MEKELLE UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING

DEPARTMENT OF MATERNITY AND REPRODUCTIVE HEALTH NURSING

PERI-CONCEPTION FOLIC ACID INTAKE AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE FOLLOW-UP IN MEKELLE CITY, TIGRAY REGION, NORTHERN ETHIOPIA MIXED METHOD STUDY/2025

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Advisor's Approval Sheet

This is to certify that the thesis entitled "**Peri-conception Folic Acid Intake Among Pregnant Women Attending Antenatal Care Follow Up in Mekelle City, Tigray Region, Northern Ethiopia-A Mixed Method Study/2025**" is submitted in partial fulfillment of the requirements for the degree of Masters in "**Maternity and Reproductive Health Nursing**" to the Graduate Program of the College of Health Sciences of Mekelle University and has been carried out by Mrs. Rigbe Tewelebrhan ID No: chs/nmrh/009/13 under my supervision. Therefore, I recommend that the student has fulfilled the requirements and can submit the thesis to the Department.

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Name of Major Advisor	Signature	Date
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Name of Co-Advisor	Signature	Date

Declaration

I hereby declare that this MSc thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

Name: Mrs. Rigbe Tewelebrhan

Signature: _____

Date: _____

This MSc thesis had been submitted for examination with my approval as an advisor.

Name: _____

Signature: _____

Date: _____

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Examiners' Approval Sheet

We, the undersigned, members of the Board of Examiners of the final open defense by "Mrs. Rigbe Tewelebrhan" have read and evaluated his/her proposal "**Peri-conception Folic Acid Intake Among Pregnant Women Attending Antenatal Care Follow Up in Mekelle City, Tigray Region, Northern Ethiopia-A Mixed Method Study/2025**" and evaluated the candidate. This is therefore to certify that the thesis has been accepted in partial fulfillment of the requirements for the Master Degree in Maternity and Reproductive Health Nursing.

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Acronyms

ANC-Antenatal Care

AOR-Adjusted Odds Ratio

CDC-Center for Disease Control

COR-Crude Odds Ratio

FA-Folic Acid

FGD-Focus Group Discussions

HIV/AIDS-Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome

NTDs-Neural Tube Defects

KII-Key Informant Interview

PCC-Pre-Conception Care

PNC-Postnatal Care

SPSS-Statistical Package for Social Sciences

VIF-Variance inflation factors

WHO-World Health Organization

WRA-Women of Reproductive Age

Abstract

Background- Although not all birth defects can be prevented, people can increase their chances of having a healthy baby by managing health conditions and adopting healthy behaviors around the time of pregnancy. Findings suggest that daily peri-conceptional intake of 0.4 mg of folic acid reduces the risk of neural tube defects occurrence by approximately 60%. A relatively high dietary intake of folate may also reduce the risk. In Ethiopia, neural tube defect-related deaths are very high with a magnitude of 104/10,000 live births. The overall occurrence of NTDs was 131 per 10,000 births in Tigray. A survey from nine regions of Ethiopia found that only 32.7% of women of reproductive age had optimal levels of serum folate; therefore, 67% had folate insufficiency. The prevalence of folate deficiency and insufficiency means that many Ethiopian women are at risk of poor birth outcomes.

Objective- The aim of this study is to assess the peri-conception folic acid intake among pregnant women attending antenatal care follow-up in Mekelle city Tigray Region, Northern Ethiopia/2024.

Methods; A mixed method study with facility based cross-sectional design for the quantitative part was conducted in Mekelle City from June/2024 –May/2025. The sample size of this study was 654 mothers. For the qualitative study, 3 focus group discussions of pregnant mothers' and 6 key informant interviews with health care professionals were conducted. Systematic sampling was used to select the study participants for the quantitative data, while purposive sampling was employed for the qualitative data. Data were collected by interviewer administered questionnaire. The data were entered to Epi-data 3.1 and analyzed by using SPSS version 22. Binary logistic regression analysis was done and the strength of statistical association was measured by adjusted odds ratios at 95% confidence interval. Statistical significance was declared at P-value <0.05. Thematic analysis was employed and result of the qualitative data was presented by triangulating.

Result: The prevalence of peri-conception folic acid intake was 18.3%. The main reasons for not taking folic acid supplementation were; lack of awareness, mother not getting sick, not prescribed by a doctor, getting enough folic acid from local food and unintended pregnancy. In the multivariable analysis, marital status (AOR =0.257, 95% CI: .072-0.917), number of antenatal care visits (AOR= 5.09, 95% CI: 1.780, 14.567), employment status (AOR= 2.169, 95% CI: 1.020- 4.614), place of delivery (AOR= 196, 95% CI: .074-.517), gestational age (AOR= .133, 95% CI: .037-.471), level of knowledge (AOR= 3.249, 95% CI: 1.825-5.782) were significantly associated with peri-conception folic acid intake.

Conclusion and recommendation: The uptake of peri-conception folic acid in this study was low. Regional health Bureau and health facilities should work on advocating peri-conception folic acid intake in terms of training and supply provision.

CHAPTER-ONE-INTRODUCTION

1.1 Background

Folic acid (FA), also known as pteroyl-L-glutamic acid or vitamin B9, is a water-soluble B group vitamin. It is a synthetic substance that is not found in nature and serves as the primary ingredient in multivitamin products, cereals, and wheat fortification. The form with higher biologic activity is 5-metyl-tetrahydrofolate (5-metilTHF), and for the FA to perform its biological function, it needs to change into this molecule. Folates acts as a cofactor of enzymes involved in purine and pyrimidine synthesis, amino acid metabolism, DNA and RNA synthesis, and, in conjunction with vitamin B12, methylation of proteins, lipids, and nucleic acids (1).

The growth and development of the fetus is significantly influenced by the nutritional status of the mothers before and during pregnancy. Therefore, it is thought that treatments that support maternal health during this peri-conception are crucial in raising the possibility of a successful pregnancy outcome. All women should take a 400 μg of daily folic acid supplement from the time they start attempting to conceive until 12 weeks of gestation. Women who have had a given birth to a child with a neural tube defect should be offered high-dose supplementation (5 mg folic acid daily) and advised to increase their food intake of folate. They should also be advised about the risk of recurrence and the protective effects of peri-conceptional folic acid supplementation. (2).

Folate deficiency can be caused by inadequate dietary intake, utilization defects, mal-absorption, increased needs during pregnancy and lactation, drug interference, smoking, and a lack of enzymes and cofactors for the production of active forms of folic acid. Furthermore, one of the most prevalent dietary deficiencies that people are experiencing is a folate functional insufficiency. One of the initial effects of even mild folate deficiency is elevated plasmatic homocysteine. (3)

Demands for folate increase during pregnancy because it is also required for growth and development of the fetus. Folate deficiency has been associated with abnormalities in both mothers (anemia, peripheral neuropathy) and fetuses (congenital abnormalities) (4).

Peri-conceptional care (PCC) is a set of interventions that aim to identify and modify medical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management. Periconception care (PCC) offers a window of opportunity to reduce or eliminate these hazards in a timely manner. Adverse pregnancy outcomes, including preterm birth, congenital birth defects, maternal problems, and mortality rates, have become less common over the previous few decades (5).

It is now well known that folic acid plays a critical role both before and during conception in protecting the developing fetus against neural tube defects (NTDs). The neural tube develops into the spine and NTDs occur

when the brain and skull and/or spinal cord and its protective spinal cord do not develop properly during the first 4 weeks after conception. The most common NTDs are anencephaly, which causes stillbirth or death shortly after birth, and spina bifida, which can cause various physical disabilities (6). A study has shown that folic acid supplementation during the peri-conception period can prevent neural tube defects. Folic acid supplementation alone or in combination with other vitamins and minerals can be effective. (7, 8)

1.2 Statement of the Problem

The risk of neural tube defects is significantly reduced by peri-conceptional folic acid. It is difficult to achieve optimal folate levels through diet alone, even with fortified flour. As a way to increase folate consumption in women of childbearing age, the Canadian Pediatric Society recommends the following steps: encouraging folate-rich foods such as leafy vegetables, fortifying foods with folate, supplementing with folate and B12, and providing free folate supplements to women who are disadvantaged (9).

In United States one in every 33 babies born with birth defects every year. Although not all birth defects can be prevented, people can increase their chances of having a healthy baby by managing health conditions and adopting healthy behaviors before becoming pregnant (10).

Findings suggested that a daily peri-conceptional intake of 0.4 mg of folic acid reduces the risk of NTDs occurrence by approximately 60%. A relatively high dietary intake of folate may also reduce the risk (11).

The global prevalence of folate preventable neural tube defect is 11.7 per 10,000 births in Africa, 21.9 per 10,000 births in Eastern Mediterranean, 9.0 per 10,000 births in Europe, 11.5 per 10,000 births America, 15.8 per 10,000 births in South-East Asia, and 6.9 per 10,000 births in Western Pacific (12). In contrast to this, in Ethiopia, NTD related deaths are very high with a magnitude of 104/10,000 live births which is 4–23 times higher. Pregnant women with no history of Antenatal care follow up are subjected to higher infant mortality which justifies the low uptake of folate (13).

Findings from a study conducted in Ethiopia shows that women's level of knowledge and utilization of preconception care was significantly low. Educational status and antenatal care follow-up were factors shown to affect knowledge of preconception care. Age and having a sound knowledge of preconception care indicated a significant association towards utilization of preconception care (14).

Although the WHO and CDC have recommended that prenatal folic acid supplementation of pregnant women is critical to reducing infant deaths related to neural tube defects, a huge number of infant deaths due to neural tube defects are recorded worldwide each year. The burden of folate-preventable neural tube defects is increasing alarmingly in developing countries such as Ethiopia. The situation is complicated

by frequent conflicts, epidemics and economic crises, which hinder maternal and child health services, especially early care (2, 8)

The most recent hospital-based studies in Tigray and Addis Ababa show very high incidence rate of NTDs in Ethiopia. The overall occurrence of NTDs was 131 per 10,000 births in Tigray (disaggregated by zone: 13.2 in Eastern Tigray, 7.28 in Western Tigray, and 6.98 in Northwest Tigray, 16.6 in Mekelle, 30.4 in Southern Tigray and 89 in Central Tigray) (15). Folate deficiency and insufficiency are widespread, prevalent and a public health problem in Ethiopia. A recent assessment based on the most current national micronutrient survey has found that, 84% of women of reproductive age (WRA) are at risk of giving birth to a child with NTDs based on the red blood cell folate levels. Another study in nine regions of Ethiopia found that only 32.7% of WRA had optimal levels of serum folate; therefore, 67% had folate insufficiency. This prevalence of folate deficiency and insufficiency means that many Ethiopian women are at risk of poor birth outcomes (16, 17).

Thus, the aim of this study is to measure the utilization folic acid and to find out the different factors affecting the utilization of folic acid in the study area.

1.3-Significance of the Study

As little is known about the peri-conception folic acid intake in the study area the finding of this study will provide a baseline report for researchers. After the study is finalized; policy makers, regional health bureau, governmental and non-governmental organizations will be benefited by considering the factors affecting the uptake of folic acid in their plans and interventions for preventing folic acid deficiency and related NTDS. Moreover, nurses, midwives and reproductive health professionals will benefit by using the finding of this study as to improve their maternal care service. More specifically, women of reproductive age will have a healthy pregnancy and birth outcome.

CHAPTER -2- LITERATATURE REVIEW

2.1 Prevalence of peri-conception folic acid uptake

A study conducted in Iran revealed that 56% and 92.9%) of the women had taken folic acid supplements before and during pregnancy respectively. However, only 54.5% of the women had taken folic acid supplements before pregnancy and continued to supplement during pregnancy (for at least 1 month). Among the study participants, 79.4% planned pregnancy (18).

Another similar study conducted in China showed that 68% of pregnant women reported taking folic acid supplementation peri-conceptionally (i.e. at some point before or during early pregnancy), and 32.8% and 65.2% had taken it before or during early pregnancy, respectively. However, only 16.1% used it optimally (i.e. regularly from four weeks before pregnancy throughout four weeks after pregnancy) (19).

The prevalence of peri-conceptional folic acid use among study participants in Germany was 41.5%. The mean period of folic acid intake was 32 weeks of pregnancy. About 91.3% of women were used folic acid at some point during the advised period, but for most of the women 47.4% the folic acid use began after pregnancy notification; in 86.3% of cases after the fifth week of pregnancy (20).

A finding from a study conducted in Ireland revealed that 85% reported taking FA at some point during the peri-conceptional period; however, only 28% took FA as recommended. Only 17.5% of women booked for care at less than 12 weeks gestation and 11.6% booked at more than 20 weeks gestation with the majority booking between 12 and 20 weeks of gestation. A third of all women reported at booking that the pregnancy was unplanned (21).

An Italian study also revealed that 66.4% of women started FA supplementation only after finding out they were pregnant and only 16.8% of women started FA supplementation12 weeks before the beginning of pregnancy. Among the study participants 16.8% did not take any FA supplements (22). Similar study conducted in Italy also showed that 84 % of the pregnant women

had taken folic acid supplements at some time point before and/or during pregnancy while only 23.5 % of the participants had reported the use of folic acid supplements before the onset of pregnancy. Specifically, 11.7 % of all women had initiated use, at least, one month before pregnancy, 11.8 % had initiated use, at least, six months before pregnancy, 54.9 % had initiated after pregnancy confirmation during the first trimester, and 5.6 % reported starting folic acid use after the first trimester of pregnancy (23).

In Canada a finding revealed that 28% of the participants were took folic acid or a multivitamin containing folic acid peri-conceptionally, although only 5.3% of women aged 16 to 25 years did so (24). In a study conducted in Maryland, only 32% of women took folic acid daily pre-pregnancy. About half of respondents reported that their most recent pregnancies were intended (54.7%). The most common reason reported for not taking folic acid was, “I wasn't planning to get pregnant” (60.9%), followed by, “I didn't think I needed to take vitamins” (40.9%). “Other” reasons were written in by 11.6% of women (25).

In Nigeria a finding revealed that about 92.9% participants were took folic acid at some point or the other during pregnancy. Only 2.5% respondents took FA during preconception. By the end of the first trimester, 29.2% women had commenced folic acid intake while 70.8%) commenced folic acid at a later age. There were 7.1% respondents who did not take the supplement at all (26).

A study conducted in Uganda revealed that 42.4% took folic acid supplements in late pregnancy, 8.1% during the first trimester, none preconception. All women said to have eaten food rich in folic acid. None were aware about fortified foods. 42.4% took folic acid supplements in late pregnancy, 8.1% during the first trimester, none preconception (27).

Findings from a study conducted in Sudan showed that 58.8% participants were used folic acid during the peri-conceptional period, and 41.2% did not. Of those who used folic acid, only 3.7% women used folic acid in the preconceptional period (28). In addition to that, in Ghana, the prevalence of folic acid supplementation during peri- conceptional period was 28.7% (29).

In a study conducted in Ethiopia the prevalence of peri-conceptional folic acid intake was 48.4% and only 3.5% of the participants were started to take folic acid supplements before pregnancy and 11.6% started in the first trimester (30).

2.2 Maternal Knowledge about Peri-conceptional Folic Acid Intake

In a study conducted in United Kingdom, about 25% of cases were not planned their pregnancy. Nearly 98% of the women had heard of folic acid, but only 42–52% knew the medical benefit of the folic acid. The main sources of information for women who were aware of folic acid were midwives and general practitioners. About 90% of women who attended their first antenatal visit were taking folic acid. However, only 40% of women knew that they should take it before pregnancy, and only between 36 and 46% knew the dietary sources of folic acid, although about 84% know the foods that should be avoided during pregnancy (31).

A finding of a study in Uganda shows that limited education and understanding of women and health workers about the importance of early folic acid intake, late presentation of women at ANC, poor supply chain and dilapidated health services caused by war and poverty (27).

A finding of a study in Qatar revealed that 53.7% were heard about foliate. The most common information sources of folate were physicians (63.4%), and newspapers/magazine/books (21.7%). From those who heard of folate, only 14% knew that it can prevent birth defects, and 40.6% of the subjects who heard folate were aware that green leafy vegetables were fortified with folic acid (32).

Similar study conducted in Addis Ababa revealed that more than two-third of the study participants, 69.0% had good knowledge on peri-conception folic acid supplementation and its health benefits. Abou 84.5% had heard about the need for peri-conception care and the main source of information were health professionals, 41.5% while the least information source was school/college/university 5.0%. About 17.7% had chronic illness follow up of which nearly half were HIV/AIDS patients. Three fourth of the respondents (73.5%) had heard about FA and able to physically identify the tablet. Among women who have heard about FA and its

benefits, 84.9% knew that FA should be taken at the time they become pregnant while 25.3%% understand the need to take it right after stopping contraceptive when pregnancy is planned (33).

2.3 Factors Associated with Periconception folic acid intake among pregnant women

2.3.1-Socioeconomic factors

In a study conducted in Iran the educational and employment status of the pregnant women were significantly associated with the peri-conceptional folic acid intake (18). Similarly, in a study conducted in China peri-conceptional folic acid intake was significantly associated with educational level, household income, registered residence and age gestational age (19). Lack of educational qualification was significantly associated with not taking periconeptional folic acid in a study conducted in Germany (20).

In a study conducted in Ireland; increasing in maternal age was significantly associated with the intake of the recommended folic acid while lower socioeconomic status/unemployment was associated with low intake of peri-conceptional folic acid (21). Findings from a study conducted in Italy revealed that higher maternal age, higher education and marriage/cohabitation were significantly associated with the intake of folic acid (23). A study in Nigeria revealed that educational and working stats were significantly associated with peri-conceptional folic acid intake (26).

2.3.2 Maternal and Knowledge related factors

Findings from Iran (18), China (19), Germany (20), Ireland (21), Italy (23), Canada (24) and Maryland (25) revealed that pregnancy planning was significantly associated with folic acid intake during pre-pregnancy and early pregnancy. Women had planned pregnancy were likely to take the folic acid.

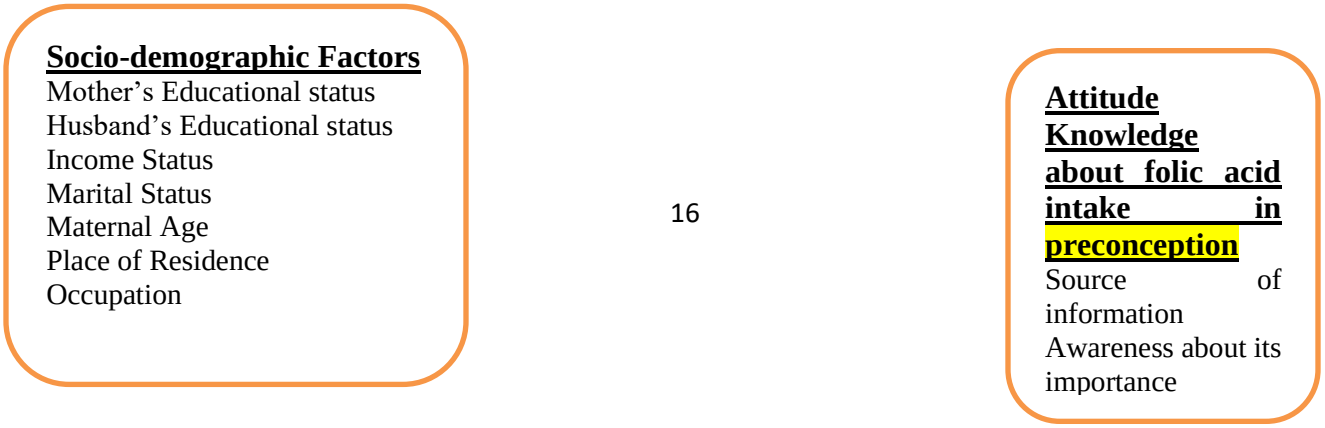
Moreover, gestational age was significantly associated with folic acid intake in study conducted in China (19). In Germany, late diagnosis of pregnancy, increased parity, and not having an awareness of importance of folic acid for optimal pregnancy outcomes were associated with not taking peri-conceptional folic acid supplements (20).

In Ireland, nulli-parity early booking (12 weeks), increasing maternal age (30–34 years), private health care and fertility treatment were among the factors associated with taking the recommended amount of folic acid, while, unplanned pregnancy and smokers were the factors associated with taking less than recommended or no folic acid (21). Furthermore, a finding from Italy showed that lower parity, infertility treatments, and chronic disease were significantly associated with folic acid intake (23).

Findings from a study conducted in Addis Ababa showed that age, educational status and Information on prenatal care (PNC) had significant association with folic acid supplementation knowledge (30).

2.4-Conceptual Frame-work

The conceptual framework is which is helpful to show the relationship among the different variables is developed by reviewing different literatures. (11,12,14,16,18) (Figure 1)



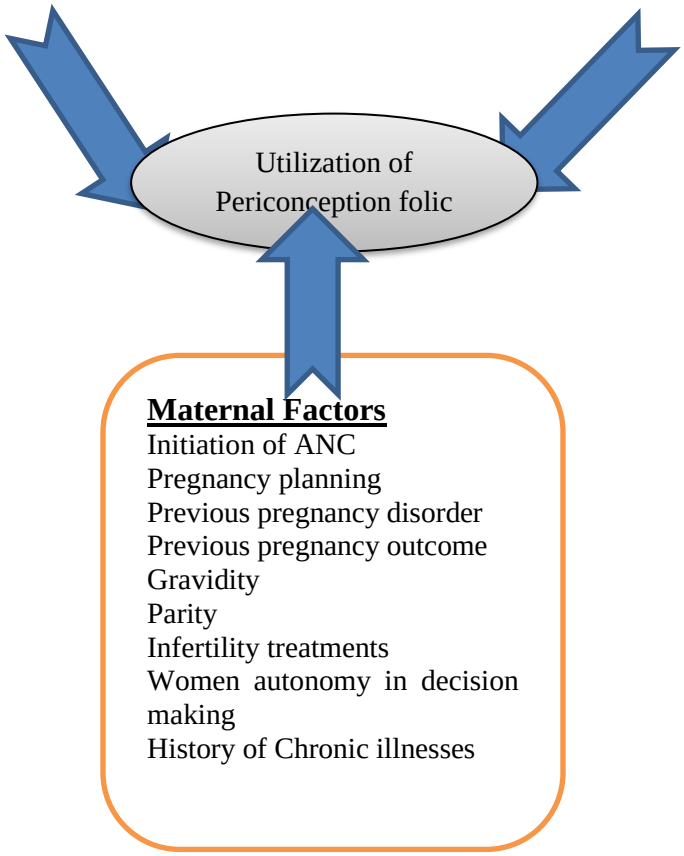


Figure 1-Conceptual frame work on peri-conception folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

CHAPTER -3- OBJECTIVES

3.1- General objective

The objective of this study is to assess the peri-conception folic acid intake among pregnant women attending antenatal care follow up in Mekelle city Tigray Region, Northern Ethiopia/2024

3.2- Specific Objectives

1. Assess the utilization of folic acid during peri-conception among pregnancy mothers
2. Identify the factors associated with the utilization of peri-conception folic acid intake
3.

CHAPTER-4-METHODS AND MATERIALS

4.1- Study area and period

The study was carried out in Mekelle, the capital city of the Tigray Regional State, at public health facilities. The city is situated around 780 kilometers, at 2254 meters above sea level, north of Addis Ababa, the capital of Ethiopia. Mekelle, which is split up into seven sub cities, is regarded as a special zone for administrative purposes. The political, cultural, and economic center of Tigray is Mekelle. According to the official statistical agency, Mekelle has a total population of 480,198 by 2023, with 243,635 men and 236,536 women. There are

ten health centers, two general hospitals, one primary hospital, and one referral hospital in the city. It is anticipated that there would be roughly 16326 pregnancies in Mekelle each year (34). The study was conducted from October/2024 to January/2025

4.2 Study design

Mixed method study with cross-sectional design for the quantitative part was conducted to answer the objective of the study. Exploratory sequential approach was used to collect the data. First, the qualitative data was collected which had a 25% weight while; the quantitative data was collected following it by considering a 75% weight of the study.

4.3 Population

4.3.1 Source population

The source populations were all pregnant women attending their antenatal care follow up in public health facilities of Mekelle City.

4.3.2 Study population

Quantitative data-the study population were selected pregnant women attending their antenatal care follow up in the selected public health facilities of Mekelle City.

Qualitative data; the study populations for the qualitative data were purposively selected pregnant women found on the ANC follow up and Health Care professionals working on ANC.

4.4 Eligibility Criteria

4.4.1: Inclusion Criteria

Qualitative data- Selected pregnant women attending their antenatal care follow up were included.

Quantitative Data-For the quantitative data selected pregnant women attending their antenatal care follow up were included.

4.4.2 Exclusion criteria:

Pregnant women who critically ill during the study was excluded.

4.5: Sample size calculation and sampling procedure

4.5.1: Sample size determination

Sample size for the qualitative data

The sample size for the qualitative data was decided by information saturation. Tentatively, two focus group discussions (FGDs) (composed of 8-10 pregnant women) and 4 health professionals key informant interview (KII) were involved in the qualitative research.

Sample size for the quantitative Data

To determine the sample size for the first objective, a single proportion sample size formula was used by considering the following assumptions; 95% confidence level 5% marginal error.

$$n=\frac{z^2p(1-p)}{d^2}=384$$

Where;

P=48.4% from a study conducted in Ethiopia (30)

n = required sample size for this cross-sectional survey

z = Percentiles of the standard normal distribution corresponding to 95% confidence level which equals to 1.96

Sample size for the first objective (n) =384

Table 1-Sample size calculation for the second objective on the utilization of peri-conception folic acid

Variables	**Proportion**	**Sample size**
History of unsuccessful pregnancy	Where; AOR=4.31, Power=80%, Ratio (Unexposed: exposed) =1:1, Outcome in unexposed group=1.2%, risk ratio= 4.17, Outcome in exposed group=5.0%	**654**
History of baby with a birth defect	Where; AOR=9.6, Power=80%, Ratio (Unexposed: exposed) =1:1, Outcome in unexposed group=1.7%, risk ratio= 8.4, Outcome in exposed group=14%	189

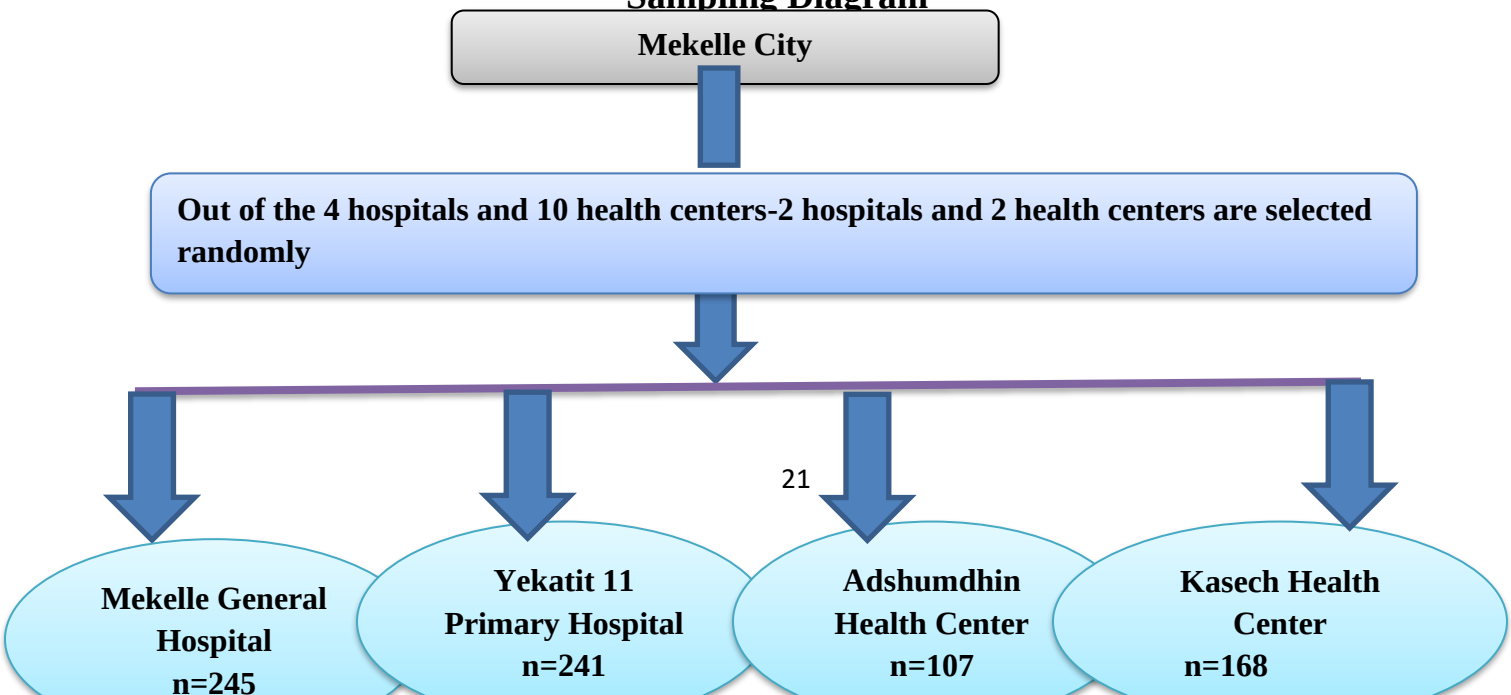
The sample size for the second objective is higher than the first objective. Therefore, the final sample size was 654 pregnant women attending ANC in Mekelle City.

4.5.2: **Sampling Procedure**

Qualitative Data- the FGD and KII members were selected purposively. Individual FGDs were composed of 8-10 pregnant women attending ANC.

Quantitative Data-First of all, Mekelle city is selected purposely. Then, a simple random sampling technique was used to approach the selection of the health facilities and finally systematic sampling was used to select the participants. Mekelle General Hospital, Yekatit 11 primary hospital, Adishumduhin Health centre and Kasech Health Centre were selected randomly. The total sample size was allocated proportionally to the size of the average pregnant women attending at each health facilities within the past six months.

Sampling Diagram



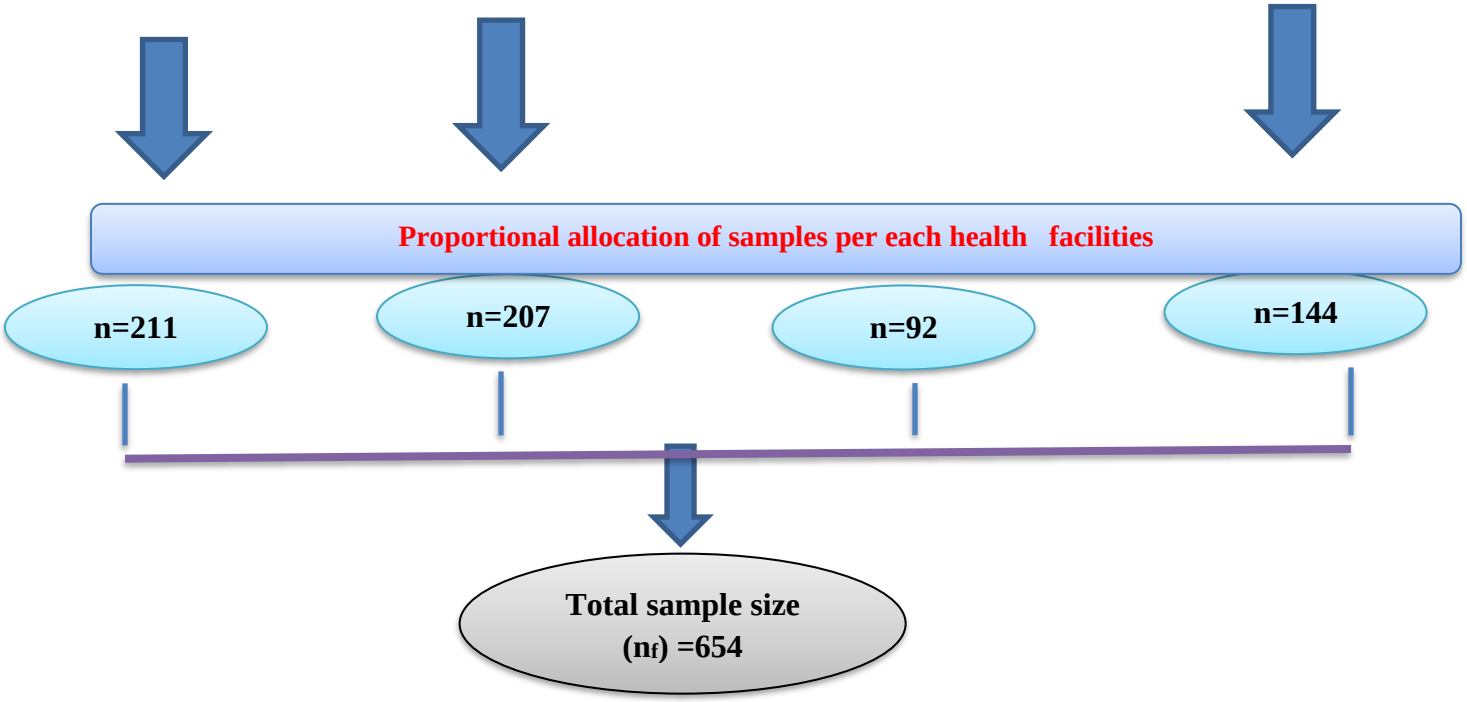


Figure 2-Schematic representation of sampling procedure on peri-conceptional folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

4.6: Data collection tools and techniques

Qualitative Data- The purpose of the qualitative data was to explore the feelings and opinions of the participants about peri-conception folic acid intake. FGDs and KIIs were conducted by a two trained data collectors and semi-structured interview guide was used to collect the data. The interview was tape recorded and field notes were taken. The tools for the qualitative data was composed of issues related to peri-conception folic acid intake status of the setting, knowledge of mothers about peri-conception folic acid intake, source of information, maternal and health professional related barriers to peri-conception folic acid intake.

For the KII, four midwife focal persons were selected purposely, then the interview was conducted separately, while two homogenous FGD of 8-10 members were assigned together and discuss about peri-conception folic acid use. One trained BSc nurse assisted in recording of the discussion and took important points to their notebook.

Quantitative Data- A primary data was collected by interviewer administered structured questionnaires prepared by reviewing different literatures. This study incorporated mainly issues related to socio-demographic data, health service factors, knowledge about peri-conception folic acid intake, maternal factors and preconception folic acid intake. Related questions or items were checked for validity and reliability using alpha coefficient. Data was collected by 4 BSc nurses and two senior nurses were supervising the data collection process. The survey was conducted from October to January/2024.

4.7: Study Variables

4.7.1: Dependent variable

Peri-conceptional folic acid intake (Yes, No)

4.7.2: Independent variable

Socioeconomic and demographic variables -Age of mother, age and sex of child, religion, monthly income, occupation, mother and father educational status.

Health Service variables -Access to nearest health facility, distance to nearest health facility,

Maternal and reproductive variables –number of children, pregnancy planning, previous pregnancy disorder, gravidity, parity, infertility treatments, women autonomy in decision making

Knowledge -Awareness about preconception folic acid intake, sources of information for peri-conception folic acid intake and knowledge about peri-conception folic acid intake.

4.8: Operational Definitions

- Peri-conception folic acid-is the vitamin that should be taken four weeks of before getting pregnant and first trimester of pregnancy (2)
- Utilization of folic acid-it is the intake/consumption of folic acid during periconception period
- Good knowledge: A pregnant woman was considered as having good knowledge if she answered above the mean for the given knowledge related questions (33).
- Poor knowledge: A pregnant woman was considered as having poor knowledge if she answered below the mean score for the given knowledge related questions (33).

4.9: Data quality Assurance

Qualitative Data- The semi structured questionnaires were first prepared in English language, and then it was translated to Tigrigna language and back to English to check the effectiveness of the questionnaires. Two days training was also given to the interviewers.

Quantitative Data-To ensure data quality, questionnaire was prepared in English language and it was translated to the Tigrignaand again to English to ensure consistency by experts. The Questionnaire was pre-tested in 5% of the sample size in Semien Health Center, a health facility which serves similar socio-demographic status and which would not be included in the main study. After the questionnaire was pretested, correction of questionnaires was conducted as needed. Collected data was edited and cleaned on a daily basis. Supervisors (2 senior Nurses) were following for the correct data collection. The principal investigator was take corrective measures for missing values, irregularities, and inconsistencies timely; to ensure data quality at each data collection points. Two days training ware provided for the data collectors and supervisors.

4.10: Data analysis procedure

Qualitative Data- Thematic analysis was employed. The main ideas of the discussion was extracted from audio records and written documents. First, the recorded audio was transcribed in to Tigrigna language and then it was translated again in to English by language experts. Main ideas were organized and thematic areas were developed. The result of the qualitative data was presented and discussed by triangulating with the quantitative data.

Quantitative Data-The data were entered to Epi-data 3.1 and analyzed using SPSS version 22. It was summarized by using tables and figures. Binary logistic regression analysis was done and the strength of statistical association was measured by adjusted odds ratios at 95% confidence interval. Variance inflation factors (VIF) was examined to test for potential multi-collinearity among independent variables. Variables with $P<0.2$ in the bivariate analysis were entered in to multivariable analysis and the statistical significance was declared at $P<0.05$.

4.11: Ethical Considerations

The study was conducted after getting ethical clearance from Mekelle University, College of Health sciences, Ethical Review Committee. Support letter was obtained from Mekelle University to Tigray Regional State Health Bureau and from Tigray Regional Health Bureau to the respective health facilities. Before interviewing participants, oral consent was obtained. Each study subject/participant were adequately informed and understood about the purpose of the study and the importance of their participation to confirm their willingness for participation. Furthermore, participants were aware that they had a full right to refuse or discontinue participating at any point of the interview. Additionally, participants were informed that the data would not be given to anyone and as it is used for the research purpose only to keep its confidentiality.

4.12: Dissemination of the Result

The finding of this study will be submitted to Mekelle University College of Health Sciences, School of Nursing, as a partial fulfillment of Master of Maternity and Reproductive Health Nursing. Finally, the finding will be disseminated to the Tigray Regional Health Bureau, Mekelle Zone Health office and to the District Health Office. It will be also presented in seminars and workshops. Efforts will be made to publish the finding in international peer reviewed journal.

CHAPTER FIVE-RESULT

5.1- Results of Qualitative Data

In this study, 6 health care professionals working in ANC were participated in the key informant interview, and 3 focus group discussions among pregnant mothers attending ANC were conducted. The KII and FGD were transcribed, coded, categorized and presented thematically. The thematic analysis process which was applied to the transcript, produced key concepts that were apparent in the data. These themes are noticed as essential in determining the understanding of all the participants.

The KII themes have been labeled as; Community Perception about peri-conception folic acid intake", "Challenges in using peri-conception folic acid", "Status of peri-conception folic acid intake","FA supplementation Status of the Setting", "Maternal and Health Professionals' Behavior and Barriers for peri-conception folic acid intake". In addition to that, the FGD themes were labeled as; "Community Perception about peri-conception folic acid intake", "Challenges in using peri-conception folic acid", "Status of peri-conception folic acid intake" and "Improving Status of peri-conception folic acid intake".

Peri-conception folic acid intake: Status of the Setting

This theme was defined as the peri-conception folic acid intake service in each settings or public hospitals and health centers. When they asked about the peri-conception folic acid intake service in their setting, all participants expressed that the general provision of iron composed folic acid at ANC was good, while the peri-conception folic acid intake is low so far. One of the participants commented her experience of peri-conception folic acid intake service as follows;

"I stayed in this health facility for about 2 years and the general provision of iron composed folic acid at ANC *service is good so far, however, the FA supplementation service was not good for* peri-conception folic acid intake. *It might be because of most mothers are not aware about the importance of FA intake during peri-conception*" [29 years old mother, Orthodox].

Maternal and Health Professionals' Behavior and Barriers for peri-conception folic acid intake

Participants supported that most mothers do not have knowledge about peri-conception folic acid intake, even though health professionals provided iron-containing FA tablets at the beginning of ANC follow up. Moreover the interviewees declared that mothers have many challenges that hinder from taking peri-conception folic acid; may related to epigastric pain, lack of knowledge, composition of FA with iron, unknown conception date, lack of trained health care providers, delayed ANC starting and low attention to pre-conception counseling. This was verbalized by one of the health care professionals as follows;

"Most of the time mothers were faced with challenges like; the presence of combined folic acid with iron, unintended pregnancy, lack of folic acid supply, low attention to pre-conception counseling and mothers and health providers do not have adequate knowledge about the peri-conception folic acid intake. These reasons were obstacles for not taking peri-conception folic acid intake" [27years old, female, BSc nurse].

"… In our health facility 400mg FA containing iron have been provided to all pregnant mother at their first visit of ANC however 5mg FA is not available for longer period of time in our setup. Therefore, I have prescribed 5mg FA outside or private Pharmacy for high risk or mother who had any history of bad pregnancy outcome…" [30 years old, Male Medical Doctor].

This was also stated by one of the FGD participants as follows; *"…mothers do not have adequate knowledge about the importance of peri-conception folic acid, they start ANC lately and have low attention pre conception counseling…"* [40 years old, Orthodox, Pregnant Woman].

The health care professionals have never heard any rumors or doubts about the peri-conception folic acid intake however elderly mothers have misunderstanding on the importance of Iron containing FA. *"...They*

perceived that FA can increase the weight of the infant beyond the expected and mothers may face a difficulty during labor …" [42 years old, Midwife nurse]

Knowledge about Peri-conception Folic Acid Intake

This theme is about the participant's awareness about FA and their sources of information. The majority of the participants were not having any information about peri-conception folic acid intake. One of the FGD participants stated that *"…In my opinion, mothers might not have knowledge about peri-conception folic acid intake which might be due to the trend of iron containing folic acid supplementation during ANC. No one was informed the mothers about taking peri-conception folic acid …"* [26 years old, female, orthodox].

Another participants of FGD stated that*"…In my opinion, mothers might not have knowledge about* peri-conception folic acid intake, *I am nine month's pregnant and I heard the importance of folic acid supplementation before a week from TV for the first time. …"* [33 years old, orthodox follower].

Community perception about peri-conception folic acid intake

In this theme the participants assured that the community's perception about iron contains FA supplementation in early pregnancy is positive. This was supported by their statements as follows; *"…Our community's perception on peri-conception FA is good because many pregnant mothers were saved from death and it is assumed like additional food …"* [37 years old, mother, orthodox follower].

One of the participants in the KII verbalized that *"majority of the community perceptions are good, however elder mothers have misunderstanding like iron contains FA supplementation during pregnancy makes bigger baby. Sadly, even today one mother gave birth baby with congenital animals 'of Cleft limps …*"[42 years old, midwifery nurse].

Coverage of peri-conception folic acid intake and the way forward

The participants reflected their understanding on the coverage of peri-conception folic acid intake in their setting. Majority of them reported that the coverage of peri-conception folic acid intake was "low". Moreover, there were many mothers who did not know about presence of peri-conception folic acid supplementation. This was articulated by one of the FGD members as follows; *"I do not think this* peri-conception folic acid supplementation *is available in public health facilities. No one supplemented folic acid before pregnancy, while they may take FA in the early pregnancy which contains Iron when mothers started ANC early* after conception *so far as to my knowledge."*[26 years old mother, Orthodox].

One of the participants in the KII supported that, majority of mothers started ANC when her abdomen is extended hence the coverage of pre-conception FA intake among pregnant women is very low as compared to taking FA during the late pregnancy…." [27 years old, BSc nurse].

The interviewees strongly recommended that the peri-conception FA intake coverage should be improved by; supplying adequate FA preparation, health education to mothers and community leaders about peri-conception FA supplementation, capacity building for maternal health care provider, and changing the behavior of the community. One of the participants in the KII recommended that *". To improve the coverage of* peri-conception folic acid intake *measures should be taken both in the facility and in the community. The following interventions should be done; train health professionals, supplying of adequate* folic acid *and awareness creation to the community about* peri-conception FA supplementation …*"* [35 years old, MCH focal person, orthodox follower].

5.2 Result of Quantitative study

5.2.1- Socio-demographic characteristics of participants

The sample size for this study was 654 mothers and the response rate was 100%. The mean age of the mothers was 29.3 (±6.3 SD) years. Ninety-one percent of the pregnant mothers were from host community and the rest participants were from internally displaced people living in the city. About 85% (555) of the pregnant women were married. Majority of the total study subjects; 609 (93.1%) were followers of orthodox Christianity. Majority of the study participants, 292(44.6%) and 159 (24.3%) were household wives and merchants respectively. Among the husbands of the participants, 294 (45%) were merchants and 238 (36.4%) were private worker. Regarding the educational status 603 (92.3%) women and 530 (96%) of their husbands were attended formal education. The average numbers of children per participants were 1.6 (SD ±:1.8). Moreover, the average monthly expenditure of the participants was 12,078.00 ETB. In addition , the average household family size per participants was 3.68 ((±1.76 SD) (Table 2).

Table 2-Socio-demographic characteristics of pregnant women participating on peri-conceptional folic acid intake in Public Health facilities of Mekelle City, Tigray/2025

Variable	Category	Frequency (%)
Mothers age (n=654)	15-19	22 (3.4)
	20-24	132 (20.2)
	25-29	212 (32.4)
	30-34	138(21)
	35-39	98(21)
	and above 40	98(15)
Educational Status of Mothers (n=654)	No formal education	52(8)
	Primary	154(23.5)
	Secondary	282(43.1)
	Above secondary	167(25.5)

	Single	61(9.3))
Marital Status of Mothers (n=654)	Married	555(84.9)
	Widowed/Divorced	38(5.8)
	House wife	292(44.6)
	Merchant	159(24.3)
Occupational Status of Mothers (n=654)	Government employed	93(14.2)
	Non-government employed	96(14.7)
	Student	14(2.2)
	No formal education	24(4.0)
	Primary	133(20.3)
Educational Status of husband (n=654)	Secondary	260(39.8)
	Above secondary	235(35.9)
	Farmer	5(.8)
	Merchant	294(45)
Occupational Status of husband (n=654)	Government employed	114(17.4)
	Non-government employed	238(36.4)
	Student	3(.5)
	1-2	208(31.8)
Number of children	3-4	256(39.1)
	5 and above	190(29.1)

5.2.2 Health Service factors

The study participants were asked about the number of ANC visit of their current pregnancy and 100% of them visited for the ANC. About 28 % of the participants had four ANC visit for their current pregnancy. Majority of the participants travel blow 30 minute to reach public health facility by foot. Out of the study subjects, 428 (66.4%) had experienced birth before the current pregnancy and 27(6.3%) of them had given birth at home (Table 3).

Table 3- Maternal health service on peri-conceptional folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

Variable	Category	Frequency (%)
	One	177(27.1)
Number of ANC visit **(n=654)**	Two	170(26)
	Three	122(18.7)
	Four and Above	185(28.3)
	Home	27(6.3)
Place of delivery **(n=428)**	Health facility	401(93.7)
	Blow 30 minute	371(56.7)
Distance to accesses HF(n=654)	30-60 minute	243(37.2)
	60-180 minute	40(6.1)

5.2.3 Maternal and reproductive health factors

Above half 355(54.9 %) of the respondents were primi-para. Regarding for the most recent pregnancy gestational age, 92(14.1%) of them were in the first trimester. Most of the participants 424(64.7%) had used family planning before the index pregnancy. The most recent pregnancy was unintended among 87 (13.3%) of the study participants (Table 4).

Table 4-Maternal health service on Peri-conceptional folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

Variable(n=654)	Category	Frequency (%)
Number of pregnancy	Primi-gravida	211(32.3)
	Multi-gravida	443(67.7)
Number of delivery	Primi-para	355(54.3)
	Multi-para	299(45.7)
Gestational age of index pregnancy	0-3 months	92(14.1)
	4-6 months	284(43.4)
	7-9 months	278(42.5)
Family planning status before index pregnancy	Yes	424 (64.8)
	No	230(35.2)
Number of planned pregnancy	yes	567 (86.7)
	No	87(13.3)
History of bad pregnancy	yes	111 (17)
	No	543(83)

Furthermore, 111(17%) participants had experienced a bad pregnancy outcome before the most recent pregnancy and 78(70.3) of the bad pregnancy outcome was miscarriage (Figure 3).

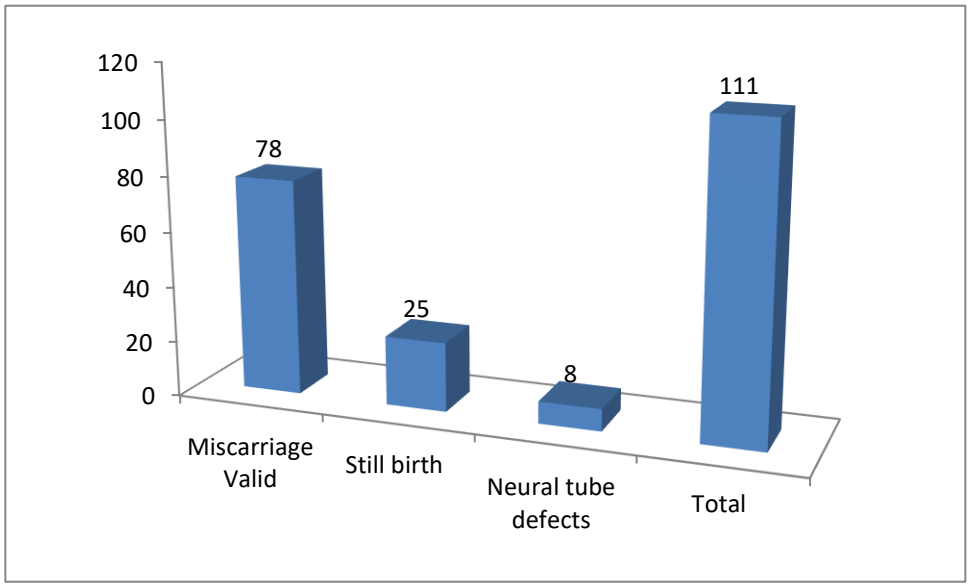


Figure 3- History of bad pregnancy out come on peri-conceptional folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

5.2.4- Knowledge about folic acid intake

Five hundred ninety-nine (91.6%) participants had ever heard about folic acid intake and 546 (91.2%) of them were getting the information from health professionals. Majority of the participants, 441 (67.4%) were not knowledgeable about peri-conception FA intake (Table 5).

Table 5-Knowledge of participants on peri-conception folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

Variable	Category	Frequency (%)
Ever heard FA (**n=654)**	Yes	599(91,6)
	No	55(8.4)
What is FA(**n=599)**	Mineral	84(14)
	Vitamin	301(50.3)
	I do not know	214(35.7)
Benefic of FA (**n=599)**	Health pregnancy	203(33.9)
	Strong baby	109(18.2)
	Prevent neural tube defect	51(8.5)
	Prevent anemia	214(26.2)
	I do not have idea	79(13.2)
Do you know recommended FA(**n=599)**	Yes	580(96.8)
	No	19(3.2)
Daily recommended dose of FA(**n=580)**	One tablet	570(98.2)
	Two tablet	10(1.7)
FA important before pregnancy(**n=599)**	Yes	97(16.2)
	No	502(83.8)
FA important early three months of pregnancy(**n=599)**	Yes	263(43.9)
	No	336(56.1)
Ideal time FA intake(**n=599)**	Before missed a menstruation	73(12.2)
	First months of pregnancy	100(16.7)
	At ANC visits	306(51.1)
	No idea	120(20)
Availability FA locally food(**n=599)**	Yes	391(65.3)
	No	208(34.7)
Mothers' level of knowledge about peri-conception FA intake(**n=599)**	Knowledgeable	213(32.6)
	Non knowledgeable	441(67.4)

5.2.5 Peri-conception Folic acid utilization

Among the study participants, 482(80.5%) had taken folic acid in their most recent pregnancy. Only 117(17.9%) of study subjects never took folic acid supplementation throughout the pregnancy. More over only 54(8.3%) and 66(10%) of respondents started on folic acid supplementation in the preconception and early period of the pregnancy respectively (Table 6)

Table 6-utilization folic acid supplementation on peri-conception folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

Variable (n=599)	Category	Frequency (%)
Peri-conception FA supplementation	Yes	120(18.3)
	No	534(81.7)
Index pregnancy FA supplementation	Yes	482(80.5)
	No	117(19.5)
Time started FA supplementation	Before missed a menstruation	54(8.3)
	First months of pregnancy	66(10)
	At ANC visits	417(63.8)
	Never	117(17.9)

5.2.6- Reasons for not taking preconception FA supplementation

The main reasons for not taking folic acid supplementation of pregnant mothers on peri-conception were; lack of awareness about the necessity of peri-conception folic acid supplementation 351 (64.4%), mother not getting sick 83 (15.2 %), not prescribed by doctor 71(13.%) , perception of getting enough FA from local food 28 (5.1%) and unintended pregnancy 12 (2.2%) (Figure 4)

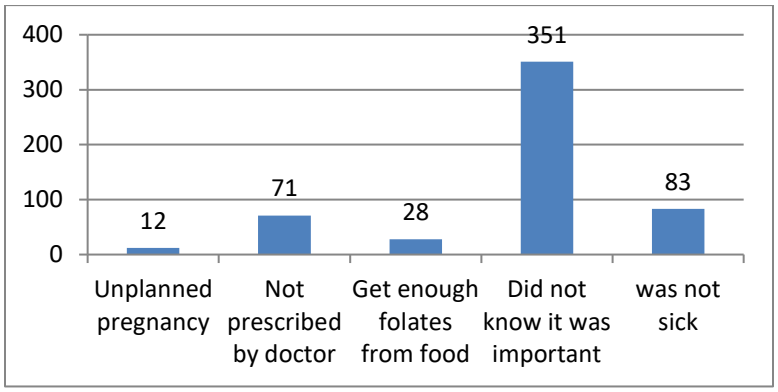


Figure 4-Reasons for not taking FA supplementation on peri-conceptional folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

5.3.1 Factor affecting peri-conception Folic acid intake

Assessment of factors affecting folic acid intake in peri-conception period was made by a logistic regression model with the assumption that it helps to predict the extent by which the peri-conception folic acid intake could be explained by the independent variables (Table 7).

In the bivariate analysis; place of delivery for the last baby, gestational age, women's occupational status, marital status, distance from health facility, number of children, parity, number of ANC visit and knowledge of mothers about peri-conception folic acid intake were associated with the outcome variable.

However, in the multivariable analysis only place of delivery for the last baby, marital status, gestational age of the pregnancy, number of ANC visits, women's occupation and knowledge of mothers about peri-conception folic acid intake were statistically associated with peri-conception folic acid intake.

Unmarried women were 74.3% less likely to be supplemented by peri-conception folic acid compared to married women **(**AOR =.257, 95% CI: .072-.917). Moreover, pregnant women who had four and above number of ANC visits were 5.09 more likely to be supplemented for peri-conception FA compared to pregnant women with less number of ANC visits (AOR= 5.01,95% CI: 1.780,14.567).

Government employed pregnant women were 2.17 more likely to be supplemented for peri-conception FA compared to house wife pregnant women (AOR= 2.169, 95% CI: 1.020- 4.614). However, pregnant women who had gave birth at health facility for their last baby were 80% less likely to supplemented Folic acid compared to mothers who had gave birth at home (AOR= 0.196, 95% CI: .074-0.517). Pregnant women who were in the third trimester were 87% more likely to be supplemented for peri-conception FA compared to pregnant women in the first trimester (AOR= .133, 95% CI: .037-.471).

In addition to that, pregnant women who are knowledgeable about peri-conception folic acid supplementation were 3.5 more likely to be supplemented for peri-conception FA compared to those who were not knowledgeable for peri-conception folic acid uptake (AOR= 3.249, 95% CI: 1.825-5.782) (Table 7)

Table 7- Factor affecting peri-conception Folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City, Tigray/2025

Variable	Category	Peri-conception FA intake		OR(95% CI)	
		No	Yes	COR	AOR
Marital Status of Mothers	Married	442	113	1	
	Unmarried	92	7	0.298(.134,.660)	**.257(.072,.917)***
Place of delivery	Home	15	11	1	
	Health facility	337	65	0.263(.116,.598)	0.196(.074,0.517)*
Distance to nearest health facility	> 30 minutes	364	69	1	
	≤30 minutes	170	52	1.583(1.055,2.373	1.372(.773,2.435)
Number of ANC visit	1-3	389	80	1	
	4 and above	145	40	1.341(.877,2.051)	**5.092(1.780,14.567)***
Gestational age of index pregnancy	First trimester	72	20	1	
	Second trimester	225	59	.944(.533,1.673)	.731(.313,1.709)
	Third trimester	237	41	.623(.343,1.431)	**.133(.037, .471)***
Occupational Status of Mothers	House wife	239	53	1	
	Merchant	141	18	.576(.324,1.022)	.631(.296,1.345)
	Government employed	65	28	1.139(.773,3.312)	**2.169(1.020,4.614)***
	non-Government employed	89	21	1.064(.607,1.864)	1.282(.544,3.024)
Number of children	0-2	286	74	1	
	3 and above	*248*	*46*	.717(.478,1.075)	*3.749(.510,27.587)*
Number of delivery	Pirmipara	281	74	1	
	Multipara	253	46	.690-(.460,1.035)	.229(.031,1.685)
Mothers' level of knowledge about peri-conception FA intake	Non-Knowledgeable	391	50	1	
	Knowledgeable	143	70	3.828(2.540,5.770)	**3.249(1.825,5.782)***

CHAPTER SIX-DISCUSSION

This study was aimed to assess the peri-conception folic acid intake and associated factors among pregnant women attending antenatal care follow up at public health facilities of Mekelle. The utilization of the peri-conception folic acid intake was 18.3 %. Place of delivery for the last baby, marital status, gestational age of the current pregnancy, number of ANC visits, occupation of the mother and knowledge of mothers about peri-conception folic acid intake were statistically associated with folic acid intake during the peri-conception period.

In this study the uptake of peri-conception folic acid was18.3%, which is lower compared to a similar studies conducted in; Iran (54.5%), China (68%), Germany (41.5%), Ireland(85%) and Canada (28%), (18,19,,20,21,24). There are different reasons for these variations. The fact of these differences might be due to many of the studies were conducted in the developed world where a better supply of folic acid and maternal health policies found. This finding was supported by the finding of the IDI and FGD. Both health professionals and mothers were reported that taking of peri-conception folic acid was low in the study area, which is consistent with the quantitative data finding.

In addition to that, the uptake of peri-conception FA was lower in this study compared to the findings of; Sudan (58.8%), Ghana (28.7%) and Ethiopia (48.4%) (28,29,30). The reasons might be due to the conflict in Tigray which affected the health work force and maternal health services drastically which in turn impacts the health seeking behavior pregnant women. In addition to that, interruption of medical supply and medications leads to low peri-conception utilization.

The most common reasons for not taking folic acid supplementation of pregnant women during peri-conception were; lack of awareness about the necessity of peri-conception folic acid supplementation, mother not getting sick, folic acid not prescribed by doctor, understanding of getting enough folic acid from local food and unintended pregnancy. This in turn supported by the FGD and IDI of the qualitative study and it is almost similar to the findings of a study conducted in Uganda and (27). The similarities may be due to the similar socio-demographic and economic status of the participants. This was also stated by one of the FGD participants as follows; *"…mother do not have adequate knowledge on the importance of* peri-conception folic acid" [40 years old, Orthodox follower mother].

Knowledge about the peri-conception folic acid was associated with taking peri-conception folic acid which is consistent to the findings of studies conducted in Germany and Ethiopia (20,30). This may be justified by the value of knowledge in improving the peri-conception folic acid intake during the NTD protective period.

This implies relevant bodies should invest on improving the knowledge of mothers about peri-conception folic acid supplementation for a better utilization (6).

In this study employed pregnant women were directly related to the peri-conception folic acid intake compared to the unemployed pregnant women. This was consistent with finding of a study conducted in Iran and Nigeria (18, 26). This may be justified by the fact that mothers who had job could get constant financial income and may get to decide on their health seeking behavior (5).

In this study gestational age was significantly negatively associated with the peri-conception folic acid intake among the study participants. As gestational age increases the folic acid intake decreases by 87%. This finding is similar with result of a study conducted in China(19). This may be justified by the evidence that folic acid is important for the neurological development in the first trimester. The impact of early initiation of ANC visits implied that higher utilization peri-conception folic acid intake can be achieved (19). Marital status of the mother was significantly associated with the peri-conception folic acid intake among the study participants. This finding is similar with result of a study conducted in Italy(23). This similarity may be justified by the fact that married women could get support from their husbands to get screening during the early pregnancy.

Even though no literatures revealed an association between the places of delivery for the last baby, in this study places of delivery for the last baby was significantly associated with the peri-conception folic acid intake among the study participants. This may be due to the fact that community health workers are able to trace and identify mothers who had delivery at home and may provide them more information about the importance of iron and folic acid supplementation during pregnancy.

In this study number of ANC visits was significantly associated with the peri-conception folic acid intake among the study participants. However, there were no literatures showing an association between the numbers of ANC visits.

CHAPTER SEVEN-CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The uptake of peri-conception folic acid in this study was low (18.3%). In the final model; place of delivery for the last baby, marital status, gestational age, number of ANC visits, occupational status of the pregnant women and level of knowledge about folic acid were significantly associated with peri-conception folic acid intake. The main reasons for not taking folic acid supplementation among the pregnant women during the peri-conception period were; lack of awareness about the necessity of peri-conception folic acid supplementation, pregnant women not getting sick, folic acid not prescribed by Doctor, believing they are getting enough folic acid from local food and unintended pregnancy.

7.2 Recommendations

Based on the finding of this study the following recommendations are forwarded to the respective bodies:

Tigray Regional Health Bureau

There should be an adequate and continuous provision of folic acid supply in all health facilities

Capacity building training for health care providers on preconception counseling and folic acid supplementation is crucial.

Health facilities

Health care providers should provide adequate health education to reproductive aged women about the importance of peri-conception folic acid supplementation.

Researchers

- A wider study should be conducted in all the other Districts in Tigray Region.
- Longitudinal study should be conducted to address the cause and effect.

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8: ANNEXES

Annex I: Information Sheet and Consent Form

Mekelle University, College of Health Sciences, School of Nursing, Department of Maternity and Reproductive Health Nursing

Periconception Folic Acid Intake among Pregnancy Women Attending Antenatal Care Follow Up in Mekelle City, Tigray Region, Northern Ethiopia-A Mixed Method Study/2024

Good morning/afternoon, my name is_____. I am here today to collect data on Preconception Folic Acid Intake among Pregnancy Women Attending Antenatal Care Follow Up. The study will be conducted by **Mrs. Rigbe Tewelebrhan Gebrekidan** from Mekelle University, college of Health Sciences, School Nursing, Department of Maternity and Reproductive Health Nursing. The purpose of this study is to assess **Periconception Folic Acid Intake among Pregnancy Women Attending Antenatal Care Follow Up in Mekelle City**. I request you to take part in this study and to respond genuinely. Your cooperation and willingness is greatly helpful in identifying problems related to the coverage **Periconception Folic Acid Intake**. The study will be conducted through interviews and you are being asked for a little of your time, about 20 minutes, to help us in this study. Your name will not be written in this form and will never be used in connection with any information you tell us. There is no possible risk associated with participating in this study except the time spent for responding to the questionnaire. All information given by you will be kept strictly confidential. Your participation is voluntarily and you are not obligated to answer any question you do not wish to answer. If you feel discomfort with the question, it is your right to drop it at any time you want. If you have questions regarding this study or would like to be informed of the results after its completion, please feel free to contact the principal investigator.

Address of the principal investigator: Rigbe Tewelebrhan Gebrekidan

Cell phone: +251 906100791 **E-mail:** rigbyeyibela@gmail.com

Consent Form

I have read the above information and understood the advantage, disadvantage and objective of study and I have also understood this study is voluntary. I consent to participate in the study.

Signature of participant_____

Date_____

Signature of researchers_____

Date_____

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Annex II: English version Questionnaires

Mekelle University, College of Health Sciences, School of Nursing, Department of Maternity and Reproductive Health Nursing

Questionnaire for assessing the periconception folic acid intake among pregnant women attending ANC in Public Health facilities of Mekelle City Tigray/2024

Questionnaire ID number: _____

Address: Kebelle: _____ Kushet_____

Date of interview: _____ Time started: _____ Time finished: _____

Interviewer Name: _____Signature _____ Date: _____ Supervisor's name: _____ Signature _____

Part I. Socio-demographic characteristics.

No.	Questions	Options/ responses	Skip to
1)	Mother's age	_____ years	
2)	What is your religion?	1. Orthodox 2. Catholicity 3. Muslim 4. Protestant	
3)	What is your Marital status?	1. Married 2. Single/never married 3. Divorced 4. Widowed	
4)	What is your family size?	_____	
5)	What is the monthly income of the household?	_____ Birr _or _____quintal/year	

6)	What is educational status of mother?	1. Illiterate 2. Read and write 3. Grade 1 to 8 4. Grade 9 to 12 5. College/ university	
7)	Educational status of husband	1) Illiterate 2) Read and write 3) Grade 1 to 8 4) Grade 9 to 12 5) College/ university	
8)	Occupation of mother	1. House wife 2. Merchant 3. Government employee 4. Non-government employed 5. Student 6. Other____	
9)	Husband's age	_____	
10)	Occupational status of husband	1. Farmer 2. Merchant 3.Government employee 4.Non-government employed 5.Student 6.Other____	
11)	Mother's residence	1. Urban 2. Rural	

Part II-Maternal and Child Health Service utilization related factors

No	**Questions**	**Options/ responses**	**Skip to**
12)	Gravida (number of pregnancies)	_____	
13)	Parity (Number of deliveries)	_____	
14)	Is this pregnancy planned?	1. Yes 2. No	
15)	have you been using Family planning before this pregnancy?	1. Yes 2. No	
16)	Gestational age	----------	
17)	How many times did you attend antenatal care?	1. One 2. Two 3. Three 4. More than three	
18)	What is the number of children siblings?	_____	
19)	Where did you deliver your last child?	1. Home 2. Health facility	
20)	How many hours does it take to reach to the health facility?	1. Less than 15 minutes 2. 15 to 30 minutes 3. 30 to 60 minutes 4. More than 60 minutes	
21)	Have you ever heard about folic acid?	1. Yes 2. No	If no Skip next Question
22)	What are your sources of information for folic acid?	1. Health professionals 2. Mass media 3. Family and friends 4. Other means----------	
23)	What do you think folic acid is?	1. Mineral 2. Vitamin 3. I do not know	

24)	What do you think about the importance of folic acid?	1. Healthy pregnancy 2. Strong baby 3. Prevent neural tube defects 4. I do not have any idea 5. Others, specify----------	
25)	Do you know the recommended dose of folic acid intake?	1. Yes 2. No	If no Skip next Question
26)	What is recommended daily intake of folic acid?	1. 1 tab per day 2. 2 tab per day 3. 3 tab per day Other	
27)	Do you know that folic acid is important in pre pregnancy?	1. Yes 2. No	
28)	Do you know that folic acid is important during first three months of pregnancy?	1. Yes 2. No	
29)	Does folic acid deficiency leads to abnormality in new born?	1. Yes 2. No 3. I do not know	
30)	Have you ever had bad pregnancy outcome?	1. Yes 2. No	
31)	What was the type of bad pregnancy outcome?	1. Miscarriage 2. Still birth 3. Neural tube defects	
32)	Did you take pre-conceptional folic acid for this pregnancy?	1. Yes 2. No	If no Skip next Question
33)	What are the reasons for not taking folic acid supplementation in preconception?	1. Unplanned pregnancy 2. Not prescribed by doctor 3. Get enough folates from food	

		4. Did not know it was important 5. not sick	
34)	Are you taking folic acid in this pregnancy?	1. Yes 2. No	
35)	When should be the ideal time for folic acid supplementation?	1. Before you miss a period 2. First month of pregnancy 3. Whenever you start antenatal follow up 4. No idea	
36)	When was the time that you start taking folic acid?	1. Before your last period 2. Once you miss a period 3. When you start antenatal 4. Never	
37)	Do you know about folate content of locally available food?	1. Yes 2. No	If no Skip next Question
38)	What are the common food sources of folic acid?	1. Green leafy vegetable 2. Oranges 3. Beans 4. Orange and beans 5. Beans, orange and green leafy veg 6. Others, specify……	

KII about peri-conception folic acid intake for Health Professionals working in ANC

Hello! I am _____ from Mekelle University, College of Health Sciences and this is _____ who is assisting me. Thank you so much for taking some time away from your job to talk with me today. As you

know, the purpose of this interview is to learn about your opinion and experience of preconception folic acid uptake so that it will be helpful to improve the program.

I am recording our talk, just as a way to take notes. Afterwards, the recording will be transcribed, and the tape will be deleted. No names will be used in the report. So please feel free to speak frankly. Do you have any questions about the process of this interview? Would you prefer to have us talk alone, or can _____ listen in and make some written notes?

1. Can you tell me your role in this health facility and you work experience
2. How long have you been working here? Tell me something about your health facility's folic acid uptake service.
3. Do you ever get questions from mother about folic acid uptake? If so, what do they ask and how do you respond?
4. Have you noticed any gaps in mother or parents' knowledge about periconception folic acid uptake?
5. Where do you think mothers go when looking for information related to folic acid in general? (If the participant does not mention them, you may ask about:

a. Internet; social media networks
b. Health care workers (who?)
c. Friends/family
d. Schools
e. Religious leaders.

6. Do you personally have any doubts or concerns about periconception folic acid uptake? If so, what are they?
7. Have you heard any stories or rumors about periconception folic acid uptake from your colleagues, friends and communities?
8. How did you describe the coverage of periconception folic acid uptake in this health facility?
9. Can you share your experience with the implementation of periconception folic acid in this health facility?
10. In your view, what could be obstacles to the implementation of periconception folic acid intake in this health facility (if any)?
11. What do you think can be done to strengthen the implementation of periconception folic acid intake in this health facility?

<u>Focus group Discussions about periconception folic acid intake for pregnant women attending ANC follow up</u>

Hello, everybody. My name is _____ and this is _____who is assisting me. Thank you for coming to this group discussion today. We work at Mekelle University, College of Health Sciences,

but our job today is to listen to you. We want to hear mothers' points of view, opinions and experiences about periconception folic acid intake so that it will help to improve intake. We are recording this discussion as a way to take notes for our research. When the discussion is over, we will transcribe the tape and then erase it. We won't use any of your names in the report. So, I would like to invite you to speak openly and honestly. There is no right or wrong answers. I hope you will share your opinions and ideas frankly.

1) Can you explain what you understand by periconception folic acid intake?
2) How do you describe the mothers' knowledge about peri-conception folic acid intake? Probe: source of information about peri-conception folic acid uptake?
3) How do the community perceive regarding the peri-conception folic acid intake? Probe; Why?
4) What challenges/factors will limit women from using folic acid?
5) Which factors will encourage women to utilize peri-conception folic acid
6) How did you describe the utilization of peri-conception folic acid intake among mothers? Characteristics of the care takers?
7) Do you think that most mothers from your area accept taking peri-conception folic acid? Are there those who do not? What are some of the reasons why they opt not to take preconception folic acid?
8) Are there days you went to a health facility and found when there was no folic acid? What did you do to get your child vaccinated?
9) What would you recommend for the future so as to give a better peri-conception folic acid intake?

This has been a very good discussion, very informative! Is there anything we haven't covered that you would like to add?

Annex III Tigrigna version information sheet, consent form and questionnaires

መቐለ ዩኒቨርስቲ

ኮለጅ ጥዕና ሳይንስ

ቤት ትምህርቲ ነርሲንግ

ክፍሊ ትምህርቲ ክንከን ኣዶታትን ስነ ተዋልዶ ጥዕናን ነርሲንግ

ኣብዚ መፅናዕቲ ንዝሳተፋ ኣዴታት ቅድሚ ቃለ-መሕትት ምጅማረን ዝወሃብ መግለፂ

ኣብ ከተማ መቐለ ኣብ ሸፋን ቅድሞ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን ዝምልከት ኣብ ቅድመ ወሊድ ክትትል ዝገብራ ነብሰፁር ኣዶታት ዝካየድ መፅናዕቲ

ከመይ ሓዲርኪ/ውዕልኪ ሽመይ_____ይበሃል:: ናብዚ ዝመፃእኹሉ ምኽንያት **ኣብ ሸፋን ቅድሞ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን ዝምልከት ኣብ ቅድመ ወሊድ ክትትል ዝገብራ ነብሰፁር ኣዶታት መፅናዕቲ** ንምክያድን ዘድሊ ሓበሬታ ንምውሳድን እዩ:: እዚ መፅናዕቲ እተካይድ ኣብ መቐለ ዩኒቨርስቲ ኮለጅ ጥዕና ሳይንስ **ቤት ትምህርቲ ነርሲንግ** ናይ ካልኣይ ዲግሪ ተመራቒት ተምሃሪት ርግበ ተወልደብርሃን እያ:: ናይዚ መፅናዕቲ ቀንዲ ዓላማ **ሸፋን ቅድሞ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** እንታይ ከም ዝመስል ፈሊኻ ንምፍላጥ እዩ:: ስለዚ ንስኻትክን ከዓ ኣብዚ መፅናዕቲ ብምስታፍ ንእትሕተታኡ ሕቶ ትኽክለኛ መልሲ ንክትህባ ብትሕትና ንሓትት:: ናትክን ምትሕብባርን ፍቓድን ምስ **ሸፋን ቅድሞ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ወሊድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ተተሓሒዞም ዘጋጥሙ ፀገማት ንምፍላይ ብጣዕሚ ጠቓሚ እዩ:: እዚ መፅናዕቲ ዝካየድ ብቃለ-መሕትት እንትከውን ዝወስዶ ግዜ ድማ ካብ 20-30 ደቒቓ ጥራሕ እዩ:: ናትክን ሽም ኣብዚ መፅናዕቲ ይኹን ንስኻትክን ኣብ እትነግራና ዝኾነ ዓይነት ሓበሬታ ፈፂሙ ኣይግለፅን እዩ:: ኣብዚ መፅናዕቲ ብምስታፍክን ኣብ ልዕሌኽን ዝበፅሕ ዝኾነ ዓይነት ሓደጋ የለን:: ንስኻትክን እትነግራና ሓበሬታ ኩሉ ምስጢሩ ዝተሓለወ እዩ::ተሳትፎኽን ብፍቓድክን እንትኾውን መልሲ ክትህባሉ ዘይደለኽን ሕቶ ንክትምልሳ ኣይትግደዳን ኢኽን:: እቲ ቃለ መሕትት እንተደኣ ዘይተሰማሚዕክን ኣብ ዝደለኽናኡ ጊዜ ናይ ምቁራፅ መሰልክን ዝተሓለወ እዩ:: ኣብዚ መፅናዕቲ ኮነ ኣብ ዙርያ እዚ መፅናዕቲ ክትፈልጣኡ እትደልያኡ ነገር እንተደሃልዩ ምስ እዚ መፅናዕቲ እተካይድ ዋና ኣካል ተራኺብክን ክትዘራረባ ትኽእላ ኢኽን።

ኣድራሻ ናይ ቀንዲ መፅናዕቲ መካየዲት; ሲስተር ርግበ ተወልደብርሃን

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ኢ-መይል-rigbyeyibela@gmail.com

ፍቓድ መረጋገፂ ቅጥዒ

እዚ ኣብ ላዕሊ ዝተፅሓፈ ሓበሬታ ኩሉ ኣንቢበዮ እየ።ጥቅሚ፣ጉድኣትን ዓላማን ናይዚ መፅናዕቲ ድማ ብደንቢ ተረዲአዮ እየ።ኣብዚ መፅናዕቲ እዚ ድማ ብፍቓደይ ከምዝሳተፍ ዘለኹ ብክታመይ የረጋግጽ።

ክታም ተሳታፈ_____

ዕለት_____

መፍለዪ ቁፅሪ ቃለ መሕትት: _____

ኣድራሻ: ጣብያ: _____ ቁሸት_____

ቃለ መሕትት ዝተኻየደሉ ዕለት: _____

ዝተጀመረሉ ሰዓት: _____ ዝተወደአሉ ሰዓት: _____

ሽም ቃለ መሕትት መካየዲ: _____ክታም_____

ሽም ተቐፃፃሪ: _____ ክታም _____

<u>ክፍሊ-1-ማሕበረ-ኢኮኖሚያዊ ዛዕባታት</u>

ታ.ቁ	**ሕቶታት**	**ኣማራፂታት**	**መብርሂ**
1)	ዕድመ ኣዶ	_____ ዓመት	
2)	ሃይማኖትኪ እንታይ እዩ?	1. ኦርቶዶክስ 2. ካቶሊክ 3. ሙስሊም 4. ፕሮቴስታንት 5. ካሊእ _____	
3)	ኩነታት ሓዳርኪ?	1. ዝተመርዐወት 2. ዘይተመርዐወት 3. ዝተፋተሐት 4. ሰብኣያ ዝሞታ 5. ተፈላልዮም ዝነብሩ	
4)	በዝሒ ኣባላት ስድራ?	_____	
5)	ናይ ገዛኹም ማእኸላይ ወርሓዊ ወፃኢኹም ክንደይ እዩ?	_____ብር	
6)	ናይ ኣዶ ደረጃ ትምህርቲ?	1. ዘይተምሃረት 2. ምንባብን ምፅሓፍን እትኽእል 3. ካብ 1ይ -8ይ ክፍሊ 4. ካብ 9ይ - 12 ክፍሊ 5. ኮለጅ/ዩኒቨርስቲ	
7)	ናይ ኣዶ ስራሕ?	1. ኣዶ ገዛ 2. ንግዲ 3. ሰራሕተኛ መንግስቲ 4. ሰራሕተኛ ዘይመንግስታዊ ትካል 5. ተምሃሪት 6. ካሊእ--------	

8)	በዓልቲ ሓዳር ወይ ከዓ ምስ ሰብኣይኪ ተፈላሊኹም እንተደኣ ትነብሩ ኮይንኹም፡ናይ ሰብኣይኪ ደረጃ ትምህርቲ ክንደይ እዩ?	1. ዘይተምሃረ 2. ምንባብን ምፅሓፍን ዝኽእል 3. ካብ 1ይ -8ይ ክፍሊ 4. ካብ 9ይ - 12 ክፍሊ 5. ኮለጅ/ዩኒቨርስቲ	
9)	ዕድመ ሰብኣኪ/በዓል ገዛኺ	_____	
10)	በዓልቲ ሓዳር ወይ ከዓ ምስ ሰብኣይኪ ተፈላሊኹም እንተደኣ ትነብሩ ኮይንኹም፡ ናይ ኣቦ ስራሕ?	1. ሓረስታይ 2. ነጋዳይ 3. ሰራሕተኛ መንግስቲ 4. ሰራሕተኛ ዘይመንግስታዊ ትካል 5. ተምሃራይ 1. 6. ካሊእ----------	
11)	ኩነታት መንበሪ ናይ ኣዶ	1. ነባሪት 2. ተመዛባሊት	

<u>ክፍሊ -2-ኣብ ኣዶታትን ህፃናትን ምስ ዘሎ ግልጋሎት ጥዕና ዝተተሓሓዙ ዛዕባታት</u>

ታ.ቁ	ሕቶታት	ኣማራፂታት	መብርሂ
12)	እዚ ጥንሲ እዚ መበል ክንደይ እዩ?	_____	
13)	ክንደይ ቆልዑ ብህይወት ወሊድኪ?	_____	
14)	እዚ ጥንሲ እዚ ብትልሚ ድዩ ተጠኒሱ?	1. እወ 2. ኣይፋሉን	
15)	ቅድሚ እዚ ጥንሲ እዚ መከላኸሊ ጥንሲ ትጥቀሚ ዶ ነይርኪ?	1. እወ 2. ኣይፋሉን	
16)	እዚ ጥንሲ ክንደይ ወርሒ ገይሩ?	-------	
17)	ነዚ ጥንሲ እዚ ክንደይ ጊዜ ቅድሞ ክትትል ገይርኺ?	1. ሓደ ጊዜ 2. ክልተ ጊዜ 3. ሰለስተ ጊዜ 4. ካብ ሰለስተ ጊዜ ንላዕሊ	
18)	ክንደይ ቐልዑ ኣለዉኺ?	_____	
19)	ናይ መወዳእታ ውላድኪ ኣበይ ተወሊዱ/ዳ?	1. ኣብ ገዛ	

		2. ኣብ ትካል ጥዕና	
20)	ናብ ጥዕና ትካል ነክትበፅሒ ክንደይ ደቒቓ/ሰዓት ይውሰደልኪ?	_____	
21)	ብዛዕባ ፎሊክ ኣሲድ ሰሚዕኺ ዶ ትፈልጢ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተደኣ ኮይኑ መልስኺ ቀፃሊ ሕቶ ዝለልዮ
22)	እቲ ሓበሬታ ካበይ ረኺብክዮ?	1. ካብ ሰብ ሞያ ጥዕና 2. ካብ መራኸቢ ሓፋሽ 3. ስድራ ቤትን ኣዕርኽትን 4. ካልኦት_____	
23)	ፎሊክ ኣሲድ እንታይ እዩ ኢልኪ ትሓስቢ?	1. ማዕድን 2. ቫይታሚን 3. ኣይፈልጦን	
24)	ናይ ፎሊክ ኣሲድ ጥቅሚ እንታይ እዩ?	1. ጥዕና ዘለዎ ጥንሲ ክህሉ ይገብር 2. ጠንካራ ህፃን ክህሉ ይገብር 3. ክፍተት ዓንዲ ሑቐ ከይጋጥም ይከላኸል 4. ኣይፈለጥኩን	
25)	እቲ ክውሰድ ዘለዎ መጠን ፎሊክ ኣሲድ ትፈልጥዮ ዶ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተደኣ ኮይኑ መልስኺ

			ቀፃሊ ሕቶ ዝለልዮ
26)	እቲ መዓልታዊ ዝውሰድ መጠን ፎሊክ ኣሲድ ክንደይ እዩ?	1. ሓደ ክኒና ኣብ መዓልቲ 2. ክልተ ክኒና ኣብ መዓልቲ 3. ሰለስተ ክኒና ኣብ መዓልቲ 4. ካሊእ _____	
27)	ፎሊክ ኣሲድ ኣብ ቅድሚ ጥንሲ ኣድላዪ ምኻኑ ትፈልጢ ዶ ?	1. እወ 2. ኣይፋሉን	
28)	ፎሊክ ኣሲድ ኣብ ናይ መጀመርታ 3 ወርሒ ጊዜ ጥንሲ ኣድላዪ ምኻኑ ትፈልጢ ዶ?	1. እወ 2. ኣይፋሉን	
29)	ሕፅረት ፎሊክ ኣሲድ ኣብቲ ዝውለድ ዕሸል ፀገም የብፅሕ ዶ?	1. እወ 2. ኣይፋሉን 3. ኣይፈለጥኩን	
30)	ፀገም ዘለዎ ጥንሲ ኣጋጢምኪ ዶ ይፈልጥ እዩ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተደኣ ኮይኑ መልስኺ ቀፃሊ ሕቶ ዝለልዮ
31)	እቲ ዘጋጠመ ፀገም እንታይ እዩ ነይሩ?	1. ምንፃል ጥንሲ 2. ሞይቱ ዝተወለደ 3. ክፍተት ዓንዲ ሑቐ 4. ካሊእ_____	
32)	ቅድሚ እዚ ጥንሲ ምጥናስኪ ፎሊክ ኣሲድ ወሲድኪ ዶ?	1. እወ 2. ኣይፋሉን	ኣይፋሉን እንተደኣ ኮይኑ

			መልስኺ ቀፃሊ ሕቶ ዝለልዮ
33)	ፎሊክ ኣሲድ ዘይወሰድክሉ ምኽንያት እንታይ እዩ?	1. ዘይተተለመ ጥንሲ 2. ብሓኪም ኣይተኣዘዘለይን 3. ካብ ምግቢ እኹል ፎሊክ ኣሲድ ስለዝረኸብኩ 4. ኣድላዪ ምኻኑ ኣይፈለጥኩን 5. ኣይሓመምኩን	
34)	ኣብዚ ጥንሲ እዚ ፎሊክ ኣሲድ ወሲድኪ ዶ?	1. እወ 2. ኣይፋሉን	
35)	ፎሊክ ኣሲድ ዘውሰደሉ ትኽክለኛ ጊዜ መዓዝ እዩ?	1. ቅድሚ ወርሓዊ ፅግያ ምጥፋኡ 2. ኣብ ናይ መጀመርታ ወርሒ ጊዜ ጥንሲ 3. ኣብ ቅድመ ወሊድ ክትትል ምስተጀመረ 4. ኣይፈለጥኩን	
36)	ፎሊክ ኣሲድ ምውሳድ መዓዝ ጀሚርኪ?	1. ቅድሚ ናይ መወዳእታ ወርሓዊ ፅግያት 2. ወርሓዊ ፅግያት ምስ ኣቋረፀኒ 3. ቅድመ ወሊድ ክትትል ምስጀመርኩ 4. ወሲደ ኣይፈልጥን	
37)	ፎሊክ ኣሲድ ካብ ዝተፈላለዩ ምግብታት ከምዝርከብ ትፈልጢ ዶ?	1. እወ 2. ኣይፋሉን	መልስኺ እወ እንተደኣ ኮይኑ
38)	ፍልፍል ፎሊክ ኣሲድ ዝኾኑ ምግብታት ኣየነዎት እዮም?(ካብ ሓደ ንላዕሊ ምምራፅ)	1. ቆፀልቲ ኣሕምልቲ 2. ኣራንሺ	

		3. ባለንጻ 4. ካልኦት	

<u>ንሰብ ሞያ ጥዕና ዝተዳለወ ቃለ መሕትት</u>

ሰላም! ሽመይ <u>----------</u> ይበሃል ካብ መቐለ ዩኒቨርስቲ ኮለጅ ጥዕና ሳይንስ እየ መፂአ።ጊዜኹምኽን ሰዊእኩም/ኽን ሎሚ ምሳይ ንምዝርራብ ስለዝፈቐድኩም/ክን ኣዝየ እየ ዘመስግን። ናይዚ ቃለ መሕትት ዓላማ ኣብ ዛዕባ **ሽፋን ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ዘለክን ሓሳባትን ተሞክሮን ንምውሳድ

እንትኸውን እዚ መፅናዕቲ ነዚ ናይ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድ** ፕሮግራም ንምምሕያሽ ጠቓሚ እዩ።

ምእንቲ እቶም ቀንዲ ሓሳባት ናይ ዝርርብና ክንሕዞም ድምፅኹም/ኽን ክቐድሑ እየ።ድሕሪ እዚ ቃለ መሕትት ምዝዛሙን እቲ ዝተቐድሐ ሓሳባት ናብ ፅሑፍ ምቕያሩን እቲ ዝተቐድሐ ቃለ መሕትት ክድምሰስ እዩ። ኣብ ውፅኢት እዚ መፅናዕቲ ናይ ተሳተፍቲ ሽም ኣይግለፅን እዩ፤ስለዚ በይዘኦም/ኣን ነፃ ኮይኖም/ነን ሓሳበን ይሃቡና/ባና።ኣብ ኣከያይዳ እዚ ቃለ መሕትት ብዝምልከት ሕቶ ኣለዎም/ወን ዶ? እዚ ቃለ መሕትት በይንና ዶ ክነካይዶ ወይስ ሓጋዚተይ ብምስታፍ ምእንቲ ሓደ ሓደ ሓሳባት ክትፅሕፈለይ?

1) ስለ ናይ ትካል ጥዕናኹም **ሽፋን ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ኣገልግሎት ዝምልከት እስኪ ሓሳባትካ/ኪ ኣካፍለኒ/ልኒ? ንኽንደይ ዝኣክል ጊዜ ኣብዚ ትካል ጥዕና ኣገልጊልካ/ኪ?
2) ኣብዚ ትካል ጥዕና ናይ ስራሕ ብፅሒትካ/ኪ እንታይ እዩ?
3) ኣዶታት ኣብ ዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ሕቶ ሓቲተናኻ/ኺ ዶ ይፈልጣ? እወ እንተደኣ ኮይኑ መልስኻ/ኺ፡ እንታይ ኢለን እየን ሓቲተናኻ/ኺ? ብኽመይ ከ መሊስካለን/መሊስክለን?
4) ኣብ ኣዶታት ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ዝምልከት ዘለወን ናይ ኣፍልጦ ሕፀረት/ክፍተት ዶ ተዓዚብካ/ኪ?
5) ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ዝምልከት ሓፈሻዊ ሓበሬታ እንተደኣ ደሊኻ/ኺ ካበይ ተረክብ/ኽቢ? (እቲ/ታ ተሳታፊ/ት እንተደኣ ዘይገሊፆሞ፤ብዛዕባ እዞም ዝስዕቡ ሕተት)

   ሀ) ኢንተርኔት/ማሕበራዊ ሚድያ

   ለ) በዓል ሞያ ጥዕና(መን)

   ሐ) ኣዕርኽተይ/ስድራቤተይ

   መ) ቤት ትምህርቲ

   ሠ) መራሕቲ ሃይማኖት
6) ንስኻ/ኺ ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ዝምልከት ዝኾነ ጥርጣረ ወይ ከዓ ዘገድስ ነገር ኣለካ/ኪ ዶ?
7) ካብ መሳርሕትኻ/ኺ፣ኣዕርኽትኻ/ኺን ሕብረተሰብን ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ዝምልከት ወግዒን ሕሹኽሹኽን ሰሚዕኻ/ኺ ዶ ትፈልጥ/ጢ?
8) ኣብ ትካል ጥዕናኹም ዘሎ ሽፋን **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድ** ብኽመይ ትገልፆ/ፅዮ?

9) ንኣዶታት ደቀን ንኸየኽትባ እንታይ ይኽልክለን ኢልካኪ ትሓስብ/ቢ?

10) ኣብዚ ትካል ጥዕናኹም እቶም ቀንዲ ዕንቅፋታት/ማሕለኻታት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን** እንታይ እንታይ እዮም? (Probe: ፖሊሲ፣ክልል፣ወረዳ…….,)

11) ኣዶታት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን** ብዝተመቻቸወ መልክዑ ንክወስዳ እንታይ የድሊ/ክግበር ኣለዎ ትብል/ሊ?

ብጣዕሚ ፅቡቕን ሓባሪን ቃለ መሕትት እዩ ነይሩ፤የቐንየለይ። ዘይዳህሰስናዮ፡ ክውሰኽ እተትደልዮ/ልይዮ ዛዕባ እንተሃልዩካ/ኪ?

<u>ንኣዶታት ዝተዳለወ ጉጅለኣዊ ምይይጥ ኣብ ዛዕባ</u> ሸፋን ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድ

ሰላም ክቡራትን ክቡራንን! ሽመይ <u>----------</u> ይበሃል ካብ መቐለ ዩኒቨርስቲ ኮለጅ ጥዕና ሳይንስ እየ መፂአ።ጊዜኹም/ኽን ሰዊእኹም/ኽን ሎሚ ምሳይ ንምዝርራብ ስለዝፈቐድኩም/ክን ኣዝየ እየ ዘመስግን። ናይ ሎሚ ስራሕና ንዓኻትክን ምድማፅ እዩ። ናይዚ ምይይጥ ዓላማ ኣብ ዛዕባ **ሸፋን ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድን ተዛመድቲ ዛዕባታትን** ኣዶታት ዘለወን ቅዋም፣ሓሳባትን ተሞክሮን ንምውሳድ እንትኸውን እዚ መፅናዕቲ ነዚ ናይ **ሸፋን ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ ፎሊክ ኣሲድ** ፕሮግራም ንምምሕያሽ ጠቓሚ እዩ።

ምእንቲ እቶም ቀንዲ ሓሳባት ናይ ምይይጥና ክንሕዞም ድምፅኽን ክንቐድሑ ኢና።ድሕሪ እዚ ምይይጥ ምዝዛሙን እቲ ዝተቐድሐ ሓሳባት ናብ ፅሑፍ ምቕያሩን እቲ ዝተቐድሐ ምይይጥ ክድምሰስ እዩ። ናይ ተሳተፍቲ ሽም ኣብ ውፅኢት እዚ መፅናዕቲ ኣይግለፅን እዩ።ስለዚ ኣብዚ መፅናዕቲ እዚ ብግልፅነትን ብተኣማንነትን ንኽትሳተፉ ብኽብሪ ንዕድመክን። ሓቂ ወይ ከዓ ጌጋ ዝበሃል መልሲ የለን እዩ። ስለዚ ሓሳባት ክን ነፃ ኮይኻኽን ከምተካፍላና ሙሉእ ተስፋ ኣለና።የቐንየልና።

1) ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ዘለኪ ኣረዳድኣ ክተብራህርህለይ ዶ ትኽእሊ?
2) ናይ ኣዶታት ኣፍልጦ ኣብ ዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ከመይ ትገልፃኡ? ኣዶታት ብዛዕባ **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ዝምልከት ሓበሬታ ካበይ ከምዝረኽባ ይግለፅ)
3) እቲ ሕብረተሰብ ን**ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ከመይ ይሪኦ ወይ ከዓ ኣተሓሳስባኡ እንታይ ይመስል? (ምኽንያት እዚ ኣተሓሳስባኡ እንታይ እዩ?
4) ኣዶታት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ከይወስዳ ዘዐንቅፍወን ፀገማት እንታይ እዮም?
5) ኣዶታት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ንክወስዳ ዘተባብዕወን ነገራት እንታይ እዮም?
6) ኣብ ኣዶታት ዘሎ ሽፋን **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ከመይ ትገልፃኡ?
7) መብዛሕቲአን ኣብ ከባቢኽን ዝነብራ ኣዶታት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ዝወሰዳ ዶ ይመስለክን? ዘይወስዳ ከ ኣለዋዶ? ንከይወስዳ ዝገበርወን ምኽንያታት እንታይ እዮም?
8) ናብ ትካል ጥዕና ከይድኽን ፎሊክ ኣሲድ ዝሰኣንክናሉ መዓልቲ ኣሎ ዶ?እንታይ ገይርኽን
9) ንቐፃሊ ዝሓሸ ኣገልግሎት **ቅድመ ጥንሲን ኣብ እዋን ጥንሲን ዝውሰድ** ፎሊክ ኣሲድ ንክህሉ እንታይ ክግበር ኣለዎ ትብላ?

- ብጣዕሚ ፅቡቕን ሓባሪን ምይይጥ እዩ ነይሩ፤የቐንየልና። ዘይዳህሰስናዮ፡ ክውሰኽ እተትደልያኡ ዛዕባ እንተሃልዩክን?