Original Research Article

AWARENESS, ADHERENCE AND DETERMINANT FACTORS AMONG PREGNANT MOTHERS ON LIFELONG TETANUS TOXOID VACCINATION AS PART OF THE NATIONAL IMMUNIZATION SCHEME

ABSTRACT

Objective . This study determined pregnant women's awareness, and determinants of uptake of National immunization recommendations for a maternal tetanus vaccine.

Study design: A cross-sectional study of 347 eligible pregnant women who attended the booking antenatal clinic of institute of maternal and child health (IMCH). Structured interviewer-administered questionnaires, captured socio-demographic the mothers' knowledge level of routine tetanus immunization and factors affecting uptake. Data were analyzed using the IBM SPSS version 20 statistical computer software package. Descriptive and inferential statistics were applied.

Results: The majority [66%} of the respondents were not aware of the national immunization schedule for tetanus toxoid. Only 28.8% (100) women could correctly state the dosing interval for the vaccination. The study showed that 184 women ought to have completed the vaccination based on their history, only 36 (19.6%) reported completion. Age, parity, marital status and women's occupation were significantly associated with tetanus vaccine uptake in pregnant women.

Conclusion: Awareness of maternal tetanus vaccination is low, thus increase may be achieved through antenatal health talk and policies

Keywords: Tetanus toxoid immunization, pregnant women, vaccination

INTRODUCTION

Tetanus infection is still an unresolved universal burden, especially in developing countries. [1] It causes worldwide morbidity and mortality in both pregnant mother and neonate.[1] Interestingly, it is responsible for up to 5% of neonatal death per annum and about 180 000 neonatal death occur yearly.[2]

Tetanus infection leads to maternal mortality of about 30,000 per year, it is, therefore, imperative to eliminate this preventable disease from being a cause of maternal and neonatal death. [1] World Health Organization(WHO) established strategies for achieving this, which are adequate protection with tetanus toxoid vaccination, clean safe delivery, and good surveillance to eliminate this menace.[2] In Nigeria, the incidence rate is about 14.6-20% per thousand live birth with only 5% of the cases reported to the health services.[3]

WHO aimed to achieve the elimination of maternal neonatal tetanus worldwide by 2015.[2] Nigeria like many other African countries and Asian counterparts failed to achieve this even in 2020. [4,5]

Tetanus toxoid-containing vaccine should be given in three doses at infancy and two booster doses during 4-7 years and later during adolescence. [2,5] This should provide protection throughout life.[5] The challenges are that many women especially in developing countries like Nigeria are neither immunized at birth or thereafter . [6,7, 8]

National Immunization scheme by WHO recommends that women should be vaccinated with a series of five doses of tetanus- toxoid vaccine with a specific minimum interval between each dose. [6] This has been incorporated into the national immunization scheme.[9] The level and protection against tetanus increase with each dose. [7] The level of protection, the duration of protection depends on the number of doses and intervals they are administered. [6,7] A woman who receives five doses of tetanus toxoid at

specific intervals is fully immunized and is protected against tetanus throughout her childbearing years.[5,7]

According to WHO, tetanus vaccination of pregnant women or women of childbearing age is mandatory if she is naïve to tetanus vaccination or she is unaware of her immunization status. [1] WHO recommends that a pregnant woman should be given 2 doses of tetanus toxoid 4 weeks apart and the last dose must be given 2 weeks before delivery to confer a protection of 1-3 years and an 80% protection, which means the doses have to be repeated during the subsequent pregnancy. [2,5,6] A five-year protection would be achieved if she is given a third dose six months from the last dose. Furthermore, if she takes two more doses, given a year apart, she would have 10-year protection after the fourth dose. While the fifth dose gives 99% protection throughout childbearing age. [2,6,9]

The aim of the study is to determine the awareness, adherence and determinant factors affecting the completion of the lifelong tetanus toxoid immunization.

Methodology

The study was conducted in the department of obstetrics and gynecology of the Lagos State University Teaching Hospital (LASUTH), Ikeja. It is one of the two main tertiary hospitals in the Lagos metropolis with 170 maternity beds. It caters to the Lagos, mainland and border towns in neighboring Ogun state and has a population of about 400,000, according to the most recent census in Nigeria (national Population commission census). It was therefore selected based on its major role in maternity care in Lagos.

Pregnant women of all gestational ages were recruited for the study. Inclusion criteria are consenting pregnant women regardless of gestational age. while excluded from the study were non-consenting pregnant women attending antenatal booking clinic. A well-structured questionnaire was used to collect data from the participants. These included age, gestational age, educational status, occupation, awareness and knowledge of the five doses of tetanus toxoid vaccine, doses of tetanus toxoid vaccine already taken, number of vaccines not taken, and reasons for not completing the total five doses of vaccine.

The sample will be calculated using the formula for sample size estimation for[15]

$N= Z^2P[1-P]/d^2$

A descriptive cross-sectional study involving 350 participants who gave a written informed consent and had the right to withdraw from study were recruited consecutively until the desired sample size was achieved. The study was conducted over a 3-month period. The study was carried between January and April 2021

Data were collected from eligible participants using structured questionnaires administered by the investigator to obtain participants' personal information and questions related to the study. Confidentiality and privacy were guaranteed for all the participants Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 (SPSS Inc. Chicago, Illinois, U.S.A.

RESULTS

The study population initially was 350 pregnant women, but three of the women opted out of the study and did not complete the questionnaire . The mean age of the women was 31.25years ± 5.47, 56.5% had tertiary education and 66.6% were of Yoruba ethnicity and 33.3% were of the Edo ethnicity. Among the participants 210(60.5%) were skilled workers. and 338(97.4%) were married. The mean(+SD) parity was 1.54 ± 0.87. The mean(+SD) husband's age was 38.17 ± 5.79 years and 77.7% were skilled workers.(Table 1)

The study showed that 66% were not aware of the national immunization schedule for tetanus toxoids. Only 28.8% of the women could correctly state the dosing interval for the vaccination schedule in Table

2. The study showed that 71% had two doses of tetanus toxoid (TT2), 1.4% had one dose (TT1), 8.3% had three doses (TT3) and 8.3% four doses (TT4) each, while 1.2% had five doses (TT5). (Table 3)

Among the 347 respondents, 58.2% had the desire to complete the vaccination; 38.3% were not sure of completing the vaccination while 3.5% indicated no desire to complete it. Among the reasons for non-completion were forgetfulness, busy schedule, loss of interest and belief that the vaccine was not needed or painful.Table4

Age(P=0.0001), parity(P=0.0112), women's occupation (P=0.0229) were significantly associated with tetanus vaccine uptake among pregnant women. [Table 5]

The study showed that the majority of the age group that contributed to the completion of the vaccine schedule were 30-39 years, the younger age group were less likely to complete the vaccination. . Primiparous were more likely to complete the uptake of the vaccine compared to women of other parity, this was not unexpected as many of these women had just started a reproductive career. Skilled workers are significantly more likely to complete the vaccination than artisans or the unemployed

Discussion

The five doses of immunization schedule are obscured to many women and it is yet to be widely accepted and practiced in several developing countries. The study showed that out of the 347 women enrolled in this study, only 34% were aware of the 5 doses of TT. In a study carried out in the eastern part of Nigeria awareness was 21.4% in Alakahia community in Rivers state which was also a semi-urban centre study but not all pregnant women. [10] In contrast, Sule et al in a Local Government centre study found

that 19.5% of women of childbearing knew of the lifelong immunization but had a smaller population size. [11] The awareness of the five doses for the completion of tetanus toxoid immunization is rather low. This is the finding in most parts of the country as well as other developing countries.[8,12]

In this study, 28.2% could correctly state the dosing interval and number of vaccines to achieve adequate lifelong immunization. Similarly, 21.4% of women of childbearing age in the Niger Delta community of Nigeria had good knowledge of TT immunization.[13] In other parts of the country, the result was not different. Gabriel-Job in South – East of Nigeria found that 58.6% of non -pregnant women responded that only two doses of TT are needed for lifelong protection while 2.2% responded that 5 doses were required. [10] In a study in the northwestern part of Nigeria, 68.8% felt that a single dose of tetanus immunization is sufficient in achieving lifelong immunity.[9]This gap in knowledge could arise from inadequate publicity of the immunization schedules by the government or ignorance, acceptance and compliance with the vaccination. schedule by the women.[9]

The awareness and knowledge of the long-life immunity are low generally among both pregnant women and nonpregnant women. [8,9,10] In Nigeria, 18.5%, of female undergraduate students in a university had knowledge of the five doses.[14] Most undergraduates may not have heard of life-long vaccination since many would not have had antenatal care exposure so this may account for the low level of knowledge.

In Nigeria, the uptake of TT2 is 62%,[19]. Most women generally know of the two doses of tetanus toxoid immunization given to pregnant women during pregnancy.[13,15] The two doses of tetanus toxoid reduces neonatal mortality by 94%.[11,15] Studies conducted in several cities in Nigeria have shown that the uptake of the protective two doses is high, Lagos (89.0%), Benin City (69%), Ibadan {81.1%}.[16,17] Worldwide, TT2 vaccination uptake ranges from 50%-82% [17,18], This buttresses the fact that awareness of TT immunization has improved. Unfortunately, not the same with the administration of the complete five doses of tetanus toxoid.

There is an obvious reduction in immunization uptake in TT5 when compared to TT2. In our study, about three-quarters have had TT2, a third had TT3 and TT4 while only 1.2 % have been completely immunized with TT5, (Table 3). In a study carried out by Opara over 70% of the women were fully immunized for TT2 while less than 5% had TT5.[19] A register-based study by Nwokeukwu in the East showed that 10-16% completed the TT5 doses.[20] Other studies showed that most mothers had two doses of tetanus 51.8% and a few 7% had 5 doses. [19] In Asia, a study in Bangladesh, 85% of women

with children less than 1 year received two doses of TT only 11% of women of childbearing age received five doses of TT.[19] Knowledge of the five doses for life long immunization schedule is rather low. [17, 18,19] In contrast, most developed countries have complete vaccination from childhood into adolescence.

Generally, there is a decline in immunization rates after the first two doses as seen in our study and this was similar to most studies carried in developing countries.[19,20,21,22] The two doses do not give a long-life protection and most women have to repeat this protective dose with subsequent pregnancies. The short interval of four weeks between the first and second dose during pregnancy allows most to just stop at TT2 and fail to complete the rest of the immunisation outside pregnancy. [5,11,12] A better approach would be the completion of the 5 doses in childbearing age or during and after pregnancies which gives maximum immunity.

Tetanus vaccination is burdened with compliance, despite the need for the completion the willingness and the means are sometimes lacking in women., [9] The study revealed that 58.2% desired to complete the vaccination during and after the index pregnancy while 38.3%, are not sure they would complete it and 3.5% of women would not. Several reasons were given for not completing the vaccination include forgetfulness, loss of interest, a busy schedule, and other doses that were not needed or were too painful. There is a need for in-depth education and counselling Most of these reasons could have been averted if there is a reminder system that allow women to be reminded or recalled to complete the vaccination during and outside pregnancy.

Our study showed that parity, age, and maternal occupation significantly influence the uptake of immunizations. This is similar to other studies which also identified the various factors which can affect the completion of the lifelong vaccination.[11, 13 19,20, ,21,22] .The educational status did not significantly affect the completion of the vaccination ,though, most of the women had tertiary education. This shows that education alone is no an independent factor for women to complete vaccination.

Women of advancing age were more likely to receive TT protective dose immunization than those of the younger age group. The advanced age groups are more inclined to accept the vaccine and more aware of immunization probably due to hindsight from past knowledge. This is similar to the study carried out in Ethiopia, Zimbabwe, Kenya, Burundi, Zambia, Bangladesh and Ivory Coast.[12,21,22,23,24] In the same vein, advanced parity would positively influence the completion as women with previous antenatal care have previously been exposed to tetanus-related health talks during antenatal care.

The finding from studies revealed that a high proportion of participants who were gainfully employed increases the chances of completing the tetanus toxoid vaccination. A means of lively hood increased the decision-making power of women[20]

The study showed a deficit in the recognition of the role of five doses of tetanus toxoid vaccination. This is not only on the part of the women but also shows that the stakeholders are yet to achieve the targeted goal of the complete elimination of tetanus toxoid among reproductive-age women.

Limitation

The limitation of the study is the recall bias that could arise from the women. The information on the dose received and the missed doses were based on reports given by the women which are highly subjective. A study that is register-based may be more representative of the actual uptake. It is therefore recommended that there is a need for proper record keeping and also a reminder system to recall women on the expected days of immunization and thus enhance complete immunization of the women. There is still a need to establish policies that would favour the completion of the expected five doses of TT immunization

Conclusion

The adoption of lifelong tetanus immunization is important in maternal and neonatal elimination of tetanus infection. It is an attainable goal requiring efforts from all stakeholders. A more effective follow-up system is required to ensure the completion of the immunization schedule. Other entry points where school-aged females could be educated and enrolled for tetanus immunization should be considered in Nigeria.

Ethical Approval and Consent

Ethical approval was obtained from the Health Research Ethics and Committee of the Lagos State University Teaching Hospital. Ref Nobler/06/10/1583.The study was carried out according to the declaration of Helsinki

The participants consented to participating in the study.

Data availability: The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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TABLES

Table 1: Socio demographic table

Age in years	Frequency(N)
20-29	143
30-39	178
40 Above	26
Total	347

Highest Education achievement

Primary	10
Secondary	138
Tertiary	196
None	3
Total	347

Occupational	**Frequency(N)**
None	50
Artisans	85
Skilled worker	212
Total	347

Marital Status	**Frequency(N)**
Single	8
Married	338
Widowed	1
Total	347

Table 2: Awareness and knowledge of pregnant women on immunization schedule for tetanus toxoid vaccination

Heard of National immunization scheme 5 doses for Tetanus	**(N)**	**(%)**
Yes	116	34.0
No	231	66.0

Knew the Dose interval and number of the national immunization schedule correctly 04611		**(%)**
Could correctly state number of doses and interval of doses	98	28.0
Don't Know or incorrect knowledge	249	72.0
Total	347	100.0

Table 3: Number of doses already taken

How many doses taken already	Frequency	%
1	37	11.3
2	232	70.9
3	27	8,3
4	27	11.3
5	4	1.2

Reasons	Frequency	%
Not needed	10	3.6
Forgot	161	57.5
Lost interest	12	4.7
Busy	3	1.4
I didn't register in the hospital; I delivered my babies through native hospital	1	0.38
I took just one because I'm a new mum to be then	2	0.76
Miscarriage	1	0.38
Not aware	8	3.04
Too painful	7	2.66
Wasn't properly educated on it then	1	0.38
Other	37	14.1

Table 4 Reasons for not completing the vaccination

Table 5:Association of the Factors limiting women from completing the national immunization status in IMCH

Age in years	Total	$X^2 = 41.53$	<0.0001*
20-29	141		
30-39	181		
40 Above	25		
Highest Education achievement		$X^2 = 7.56$	0.1757
Primary	10		
Secondary	138		
Tertiary	196		
None	3		

Occupational		$X^2 = 4.95$	0.0229*
None	52		
Artisans	85(100.0)		
Skilled worker	210(100.0)		
Number of pregnancies carried to 9 months		$X^2 = 8.98$	0.0112*
0	5(100.0)		
1	203(100.0)		
2	95(100.0		
3	32(10		