WOLKITE UNIVERSITY

COLLEGE OF HEALTH SCIENCE AND MEDCINE

DEPARTEMENT OF PUBLIC HEALTH

ASSESSING THE PREVALECE OF ANEMIA AND ASSOCIATED FACTERS AMONG PREGNANT MOTHER WHO ATTEND ANC CLINIC AT WORABE COMPRHENSIVE SPECIALIZED HOSPITAL SILTE ZONE, SOUTH NATION NATIONALITY PEOPLE REGION, SOUTHERN ETHIOPIA 2021.

BY:

CHERU ESHETU……083/10

MELAKU WOLDE……102/10

SINTAYEHU FELEKE……115/10

ADVISSORS:

MR MEHAR (MSC)

MS KEBEBUSH (MSC)

A RESEARCH PAPER SUBIMITTED TO WOLKITE UNIVERSITY COLLEGE OF HEALTH SCIENCE DEPARTMENT OF PUBLIC HEALTH IN PARTIAL FULFILEMENT FOR THE REQUARMENT OF BACHLER DEGREE IN PUBLIC HEALTH

WOLKITE - ETHIOPIA 2021

ACKNOWLEDGEMENT

First of all, we would like to express our heartfelt thanks to God for enabling us to undertake this study.

We gratitude to Wolkite university collage of health science and medicine, department of public health due to giving of this golden educational opportunity and approving our title.

We would like to express our deepest gratitude and appreciation to our advisors Mr. Mehari(MSC) and Ms. Kebebush(MSC) for their encouragement and provision of constrictive comment and guidance while contacting this proposal.

We will also want to thanks worabe comprehensive specialized hospital for their support by giving information during this result development.

Table of contents

List of contents **Page**

List of tables

List of figures

Acronyms

ANC - Ante Natal care

APH -Ante Partum Hemorrhage

DHS - Demographic and Health Survey

HEW - Health Extension Worker

Hg - Hemoglobin

HIV - Human Immunodeficiency Virus

IDA - Iron Deficiency Anemia

ID - Iron Deficiency

MCH - Maternal and Child Health

MDGs - Millennium Development Goals

MOH - Ministry of Health

PPH - Post Partum Hemorrhage

PW - Pregnant Women

PMTCT - Prevention of Mother to Child Transmission of HIV

SNNPR- South Nation Nationality and People Region

WCSH - Worabe Comprehensive Specialized Hospital

WHO - World Health Organization

Abstract

Background: In pregnancy, anemia is an important factor associated with an increased risk of maternal, fetal, and neonatal mortality, poor pregnancy outcomes, and impaired cognitive development, particularly in developing countries like Ethiopia. This study aimed to assess prevalence and factors associated with anemia among pregnant women attending antenatal clinic at worabe comprehensive specialized hospital, silte zone, Ethiopia.

Objective: To assess the prevalence and associated factors of anemia among pregnant women attending antenatal care clinic in worabe comprehensive specialized hospital, Southern Ethiopia from September 2 to October 3, 2021

Methods: Facility based descriptive cross-sectional study was carried out on 295 pregnant women by using probability systematic sampling method with structural questionnaire of face-to- face interview at WCSH, worabe town, Silte zone, SNNPR, Southern Ethiopia. Structured questionnaire pretesting was used. The collected data were edited, coded, and analyzed manually. Descriptive statistical techniques would have employed. Percentages were computed and graphical techniques also considered.

Results: Among the 295 study participants, 21.7% were anemic. Out of these majorities were mild types 79.69%. Illiterate Pregnant woman, having low dietary level, and infected with malaria had higher odds of being anemic with comparing to their counterpart but gestational age of first and second trimester has lower odds of being anemic when comparing to the third trimester anemic. Out of these majorities were mild types.

Conclusion: -Anemia among pregnant women is found to be moderated public health problem in the study area. Parity, illiteracy, and Irion containing meal consumption were significantly and independently affect anemia of pregnant women. Improved Irion containing meal consumption contributes for decreasing prevalence of anemia. Moreover, Diversifying food intake and educating of pregnant women is highly recommended.

Recommendation: **-**Worabe Comprehensive Specialized Hospital, together with collaborators and stakeholders, shall Work on early detection of anemia in pregnancy.

Zonal health office, together with collaborators and stakeholders, provide health education and information on nutritional anemia

1 INTRODUCTION

1.1 Background Information

Anemia refers to a condition in which the hemoglobin content of the blood is lower than normal as a result of a deficiency of one or more essential nutrients, heavy blood loss, parasitic infections such as hookworm infestations, acute and chronic infections, and congenital hemolytic disease (1).

At least half of anemia worldwide is due to iron deficiency. Iron deficiency is primarily due to lack of bio-available dietary iron or increased requirements in childhood and pregnancy. The major factors that lead to anemia during pregnancy are diminished intake of iron, diminish absorption, disturbed metabolism, pre-pregnancy health status and excessive demand.

The pathological anemia is grading according to level of hemoglobin, mild anemia between 10-10.9gm/dl, moderate anemia between 7-9.9 gm/dl, severe anemia less than 7gm/dl [2]. There are a variety of causes of anemia, related to both individual and environmental factors. Nutritional deficiencies (float, vitamin B12 and vitamin A) are also risk factors for anemia, as are diets rich in phytate and poor in animal products (3).

Nutritional anemia, especially iron deficiency anemia, was currently the greatest global nutritional problem, mainly affecting women and children with representation a significant constraint for many nations' chances of improved public health and economic development. The diets of the poor are characterized more by poor quality than quantity, although the latter is often the case in many chronic and especially acute, emergency situations. The diets of the poor have a low energy density and poor availability of important micronutrients, for example, iron, vitamin A and zinc (4).

WHO estimates that 35% to 75% (56% on average) of pregnant women in developing countries and 18% of those in industrialized countries have anemia. The prevalence rate of anemia is higher in developing country than in industrialized countries but in the later still reach level of public health significance (above 10%) in pregnant women. The most affected group in approximate descending order are pregnant women, preschool aged children, low birth weight infants, other women, the elderly, school age children and adult men. In the developing country the prevalence rate in pregnant women is commonly in the range of 40%

to 60%; among the women 20% to 40%; and in school age children and adult men, around 20%. Around half of those with anemia are suffering iron deficiency anemia (5).

An organized approach to the diagnosis of anemia is very much essential. The Complete Blood Count (CBC) is the most commonly ordered blood test. The measured values of the CBC include the total counts for red blood cells (RBCs), platelets, and white blood cells (WBCs) and the volumes of RBCs, platelets, WBCs, and hemoglobin. The calculated values include the hematocrits, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), and red cell distribution width (6).

The etiology of anemia in Ethiopia is not well established and the information available is limited in representativeness of the whole country. Various researchers came up with different conclusions despite the problem being among the ten top morbidities reported by most health institutions in the country. Therefore, important risk factors have to be identified and their role in causing anemia was evaluated in order to design an intervention for treatment and prevention of anemia in pregnant women (7).

Anemia in pregnancy is related to different socio-demographic, dietary and economic factors. The commonest cause of anemia during pregnancy includes iron and foliate deficiency aggravated by short birth intervals, and parasitic infections. Different dietary factors affect the bio availability of iron from food. The influence of ascorbic acid is most substantial in inhibitory food, which means food that contains the main inhibitors of non-hem iron absorption, Phytate and polyphenols. (8).

Anemia is the end result of severe nutrient deficiency of one or more hematopoietic factors usually iron, less frequently foliate or vitamin B_{12}.

Hemoglobin concentration, by which anemia is diagnosed, is a relatively insensitive index of milder degrees of nutrient depletion, so that by the time a woman becomes anemic she is already suffering from a marked degree of nutrient deficiency. Because a low hemoglobin content of blood is more easily detected than the underlying deficiencies, it has come to be used as an index of hematopoietic status. The overall cause of nutritional anemia is low nutrient intake, poor absorption or utilization and increased nutrient loss and/or demands. In many developing countries nutrient intake is low simply because food intake is low. In addition to those who actually go hungry there are millions more who suffer a lack of specific

nutrients in their diet. Important differences in hemoglobin value may frequently be found at different social and income levels, pointing to dietary shortcoming related to cost, as well as dietary and cooking habits (9).

Women in reproductive age have a particularly high demand for hematopoietic nutrients. When not pregnant or lactating, regular menstrual losses constitute a continuing drain of nutrients which have to be replaced. On average a healthy woman loses 25 to 30 ml of blood each month. This is equivalent to an average daily blood loss of 0.5mg of iron.

A FAO/WHO expert group has calculated that non-pregnant women require a daily absorption of 2.4mg of iron compared to 1.1mg required by an adult man. Nutrient requirement in pregnancy is much greater. The total iron need during the whole of pregnancy is estimated at about 1000mg. The daily requirements for iron, as well as foliate, are six times greater for women in the last trimester of pregnancy than for a non-pregnant woman. This need cannot be met by diet alone but is derived at least partly from maternal reserves. In a well-nourished woman about half the total requirement of iron may come from iron stores.

When these reserves are already low due to malnutrition and/or frequent pregnancies anemia will results. It has been estimated that even when food intake is adequate it may take two years to replenish body iron stores after pregnancy (10).

In malaria infection red blood cell are rapidly destroyed, and at a rate faster than the body can replace them. In the case of bacterial infections normal bone marrow function is suppressed so that even if the relevant nutrients are all present in the body their conversion to hemoglobin cannot take place until the infection is brought under control. In the course of blood loss from the causes mentioned above, red corpuscles and hence hemoglobin are lost. If the hemorrhage is very heavy, the hemoglobin concentration will fall and will remain low until the lost red cells are replaced (11). Ethiopia is among countries where there is a high level of anemia among women of reproductive age and pregnant women. A higher proportion of pregnant women are anemic (22 %) than women who are breastfeeding (19 percent) and women who are neither pregnant nor breastfeeding (15%).Therefore, the objective of this study will be to determine the prevalence of anemia and associated factor among pregnant women in worabe comprehensive specialized hospital, SNNP, Ethiopia.

1.2 Statement of the problem

Anemia is wide spread public health problem associated with increased risk of morbidity and when sever mortality especially in pregnant women and young children with estimated global prevalence of 51% and 43% respectively (12).

In pregnancy, anemia has significant impact on the health of fetus as well as that of mother. Twenty percent of maternal death in Africa has been attributed to anemia (13).

Fetus is at risk of low birth weight (LBW), morbidity and prenatal mortality due to impairment of oxygen delivery to placenta and fetus (14, 15).

The consequence of anemia in pregnancy includes; still birth, low birth weight, reduced work capacity, decreased mental performance, low tolerance to infections, and death from anemic heart failure and maternal deaths due to uncontrolled bleeding (16).

Iron deficiency anemia during pregnancy is associated with higher rates of premature birth and low birth weight.

In the developing world, pregnant women and their child are frequently exposed to parasitic infections like malaria and intestinal helminths, which co-exist widely with micronutrient deficiencies and contribute to iron deficiency anemia and anemia also related to different socio-demographic, dietary and economic factors (17).

Associated factors include, low socio-economic status, illiteracy, ignorance. Infection with Hook worm and intestinal helminths causes gastro-intestinal blood loss resulting in depletion of iron stores and consequently impaired erythropoietin. They also lead to mal-absorption and inhibition of appetite, there by worsening micronutrient deficiency and maternal anemia (18).

So, our aim will be to improvement mother and child health during pregnancy related to anemia and its associated factor, community of participants in the study and society at large.

1.3 Significance of the study

This study will be conducted to assess the prevalence of anemia and its associated factors among pregnant mothers in WCSH.

Therefore, the result of this study may scale up the knowledge concerning the prevalence and the contextual associated factors of anemia at different levels. It will create awareness among pregnant women concerning anemia and its associated factors in preventing and reducing the occurrence of the problem and hence helps to have a healthy outcome of pregnancy. It also creates awareness among the health care providers in the study area and others thereby it can also help them being an input of their action plan in alleviating the problem. Apart from this the study result can also help the local health personnel and authorities in revising their programs towards maternal health. Therefore, it also in reducing the maternal and prenatal morbidity and mortality posed by the occurrence of anemia through early screening, detection and taking corrective measures for the pregnant women who are risk of developing the problem. In addition, the study may be helpful for future researchers by serving as an input material while conducting further studies on similar problems.

1.4 Literature review

1.4.1 Prevalence of Anemia

Studies carried out in India have shown that iron deficiency is the major cause of anemia followed by foliate deficiency. In recent years, the contribution of B12 deficiency has been highlighted. In India, the prevalence of anemia is high because of (*I*) low dietary intake, poor iron (less than 20 mg/day) and folic acid intake (less than 70 mg/day); (*ii*) poor bioavailability of iron (3-4% only) in phytate and fiber -rich Indian diet; and (*iii*) chronic blood loss due to infection such as malaria and hookworm infestations (19).

The prevalence of anemia in pregnant women in Vietnam varies by area, from 32% and 39% in the plain areas to 41% in the mountainous areas of the Central Coast and 60% in the Centre Highland. The prevalence of anemia in non-pregnant women ranges from 8% to 24%.

Factors related to anemia in PW include pregnancy during the third trimester, having four or more pregnancies, illness, low iron intake and Hookworm (20).

In Africa Prevalence of anemia can be as high as 61% in developing countries. Studies in Nigeria have shown that malaria is still a major problem among pregnant women. In pregnancy, anemia has a significant impact on the health of the fetus as well as that of the mother. 20% of maternal deaths a have been attributed to anemia (21).

A study from Malawi and Tanzania showed that 60% of iron-deficient women had other deficiencies as well and many had signs of inflammation. It was identified complex, multiple causes such as iron deficiency, malaria, hookworms, and other infections as major causes of anemia (22)

In areas of Africa with stable malaria transmission, malaria infection during pregnancy is estimated to cause 400,000 cases of severe maternal anemia and from 75,000 - 200,000 infant deaths each year (23).

In Ethiopia anemia is one of the serious health problems among pregnant women a. Prevalence rates of 40.5% in the general population and 47.2% in the children and. higher rates about 57% pregnant women reported in Jimma [24]

A research conducted in AA in 2011 indicated that the prevalence of anemia in pregnant mother who do not eat animal product, fruit and vegetable and taking coffee and tea immediately after meal were 17.8%, 22.4%and 15.3% respectively. the overall prevalence of anemia was 16.6%. this research also indicates the prevalence of anemia in illiterate, monthly income <700 Ethiopian birr, in serum states positive, infected with intestinal parasite and having chronic illness were 25.7%,22%,38.8%,34.8% and 27.3% respectively. (25)

The research conduct at Azezo in Gonder town indicates that prevalence of anemia was 21.6%. The majority of anemia cases 49% were the mild type followed by 46% cases of moderate and 5%are saver anemia. Demographically 29.2%are lived in rural area and 70.8% are urban area. From this study 64.8% of the women were third trainmaster (gestational age >28 week) followed by 25 % are second trimester (gestational age 14-28 week) and 10.5% are first trimester (gestational age 13 and below. woman without previous pregnancy (no child) were 25.5% anemic, with one child were 27.3%anemic, with two children were 28.9% anemic and 3 and more child were32%anemic. (26)

A study conducted in SNNPR at Sidama town show that the overall prevalence of anemia was 20%. Majority of the participant 92% were in the age of between 18 and 36 years, the Mean age is 30 years and rang from 18 to 48 years. The prevalence of anemia on mother iron sulphat supplementation, birth interval <2 years, experience of abortion and who had no habit of regular shoes wearing were 47.7%,52.7%,23.7%and 58% respectively. The prevalence of anemia in contraceptive users and had excess menses were 28%and 40% respectively. (27)

In Ethiopia, anaemia is the most frequent morbidity among pregnant women with the prevalence ranging from 23% to 66.5%. There is an urban rural deferential in the prevalence of anaemia. As indicated by studies in Mettu, anaemia among pregnant women was consistently higher in the rural women compared to the urban counterparts (10,23).

A cross-sectional study done in Jimma university specialized hospital showed that severe anaemia was identified in 9(5.4%), and the rest had moderate and mild anemia,31(18.5%), and 24(14.3%), respectively. Prevalence of anaemia among rural women was slightly higher than urban that is19 (38.8%) and 45(37.8%), respectively. The prevalence of anaemia was 40%, 34.8%, and 39.5%, for the first, second, and third trimester (28).

1.4.2 Associated factors of Anaemia

According to the study conducted at Azezo health center, Gondar town, North West Ethiopia, 384 pregnant women were participated in the study. Pregnant women with age >34 rural residence, history of malaria attack, hook worm infection and absence of iron supplementation are significantly associated with increased risk of anemia. The most prevalent intestinal parasite among pregnant women's in the study is hook worm (4.7%) (29).

A cross sectional study conducted in Shallaworeda, west Arsi zone, Oromo region, Ethiopia, total of 374 pregnant women were participant. According to this finding, family size of five or more were found to be significantly associated with the occurrence of anemia in pregnancy and intake of vegetables and fruits less than ones per day, intake of tea always after meal and recurrence of illness during pregnancy were additional factor associated with anemia (30).

A facility based cross-sectional study involving 258 pregnant women, were conducted from March to June 2013 , on the prevalence of anemia and associated factors among pregnant

women attending antenatal care(ANC) at Bisidimo Hospital in southeast Ethiopia, residence in rural area(AOR=3.3,95% CI:1.5-7.4),intestinal parasitic infection(AOR=2.5,95%CI:1.3-4.8) and history of heavy menstrual cycle(> 5 days of menses)(AOR=2.7,95%CI:1.3-1.7) were the predisposing factors of anemia among the pregnant women(31).

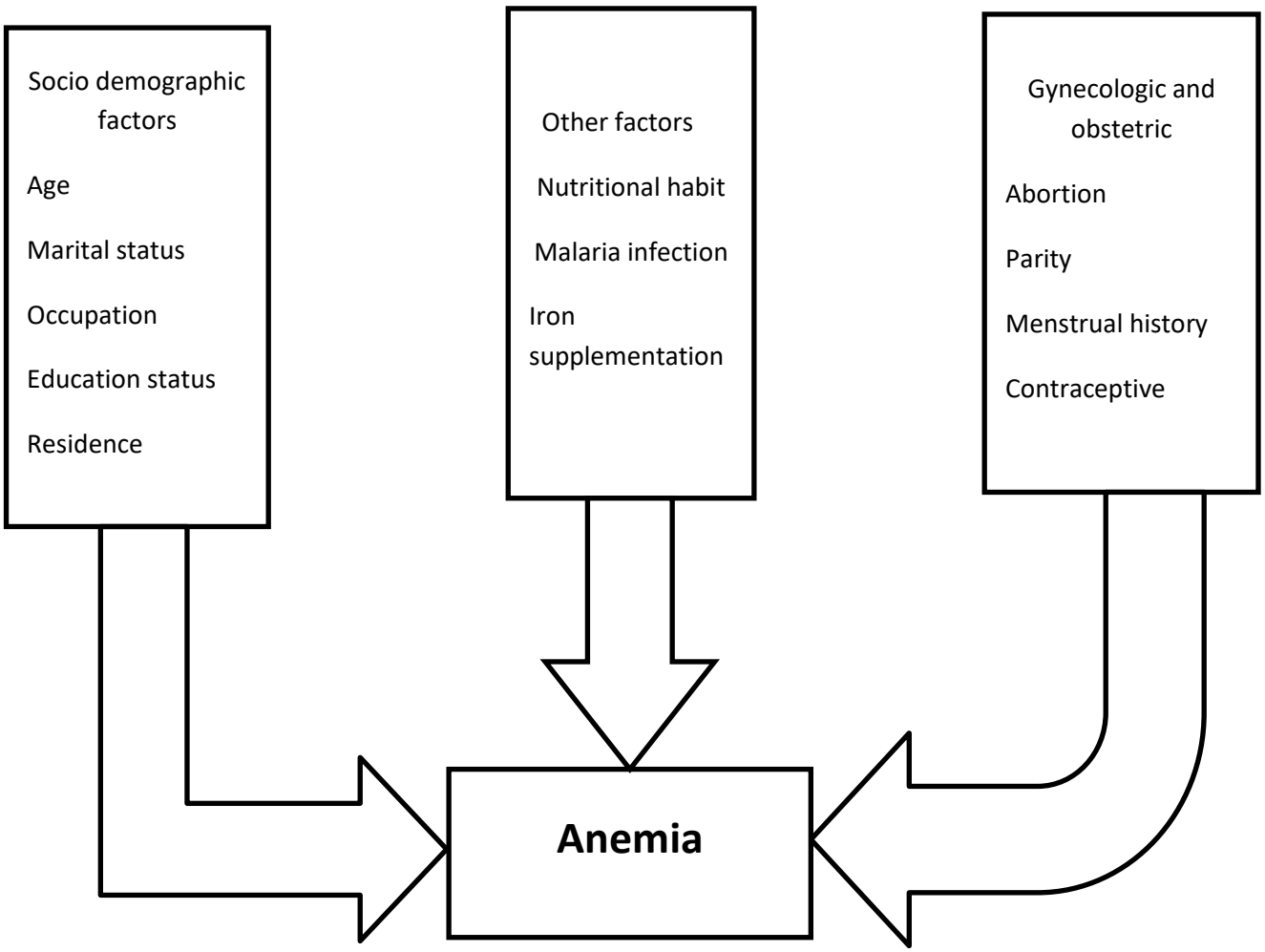

Figure 4-conceptual frame work for factors Affecting anemia in pregnant women

2 Objectives

2.1 General Objective

- Assessing the prevalence of anemia and its associated factors among pregnant mothers who attend ANC clinic at WCSH silte zone, SNNPR, south Ethiopia 2021.

2.2 Specific Objectives

- To assess the prevalence of anaemia among pregnant who attend ANC clinic at worabe comprehensive specialized hospital silte zone, SNNPR, Ethiopia, 2021.
- To assess the associated factors of anemia among pregnant mothers who attends ANC clinic at worabe comprehensive specialized hospital silte zone, SNNPR, Ethiopia, 2021.

3 METHOD AND MATERIAL

3.1 Study area and study period

This study was conducted at WCSH in Silte Zone; SNNPR. Silte Zone is one of 15th zone of SNNPR. Located 176.4KM from Addis Ababa the capital Ethiopia and it was 156.30KM from Hawassa the capital city of SNNPR.

This zone is located in south Ethiopia and bounded by Alaba special woreda in south, Hadiya zone in south west, Gurage zone in north and on east by Oromia region. The capital town of the zone is worabe.

Currently the town has 1 comprehensive specialized hospital,2 health center, 7 private clinic (two of which are medium) 6 health post, 11 pharmacies

WCSH was established in 2008 EC and has total surface area of 105,887km^{2}and the hospital has about 194 beds with occupied rate of 90%, total staff number of 226 with 158 technical and 68 supportive staff.

The hospital has emergency case team, delivery case team, outpatient case team, in patient case team and Surgical case team, paediatrics case team orthopaedics case team, psychiatry case team. This hospital gives a service for about more than 2 million people up to Hadiya but

the health coverage of this hospital was not known due to the catchment population were not known correctly.

The study was conducted from September 2 to October 3 in 2021G.C.

3.2 Study design

Facility based descriptive cross-sectional study design was employed to assess the prevalence of anemia among pregnant mothers attending ANC clinic at WCSH.

3.3 Population

3.3.1 Source population

All pregnant mothers who were attend ANC clinic at WCSH for routine follow up.

3.3.2 Study population

All Pregnant mothers were selected for the study from those attending ANC clinics at WCSH for routine follow up and who fulfill the inclusion criteria.

3.4 Inclusion and Exclusion Criteria

3.4.1 Inclusion Criteria

- Those pregnant women who was volunteer to participate in the study.

3.4.2 Exclusion criteria

- Mothers who were critically ill.
- Mothers with communication barriers

3.5 Sample size determination and Sampling Technique

The sample size was determined by using a single population proportion formula by taking 95% confidence interval and 5% degree of precision taking in to consideration the following assumption.

5% non-response rate

P = estimated prevalence of anemia in study population which was 24.1 from a research conducted in Adare General Hospital, southern Ethiopia.

$N = \frac{(z)^2\, p(1-p)}{d^2}$ where

N sample size of a population assuming more than 10,000 total population

p 0.241

z 1.96(critical value at (95% confidence interval)

d 0.05(margin error between the sample and population)

q 0.759(1-q)

$$N = \frac{(1.96)^2 0.241(0.759)}{(0.05)^2} = 281$$

By adding 5% non-response rate=295

Hence, a total 295 sample would be taken

3.5.1 Sampling technique

The required sample size for this study was calculated using a single population proportion formula with a 95% CI, 5% margin of error, and assumption that 24.1 % of pregnant women are anemic. By adding 5% for non-response, a total of 295 pregnant women were enrolled from antenatal care clinic of obstetrics and gynecology department of WCSH. Systematic random sampling technique was used to recruit the study participants from their sequence of ANC visit during the study period.

3.6 Data collection tool and procedure

The data were collected through face-to-face interview by using structural questioner regarding socio demographic, obstetrics characteristic. We took responsibility to file questioner after obtaining verbal consent from the subject.

We would monitor the overall data collection process on daily bases. Each night we were check all the filled questioner for completion, clarity and proper identification of the respondent. Then we sent the client to laboratory with request of identification number given for research purpose and Hemoglobin measurement were done in the laboratory.

The result of the client was registered on the format prepared on the separate column of hemoglobin.

The data collection instruments were questionnaire, pen, pencil, blood tube, hemoglobin measurement (centrifuge).

3.7 Data quality assurances

The structured questionnaire was pretested on the heads of selected attendant using 5% of sample size which was not included in the sample for classify and cultural acceptability. The principal investigator was conducted this and the necessary modification was done when appropriate, each day the data was checked for completeness and consistency refilled if any.

3.8 Data processing and analysis

The data were checked and edited for any incompleteness or in consistency and the data entered SPSS21 version and were analyzed using SPSS version. Data were summarized in tables and figure. Bivariate analyses were done to identify independent predictors of anemia. P-value was settled at<0.05 for statistical significance

4 Study variables

4.1.1 Dependent variable

- Prevalence of Anaemia

4.1.2 Independent variable

- Socio-demographic variables (Age, religion, ethnicity, educational status, marital status income, occupation)
- Infections (history of Malaria infection)
- Obstetric factors (Excess menses, History of PPH, APH, Birth interval, parity, Gestational age, and history of abortion.)
- Dietary practice

4.2 Ethical considerations

The permission was obtained from college of health science department of public health and WCSH administration to conduct the study.

All concerned officials at all levels of WCSH was communicated and informed about the purpose of the study. Confidentiality of the respondent was assured.

Informed consent signed by the participant and the data collector were obtained for each study subject before the data collection. Participation of the study was on the voluntary bases.

4.3 Dissemination plan

The result of the study will be disseminated to the concerned bodies such as wereda health office, WCSH, WKU colleague of health science department of public health.

4.4 Operational definitions

Additional meal - Food intake during pregnancy at least one additional meal of what is available in the house per day as compared to non-pregnant state.

Anemia in pregnancy: Hemoglobin level below 11 g/dl during first and third trimester and 10.5 g/dl during the second trimester pregnancy**.**

APH – A woman considered as she had APH by ANC physician was considered "yes" for APH question and was taken from ANC card.

Excess menses – is bleeding more than 8 days per cycle or bleeding that demands changing of more than 3 pads per day.

Gestational age – in completed weeks, was estimated based on the last menstrual period.

Mild anemia - hemoglobin 10-10.9gm/dl (2)

Moderate anemia - hemoglobin 7-9.9gm/dl (2)

Severe anemia - hemoglobin < 7gm/dl (2)

PPH History– since data is collected after physician assessment of the pregnant women, individual record as PPH by physician on ANC card was considered as she has PPH.

Parasitic Infection: Presence of organisms/ova in human blood/stool.

5 RESULTS

5.1 Result show socio-demographic characteristic

A total of 295 pregnant women were included in the study. The majority of the study groups,224(75%), were in the age range of 18-35 years. most of the respondents,196(66.44%),195(66%),129(43.7%),167(56.6%) and 171(58%), were silte in ethnicity, Muslim in religion, urban resident and housewife in occupation respectively.

Table 3- socio-demographic characteristics in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		Frequency(n)	Percentage (%)
Age	<18	12	4.10
	18-35	224	75.90
	>35	59	20.00
Marital statues	Single	11	3.7
	Married	271	91.9
	Widowed	5	1,7
	Divorced	8	2.7
Educational statues	Illiterate	129	43.7
	Read& write	73	24.7
	Primary	31	10.5
	Secondary	32	10.8
	College & above	30	10.2
Monthly in come	<1000	120	40.70
	1000-5000	124	42.00
	>5000	51	17.30
Residence	Rural	128	43.4
	Urban	167	56.6
Occupation	Housewife	171	58.00
	Employee	49	16.60

	Merchant	56	19.00
	Farmer	13	4.40
	Others	6	2.00

4.2 Result showing past obstetric and gynaecologic history

Regarding obstetrical history, 147(49.80%) were in the third trimester, 244(82.7%) were muligravidae ,51(17.3%) had no child ,41(15.96%) had excessive menstrual blood loss during the current pregnancy,43(17.63%) experienced abortion, and 93(38.11%) had birth interval less than two years.

Table 4- Past obstetric and gynecologic history and Nutritional history in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		Frequency(n)	Percentage (%)
History of excessive menstrual bleeding	Yes	47	15.96
	No	248	84.04
Gestational age	≤13	10	3.40
	14-26	138	46.80
	≥27	147	49.80
Gravidity	Primigravidae	51	17.3
	Multigravidae	244	82.7
Birth interval	< 2 years	93	38.11
	2-4 Years	83	34.01
	>4 years	68	27.88
Abortion	Yes	43	17.60
	No	201	82.40

Contraceptive	Yes	195	66.1
	No	100	33.9
History of APH	Yes	25	8.48
	No	270	91.52
History of PPH	Yes	16	6.56
	No	228	93.44
History of C/S	Yes	67	27.46
	No	177	72.54
History of pre-eclamp Sia	Yes	35	11.87
	No	260	88.13

5.2 Result showing Nutritional history

From the study 192(65.1%) of pregnant women had taken iron supplementation during the current pregnancy. More than half of the pregnant women 201(68.1%) eat meat less than once per week. Only 34(11.5%) of the study subject had the habit of eating fruits and vegetables at least once per day. Majority of women 210(71.2%) had the habit of drinking tea/coffee immediately after meal at least once per day.

Table 5-Nutritional history in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		Frequency(n)	Percentage (%)
Animal product	At least once per weeks	94	31.9

	Less than once per weeks	201	68.1
Vegetable	At least once per day	34	11.5
	Less than once per day	261	88.5
Coffee and tea after meal	More than once per day	210	71.2
	Less than once per day	85	28.8
Three regular meal	Yes	161	54.60
	No	134	45.40
Extra meal	Yes	53	18.00
	No	242	82.00
Iron supplementation	Yes	192	65.1
	No	103	34.9

5.3 Prevalence of Anemia among respondents

The overall prevalence of anemia in this study was 21.7 %((64). the mean hemoglobin concentration among the study participants was (11.642) g/dl range from (6.04-14.19)

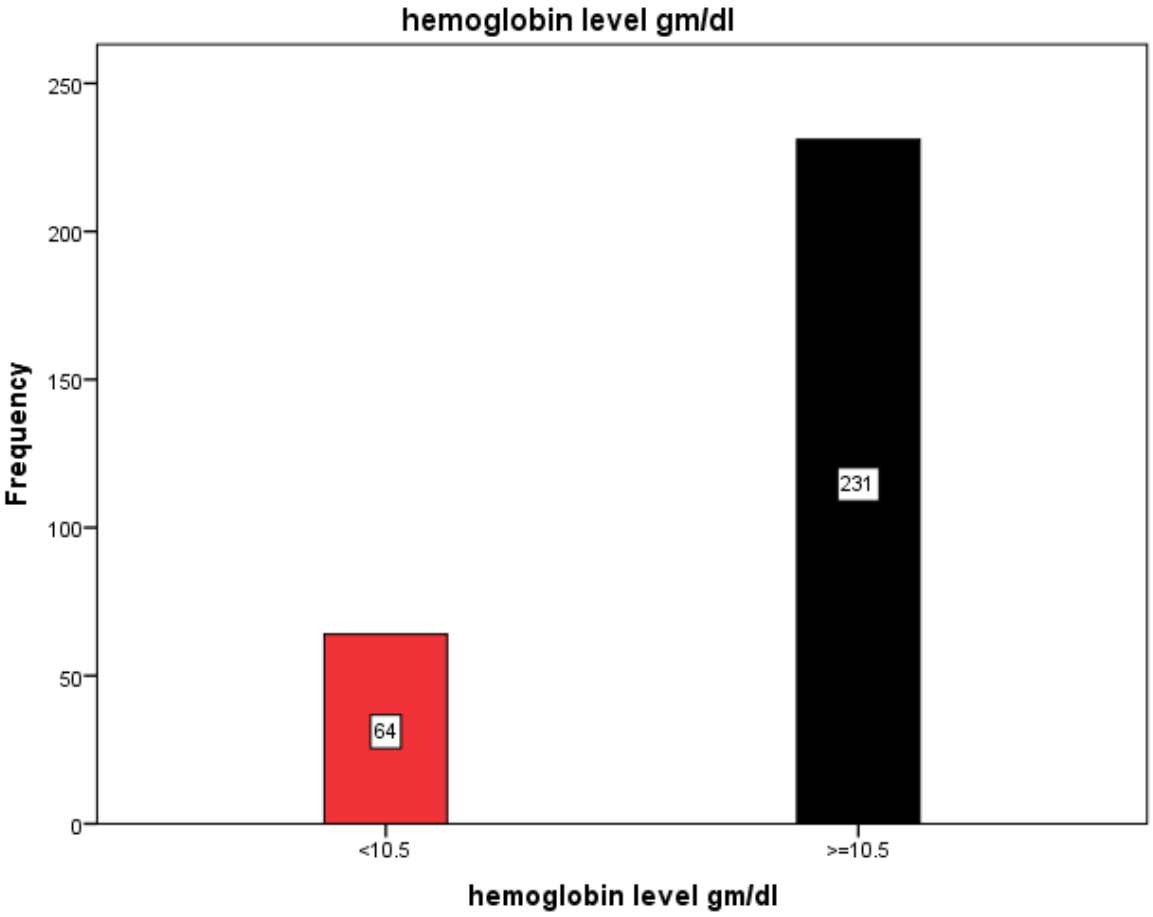

Figure 5 prevalence of anemia among pregnant women attending ante natal care at WCSH 2021

5.4 Result showing the severity of anaemia

Out of all anemic pregnant women about 79.69% were mildly anemic, 18.75% were moderately anemic and 1.56% was sever.

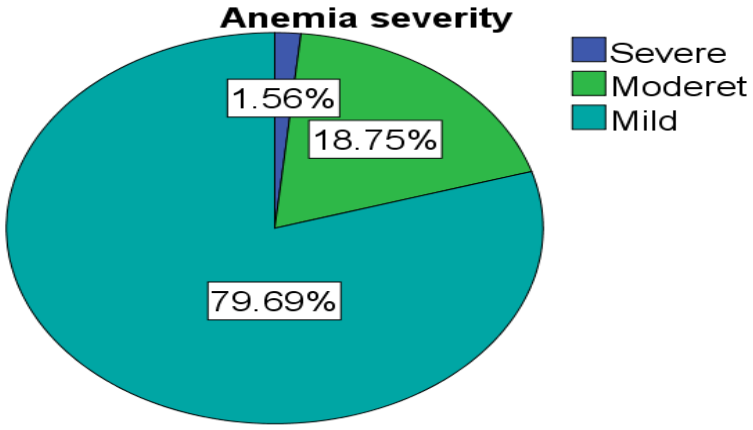

Figure 6 severity of anemia among pregnant women attending ANC follow at WCSH 2021

5.5 Result showing factors associated with anemia

Table 6-The Relationship of anemia to socio-demographic characteristics in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		Anemia		COR(95%CI)
		Yes	No	
Age	<18	1(8.33%)	11(91.67%)	3.150(0.399-24.868)
	18-35	59(26.34%)	165(73.66%	4.72 (1.814-12.284)
	>35	4(6.78%)	55(93.22%	0.213(0.074-0.614)
Residence	Urban	35(27.13%)	93(72.87%	0.558(0.320-0.976)
	Rural	29(17.36)	138(82.64%	1. OO
Educational	College& above	3(10.00%)	27(90.00%)	2.691(0.789-

Statues				9.176)
	Secondary	12(37.50%)	20(62.50%)	0.411(0.189-0.894)
	Primary	11(35.50%)	20(64.50%)	0.457(0.206-1.011)
	Read&write	12(16.44%)	61(83.56%)	1.555(0.778-3.108)
	Illiterate	26(20.15%)	103(79.85%	1.17690.670-2.064)

Table 7-The Relationship of anemia to Past obstetric, gynecologic history in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		**Anemia**		**COR(95%CI)**
		Yes	No	
Gravidae	Primigravidae	9(17.65%)	42(82.35%)	1.00
	Multigravidae	55(22.54)	189(77.46%)	0.736(0.338-1.606)
Abortion	No	23(12.10%	167(87.90%	1.00
	Yes	32(59.25%	22(40.75%)	2.697(0.608-11.967)
Family planning	Yes	51(26.15%)	144(73.85%)	0.422(0.217-0.820)
	No	13(13%)	87(87%)	1.00
Gestational Age	>27	36(24.50%)	111(74.50%)	1.390(0.796-2.427)

	14-26	23(17.97%)	115(82.03%)	0.566(0.319-1.003)
	≤13	5(50%)	5(50%)	3.831(1.073-13.671)

Table 6-The Relationship of anemia to nutritional history and infection in pregnant women attending ANC follow up at WCSH in 2021(n=295)

Variable		Anemia		COR(95%CI)
		Anemic	Non-anemic	
Animal product(meat)	At least once per week	15(13.8 %)	94(86.2%)	1.00
	Less than one per week	49(24.4%)	152(75.6%)	0.589(0.371-1.116
Fruit and Vegetable	At least once per day	10(29.4%)	24(70.6 %)	1.00
	Less than once per day	54(20.7%)	207(79.3 %)	0.249(0.720-3.54)
Coffee and tea	More than once per day	47(22.45%)	163(87.55%)	0.867(0.465-1.616)

	Less than once per day	17(20%)	68(80%)	1.00
Three regular meal	Yes	21(13.04%)	140(86.96%)	1.00
	No	43(32.10%)	91(67.90%)	0.317(0.177-0.570)
Extra meal	Yes	9(17%)	44(83%)	1.00
	No	55(22.72%)	187(77.28%)	1.438(0.661-3.129)
Iron supplementation	Yes	28(15.64%)	151(84.36%)	1.00
	No	36(31.03%)	80(68.97%)	2.278(1.299-3-995)
Malaria attack	Yes	37(74.00%)	13(26%)	0.044(0.021-0.092)
	No	27(2.75%)	218(97.25%)	1.00

6 DISCUSSION

The study was conducted with intention of assessing magnitude of anemia and identifying its associated factors or determinants. According to the finding from this study the prevalence of anemia among pregnant women attending anti natal care (ANC) was 21.7%. this finding was found coherent with the result obtained in Gonder 23.2%, Tikure Anbesa specialized

hospital 21.3% and Nigeria 23.2% [12, 16–20]. However, our finding is much lower than studies conducted in Pakistan (90.5%), India (87.2%), Malaysia (57.4%), Benin (68.3%), Somali Region (56.8%), Walayita Sodo (40%).

The difference may be due to geographical variation, differences in socioeconomic status, and dietary habits of the study participants. The lower finding of our study also may be due to the governments' effort to achieve Millennium Development Goals (MDGs) since improving maternal health is one of the eight MDGs and targeted to reduce the maternal mortality ratio by three-quarters in 2015.

In this study, mild anemia was common followed by moderate anemia. This is consistent with reports from the different part of the country (22, 26- 29). The mean Hgb concentration the present study was 11.642g/dl. This is consistent with the study report from Hawassa 12.3g/dl (27).

This study also showed that the malaria infection was increase the risk for the development of anemia among pregnant women compared to those were not infected.

Pregnancy is the most Irion demanding period in a woman's life. Consequently, pregnant women are advised to eat more iron containing diet than usual. The level of iron containing diet among pregnant women was lower and it significantly determines the maternal anemic level in the study. This is agreement with the national study among reproductive age group (25). The possible Explanation might be the presence of food taboos during pregnancy.

This study demonstrated that mothers who have low monthly family income were more likely to be anemic as compared to those with high monthly family income. This is in agreement with study conducted in Gondar University Teaching Hospital (29).

Pregnant women in second and third trimester were more likely to be anemic when compared to pregnant women in first trimester. This might be due to the higher maternal plasma volume increments (40–50%) relative to red cell mass (20–30%) and accounts for the fall in hemoglobin concentration [33]. Our study is similar with study conducted in Tikur Anbessa hospital (34).

The risk of developing anemia increased in pregnant women who did not receive iron supplementation during pregnancy when compared to those who received iron supplementation. This may be due to iron deficiencies developing during pregnancy because of the increased iron requirements to supply the expanding blood volume of the mother and the rapidly growing fetus and placenta. The study is in agreement with study conducted in Eastern Ethiopia [35].

Age category and Family monthly income of pregnant women showed significant association by bi-variate analysis. In addition, in the study, illiterate, Multigravidae, have history of abortion, had high odds for anemia as compared to their counterpart. This study was similar with what was reported in other studies (27). in this study anemic cases were 2 times likely to have history of excess menstrual bleeding prior to the index pregnancy similar with what was reported in other studies (24).

7 LIMITATION OF THE STUDY

- Stool concentration technique and parasite density /stool examination were not done so we could not assess the impact of parasite load on the severity of anemia

8 CONCLUSION AND RECOMMENDATION

8.1 CONCLUSION

Anemia among pregnant women is found to be moderate public health problem in the study area. Parity, illiteracy, and Iron containing meal consumption were significantly and independently affect anemia of pregnant women. and improved Iron containing meal consumption contributes for decreasing prevalence of anemia. Moreover, increasing in consumption of Iron containing meal and educating of pregnant women is highly recommended.

8.2 RECOMMENDATION

WCSH, together with collaborators and stakeholders, shall Work on early detection of anemia in pregnancy.

Zonal health office, together with collaborators and stakeholders, provide health education and information on nutritional anemia.

9 References

1. Haidrand Rebecca S. Pobocik. Iron deficiency anaemia is not a rare problem among women of reproductive ages in Ethiopia: a community based cross-sectional study. BMC blood disorder, 2009.
2. D.C. Dutta's Text books of obstetrics, India, chintamonidaslane, Kolkata 2011,7th edition.
3. Ismael - Ngnie Teta, Olivier Receveur, and BarthelemyKuate-Defo. Risk factors for moderate to severe anaemia among children in Benin and Mali: Insights from a multilevel analysis. Food s and Nutrition Bulletin 2007; 28 (1):76-77.
4. Klaus Kraemer Michael B. Zimmermann. Nutritional Anaemia. 3rd edition. Sight and life press: Switzerland, 2008:11-12.
5. WHO, The World Health Report 2002: Reducing risks, promoting healthy life. Geneva, World Health Organization, 2002.
6. Thomas M. Habermann. Haematology. In: Thomas M. Habermann, Amit K (eds). Mayo clinic internal medicine, concise text book. Rochester: Mayo clinic scientific press Informal healthcare 2008: 347-351.
7. Melaku U, Jemal H, Tsegaye D, et.al. Iron Deficiency Anaemia among Women of Reproductive Age in Nine Administrative Regions of Ethiopia. Ethiopian J. Health Dev. 2008; 22(3):152.
8. K.E. Agho et.al. Factors Associated with Haemoglobin Concentration among Timor-Leste Children Aged 6-59 Months'. Health Popul. Nutrition2008; 26(2):200-209.
9. El Hioui M, Ahami A.O.T, Aboussaleh Y et.al. Risk Factors of Anaemia among Rural School Children in Kenitra, Morocco. East African Journal of Public Health 2008; 5(2): 62.
10. Jane Crawley. Reducing the burden of anaemia in infants and young children in malaria-endemic countries of Africa: from evidence to action. Am. J. Trop. Med. Hyg. 2004; 71(2):25–34.
11. Allen LH. Anaemia and iron deficiency: effects on pregnancy outcome. Am. J. Clin. Nutrition 2000; 71:1280S–12804S.
12. Haggaz AD, Radi EA, Adam I. Anemia and low birth weight in western Sudan. Trans R Soc Trop Med Hyg. 2010;104(3):234–236. [PubMed] [Google Scholar]
13. DemayerEM:Preventing& controlling IDA through PHC, Geneva: WHO.1989

14 Harrison KA: Maternal Mortality and Anemia in pregnancy West. Africa med J 1975; 23: 27-31,

15 DemayerEM:Preventing& controlling IDA through PHC, Geneva: WHO.1989

16 . Khan KS,WojdylaD,SayL,GulmazogluAM,Van Look PF.WHO Analysis of causes of maternal anemia.Systemic review. Lancet 2006; 367:1066-1074

17 . World Health Organization/United Nation University/UNICEF:Iron Deficiency Anemia,Assessment,Prevention and Control. A guide for program managers.Geneva

18 . WHO;2001NellyJY,JiangYI,TsiriA,et al :Malaria and intestinal helminthes co infection among pregnant women in Ghana. Prevalence and risk factor.AmJ Trop Med Hyg 2009; 80(6):896-901

19 . Waweru J, Mugenda O and E kuria. Anaemia in the context of pregnancy and hiv/aids: a case of Pumwani maternity hospital in Nairobi Kenya 2009; 9:2

20 . Godwin Fuseini, et al. Parasitic infections and anaemia during pregnancy in the Kassena-Nankana district of Northern China. Journal of Public Health and Epidemiology 2010; 2(3):48-52.

21 . Desalegn S. Prevalence of anemia in pregnancy in jimma town, Southwestern Ethiopia. Med J 2012; 31:251-258.

22 . Gupta R Kumar P. Social evils, poverty & health. J. Med. Res. 2007; 126:279–88

23 . Godwin Fuseini, et al. Parasitic infections and anaemia during pregnancy in the Kassena-Nankana district of Northern China. Journal of Public Health and Epidemiology 2010; 2(3):48-52.

24 . Wondyifraw .C: Prevalence and associated factor in pregnant women attending ANC clinic at Jimma specialized Hospital, Ethiopia Medical research 2009, 30(2) 20-23.

25 . A, HKhamis and MJ Ebashir prevalence of anemia in pregnant mother attending ANC clinic at AA specialized hospital Ethiopia tropical medical 2011,5(10)6-8.

26 . AshalewGelaw.R. prevalence anemia and associated risk factors among pregnant women in Gonder, Azezo health center2013, 1(3) 147_144.

27 . Degu.S. Prevalence of anemia in pregnant mother in Sidama south western Ethiopia, medical Jounal volume 44, page 211-220,2010.

28 . Mulatu S. Prevalence of anemia in Jimma town, Southwestern Ethiopia, Ethiopia, Med J 2009; 12:120 -128.

29 . MeseretAlem,BamlakuEnawgaw,AschalewGelaw,etel:Prevalence of anemia and associated risk factors among pregnant women attending ANC in Azezo Health center Gonder town North west Ethiopia.2013; 1(3):137-144 .

30 . AlemayehuHailuJufar: Prevalence of anemia among pregnant women attending ANC at TikurAnbessa Specialized Hospital Addis Ababa,Ethiopia. March, 2013; 2329-8790

31 . Filagot K,Endalew Z,Yaregal A,and Lealen G:Anmia among pregnant women in south east Ethiopia Prevalence,Severity and Associated risk factors.Nov,2014;7.

32 . Central statistical authority (CSA) & Ethiopian demographic & health survey 2011 Addis Abeba, Ethiopia.

33 . D. M. Townsley, "Hematologic complications of pregnancy," Seminars in Hematology, vol. 50, no. 3, pp. 222–231, 2013.

34 . A. H. Jufar and T. Zewde, "Prevalence of anemia among pregnant women attending antenatal care at Tikur Anbessa Specialized Hospital," Journal of Hematology Thromboembolic Diseases, vol. 2, no. 1, pp. 1–6, 2014

35 K. A. Alene and A. Mohamed Dohe, "Prevalence of Anemia and Associated Factors among Pregnant Women in an Urban Area of Eastern Ethiopia," Anemia, vol. 2014, pp. 1–7, 2014.

College of health science department of public health

Questionnaire to assess prevalence of anemia among pregnant mothers attending WSCH ANC clinic, SNNPR Regional State, in silte zone, Worabe Town at WSCH south west Ethiopia, 2013EC.

10 Annex 1. Consent format

INFORMATION SHEET

Hello, my name is _____ I am from Wolkite University, College of health science, and Department of public health to conduct a research on prevalence and associated factor of anemia among pregnant mothers for the fulfillment of Bachler degree.

I would like to inform you that I am going to have a short discussion concerning this study. Before we go to our discussion, I will ask you to listen carefully to what I am going to read to you about the purpose and general condition of the study and tell me whether you agree or disagree to participate in this study. As part of this study we are collecting information on risk factors for Anemia among pregnant mothers. You are selected to be one of the participants in the study. The Anemia risk assessment is being done to find out what factors are involving. This enables the concerning and pertinent bodies to develop programs to prevent and treat anemia particularly in pregnant mothers. But to do this it needs reliable information. That is why we are now asking information and collecting a few drops of blood from your finger and stool sample. The instruments I use for taking the blood are completely clean, sterile and safe. You may fill minimum pain while we collect blood from your finger for hemoglobin. The blood will be analyzed with equipment and the results of the test will be given to you. The results and the information will be kept confidential. If a report of the result to be published, only summarized information of the total group will appear. If you diagnosed condition/disease, you will be referred immediately and will get the treatment in collaboration with ANC clinic.

Do you have any questions?

Are you volunteer to participate in this study? If you decide not to participate, it is your right and I will respect your decision. Now please tell me if you agree to participate in the study.

Yes____ continue the interview No ____ thank you!

Date____/____/_____ Questioner nº_____

Interviewer (name and signature) _____

Annex 2: Questionnaire

Instruction: Circle the response provided by the interviewee or write the appropriate answer on the space provided

I). Socio demographic information

1. Age _____

2. Marital status a) Single b) Married c) Divorced d) widowed

3. Religion a) Muslim b) Orthodox c) Protestant d) other (specify) _____

4. Ethnicity a) Silte b) hadiya C) Oromo d) Gurage e) other_____

5. Educational status a) Illiterate b) Read& write c) primary school d) secondary school e) collage and above

6. Monthly income a) below 1000 b) b/n 1000-5000 c) above 5000

7. Residence a) urban b) Rural

8. Occupation A) House wife B) employee C) merchant D) farmer E) others

2). Past obstetric and gynecologic history

9. Do you have a history of excessive menstrual bleeding prior to this pregnancy? 1. Yes____ 2. No ____

10. what is your gestational age? (Trimester)___

11. What is the number of birth you give(parity)__

12. What is your birth interval for your last child and current pregnancy (in months)?

13. Do you experience abortion? 1. Yes _ 2.no_

14. If yes for Q13 the number of abortions you experienced ___

15. Do you use contraceptive prior to this pregnancy? 1. Yes__ 2. No__

16. History of ante partum hemorrhage (APH)? 1. Yes 2.no

17. History of postpartum hemorrhage? 1. Yes 2.no

18. Do you have previous history of caesarian section (CS) 1, yes 2? No

19. Do you have history of hypertension or pre-eclampsia 1? Yes 2. No

3) Chronic illness related

20. Do you have history of heart disease? 1. Yes 2.no

21. History of renal disease? 1. Yes 2.no

22. Serostatus of the pregnant women 1. Negative 2. Positive

23. Do you drink alcohol? 1. Yes 2. No

4) Infection related

24. Do you have regular shoe wearing habit? 1. Yes 2.no

25. Do you have intestinal helminths infection previously? 1. Yes 2.no

26. Parasitic infection from stool exam (laboratory result)? 1. Yes 2.no

27. If yes for Q#26 write type and density type of parasite

28. Do you have history of malaria infection in the last three months? 1. Yes 2. No

29. Hemoglobin level of the respondent (from lab result)? _____g/dl

5) Dietary related options

30. Do you have iron supplementation? 1. yes 2.no

31. For how long did you get animal product? 1.at least once per week 2. less than once per week

32. For how long did you get fruits and vegetable? 1. At least once per day 2. less than once per day

33. Do you drink coffee/tea immediately after meal and for how long? 1. more than once per day 2. less than once per day

34. Do you use three regular meal/day 1? Yes 2. No

35. Do you eat additional meal extra from commonly use three meal /day 1. Yes 2. No

Finally, I thank you for your coordination