

UTILIZATION OF TETANUS TOXOID VACCINATION AND ASSOCIATED FACTORS AMONG WOMEN OF REPRODUCTIVE AGE IN LIRA CITY, NORTHERN UGANDA. ACROSS-SECTIONAL STUDY.

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Abstract

Background

Tetanus is a fatal disease caused by Clostridium Tetani. It affects women during pregnancy and 6 weeks postpartum and their neonates in the first 28 days of life who were not protected by the TT vaccine. Africa contributes 44% of global deaths due to tetanus and Uganda with neonatal mortality due to tetanus at 0.65/100000. Tetanus toxoid vaccination is evident in protecting against tetanus disease by receiving 5 doses for lifelong protection.

Methodology

A cross-section study employing the quantitative method of data collection was done among 151 mothers attending ANC at Ober HCIV who were selected through simple random sampling. Data was entered, double-checked, and cleaned using Statistical Package for Social Sciences (SPSS) version 23 for analysis.

Results

The response rate was 100%. The level of TT utilization was 58.3% as 41.7% have never received any dose, TTV1- 25.8%, TTV2- 15.2%, TTV3- 8.6%, TTV4- 6.6% and TTV5-2.6%. However, associated factors included the husband's education level, Family monthly income, exposure to mass media, partner involvement, number of antenatal visits, Place of delivery, Modern family planning use, time travel to the health facility, access to TTV, TT vaccination outreaches in communities and the level of knowledge on TT vaccination utilization.

Conclusion

Utilization of TT vaccination is very low at 58.5% according to the WHO national target of 90%. Attending antenatal care at least 4 times, having access to TT vaccines, and having good knowledge regarding TT vaccination are significant associations for the utilization of TT vaccination among women of reproductive age group.

Recommendation

Midwives and Nurses should endeavor to sensitize women of reproductive age and their husbands or next of kin about the importance of utilizing and completing vaccination schedules about maternal and neonatal tetanus.

Keywords: TT vaccination, Women of reproductive age, Ober HCIV.

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Background of the study

Tetanus disease is fatal and it's due to being exposed to 'clostridium tetani' a bacterium that lives, in soil, dust, manure, and saliva and enters the body through deep wounds, cuts, and burns manifesting as painful muscle contractions (WHO, 2023). It affects everyone notably women during pregnancy and 6 weeks postpartum plus their neonates in the first 28 days of life who were not protected by the TT vaccine. Globally, the World Health Organization predicted 2500 newborn deaths due to tetanus in 2018 (WHO, 2023). Africa contributes to 44% of the global deaths due to tetanus (Gelaw, Ayalew, & Eyene, 2022). Uganda had the highest incidences of 12.7/100000 neonatal tetanus in the world in 2016 and a high neonatal mortality rate due to tetanus of 0.65/100000 (Kazibwe et al., 2022). There is no literature indicating the prevalence of tetanus in northern Uganda.

Tetanus toxoid vaccine is approved by FDA to be used in the treatment and management of tetanus disease and as a prophylaxis in wound care and management manufactured through the inactivation of toxigenic strains of Clostridium tetani (Rabadi & Brady, 2023). WHO recommends a 5-dose schedule of TT vaccine according to the EPI schedule, 1st dose is given on the first contact, 2nd dose is received at least after 4 weeks of the first dose, 3rd received at least after 4 weeks of the 2nd dose, 4th and 5th doses received at the intervals of at least 1 year (Shafiq et al., 2017). During pregnancy, mothers are supposed to receive at least 2 doses for effective protection against MNT (Amin, Roy, Meem, Hossain, & Aktarujjaman, 2022). The importance of vaccinating women of reproductive age with the TT vaccine is to prevent MNT (Ibrahim, Sabahelzain, Elhadi, Malande, & Babiker, 2023)

In highly endemic regions due to tetanus especially sub-Saharan Africa, neonatal case fatality due to tetanus

remains 80-100% (Mugagga et al., 2023). A study in 59 high-risk African countries, Uganda inclusive reported that 29% of had attained 80% and beyond of two or more doses of tetanus toxoid vaccination among women of reproductive age (Njuguna, 2020). A study carried out in 10 East African countries reported factors affecting TT vaccination among women of reproductive age including their; level of education, financial status, marital status, age, occupation, distance from the health facilities, number of hospital visits (Belay, Fenta, Agegn, & Muluneh, 2022). In a study in Ethiopia regarding knowledge and uptake of TT, only 44% of the mothers in the study had good knowledge of TT vaccination (Gelaw et al., 2022).

A knowledge gap was revealed as there were misconceptions about the TT vaccine such as the belief that it treats malaria and general body weakness (Kajungu, Muhoozi, Stark, Weibel, & Sturkenboom, 2020). Despite the TT vaccine being well-approved in Uganda some women still confuse it with other ANC treatments showing a very big knowledge gap (Nalubega et al., 2021). There is still a knowledge gap among mothers of reproductive age as there is still vaccine hesitancy even though WHO introduced vaccination programs hence a public health concern (Nalubega et al., 2021). In comparison, maternal tetanus is given less attention compared to neonatal tetanus which is considered core with descriptive statistics than maternal tetanus (Amin et al., 2022).

Even though most studies on maternal TT vaccination focused on African developing countries due to their poverty and many neglected populations due to limited access to health services, although the problem is common in Africa, there is still little information researched on various factors affecting the utilization of TT vaccination among women of reproductive age in Uganda (Belay et al., 2022). According to Gelaw et al. (2022), states that

although there is good progress toward eliminating MNT, tetanus disease remains a crucial concern in public health. Therefore, this research intended to assess the utilization of TT vaccination and associated factors among women of reproductive age in Lira City, Northern Uganda.

Methodology

Research Design

The study design was a facility-based cross-sectional study employing a quantitative data collection method. This involved administering structured questionnaires to antenatal mothers. The cross-sectional descriptive design was preferred as it allowed the researcher to use numerous characteristics at once and answer the research questions within a short period.

Study Site and Setting

Study Site

The study was done at Ober Health Center IV located in Ojwina division, Lira City West which is surrounded by Ogur Sub-County to the North, Barr Sub-County and Adak Okwok Sub-County to the East, Amach Sub-County to the South, and Kole District to the West. Ober HC IV is approximately 2.5 kilometers from Jinja camp, Lira City in the North, and 1 kilometer from Odokomit town on the Kampala-Lira highway in the West.

Study Setting

Ober Health Center IV is a government facility that has been recently upgraded from an HC III to an HC IV. It serves over 44000 clients within the whole of Lira City and provides a range of healthcare services including antenatal care, immunization, medical and maternity services, inpatient and outpatient care, as well as diagnostic services like medical laboratory tests. It receives a daily antenatal attendance of approximately 20 pregnant mothers daily. It has 2 ANC beds shared for antenatal care and family planning within the upper wing of the maternity ward.

Study Population

Target Population

Women of reproductive age who were receiving medical care in Lira City.

Accessible Population

Pregnant women who were attending Antenatal Care at Ober Health Center IV.

Eligibility Criteria

Inclusion criteria

Pregnant women who were attending Antenatal Care at Ober Health Center IV of ages between 15 and 49 years and were currently staying in Lira City as their place of residence.

Exclusion criteria

Antenatal women who had ever been affected by tetanus disease and hospitalized.

Antenatal women who were critically ill either mentally or physically to participate in this study

Antenatal women at Ober HCIV declined to consent to this study.

Sample size calculation

The sample size was calculated using Yamane's formula for sample size calculation is given by: $n = \frac{N}{1 + N(e)^2}$

Where **n** is the sample size

N is the population size which was calculated considering the monthly attendance of antenatal care at Ober HCIV Lira City West being at an average of 218 mothers from August 2023 to December 2023. **e** is the marginal error= 5% (0.05)

Therefore; $n = \frac{218}{1 + (218 * 0.05)^2}$

$n = 141$, Plus a non-responsive rate of 7 %

Sample size = $141 + 10 = 151$ participants

Sample size = 151 participants.

Sampling technique and procedure

Sampling Technique

Simple random sampling was used among those who met the inclusion criteria. It allowed the researcher to easily generalize the findings from a specific population as there was an equal chance of participants being selected without any form of bias.

Sampling Procedure

Regarding a sample size of 151 participants, the researcher made 151 pieces of paper written on numbers from 1 up to 151. The researcher folded the papers and made the mothers who met the inclusion criteria select any paper at random without taking it back. The paper the mother would choose acted as her random number that was filled in on the questionnaire. The remaining papers were kept for the next days of data collection until they were completely done.

Recruitment of study participants

The researcher passed the information regarding data collection through the in-charge antenatal ward and the midwives on duty who informed mothers to participate in this study. The researcher also physically communicated to mothers to participate in the study by explaining to them information about the study and gaining their consent.

Study variables

Dependent variable

Utilization of tetanus toxoid vaccination

Independent variable

Socio-demographic factors

Obstetric factors

Health-related factors

Data Collection

Data collection method

This study employed a quantitative method of data collection done by administering questionnaires physically to the participants and translating for them either into English or Luo with the help of a Lango translator. The quantitative method was chosen because it quantifies a problem in the form of trends and patterns thus an easy provision of recommendations.

Data collection instrument

A structured questionnaire made up of closed-ended questions was used. It consisted of 4 sections with section one covering socio-demographic variables, section two about knowledge regarding utilization of TT vaccination, section three about utilization of TT vaccination, and section four about factors associated with TT vaccination. The researcher verbally translated the questionnaire questions into Leblango with the help of a translator for those who didn't know English but knew Leblango. An interview administered questionnaire was done among those who were unable to read and write. The questionnaire was administered in only 40 minutes per person.

Data Collection Procedure

The approval letter and clearance were obtained from the Lira University Research and Ethics Committee (LUREC-2024-137) to allow the commencement of data collection. Permission from the town clerk of Lira city and the in-charge Ober HCIV was also sought. Antenatal mothers who met the eligibility criteria were given adequate information and were asked to sign the consent forms. The researcher then distributed questionnaires physically to those who consented, however, those who were unable to read and write were asked by the researcher as their responses were filled in the questionnaires. The ones who didn't know English were given a Lango fluent translator to assist them in answering the questions. Questionnaires

were administered for at most 40 minutes per person, collected from participants after completion, checked for completeness after data collection, and kept for data entry.

Data Management and Analysis

Checking the completeness of the questionnaires was done on every day of data collection. Data was entered, double-checked, and cleaned using Statistical Package for Social Sciences (SPSS) version 23. Data was then analyzed at 3 levels using SPSS version 23 in the form of figures, tables, and bar graphs.

Univariate analysis; Variables were analyzed and presented in the form of frequency tables as frequencies and percentages then also in the form of descriptive statistics as figures and bar graphs.

Bivariate analysis; the chi-square test was used to determine associations between the utilization of TT vaccination with the demographic and other associated factors at a P value<0.05, confidence interval of 95%.

Multivariate analysis; and multivariate regression analysis were used to control all the confounding associated factors at a significance level of P< 0.05.

Quality Control Validity

With guidance from the supervisor, the researcher ensured that the questionnaire contained all the aspects covering the utilization of TT vaccination and associated factors among women of reproductive age by using close-ended questions to answer all the research questions while using clear language for easy interpretation of the questionnaire by the respondent.

Reliability

The interview administered questionnaire was pretested among 5 women who attended ANC at Ober HCIV on a certain day. It was then retested among another group of women attending ANC at Ober HCIV on a different day. The researcher then checked for questions with similar

constructs and they were detected for internal consistency. All repeating questions were removed and missing questions were added.

Ethical consideration

Approval

The researcher got an approval letter from the Lira University Research Ethics Committee to start the collection of data. The researcher also got clearance from the town clerk, Lira city, and the In-charge, Ober HCIV where the study was conducted from.

Informed Consent

The researcher explained the aim of the study to the participants and the willing participants were given consent forms which they signed as a way of participating in this study after reading to them that there was no compensation for their participation in the study and that they had a right of withdrawing from the study at any time and its punishable.

Privacy

Interview-administered questionnaires were done with one-on-one antenatal mothers for those who were unable to read and write in a comfortable and quiet place to avoid the physical leaking of the participants' verbal information. Privacy was also secured by restricting data storage using passwords on the computer and also proper keeping of questionnaires in a locked case to prevent information leakage.

Confidentiality

Participants were requested to use random numbers they picked during sampling and also use initials instead of their full names and sensitive information regarding the identities of participants was secured.

Results

Figure 1: showing the study profile

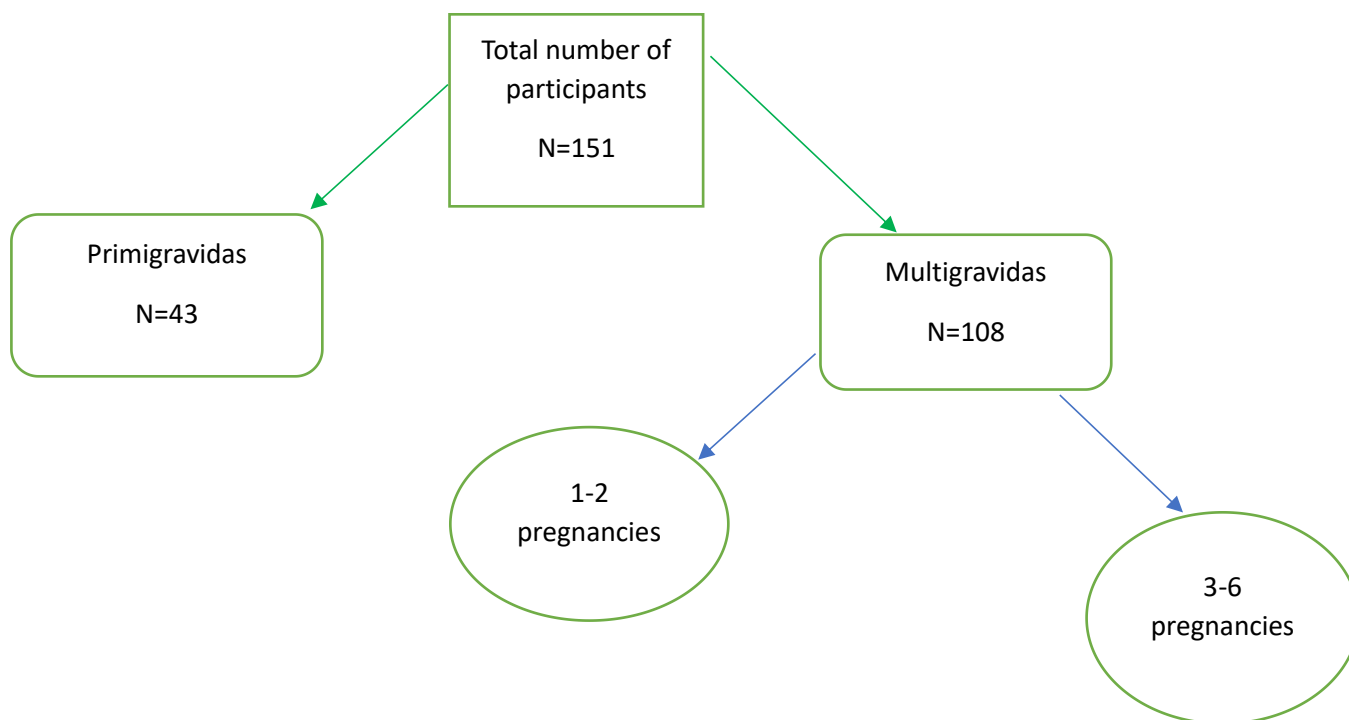


Figure 1 shows data collected from 151 participants. Among them, 43 were Primigravidas and 108 were multigravidas. Out of the 108 multigravidas, 77 participants had given birth once or twice, while 31 participants had a parity of 3 to 6 births.

Socio-demographic characteristics of participants

Table 1 Distribution of socio-demographic characteristics of participants

Variable	Frequency (n)	Percentage (%)
Age		
15 to 24 years	77	51.0
25 to 29 years	47	31.1
30 to 40 years	27	17.9
What is your marital status?		
Married	130	86.1
Single	19	12.6
Divorced	2	1.3
What is your occupation?		
Farmer	51	33.8
Civil servant	17	11.3
Business	68	45.0
Non-employee	15	9.9
What is your level of education?		
No formal education	11	7.3
Primary	73	48.3
Secondary	48	31.8
Tertiary	19	12.6
What is your husband's occupation?		
Farmer	19	14.6
Civil servant	23	17.7
Business	77	59.2
Builder	4	3.1
Driver	7	5.4
What is your husband's education level?		
No formal education	4	3.1
Primary	34	26.2
Secondary	63	48.5
Tertiary	29	22.3

Table 1 above shows that more than half of the respondents, 77 (51.0%), are between the ages of 15 and 24 years. More than three-quarters, 130 (86.1%), were married. Most of them, 68 (45%), were businesswomen. The majority of the study participants, 73 (48.3%), had a primary school-level

education. More than half of the participants' husbands, 77 (51%), were engaged in business, and most of their husbands, 63 (41.7%), had completed up to secondary education

Utilization of TT vaccine

Figure 2; shows the number of participants who have received the TT vaccine

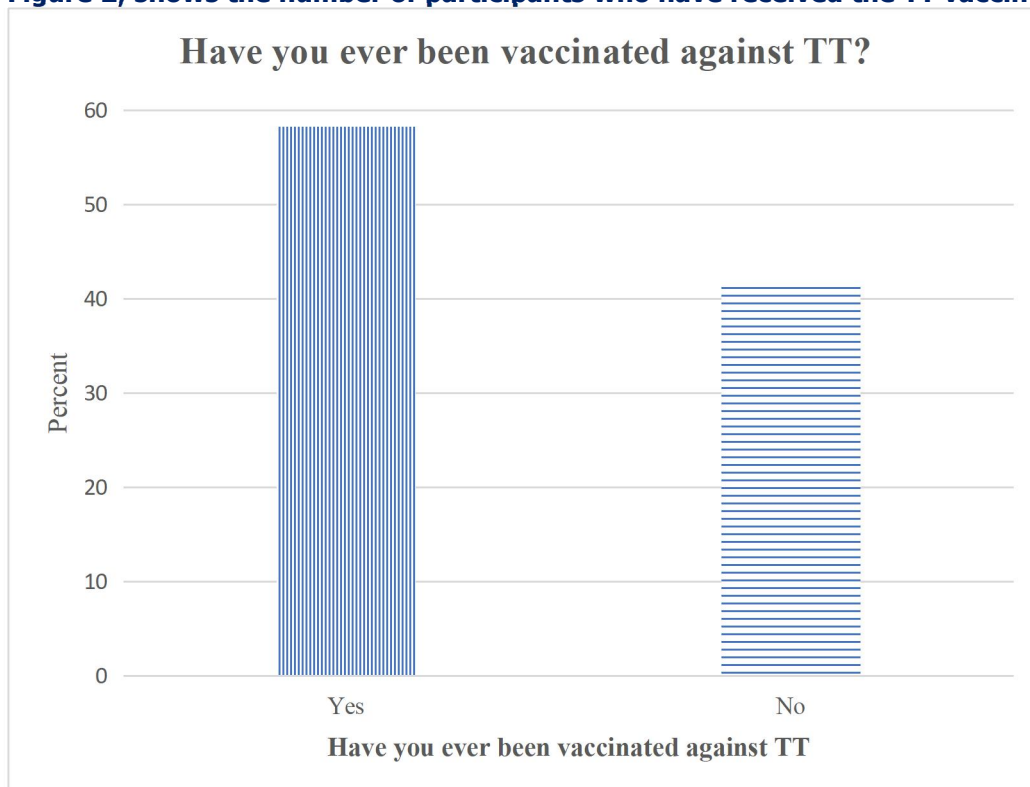


Figure 2 above indicates that 88(58.3%) of the participants were vaccinated while 63(41.7%) were not vaccinated with TT vaccines.

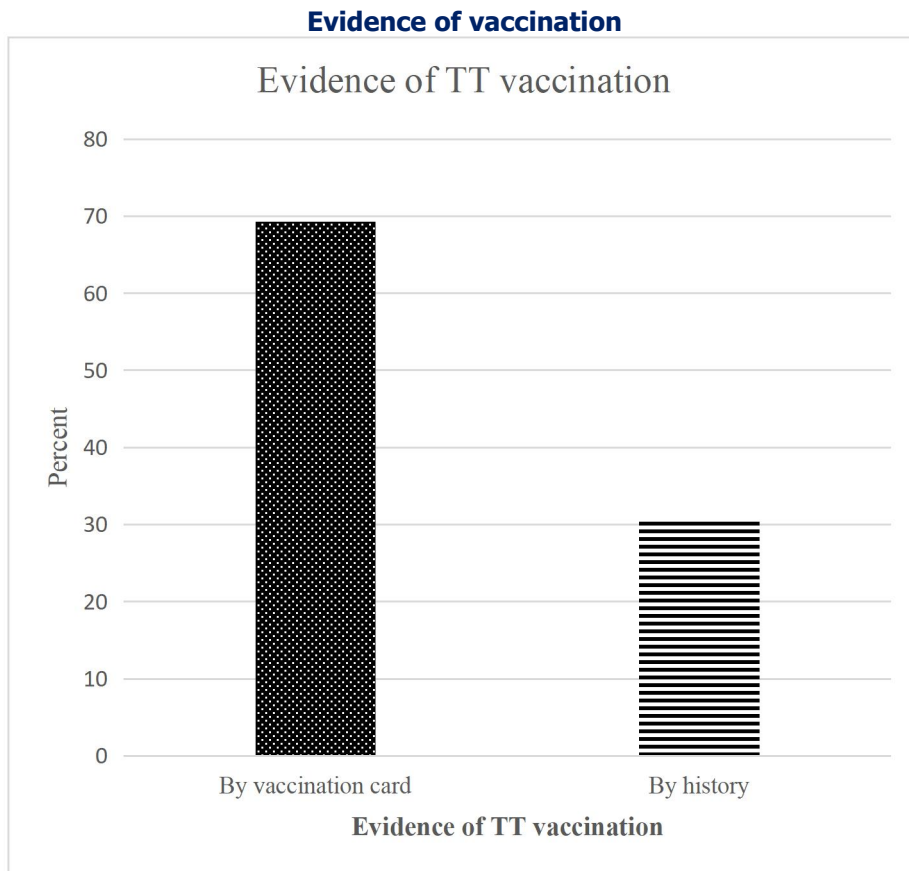


Figure 3: showing evidence of vaccination among the vaccinated participants

Figure 3 shows that, 61(69.3%) vaccinated participants reported having a vaccination card as evidence of TT vaccination, and 27(30.7%) reported vaccination by history.

Utilization of TT vaccine per dose

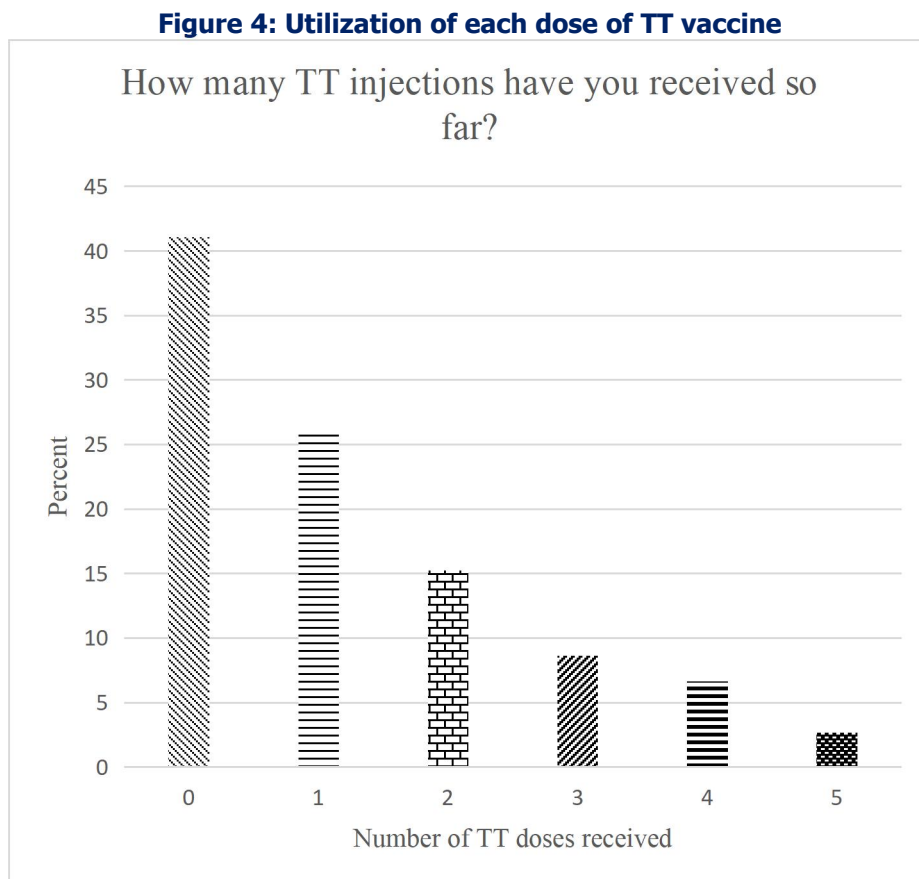


Figure 4 above shows the utilization of TT vaccine per dose. Of the participants, 63(41.1%) have never received vaccination, 38(25.8%) have received TTV₁, 23(15.2%) have received TTV₂, 13(8.6%) have received TTV₃, 10(6.6%) have received TTV₄, and 4(2.6%) have received TTV₅.

Factors associated with utilization of tetanus toxoid vaccination.

Table 2 shows factors associated with utilization of tetanus toxoid vaccination

Variable	Frequency(n)	Percentage
Estimated family monthly income		
Less than 100,000UGX	70	46.4
100,000- 200,000UGX	47	31.1
Greater than 200,000UGX	34	22.5
Household size		
5 people or less	135	89.4
More than 5 people	16	10.6
Do you have access to a radio?		
Yes	120	79.5
No	31	20.5
Do you have access to television?		
Yes	77	51.0
No	74	49.0
Do you make joint decision with your husband?		
Yes	107	82.3
No	23	17.7
Do you need to get permission from your husband to go to the health facility?		
No restriction	90	69.2
Some restriction	29	22.3
Restricted at all	11	8.5
How many times have you given birth?		
Primigravida	43	28.5
1-2	77	51.0
3-6	31	20.5
Is this current pregnancy your last one?		
Yes	70	46.4
No	81	53.6
What is the number of ANC visits in this pregnancy?		
Below 4 times	76	50.3
4 times and above	75	49.7
Where was the place of delivery for the previous child?		
Home	16	14.8
Health facility	92	85.2
Do you use modern family planning?		
Yes	75	49.7
No	76	50.3
What is the time of travel from home to the health facility?		
Less than 1 hour	101	66.9
Greater than one hour	50	33.1
Do you have access to tetanus toxoid vaccines?		
Yes	95	62.9
No	56	37.1
Do you have TT vaccination outreaches?		
Yes	75	49.7
No	76	50.3

Table 2 above shows that; 70(46.4%) of the participants had a family monthly income of less than 100,000, and 135(89.4%) had a household size of 5 people or less. 120(79.5%) participants had radio access and 77(51%) had access to television (TV). 75(49.7%) participants had

attended ANC at least 4 times and had used modern family planning. 92(85.2%) participants delivered from a health facility and 101(66.9%) participants traveled in less than 1 to health facility.

Knowledge of participants on TT vaccination

Table 3 showing the knowledge of the participants

Parameter	Frequency (n)	Percentage (%)
Have you ever heard of the tetanus toxoid vaccine?		
Yes	118	78.1
No	33	21.9
Can the tetanus toxoid vaccine prevent tetanus?		
Yes	120	79.5
No	31	20.5
Who is eligible for tetanus toxoid vaccine		
Only infants	2	1.3
Only pregnant women	43	28.5
Women of reproductive age	57	37.7
I don't know	49	32.5
Does the tetanus toxoid vaccine serve as family planning		
Yes	26	17.2
No	125	82.8
What is the purpose of the tetanus toxoid vaccine?		
To protect only the mother from tetanus	10	6.6
To protect both mother and baby from tetanus	127	84.1
To prevent pregnancy	10	6.6
I don't know	4	2.6
What is the right appointment for receiving TT2 after TT1?		
After 1 week	8	5.3
After 4 weeks	65	43.0
After 1 year	14	9.3
I don't know	64	42.4
What is the total number of TT doses for lifelong protection?		
1	34	22.5
2	33	21.9
3	36	23.8
4	10	6.6
5	30	19.9
More than 5 doses	8	5.3

Table 3 shows that, three-quarters of the participants, 118(78.1%) have ever heard of tetanus toxoid vaccine. However, the majority of the participants, 120(79.5%) reported that TTV prevents tetanus. 125(82.8%) reported that TTV doesn't serve as family planning while most of

the participants, 131(86.8%) reported that TTV protects both mother and baby from acquiring tetanus. Only 30(19.9) reported that a person needs 5 TT doses for lifelong protection.

Figure 5: Level of knowledge on TT vaccination

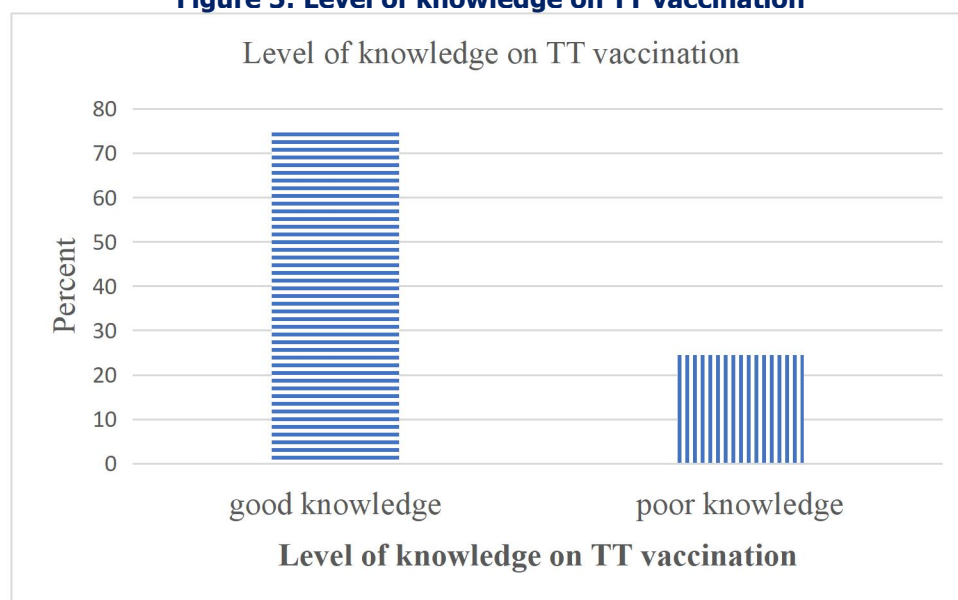


Figure 5 shows that out of 151 participants, 114(75.5%) had good knowledge regarding TT vaccination while 37(24.5%) had poor knowledge regarding TT vaccination utilization.

Relationship between socio-demographic characteristics and utilization of TT vaccination.

Table 4 Relationship between socio-demographic characteristics and TT vaccination utilization.

Socio-demographic characteristic	Vaccinated		unvaccinated		P value	df	Chi-square
	count	%	count	%			
Age							
15-24 years	40	45.5	37	58.7	0.210	2	3.119
25-29 years	29	33.0	18	28.6			
30-40 years	19	21.6	8	12.7			
Marital status							
Married	77	87.5	53	84.1	0.241	2	2.843
Single	11	12.5	8	12.7			
Divorced	0	0.0	2	3.2			
Occupation							
Farmer	26	29.5	25	39.7	0.326	3	3.458
Civil servant	13	14.8	4	6.3			
Business	40	45.5	28	44.4			
Non-employee	9	10.2	6	9.5			
Level of education							
None	5	5.7	6	9.5	0.792	3	1.037
Primary	42	47.7	31	49.2			
Secondary	29	33.0	19	30.2			
Tertiary	12	13.6	7	11.1			
Husband occupation							
Farmer	7	9.1	12	22.6	0.057	4	9.451
Civil servant	18	23.4	5	9.4			
Business	47	61.0	30	56.6			
Builder	1	1.3	3	5.7			
Driver	4	5.2	3	5.7			
Husband education							
None	0	0.0	4	7.5	0.005*	3	12.913
Primary	15	19.5	19	35.8			
Secondary	45	58.4	18	34.0			
Tertiary	17	22.1	12	22.6			

Table 4 shows that a significant association with vaccination utilization was considered when a P value < 0.05 whereas a p value ≥ 0.05 , there was no significant relationship considered. A significant relationship was obtained between the husband's education level and

utilization of TT vaccination (**P=0.005**) but there was no significant relationship between; age, marital status, level of education of the mother, occupation and the husband's occupation with utilization of TT vaccination.

Relationship between associated factors and utilization of TT vaccination.

Table 5 Relationship between associated factors and utilization of TT vaccination.

Associated factor	vaccinated		Not vaccinated		P value	df	Chi-square
	count	%	count	%			
Family income							
Less than 100,000	33	37.5	37	58.7	0.015*	2	8.424
Between 100,000 to 200,000	29	33.0	18	28.6			
Greater than 200,000	26	29.5	8	12.7			
Household size							
5 and below	78	88.6	57	90.5	0.717	1	0.131
Greater than 5	10	11.4	6	9.5			
Access to radio							
Yes	77	87.5	43	68.3	0.004*	1	8.336
No	11	12.5	20	31.7			
Access to TV							
Yes	54	61.4	23	36.5	0.003*	1	9.077
No	34	38.6	40	63.5			
Joint decision							
Yes	68	88.3	39	73.6	0.031*	1	4.675
No	9	11.7	14	26.4			
Permission							
No restriction	64	83.1	26	49.1	0.002*	2	18.384
Some restriction	11	14.3	18	34.0			
Restricted at all	2	2.6	9	17.0			
Parity							
Primigravidas	22	25.0	21	33.3	0.361	2	2.038

1-2 births	45	51.1	32	50.8			
3-6 births	21	23.9	10	15.9			
Plan of having the last Child in the current pregnancy							
Yes	39	44.3	31	49.2	0.553	1	0.353
No	49	55.7	32	50.8			
Number of ANC visits							
Less than 4 times	30	34.1	46	73.0	0.001*	1	22.253
4 times and above	58	65.9	17	27.0			
Place of delivery							
Home	5	7.6	11	26.2	0.008*	1	7.047
Facility	61	92.4	31	73.8			
Family planning use							
Yes	51	58.0	24	38.1	0.016*	1	5.792
No	37	42.0	39	61.9			
Time travel							
Less than 1 hour	65	73.9	36	57.1	0.031*	1	4.635
Greater than 1 hour	23	26.1	27	42.9			
Access to TTV							
Yes	78	88.6	17	27.0	0.000*	1	59.812
No	10	11.4	46	73.0			
TT vaccination outreaches							
Yes	66	75.0	9	14.3	0.000*	1	54.139
No	22	25.0	54	85.7			
Knowledge of TT vaccination							
Yes	81	92.0	33	52.4	0.001*	1	31.225
No	7	8.0	30	47.6			

Table 5 shows that a significant relationship was considered at $P < 0.05$ but for $P > 0.05$, there was no significant relationship. There was a significant relationship found between estimated family income, access to radio and television, joint decision with the

husband, permission from the husband, number of ANC visits, use of modern family planning, place of delivery, time travel to the facility, level of knowledge, access to TT vaccines and availability of TT community outreaches with utilization of TT vaccination.

Multivariate analysis of factors associated with utilization of TT vaccination

Table 6 Multivariate analysis of factors associated with the utilization of TT vaccination

Variable	COR	AOR	CI	P-value
Husband's education				
No formal education	0.999(0.000-0.002)	14.645	0.000-0.004	0.999
Primary	1.794(0.659-4.888)	0.270	0.013-5.678	0.400
Secondary	0.567(0.226-1.421)	0.158	0.011-2.281	0.176
Tertiary	1.000			
Estimated family income				
Less than 100000UGX	3.644(1.451-9.152)	7.527	0.160-354.625	0.304
100000 to 200000 UGX	2.017(0.752-5.412)	6.775	0.104-443.204	0.370
Greater than 200000	1.000			
Access to radio				
Yes	0.307(0.135-0.701)	0.421	0.051-1.928	0.329
No	1.000			
Access to TV				
Yes	0.362(0.185-0.707)	0.348	0.046-2.639	0.307
No	1.000			
Joint decision making				
Yes	0.369(0.146-0.930)	2.258	0.152-33.547	0.554
No	1.000			
Permission from the husband				
No restriction	0.090(0.018-0.446)	0.271	0.018-4.064	0.345
Some restriction	0.364(0.066-2.002)	6.761	0.206-222.364	0.284
Restricted at all	1.000			
Place of delivery				
Home	4.329(1.382-13.564)	0.870	0.081-9.344	0.909
Health facility	1.000			
Use of modern family planning				
Yes	0.446(0.230-0.865)	0.499	0.084-2.966	0.445
No	1.000			
Number of ANC visits				
Less than 4 visits	5.231(2.573-10.638)	0.624	0.215-12.930	0.624
At least 4 visits	1.000			
Time travel to the facility				
Less than 1 hour	0.472(0.237-0.940)	1.632	0.260-10.239	0.601
1 hour and greater	1.000			
Having access to TT vaccines				

Yes	0.047(0.020-0.112)	0.048	0.005-0.437	0.007*
No	1.000			
Availability of TT outreaches				
Yes	0.049(0.024-0.131)	0.140	0.018-1.060	0.048*
No	1.000			
Knowledge on TT vaccination				
Good knowledge	0.095(0.380-0.238)	0.347	0.048-2.905	0.347
Poor knowledge	1.000			

Table 6 shows that two factors were found significant at multivariate regression analysis as a significant relationship considered at a P- value<0.05. Those who had access to TT vaccines having access to TT vaccines were 20.8 times more likely to utilize TT vaccination (AOR=0.048, CI= 0.005-0.437) and those who had outreaches in their communities were 7.1 times more likely to receive TT vaccination (AOR= 0.140, CI=.0.018-1.060).

Discussion

This study found that 58.3% of participants had received the TT vaccine; this is significantly less than the 96.3% reported in a study conducted in Sierra Leone (Yaya, Kota, Buh, & Bishwajit, 2020). However, there are varying levels of antenatal attendance as 49.7% of participants in this study attended at least 4 ANC visits as opposed to the study done in Sierra Leone where the proportion was 85.5%.

This study reported that 33.1% of the participants had received at least 2 TT doses. This is considerably lower than the 51.8% reported in the study done in Error, Ethiopia (Gebremedhin et al., 2020). However, only 43% of the participants in this study knew about the appointment of TT2 after TT1 compared to 53.5% in the Error study.

This study found that 2.6% of the participants received lifelong protection doses. This is slightly higher than the 1.2% proportion of the participants who had received lifelong protection doses. (M Gembe et al., 2024). However, there were variations in the levels of education as only 3.1% in this study had no formal education compared to a large 52% who had no formal education in the Ethiopian study.

In this study, 62.5% of the vaccinated participants belonged to high-income families. This is similar to research conducted in Tanzania and Sudan, which found that the wealthiest families accounted for 56.6% and 76.3%, respectively, of the vaccinated participants (Mohamed & Ahmed, 2022; Tugaraza & Moshi, 2020). However, this study opposes the study done in Sudan that reported no significant association between family income and Utilization of TT vaccination (Ibrahim et al, 2023).

This study reported that 87.5% and 61.4% of the vaccinated participants had access to radio and TV respectively. Similarly, the studies done in Ethiopia and sub-Saharan Africa reported that women who were exposed to mass media were 8.3 times and 0.87 times respectively more likely to utilize TT vaccination (Nigussie et al., 2021; Aboagye et al., 2023). The possible explanation is that exposure to media provides a chance to receive important information that can increase women's knowledge of the advantages of tetanus toxoid immunization (Nigussie et al., 2021)

In this study, 92.4% of the vaccinated mothers had delivered from the health facility which is evident in the studies conducted in Ethiopia and East Africa that reported that participants who delivered from the hospital were 1.6 times more likely to be vaccinated than those who delivered from home (Anatea et al., 2018; Belay et al., 2022). This could be because of the availability of health education and counseling for women giving birth in health facilities and being vaccinated for TT just after delivery procedures. home (Anatea et al., 2018)

According to this study, 58% of the vaccinated participants were using modern family planning. This is similar to the studies in Ethiopia that reported that those who used family planning were 5.19 and 1.28 times more likely to get vaccinated than those who did not use it. (Dubale et al.,

2018; Asmamaw et al. 2023). It was explained that health information is given in family planning service due to service integration (Dubale et al., 2018)

This study found that 88.3% of the vaccinated participants had joint decisions with their husbands concerning health issues. This is similar to the study done in Tennagra and Ethiopia that reported that those who had joint decisions with their husband were 10.48 and 4 times respectively more likely to utilize TT vaccination.(Leo, Sinaga, & Wijaya, 2023; Dubale et al., 2018). In explanation, Dubale et al (2018) said that a mother who has a joint discussion with her husband gets more confidence and social support for the TT utilization and will have protective doses of the TT vaccine.

This study reported that 73.9% of the vaccinated participants traveled to the health facility within 1 hour. This is similar to the studies done in the Saharan region and Ethiopia that reported that mothers who traveled to the facility in less than 1 hour were 1.08 and 4.6 times respectively more likely to be vaccinated with the TT vaccine. Vaccination (Aboagye et al., 2023; Nigussie et al., 2021; Gebremedhin et al., 2020; Dubale et al., 2018).

This study found that 80.5% of the vaccinated participants had husbands of secondary education and above. This is similar to the studies done in Ethiopia as they reported that those who had husbands of secondary education and above were 9.539 times more likely to be vaccinated with TT (Dubale et al., 2018; Gessesse et al., 2021). This was explained in a way that educated husbands have greater awareness about the TT vaccine and support their wives to utilize the vaccine (Gessesse et al., 2021).

In this study, 92% of the vaccinated participants had good knowledge. This is similar to the studies done in Tenggara and Turkey that reported that women who had good knowledge of TT vaccination were more likely to be vaccinated compared to the ones with poor knowledge.(Leo, Sinaga, & Wijaya, 2023; Dağdeviren et al., 2020). This was elaborated as prior knowledge of the correct appointment schedule for TT vaccines provides a greater advantage in receiving subsequent doses hence increasing the likelihood of mothers receiving additional doses of TT (Gebremedhin et al., 2020).

This study reported that 83.1% of the vaccinated participants had permission from their husbands to go to the facility. This is similar to the study done in Tenggara that reported that women who had supporting husbands towards TT vaccination were 10.48 times more likely to be vaccinated with TT compared to those who were denied permission (Leo et al., 2023).

In this study, 75% of the vaccinated participants had TT vaccination outreaches in their communities which is evident in the Ethiopian study that explained that those who had health care workers visiting their homes were 7 times more likely to be vaccinated with TT vaccine. (Dubale et al., 2018).

The study reported that 65.9% of the vaccinated mothers attended antenatal for at least 4 times. This is similar to the studies done in Ivory Coast, Sierra Leone, sub-Saharan Africa, and Sudan that reported that mothers who attended antenatal for 4 times and above were 2.347, 1.919, 24.03, and 1.49 times more likely to be vaccinated with the TT vaccine (Yaya et al., 2019; Yaya., 2020; Aboagye et al., 2023; Mohamed & Ahmed, 2022). This was explained by Dubale et al (2018) that repeated health facility visits for ANC follow-up allow TT vaccine injection and provides insight into tetanus prevention.

This study reported that 88.6% of the vaccinated participants had access to TT vaccines. This is similar to

the study done in Tanzania that reported that those who reported the availability of TT vaccines were 2.1 times more likely to utilize TT vaccination (Tungaraza & Moshi, 2020).

Conclusion

Utilization of TT vaccination is very low at 58.5% according to the WHO national target of 90%. Attending antenatal care at least 4 times, having access to TT vaccines, and having good knowledge regarding TT vaccination are significant associations for the utilization of TT vaccination among women of reproductive age group.

Recommendations

Midwives and Nurses should endeavor to sensitize women of reproductive age and their husbands or next of kin about the importance of utilizing and completing vaccination schedules about maternal and neonatal tetanus.

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List of Abbreviations.

ANC	Antenatal Care
EPI	Expanded Program on Immunization
FDA	Food and Drug Administration
MNT	Maternal and Neonatal Tetanus
TTV	Tetanus Toxoid Vaccine
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

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Conflict of interest

The author declares no conflict of interest.

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