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

PREVALENCE AND ASSOCIATED FACTORS OF ANEMIA AMONG PREGNANT WOMEN ATTENIDING ANTENATAL CARE AT MIZAN TEPI TEACHING HOSPITAL, SOUTHERN ETHIOPIA, 2016.

BY DREJE SISAY (BSC)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, SCHOOL OF ALLIED HEALTH SCIENCES, DEPARTMENT OF NURSING AND MIDWIFERY FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR DEGREE OF MASTERS IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

MAY, 2016

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APPROVAL BY THE BOARD OF EXAMINATION

THIS THESIS BY DEREJE SISAY (BSC) IS RECOGNIZED IN ITS PRESENT FORM BY BOARD OF EXAMINERS AS GRATIFYING THESIS REQUIREMENT FOR THE DEGREE OF MASTERSIN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

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Declaration

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or another university and that all sources of materials used for this thesis have been fully acknowledged.

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List of abbreviations/acronyms

AAU**:** Addis Ababa University

ANC: Antenatal care

AOR: Adjusted odds ratio

BSc: Bachelor of Science

CDC: Center of Disease Control and Prevention

CI: Confidence interval

COR: Crude odds ratio

EDHS: Ethiopian Demographic and Health Survey

ETB: Ethiopian Birr

G/dL: Gram/deciliter

Hb: Hemoglobin

IDA: Iron deficiency anemia

MSc: Master of Science

OR: Odds ratio

PI: principal investigator

SD: Standard deviation

SNNPR: Southern nation nationality and people of region

SPSS: Statistical package for social science

WHO: World Health Organization

Abstract

Background Anemia is a global public health problem which has severe impact on pregnant mother. Anemia in pregnant women has severe negative consequences on health, social, and economic development which result in at risk of low physical activity, increased maternal morbidity and mortality and adverse neonatal outcome especially those with severe anemia.. Despite the wider scope of the problem, little research data has been explored about severity of anemia at ANC in study area particular, which resulted from secondary to underlying factor like plant base consumption (goder), lack of awareness about iron/folic supplementations benefits, absence of early antenatal booking, lack of dietary diversity and intake of fluid (chemo) that hinder iron /folic absorption.

Objective The study aimed to assess Prevalence of anemia and associated risk factors among pregnant women attending antenatal care at Mizan Tepi Teaching Hospital in South west Ethiopia from March to April, 2016

Methods Facility based cross-sectional study design was conducted from March to April, 2016 on 405 pregnant women. Study subject were selected consecutively during data collection period time until the sample size were fulfilled at ANC clinic. Data were entered in to Epi Info version 3.5.3 and analyzed using SPSS version 21 statistical software. The significantly independent value of the variable to Anemia were identified by bivariate and multiple logistic regression analysis. Finally, results were presented in texts, graphs and tables.

Result The overall prevalence of anemia among pregnant women was 41.2%. Meal frequency less than two per day (AOR=3.166, CI [1.2601, 7.956]), third trimester (AOR=8.040, CI [3.201, 20.196]), excess menstrual bleeding (AOR=5.403, CI [3.027, 9.644]) and intake of tea always after meal (AOR = 3.73, CI [2.060-6.780]), were factors significantly associated with anemia.

Conclusion This study showed that anemia is a moderate public health problem. The present study had shown a statistically significant association between anemia and increased gestational age, meal frequency less than two per day, excess menstrual bleeding, and tea intake after meal. Awareness creation through the strengthened health education on risk factors like avoiding tea intake after meal and prevention of anemia as well as nutritional counseling should highly recommended during ANC follow up in an attempt to reduce the prevalence of anemia among pregnant mothers.

Keyword prevalence, associated factor, anemia pregnant women

CHAPETER ONE
INTRODUCTION
1.1 Background

Anemia is defined as a condition in which there is less than the normal hemoglobin (Hgb) level in the body, which decreases oxygen-carrying capacity of red blood cells to tissues.It occurs as a result of deficiencies of essential nutrients, heavy blood loss, parasitic infections or increased requirements including those seen in pregnancy **[1]**.Anemia has a variety of converging contributing factors including nutritional, genetic, and infectious disease factors; however, iron deficiency is the cause of 75% of anemia cases [**2]**.

World Health Organization (WHO) definitions for anemia differ by age, sex and pregnancy status as follows: children 6 months to 5 year anemia is defined as a Hgb level <11g/dl, children 5–11 years Hgb < 11.5 g/dl, adult males Hgb < 13 g/dl; non- pregnant women Hgb <12g/dl and pregnant women**[3].**

Anemia during pregnancy is defined by the Centers of Disease Control and Prevention (CDC) and World Health Organization as a hemoglobin concentration less than 11 g/dL. It is considered severe when hemoglobin concentration is less than 7.0 g/dL, moderate when hemoglobin falls between 7.0 and 9.9 g/dL, and mild when hemoglobin is from 10.0 to 10.9 g/Dl**[4, 5, 6].**

Anemia in pregnant women has severe consequences on health, social, and economic development which result in at risk of low physical activity, increased maternal morbidity and mortality, especially those with severe anemia **[1].** Iron deficiency anemia affects the development of the nation by decreasing the cognitive development of children and productivity of adults **[2].** Anemia occurs at all stages of the life cycle but its risk is higher in state of pregnancy due to an increased iron requirement, physiological demand, loss of blood and due to infections **[7].**

Nutritional anemia is the most common type of anemia worldwide and mainly includes iron, folic acid, vitamin B_{12} and vitamin C deficiencies **[7].** The predisposing factors that result in anemia among pregnant women are different. The fundamental interactional factors like women's' socio-demographic, socio- economic, nutritional and health related factors cause anemia in pregnant women. The relative contribution of the these factors varies greatly by geographical location, season, and dietary practice **[2**Anaemia is one of the important factor which decides the outcome of pregnancy **[1]**.Anaemia in pregnant women has been regarded as detrimental to the fetal growth and pregnancy outcome. **[8]**.Indeed Anaemia in Pregnancy is a known factor for many maternal complications such as premature labor, poor weight gain and dysfunctional labor and fetal and neonatal complications such as prematurity, low birth weight, fetal and neonatal distress etc. requiring prolong resuscitation and causing neonatal anemia due to poor reserve**[6,8].**

The prevalence of anemia in pregnant mothers, as indicated in WHO's reports, both in developed and developing nations needs urgent intervention. In most of the cases, anemia is largely preventable and easily treatable if detected in time. Effective management of anemia includes treatment of the underlying causes, restoration of the hemoglobin concentration to normal levels, and prevention and treatment of complications [**9]** .The magnitude of the problem in poor countries like Ethiopia is widespread and associated with different contributing factors such as nutritional deficiencies, and health related factor and socio-demography of segment population. Despite the wider scope of the problem, no sufficient research data has been documented to disclose the severity of anemia in ANC. Therefore, the objective of this study was to assess the prevalence of anemia among pregnant women attending ANC at Mizan- Aman General hospital , southern Ethiopia and to identify factors that contribute to the presence and severity of anemia

1.2Statement of problem

Globally, anemia affects 1.62 billion people (25%), among which 56 million are pregnant women **[1, 2].** It is a global public health problem affecting all ages of the population with its highest prevalence among children under five years of age and pregnant women **[2, 4].**

Current estimates from the World Health Organization (WHO) put prevalence of anemia at 41.8% among pregnant women, with the highest prevalence rate (61.3%) found among pregnant women in Africa and 52.5% among South East Asia **[10].** Sub-Saharan Africa is the most affected region, with anemia prevalence among pregnant women estimated to be 17.2 million, which corresponds to approximately 30% of total global cases **[11, 12].**

The World Health Organization (WHO) estimates that the highest proportion of individuals affected by anemia are in Africa and that in Ethiopia anemia is a severe problem for both pregnant (62.7%: 95% CI 30.1-86.7) and non-pregnant women of childbearing age (52.3%: 95% CI 24.9-78.4) **[2].** In Ethiopia, anemia is the severe problem affecting 62.7% of pregnant mothers and 52.3% non-pregnant women**[1].**

Globally, anemia contributes to 20% of all maternal deaths. Anemia in pregnant women remains one of the most intractable public health problems in developing countries because of various sociocultural problems like illiteracy, poverty, lack of awareness, , poor dietary habits, and high prevalence of parasitic infestation [**2,4].**Anemia during pregnancy is a major cause of morbidity and mortality of pregnant women I n developing countries and has both maternal and fetal consequences[**7].**

The prevalence of anemia in developing countries is estimated to be 43% and that of developed countries is 9%. Anemia is estimated to contribute to more than 115 000 maternal deaths and 591000 prenatal deaths globally per year**[2, 4].** In addition, both pregnant women and their neonates encounter negative consequence including fetal anemia, low birth weight (LBW), preterm delivery, intrauterine growth restriction and perinatal Mortality ,still-birth, low birth weight and pre-term births, reduced work capacity, decreased mental performance, low tolerance to infections, death from anemic heart failure and maternal deaths due to uncontrolled bleeding **[1,8,12].**

Recently, mental impairment in children who were anemic in the very beginning of their life has been reported. All of those showed the necessity of special control program for anemia in vulnerable population **[11,13].**

Globally, different studies have shown different prevalence of anemia during pregnancy reported accordingly by their different socioeconomic, demographic and clinical characteristics of pregnant woman that may affect the magnitude of anemia which come up with figure ranging from 19.7% –61.1.% **[14-23].** Iron deficiency anemia affects the development of the nation by decreasing the cognitive development of children and productivity of adults **[2].**According to the Ethiopian Demographic and Health Survey (EDHS) report, 17% of reproductive age women are estimated to be anemic and 22% of the pregnant women are anemic **[15]**.In Ethiopia anemia is one of the serious health problems among pregnant women. Prevalence rates of 31.6% in sidama[16] and 39.94%in woliyata sodo**[9].** Higher rates about 61.6% have also been reported in pregnant women in boditii heath center **[17].** The availability of local information on the magnitude and related risk factors has a major role in the management and control of anemia in pregnancy contributing to reduction in maternal morbidity and mortality. Despite the wider scope of the problem, little research data has been explored about severity of anemia at ANC in study area particular, which resulted from secondary to underlying factor like plant base consumption (goder), lack of awareness about iron/folic supplementations benefits, absence of early antenatal booking, lack of dietary diversity and intake of fluid (chemo) that hinder iron /folic absorption.

Therefore, this study is aimed at determining prevalence of anemia and assessing associated risk factors among pregnant women attending antenatal care at Mizan Aman General Hospital in South western Ethiopia.

1.3 Significance of study

The magnitude of anemia both in developing and developed countries is estimated to be 43%and9% respectively **[2]**. It remains one of the most difficult public health problems in developing countries which associated with different contributing factors such as nutritional deficiencies, health related factor and socio-demography of segment population. Although the prevalence of anemia among pregnant women in different regions of Ethiopia was documented, there are no recent studies done adequately studied amongst pregnant women in the present study area. ***Thus, data obtained from this study would primarily help:***

- To ascertain the existing significant variables related to anemia that enables pregnant women to equip with awareness of wider scope of the problem and the potential benefit of avoiding single plant base consumption (goder), awareness about iron/folic supplementations , early antenatal booking, increasing dietary diversity and avoiding intake of fluid (chemo) that hinder iron /folic absorption that prevent the problem in the particular study area

- To obtain information on distribution of anemia among the pregnant mothers attending ANC follow up at Mizan Aman General Hospital which would help to guide the antenatal care service providers to work towards alleviating the problem in which identified risk factors should be considered for prevention and control of anemia among pregnant women.

- Finally, this study used as base line data for health care providers and nurse researchers who are interested on the magnitude of anemia and barrier factors in this study area and more over it also shows the significance of the problem to different stake holders as well as to the concerned

CHAPTER TWO

2.1. Literature Review

Anemia is a global public health problem affecting people in all age groups but the burden of the problem is higher in pregnant women **[3].** Anemia in pregnant women remains one of the most intractable public health problems in developing countries because of various socio cultural problems like illiteracy, poverty, lack of awareness, cultural and religious taboos, poor dietary habits, and high prevalence of parasitic infestation **[10].** Pregnant women are one of the vulnerable groups of a population to develop anemia particularly in developing countries **[22].** Knowledge of these factors associated with anemia will help to formulate multipronged strategies to curtail this important public health problem in pregnancy. In view of the above, the present study was carried to find out the status of anemia in pregnant women and various factors associated with it. Therefore, it is better to preview and explore factors that independently affecting pregnant women attending ANC during pregnancy which attributable to anemia according to their predictor as following;

2.2. Socio economic and demographic factors related to Anemia **in pregnancy**

Age, Family size, Residence, Income and Educational status

A study conducted in local area of the country reveled statistically significant association between Age group of 15–24 years, family size greater than four, and monthly household income less than 968 Ethiopian Birr with anemia **[9,10].** A study conducted in a country showed as the burden of anemia was significantly high among illiterates, women devoid of self-income, lowlanders, multiparas and women aged 25-34 years. [**16]**

A study conducted in different area of the country as well as across the country also revealed similar finding with that of above finding as reported by other studies done in south eastern Ethiopia (AOR = 3.3, 95% CI = 1.5–7.4) **[17],** Gondar (AOR = 2.14, 95% CI = 1.51–3.38) **[18],** and southwest Ethiopia (AOR = 1.62, 95% C.I = 1.02–2.62) **[19]** north western zone of Tigaray (AOR = 1.56, 95% CI = 1.03–2.37)[20], and North west Gondar(AOR = 0.79, 95% CI = 0.07–0.49) **[21].**

A study conducted in different area of the country as well as across the country also revealed association of anemia with different socio-demographic factors which evidenced by Pregnant women with age, family size, parity and economical status were found to be significantly associated with anemia during pregnancy. [**22,23,25, 26**].

A study conducted in woliyata sodo with the multivariable logistic regression analysis revealed as anemia was higher among pregnant women who were illiterate (6.89%) as compared to pregnant women greater than Grade 12(7.61%) in which the risk of developing anemia among illiterate pregnant women was significantly higher as compared to those pregnant women greater than Grade 12. A study conducted by Specialized A in Addis Ababa (AOR = 2.12, 95% CI = 2.47–6.80) **[25],** also obtained similar study in Tikur Anbessa Specialized Hospital indicated 5.07% and 30.89%, respectively. A study done in India showed that pregnant women from lower socioeconomic classes were at increased risk of developing anemia compared with those in higher socioeconomic classes **[2, 27].**

A study conducted by Kumar V et al in india found that there was no significant difference in anemia according to education level of the women which is in contrast with the other studies in which severity of anemia was found to be inversely related to educational status **[28,29].**

A study conducted in West Bengal showed the prevalence of anemia was significantly associated among pregnant women who are not educated as compared to those pregnant women who are educated in which pregnant women who were not educated were at 17.50, higher risk to be anemic as compared to pregnant women who had formal education **[30].**

Residence

A study conducted in north western zone of Tigaray with the multivariable logistic regression analysis revealed anemia was higher among pregnant women who were from rural areas as compared to pregnant women residents of urban areas in which the risk of developing anemia among rural pregnant women was 1.75 times higher to be anemic as compared to those pregnant women living in urban areas (AOR = 1.75, 95% CI = 1.01–3.04**)[18].**A study conducted in different local area of the country also revealed similar finding as reported by other studies

done in in south eastern Ethiopia (AOR = 3.3, 95% CI = 1.5–7.4) [21], Gondar (AOR = 2.14, 95% CI = 1.51–3.38**) [12],** and southwest Ethiopia (AOR = 1.62, 95% C.I = 1.02–2.62) **[13].**

2.2. Gynecological and Obstetric factors related to anemi in pregnancy

Parity

Finding which evidenced from the study done in Eastern Anatolian Province, Turkey **[32]**reveled associations in which pregnant women with parity of four or more were 2.2 times more anemic compared to those with parity less than four. Child spacing was also found to be associated significantly with the occurrence of anemia in the study conducted at Arsi **[23],** which is in line with other study results in those pregnant women who had 3–5 pregnancies were 1.95 times more likely to be anemic, compared with those who had less than 3 pregnancies (AOR =1.95 (95% CI=1.19–3.19**[22]**

A Study conducted in Mekele**[14]** revealed that there is statically significant association of anemia with odds of repeated pregnancies [AOR 2.3 95% CI (1.4,3.8)] more than two or more were at higher risk of developing anemi among pregnant mothers as compared to those who have less than two number of pregnancies with similar report from Pakistan.**[31**].A study conducted by Kumar V et al in India **[29]** showed that anaemia was significantly more common among multipara women (81.2%) than primi and nullipara which is similar to other study**[23].**

Gravidity (number of pregnancies)

Increased number of pregnancies and deliveries is positively associated with the risk of developing anemia as study revealed in Gode town Somalia region**[22].**which evidenced by 3–5 pregnancies is significantly associated when compared with those who had less than 3 pregnancies (AOR =1.95 (95% CI=1.19–3.19)).

Age of current pregnancy (trimester)

A Study conducted in eastern Ethiopia**[22]** revealed that there is statically significant association of Pregnant women in the third and second trimesters were 3.32 (95% CI 1.84–6.0) and 2.87 (95% CI 1.61–5.17) times more likely to be affected by anemia as compared to pregnant women in the first trimester, respectively**[22].**This finding is consistent with the findings from studies in India, which indicated that third and second trimesters were among the most significant risk factors for developing anemia during pregnancy**[29].**An association of gestational age with

anemia statistically significant for the third trimester, (P<0.001) as study report from bodit health center**[17].**The association of gestational age with anemia was statistically significant for the third trimester in a study conducted in west arsi by Niguse o et al**[23]**in Ethiopia and Nigeria **[30].**

Excess menstrual bleeding

A study conducted in woliyat sodo by Lealem G et al obtained that There was a statistically significant association between anemia and history of excess menstrual bleeding (usage of more than two sanitary pads within a day during menstruation);[**9]**

2.3 Dietary and maternal habitand Anemia Risk Reduction Behavioral factors related to anemiain pregnancy

Meal frequency

A study conducted in mekelle revealed that the prevalence of anemia was significantly higher among pregnant women having a meal frequency of less than 3 times per day as compared to pregnant women who had a meal frequency of more than 2 times per day in which the pregnant women having a meal frequency of less than 3 times per day were at 3.88 times higher risk of developing anemia as compared to pregnant women who had a meal frequency of more than 3 times per day AOR = 3.88, 95% CI = 1.93, 7.79) **[14].** A other studies conducted in different area of the country come up with consistent report like in West Arsi (AOR = 4.66, 95% CI = 2.94, 7.38) [23].and North western of Zone of Tigray (AOR = 2.18, 95% CI = 1.06–4.91) [**20].**Studies conducted in Pakistan[**31]** and west Arsi **[23**] also suggested consumption of fruit two or more times per week is associated with a decreased risk of anemia

A Study conducted by Gebremedhin et al**[15]** in nine regional states of Ethiopia revealed that Pregnant women with lower level of Dietary diversity score of more likely to develop anemia than those with higher dietary diversity score. Comparable report also with that of study done in mekelle **[14]**with Low Dietary Diversity score [AOR 12.8 95% CI (6.4,25.6)].

Meat and Vegetables consumption

Study conducted in West Arsi revealed statistically significant association of Frequency of meat***<1x/wk*** *(COR=3.47, CI (1.58, 7.64)* and vegetables consumption***(****AOR= 6.7, CI [2.49, 17.89])* with anemia**[23**] . it is interesting that report from West Arsi**[23]** area also showed that participants who take tea after meal were found to be almost two fold more anemic than those who take tea once or none per day **[23].**Anemia among pregnant women was significantly

associated with habit of eating meat once per week AOR 2.2 95% CI (1.0,4.9)] were at higher risk of developing anemia than pregnant mothers who ate meat more than twice per week as report from A study conducted in mekelle governmental institution. This finding is in line with other studies in which pregnant women who ate red meat two or more times a week had higher mean hemoglobin concentrations **[14, 23, 33].**

Iron supplementation

A study conducted in rural Sidama showed that , the prevalence of anemia was significantly higher among pregnant women who did not take iron supplementation during pregnancy then their counterpart in which pregnant women who did not take iron supplementation were at 1.90 times higher risk to be anemic as compared to pregnant women who took their iron supplementation. There was also finding that is in line with study above as conducted in west West Bengal**[30],** (AOR = 5.65, 95% CI = 1.78–18.54) [24], Gode town (AOR = 1.54, 95% CI = 1.04–2.27) **[21],**West Algeria **[28](**AOR = 0.71, 95% CI = 0.26–0.99) and north western Zone of Tigary (AOR = 3.76, 95% CI = 1.92–8.37**)[20]**

Current illness

A study conducted in West arsi showed that Recurrence of acute febrile illnesses was a factor that showed significant associations with the occurrence of anemia as most acute febrile illnesses are attributable to malaria, which causes RBCs destruction that leads to anemia **[23]**.Anemia among pregnant women was significantly associated with presence of clinical illness as reported from study conducted in woliyat sodo **[9]** which revealed that Pregnant women who had clinical illness and intestinal parasitic infection were more likely to be anemic than pregnant women who did not have clinical illness and intestinal parasitic infections. Similar findings in country were obtained from local finding in gilgel gibe **[19].**

2.4 prevalence of anemia in pregnancy

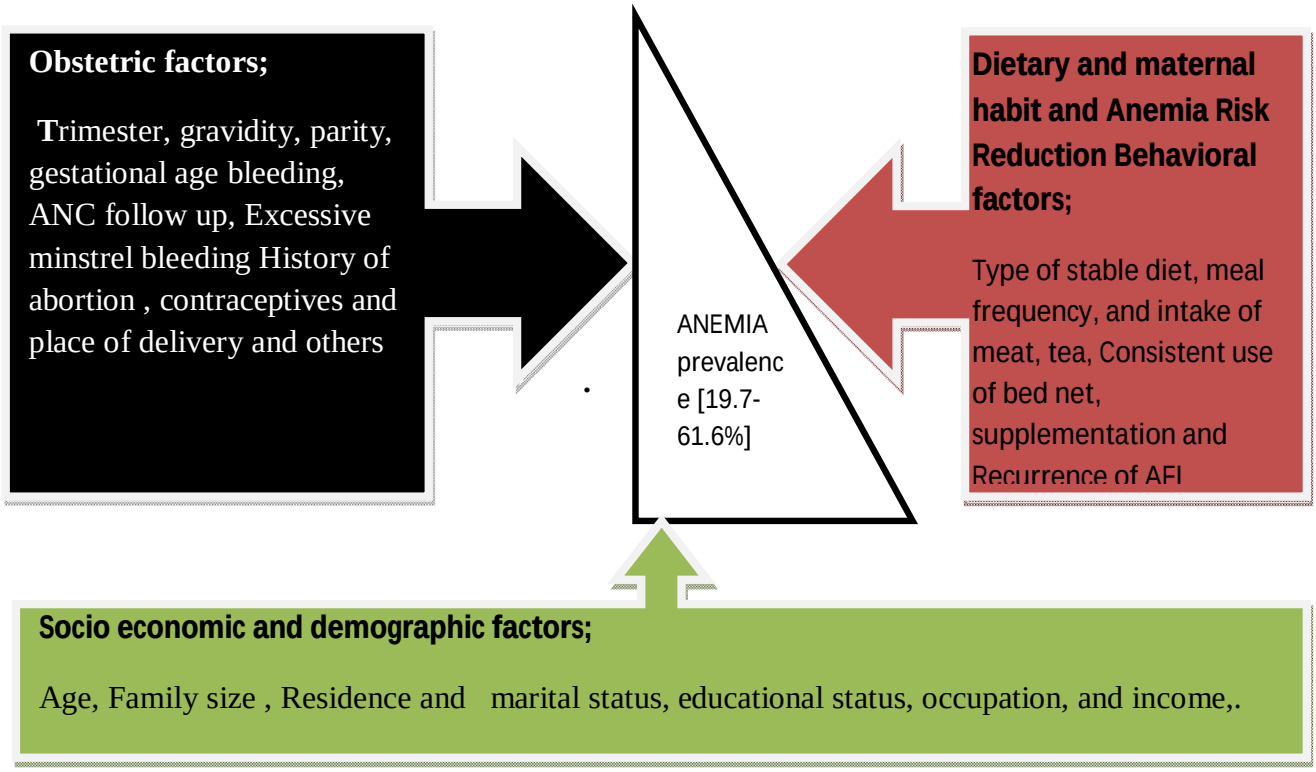
Anemia is found to be a health problem in a study conducted in a different area of the country as well as across country. The prevalence of anemia reported in pregnant women showed variability both locally and in other countries. A study conducted in south East Ethiopia (Harar) **[13]** showed prevalence of anemia as 27.9%, and in Gondar (23.2%) **[18]** . A study conducted in mekele governmental institutional revealed lower prevalence of anemia than the previous studies done on pregnant women at ANC clinic in Shalla Worda,and in Urban Pakistan which is19,,36.1%, 64.4% respectively**[14,23,31]** .This finding is consistent with study conducted in

Gondar town and Nine regional states of Ethiopia with the prevalence of 21.6% **[18]** and 18% **[15]** respectively . The prevalence of anemia obtained in the study conducted in north western zone of Tigray **[20]** come up with similar result with other studies conducted among pregnant women attending antenatal clinics in Sidama **[16],** and West Arsi **[23],** with the prevalence of 31.6%,36.1% and36.6%, respectively. Report obtained by Abel G et al from north western zone of Tigray was much lower than the previous studies conducted among pregnant women attending antenatal clinics in Gode town [**19]** and Pakistan **[31],** with the prevalence of 56.8 %and 90.5%, respectively, but higher than a study conducted in Mekelle **[14]** and Addis Ababa **[25]** and the national prevalence of anemia noted in 2011, Ethiopian Demographic and Health Survey report **[15],** where the prevalence anemia among the pregnant women was found to be 11%, 21.3%, and 22%, respectively.

The literature underlines the urgency of Intervention measures to be planned and improved based on available information regarding the magnitude and severity of anemia, and associated risk factors in the geographic area that seem to fuel each other. To sum up, this study was aimed to assess the prevalence of anemia among pregnant women attending ANC at Mizan Aman General Hospital, southern Ethiopia and to identify factors that contribute to the presence and severity of anemi

2.5. Conceptual frame workof prevalence and its associated Factors to related anemia among pregnant women

This conceptual frame work was developed by referring different literature review.it indicates a set of interrelated concept between anemia and its associated risk factor. this diagram illustrate as Anemia in pregnant women has been associated with different factors such as nutritional deficiencies, high prevalence of parasitic infestation , poor antenatal care service, sociocultural problems like illiteracy, poverty, lack of awareness, , poor dietary habits parity, gravidity, bleeding, chronic diseases and socio-demography. The arrows indicates casual linkage between anemia and its associated factor likeDietary and maternal habitand Anemia Risk Reduction Behavioral factors, Socio economic and demographic factors and Obstetric factors;



Anemia has been associated with different factor like stated above which has significant adverse outcomes for both fetus and mother. Knowledge of these factors associated with anemia will help to formulate multipronged strategies to curtail this important public health problem in pregnancy.

Figure 1: Conceptual Framework of anemia and factors affecting anemia among pregnant women attending ANC (14-23) .

CHAPTER THREE

OBJECTIVE OF THE STUDY

3.1 General objective

The aim of this study will be to assess the prevalence anemia and its associatedrisk factors among pregnant women attending antenatal care in Mizan - Aman General Hospital, from **March to April in** 2016southern Ethiopia,.

3.2 Specific objectives

- ✓ to identify risk factors of anemia among pregnant women attending antenatal care
- ✓ To determine the status of anemia among those pregnant women attending antenatal care

CHAPTER FOUR
METHODS AND MATERIALS

4.1. Study Area

This study was conducted at Mizan Tepi Teaching Hospital in Mizan Aman town. The town found in south western zone of Benj Maji which is located at 625 Kilometer from Addis Ababa .Mizan Tefere (also called simply Mizan) was a town in southern Ethiopia. It largest town, and the administrative center, of the Bench Maji Zone of the Southern Nations, Nationalities, and Peoples Region (SNNPR), and located about 160 kilometers southwest of Jimma, Mizan Tefere has a latitude and longitude of 7°0′N 35°35′ECoordinates: 7°0′N 35°35′E and an elevation of 1451 meters. Mizan Teferi, together with the neighboring town of Aman, forms a separate woreda called Mizan Aman. This is surrounded by Debub Bench woreda.

Based on the 2007 Census conducted by the CSA, woreda of Mizan Aman has a total population of 34,080, of whom 18,138 are men and 15,942 women. There were one governmental hospitals and 3.public health centers which provides routine antenatal care service to the community. The hospital offers medical, surgical, obstetric and pediatric services of which obstetric clinic gives routine antenatal care service to pregnant women in the study period **[24].**

4.2. Study design

A Cross sectional quantitative study design was employed

4.3. Study period

The data were collected at Mizan Aman General Hospital from March to April in 2016.

4.4. Population

4.4.1 .source population

Source populations of the study were all pregnant women who live in Mizan Aman town in Benji -Maji zone

4.4.2. Study population

All pregnant women attending antenatal care at Mizan Aman General Hospital. Pregnant women who came for ANC during the study period that fulfill the inclusion and exclusion criteria during the data collection period were included in the study as study participants.

4. 5. Eligibility criteria

4.5.1. Inclusion criteria

- ✓ All pregnant women who came for antenatal care service and give informed consent

4.5.2. Exclusion criteria

- ✓ Those severely ill pregnant women due to other medical conditions and unable to respond.
- ✓ pregnant women with repeated visits were excluded during study time
- ✓ Those pregnant mothers who don't give informed consent.

4.6. Sampling technique and sample size

4.6.1. Sampling technique

Study participants were selected based on the inclusion and exclusion criteria by non probability consecutive sampling method until sample size fulfilled.

4.6.2. Sample size determination

The sample size was computed using the general formula for a single population proportion. This was calculated by considering 39.94% prevalence of anemia among pregnant women (13), 5% margin of error and 95% confidence interval (CI). Accordingly, the final sample size would be **368**.

Sample size (n) is determined using the following statistical formula.

$$n = \frac{Z^2.P\,(1 - P)}{(.05)^2}$$

$$n = \frac{1.96^2 \times .3994(1 - .3994)}{0.0025} = 3.84*.2398/.0025=.9211/.0025=368$$

By adding 10% for none response the final sample size will be=405

d = margin of error between the sample and the population.

n = sample size

Z = 95% confident interval

P = prevalence rate of anemia based on the previous study

4.7. Measurements and variables

4.7.1. Instruments

The questionnaire began with a section requesting selected demographics and work characteristics information. A structured and interviewer administered questionnaires were used to collect data on the socio-demographic variables, dietary habit, gynecologic and obstetric factors. The questionnaires were developed in English language and then translated to Amharic. The First statement request contained part of socio demographic and economic characteristics of the respondent profile .The second part ask about clinical related factor associated with anemia The next part asked about nutritional related factor associated with anemia. Finally, the fourth part requested the level of hemoglobin of the pregnant women from pregnant chart reports. This interviewer administered questionnaire took approximately 15–20 min to complete and assesses Factors related anemia among pregnant women attending ANC The questionnaire were used which has been developed and adopted by the CBE (Community Based Education) office of Hawassa University College of Medicine and Health Sciences[**17]**

4.7.2. Study variables

- ✓ Anemia in pregnant women

Independent variables

- ✓ **Socio demographic factors**: age, Family size , Residence and marital status, educational status, occupation, and income,.
- ✓ **Obstetric factor**; trimester, gravidity, parity, gestational age bleeding ANC follow up, iron excessive menstrual bleeding ,history of abortion ,supplementation, contraceptives and others
- ✓ **Nutritional factor**; type of stable diet, meal frequency, intake of meat, tea and others

4.8. Operational definitions

The following operational definitions will be used;

Anemia was defined in accordance with the WHO standard for pregnant woman:

Pregnant woman: a woman whose pregnancy was confirmed by HCG test or abdominal examination and fetoscope at the study health center

Anemia in pregnancy: hemoglobin level below 11g/dl during pregnancy

Mild anemia: hemoglobin level from 10 -10.9 g/dl

Moderate anemia: hemoglobin level from 7- 9.9 g/dl

Severe anemia: hemoglobin level from 7 g/dl

4.9. Data collection procedure

Data were collected by three trained Bsc clinical nurses under the supervision of senior Bsc staff using pretested interviewer administered questionnaire, which contains socio demographic characteristics (age, education, occupation, marital status, and others), obstetric and gynecological history (trimester, gravidity, parity, ANC follow up, iron supplementation, and others), and dietary factors (type of stable diet, meal frequency, and intake of meat, tea, egg, and milk and milk products). Data on hemoglobin level was collected by reviewing charts of pregnant women. The questionnaires were used which has been developed and adopted by the CBE (Community Based Education) office of Hawassa University College of Medicine and Health Sciences. A total of **405** pregnant women were enrolled in this study. The HGB value was determined and the severities of anemia were noted based on the HGB value according to the WHO definition as mild, moderate and severe anemia. Anemia during pregnancy was defined by the Centers of Disease Control and Prevention (CDC) and World Health Organization as a hemoglobin concentration less than 11 g/dL. It were considered severe when hemoglobin concentration is less than 7.0 g/dL, moderate when hemoglobin falls between 7.0 and 9.9 g/dL, and mild when hemoglobin is from 10.0 to 10.9 g/Dl **[4, 5,6].**

4.10. Data quality assurance and management

To assure quality of the data, training were given to the data collectors to minimize technical and observer bias. Data were collected by a structured and interviewer administered questionnaire. Three staff Nurses were recruited as data collectors and two nurse as supervisor's .Training were given for one day on the purpose of the study, details of the questionnaire, and insuring confidentiality of the respondents. The structured questionnaire were translated in to Amharic and retranslated back to English to ensure accuracy of translation in to Amharic language.

4.11. Pre-test of the tool

Before the actual data collection, the questionnaires were pre tested on 10% of the subjects (40 pregnant women) in the nearby health center (Bergese health) to check the consistency and appropriateness, and then necessary correction was taken before the actual data collection started. Daily close supervision at the end of every data collection was made; the questionnaire were reviewed and checked for completeness, accuracy and consistency by supervisors and investigator to take timely corrective measures. After the pretest questions, ambiguous words or anything wrong was corrected before the final questionnaire is printed and distributed

4.12. Data processing and Analysis

Data were entered, cleaned, checked, edited, and coded in to Epi Info version 3.5.3 and analyzed using SPSS version 21 statistical software. Categorical variables were summarized as numbers and percentages, whereas normally distributed continuous variables were presented as means and standard deviations by descriptive statistics. Inferential statistics analysis using both binary and multiple logistic regressions were employed to show the relationship between prevalence of anemia and its associated factor. To identify factors associated with the outcome variable (anemia), first a bivariate logistic regression analysis were performed for each independent variable and crude odds ratio (COR) with 95% confidence intervals were obtained. Then, significant variables observed in the bivariate logistic regression analysis value were subsequently included in the multivariable logistic regression model to determine independent predictors for the outcome variable among the pregnant women and then variables significant at P-value <0.05 were identified as independent predictors for anemia in pregnant women. The strength of statistical association were measured by adjusted odds ratios (AOR) and 95% confidence intervals. value < 0.05 were considered statistically significant. Finally, the results were presented using tables and graph

4.13. Ethical consideration

The study were conducted after getting ethical clearance from Addis Ababa university, College of Health Science, and school of allied health, department of nursing and midwifery ,Ethical Review Committee. Permission from Mizan Tepi Teaching Hospital sought before initiating data collection by communicating with medical director office through official letters from Addis Ababa University. After the purpose and objective of the study have been informed, written informed consent were obtained from each pregnant women included in the study and informed about their rights to interrupt the interview at any time. Participants were informed participation is on voluntary basis. The consent form read in the local language and a copy will be given to the women upon request. To ensure confidentiality, participants' data was linked to a code number and the data collection procedure was anonymous, the name of the participants and any participants' identifier were not written on the questionnaire, and, also during the interview to keep the privacy, they were interviewed alone. Individual-level obstetric and medical information obtained from the study participants kept strictly confidential and they were assured that only aggregate data were reported. Completed questionnaires kept locked in a cup-board and used for the intended purpose only. Only the researchers and the supervisor would had access to collected data

4.14. Dissemination

The findings of the study were submitted to Addis Ababa University, College of Health Sciences. The results will be publicly presented at Addis Ababa University. An attempt will be made to publish the findings of this study in widely accessible national or international journals. The finalized report will be communicated to managerial personnel of the Mizan Tepi Teaching Hospital and university community

Results

Socio demographic characteristics of pregnant women

A total of 405 pregnant women attending Antenatal care were included in this a study area with a response rate of 100 %.The mean ± SD age of respondents was 23.2 ± 3.31 years. Majority of respondents were urban dwellers 262 (64.7%) and 195 (48.1%) were farmer. All of the respondents were married and 260 (64.2%) were orthodox Christian followers. Majority of the respondents were unable to read and write 117(28.9%), 56(13.8%) were attended education up to higher school who were able to read and write at least with more than one language .Majority 154 (38%) of the respondents were Bench in ethnicity followed by sheka 103 (25.4%). More than half 257 (63.5%) of the pregnant women were within the age range of 20-24 years. The median monthly income of family was 400.00 Birr (table1).

Table 1. Socio-demographic and economic characters of pregnant women attending Antenatal care ANC at Mizan Tepi Teaching Hospital from March to April, Southern Ethiopia, June 2016.

VARIABLE	*CATEGORIES*	*Frequency*	*Percent*
Age	*15–19*	*28*	*6.9*
	20–24	*257*	*63.5*
	25-29	*93*	*23.0*
	30-34	*27*	*6.7*
Resident	*Rural*	262	*64.7*
	Urban	143	*35,3*
Marital status	*Married*	*405*	*100.00*
Occupation	*Farmer*	*195*	*48.1*
	Government employee	*55*	*13.6*
	Merchant	*26*	*6.4*
	Student	*16*	*4.0*

	House wife	*113*	*27.9*
Ethinicty	*Bench*	*154*	*38.0*
	Sheka	*103*	*25.4*
	Amahar	*81*	*20.0*
	Tigrey	*19*	*4,7*
	KEFA	*36*	*8.9*
	*Other(specify)**	*12*	*3.0*
Religion	*Orthodox*	*260*	*64.2*
	Protestant	*94*	*23.2*
	Muslim	*51*	*12.6*
Educational status	*Cannot read and write*	*117*	*28.9*
	Read and write	*91*	*22.5*
	Elementary school	*76*	*18.8*
	Secondary school	*65*	*16.0*
	Higher school	*56*	*13.8*
Income	*=<300*	*84*	*20.7*
	300-500	*119*	*29.4*
	500-23000	*108*	*26.7*
	=>23000	*94*	*23.2*

Others *=dizi ,dawo ,menit, silte

Clinical related Characteristics

More than half of respondent, 241 (59.5%) of the women were in the third trimester (gestational age greater than 28 weeks), while 63 (15.6 %) of the pregnant women were in their second trimester (between 13 and 28 weeks of gestation). One hundred one (24.9%) of the participants were in the first trimester (gestational age less than 13 weeks). Women without a previous pregnancy (no child) were 60.5%.About 35.8% of the pregnant women were on iron supplement at the time of the study pregnancy. Majority of study respondent 350(86.4%) were using contraceptive prior to current pregnancy. Two hundred thirty two (57.3%) of them had no history of excess blood loss/ in their previous pregnancy. More than half of respondent 240 (59.3) did not follow ANC in their previous pregnancy. The reason that hinder ANC follow up were not being informed, absence of health institution and financial problem were found to be 18.5% 59.3%and 59.3% respectively.

Table 2. Distribution of Clinical characteristics of pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April, Southern Ethiopia, June 2016

VARIABLE	*CATEGORIES*	*Frequency*	*Percent*
First pregnancy	*Yes*	*245*	*60.5*
	No	*160*	*39.5*
Parity if not first pregnancy	*2*	*67*	*41.9*
	3	*64*	*40.0*
	4	*29*	*18.1*
	>5		
Birh interval	*<2yr*	*12*	*12.75*
	=>2yr	*148*	*92.5*
GESTATIONAL AGE	*1*	*101*	*24.9*
	2	*63*	*15.6*
	3	*241*	*59.5*
ANC FOLLOW UP	*Yes*	*165*	*40.7*
	No	*240*	*59.3*
Reason not follow	*Not informed*	*73*	*18,5*
	Absence of health institution	*240*	*59.3*

	near by house		
	Financial	*240*	*59.3*
Current illness	*Yes*	*15*	*3.7*
	No	*390*	*96.3*
Specify	*Ips*	*0*	
	Malaria	*10*	*66.7*
	HIV/AIDS	*3*	*20*
	Vaginal bleeding	*2*	*13.3*
Knowledge of anemia	*Yes*	*54*	*13.3*
	No	*351*	*86.7*
Cause uf anemia	*Ips*	*2*	*3.7*
	Malaria	*47*	*87.0*
	Hiv/Aids	*0*	*0*
	Vaginal bleeding	*5*	*9.3*
Supplementation	*Yes*	*145*	*35.8*
	No	*260*	*64.2*
History of contraceptive usage	*Yes*	*350*	*86.4*
	No	*55*	*13.6*
Contraceptive type	*DEPO-PROVERA*	*309*	*88.3*
	PILLS	*27*	*7.7*
	ICUD	*7*	*2.0*
	COC	*2*	*.6*
	IMPLANON	*5*	*1.4*
Excess menstrual Bleeding	*Yes*	*173*	*42.7*
	No	*232*	*57.3*
Pad	*=>3*	*173*	
	<3	*0*	
Menstrual cycle	*Regular*	*185*	*45.7*
	Irregular	*220*	*54.3*
Abortion	*Yes*	*43*	*10.6*
	No	*362*	*89.4*
Consistent use of bed net	*Yes*	*114*	*28.1*
	No	*291*	*71.9*

Nutritional Characteristics/habits

Godere was the staple diet for 221(54.6) pregnant women. More than half of the pregnant women 222 (54.8 %) ate three times per day. Majority of pregnant women 289 (71.4%) took meat less than once per week, about 311 (33.4%) of women had the habit of eating fruits and vegetables after meal less than one per day. More than half of the study subjects had the habit of drinking tea immediately after meal once or less per day 231(57%). Three hundred seventy (66.7%) of the study subjects had the habit of drinking chemo immediately after meal Once or less per day

Table 3. Distribution of dietary characteristics plus other maternal habits among pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April, Southern Ethiopia, June 2016.

VARIABLE	*CATEGORIES*	Frequency	Percent
Stable diet	*Enjera*	184	45.4
	Godere	221	54.6
Meal frequency	*=<2*	222	54.8
	=>3	182	45.2
Meat consumption per week	*At least once per week*	116	28.6
	Less than once per week	289	71.4
Vegetables & fruits perday	At least once per day	94	23.2
	Less than once per day	311	76.8
Tea in take	Always after every meal	174	43.0
	Once or less per day	231	57.0
Chemo in take	Always after meal	135	33.3
	Once or less per day	270	66.7
Chat chewing	Never	405	100

Prevalence of Anemia

The overall prevalence of anemia using a cut off level of hemoglobin <11 g/dl (<33% haematocrit) was 41.2% (167/405). Out of all anemic pregnant women about 45.5% (76/405) were mildly anemic, 50.3% (84/405) were moderately anemic and 4.2% (17/167) were severely anemic (Figure 1)

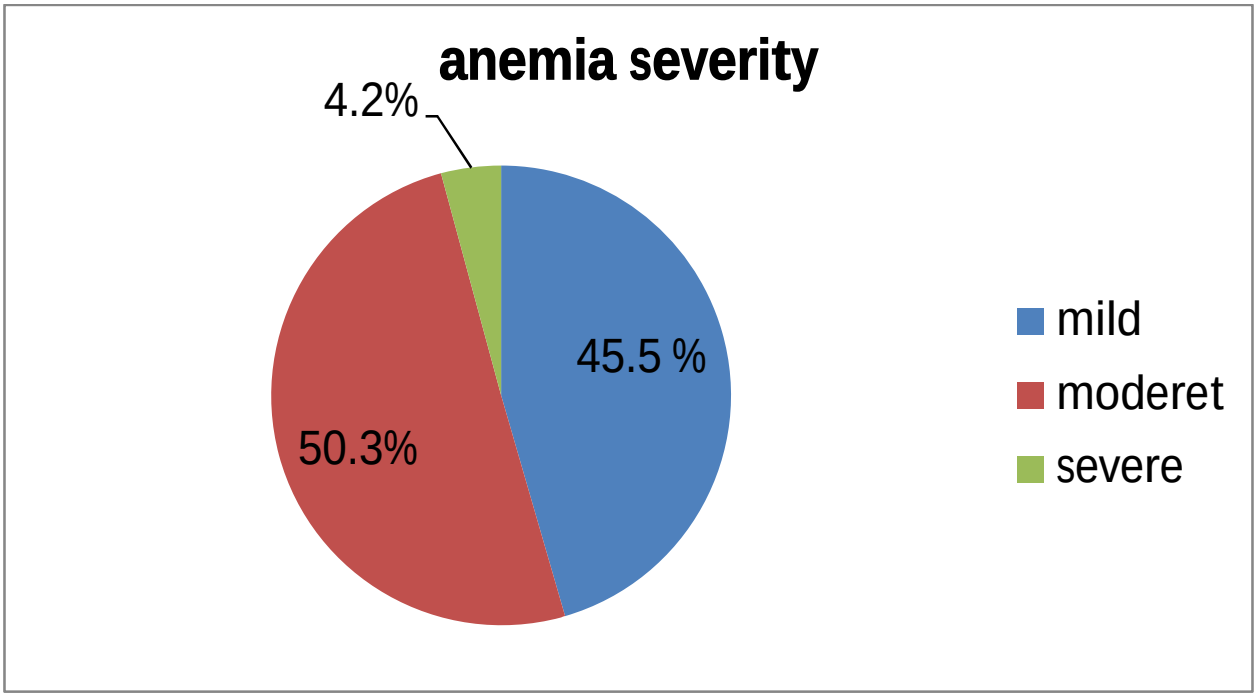


Figure 1: Shows the distribution of the degree of anemia among pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April, Southern Ethiopian 2016 (n=405)

Associated factors of anemia

Bivariate analysis, family monthly income, residence , gestational age, excess menstrual bleeding ,regular menstrual bleeding ,meal frequency iron supplementation, bed net,, stable diet tea after meal and ANC follow up of pregnant women were significantly associated with maternal anemia . After Controlling the effect of confounding factors Multiple logistic regression analysis revealed that meal frequency twice per day (AOR=3.166, CI [1.2601, 7.956]), third trimester (AOR=8.040, CI [3.201, 20.196]), excess menstrual bleeding (AOR=5.403, CI [3.027,9.644]) ,intake of tea after meal (AOR = 3.73,CI [2.060-6.780]), and were factors significantly associated with anemia at p-value ≤ 0.05. (Table 4)

Table 4 Multivariate Logistic Analysis of Factors Influencing in pregenacy among Pregnant Women Attending ANC at MizaTepi Teaching Hospital from March to April, Southern Ethiopia, 2016.

VARIABLE	*CATEGORY*	*ANEMIA*		COR(95%CI)	AOR(95% C.I)
		YES	*NO*		
Residence	*Rural*	127(48.1%)	137(51.9%)	*2.341(1.510-3.629)*	*1.74(.79-3.83)*
	Urban	40(28.4%	101(71.6%)	*1*	*1*
Income	*<300*	46(54.8%)	38(45.2%)	*3.737(1.976-7.065)**	*1.581(.305-8.19)*
	300-500	69(58%%)	50(42%)	*4.260(2.350-7.721)**	*1.627(.323-8.20)*
	500-2300	29(26.9%)	108(100%)	*1.13(.601-2.137)*	*.746(.291-1.911)*
	>2300	23(24.5%)	71(75.5%)	*1*	*1*
Excess menstrual Bleeding	*Yes*	*105(60.8%)*	*68(39.3%)*	*4.234(2.778-6.453)**	*5.403(3.027-9.644)*
	No	*62(26.7%)*	*170(73.3)*	*1*	*1*
Trimesters	*1st*	*30(29.7)*	*71(70.3%)*	*2.535(1.111-5.783)**	*2.790(1.0307.562)*
	2nd	*9(14.3)*	*54(85.7)*	*1*	*1*
	3rd	*128(53.1)*	*113(46.9)*	*6.796(3.21214.383)**	*8.040(3.20120.196)*

Tea intake	*Yes*	*108(62.1%)*	*66(31.9)*	*4.770(3.1177.7.302)**	*3.739(2.0606.786)*
	No	*59(25.5)*	*172(74.5%)*	*1*	*1*
Stable diet	*Enjera*	*64(34.8%)*	*12065.2%)*	*1*	*1*
	Goder	*103(46.6)*	*118(53.4)*	*.611(.409-.914)*	*.577(.205-1.22)*
Meal frequency	*=<2*	*123(55.4%)*	*99(44.6%)*	*3.925(2.5536.034)**	*3.166(1.260-7.956)*
	=>3	*44(24%)*	*139(76%)*	*1*	*1*
Iron supplementation	*Yes*	*39(26.9%)*	*106(73.1%)*	*1*	*1*
	No	*128(49.2%)*	*132(50.8)*	*2.636(1.6974.093)*	*1.277(.577-2.83)*
Bed net	*Yes*	*38(33.3%)*	*76(66.7)*	*1*	*1*
	No	*129(44.3%)*	*162(55.7%)*	*1.593(1.0132.505)*	*.610(.280-1.33)*

NOTE

- 1=Reference group
- * Those variables showing significant association in the multivariate analysis.
- Enter LR method was used to select factor.
- 'The model adequately fits the data at p-value = 0.05 (Hosmer and Lemeshow goodness offit test).

Discussion

The prevalence of anemia in the present study was 41.2% in pregnant women attending ANC in the study area, which is consistent with the study done in woliyta sodo with prevalence of 39.9%**[9]**. Prevalence of anemia obtained in this study was higher than the previous studies done on pregnant women at western Ethiopia, Harara ,Mekelletown,EDHS,Gondar North western of Tigray, WestArsi, TikurAnbess Specialty Hospital ,and Turkey where prevalence were found 29%,27.9%,19%,22%,23.2%36.1%,31.6%,36.6%,21.3%and%27.1% respectively.

[10,13-18,19,20,23,25,26]

But it was lower than a study done in boditti health center and Gode town where the prevalence was found to be 60%% and 56.8% respectively **[17, 22].** The possible reason for observed difference for higher prevalence of anemia in the present study than previous reports might be attributed to Socioeconomic, study population and geographical variations that show different prevalence's of anemia in pregnant women across countries. Additionally, In this study, pregnant women with severe anemia were included, while these were excluded in studies done in Gondar, mekella and Turkey **[18, 14, 26].**This may higher the prevalence of anemia among the pregnant women in present study compared to the pregnant women in other previous study area. Moreover, it is evidenced by One of the major contributory factors for anemia in developing countries which is consumption of plant based food containing insufficient iron which is in line of stable diet [godere] for majority respondent in study area especially insufficient available hem iron from meat even though Meat is a good source of high quality protein, iron and zinc and of all the B-vitamins except folic acid **[25**].

Out of all anemic pregnant mothers in this study, 45.5% (76/167) of them had mild anemia, 50.3% (84/167) had moderate anemia and 4.2% (7/167) had severe anemia according to WHO classification for degree of anemia). In contrast to this study, a study conducted in western Ethiopia, Mekelle town Tikur Anbessa Specialty Hospital and West Arsi had shown mild anemia in 72.2% ,13,7%,,80.9%and 36.6% respectively [**10,14.23,25]**. it might because of methodological variations and poor antenatal care between the present study and the aforementioned one

Prevalence of anemia was higher in the first and third trimesters than in the second trimester in this study. Taking the second trimester as reference group, the relationship of gestational age with anemia was statistically significant for first and the third trimester (AOR = 8.040, 95% CI: 3.201-20.196). This finding is in line with other studies report which was evidenced by the fact that hem dilution increase toward the end of gestational age as a result of increase in estrogen level **[10 14 ,23,26].**it might also indicated poor antenatal care

In this study pregnant women with a history of heavy cycle were 5 times more likely to be anemic than those who had normal menstruation cycle (AOR = 5.403, 95% CI: 3.027-9.644). This finding is in line with study done in Mekelle town ,North western Tigray and west Arsi **[14 ,20,23**]. These might be due to the fact that increase in number of sanitary pad usage per day reflects increase in the amount of blood flow-one of the predisposing factors for the occurrence of anemia

Pregnant women who had meal frequency less than two times per day were 3 times at higher risk of developing anemia than those whose meal frequency was more than three times per day (AOR = 3.166, 95% CI: 1.260-7.956) . This finding is in line with study done in Mekelle town ,North western Tigray and west Arsi **.**This might be due to the fact that Pregnancy is the most nutritionally demanding period in a woman's life and can be fulfilled with increased meal frequency and pregnant women are advised to increase meal frequency than usual because when prepregnancy iron stores are low, the amount of iron required during the last half of pregnancy cannot easily be met by meal and the risk of iron anemia could be high, especially toward the end of pregnancy. **[14 ,20,23]**

Study participants who take tea after meal were found almost four times more anemic than those who take tea once or none per day(AOR = 3.739, 95% CI: 2.060-6.786). The This finding is consistent with the study done Mekelle town and western Arsi in which pregnant women who took meal after meal were more anemic compared to their counterpart **[14,23].**This is due to the fact that Iron absorption is enhanced when consumed with foods high in vitamin C such as orange juice but substances in coffee and tea inhibit iron absorption by the formation of insoluble iron tannate complexes **[14, 23, 25].**

Strength

In line to any other study, the current study has strengths as well as limitations which need to be noted while interpreting the findings. The main strength of the study is it was conducted at a teaching hospital that coverage large geographical area with large sample size (405) which almost being representative of study participant where large flow of client and referral has been seen in a study area .Hence, the finding can clearly reflect the prevalence and associated risk factor of Anemia in a given area.

Limitation

The findings of this study should be interpreted with caution due to the following limitations of the study.

- First, cross sectional nature of the study limits measuring the cause and effect relationship due to the cross sectional study design used, whether anemia preceded the predisposing factors or the vice versa could not be verified in this study.
- Second, there was both social desirability and re call bias while subjects were requested to give dietary information and monthly income. Inclusion of patients with severe anemia may potentially higher the prevalence in the study groups and.
- Third, micronutrients were not measured in this study, which limits further classification of the anemia.
- Last, since HGB level is recorded from client chart it limit reliability.

Conclusion and recommendation

The overall prevalence of anemia in this study using a cut off level of haemoglobin <11 g/dl (<33% haematocrit) was 41.2% and the majority of them were of the moderate type (haemoglobin: 10-10.9 g/dl).. The present study has shown a statistically significant association between anemia and increased gestational age, meal frequency less than two per day, excess menstrual bleeding, and tea intake after meal. This emphasizes the need for continuing strengthening of interventions on factors associated with anemia. The following are recommended during pregnancy at health institutions during ANC follow up to women in child bearing age in general and pregnant women in particular;

HEALTH PROFESIONAL PROVIDING ANC SERIVCE

- Awareness creation should promoted through the strengthened health education on risk factors like avoiding tea intake after meal and prevention of anemia and nutritional counseling should given at health institutions during ANC follow up in an attempt to reduce the prevalence of anemia among pregnant mothers..
- Additionally, strengthen health care seeking behavior of women to ensure early Antenatal booking and special care toward end of gestation during pregnancy period should be inspired by health care provider

RESEARCHER

- Further research on risk factors of anemia, which include micronutrient deficiencies, as well as laboratory studies should be conducted to identify the root cause of the underlying problems in the pregnant mothers so as to guide the health care provider to alleviate the existing problems

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Annex 1. Information sheet

Code No:…….

Addis Ababa University College of Health Science, Department Of Nursing and Midwifery

Information page

Interviewer administered questionnaire consent format used to obtain permission immediately before data collection time from respondents to assess the prevalence and associated risk factors for anemia in pregnant women attending antenatal care at Mizan - Aman General Hospital, southern Ethiopia

Good morning/Afternoon! My name is _____. I am working as data collector in a study conducted by the College of Health science, department of Nursing and Midwifery Addis Ababa University. This questionnaire is prepared to conduct study of the prevalence and associated risk factors for anemia in pregnant women attending antenatal care. . The first sets of questionnaire comprise questions about socio-demographic variables and other independent variables. The second component concerned knowledge and associated risk factor of anemia in pregnancy.Part three focuses on hemoglobin report chart of pregnant women that infer the level of anemia .You are selected and included in the study as part of the sample population to complete the questionnaire designed by the researcher. The data you will provide is very helpful to give important comments that will help to strengthen and improve the study. The information obtained in this study will be used only for research purposes. Your name will not be put in the format. Any information obtained will be kept strictly confidential and will not be exposed to any other body in connection to your name. Your participation is voluntary and you are not obliged to answer any questions you don't want. But your honest participation will contribute a lot to generate information to come up with important findings. It will take about 20 minutes.

Do I have your permission to continue?

Yes ____

No ____

Data collector: Name_____ Signature: _____ Date: ____

Annex2- II. Informed consent

I have read this form or it has been read to me in the language I understand all conditions stated above. Therefore, I am willing to participate in this study.

Signature _____

For whom who needs my address;

Name of **PI**: Dereje Sisay

Address: Tell 0933952644

E-mail eyudereyasis@gmail.com

Name of witness _____

Signature _____

Date of interview----------Time started---------- Time completed----------

Result of interview:

1. Completed 2. Refused 3. Partially completed

Checked by:

Supervisor Name----------signature----------Date---------

If no, skip to the next participant by writing reasons for his/her refusa

Annex III.: English version Questionnaire)

Questionnaire ID No----------

Direction for Data Collectors:Put**(√)** mark on the boxes in front of options provided.

Part I: socio demographic and economic characteristics of the respondents among pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April , 2016.

1. Code No_____, Age_____

2. Address : Region ____ Zone_____ Woreda ____ Kebele ____

3. Occupation ☐Government employee ☐ Merchant ☐ Maid ☐ Student

☐ House wife ☐ Bartender ☐ Others specify

4. Educational level ☐ Illiterate☐ Literacy campaign☐ Elementary Schoo

l☐Secondary school ☐Higher level

5. What is your monthly income (in average) in birr? …….

Part 2. Clinical related characteristics of the respondents among pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April, 2016.

6. Is this your first pregnancy? ☐ Yes ☐ No

7. If no to No 7, how many times have you been pregnant? ☐1 ☐ 2☐ 3 ☐ 4☐ Above 5

8. What is the duration of time you waited between pregnancies? ☐Less than two years☐ Greater than two years.

9. Did you follow ANC during your previous pregnancies? ☐ Yes ☐ No

10. If no to No 10 why? ☐ You were not informed about it ☐Absence of health institution near your house. ☐ You were not willing ☐ Financial problem ☐Others (specify)

11. Was there any chronic disease in the previous pregnancies? ☐ Yes☐ No

12. If yes to No 11 what was the disease? Specify……..

13. Do you have any disease now? ☐ Yes ☐No

14. If yes to No 13 specify. …….

15. Do you know about anemia? ☐Yes ☐ No

16. If yes to No 15, how do you think it's caused? Specify

17. Did you take supplements during your pregnancies? ☐Yes ☐ No

18.Have you ever used contraceptive? ☐Yes ☐ No

19.was there history of excessive menstrual bleeding? ☐ Yes ☐ No

20. did your menstrual bleeding regular? ☐ Yes ☐ No

21. was there history of abortion? ☐ Yes ☐ No

Part 3;Nutritional habit of the respondents among pregnant women attending ANC at Mizan Tepi Teaching Hospital from March to April, 2016.

22.How many times do you eat meat per week? ☐At least once per week☐Less than once per week

23Hoe many times do you eat fruit and vegetables per aday? ☐At least once per day ☐Less than once per day

24.Do drink tea after meal? ☐At least once per day☐Less than once per day

25.Do you drink coffee after meal? ☐Always after meal ☐Once or less per day

26. Do you chew chat ? ☐Every day☐Occasionally☐Never

27.Do you use bed net consistently? ☐ Yes ☐ No

***Part 4. Laboratory Test* information among pregnant women attending ANC at Mizan Aman General Hospital , 2016**

28. Hemoglobin Report ☐ (Above 11☐Mild (10-11)☐Moderate (7-9.9)☐Total anemic N (%

IV. Amharic version Questionnaire

አማርኛቅፆችመጠይቅ

ቅፅ 1- የመረጃ ገፅ

መለያ ቁጥር፣ ……..

በአዲስ አበባ ዩኒቨርሲቲ የጤና ሳይንስ ኮሌጅ፣ የነርሲንግና የአዋላጅ ነርሶች ዲፓርትመንት

የመረጃ ገፅ

በደቡብ ኢትዮጵያ ሚዛን አማን አጠቃላይ ሆስፒታል የቅድመ ወሊድ ክትትል ከሚያደርጉ ነፍሰ ጡር ሴቶች የደም ማነስ ስርጭትንና ተዛማጅ መዘዞች/አደጋዎችን በተመለከተ በተሰራ የዳሰሳ ጥናት፣ በመረጃ ሰብሳቢው ለሚቀርቡ መጠይቆች መረጃ ከመሰብሰቡ አስቀድሞ የመረጃ ሰጪዎችን በፍቃደኝነትና በእውቀት ላይ የተመሰረተ ስምምነት ለማግኘት የተዘጋጀ ቅፅ/ፎርም፡፡

እንደምን አደሩ/ዋሉ! ስሜ _____ይባላል፡፡የአዲስ አበባ ዩኒቨርሲቲ የጤና ሳይንስ ኮሌጅ፣ የነርሲንግና የአዋላጅ ነርሶች ዲፓርትመንት በሚያካሂደው ጥናት መረጃ ሰብሳቢ በመሆን በማገልገል ላይ እገኛለሁ፡፡ይህ ቃለ መጠይቅ የተዘጋጀው የቅድመ ወሊድ ክትትል ከሚያደርጉ ነፍሰ ጡር ሴቶች የደም ማነስ ስርጭትንና ተዛማጅ መዘዞች/አደጋዎችን በተመለከተ ጥናት ለማካሄድ ነው፡፡የመጠይቁ የመጀመሪያ ክፍል የመረጃ ሰጪውን ማህበራዊና ኢኮኖሚያዊ ሁኔታዎች ይዳስሳል፡፡ሁለተኛው ክፍል በእርግዝና ወቅት ስለ ደም ማነስና የሚያስከትላቸው መዘዞች/አደጋዎች ይመለከታል፡፡ሶስተኛው የመጠይቁ ክፍል ነፍሰጡር ሴቶች ምን ያህል በደም ማነስ ተጠቂ መሆናቸውን የሚጠቁመው የደም መጠንን ስለሚያመለክተው የቻርት ሪፖርት ላይ ያተኩራል፡፡ እርስዎ ለዚህ ቃለመጠይቅ የተመረጡት ጥናቱ የሚመለከተውን የህብረተሰብ ክፍል በሚወክለው ናሙና ውስጥ የተካተቱ በመሆንዎና በተመራማሪው የተዘጋጀው መጠይቅ ምላሽ ስለሚያስፈልገው ነው፡፡እርስዎ የሚሰጡት መረጃ ጥናቱን ለማዳበርና ለማጠናከር የሚሰጡ ጠቃሚ አስያየቶችን ለማጠናቀር እጅግ ጠቃሚ ነው፡፡በዚህ ጥናት የሚሰበሰበው መረጃ ለምርምር ስራ ብቻ በግብዐትነት ይውላል፡፡ የእርስዎ ስም በዚህ የመረጃ መሰብሰቢያ ቅፅ ውስጥ በፍፁም አይካተትም፡፡ማንኛውም የሚሰበሰበው መረጃ በፍፁም ሚስጥራዊነት የሚጠበቅ ሲሆን ከእርስዎ ስም ጋር በተያያዘ ለሌላ ወገን ተላልፎ አይሰጥም፡፡የእርስዎ በዚህ ጥናት መሳተፍ በፍቃደኝነት ላይ የተመሰረተ ሲሆን ምላሽ ለመስጠት ለማይፈልጉት ጥያቄ መልስ እንዲሰጡ አይገደዱም፡፡ነገር ግን በታማኝነትና በእውነተኛነት ላይ የተመሰረተ ተሳትፎዎ ጠቃሚ ግኝቶችን ለማግኘት ለሚጠናቀረው መረጃ የላቀ አስተዋፅአ አለው፡፡ ቃለ መጠይቁ 20 ደቂቃዎችን ሊወስድ ይችላል፡፡

ለቃለ መጠይቁ ፍቃደኛ ነዎት? አዎ _____ አይደለሁም _____

የመረጃ ሰብሳቢው፣ስም_____ ፊርማ፣ _____ቀን፣_____

ቅፅ 2-ስምምነት

ይሄንን ፎርም ሊገባኝና ልረዳበት በምችልበት ቋንቋ አንብቤ ወይም ተነቦልኝ እንዲሁም ከላይ የተዘረዘሩት ነባሪያዊ ሁኔታዎች ተብራርተውልኝ፣ በዚህ ጥናት ተሳታፊ ለመሆን ፍቃደኝነቴን ገልጫለሁኝ፡፡

ፊርማ _____

አድራሻዬን ማግኘት ለሚፈልጉ በሚከተሉት አድራሻዎች መገኘት እችላለሁ፤ ደረጀ ሲሳይ

ስልክ፣ 0933952644

ኢ-ሜይል፣ eyudereyasis@gmail.com

እማኝ ምስክር ስም፣ _____

ፊርማ፣ _____

መጠይቁ የተካሄደበት ቀን፣----------የተጀመረበት ሰዓት፣---------- የተጠናቀቀበት ሰዓት፣----------

የቃለ መጠይቁ መደምደሚያ ውጤት፣

1. ተጠናቋል 2. ለቃለ መጠይቁ ፍቃደኛ ሳይሆኑ ቀርተዋል 3.ቃለመጠይቁ በከፊል ተጠናቋል

ያረጋገጠው፣

የመረጃ ተቆጣጣሪው ስም፣----------ፊርማ፣----------ቀን፣---------

ተጠያቂዋ መረጃ ለመስጠት ፍቃደኛ ካልሆነች፣ ምክንያቱን በመፃፍ ወደሚቀጥለው ተጠያቂ እለፍ፡፡

ቅፅ 3-የመረጃ መሰብሰቢያ መጠይቅ(አማርኛ ቅጅ)

የመጠይቁ መለያ ቁጥር----------

ለመረጃ ሰብሳቢው/ዋ የተሰጠ መመሪያ፣ መረጃ ሰጪዋ የምትሰጠውን ምላሽ ከተሰጡት አማራጮች ይሄን(√)ምልክት በሳጥኑ ውስጥ በማድረግ አመልክት/ቺ.

ክፍል 1 የመረጃ ሰጪተጠያቂዋን ማህበራዊና ኢኮኖሚያዊ ሁኔታዎችን የሚመለከት መሰረታዊ መረጃ(በሚዛን አማን አጠቃላይ ሆስፒታል የቅድመ ወሊድ ክትትል ለሚያደርጉ ነፍሰ ጡር ሴቶች የቀረበ መጠይቅ፣ 2008 ዓ.ም)

1. መለያ ቁጥር_____ ዕድሜ_____

2. አድራሻ፣ ክልል_____**ዞን**_____ **ወረዳ**_____ **ቀበሌ**_____

3. ሥራ

☐ የመንግስት ሠራተኛ ☐ ነጋዴ ☐ የቤት ሠራተኛ ☐ ተማሪ ☐ የቤት እመቤት

☐ የቡናቤት ሰራተኛ ☐ ሌሎች(ይጠቀስ)_____

4. የትምህርት ደረጃ

☐ ያልተማረች ☐ መሠረተ ትምህርት ☐ የመጀመሪያ ደረጃ

☐ ሁለተኛ ደረጃ ☐ ኮሌጅ/ዩኒቨርስቲ

5. የወር ገቢዎ በአማካይ ምን ያህል ነው(በብር)?.....

ክፍል 2በሚዛን አማን አጠቃላይ ሆስፒታል የቅድመ ወሊድ ክትትል ለሚያደርጉ ነፍሰ ጡር ሴቶች ስለ ደም ማነስና መንስኤዎቹ ያላቸውን ግንዛቤ ለማወቅ የቀረበ መጠይቅ፣ 2008 ዓ.ም

6. ይህ የመጀመሪያ እርግዝናዎ ነው?☐ አዎ ☐ አይደለም

7. ለጥያቄ 6 መልስዎ አይደለም ከሆነ፣ ለምን ያህል ጊዜ ነፍሰ ጡር ሆነው ያውቃሉ?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ከ5 ጊዜ በላይ

8. በሁለት ተከታታይ የእርግዝና ጊዜዎ ወቅት በመካከል የነበረው የጊዜ ልዩነት ምን ያህል ነበር?

☐ ከሁለት አመት በታች ☐ ከሁለት አመት በላይ

9. በቀደመው የእርግዝናዎ ወቅት የቅድመ ወሊድ ክትትል አድርገው ነበር?

☐አዎ ☐ አይደለም

10. ለጥያቄ ቁ.9 መልስዎ አይደለም ከሆነ፣ለምን?

☐ ግንዛቤ አልነበረኝም ☐ በአቅራቢያዬ የጤና መስጫ ተቋም አልነበረም/የለም ☐ ፍቃደኛ አልነበርኩም

☐ የገንዘብ ችግር ነበረብኝሌሎች(ይጠቀስ)…….

11. በቀደሙት የእርግዝናዎ ወቅት መድሀኒት ያልተገኘለት ፈውስ የለሽ ህመም ነበረብዎት?

☐አዎ ☐ አይደለም

12. ለጥያቄ ቁ.11 መልስዎ አዎ ከሆነ፣ የበሽታዎ ዓይነት ምን ነበር? ይጠቀስ፣……

13. አሁን ማናቸውም ዓይነት በሽታ/ህመም አለብዎት?

☐አዎ ☐ አይደለም

14. ለጥያቄ ቁ.13 መልስዎ አዎ ከሆነ፣ የበሽታው ዓይነት ይጠቀስ፣…….

15. ስለ ደም ማነስ የሚያውቁት ነገር አለ?

☐አዎ ☐ አይደለም

16. ለጥያቄ ቁ.15 መልስዎ አዎ ከሆነ፣ መንስኤው ምንድነው ብለው ያስባሉ? ይጠቀስ፣…….

17. በእርግዝናዎ ወቅት ተጨማሪ በሀኪም የታዘዘ ንጥረ ነገር ይወስዳሉ/ወስደው ነበር?

☐አዎ ☐ አይደለም

18. የእርግዝና መከላከያ ተጠቅመው ያውቃሉ?

☐ አዎ ☐ አይደለም

19. ከተለመደው ውጪ የተራዘመ ገደብ የለሽ የወር አበባ መፍሰስ ታሪክ አጋጥሞዎት ያውቃል?

☐አዎ☐አይደለም

20. የወር አበባ ዑደትዎ ያልተዛባ ነው?

☐መደበኛ☐መደበኛ ያልሆነ

21. የፅንስ ማስወረድ/ማቋረጥ ታሪክ አለዎት?

☐አዎ☐አይደለም

22. በሳምንት ውስጥ ለምን ያህል ጊዜ ስጋ ይመገባሉ?

☐ቢያንስ በሳምንት ለአንድ ጊዜ ☐በሳምንት ከአንድ ጊዜ በታች

23.በቀን ለምን ያህል ጊዜ አትክልትና ፍራፍሬ ይመገባሉ?

☐በየቀኑ☐ቢያንስ በቀን አንድ ጊዜ ☐በቀን ከአንድ ጊዜ በታች

24.ከምግብ በኋላ ሻይ ይጠጣሉ?

☐ሁልጊዜ ከምግብ በኋላ እጠጣለሁ ☐በቀን አንድ ጊዜ ወይም ከዚያ በታች እጠጣለሁ

25. ከምግብ በኋላ ቡና ይጠጣሉ?

☐ ሁልጊዜ ከምግብ በኋላ እጠጣለሁ ☐በቀንአንድጊዜወይምከዚያበታችእጠጣለሁ

26. ጫት ይቅማሉ?

☐ በየዕለቱ እቅማለሁ☐አልፎ አልፎ እቅማለሁ

27. የወባ መከላከያ አጎበር አዘውትረው ይጠቀማሉ?

☐አዎ☐አይደለም

ክፍል 3. በሚዛን አማን ሆስፒታል የቅድመ ወሊድ ክትትል ሰለ ሚያደርጉ ነፍሰ ጡር ሴቶች የተወሰደ የላቦራቶሪ ምርመራ መረጃ፣ 2008 ዓ.ም

28. የመረጃ ሰጪ ተጠያቂዋ የደም መጠን

☐ ከ 11 በላይ☐መጠነኛ (10-11) ☐መካከለኛ (7-9.9) ☐አጠቃላይ የደም ማነስ ምልክት (%)