



WOLKITE UNIVERSITY

COLLEGE OF MEDICINE & HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

**TETANUS TOXOID VACCINE UTILIZATION AND ASSOCIATED
FACTORS AMONG PREGNANT WOMEN ATTENDING WOLKITE
UNIVERSITY SPECIALIZED TEACHING HOSPITAL GURAGE
CENTRAL ETHIOPIA 2024.**

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ABBREVIATION AND ACRONAMES

ANC	Ante Natal Care
AOR	Adjusted Odds ratio
EC	Ethiopian Calendar
ETB	Ethiopian birr
GC	Gregorian calender
MNT	Maternal and Neonatal Tetanus
MNTE	Maternal and Neonatal Tetanus Elimination
NT	Neonatal Tetanus
PAB	Protected at birth
SPSS	Statistical Package of Social Science
TT	Tetanus Toxoid
TT ²⁺	Two or more doses of tetanus toxoid immunization
TTCV	Tetanus Toxoid containing vaccine
WHO	World Health Organization
WUSH	Wolkite University Specialized Hospital

ABSTRACT

Background: Tetanus is a bacterial disease caused by the bacterium *Clostridium tetani* which is a highly fatal, non-communicable, and toxin-mediated disease. The main strategy to prevent the disease is immunization with protective dose of tetanus toxoid vaccine. But globally, maternal and neonatal tetanus is a public health problem due to low maternal tetanus toxoid vaccination. Ethiopia has highest neonatal mortality and morbidity related to tetanus in the world due to low tetanus toxoid immunization coverage. Despite several studies were conducted in Ethiopia on tetanus toxoid vaccination coverage, there is no well-known study done in the study area.

Objectives: The aim of this study was to assess tetanus toxoid vaccine utilization and associated factors among pregnant women attending Wolkite University Specialized Hospital Gurage Central Ethiopia 2024GC.

Methods: An institutional-based cross-sectional study design was conducted among 240 pregnant women visiting for antenatal care at Wolkite University Specialized Teaching Hospital. Study participant was selected using Systematic random sampling technique and the data was collected through an Interviewer-administered questionnaire. The collected data was entered into SPSS version 27 and analyze using the SPSS, bi-variable and multivariable logistic regression was computed. The p-value $P < 0.05$ was used to declare the final statistical significance.

Result: The total tetanus vaccine intake (TT+2) doses were 77.7%. Mothers whose age ≥ 30 [(AOR 4.24 95%CI (1.04 - 17.25)], Mothers who attended primary school [(AOR 4.55 ,95%CI (1.040- 19.89)], mothers whose husbands had diploma and above education [(AOR :6.63: 95% CI (1.02 - 43.35)], Advice on TT vaccine [AOR= 4 :95% CI:(1.22 -13.003)], appropriate behavior of health workers [AOR= 7.6: 95% CI; (1.22 - 47.36)], good quality service [AOR: 4.62 95% CI (1.13 - 18.90)] and mother who have Good knowledge about TT vaccine and utilization [(AOR: 3.76, 95% CI: (1.276 - 11.06)] were significantly associated with TT vaccine utilization.

Conclusion: In general, the utilization of protective doses of TT vaccination among participants in the area was low as compared to the WHO's recommendation for pregnant mothers 100% and the national figure. The most influencing factors in TT vaccine utilization were mother age, the mother and her husband's low educational level, advice about TT at ANC, the quality of service,

the healthcare provider's behavior, and the mother's knowledge about TT vaccine and utilization.

Key terms: Tetanus toxoid, Immunization, pregnant mothers, utilization

CHAPTER ONE: INTRODUCTION

1.1. Background

Tetanus is a non-communicable disease caused by a potent neurotoxin produced by *Clostridium tetani* bacteria whose resistant spores are present in soil and the environment(1) .The causative organism is harbored by humans and animals that excrete the bacteria and spores. Once in a suitable anaerobic environment such as a contaminated wound, the bacteria multiply and releasing tetanus toxin, which is responsible for the symptoms and outcomes of the disease(2). Muscle rigidity and spasms ensue, often manifesting as trismus/lockjaw, dysphagia, opisthotonus, or rigidity and spasms of respiratory, laryngeal, and abdominal muscles, which may cause respiratory failure(3).

While the disease affects people of all age, it is particularly common and deadly in neonates(4) .In the case of neonates, the entry point for the bacteria is the umbilical stump due to harmful traditional birth practices such as cutting the umbilical cord with unsterile instruments and the application of traditional substances (herbs, cow dung, rat faces) onto the umbilical stump expose the newborn child to contamination with spores, thereby increasing the likelihood of infection and hence disease(5).

The main Strategy for the prevention of maternal and neonatal tetanus (MNT) at birth is vaccination of pregnant mothers with protective dose of Tetanus toxoid (TT) immunization(6) .Hence, a pregnant woman should receive at least two doses during each pregnancy for full protection (7). The World Health Organization (WHO) recommends 5 consecutive doses of tetanus +toxoid (TT) vaccination for childbearing women per schedule to protect the birth against tetanus and to provide life time protection for the mother(8) .

Globally, maternal and neonatal tetanus (MNT) is a public health problem due to low maternal TT immunization (9). Annually, 3.3 million neonatal deaths occur, of which neonatal tetanus shares a high proportion (more than half million neonatal deaths), particularly in developing countries where home delivery is common (8). In 2017, 38,000 people worldwide died from tetanus. Around half of them (49%) were under five years of age. Most new tetanus cases occurred in South Asia and Sub-Saharan Africa in 2017. The two regions account for 82% of all tetanus cases globally. Likewise, 77% of all tetanus deaths occur in South Asia and Sub-Saharan Africa with 29,500 lost lives. Tetanus cases are still more common in Sub-Saharan Africa than everywhere else in the world. In 2017, South Sudan and Somalia had rates of tetanus cases greater than 10 per 100,000 people [(10),(11),(12)]. Ethiopia is one of 18 countries where maternal and neonatal mortality remains a public health problem. The maternal and neonatal mortality rates in Ethiopia are 412 per 100,000 live births and 29 per 1000 live births, respectively. This mortality rate is the highest maternal and neonatal death rate in comparison to other Sub-Saharan African countries (13).

Most maternal problems occur due to lack of vaccination or incomplete immunization on exposure leading to an increase in morbidity and mortality. An estimated 15,000–30,000 women die from tetanus infection during or after delivery[(13),(14),(15)]. The causality of tetanus among neonates is about 80%–100%, and it is still a significant public health concern in areas with poor immunization utilization and limited access to clean deliveries(16).

1.2. Statement of problem

Globally 2.3 million children died in the first 28 days of life in 2022. There are approximately 6500 newborn deaths every day(17).In 2017, approximately 30,848 neonates died of neonatal tetanus (10). It is estimated that tetanus deaths in 2018 were 25, 000 **(18)**. Globally tetanus is responsible for 5% of maternal deaths and 14% of neonatal deaths annually, accounting for up to 25% neonate's death in some African countries (19).

The disease remains an important public health problem in many parts of the world where immunization programs are suboptimal, particularly in the least developed districts of low income countries (1). Due to unhygienic deliveries and low tetanus toxoid (TT) immunization, women and their newborns are high risk of acquiring tetanus (20).

Despite the country's effort of interventional policy to meet the WHO goals towards Maternal and Newborn Tetanus Elimination (MNTE) through extended immunizations and campaigning tetanus toxoid vaccinations, Ethiopia continues to have higher tetanus morbidity and mortality rates (21). The reasons are due to the low coverage of TT immunization and the high number of home deliveries in the country and only 32% of mothers had at least 4 ANC visits and only 26% of mothers delivered in the presence of skilled birth attendant (22).

Although the country was expected to reach 86% coverage of national tetanus protective at birth (PAB) by 2015, there is still low coverage and varies between regions with fewer identified associated factors (23).Nearly 94% of neonatal mortality related to tetanus can be reduced by immunization of women of childbearing age with at least two doses of tetanus toxoid immunization (TT2+) (20).Even though there is low coverage of maternal health services such as antenatal care and Skilled birth attendant delivery as well as poor sanitary practice during delivery in Ethiopia, The proportion of births protected by the tetanus vaccine is low(14).

In many parts of low-income countries, however, despite the efforts made to improve maternal and neonatal protection through TT immunization programs, valid doses of TT (two and more) immunization coverage still remains low (15). For instance, about 27% of the participant women did not receive any TT vaccination during their most recent pregnancies in India (24). A report from Pakistan demonstrated that only

55.6% of the participant received the complete TT vaccination (25). Similarly, the majority of the Sub-Saharan African countries could hardly reach the TT immunization target set to be covered. Because of this, they have not yet fully achieved the complete elimination of MNT. Accordingly to a study from Nigeria showed that only 40.8% of TT2 coverage was achieved while 44.4% of mothers did not receive any TT vaccination (26). Ethiopia is one of the countries which have not fully achieved the complete elimination of MNT(27). Due to the low TT coverage achieved. According to Ethiopian demographic and health survey (EDHS 2016) report showed that the proportion of sufficient doses of TT (TT2+) was 49% (22).

According to a systematic review and Meta-analysis done on TT protective dose immunization in Ethiopia is also showed that about 52.6% of women were vaccinated during pregnancy at least twice (23). A community-based cross-sectional study done on immunization dropout rate in Debrebirhan Town, Amhara Region, Northern Ethiopia was found to be 72.3% (28). A different study conducted in different segments of Ethiopia such as in Errer District, Somali Regional State, Eastern Ethiopia (51.8%)(29), Tselemti District, Ethiopia (61.8%)(30), Damboya Woreda, Kembata Tembaro Zone, SNNP, Ethiopia (72.5%)(31), DebreTabor town, Ethiopia (56.2%) (13) , Dukem Town, Eastern Ethiopia (39.2%) (15) , and Hawzen, Eastern Zone of Tigray, Ethiopia (40.2%)(12) showed that none of those studies hits the target standard endorsed by WHO Global Immunization target of at least 90% national vaccination coverage and at least 80% vaccination coverage in every district(32).

Both maternal and neonatal tetanus are preventable health problems. Proper implementations of maternal immunization programs, like the TT immunization is one of the basic intervention strategies used to alleviate these situations.

Despite several studies were conducted in Ethiopia on, tetanus toxoid vaccination coverage and its predictors; however, there were no well-known study done in the study area. Therefore the study was aim to assess the magnitude of TT vaccine utilization and associated factors among pregnant women in the WUSTH Gurage zone .Low tetanus toxoid vaccination is a real health issue which deserves more attention and requires having better knowledge of its magnitude and particularly its associated factors.To the best of our knowledge, local studies especially among

WUSTH pregnant women studying tetanus toxoid vaccination coverage and its associations are scarce and it will be interesting to see the magnitude, associated factors among pregnant women.

1.3. Significance of the study

According to Ethiopian Demographic Health Survey of 2016, only 49% of mothers received two tetanus toxoid (TT) injections during their last pregnancy which is below the World Health Organization and Ethiopia Ministry of Health recommendation (22).

The findings of this study will provide valuable information on the magnitude of TT vaccine utilization and associated factors among pregnant women in the WUSTH Gurage zone.

This study will also provide useful information which can be a base line for WUSTH administrators for developing a plan that specifically give attention for pregnant women who aren't getting TT vaccination.

Policy and Program Development: Evaluation of TT vaccination coverage. provides valuable data for policymakers and program developers. It helps identify areas of improvement, allocate resources effectively, and develop evidence-based policies to enhance the delivery of TT vaccine.

In addition, this study may provide a pathway and information for other researcher who wants to conduct their study on the same issue and findings also will help as base line for future study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Utilization of Tetanus Toxoid vaccine

Tetanus vaccine is an inactivated toxin (toxoid) that was produced in 1924 and used extensively for the first time among soldiers during World War II. Since then, immunization programs using TT containing vaccines (TTCVs) have been highly successful in preventing maternal and neonatal tetanus (MNT) as well as injury-associated tetanus (20). In Africa; the proportions of childbearing women with at least two doses of tetanus-containing vaccine at birth were 69% (33). In Ethiopia, according to the Ethiopian Demographic and Health Survey (EDHS) 2016 report, only 49% of women had their last birth protected against neonatal tetanus (22).

An institution based cross-sectional study conducted among 254 pregnant women in North-West Nigeria in Nov 2018, showed that 175 (68.1%) of the respondents had received at least 1 dose of TT immunization during pregnancy from those only 60 (34.3%) had received two or more doses of the vaccine (34).

Another cross-sectional study conducted among 8,722 mothers in Sierra Leone in 2017, reveals that the prevalence of receiving TT immunization during women's last pregnancy was 96.3% and the prevalence of receiving at least two doses was 82.12% (35).

Based on a secondary data analysis done in Ethiopia among 7043 pregnant women the prevalence of pregnant women who received sufficient doses of tetanus toxoid vaccination to protect their last birth against neonatal tetanus was 49.4% (14).

2.2 Factors associated with utilization of TT vaccine

2.2.1 Socio-demographic characteristic

□ Education and employment status of mothers

A cross sectional study done in Kenya revealed that mother who had higher, secondary and primary education were more likely to receive two or more dose of TT vaccine than mothers with no formal education (22).

Based on a cross sectional study done in Duguna Fango District, Southern Ethiopia, 2018, among Pregnant Women, mothers who had never attended formal education were less likely to receive two or more doses of TT injection than educated mothers (36).

A Community based cross sectional study conducted among reproductive-age women in Dukem Town, Eastern Ethiopia: 2018 showed that mothers having primary and secondary and above education were more likely to have births protected against NT as compared to those mothers with no formal education (15).

Based on multilevel analysis of data from 2016 Ethiopian demographic and health survey; 2021, done in Ethiopia showed that the likelihood of having inadequate dose of TT immunization was higher among unemployed women as compared to their counterparts (21).

□ Distance from home to health facility

A multilevel analysis of data from 2016 Ethiopian demographic and health survey; 2021, done in Ethiopia showed that there is significant association between distances from home to health facility with tetanus toxoid immunization. Women who walked less than 1 hour to reach health facilities were 2.6 times more likely to take tetanus toxoid immunization than mothers who walked greater than or equal to 1 hour to reach the health facility (21).

According to a Community based cross sectional study conducted among reproductive-age women in Dukem Town, Eastern Ethiopia: 2018; mothers who perceive distance from the health facility as a big problem had lower immunization status compared to mothers having short distance from home to health facility (15).

□ **Residence**

Institution-based cross-sectional study was conducted in Gonder comprehensive specialized hospital, northwest Ethiopia, 2019, showed significant association between resident and TT vaccine utilization(37).

community-based cross-sectional study was conducted in Errer District, Somali Regional State, Eastern Ethiopia showed that urban residents were more likely to vaccinate for TT2 and the above doses as compared to rural residents. This is in line with the result from Peshawar, Pakistan, and Tselemti district of the Tigray region of Ethiopia (29).

A multilevel analysis of data from 2016 Ethiopian demographic and health survey; 2021, done in Ethiopia showed that TT vaccine uptake was 1.13 times lower among rural women as compared to those from urban communities(21).

2.2.2 Knowledge of women about TT vaccine/media exposure

An institution based cross-sectional study done in North-West Nigeria on mother's knowledge about TT vaccine showed that Women who had knowledge about TT vaccine tended to practice the immunization more than their counterparts (34).

Another study done in Indonesia showed those who had information on TT vaccine tended to practice the immunization more than compared to those who did not receive any information (38).

A multilevel analysis of data from 2016 Ethiopian demographic and health survey; 2021, done in Ethiopia showed that Women who had media exposure were 8.3 times more likely to receive two or more dose of tetanus toxoid immunization than women who had no media exposure(21).

2.2.3 Maternal health service utilization

□ ANC visits

A cross-sectional study conducted in Sierra Leone and Indonesia revealed that there is association between ANC visits and TT Vaccine utilization. Both studies showed that those who had antenatal care had the highest tendency to utilize TT vaccine [(35), (38)].

According to a Community based cross sectional study conducted in southern Ethiopia a participants who had at least four ANC visits during their last pregnancy were 2.5 times more likely to be vaccinated with the protective doses of TT immunization than those who had a maximum of three ANC visits. This finding is consistent with the studies conducted in Brazil, East Africa,Sudan, and Hawzen (Tigray Region)(39).

According to a Community based cross sectional study conducted in Debre Tabor town, North West Ethiopia, 2018; among postnatal Mothers revealed that Mothers with history of initiating ANC visit within the first trimester were nearly 4 times more likely to have been immunized with this dose than those starting later. Similarly, mothers who had four or more ANC visits during the last pregnancy were 5.16 times more likely to have been immunized with TT protective dose than those who had below four ANC visits (13).

Generally, from the above literatures ANC visits, media exposure, distance of health facilities, educational status of mothers, and their husbands were significantly associated with tetanus toxoid immunization status among women in Ethiopia.

2.3 CONCEPTUAL FRAME WORK

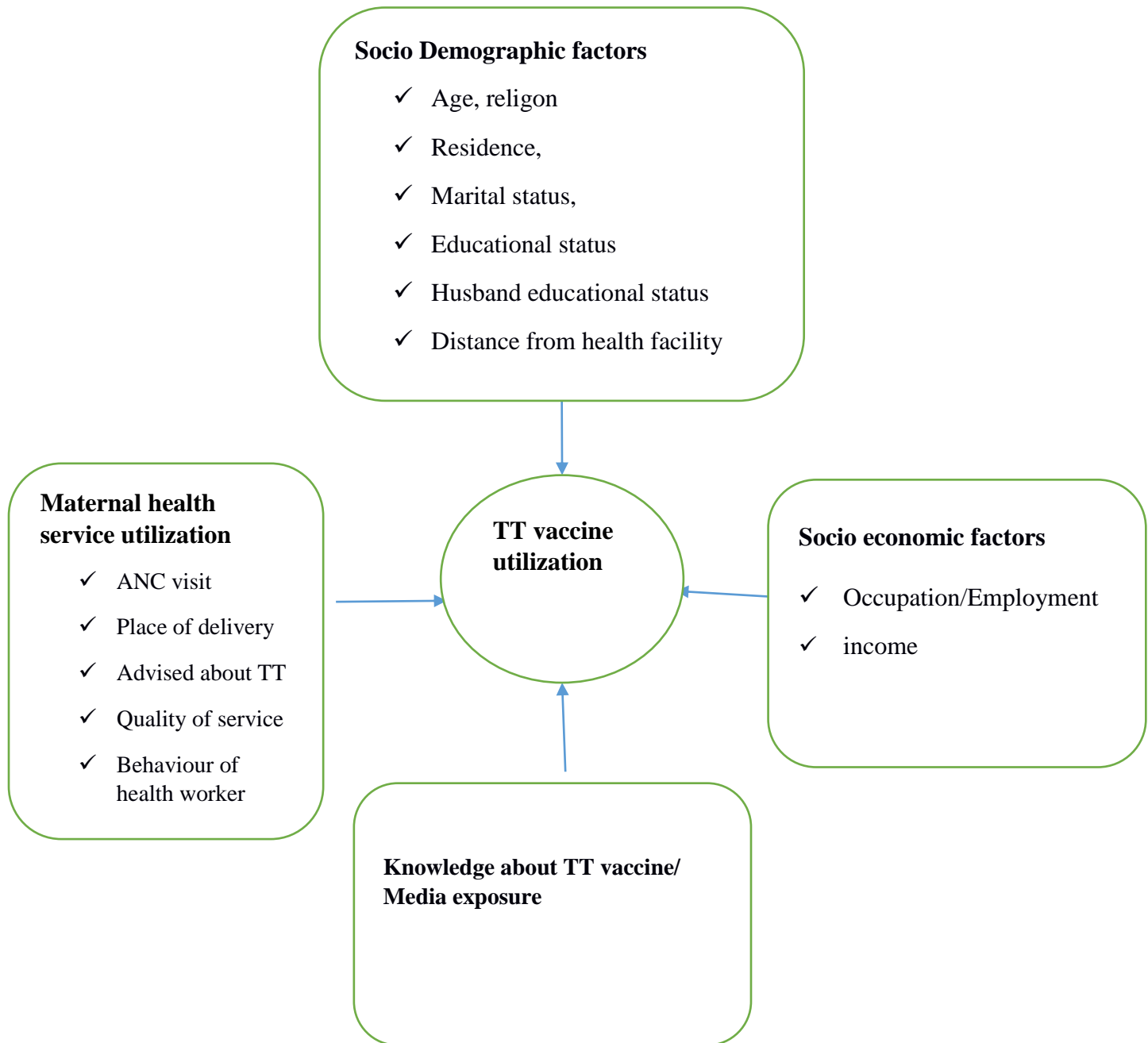


Figure 1: modified conceptual frame work of tetanus toxoid vaccine utilization and associated factors among pregnant women attending WUSTH ,2024 ((29),(30),(36)).

CHAPTER THREE: OBJECTIVES

3.1 General objective

- To assess the magnitude and associated factors of Tetanus Toxoid vaccine utilization, among pregnant women attending Wolkite University Specialized Teaching Hospital, Gurage Central Ethiopia, 2024.

3.2 Specific objective

- To determine magnitude of Tetanus Toxoid vaccine utilization among pregnant women attending Wolkite University Specialized Teaching Hospital Gurage zone, Central Ethiopia, 2024.
- To identify factors associated with Tetanus Toxoid vaccine utilization among pregnant women attending Wolkite University Specialized Teaching Hospital Gurage zone, Central Ethiopia, 2024.

CHAPTER FOUR: METHODOLOGY

4.1 Study area

The study was conducted in WUSTH. The hospital in Central Ethiopia, Gurage zone, Wolkite, 171 kms southwest of Addis Ababa. The hospital provides service for about more than five million people of gurage zone and peoples of neighboring zones, southwest oromia and east shewa. The annual report of pregnant women attending antenatal care at hospital in 2016 EC was 2350 (only ANC 1,ANC4,ANC 8) and the monthly report of ANC 1-8 from 29/2/2017 E.C to 29/3/2017 EC was 498 (40).

4.2 Study period

The study was conducted from December 24 /2024 to Jan 06 /2025 GC.

4.3 Study design

Institutional based cross sectional study design was conducted at Wolkite university specialized teaching hospital.

4.4 population

4.4.1 Source population

All pregnant women who has been attending antenatal care at Wolkite University Specialized Teaching Hospital.

4.4.2 Study population

All pregnant women who was attended antenatal care at Wolkite University specialized teaching hospital from December 24 /2024 to Jan 06 /2025 GC will be the study population.

4.5 Eligibility criteria

4.5.1 Inclusion criteria

- ❖ All Pregnant women those who was attended ANC visit to the WUSTH at the time of data collection

4.5.2 Exclusion Criteria

- ❖ Pregnant women who was seriously sick.
- ❖ Primigravida mother's
- ❖ Neurological disease or mental incapacity who could not respond to the questioners

4.6: Sample size determination

A single population proportion formula, using the assumptions of 95% confidence level and 5% margin of error, was used to estimate the sample size. Proportion of pregnant women who received sufficient doses of tetanus toxoid vaccination of 49.4 % was used to calculate the sample size(22).Using the above assumptions, the required sample size was calculated to be;

$$n = \frac{Z_{\alpha}^2 p(1-p)}{d^2} \quad \text{Where, n= sample size}$$

Z=95% confidence interval (1.96)

P = the proportion of pregnant women who received sufficient doses of tetanus toxoid vaccination to protect their last birth against neonatal tetanus was 49.4 %.in Ethiopia (22)

d²=Margin of sampling error to be tolerated 0.05(5%)

$$n = \frac{(1.96)^2 * 0.494(1 - 0.494)}{(0.05)^2} = 384.1 = 385$$

Since the source population (the number of pregnant mother who came for ANC visits during the study period was 498) which is < 10,000 the sample size was reduced by **correction formula.**

$$Nf = \frac{ni}{1 + ni/N}$$

$$1 + ni/N$$

$$Nf = \frac{385}{1 + 385/498} = 217.5 = 218$$

Then, with 10% non-response rate total sample size was 240

Table 1 : Sample Size Determination for Second Objective among pregnant women attending antenatal care at Wolkite University Specialized Teaching Hospital.

Factors	Unexposed	AOR	power	CI	Ratio	SS	10%	Final SS	reference
Age>31	68.2	9.69	80%	95%	1	150	15	165	(31)
Mother education	17	6.55	80%	95%	1	106	11	117	(39)
residence	42.2	4.33	80%	95%	1	154	16	170	(29)
Behaviour of HW	17.6	6.2	80%	95%	1	110	11	121	(16)
Knowledge about TT	25.1	3.45	80%	95%	1	212	22	234	(29)

Therefore the final total sample size was 240.

4.7. Sampling techniques

The study participant was selected using systemic random sampling technique, pregnant women's come to ANC. Number of pregnant women came to ANC in november month 498. Then the total number of women in the study period, N= 498 and n (sample size) =240

The first sample was selected using lottery method from the first up to Kth and then selected every K unit.

$$K=N/n=498/240=2.07 \text{ then } K =2$$

4.8. Data collection method and measurement

The data collection tool was adapted from different related literature((15),(29),(36)).The questionnaire includes 30 items in three different domains. The first section assess the socio-demography status, the second section assess about maternal health service and the third section assess about knowledge of the mother towards TT vaccine and TT vaccine utilization. Three BSc public health students were recruited as data collectors and one Asst professor and one MPH public health as supervisors and advisors. The training was given to both data collectors and supervisors by the investigator about the objective of the study, data collection tool, procedure, and how to fill the questionnaires. All pregnant mothers who came for

ANC visits in WUSTH was interviewed by interviewer administered face to face interview after assessing eligibility and obtaining informed written consent.

4.9. Study variables

4.9.1. Dependent variable

❖ TT vaccine utilization

4.9.2. Independent variable

Socio demographic and economic characteristics (age, residence, religion, marital status, educational status, husband educational status, distance from home to health facility, occupation, income)

Obstetric and Maternal health service utilization (ANC visit, place of delivery, advised about TT, quality of service, behavior of health worker)

Knowledge about TT vaccine/ Media exposure

4.10. Operational definitions

- **TT vaccine utilization:** the proportion of women who had received 2 or more doses of TT vaccine during that pregnancy (39).
- **Adequate dose of TT vaccination,** defined as proportion of mothers who have been received two tetanus toxoid injections during that pregnancy (39).
- **Inadequate dose of TT vaccination,** receiving less than two doses of TT vaccine during that pregnancy (39).
- **Protected at Birth (PAB):** if the mother had received a documented or not, two or more doses of TT during current pregnancy or at least two TT doses prior to the current pregnancy of which the last dose was <3 years before the birth; or three doses within the 5 years before the current pregnancy; or four doses with the last dose <10 years before the pregnancy or receiving five doses or more before the current pregnancy(31).
- **Media exposure.** Created by combining whether a respondent reads the newspaper, listens to the radio, and watch television and if the mother was exposed to at least one of the three media (14).
- **Good knowledge ,**Women who answered at least average of questions related to tetanus toxoid (36).

- **Poor knowledge** ,those who answered below average of questions related to tetanus toxoid (36).
- **Rural**, the majority of the population is engaged in agricultural activity ,including farming, livestock rearing, and related practice(41).
- **Urban**, the majority of the population engaged in non-agricultural activity economies focused on industry, service and commerce(41).
- **Income** , is the monetary or non-monetary gain received by an individual or entity as compensation for labor, services, capital, or investments over a specific period(42).
- **Education** ,is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits(43).
- **Occupation** , the work role that an individual undertakes in exchange for economic compensation, contributing to the individual's social identity and societal structure(44).
- **ANC** , defined as the complex of interventions that a pregnant woman and adolescent girl receives from skilled health care professionals in order to ensure the best health conditions for both mother and baby during pregnancy(22).

4.11. Data processing and analysis

The collected data was checked visually for its completeness and the response was coded and entered in to computer using statistical package for social sciences (SPSS) version 27. Descriptive analysis like frequency and percentage was employed to describe the characteristics of the study participants. Bivariable analysis was done to see the crude significant relation of each independent variables with dependent variable individually. Then Variables with P value < 0.25 during the Bi variable analysis was entered to multi variable analysis to see the neat effect of each independent variable on the outcome variable. The degree of association between independent and dependent variables was assess using adjusted odd ratio with 95% confidence interval The variables that have P-value less than 0.05 was considered as statistically significant. Finally the results presented using figure, table. graph.

4.12. Data quality control

The questionnaire was developed in English language originally and translated into Amharic language for better understanding by respondents then Amharic version of the questionnaire was translated back to English language to check for its consistency. The training was given to data collectors and supervisors. Pretest was done among 5 % of pregnant women who will attend ANC at Atat hospital. Data collectors were trained on each item included in the questionnaire, its meaning & filling the questionnaire. A data collector were supervise throughout the data collection period. Then, the overall process was coordinated and controlled by the investigator. Investigators, supervisors, and data collectors took a discussion meeting after data collection to ensure completeness. During data collection the principal investigator was checked the completeness, ambiguous suspicions and checked on the spot & corrected by cross checking the questioners. Furthermore, the collected data was Checked and coded and entered into SPSS.

4.13. Ethical consideration

Ethical clearance was obtained from the institutional review board of Wolkite University. A formal letter of cooperation was written to college of medicine and health sciences, Public Health department, Wolkite University Specialized Teaching Hospital, and permission will be obtained. Verbal consent was obtained from each study participant. The name of participant was not be mentioned/ recorded anywhere and the information they provided to us was maintained and could not be accessed by a third party but it has been used for research only and burnt by the end of the survey.

4.14. Dissemination plan

After finishing this research it will be disseminated to Wolkite University then college of medicine and health science and also to department of Public Health. It will also be disseminated to the Wolkite University specialized teaching hospital and may also will be published on peer reviewed journals.

CHAPTER FIVE: RESULT

Among a total sample of 240 study participants, 234 pregnant women were interviewed in the study, and gave a response rate of 97.5% response rate and the results were presented as follows under subheadings.

5.1 Socio-demographic characteristics

Among 234 of the participants were 26 to 29 years with a mean and SD of 29.27 ± 10.38 years. Majority of respondents were married 231(98.7). Additionally, regarding educational status of mother 189(80.7%) were at least attend primary and above educated and 127 (54.2 %) of husband educated secondary and above and also majority of respondents were urban residence (75.2%). (table 1)

Table 2 Socio-demographic characteristics among pregnant women who was attended antenatal care at Wolkite University specialized teaching hospital

Variables	categories	Frequency(n=234)
Age in years	20-25	44(18.8)
	26-29	97(41.5)
	30 and above	93(39.7)
The mean \pm SD age of the respondents were 29.27 ± 10.38		
Religion	Orthodox	131(56.0)
	Muslim	75(32.1)
	Protestant	20(8.5)
	Catholic	8(3.4)
Ethnicity	Gurage	199(85.04)
	Amhara	13(5.55)
	Oromo	8(3.41)
	Kebena	6(2.56)
	other specify	8(3.41)
Residency	Urban	176(75.2)
	Rural	58(24.8)
Educational level	Unable to read and write	29(12.4)
	No formal education	16(6.8)
	Primary	74(31.6)
	secondary	61(26.1)

	Diploma and above	54(23.1)
Husband Educational level	Unable to read and write	20(8.5)
	No formal education	14(6)
	Primary	73(31.2)
	secondary	63(26.9)
	Diploma and above	64(27.4)
Occupational status	Government employee	55(23.5)
	Merchant	39(23.5)
	Housewife	110(47.0)
	Private employee	18(7.7)
	Farmer	12(5.1)
Income level	<5000	38(16.2)
	5000-10000	125(53.4)
	10001-15000	55(23.5)
	>15000	16(6.8)
Distance from home to health facility	<30 minute	83(35.5)
	30-60 minute	106(45.3)
	>1 hour	45(19.2)
Tv /radio	Yes	184(78.6)
	No	507(21.4)

5.2 TT vaccine utilization of the respondents

In this study, out of 234 participant pregnant mothers, 192 (82.05%) vaccinated. From those 10 of them were vaccinated only the TT1 vaccination dose. So only 77.7% (N = 182) were vaccinated the valid (TT2+) doses. (table 2)

Table 3 TT vaccine utilization among pregnant women who was attended antenatal care at Wolkite University specialized teaching hospital

Variable		Frequency (%)
Vaccinated for TT	yes	192 (82.05)
	no	42(17.95)
Place of vaccination	Health center	105(54.7)
	Hospital	83(43.2)

Health post	4(2.1)
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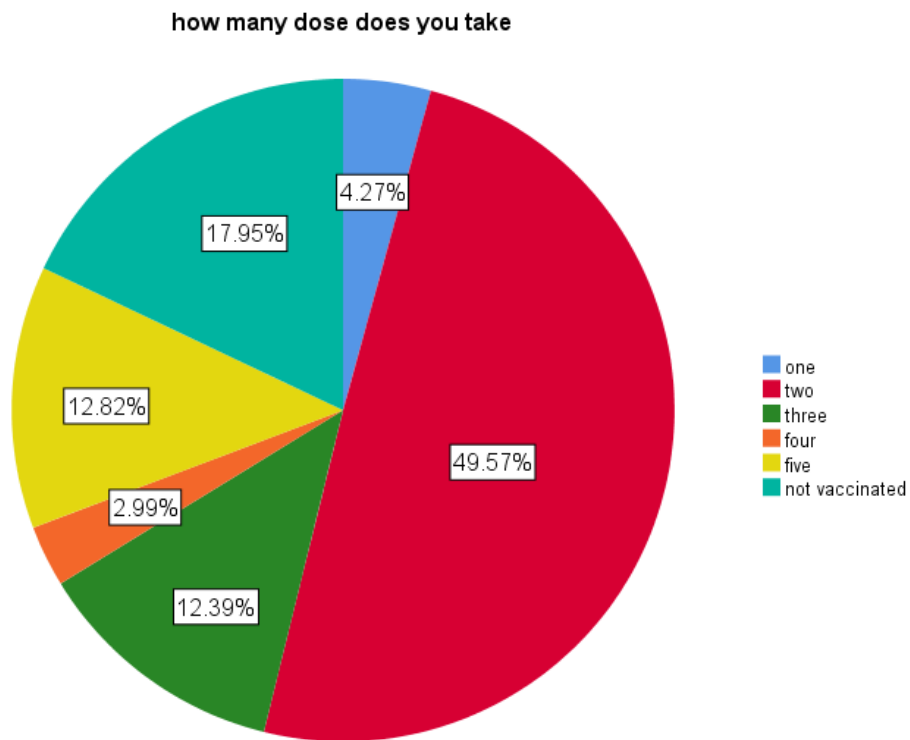


Figure 2 percentage Tetanus toxoid vaccine utilization status in WUSTH 2024

Out of 234 participants only 42 doesn't receive any dose of TT vaccine

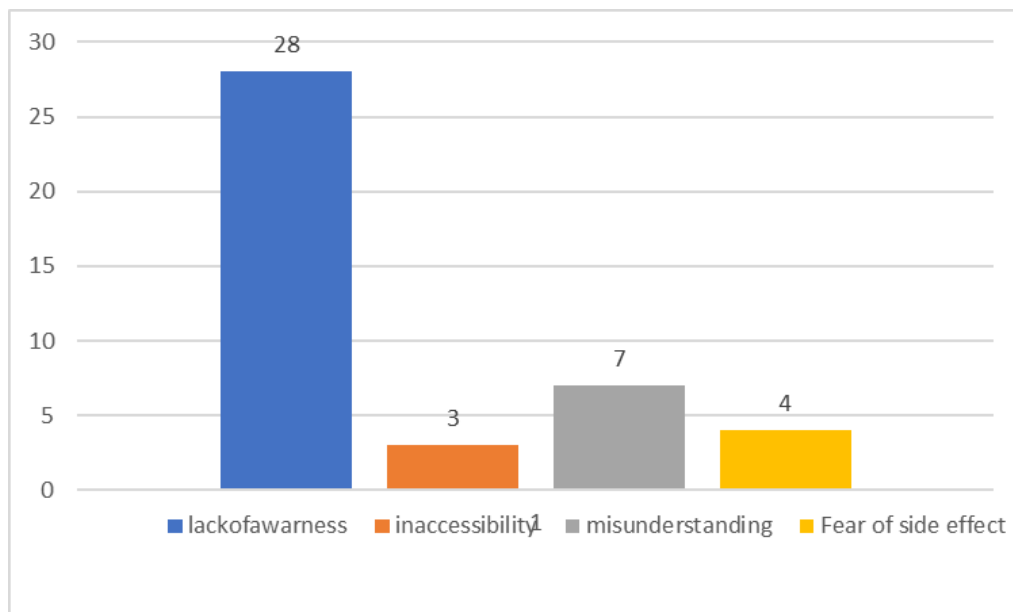


Figure 3 frequency distribution the reason of nonvaccinated of tetanus toxoid vaccine pregnant women in WUSTH 2024

5.3. Obstetric and health service related characteristics

Out of 234 pregnant mothers included in this study, 123 (52.6%) had received advice on tetanus toxoid vaccination. 155 (66.2%), of women perceived as good quality of health services and 175, (74.8%), thought as the service provider respected the women. (table 3)

Table 4 Obstetric and maternal health service among pregnant women who was attended antenatal care at Wolkite University specialized teaching hospital

Variables	Categories	Frequency (%)
Gravidity	multigravida	204(87.2)
	grandmultigravida	30(12.8)
Parity	primiparus	59(25.2)
	multiparus	155(66.2)
	Grandmultiparus	20(8.5)
Total ANC visit	once	21(9.0)
	two	45(19.2)
	three	65(27.8)
	Four and more	103(44.0)
Time of first visit	First trimester	130(55.6)
	Second trimester	104(44.4)
Place of delivery	Health facility	222(94.9)
	home	12(5.1)
Quality of service	good	151(64.5)
	fair	63(27.4)
	poor	20(8.5)

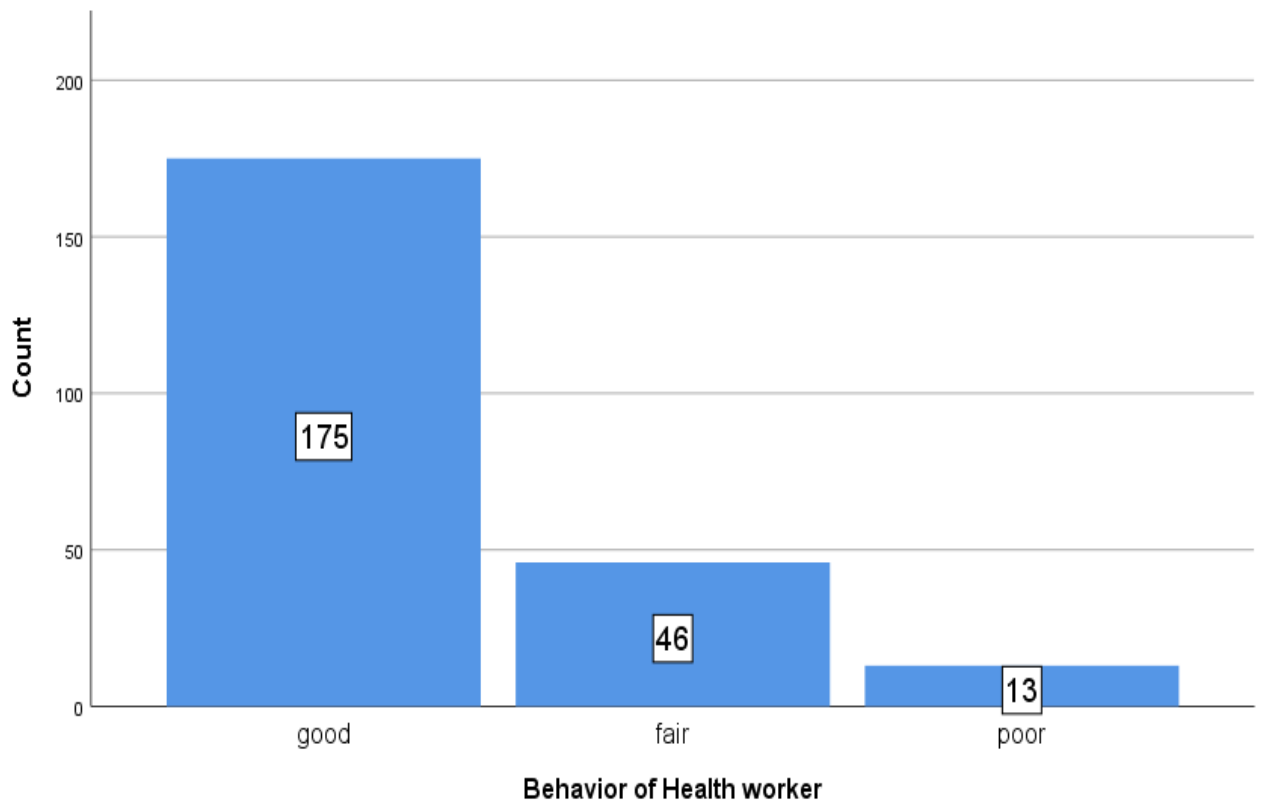


Figure 4 frequency behavior of health worker stated by respondent in WUSTH 2024

5.4 Knowledge of women on tetanus disease and TT vaccine.

majority of the study participants responded that they heard about tetanus disease 198 (84.6%), 135 (57.7%) of them knew the cause of tetanus, 169 (72.2%) them knew tetanus is preventable. 165 (70.5) of the study participants responded that they heard about tetanus vaccine. Only 160 (68.4%) of the respondents had good knowledge about the disease tetanus and TT vaccine. (table 4)

Table 5 Knowledge of women on tetanus disease and TT vaccine among pregnant women who was attended antenatal care at Wolkite University specialized teaching hospital, 2024

Variables	Categories	Frequency (%)
Heard about tetanus	yes	198(84.6)
	no	36(15.4)
Cause of tetanus	Contaminated wound with soil rusty metal	116(49.5)
	I don't know	99(42.3)
	Inappropriate wound management	11(4.7)
	Come through family	8(3.4)
How tetanus prevented	Immunization	109(64.5)
	immunization and post exposure prophylaxis	22(13.0)
	Post exposure prophylaxis	16(9.5)
	Proper wound management	3(1.78)
	I don't know	19(11.2)
Priority for TT vaccination	Pregnant mothers	160(68.3)
	Women of reproductive age	20(8.5)
	Female of any age	12(5.2)
	Male of any age	2(0.9)
	I don't know	40(17.1)
Purpose of TT injection	To prevent both self and child from tetanus	152(65)
	child prevention from tetanus only	18(7.7)
	To prevent pregnancy	5(2.1)
	To self prevention only	3(1.3)
	I don't know	56(23.9)
Minimum dose injection required for fully protection during pregnancy	One	21(9.0)
	Two	68(29.1)
	Three	65(27.8)
	Four	2(0.9)
	Five	19(8.1)
	I don't know	59(25.2)
Tetanus can cause death in both mother and new born	Yes	135(57.7)
	I don't know	99(42.3)
Do you know tetanus transmitted during unsafe delivery	Yes	126(53.8)
	I _don't know	108(46.2)
Did you heard TT five dose only prevented life long from tetanus	Yes	120(51.3)
	No	114(48.7)

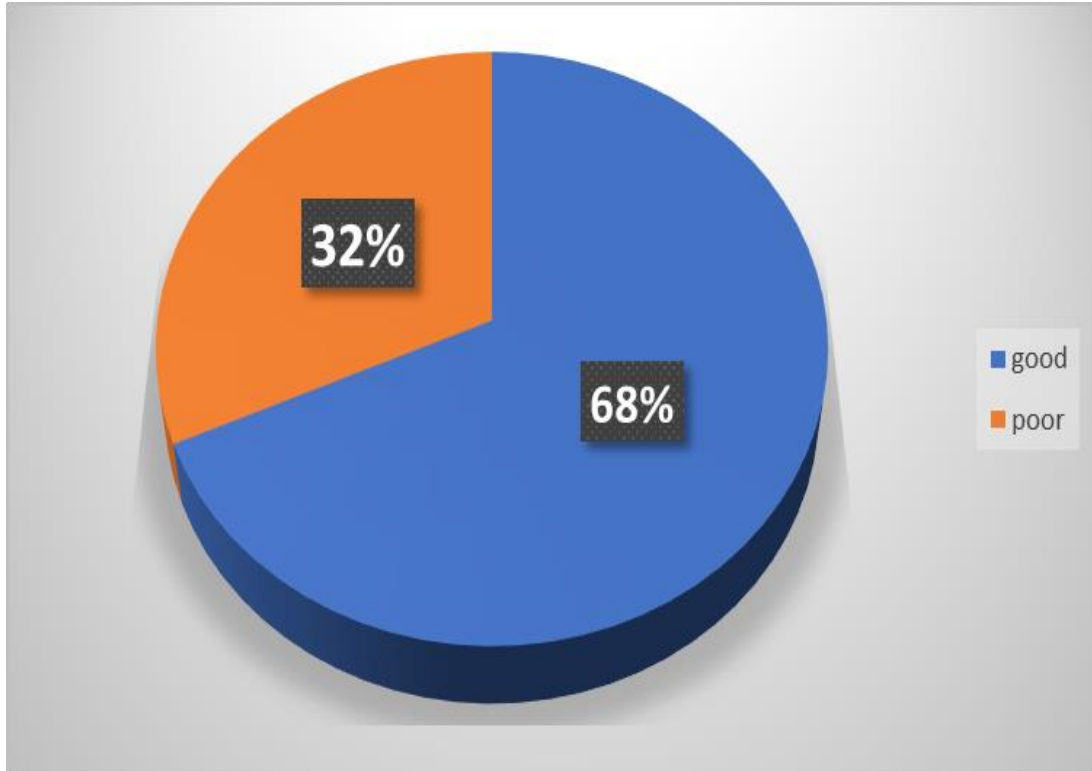


Figure 5 percentage knowledge about tetanus toxoid vaccine and utilization among pregnant women in WUSTH 2024

5.5. Factors associated with Tetanus Toxoid vaccination

Binary logistic regression analysis was done to identify candidate variables for multivariable logistic regression at a p-value of less than 0.25, And variables from socio demographics (age of mothers, education status of the mother, husband educational status , residence, time take to reach health facility) , from obstetric and maternal health service (advice on tetanus toxoid vaccination , behavior of health worker and quality of service)and level of maternal Knowledge on tetanus and tetanus toxoid vaccination were taken to multivariable logistic regression. In multi variable logistic regression seven variables were found to be statistically significantly associated with TT vaccine utilization at P value <0.05.

Maternal age ≥ 30 was significantly associated with TT vaccine utilization with [(AOR 4.24 95%CI (1.04 - 17.25)]. Maternal educational status was significantly associated with TT vaccine utilization with [(AOR 4.55 ,95%CI (1.040- 19.89)]. Husband educational status was significantly associated with TT vaccine utilization with [(AOR :6.63: 95% CI (1.02 - 43.35)]. Advice on TT vaccine was significantly associated with TT vaccine utilization with [AOR= 4 :95% CI:(1.22 -13.003)]. Quality of services was significantly associated with TT vaccine utilization with [AOR: 4.62 95% CI (1.13 - 18.90)]. Health workers behavior was significantly associated with TT vaccine utilization with [AOR= 7.6: 95% CI; (1.22 - 47.36)]. Knowledge about TT vaccine and utilization was significantly associated with TT vaccine utilization with [(AOR: 3.76, 95% CI: (1.276 - 11.06)]. (table5)

Table 6; Bivariable and multivariable logistic regression for factors associated with TT vaccination utilization among pregnant women who attend ANC at WUSTH

Variables	Categories	TT vaccine utilization				
		Frequency (%)		COR (95%CI)	AOR (95%CI)	P-value
		yes	no			
Age	20-25	33(74.3)	11(25.7)	1	1	
	26-29	80(82.5)	17(17.5)	1.57(0.66 - 3.71)	1.09 (0.34 - 3.56)	0.88
	≥ 30	79(84.9)	14(15.1)	1.88 (0.77 - 4.57)	4.24 (1.04 -17.25)*	0.04
Educational status	Unable read & write	15(51.7)	14(48.3)	1	1	
	No formal education	10(62.5)	6(37.5)	1.56 (0.45 - 5.41)	0.44 (0.07 - 2.75)	0.38

	primary	65(87.3)	9(12.7)	6.74(2.46 - 18.47)	4.55 (1.04- 19.89)*	0.044
	secondary	54(88.5)	7(11.4)	7.20(2.46 -21.04)	3.24 (0.56 - 18.51)	0.19
	Diploma and above	48(88.9)	6(11.1)	7.47 (2.44- 22.85)	1.85 (0.27 -12.87)	0.53
Husband educational status	Unable read & write	9(45)	11(55)	1	1	
	No formal education	9(64.3)	5(35.7)	2.20(0.54 - 8.96)	3.05(0.37 - 24.84)	0.297
	primary	61(83.5)	12(16.4)	6.21(2.12 - 18.23)	5.08 (1.08- 23.91)*	0.040
	secondary	57(90.5)	6(9.5)	11.61 (3.43- 39.25)	6.38(1.00- 40.64)	0.050
	Diploma and above	56(87.5)	8(12.5)	8.56 (2.71 - 27.05)	6.63 (1.02 - 43.35)*	0.048
Residence	Rural	41(70.7)	17(29.3)	1	1	
	Urban	151(85.8)	25(14.2)	2.50(1.24 -5.07)	0.21 (0.03- 1.33)	0.098
Distance from home to HF	<30min	7188.75)	9(11.25)	10.30(3.69 -28.79)	3.13(0.71 -13.73)	0.130
	30-60min	94(84.7)	17(15.3)	7.07(2.77 -18.02)	1.71 (0.50 - 5.78)	0.390
	>1hr	27(62.8)	16(37.2)	1	1	
TV/radio	Yes	163(88.6)	21(11.4)	5.62(2.73 -11.58)	2.36 (0.42 - 13.35)	0.330
	No	29(58)	21(42)	1	1	
Advised about tetanus at ANC	Yes	116(94.3)	7(5.7)	7.63(3.22-8.06)	3.99 (1.22 -13.00)*	0.022
	No	76(68.5)	35(31.5)	1	1	
Behaviour of HW	Good	149(85)	26(15)	3.58(1.09 - 11.80)	7.60 (1.22 - 47.36)*	0.030
	Fair	35(76)	11(24)	1.99 (0.54 - 7.35)	5.38 (0.77 - 37.72)	0.091
	Bad	8(61.5)	5(38.5)	1	1	
Quality of service	Good	133(88.1)	18(11.9)	6.04(2.20- 16.58)	4.62 (1.13 -18.90)*	0.033
	Fair	48(76.2)	15(23.8)	2.62 (0.91 - 7.52)	2.93 (0.65 - 13.11)	0.161
	Bad	11(55)	9(45)	1	1	
Knowledge about TT vaccine and utilization	Good	148(92.5)	12(7.5)	8.40(3.97-17.79)	3.76 (1.28 - 11.06)*	0.016
	Poor	44(59.5)	30(40.5)	1	1	

COR=Crude odds ratio, AOR=Adjusted odds ratio, *= statistically significant at p-value <0.05

CHAPTER SIX: DISSCUSION

This study revealed that the magnitude of valid tetanus toxoid (TT+2) vaccination use was 77.7%.The result is consistent with that of southern Ethiopia and western Cameroon. Ethiopia (72.5%, 71.9 and 72.78 respectively ((31, 36, 45)).This may be due to the time frame is close, socioculture.

This result is lower than the WHO target and Ethiopian Ministry of Health (90.0%), Pakistan (86.1%), Sierra Leone (81.6%), and Ivory Coast (81.97%) ((12),(46),(35),(47)).The difference might be because of the difference in the study population in terms of culture, health-seeking behavior, and health care coverage, economic and infrastructural access .

This result is higher than that of Ethiopian Demographic Health Survey of 2016 and other local reports in the Ethiopian regions and in Nigeria((12),(16),(22),(29),(34)).This discrepancy may be due to the time variation, the study setting in which most of the previous studies were conducted as a community based and the sample size In addition, awareness about the vaccine has increased with the advancement of technologies like social media and other sources of information

Multivariate analysis model findings claimed that maternal age, maternal educational level, husband's educational level, advice about TT during ANC, quality of the provided health services, behavior of the health workers, and the knowledge of mother about TT vaccine and utilization associated with sufficient utilization of TT vaccine. consequently

This study shows that mothers whose age is ≥ 30 years were 4.2 times more likely to receive adequate doses of TT vaccine than mothers whose age is between 20 and 25 years, this finding is similar to study findings in Peshawar, Damboya woreda southern Ethiopia [(25),(31)].This may be this age group actively participates in health-related issues and takes responsibility for child healthcare. in addition may have past exposure provide them with practical knowledge of healthcare services for themselves and their children.

Pregnant mothers who unable to read and write were 4.5 times less likely to receive adequate doses of TT vaccine per injection than those who attended primary and

higher education. This finding is in line with studies conducted in different regions of Ethiopia and Nigeria ((15),(29),(31), (48)). This may be due to easy access to information and knowledge of a mother on immunization services and because of the fact that education is likely to enhance confidence.

Mothers whose husbands had unable to write and read were 6.6 times less likely to receive adequate doses of TT vaccine than mothers whose husbands had diploma and above education. This result is consistent with studies conducted in India (24), Damboya Woreda, South Ethiopia (31), Somali Regional State, Eastern Ethiopia (29). This may be due to the fact that educated husband has more exposure to different information sources concerning health issues and better level of understanding than the non educated husband. Also, it is a general fact that education increases overall awareness including health and healthcare utilization of an individual.

This study shows that Pregnant mothers who received advice on TT vaccine were 4 times more likely to receive adequate doses of TT vaccine than those who did not receive advice on TT vaccine. This finding was supported by a study done in Indonesia (38). This might be due to pregnant women who got detailed counseling could gain a better knowledge regarding the benefit of the vaccine to her pregnancy outcome and know the required dose of TT vaccine during pregnancy.

This study shows that, adequate doses of TT vaccine is 4.6 times more likely with mothers who perceived good quality services than the counter. The result is supported by a study conducted in Ethiopia((13)). A study conducted in developing countries concluded that the quality of care provided is vital to user confidence in the health system and a study conducted in Ghana showed that satisfaction with the service and treatment they receive affect TT vaccine utilization ((49),(16)).

This study revealed that health workers who behaved well had 7.6 times higher chance of receiving adequate doses of TT vaccine. This finding is supported by a study that stated, that effective communication with providers, demonstrating empathy and understanding is more likely to improve patient knowledge, health literacy, and shared decision-making, encouraging return visits((45),(16)). Mothers do not complete the recommended vaccine, because they are dissatisfied with the services they have received for such reasons as rudeness on the part of the service

provider(45). In another study, half of the unvaccinated women reported that health providers did not motivate them to receive the TT vaccine (46).

This study shows that mothers with good knowledge status on tetanus toxoid vaccination were 3.76 times more likely to receive adequate doses of TT vaccine than those mothers with poor knowledge status. This finding is in line with the study conducted in Indonesia (38). Duguna Fango District, Southern Ethiopia(36). This might be the mothers know benefits, timing and frequency of tetanus toxoid vaccination should be strengthened using variety of methods

6.1. Strength of this study

Primary data was collected at the facility during visit at ANC, hence the possibility of obtaining full information about the women's was enhance, in order to check the quality of data, pretest was done before the main data was collected. The response rate of the questionnaire was 97.5% which was highest level of ratings.

6.2. Limitation of this study

Immunization status was collected including self-report of mothers, this made it susceptible for recall bias. Institutional card or registration book review was not conducted

CHAPTER SEVEN: Conclusion and Recommendation

7.1 Conclusion

In general, the utilization of protective doses of TT vaccination among participants in the area was low as compared to the WHO's recommendation for pregnant mothers and the national figure. Maternal age ≥ 30 , being primary and above educational status of mother, being a diploma and above level of husband's educational status, women who received advised about TT, women who stated that 'the provision of TT vaccine service was good' and "health care workers who provide TT vaccine were good in their behavior" and pregnant women who have good knowledge about TT vaccine and utilization were statistically significant factors influencing TT protective dose vaccine utilization.

7.2 Recommendation

Based on the findings the following recommendations were forwarded:

To the gurage zone health bureau:

- ✓ At a community level provide intensive public health education to fill the knowledge gap among the mothers to enhance health seeking behavior

To gurage zone education bureau

- ✓ Enhancing women's educational level
- ✓ promoting husband's education

To health care facility

- ✓ The health care facility should Improve the quality of service and decrease the waiting time for the service.
- ✓ Training the health care provider how to give tetanus vaccine and how to counsel.

To healthcare provider

- ✓ The health care provider should advice the women in detail about the TT vaccine (its importance, minimum dose required during each pregnancy).
- ✓ The health care provider should provide compassionate & respectful care for the women

To researchers

- ✓ Further community based study should conduct and using a different study design including a qualitative on

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APENDEDEXES

Annex I Information sheet and consent form

Introduction: Hello, how are you? My name is _____ I am working as a data collector in a survey conducted by fourth year public health students at WUSTH. The research supported in collaboration of Wolkite University, College of Health Sciences, Public Health Department. You are invited to participate in this study and I kindly request your active involvement in this survey to provide me with the necessary information. So thank you for your contribution.

Study topic: Tetanus toxoid vaccine utilization and associated factors among pregnant women attending WUSTH, Central Ethiopia, 2024

The objective of the study: To assess the Tetanus toxoid vaccine utilization and associated factors among pregnant women attending WUSTH, Central Ethiopia, 2024

Study period: from December 24 /2024 to Jan 06 /2025 GC.

Process of study: I am going to ask you some questions that are not difficult to answer. You do not have to answer any question that you do not want to answer and you may end this interview at any time you want to. I would appreciate your help in responding to this survey question. This interview may take 15-20 minutes.

Benefit and risk of the study: There is no payment or any special privilege given to you, but your honest answers to these questions will help the study to identify to assess the magnitude and associated factors of TT vaccine utilization. If you are not feeling good at any time, please don't worry to ask to stop the procedure.

Confidentiality: Certainly, I assure you that your name or your name will not be mentioned/ recorded anywhere. The confidentiality of the information you provided to me will be maintained and could not be accessed by a third party but it has been used for research only and burnt by the end of the survey. If you have any questions regarding this study, you can call me at 0921688826 /0979788772 /0923624413

After I get clear information and understanding about this interview:

I accept the interview

I reject the interview

Data collector name _____ Signature _____ Date of data collection _____

Checked by supervisor; Name _____ Signature _____

Annex I; English version questionnaire

Part One: Socio Demographic Characteristics			
Question No	Question	Response	Skip
1.1	Age	Years -----	
1.2	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Other specify it	
1.3	Ethnicity	1. Gurage 2. Oromo 3. Amhara 4. Kebena 5. Other, specify	
1.4	Educational status	1. unable to read and write. 2. No formal education 3. Primary 4. Secondary 5. Diploma and above	
1.5	Husband's Educational status	1. unable to read and write. 2. No formal education 3. Primary 4. Secondary 5. Diploma and above	
1.6	Occupation	<ul style="list-style-type: none"> • Merchant • Government Employee • Housewife • Farmer 	

		<ul style="list-style-type: none"> • Private employee • Other specify it 	
1.7	Marital Status	1. Single 2. Married 3. Divorced 4. Widowed	
1.8	Residence	1. urban 2. rural	
1.9	Income per month	In birr-----	
1.10	Distance of the health facility from the home	1.<30 minute 2. 30-60 minute 3.>1 hour	
2.11	TV/ radio	1. YES 2.NO	

Part Two: Questionnaire on Maternal health service utilization

	gravidity	1,multigravida Grandmultigravida	
	parity	1.primiparus 2.multiparus 3.Grandmultiparus	
2.1	What is the total number of ANC visits for the current pregnancy?	1. Once 2. Two 3. Three 4.Four and more	
	Time of start ANC	1first trimester 2,second trimester	
2.2	Have you advised about TT vaccine during ANC visit?	1.Yes 2.No	
2.3	Place of delivery	1 home 2.Health facility	
2.4	Vaccinated TT during last pregnancy	1. Yes 2.no	

2.5	If yes; how many dose does you take?	1.One 2.Two 3.Three 4.Four 5.Five	
2.6	If vaccinated, where was the place of TT dose given?	1. Health Centre 2.Hospital 3. Health Post	
2.7	If no; what is the reason?	1.lack of awareness 2.Inaccessibility 3.Misunderstanding 4. Fear of side effects 5.Others specify	
2.8	Quality of the service	1.Good 2 ,fair 3.Poor	
2.9	Behavior of health worker	1 good 2,fair 3 poor	
	Part: Three	Knowledge on TT vaccine and TT vaccine utilization	
3.1	Have you heard about tetanus?	1. Yes 2. No	
3.2	If your answer is yes what is the source of information?	1.Mass media 2.Health workers 3.Friends/relative 4. others specify	
3.3	What is/are the causes of tetanus do you think (more than one answer is possible)	1.come through family 2.contaminated wound with soil, rusty metals, bacteria 3.inappropriate wound management 4.Other (specify)	
3.4	Is tetanus Preventable?	1. Yes 2.No	
3.5	How can tetanus Prevented? (more than one answer is possible)	1.Immunization 2.Proper wound management 3.Post exposure prophylaxis 4.Decrease exposure to soil, animal dung, rusty material	

			5.Others	
3.6	Have you ever heard about tetanus vaccine?		1. Yes 2. No	
3.7	If your answer is yes what is the source of information?		1.Mass media 2.Health workers 3.Friends/relative 4. others specify	
3.8	Who is given priority for the TT vaccination?		1.Female of any age 2.pregnant mothers 3.Women of reproductive age 4.Male of any age 5.Others	
3.9	What is the purpose of getting injection?		1. Self-prevention from Tetanus. 2. to prevent both, self and child from tetanus 3. Child prevention from Tetanus. 4.Don't know 5.Other	
3.10	How many dose of TT vaccine required during pregnancy for fully protection from tetanus?		1 ,one 2,Two 3,Three 4,Four 5.Five	
3.11	Are you aware that tetanus disease cause death in both mother and newborn		1 yes 2,idon't know	
3.12	Do you know tetanus is serious and can transmitted during unsafe delivery?		1,yes 2,no	
3.13	Did you hear TT five dose only prevented life long from tetanus		1,yes 2, no	