ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

DEPARTMENT OF MIDWIFERY

TETANUS TOXOID VACCINE UTILIZATION AND ASSOCIATED FACTORS AMONG REPRODUCTIVE-AGE WOMEN IN DEBRE MARKOS TOWN, NORTH-WEST ETHIOPIA, 2021: A COMMUNITY BASED CROSS-SECTIONAL STUDY

BY: YIHUNNIE DESSIE (BSC)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF MIDWIFERY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

JUNE, 2021

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF MIDWIFERY

TETANUS TOXOID VACCINE UTILIZATION AND ASSOCIATED FACTORS AMONG REPRODUCTIVE- AGE WOMEN IN DEBRE MARKOS TOWN, NORTH-WEST ETHIOPIA, 2021: A COMMUNITY BASED CROSS-SECTIONAL STUDY

BY: YIHUNNIE DESSIE (BSC)

ADVISORS: DR. ENDALEW GEMECHU SENDO (PHD, ASS. PROF)
MR. JEMBERE TESFAYE (BSC, MSC)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF MIDWIFERY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

JUNE, 2021
ADDIS ABABA, ETHIOPIA

APPROVAL BY THE BOARD OF EXAMINATION

This proposal is by _______________________is accepted in its present form by the board of examiners as satisfying proposal requirement for the degree of masters in __________________

INTERNAL EXAMINER:

______________________	______________	______________	____________
NAME	RANK	SIGNATURE	DATE

EXTERNAL EXAMINER

_______________________	____________	_____________	__________

RESEARCH ADVISORS:

_______________________	______________	____________	___________
NAME	RANK	SIGNATURE	DATE

_______________________	_______________	____________	____________
NAME	RANK	SIGNATURE	DATE

DEPARTMENT HEAD

_______________________	_______________	____________	__________
NAME	RANK	SIGNATURE	DATE

DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, School of Nursing and Midwifery, department of Midwifery.

Student

Name: Yihunnie Dessie Signature: _________ Date: __________

Research Advisors:

Dr. Endalew Gemechu (PhD, Ass.Prof) ____________ _____________

Name Rank Signature Date

Mr. Jembere Tesfaye (BSc, MSc) ____________ _____________

Name Rank Signature Date

ACKNOWLEDGMENTS

Firstly, my sincere thanks goes to Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery, for giving me the opportunity to join Maternity and Reproductive Health Nursing MSc program and funding the thesis.

Then, I would like to express my heartfelt gratitude to my advisors' Dr. Endalew Gemechu and Mr. Jembere Tesfaye, for their valuable support, guidance, and constructive comments throughout the thesis work

In addition, I would like to express my appreciation to the study participant mothers and data collectors for their cooperation.

Finally, I would like to thank my families for their support throughout the academic years. I would also like to extend my deepest thanks to my friends and colleagues for their help and support.

ABBREVIATIONS AND ACRONYMS

AOR- Adjusted odds ratios

ANC-Antenatal Care

EDHS - Ethiopian Demographic and Health survey

ETB - Ethiopian Birr

HEW- Health Extension Workers

MNT-Maternal and Neonatal Tetanus

MNTE- Maternal and Neonatal Tetanus Elimination

NT- Neonatal Tetanus

PAB- Protected at Birth

SIAs- Supplementary Immunization Campaign Activities

SSA-Sub Saharan Africa

SPSS- Statistical Package for Social Science

TTCV-Tetanus Toxoid Containing Vaccine

WHO-World Health Organization

Table of Contents

APPROVAL BY THE BOARD OF EXAMINATION iii

DECLARATION iv

ACKNOWLEDGMENTS v

ABBREVIATIONS AND ACRONYMS vi

LIST OF TABLES ix

LIST OF FIGURES x

ABSTRACT xi

1. INTRODUCTION 1

1.1. Background 1

1.2. Statement of problem 3

1.3. Significance of the study 5

2. LITERATURE REVIEWS 6

2.1. Introduction 6

2.2. Utilization of TT vaccine 6

2.3. Factors associated with TT vaccine utilization 7

2.3.1. Socio-demographic characteristics 7

2.3.2. Obstetric related factors 8

2.3.3. Health Service-Related Factors 9

2.4. Conceptual framework 10

3. OBJECTIVES 11

4. METHODS AND MATERIALS 12

4.1. Study Area 12

4.2. Study design and Period 12

4.3. Source Population 12

4.4. Study population 12

4.5. Inclusion Criteria 12

4.6. Exclusion Criteria 12

4.7. Sample Size Determination 13

4.8. Sampling Technique and Procedures 14

4.9. Study Variables 16
4.9.1. Dependent variable 16
4.9.2. Independent variables 16
4.10. Operational Definitions 16
4.11. Data Collection 17
4.12. Data Quality Control 17
4.13. Data Analysis 17
4.14. Ethical Consideration 18
4.15. Plan for Dissemination of Findings 18
5. RESULTS 19
5.1. Socio-demographic characteristics 19
5.2. Obstetric and health service-related characteristics 20
5.3. Tetanus toxoid vaccine utilization 23
5.4. Factors associated with tetanus toxoid vaccine utilization 26
6. DISCUSSION 29
7. Strength and Limitation of the Study 32
7.1. Strength of the study 32
7.2. Limitation of the study 32
8. CONCLUSION 33
9. RECOMMENDATIONS 34
10. REFERENCES 35
11. ANNEXES 39
Annex I: Consent Sheet 39
Annex II: Data collection tool 41
Annex III: Amharic Version Questionnaire 44

LIST OF TABLES

Table 1: List of variables to calculate sample size for associated factors 13

Table 2: Sociodemographic characteristics of study participants in Debre Markos Town, North-West Ethiopia,2021 (N=505) 19

Table 3: Obstetric and health service-related factors to assess TT vaccine utilization and associated factors participants in Debre Markos Town, North-West Ethiopia, 2021 21

Table 4: TT vaccination utilization characteristics of mothers who gave birth in the last 12 months in Debre Markos Town, North-West Ethiopia,2021 23

Table 5**:** Bivariate and Multivariate logistic regression results for factors associated with TT vaccine utilization of reproductive-aged women in Debre Markos Town, Ethiopia (N=505) 27

LIST OF FIGURES

Figure 1: Conceptual framework for TT vaccine utilization risk factors adapted from Northern Ethiopia[3]. 10

Figure 2: Schematic diagram of sampling procedure in Debre Markos Town, selected kebeles . 15

Figure 3: Reasons explained by mothers for not started TT vaccine in Debre Markos Town, North-West Ethiopia 24

Figure 4: TT vaccine utilization status in Debre Markos Town, North-West Ethiopia,2021..... 25

ABSTRACT

Background: Pregnant women will reduce the risk of neonatal tetanus infection by receiving two doses of maternal tetanus toxoid vaccine. In Ethiopia, however, low levels of immunization coverage, mostly due to missed opportunities, are a concern.

Objective: To assess tetanus toxoid vaccine utilization and associated factors among reproductive-age women in Debre Markos Town, North-West Ethiopia,2021.

Methods: A community-based cross-sectional study was conducted among 505 mothers who had given birth in the last 12 months from February 08 to March 08, 2021, in Debre Markos Town. A two-stage stratified sampling technique was applied. The participants were selected using a systematic random sampling technique. Data were entered into Epi-Data manager Version 4.6.0 and analyzed using Statistical Package for Social Science (SPSS) version 25 software. Bivariable and multivariable binary logistic regression analysis was performed. Adjusted odds ratios (AORs) with their 95% CIs were used to identify factors associated with TT utilization.

Results: In the final analysis, the total tetanus vaccine intake (TT+2) doses were found to be 71.2 %. Mothers who were attended primary education [AOR: 0.07,95% CI: (0.01-0.6)], mothers whose husbands had secondary education [AOR: 0.26, 95% CI: (0.08-0.84)], mothers attended 2-3 for ANC visit [AOR: 0.05,95% CI: (0.01-0.3)], good quality service served [AOR: 2.8, 95% CI: (1.05-7.5)], appropriate behavior of health workers [AOR: 6.2, 95% CI: (2.2-18.7)] and who visited with health extension workers [AOR: 7.6, 95% CI: (2.3-25.3)] were significantly associated with TT vaccine utilization.

Conclusion: Despite the fact that the study was conducted in a town, only three out of every four participant women received the current TT vaccine during their previous pregnancy. The most influencing factors in TT vaccine use were mothers with low educational levels, low husband's educational level, attended 2-3 ANC visit during pregnancy, poor standard of health care service, improper actions of health professionals, and mothers visited with health extension staff.

Key Words: Tetanus Toxoid, Vaccine utilization, Neonatal Tetanus, Reproductive age mothers

1. INTRODUCTION

1.1. Background

Tetanus is an acute bacterial infection caused by a highly potent neurotoxin produced by the spore-forming bacterium Clostridium tetani which cannot be eliminated as spores exist in the environment[1]. Mothers and their newborns are at a high risk of gaining tetanus during the birth process[2], where maternal tetanus infections are associated with the unhygienic delivery procedure, after abortion and miscarriage[3]. Even though tetanus can occur in all age groups, but highly affects most reproductive-age women and neonates which make half of the world population. Pregnant women, unborn fetuses, and neonates represent three populations of risky individuals that can all be concurrently threatened from vaccine-preventable infectious disease with deliberate maternal immunization protocols[4, 5].

World Health Organization (WHO) recommends vaccination against tetanus, which is an intervention with the potential to shield mothers and newborns with Tetanus Toxoid Vaccination (TTCV) during pregnancy[6]**.** WHO recommended that women of childbearing age should begin a 5-dose regimen of vaccination. This comprises that the primary dose should lean any time in her reproductive ages (15-49 years). The second dose is given four weeks apart and also the third dose is given after one year from the first dose[7]. A proper antenatal service coverage with full TT vaccination of pregnant mother will pass antibodies through the placenta to the fetus, thus protecting against tetanus until the baby are often vaccinated at 6 weeks of age[8]**.** Maternal and Neonatal Tetanus Elimination(MNTE) strategies focused on reproductive-age women, and also supplementary immunization campaign activities (SIAs) implementation to vaccinate women 15-49 years of age in limited access to health services and effective surveillance in high-risk areas has been very successful[9].

WHO declared a strategy in the promotion of clean delivery practices to eliminate the occurrence of neonatal tetanus to a level less than 1 per 1000 live births annually[10]. Neonatal tetanus is one of the acute infections that cause mortality that occurred from non-immunized mothers once they are exposed to the organism during pregnancy or after 6 weeks of the postpartum period. Cases that delivered from unimmunized mothers could develop painful muscle spasms, inability to suck, and generalized rigidity-like symptoms[11]. The estimated mortality rate of neonatal tetanus (NT) varies widely from one country to a different one and is generally associated with the poor, illiterates, and people in adverse environmental circumstances and it is being described as a social

plague. Mothers of affected babies are likely to possess low antenatal care visits during pregnancy, low tetanus toxoid coverage, and had given birth outside a sickbay with the assistance of unskilled birth attendants and unhygienic cord care[12]**.**

Africa and Southeast Asia are where most mothers and newborns die from tetanus. Because of poverty, weak medical infrastructure, or humanitarian crisis in these areas, poor women have almost no access to medical services and little information about safe delivery methods. Once the disease is infected, the death rate is usually as high as 100%, without hospitalization; if hospitalized, the death rate is usually between 10% and 60%. The true estimate of tetanus deaths is unknown, no births or deaths of have been reported, so most of the mothers and newborns died at home [13]**.**

The majority of the Sub-Saharan African countries had face difficulty to scope WHO Global TT immunization target set to achieve complete elimination of MNT at least 90% and 80% national and district vaccination coverage[10]. Globally, from mothers who have given the TT vaccine a minimum of twofold, 82% of newborns are protected at birth. In a 2015 report, African countries had the proportions of childbearing women with a sufficient tetanus-containing vaccine and the proportions of newborns protected at birth were 69% and 77% respectively[14].

Evidence from previous studies identified the following factors: lack of awareness of the need and importance of the TT vaccine, too far from the vaccination site, perception of hostile health personnel, and lack of TT vaccine[13]. In another study factors such as the age of the mother, wealth index, ANC follow-up, parity, use of modern family planning, educational status and occupation of both mothers and husband, urban and rural residency are associated with utilization of TT vaccine[15].

Ethiopia had an interventional policy effort towards Maternal and Neonatal Tetanus Elimination to satisfy the WHO goals, but still having the highest neonatal tetanus mortality and morbidity in the world due to low tetanus vaccination and a higher number of home deliveries[15].

1.2. Statement of problem

Tetanus is a public health problem in many parts of the world where immunization programs are suboptimal. Most of the reported tetanus cases are related to the birth process, among mothers insufficiently protective vaccinations and their new born infants result from unclean deliveries and abortions, and poor post-natal hygiene[9].

Worldwide, more than 50,000 maternal deaths occur per year, and most cases occur due to lack of vaccination or incomplete immunization on exposure leading to increase morbidity and mortality[16]. Maternal vaccination provides protection for an estimated 84% of the neonates when the mother had proper ANC visit and TT vaccine immunization[17].

The causality pace of tetanus among neonates accounts for about 80-100%, and still a significant public health concern in areas with poor immunization coverage and limited access to clean deliveries[18]. According to a 2018 WHO report, around 25,000 newborns passed on from neonatal tetanus (NT) and mostly occur in remote communities and in areas where underserved by healthcare system frameworks. Thus, the number of cases reported annually is likely <11% of the actual number of NT cases occurring in the world annually[18].

Maternal and Neonatal Tetanus (MNT) is considered a silent killer because the exposed case died without early detection. MNT case represents a failure in the public health system, which indicates a failure in quality antenatal care services, unsafe delivery practice, and inadequate TT immunization to the mother, and studies show that 14% of newborn death and 5% of maternal deaths were due to tetanus infection[19, 20]. Each year, an estimated 15,000 to 30,000 women die from tetanus infection during or shortly after delivery[21].

Africa has the most elevated MNT deaths, which averages 110,000 in a year and accounts for 90% of the global neonatal tetanus cases[22]. Sub-Saharan African (SSA) and South Asia are areas where the vast majority of neonatal deaths happen, generally in areas where poverty is widespread. This is because of mothers' problems in accessing the quality of maternal care, lack of information for clean deliveries since home delivery is still high and they used traditional cord clamping material. The issue of maternal and neonatal deaths could not be estimated in many developing countries, since most neonates and women die during home delivery and without appropriate

surveillance through which the birth and death cannot be reported[1]. According to WHO estimation, in 1999 Ethiopia about 17,875 neonatal tetanus cases and 13406 neonatal tetanus deaths contribute about 4.6% from a global neonatal death[23].

Maternal and Neonatal immunization needs special attention, in a reason of protecting the health of both the mother and neonates[24]. Both maternal and neonatal tetanus is preventable with proper implementation of TT vaccine immunization strategy. Tetanus toxoid vaccine immunization during pregnancy helps to eliminate neonatal tetanus and at least two doses of injection should be given during pregnancy to the protection of neonates at birth[21]. When pregnant women received only three doses of TTCV in their childhood period, should receive 2 doses of TTCV at the earliest opportunity during pregnancy with a minimal interval of 4 weeks between doses and the second dose at least 2 weeks before giving birth[25]. Vaccination provides the women to develop enough antibodies against tetanus toxin to pass on to the unborn fetus during pregnancy, which will protect against disease in the first few weeks of life when the risk is highest[10].

Ethiopia is one of the Sub Saharan countries and has still low TT vaccine coverage in step up with the 2016 EDHS report which indicates only 49% of newborns are protected at birth [26]. The magnitude magnified in Amhara Region that only 36% of reproductive age women has got TT^2 and above immunization and only 54% and 57% of mothers had delivered in the health facility and give birth with the help of skilled health providers next to Somali and Afar regions, and only 50.8% women have ANC+4 visit[27].

To decrease maternal and neonatal mortality and to achieve Millennium Development Goals, assessment of TT vaccine utilization is mandatory in different parts of Ethiopia. Determining the barriers in maternal TT vaccine utilization will support immunization program developers and improve the health of the mother and newborn. Therefore, the purpose of this study was to assess TT vaccine utilization and to determine the relevant factors in the study area.

1.3. Significance of the study

Ethiopia is one of the SSA countries with low maternal TT immunization coverage. This indicates there is still a gap in immunization coverage and the reported number also shows institutional-based. In Ethiopia, even though a few studies had been conducted in different parts of the country to determine factors and tetanus toxoid utilization status, there is regional variation in TT vaccine utilization and predictors. Most of the studies conducted in Ethiopia were designed as community-based, but they determined almost similar characteristics.

In Amhara Region, TT vaccine utilization is very low in different factors. Therefore, the study aims to assess TT vaccine utilization and associated factors among reproductive-age women in Debre Markos town, North-West Ethiopia. The recommendations from this study will be helpful for mothers and newborns with a policy designed by local health planners, health administrators, and those organizations working on community health service providers for the improvement of maternal and neonatal health.

It will also provide baseline information for the study area and gives direction for further reproductive health indicators research in the area.

2. LITERATURE REVIEWS

2.1. Introduction

Over the last 20 years, significant progress has been made in reducing the prevalence of maternal and neonatal tetanus around the world. The TT vaccine has been part of the normal immunization regimen to protect pregnant women and their unborn children from tetanus since 1980. The use of the TT vaccination at the recommended dosages lowers the risk of maternal and neonatal complications. Although, there is no natural immunity against tetanus the disease is preventable through immunization, and recovery from tetanus does not confer immunity[28].

In developing countries, socio-demographic related factors, obstetric related factors, and health service-related factors are associated with the low adherence of TT vaccine utilization. Behavioral factors such as women's lack of information have also predicted both poor adherence to vaccination recommendations and a high risk of dropouts. Antenatal care services have been reported to have a significant association with being protected at delivery from tetanus[29].

2.2. Utilization of TT vaccine

Pregnant women should be immunized against tetanus, and trained birth attendants should promote clean births and cord care techniques to prevent neonatal tetanus. According to a descriptive cross-sectional study conducted in Pakistan's Pak emirates military hospital, the majority of pregnant women, 85 percent, were given two doses of TT during their pregnancy [30]. In the same country, a study looked into the relationship between ANC visits and TTCV, and found that 79% of pregnant women were given two doses of the TT vaccination [31]. An another community-based study conducted in Afghanistan, found that about 54.1% of the women had adequate TTCV coverage during their most recent pregnancy[8].

Even though much progress has been made in reducing deaths from maternal and neonatal tetanus, and it remains a public health problem and poses a feasible risk in many developing countries, mostly in Asia and Africa. A cross-sectional study conducted in Sierra Leone in 8,722 pregnant mothers found that 65.16% of the participants reported as they received at least two doses of TT immunization during their most recent pregnancy[32]. Another institutional-based cross-sectional study conducted in North-West Nigeria revealed that only 34.3% of the participants had received

two or more doses of TT vaccine from 254 respondents attending tertiary center[33]. An additional study conducted in West Cameroon showed that 69.3% of mothers immunized two and above doses of TT vaccine and 53.7% had received more than five tetanus vaccine doses which increased with the number of pregnancies and for the last pregnancy, the two-dose immunization proportion was 21.7%[34]. Another study conducted in Ivory Coast shows that 78.75% of participants received at least two doses of TT immunization among 9583 women aged between 15 and 49 years[35].

A cross-sectional survey of 511 mothers in Debre Tabor, North West Ethiopia, found that 56.2 percent of them received protective doses of the TT vaccine[3]. A similar study conducted in Damboya Woreda, Kembata Tembaro Zone, Southern Ethiopia showed that 72.5% of mothers were protected against TT at last birth[36]. A cross-sectional study conducted in Duguna Fango District, Southern Ethiopia showed that about 69.3% of women had TT^2 and more tetanus toxoid vaccination in their last pregnancy, and about 49.4% of children who were born in the last pregnancy were protected from TT at birth[37]. An additional study reported from Hawzen, Eastern Zone of Tigray, Ethiopia showed that 40.2% of mothers were received greater or equal to two doses of TT vaccine[38]. Moreover, a community-based cross-sectional study conducted in Dukem Town, showed that only 39.2% were vaccinated the valid (TT2+) doses from 422 respondents[21].

2.3. Factors associated with TT vaccine utilization

2.3.1. Socio-demographic characteristics

Several studies have reported several factors that seem to influence tetanus toxoid vaccination uptake among women of reproductive age[29]. Regarding sociodemographic characteristics, the mother's age was the most common independent factor significantly associated with the utilization of the TT vaccine, and the majority of those surveyed are between 20 and 30 years old[32, 33]. Concerning the religion of women, being a Muslim was associated with TT vaccine utilization, about greater than 80% of mothers were Muslim in their religion[33, 34]. Concerning educational status, mothers with formal education level was associated with TT vaccine utilization. Mothers with formal education were more likely to receive a protective dose of TT immunization[3]. In contrast, the high proportion of unprotected births (36.4%) in the last pregnancy was among those

educated to secondary education level. This indicates as the education level of mothers affects negatively TT^2 vaccine utilization[34]. Maternal occupation is another sociodemographic factor that affects TT vaccine utilization, the majority of mothers were housewives in occupation[36] and another study conducted in River State, Nigeria shows that 94.4% of civil servants received 2 or more doses of TT vaccine[20]. Related to the marital status of the women, married respondent women are more likely to utilize the TT vaccine during their last pregnancy. Women who are married were more likely to have received more than two doses of TTV and more than those who were single[39].

Regarding husband education, husbands who attended school had significantly associated with protection at the birth of TT immunization. Mothers husband who can read and write and who attended primary schools shows significantly associated PAB and more likely to give protected at the birth of children (PAB) than respondents who cannot read and write respectively[40, 41]. Concerning media exposure, women having Tv sets in the houses and who always listen Radio significantly determined the status of TT immunization[21, 38, 40, 41].

2.3.2. Obstetric related factors

From obstetric-related factors, ANC visit is the most significant associated factor in the use of TT vaccine utilization. For mothers who had visited health institutions at least 4 times for ANC visits, receiving adequate doses of TT immunization was higher among women who had attended 4 ANC visits compared to those with less ANC attendance[32, 35, 42]. In another study conducted in Kembata Tembaro, Ethiopia, and in Pakistan, mothers who visit 2-3 antenatal care were expected to receive two doses of TT injection than mothers who attended less than two antenatal care visits[31, 36].

Concerning parity, women with higher parity had higher chances of receiving TT, and also the adequate dose of TT immunization and indicates that the number of doses increased with the number of pregnancies [32, 34]. In contrast to this, in a study conducted in Ivory Coast, having higher parity (> 4) was significantly associated with lower odds of receiving TT immunization for rural participants only compared to those who delivered once[35, 43].

Planned last pregnancy is another obstetric-related significant associated factor in adequate TT vaccine utilization. The majority (86.9%) of mothers had planned to have a child for last pregnancy and 87.7% of mothers have future fertility plan[36] and mothers who had no future plan for fertility were less likely to receive two doses of TT vaccine injection compared to mothers who had a future plan for fertility[38].

2.3.3. Health Service-Related Factors

Distance from home to the health facility one of the health-related factors, which affects TT vaccine utilization. Mothers who traveled less hour to reach the nearest health facility were more likely to receive two doses of TT injection than mothers who walk greater, and the same study revealed that nearly half of the mothers, 51.4% traveled more than one hour to reach a nearby health facility, while only 20.2% of the women spent less than 30 minutes to reach the district's health facilities[36, 44].

Effectively providing services to pregnant women may be an issue with TT vaccine coverage. Mothers who have a good knowledge of service quality are more likely to receive a protective dose of TT immunization than their congruent [3, 6]. Mothers who perceived good quality of services, most of the women believe that service providers respect the women, there was no confidentiality problem and trust the providers and encouraging return visits for immunization[3, 6].

Concerning on behavior of service providers, lack of motivation has a significant negative influence and association with TT utilization. This means that the role of healthcare providers should be high in motivating pregnant women to receive the TT vaccine[31, 45].

2.4. Conceptual framework

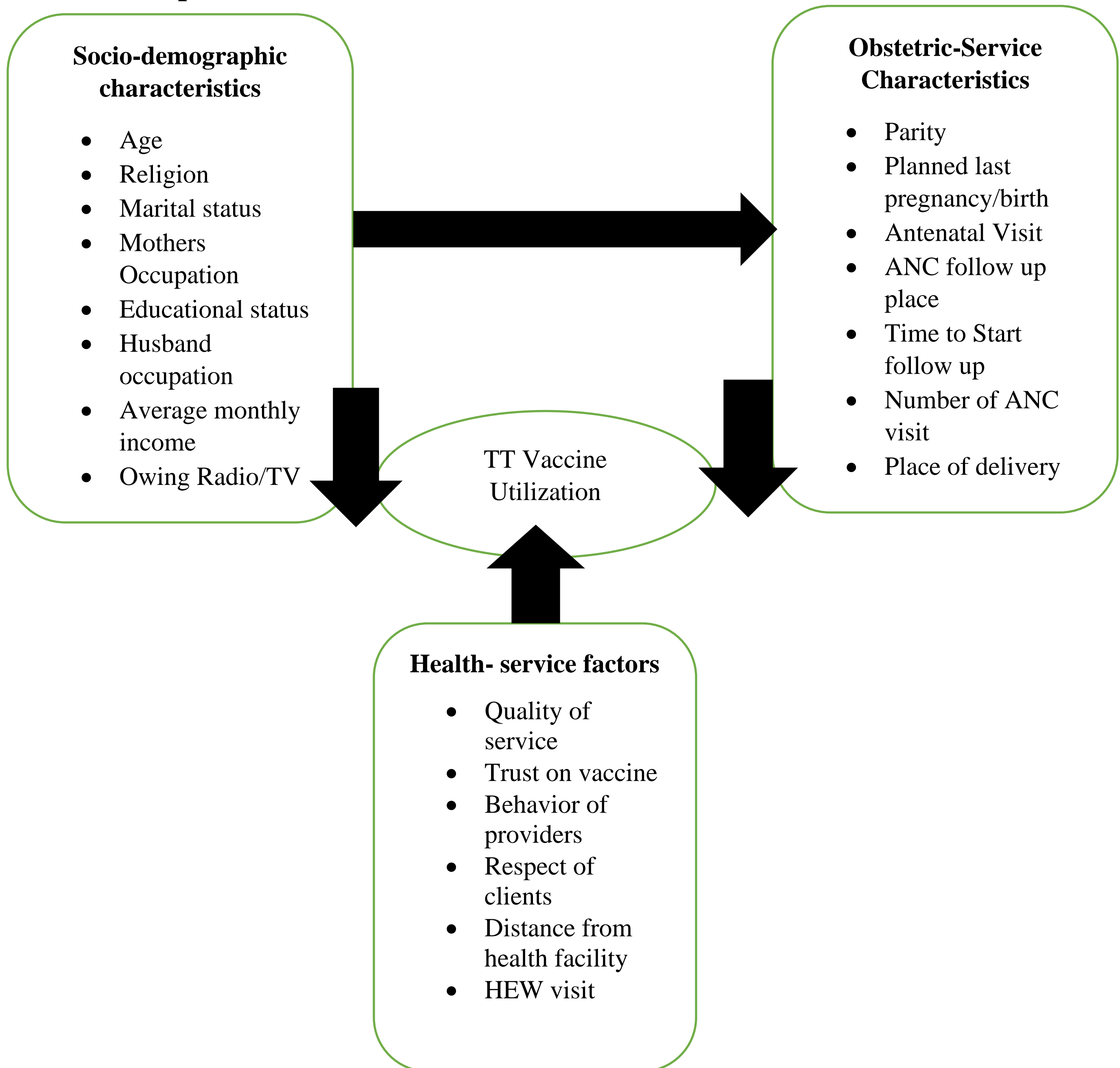

Figure 1: Conceptual framework for TT vaccine utilization and associated factors at Debre Markos Town, North-West Ethiopia, 2021. (Source: adapted from [3].

3. OBJECTIVES

3.1. General objectives

To assess tetanus toxoid vaccine utilization and associated factors among reproductive-age women in Debre Markos town, North-West Ethiopia,2021.

3.2. Specific objectives

- To determine the magnitude of tetanus toxoid vaccine use among reproductive-age women in Debre Markos town, North-West Ethiopia,2021.
- To identify factors associated with tetanus toxoid vaccine utilization among reproductive-age women in Debre Markos town, North-West Ethiopia,2021.

4. METHODS AND MATERIALS

4.1. Study Area

The study was conducted in Debre Markos Town, which is located 299 km from Addis Ababa, and 265 km from Bahir-Dar, the main city of Amhara Regional State. According to the 2019 Census, the town has a total population of 138,996, of which, 70,425 were women and 30,782 households. The total number of reproductive age mothers were 32,775 and the number of mothers who gave birth in the last 12 months were 4684. The town has eleven Kebeles. Of these four are pure urban and the rest seven kebeles are urban divided with a gote. Debre Markos has one referral hospital, three health centers, seven health posts, and five nongovernmental clinics which are giving different reproductive health services in the town[46].

4.2. Study design and Period

A community-based cross-sectional study design was conducted from February 08 to March 08, 2021.

4.3. Source Population

All reproductive age women (15-49 years) in Debre Markos Town were the source population.

4.4. Study population

All reproductive age women who gave birth in the last 12 months in the selected kebeles and available during the data collection were the study population.

4.5. Inclusion Criteria

Women of reproductive age (15 – 49years) who has at least one child in the last 12 months

4.6. Exclusion Criteria

Women who had a mental problem, unable to hear, and not available at home during the interview were excluded.

4.7. Sample Size Determination

The sample size for the first objective was determined using a single population formula.

To calculate the sample size, the following parameters were considered

- P :- the proportion of mothers who received at least two TT doses = 72.5% [36].
- D: - margin of error = 0.05 with 95% confidence interval
- Z:- 1.96 (level of significance)

$$n = \frac{(z\alpha/2)^2 p (1 - p)}{d^2} = \frac{(1.96)^2 0.725 (1 - 0.725)}{(0.05)^2} = 306$$

- The sample size for the second objective was calculated using Epi InfoTM7 version 7.1 Stat calc function

  Parameters used in this formula were as follows;

  Confidence interval -95%

  Power - 80% and

  Significantly associated variables odds ratio (ANC visit >=4 and mother's educational status).

Table 1: List of variables to calculate sample size for associated factors

Variables	OR	Power	CI	Sample size with 10% non-response	Reference
ANC Visit >= 4	5.1	80%	95%	172	[3]
Mother's Education	3.72	80%	95%	390	[36]

The formula that yields the highest number was taken to calculate the final sample size. Considering the design effect 1.5 and 10% non-response rate, the final sample size was 505. The maximum sample size was calculated using a single population formula for the first objective.

4.8. Sampling Technique and Procedures

Two-stage stratified sampling technique was applied in the study. A total of 11 kebeles are found in the town and was stratified into urban and rural kebeles. There are 4 urban and 7 rural kebeles. Then, 2 urban and 2 rural kebeles was selected with a simple random sampling method. Then to select 505 participants from the total four selected kebeles, all kebeles was listed down with their respective mothers who delivered in the last one year. The total sample size was proportionally allocated to the selected kebeles. The participants were selected using systematic random sampling according to their registration. Registration of mothers who gave birth in the last 12 months was obtained from health extension workers. After obtaining a list of participant households, every Kth mother was recruited by labeling each household that had a mother who had given birth in the last one year in the four kebeles until the required sample size was fulfilled. If there are more than one reproductive age mother has been found only one participant was selected.

The total sample size (505) was allocated proportionally to the selected kebeles based on the number of mothers found in the kebele.

$$nk = \frac{nxNk}{N}$$

Where;

nk= is the sample size of the k kebeles

Nk= is the total mothers who gave birth in the last 12 months in the selected kebeles

n= n1+ n2+n3 +n4 is the total sample size (505)

N=N1+N2+N3+N4 is total number of mothers who gave birth in the last 12 months (738)

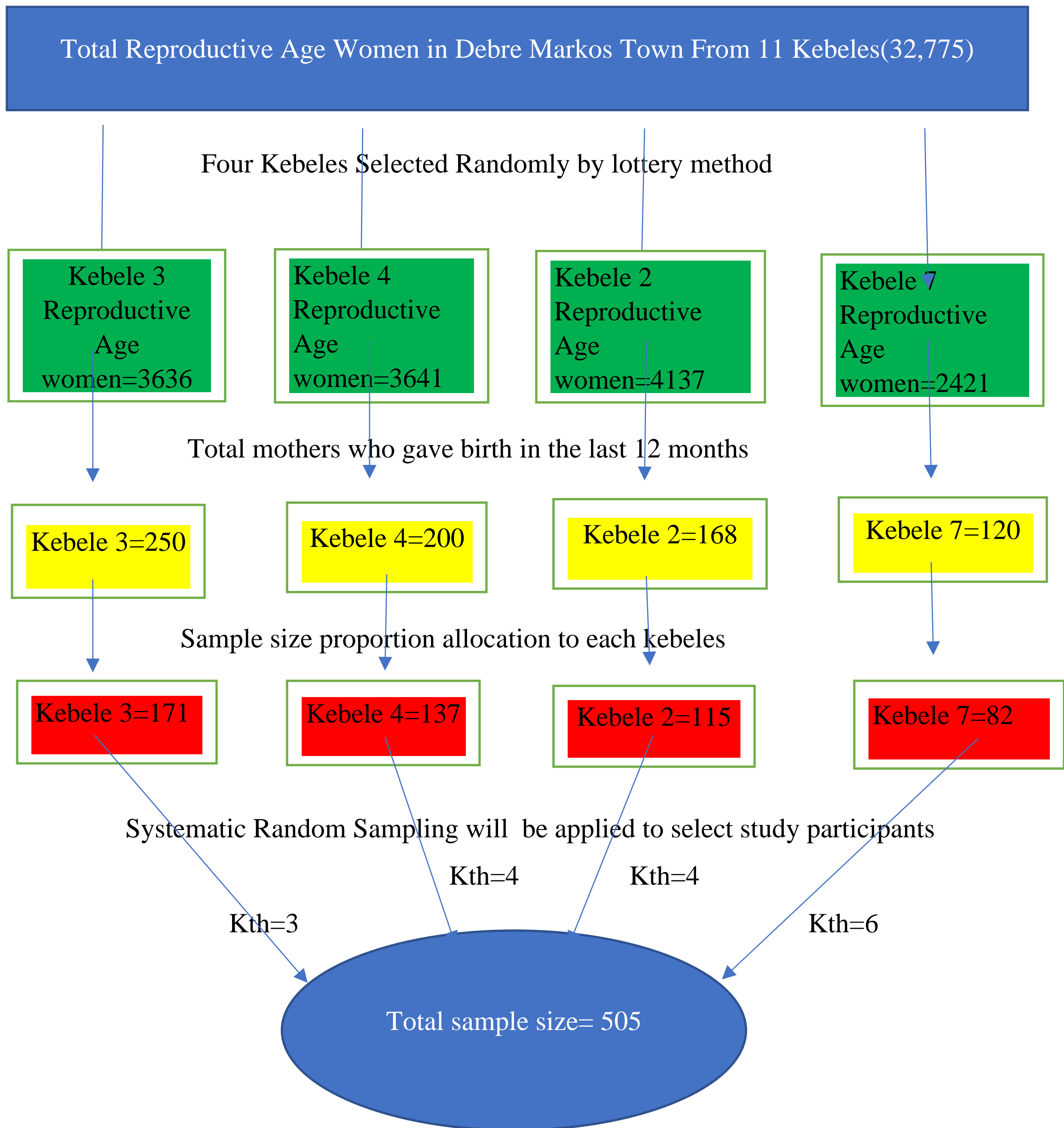

Figure 2: Schematic diagram of sampling procedure in Debre Markos Town, selected kebeles

4.9. Study Variables

4.9.1. Dependent variable

Tetanus Toxoid vaccine utilization

4.9.2. Independent variables

- **Sociodemographic characteristics:** mother's age, mother's level of education, marital status, religious beliefs, mother's occupation, monthly family income, husband's level of education, husband's occupation, and having radio and television
- **Obstetric related factors:** parity, last planned pregnancy, ANC visits during the most recent pregnancy, number of ANC visits, start time of ANC visits, ANC visit place, delivery place
- **Health-service related factors:** quality of service, confidentiality, trust on the vaccine, the behavior of service provider, respecting clients, distance from home to health facility, and health extension visit

4.10. Operational Definitions

- ✓ **Neonatal tetanus-** occurs during the first 28 days of life; neonatal tetanus infection occurs following cutting the umbilical cord under nonsterile conditions or applying nonsterile traditional remedies to the umbilical stump in an infant without passively (trans placentally) acquired maternal antibodies[18].
- ✓ **Neonatal tetanus (NT) elimination-** is defined as the occurrence of less than one NT case per 1,000 live births per year in every district in every country[18].
- ✓ **TT vaccine utilization:** Mothers who received at least two doses (TT^{+2}) in the last pregnancy
- ✓ **Valid TT doses**: Mothers who received at least 2 doses of TT (TT2) in the recommended intervals
- ✓ **Good quality of service**- Pregnant women access TT vaccine and other corresponding services according to standards set for health facilities with a professional, health providers in a confidential, trust and respectful way and with the short waiting time.

4.11. Data Collection

Data was collected with interviewer-administered and in pretested structured questionnaires. The questionnaire was adapted from the same research but with a different area of study with some modifications[3]. The questionnaire included socio-demographic characteristics, obstetric and health service-related determinants, and questions on TT immunization. Data were collected by four trained data collectors (health extension workers) through a face-to-face interview. Training and orientation for data collectors and supervisors about the purpose of the study and procedure of data collection was given for two days. Mothers were asked to show TT immunization cards and the number of doses received and the dates of immunization when available.

4.12. Data Quality Control

The questionnaire was originally prepared in English, then translated into Amharic (the local language), and then translated into English by language experts to ensure consistency. At the time of data collection, filled questionnaires were checked for completeness of information by a supervisor on a daily basis. Finally, the principal investigator checked the filled questionnaires for completeness and consistency of information. The pretest was done among 5% of the sample in the same town.

4.13. Data Analysis

Data were entered into Epi Data manager Version 4.6.0 and exported SPSS version 25 software for further analysis. Descriptive statistics were summarized as frequencies and percentages and visualized using tables and charts. In addition, the cross-tabulation was computed using dependent and independent variables. Both bivariable and multivariable binary logistic regression analyses were used to identify factors associated with TT. The model fitness was checked using the Hosmer and Lemeshow goodness of fit test. In the bivariable analysis, variables with P-values less than 0.25 were included in the multivariable analysis. In the multivariable logistic regression, adjusted odds ratios (AORs) with their 95% CIs were used to predict factors associated with TT utilization, and variables with p-values < 0.05 were considered as statistically significant.

4.14. Ethical Consideration

Ethical clearance was obtained from an institutional review board of the College of Health Science, Addis Ababa University. In addition, a permission letter was obtained from Debre Markos Health Bureau. Before conducting the interviews, information was given to the participants and was assured for voluntary participation, confidentiality, anonymity, and freedom to withdraw from the study at any time. The nature and significance of the study were explained and written informed consent was obtained from the participants.

4.15. Plan for Dissemination of Findings

The results of this study will be submitted and presented to Addis Ababa University, College of Health Science, Department of Midwifery. Additionally, findings will be disseminated to the East Gojjam Town health office through soft copy and hard copy. Results will also be presented at national and international research conferences. At last, attempts will be made to publish in a peer-reviewed journal for wider dissemination.

5. RESULTS

5.1. Socio-demographic characteristics

A total of 505 women who delivered in the last 12 months before the survey were face-to-ace interviewed. Three-fourths (75.6%), of the participants, were in the age group 26-35 years. More one third (36.4%), of the participants, were housewives and, 39% of them attended their secondary school (Table 2). Most of (92.7%) of the participants were married and the majority (86.5%) of them were orthodox religious followers. Nearly two-thirds (65%) of the study participants had an average monthly income of 95 USD.

Table 2: Sociodemographic characteristics of study participants in Debre Markos Town, North-West Ethiopia,2021 (N=505)

Variables	Category	Frequency(N)	Percentage (%)
Maternal Age	15-25	45	8.9
	26-35	382	75.6
	36-49	78	15.4
Religion	Orthodox	437	86.5
	Muslim	49	9.7
	Others	19	3.8
Marital status	Single	16	3.2
	Married	468	92.7
	Divorced	21	4.2
Maternal Education	Unable to write and read	26	5.1
	Primary (1-8)	93	18.4
	Secondary (9-12)	197	39.0
	Tertiary (diploma or degree)	189	37.4
Occupation	Housewife	184	36.4
	Merchant	93	18.4
	Government Employee	158	31.3
	Student	13	2.6
	Daily Labourer	57	11.3

Average monthly income	<= 3200	174	34.4
	3201-5250	181	35.8
	5251-7900	91	18
	>= 7901	59	11.5
Husbands Education Level	Unable to write and read	10	2.0
	Primary (1-8)	37	7.3
	Secondary (9-12)	134	26.5
	Tertiary (diploma or degree)	285	56.4
Husband Occupation	Government Employee	249	49.3
	Merchant	108	21.4
	Daily Labourer	98	19.4
	Others	11	2.2
TV or Radio	Yes	495	98.0
	No	10	2.0

5.2. Obstetric and health service-related characteristics

More than half of the participants (56.4%) had given birth to two-three children during their lifetime. More than two-thirds (68.1%) of the participants had a future fertility plan and the majority (80.4%) of the women's last pregnancy were planned. Regarding ANC visit, most (97.8%) of the participants had at least one and above ANC visit in the last pregnancy and participants who had 2-3 times follow-up were 44.5%. The majority of the participants (88.7%) started their ANC visit in between 13-28 week or in the second trimester and 69.9% had ANC visit at health centre (as presented by Table 3). Concerning time to cover the distance, 42.5% of participants travelled between 30min and 1 hour. On the other hand, the majority (92.3%) of participants had visited with health extension workers during their pregnancy.

Table 3: Obstetric and health service-related factors to assess TT vaccine utilization and associated factors participants in Debre Markos Town, North-West Ethiopia, 2021

Variables	**Category**	**Frequency(N)**	**Percentage (%)**
Parity	1	153	30.3
	2-3	285	56.4
	>=4	67	13.3
Future fertility intention	Yes	344	68.1
	No	100	19.8
	Don't know	61	12.1
Planned last pregnancy	Yes	406	80.4
	No	99	19.6
ANC follow up	Yes	494	97.8
	No	11	2.2
Number of ANC follow up(N=494)	1	64	12.9
	2-3	220	44.5
	>=4	210	42.5
Timing of ANC (N=494)	<13 week	41	8.1
	13-28 week	448	88.7
	>28 week	5	1.0
Place of ANC visit(N=494)	Health post	26	5.1
	Health Centre	353	69.9
	Hospital	82	16.2
	Private clinic	33	6.5
Place of delivery(N=494)	Home	30	5.9
	Health institution	475	94.1
HW's respectfulness	Yes	428	84.8
	No	63	12.5
	Don't know	14	2.8
Quality of the service	Good	363	71.9
	Poor	142	28.1

Trust on health provided	Yes	458	90.7
	No	23	4.6
	Don’t know	24	4.8
Behavior of HW’s	Good	362	71.1
	Poor/bad	143	28.3
Time to cover the distance	<30 minutes	195	38.6
	30min- 1 hr	223	44.2
	>1 hour	87	17.2
Health extension visit	Yes	466	92.3
	No	39	7.7

5.3. Tetanus toxoid vaccine utilization

Based on the mother's vaccination card and oral history, (71.2 %) mothers were vaccinated the valid doses against tetanus during their last pregnancy. More than half, (59.2%) of the vaccination status was confirmed through oral history, and only 7.7% of participants had vaccination cards. Among vaccinated mothers, 74.3% got the vaccine from health centers. Concerning the purpose of the injection, 64.0% replied for the prevention of both the mother and child, 24.2% uses for prevention of child only (Table 4).

Table 4: TT vaccination utilization characteristics of mothers who gave birth in the last 12 months in Debre Markos Town, North-West Ethiopia,2021

Variables	Category	Frequency	Percent
TT vaccine in last pregnancy	Yes	452	89.5
	No	53	10.5
How many doses(N=452)	One	130	28.8
	Two	197	43.6
	Three	85	18.8
	Greater than or equal to four	40	8.8
Source of the vaccine	Health post	9	1.9
	Health centre	336	74.3
	Hospital	107	23.6
Purpose of the injection	To prevent self from tetanus	29	5.7
	To prevent the child from tetanus	122	24.2
	Both	323	64.0
	I don’t know	31	6.1
TT vaccine evidence	Vaccination card	99	7.7
	History	299	59.2
	Both	167	33.1

Reasons not getting the valid TT^{+2} vaccine

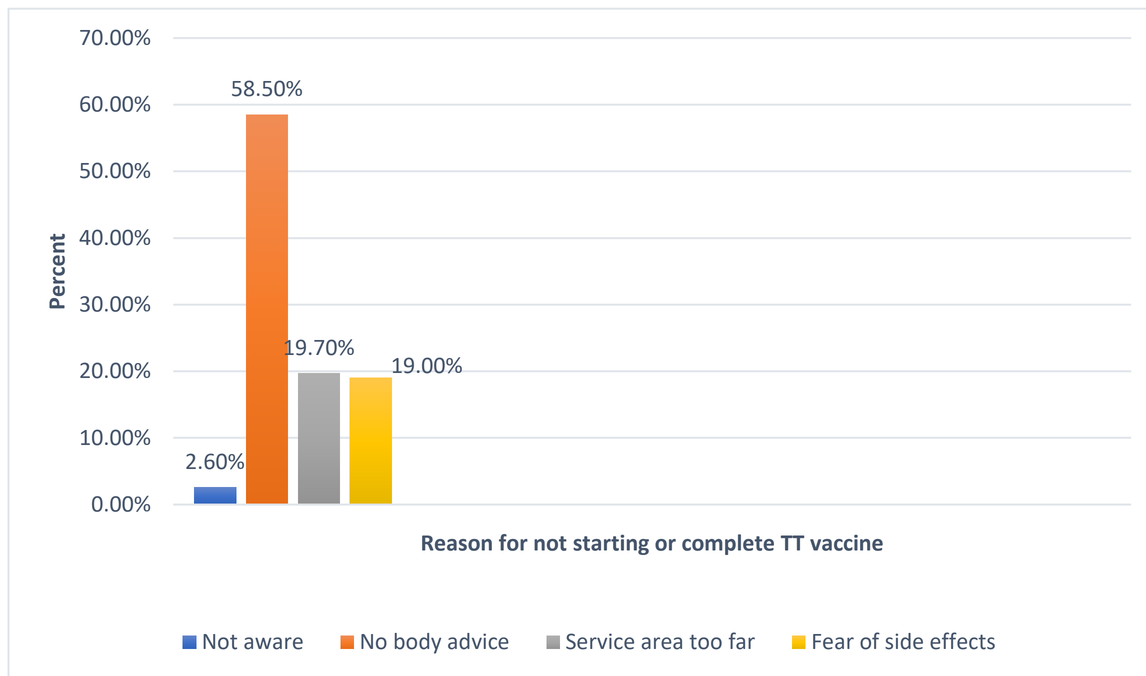

Figure 3: Reasons explained by mothers for not started TT vaccine in Debre Markos Town, North-West Ethiopia

The finding revealed that the most reasons for not getting or starting the vaccine was that, (58.8%) of participants were nobody advised them about the importance of the TT vaccine, (19.7 %) were too far from the service area, (19 %) participants had fear of side effects and not aware about the vaccine (2.6%).

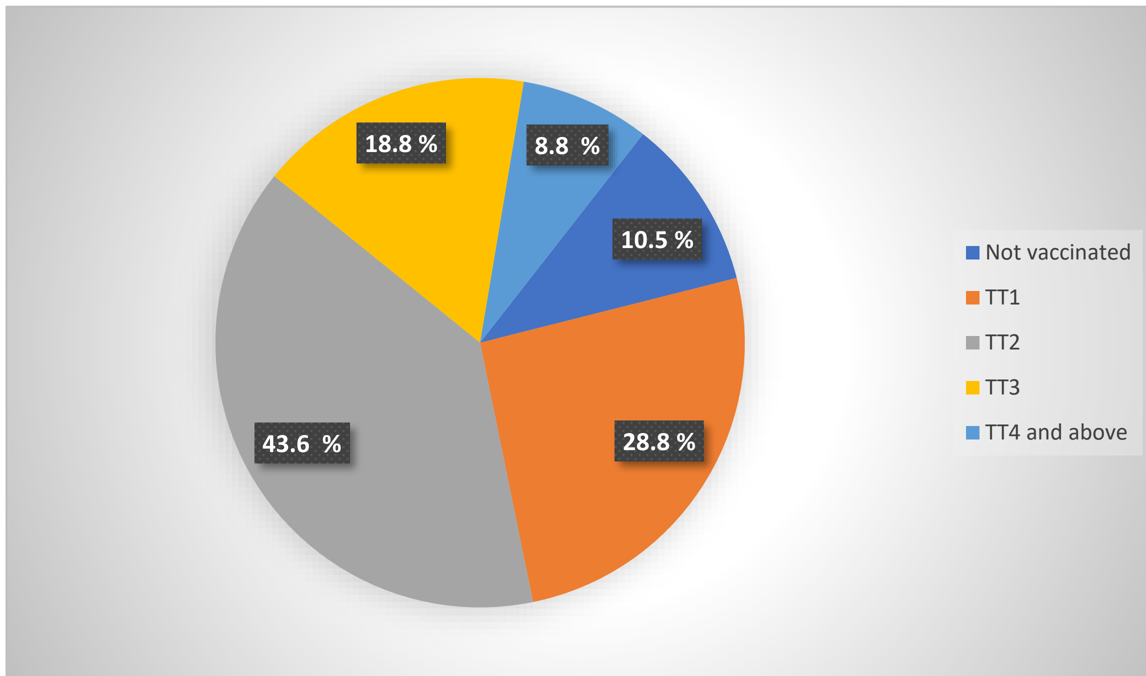

Figure 4: TT vaccine utilization status in Debre Markos Town, North-West Ethiopia,2021

From the total 505 participants, about 10.5% women were not vaccinated the valid TT vaccine in their last pregnancy. And, 28.8% women were vaccinated only one dose of tetanus toxoid vaccine which could not prevent both the mother and the neonate. Of the participants, 71.2% women immunized two and above TT doses in the last pregnancy

5.4. Factors associated with tetanus toxoid vaccine utilization

Bivariate Analysis

In bivariate logistic regression, nine variables showed an association with TT vaccination status at a p-value of < 0.25. Age of the mother, maternal and husband's educational level, marital status of mothers, planned last pregnancy, number of ANC follow up, quality of health services, behaviors of health workers, traveling time to the health facility, and health extension visits were significantly associated with TT vaccine utilization at a p-value < 0.25.

Multivariate Analysis

After controlling possible confounders in the multivariable logistic regression model, mother's and husband's educational status, number of ANC visits, perceived quality of service, the behavior of health workers, traveling time to health facilities, and health extension visits were significantly associated with TT vaccine utilization. Accordingly, mothers who are attended primary school were 7% less likely to be immunized TT vaccine than uneducated mothers [AOR: 0.07,95% CI: (0.01-0.6)), p-value =0.001]. And, mothers whose husbands had secondary education were 26% less likely to receive two doses of TT vaccine compared to mothers whose husband has higher education [AOR: 0.26, 95% CI: (0.08-0.84), p-value =0.02]. Mothers who had 2-3 ANC follow-up in the last pregnancy were 5% less likely to have the odds of protective doses of TT vaccine than the congruent [AOR: 0.05,95% CI: (0.01-0.3), p value=0.00]. Besides, mothers who receive a good quality of service were 2.8 times more likely to receive TT vaccine than the congruent [AOR: 2.8, 95% CI: (1.05-7.5), p-value = 0.04]. And, participants who served the service by health workers with good behavior were 6.2 times more likely to receive the vaccine than congruent [AOR: 6.2, 95% CI: (2.2-19.2), p value= 0.001]. Finally, mothers who had visited with health extension workers were 7.6 times more likely to have TT vaccine utilization [AOR: 3.1, 95% CI: (2.3-25.3), p value= 0.03] (Table 5).

Table 5*:* Bivariate and Multivariate logistic regression results for factors associated with TT vaccine utilization of reproductive-aged women in Debre Markos Town, Ethiopia (N=505)

Variables	TT^{2+} vaccine utilization				
	Yes no(%) (N=322)	No no(%) (N=183)	COR (95% CI)	AOR (95% CI)	*p-value*
Age of mothers					
15-25	31(68.8%)	14(31.1%)	2.8(0.75-10.4))	5.8(0.8-41.6)	0.20
26-35	246(64.3%)	136(35.6%)	1.8(0.94-3.7)	1.2(0.4-3.7)	
>=36	45(57.6%)	33(42.3%)	1.00	1.00	
Marital status					
Single	11(68.7%)	5(31.2%)	0.8(0.2-3.6)	0.44(0.06-3.4)	0.09
Married	299(63.8%)	169(36.1%)	4.1(1.5-11)	2.3(0.6-8.8)	
Divorced	12(57.1%)	9(42.8%)	1.00	1.00	
Educational status					
Unable to read & write	8(30%)	18(70%)	1.00	1.00	
Primary	43(46.2%)	50(53.8%)	0.03(0.01-0.12)	**0.07(0.01-0.6)** *	0.001
Secondary	123(62.4%)	74(37.5%)	0.06(0.02-0.23)	0.4(0.07-2.5)	
Tertiary	148(78.3%)	41(21.7%)	0.12(0.03-0.68)	0.3(0.07-1.6)	
Husband education					
Unable to read & write	7(70%)	3(30%)	0.23(0.05-1.2)	0.2(0.006-6.3)	
Primary (1-8)	16(43.2%)	19(51.3%)	0.25(0.09-0.67)	0.6(0.11-3.2)	
Secondary (9-12)	82(61.2%)	52(38.8%)	0.41(0.2-0.8)	**0.26(0.08-0.84)** *	0.02
Tertiary	187(65.6%)	98(34.3%)	1.00	1.00	
Planned last pregnancy					
Yes	297(72.6%)	112(27.3%)	13.8(7.3-26.2)	1.9(0.6-5.7)	0.24
No	25(5.0)	71(74%)	1.00	1.00	

Table 5: Bivariate and Multivariate logistic regression results for factors associated with TT vaccine utilization of reproductive-aged women in Debre Markos Town, Ethiopia (N=505) (**continued**)

Number of ANC follow up					
1	6(9.4%)	58(90.6%)	1.00	1.00	
2-3	136(61.8%)	84(38.2%)	0.01(0.01-0.05)	**0.05(0.01-0.3)** *	0.002
>=4	181(86.2%)	29(13.8%)	0.15(0.03-0.68)	0.42(0.07-2.4)	
Time taken to HF					
< 30 minutes	186(95.3%)	9(4.6%)	22.6(7.6-67.2)	1.4(0.2-8.0)	
30 min- 1hour	114(51.1%	109(48.8%)	4.5(2.4-8.6)	2.3(0.78-6.6)	0.32
>1 hour	2(2.3%)	85(97.7%)	1.00	1.00	
Quality of services					
Good	297(81.8%)	66(18.1%)	10.5(5.4-20.5)	**2.8(1.05-7.5)** *	0.04
Poor	25(17.6%)	117(82.3%)	1.00	1.00	
Behavior of HW					
Good	297(81.8%)	66(18.1%)	13.3(6.6-26.7)	**6.2(2.1-18.7)** *	0.001
Poor/bad	25(17.6%)	117(82.3%)	1.00	1.00	
Health extension visit					
Yes	318(68.2%)	148(31.7%)	10.5(5.1-21.6)	**7.6(2.3-25.3)** *	0.001
No	18(46.1%)	21(53.8%)	1.00	1.00	

CI: confidence interval; AOR: adjusted odds ratio; COR: crude odds ratio. *P-value < 0.05

6. DISCUSSION

A community-based cross-sectional study was conducted to assess the utilization of TT vaccine and to identify factors affecting the utilization among reproductive-age women in Debre Markos Town, North-West Ethiopia. Maternal utilization of at least two doses of TT vaccine (TT^{+}) is significantly associated with protective dose at birth and prevents tetanus infection for both the mother and the fetus. This study found that the proportion of valid tetanus toxoid vaccine utilization (TT^{2+}) was 71.2%. This means that 28.8% of mothers didn't receive the valid vaccine.

Our result finding is consistent with those from West Cameroon and Southern Ethiopia, where TT^{+2} vaccine utilization was found to be 69.3%,69.3% and 72.5% respectively[36, 37, 47].

This is lower than the WHO target of over 90% as well as the Ethiopian Ministry of Health recommendations of greater than 90% compliance at the national and more than 80% compliance at the district level [38].This result is also lower than the report which is found in Pakistan [31], Sierra Leone[32], and Ivory Coast [35].

This result is larger as compared to EDHS 2016, which was reported as 49% [26] and other local reports which was done in Ethiopian regions [21, 38, 44] with a proportion of valid TT vaccine of 39.1%, 40.2% and 51.8% respectively. It is also higher than studies conducted outside of Ethiopia, Nigeria (37.1%) [20], North-West Nigeria (23.6%) [33].

This disparity in invalid TT vaccine utilization might be due to a variety of socio-economic factors such as knowledge and information about vaccination and health-service related factors like quality of services given and distance from the health facility, and the existing political environment. Some studies include both urban and rural participants. Rural areas are low in accessing health service infrastructures and low level of mother's educational status. Another reason behind the discrepancy in TT vaccine utilization is the difference in methods used to collect the data and the different tools to measure the outcome variable or utilization status of participants [3, 21].

Our multivariate analysis model finding claimed that maternal educational level, husband's educational level, number of ANC visit, quality of health services served, behavior of health workers and health extension visit was significantly associated with sufficient utilization of TT vaccine or not.

The multivariate logistic regression result revealed that maternal educational level was significantly associated with TT^{+2} vaccine utilization. Mothers who were attended primary school were 7% less likely to receive two doses of TT vaccine injection than illiterate mothers [AOR: 0.07, 95% CI: (0.01-0.30)]. This result is in line with findings [20, 21, 36, 40, 44]. The result is contrasted with a study conducted in Sierra Leone which states, women with primary and higher educational levels had lower odds of receiving TT immunization when compared to those with no formal education[32]. The reason might be the knowledge difference about TT vaccine utilization and the decision-making gap between the two groups. And also, easy communication between them can help health care providers having a good approach and respectfulness for educated mothers[21, 31].

Husband education is one of the factors for mothers to receive the vaccine during their pregnancy. Mothers whose husbands had secondary education were 74% less likely to receive two doses of TT vaccine compared to mothers whose husband has higher educational status [AOR: 0.26, 95% CI: (0.08-0.84). This finding is supported in a study conducted in Ethiopia [36, 40]. This may be due to that the educated husband has more awareness concerning health and health-related information. Thus, effective decision-making with his wife will contribute to receive TT vaccine during pregnancy.

Most of the studies have revealed that ANC visit is a strong determinant factor of the utilization of TT vaccine. Mothers who attended 2-3 antenatal care visits were 5% less likely to receive two doses of TT vaccine injection compared to mothers who attended once antenatal care visits [AOR: 0.05, 95% CI (0.01-0.25)]. This finding was supported in different studies conducted at Ethiopia [3, 21, 38], Sierra Leone [32], and Ivory Coast[35]. This implies attending the recommended ANC visit gives an opportunity to have different health service-related information and knowledge and took the valid protective dose of the TT vaccine.

The odds of valid TT vaccination were significantly affected by the quality of the service served in the health facility. In this study, valid TT vaccine utilization is 2.8 times more likely with mothers who perceived good quality services than the counter. The result is supported in a study conducted in Ethiopia [3]. 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 concluded that satisfaction towards service and treatment they receive have an effect on TT vaccine utilization [6, 45].

The behavior of health workers was also a significant factor to receive the recommended doses of the TT vaccine. Our finding revealed, health workers with good behavior were 6 times more likely to receive at least two doses of the vaccine. This finding is supported in a study which was stated, effective communication by providers, demonstrating empathy and understanding is more likely to improve patient knowledge, health literacy, and shared decision making, encouraging return visits. 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 [6, 45]. In another study, half of the unvaccinated women reported that health providers did not motivate them to receive TT vaccine[42].

Health extensions visit has significantly associated with the uptake of valid TT vaccine. Our study revealed that mothers who visited with extension workers during their pregnancy were 7 times more likely to receive at least two doses of TT vaccine. A study conducted in Ethiopia supported the finding [36]. The reason could be health extension workers provide the necessary health education as a routine intervention during home-to-home visit.

As a result, this research has both public and clinical implications. In terms of public health, it provides information on factors that influence the use of the effective TT vaccine, which can be improved to reduce tetanus-related deaths. This will increase the economy of the country by decreasing treatment costs associated with such infection. Furthermore, knowing the causes of incomplete the valid vaccination can help clinicians to take measures on such factors to decrease the rate of defaulters.

7. Strength and Limitation of the Study

7.1. Strength of the study

- This community-based study was the first to assess tetanus toxoid vaccine utilization and associated factors among reproductive-age women in the study setting.
- Data was obtained from rural and urban regions of the town

7.2. Limitation of the study

- The results of this study can only be generalized to the group of women of childbearing age in this study.
- As in all cross-sectional studies, we can infer association but not causation.
- There may also be recall bias in this study for doses given to women who did not have a vaccine card, as well as interviewer bias during the data collection process.

8. CONCLUSION

Despite the fact that the study was conducted in a town, 71.2% participant women received the current TT vaccine during their previous pregnancy. This study tried to find some factors which affect vaccine utilization in the study area. Thus, based on the findings, stakeholders will take the responsibility for policymaking to improve vaccine utilization and to researchers uses it as an input to dig out other factors.

The most influencing factors in TT vaccine use were mothers with low educational levels, low husband's educational level, attended 2-3 ANC visit during pregnancy, poor standard of health care service, inappropriate actions of health professionals, and mothers visited with health extension staff.

9. RECOMMENDATIONS

Based on the finding results, we recommend the following actions:

- **For Health Bureaus**

- Thus, the town health bureau should work to raise awareness by designing proper health education targeting the mothers during preconception care and antenatal care to improve vaccination status
- Immunization campaign needed for pregnant mothers or outreach site vaccination for those who are living far from health facility
- Enough immunization service centers should be made available close to the various communities to enable the people to get quick access to the centers
- Raising behavioral change in health professionals to improve the health services served in the health facility

- **For Health Care Providers**

- Sustained health education for the mothers during pregnancy for the importance of vaccination
- Vaccination with integrated clean delivery service to improve or to be a guarantee for maternal and neonatal health is needed

- **For Researchers**

- Additional research should be conducted to assess the absolute proportion of TT vaccine utilization for pregnant mothers in the town
- To better understand women's perceptions on tetanus toxoid vaccine use, a qualitative study is also needed.

10. REFERENCES

1. Raza, S.A. and B.I. Avan, *Eliminating maternal and neonatal tetanus and promoting clean delivery practices through disposable clean birth kits.* Frontiers in Public Health, 2019. **7**: p. 339.
2. Thwaites, C.L., N.J. Beeching, and C.R. Newton, *Maternal and neonatal tetanus.* The lancet, 2015. **385**(9965): p. 362-370.
3. Mihret, M.S., M.A. Limenih, and T.W. Gudayu, *The role of timely initiation of antenatal care on protective dose tetanus toxoid immunization: the case of northern Ethiopia post natal mothers.* BMC pregnancy and childbirth, 2018. **18**(1): p. 235.
4. Mohammed, A., et al., *DETERMINANTS OF UPTAKE OF TETANUS TOXOID VACCINE AMONG WOMEN OF REPRODUCTIVE AGE IN A SELECTED COMMUNITY IN FUNAKAYE LGA, GOMBE STATE, NIGERIA.* Age. **15**(24): p. 25-34.
5. Vermillion, M.S. and S.L. Klein, *Pregnancy and infection: Using disease pathogenesis to inform vaccine strategy.* Npj Vaccines, 2018. **3**(1): p. 1-11.
6. Pathirana, J., J. Nkambule, and S. Black, *Determinants of maternal immunization in developing countries.* Vaccine, 2015. **33**(26): p. 2971-2977.
7. Enuku, C.A. and O. Orru, *Awareness of tetanus toxoid vaccination by pregnant women attending antenatal clinic in central hospital, Benin City.* J Sci Pract Pharm, 2016. **3**(1): p. 92-96.
8. Sherley, J. and S. Newton, *The association between area of residence and sufficient antenatal tetanus vaccination in women ages 15–49 in Afghanistan: an analysis of the 2015 DHS dataset.* Global health research and policy, 2020. **5**(1): p. 1-13.
9. Organization, W.H., *Protecting All Against Tetanus: guide to sustaining maternal and neonatal tetanus elimination (MNTE) and broadening tetanus protection for all populations.* 2019.
10. Messeret, E.S., et al., *Maternal and neonatal tetanus elimination (MNTE) in the WHO African region.* Journal of immunological sciences, 2018(15): p. 103.
11. Mehanna, A., M.H. Ali, and I. Kharboush, *Knowledge and health beliefs of reproductive-age women in Alexandria about tetanus toxoid immunization.* Journal of the Egyptian Public Health Association, 2020. **95**(1): p. 1-11.
12. Adeyemo, F.O., et al., *Incidence of neonatal tetanus in a Nigerian State Hospital, Benin, Nigeria.* Journal of Health Research and Reviews, 2016. **3**(3): p. 102.
13. Belihu, K.D., F.Y. Tesso, and T.D. Woldetsadik, *Dropout Rate of Tetanus Toxoid Immunization and Associated Factorsamong Reproductive Age Group of Women in Debrebirhan Town, AmharaRegion, Northern Ethiopia.* Journal of women's health care, 2017. **6**: p. 1-8.
14. Teshale, A.B. and G.A. Tesema, *Determinants of births protected against neonatal tetanus in Ethiopia: A multilevel analysis using EDHS 2016 data.* Plos one, 2020. **15**(12): p. e0243071.
15. Nigussie, J., et al., *Tetanus toxoid immunization Coverage and associated factors in Ethiopia: A systematic review and meta-analysis.* 2020.

16. Mohamed, A.A. and F.A. Nasor, *Effect of tetanus toxoid immunization training program on knowledge and attitude on female nursing students in Government Universities in Khartoum State.* International Journal of Nursing and Midwifery, 2020. **12**(2): p. 51-63.
17. Organization, W.H., *Protecting all against tetanus: guide to sustaining maternal and neonatal tetanus elimination (MNTE) and broadening tetanus protection for all populations.* 2019.
18. Njuguna, H.N., et al., *Progress Toward Maternal and Neonatal Tetanus Elimination—Worldwide, 2000–2018.* Morbidity and Mortality Weekly Report, 2020. **69**(17): p. 515.
19. Muhammad-Idris, Z.K., A.U. Shehu, and F.M. Isa, *Assessment of tetanus toxoid coverage among women of reproductive age in Kwarbai, Zaria.* Archives of Medicine and Surgery, 2017. **2**(2): p. 48.
20. Gabriel-Job, N. and L.Y. Ide, *Tetanus Toxoid Status and Determinants of Uptake among Women in Etche Local Government Area, Rivers State, Nigeria: A Community Based Study.* Asian Journal of Medicine and Health, 2019: p. 1-7.
21. Anatea, M.D., T.H. Mekonnen, and B.A. Dachew, *Determinants and perceptions of the utilization of tetanus toxoid immunization among reproductive-age women in Dukem Town, Eastern Ethiopia: a community-based cross-sectional study.* BMC international health and human rights, 2018. **18**(1): p. 27.
22. Bello, A.D. and P.E. Aduroja, *Assessment of tetanus toxoid vaccination awareness and uptake among women of reproductive age in Kwara State, Nigeria.* Journal of Complementary and Alternative Medical Research, 2017: p. 1-10.
23. Ethiopia, F., *National expanded programme on immunization, comprehensive multi year plan 2011-2015.* Addis Ababa, December, 2010.
24. Organization, P.A.H.O.W.H., *Maternal and neonatal immunization field guide for Latin America and the Caribbean*. 2017, Pan American Health Organization Washington, DC.
25. Organization, W.H., *Tetanus vaccines: WHO position paper, February 2017–recommendations.* Vaccine, 2018. **36**(25): p. 3573-3575.
26. CSACE, I., *Ethiopia demographic and health survey 2016.* Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF, 2016.
27. Institute, E.P.H. and ICF, *Ethiopia mini demographic and health survey 2019: key indicators*. 2019, EPHI and ICF Rockville, Maryland, USA.
28. Khan, R., et al., *Maternal and neonatal tetanus elimination: from protecting women and newborns to protecting all.* International journal of women's health, 2015. **7**: p. 171.
29. AJUMA, G.M., *Assessment of factors associated with tetanus toxoid vaccination uptake by pregnant women receiving care at Kakamega county referral hospital, Kenya*. 2016, Maseno University.
30. Bint e Ajmal, K., et al., *KNOWLEDGE ATTITUDE AND PRACTICES REGARDING TETANUS TOXOID VACCINATION IN REPRODUCTIVE AGE WOMEN (15-49). A DESCRIPTIVE CROSSSECTIONAL STUDY IN PAK EMIRATES MILITARY HOSPITAL, RAWALPINDI.* Pakistan Armed Forces Medical Journal, 2019. **69**(SUPPL 2): p. S334-39.
31. Iqbal, S., et al., *Increasing Frequency of Antenatal Care Visits May Improve Tetanus Toxoid Vaccination Coverage in Pregnant Women in Pakistan.* Human Vaccines & Immunotherapeutics, 2020: p. 1-4.

32. Yaya, S., et al., *Prevalence and predictors of taking tetanus toxoid vaccine in pregnancy: a cross-sectional study of 8,722 women in Sierra Leone.* BMC public health, 2020. **20**: p. 1-9.
33. Awosan, K. and M. Hassan, *Perception and utilization of tetanus toxoid immunization among pregnant women attending a tertiary centre in North-West Nigeria.* Journal of Drug Delivery and Therapeutics, 2018. **8**(6): p. 119-124.
34. Nguegang, I.N., et al., *Tetanus vaccine coverage in recommended and more than recommended doses among mothers in a West Cameroon health district: a cross sectional study.* Gates Open Research, 2020. **4**(46): p. 46.
35. Yaya, S., et al., *Antenatal visits are positively associated with uptake of tetanus toxoid and intermittent preventive treatment in pregnancy in Ivory Coast.* BMC public health, 2019. **19**(1): p. 1467.
36. Dubale Mamoro, M. and L. Kelbiso Hanfore, *Tetanus toxoid immunization status and associated factors among mothers in Damboya Woreda, Kembata Tembaro zone, SNNP, Ethiopia.* Journal of nutrition and metabolism, 2018. **2018**.
37. Facha, W., B. Yohannes, and G. Duressa, *Tetanus Toxoid Vaccination Coverage and Associated Factors among Pregnant Women in Duguna Fango District, Southern Ethiopia.* International Journal of Health Sciences and Research, 2018. **8**(1): p. 148-154.
38. Mengesha, M.B., et al., *Tetanus Toxoid Immunization Status and Associated Factors among Mothers in Hawzen, Eastern Zone of Tigray, Ethiopia, 2019.* The Open Public Health Journal, 2020. **13**(1).
39. Ymele Fouelifack, F., et al., *Determinants of Noncompletion of the Third Dose of Tetanus Toxoid Vaccine in Pregnant Women in Dschang Health District, Cameroon.* Advances in Preventive Medicine, 2020. **2020**.
40. Kenea, A., et al., *Assessment of Protection at Birth of Tetanus Toxoid Immunization and Associated Risk Factors in Ilu Aba Bora Zone Southwest, Ethiopia.* Int J Vaccine Immunizat, 2016. **2**(3).
41. Somoro, A.W., et al., *Tetanus-Toxoid Vaccination among Married Women of Reproductive Age (18-49) and its Association with Socio-demographic in Union Council Kamu Shaheed District Ghotki Sindh.* Journal of Liaquat University of Medical & Health Sciences, 2019. **18**(04): p. 307-313.
42. Ahmed, A. and M. El-Berrawy, *Factors Affecting Maternal Tetanus Vaccination in Dakahlia Governorate, Egypt.* Journal of High Institute of Public Health, 2019. **49**(1): p. 30-35.
43. Haile, Z.T., I.R.A. Chertok, and A.K. Teweldeberhan, *Determinants of utilization of sufficient tetanus toxoid immunization during pregnancy: evidence from the Kenya demographic and health survey, 2008–2009.* Journal of community health, 2013. **38**(3): p. 492-499.
44. Gebremedhin, T.S., et al., *Tetanus Toxoid Vaccination Uptake and Associated Factors among Mothers Who Gave Birth in the Last 12 Months in Errer District, Somali Regional State, Eastern Ethiopia.* BioMed Research International, 2020. **2020**.
45. Anokye, M., et al. *Immunization Coverage of Pregnant Women with Tetanus Toxoid Vaccine in Dormaa East District-Brong Ahafo Region, Ghana*. in *International Conference on Applied Science and Technology Conference Proceedings*. 2017.

46. Bante, S.A., et al., *Uptake of pre-cervical cancer screening and associated factors among reproductive age women in Debre Markos town, Northwest Ethiopia, 2017.* BMC public health, 2019. **19**(1): p. 1102.
47. Nguemouo Nguegang, I., et al., *Tetanus vaccine coverage in recommended and more than recommended doses among mothers in a West Cameroon health district: a cross sectional study.* Gates Open Research, 2021. **4**: p. 46.

11. ANNEXES

Annex I: Consent Sheet

English version information sheet and consent form

Research project**:** Tetanus toxoid vaccine utilization and associated factors among reproductive age women in Debre Markos Town, North-West Ethiopia, 2021: A community based cross-sectional study

Name of principal investigator-Yihunnie Dessie

Introduction: This information sheet and consent form were developed by the investigator to assess tetanus vaccine use and related factors in women of childbearing age in the town of Debre Markos, northwest Ethiopia,2021. The investigator is graduating MSc in Maternity and Reproductive Health from Addis Ababa University School of Nursing and Midwifery, Department of Midwifery.

Purpose of the Study: This research tries to assess tetanus toxoid vaccine utilization and associated factors among reproductive age women. This will enable to know the current TT vaccine utilization and determinant factor in the town.

Procedure: You will be asked to answer a questionnaire. You decide to join or not. If you decide to participate, you will receive this fact sheet to sign your consent form. I would also like to inform you that you have the right to withdraw from the study or to interrupt the interview at any time or to skip any questions that you do not wish to answer. It is estimated that the total time to complete this study will be 20-30 minutes.

Benefit and Risk of Participants: I would like to inform you that by participating in this study you will not experience any risks or benefits in the short or long term. All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

Incentives: This is totally a voluntary participation.

Funding organization: Addis Ababa University, College of Health Sciences, Department of Nursing and Midwifery.

Contact Information:

Name: Yihunnie Dessie

Mobile: +251 966258762, email: yihunnied@gmail.com

If you agree to participate in this study, I appreciate your truthfulness, and after having this consent form read to you, please put a sign below to show if you are willing to participate (No need of writing your name).

Are you willing to participate in this study? Yes [ ] No [ ]

Thank you for taking part in this study.

Annex II: Data collection tool

Date---month------------------------Year------------------

Name of data collector-------------------------- signature---------------------------------------

Name of supervisor--------------------------------signature--------------------------------------

Code no-----------------------------

Part I: Socio-demographic characteristics

S. No	Questionnaire	Response	Remark
101	Age of mother	___________in years	
102	Religion of the mother	Orthodox 2. Muslim 3. Others(specify)-------	
103	Mother's educational status	1. Unable to read and write 2. Primary school (1-8) 3.Secondary (9-12) 4. Tertiary (Diploma or Degree)	
104	Marital status	1. Single 2. Married 3. Divorced 4. Widowed	
105	Mother's occupation	1. Housewife 2. Merchant 3. Government employee 4. Student 5. Daily laborer 6. Other specify---------	
106	Monthly average family income	______________________ ETB	
107	Husband's occupation	1. Governmental employee 2. Daily laborer 3. Merchant 4. Student 5. Others specify---------	
108	Husband's educational status	1. Unable to read and write 2. Primary (Grade 1-8)	

		3. Secondary (Grade 9-12) 4. Tertiary (Degree or Diploma)	
109	Radio/Television	1. Yes 2. No	

Part II: Obstetric and health service-related questions

201	Parity	1 2-3 >=4	
202	Have you future fertility intention?	Yes 2. No 3. Don't know	
203	Was the last pregnancy/birth planned?	Yes 2. No	
204	ANC Follow up in the last pregnancy	Yes 2. No	If no, skip to 208
205	If yes, the number of ANC Visit	One 2. Two-three 3. ≥ four	
206	If yes, time of starting ANC (GA by week)	____________	
207	If yes, place of ANC follow-up	1. Health Post 2. Health Centre 3. Hospital 4. Private clinic	
208	Place of delivery	Home 2. Health institution	
209	Were health workers respectful?	1. Yes 2. No 3. Don't know	
210	Did you think that lack of privacy was problem at TT immunization?	1. Yes 2. No 3. Don't know	

211	How did you feel about the quality of services given?	1. Good 2. Poor	
212	Do you trust on the service provided at that health institution?	1. Yes 2. No 3. Don't know	
213	How was the behavior of health workers providing immunization services?	1. Good 2. Poor/bad	
214	Do you pay for immunization services rendered to you?	1. Yes 2. No	
215	How long does it take from your home to the nearest health institution?	1.≤ 30min 2. 30 min-1 Hr 3. ≥ 1 Hr	
216	Have you visited with Health Extension Workers	Yes 2. No	

Part III: Questionnaire on TT immunization

301	TT vaccine in the last pregnancy	1. Yes 2. No	If no, skip to 304
302	If yes, how many doses?	1. One 2. Two 3. Three 4. ≥ Four	
303	If yes, where did you get TT vaccine?	1. Health Post 2. Health Centre 3. Hospital 4. Home/Out reach	
304	Purpose of getting injection?	1. To prevent self from Tetanus 2. To prevent child from Tetanus 3. To prevent both, self and child from tetanus 4. I don't know	
305	Reason not getting TT injection	1. Not aware 2. Nobody advice 3. Service area too far	

	(more than one answer is possible)?	4. Fear of side effects 5. Provider not available 6. Other (specify)----------	
306	Source of information about TT vaccination?	1. Health facility 2. Media 3. School 4. Other (Specify)--------	
307	TT vaccine evidence?	1. Vaccination card 2. History 3. Both	

Annex III: Amharic Version Questionnaire

የመረጃ መስጫ እና ስምምነት ቅጽ (ውል)

በደብረማርቆስ ከተማ ለሚገኙ እናቶችንን የመንጋጋ ቆልፍ ክትባት አጠቃቀም እና ተጽእኖ የሚያሳድሩ ነገሮችን ለማጥናት የተዘጋጀ መጠይቅ

የጥናቱ ባለቤት- ይሁን ደሴ

ጥናቱ ርዕስ ፡- በደብረ ማርቆስ ከተማ ለሚገኙ እናቶችን የመንጋጋ ቆልፍ ክትባት አጠቃቀም እና ተጽእኖ የሚያሳድሩ ነገሮችን ማጥናት

ጤና ይስጥልኝ ስሜ ……………… ይባላል! እኔ መረጃ ሰብሳቢ ሲሆን ይህንን መረጃ የምሰበስበው ይሁን ደሴ (በአዲስ አበባ ዮኒቨርሲቲ የህክምና ሳይንስ ኮሌጅ ፤ የነርሲንግና ሚድዋይፈሪ ትምህርት ክፍል ፤ የድህረ ምረቃ ተማሪ) የማስተርስ ትምህርታቸውን ለማጠናቀቅ የመመረቂያ ጽሑፋቸውን ለማዘጋጀት እንዲረዳቸው ሲሆን የጥናቱ ዓላማ በደብረማርቆስ ከተማ ለሚገኙ እናቶችንን የመንጋጋ ቆልፍ ክትባት አጠቃቀም እና ተፅኦኖ የሚያደርጉ ችግርሮችን መለየት ነው። ጥያቄዎችን ለመመለስ ከ25-30 ደቂቃ ሊፈጅ ይችላል። በጥናቱ ላይ የእርሶ ስምና አድራሻ አይጠቀስም፡ የሚሰጡትም መረጃ ከዚህ ጥናት ውጭ ለሌላ አካል ተላልፎ አይሰጥም፡ ሚስጢራዊነቱም የተጠበቀ ነው። በዚህ ጥናት ላይ በመሳተፎት የሚደርስብዎት ጉዳት ወይም የተለየና ጊዜያዊ ጥቅም አይኖርም ። በዚህ ጥናት መሳተፍ ፈቃደኛ ካልሆኑ ፣ በመጠየቅ መሀል ማቋረጥ ከፈለጉ ወይም መመለስ የማይፈልጉት ጥያቄ ሲኖር የማቋረጥ ሙሉ መብት እንዳላዎት ልገልፅዎት እወዳለሁ። በጥናቱ ላይ ለመሳተፍ የእርሶ ትብብር እና ፈቃደኝነት በጉዳዩ ላይ የሚነሱ ችግሮችን ለመለየት

እጅግ ጠቃሚ ስለሆኑ በጥናቱ ላይ በፈቃደኝነት እንዲሳተፉ በትህትና እንጠይቃለን፡፡ ከላይ በተሰጠኝ መረጃ መሰራት በዚህ ጥናት ላይ ፍቃደኛ ነኝ፡፡

ፊርማ……………

መጠየቅ የሚፈልጉትን ወይም ግልጽ ያልሆነ ነገር ካለ ከታች በተጠቀሰው አድራሻ ማግኘት ይችላሉ፡፡

የጥናት አድራሻ ስም ፡- ይሁን ደሴ

ስልክ ቁጥር- +251-966-25-87-62

ኢ-ሜይል፡-yihunnied@gmail. com

መጠይቅ

በደ/ማርቆስ ከተማ የሚኖሩ እናቶችንን የመንጋጋ ቆልፍ ክትባት አጠቃቀም እና ተፅዕኖ የሚያሳድሩ ነገሮችን/ችግሮችን ለማወቅ የተዘጋጀ የመረጃ መሰብሰቢያ መጠይቅ፡፡

01. ቃለ መጠይቀ የተደረገበት ቀን ....
02. የመረጃ ሰብሳቢው ስም ....ፊርማ.......................................
03. የሱፐርቫይዘር ስም...ፊርማ.......................................
04. የመጠቅ መለያ ቁጥር ……………………….

ክፍል 1- የተጠያቂ ማህበራዊ እና ዲሞግራፊያዊ ሁኔታ

ተ.ቁ	ጥያቄ	መልስ	
101	እድሜሽ ስንት ነዉ?	__________ዓመት	
102	ሀይማኖትሽ ምንድን ነዉ?	ኦርቶዶክስ 2. ሙስሊም 3. ሌላ (ግለፅ)…..	
103	የትምህርት ሁኔታሽ?	1. ማንበብና መፃፍ የማይችል 2. ክፍል 1-8 3. ክፍል 9-12 4. ዲፕሎማና ከዛ በላይ	
104	የጋብቻ ሁኔታሽ?	1. ያላገባች 3. የፈታች 2. ያገባች 4. በሏ የሞተባት	
105	አሁን ምን ዓይነት ስራ ነው	1. የቤት እመቤት 4. ተማሪ	

	የምትሰሪዉ?	2. ነጋዴ 5. የቀን ሰራተኛ 3. የመንግስት ሰራተኛ 6. ሌላ(ግለፅ)..........	
106	አማካኝ ወርሃዊ ገቢ ምን ያህል ነዉ?	______________________ብር	
107	የባለቤት ስራ ምንድን ነዉ?	1.የመንግስት ሰራተኛ 2. የቀን ስራተኛ 3. ነጋዴ 4. ተማሪ 5. ሌላ(ግለፅ)..........	
108	የባለቤትሽ የት/ት ሁኔታ?	1. መፃፍና ማንበብ የማይችል 2. ክፍል (1-8) 3. ክፍል (9-12) 4. ዲፕሎማ ወይም ዲግሪ	
109	ራዲዮ/ቴሌቪዠን ተጠቃሚ ናችሁ?	1. አዎ 2. የለም	

ክፍል 2- የወሊድ ሁኔታና አጠቃላይ የጤና ዓገልግሎት

201	ስንት ልጅ ወልደሻል?	1 2 .2-3 3. >=4	
202	ወደፊት የማርገዝ እቅድ አለሽ	1.አዎ 2. የለኝም 3. አላዉቅም	
203	የታቀደ እርግዝና ነበር?	1.አዎ 2. አይደለም	
204	የእርግዝና ክትትል ነበረሽ?	1. አዎ 2. አልነበረኝም	አዎ ካልሆነ ወደ ጥያቄ ቁጥር 208
205	ምን ያህል የእርግዝና ክትትል ነበረሽ?	1 2. 2-3 3. ≥ 4	
206	የቅድመ-ወሊድ ክትትል የጀመርሽበት ጊዜ / በሳምንት/	____________	

207	የቅድመ-ወሊድ ክትትል ያደረግሽበት በታ?	1. ጤና ኬላ 2. ጤና ጣቢያ 3. ሆስፒታል 4. የግል ክሊኒክ	
208	የወለድሽበት በታ?	1. ቤት 2. ጤና ተቋም	
209	የጤና ባለሙያዎች እናቶችን ያከብራሉ ?	1. አዎ 2. አይደሉም 3. አላውቅም	
210	በክትባቱ ጊዜ የሚስጥር አለመጠበቅ ችግር ነበር ብለሽ ታስቢያለሽ	አወን 2. የለም 3. አላዉቅም	
211	ስለ አገልግሎቱ ጥራት ምን ስሜት ነበረሽ?	1. ጥሩ ነው 2. በቂ ነዉ 3. ደካማ ነው 4. አላውቅም	
212	በሚሰጠው አገልግሎት እምነት ነበረሽ?	1. አዎ 2. አልነበረኝም 3. አላውቅም	
213	ክትባቱን የሚሰጡት ባለሙያዎች ፀባይ እንዴት ትመለከቻለሽ?	1. ጥሩ ነበር 2. በቂ ነበር 3. መጥፎ ነበር 4. አላውቅም	
214	ለክትባቱ ክፍያ ከፍለሻል?	1. አዎ 2. አልከፍልሁም	
215	ከቤትዎ እስከ ጤና ጣቢያው ያለው ርቀት ምን ያህል ነዉ?	1.≤ 30ደቂቃ 2.30 -1 ሰዓት 3. ≥ 1 ሰዓት	
216	የጤና ኤክስቴንሽን ባለሙያዎች ይጎበኛሉ ወይ?	1. አዎ 2. የለም	

ክፍል 3- የመንጋጋ ቆልፍ ክትባት ጥያቄዎች

301	በቅርብ በነበረው እርግዝናሽ ክትባት ተከትበሻል?	አዎ አልተከተብኩም	አዎ ካልሆነ ወደ ጥያቄ 304
302	ጥያቄ ቁጥር 301 አዎ ከሆነ መልሱ ስንት ጊዜ ወሰደሻል?	1. አንድ 2. ሁለት 3.ሶስት 4. አራትና ከዛ በላይ	
303	ክትባቱን የወሰድሽበት ቦታ?	1. ጤና ኬላ 2. ጤና ጣቢያ 3. ሆስፒታል 4. ቤት	
304	ጥቅሙ ምን ይመስልሻል ?	1. ራስን ከመንጋጋ ቆልፍ መከላከል 2. ልጅን ከመንጋጋ ቆልፍ መከላከል 3. ሁለቱንም መከላከል 4. አላውቅም	
305	ክትባትን ያለገኘሽበት ምክንያት	1. እንዳለ አላውቅም 2. ማንም ምክር አልሰጠኝም 3. በታው ሩቅ ስለሆነ 4. የጎንዮሽ ጉዳቱን በመፍራት 5.የጤና ባለሙያ አለመኖር 6. ሌላ(ግለፅ)………..	
306	ስለክትባቱ መረጃ ከየት አገኘሽ?	1. ጤና ጣቢያ 2. ሚዲያ 3. ት/ት ቤት 4. ሌላ(ግለፅ)..........	
307	የክትባት መረጃ ከየት ተገኘ?	1. ካርድ 2. ከእናት 3. ከሁለቱም	