to receive Tetanus Toxoid vaccine

Variable	**Frequency**	Percent
The best is to get the complete 5 doses of tetanus toxoid vaccine		
Agree	32	21.05
strongly agree	55	36.18
Disagree	24	15.79
strongly disagree	41	26.97
It is important to get at least 2 doses in every pregnancy		
Agree	45	29.61
strongly agree	64	42.11
Disagree	30	19.74
strongly disagree	13	8.55
There is a need to continue tetanus toxoid vaccine even after pregnancy		
Agree	25	16.45
strongly agree	55	36.18
Disagree	45	29.61
strongly disagree	27	17.76
One dose of Tetanus toxoid vaccine is enough to achieve protection		
Agree	16	10.53
strongly agree	9	5.92
Disagree	75	49.34
strongly disagree	52	34.21

Table 5: Results of Statistics for the hypotheses

Variable	Frequency	P-value
Awareness	**Level**	
Yes	148	0.022
No	4	
Level of	**Vaccine Uptake**	
Yes	139	0.023
No	9	
Dosage	**Received**	
≤ 2	107	
>2 but <5	25	0.721
≥ 5	20	

P < 0.05

Also, the Table indicates a significant difference (p = 0.023) between those who received the TT vaccine and those who have not received it among the respondents. Most of the respondents (139) have received the vaccine while a few (9) have never received the vaccine. Of the total respondent, 107 have received 2 or fewer doses, 25 have received 3 or 4 doses are 25, and 20 respondents have received more than 5 doses. The result of the chi-squared show there is no significant difference among the group (p = 0.721). This shows the awareness level and uptake update level are both significant and the update could probably have been influenced by their awareness level.

From the findings of this research, the null hypothesis 'there is no relationship between n the level of education and uptake of Tetanus toxoid vaccine among pregnant women' is accepted, since the P value is greater than 0.05 (P value = 0.99). Therefore, the uptake of TT is not a function of the level of education of pregnant women. The researcher was able to deduce from this study that the null hypothesis, there is no relationship between parity and uptake of Tetanus toxoid vaccine among pregnant women is true, since the P value is greater than 0.05 (p-value = 0.98). Therefore, the parity of pregnant women does not determine the uptake of TT. The results of the statistical analysis showed the level of uptake has no significant association with not only the parity (P = 0.98) but other socio-demographic factors such as age (P = 0.887), an education level (P= 0.993), ethnic (P = 0.855) and occupation (P = 0.94).

Table **6:** Socio demographic characteristics that influence the uptake of TT vaccine

Variable	Total	Yes	No	Yes (%)	No (%)	P value
Age						
15-20	23	21	2	91.3	8.7	
21-25	70	64	6	91.43	8.57	
26-30	32	30	2	93.75	6.25	0.887
31-35	14	13	1	92.86	7.14	
36-40	9	8	1	88.89	11.11	
41 and above	4	3	1	75	25	
Education level						
No formal education	23	21	2	91.3	8.69	
Primary	34	31	3	91.18	8.82	0.993
Secondary	75	69	6	92	8	
post-secondary	20	18	2	90	10	
Ethnicity						
Kanuri	30	27	3	90	10	
Hausa/Fulani	77	70	7	90.91	9.09	0.855
Others	45	42	3	93.33	6.67	
Occupation						
Unemployed	114	104	10	91.23	8.77	
Employed	16	15	1	93.75	6.25	0.94
self employed	22	20	2	90.91	9.09	
Parity						
Primip	32	29	3	90.63	9.38	
Multiparous	97	89	8	91.75	8.25	0.98
Grand multiparous	23	21	2	91.3	8.69	

$P < 0.05$

4.0 Discussion of Findings

Several socio-demographic factors have been listed as influencing the uptake of tetanus toxoid vaccine among women of reproductive age [22] (Singh et al., 2012). Age is considered one such factor that influences women's healthcare-seeking behaviour [23]. From the results of the assessment of the knowledge and uptake of the tetanus toxoid vaccine among pregnant women in Nguru town, it was observed that most (70) of the pregnant women were between the age of 21- 25. The high percentage (46.1%) of this group is not unanticipated as most of them are still in their reproductive age. Though the report of [24] asserted that no definite relationship exists between the utilization of maternal TT immunization services and the age of women as it varies from one area study to another. [25] opined that young women were more likely to utilize TT immunization services than older ones. Their findings showed that the highest percentage (29.2%) of the study sample were in the age group (20-24) years. It is worth noting that the report of [26] also reported a high prevalence rate (44.3%) of TT cases of mothers in Zaria, Kaduna State for the same age group (20-24). This could suggest that many childbearing women within Northern Nigeria are within the age.

It is evident from the result that those who acquired secondary school certificates represent almost half (49%) of the respondents. This agrees with the claim of [27] that education is an important factor that determines women's antenatal care-seeking behaviour in utilizing maternal TT immunization services.

On the knowledge of Tetanus Toxoid vaccine among pregnant women in Nguru town, the results of the findings show that 97.37% of the respondents have awareness of TT, this is contrary to findings of [28] who found that the level of awareness on TT vaccination in a state in the North Central, Nigeria was 25.7%. However, it is in agreement with the findings of [29] and [30] both of whom reported respective values of 66.2% and *98.1% for* the respondents with awareness of the existence of Tetanus Infection and Tetanus Toxoid in South-south, Nigeria. Similarly, a high value (87%) was reported by [31] for TT awareness of pregnant women in a tertiary centre in North-West Nigeria.

The majority (84.21%) of the participants mentioned health practitioners as their first source of information. This conforms with the report of earlier studies (e.g., [29] [32]). In the same vein, 76.32 % of the respondent knew that TT is for preventive measure and 65.79% affirmed that vaccination is the only way of preventing tetanus. This is similar to the findings made by [29] who stated that the majority of respondents knew tetanus toxoid immunization is for the prevention of tetanus infection. However, the knowledge of when to acquire the vaccine was not known to a large number of the respondents and only 13% were able to provide the correct answer. This indicates that even though many of the respondents demonstrate good knowledge of TT awareness, they still could not ascertain when to receive the vaccine. The health practitioners reported in this study as the main source of information agrees with the study of [30] who reported that 85.9% of respondent named health workers are their primary source of information.

On the level of uptake of Tetanus Toxoid vaccines among pregnant women in Nguru town, this study reveals that 91.45% of the respondents claimed to have ever received the vaccine in their lifetime. This is contrary to the finding of earlier research which claimed that the rate of no vaccination was as high as 55% for sub-Saharan countries ([33] [34]. However, our finding agrees with the assertion of [30] that 93.7% of their respondents had received at least a dose of TT. Fear of side effects or pain (70.4%) and ignorance of the need for it after delivery (29.1%) mentioned in this study as a reason for non or partial compliance had been reported in earlier studies (e.g., [24] [35]). Non-completion of dosage reported for the respondent in this study had also been reported by [36] for child-bearing women in Ilorin West, Kwara State.

The null hypothesis, 'There is no significant association between knowledge (or awareness) and uptake of Tetanus toxoid vaccine among pregnant women' is rejected since the P value is less than 0.05 (P value = 0.022), this implies that there is a significant association between knowledge and uptake of TT among pregnant women. This is in agreement with the findings of [28] which showed that education was the major determinant of TT uptake. Also, the null hypothesis 'there is no relationship between the level of education and uptake of Tetanus toxoid vaccine among pregnant women' is accepted, since the P value is greater than 0.05 (P value = 0.99). Therefore, the uptake of TT is not a function of the level of education of pregnant women. Though a contrary view has been expressed in some reports (e.g., [29]) However, the work of [37] has also reported the existence of no significant association between the level of education of pregnant women and TT update. Furthermore, the null hypothesis; there is no relationship between parity and uptake of the Tetanus toxoid vaccine among pregnant women can be said to be true and hence accepted, considering the P value (p-value =

0.98). Therefore, the parity of pregnant women does not determine the uptake of TT. The result of this finding is in disagreement with the report of [28] who claimed that uptake depends largely on the number of children had by respondents, as the number of doses increases with the number of children.

5.0 Conclusion

Assessing the awareness level of pregnant women in Yobe State with Nguru as a case study has the potential to enable the government and policymakers to evaluate the successes made towards achieving the regional and global TT elimination goal. In this study, most pregnant women (97.37%) that participated were aware of the tetanus toxoid vaccine, and the number of doses required during pregnancy. Almost half of the respondents (57 %) also demonstrated a willingness to receive the complete dose of the vaccine. However, their knowledge of the time interval between and the type of disease prevented by TT is inadequate. In view of this, healthcare workers and Government should scale up the education of the populace on the TT immunization schedule and implement community-based vaccination of women of childbearing age in Nguru, Nigeria. Regional as well as global NNT elimination can only be achieved through vaccination of pregnant women, hygienic delivery of the newborn and identification of high-risk areas to implement corrective action in the form of immunization of women of childbearing age.

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