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WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTMENT OF MIDWIFERY

PREVALENCE OF ANEMIA AND ITS ASSOCIATED FACTOR AMONG PREGNANT WOMEN ATTENDING ANC IN DURAME GOVERNMENTAL HEALTH INSTITUTIONS, SOUTHERN ETHIOPIA, 2021G.C

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AUGUST 2021 G.C

WOLKITE, ETHIOPIA

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A Research Report Submitted to Wolkite University College of Medicine and Health Science, Department of Midwifery, in partial Fulfillment of the Requirement for Bachelor Degree in Midwifery

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DECLARATION

We here declare that, this is our original work and has not been presented for degree in any other university and all source of material used for this thesis have been fully acknowledged.

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DEPARTMENT OF MIDWIFERY

ADVISOR'S APPROVAL SHEET

This is to certify that the thesis entitled PREVALENCE OF ANEMIA AND ASSOCIATED FACTORS" submitted in partial fulfillment of requirements for degree of bachelor in MIDWIFERY, undergraduate program and has been carried out by TINSAE H/MICHAEL, MIHRET TAYE, AZIZA MIFTAH under our supervision. Therefore, we recommend that the students have fulfilled the requirements and hence, here by submit the thesis to the department.

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Table of Contents

ACKNOWLEDGMENT viii
ABBREVATION AND ACRONONYM ix
ABSTRACTE x
CHAPTER ONE 1
Introduction 1
1. BACKGROUND 1
1.2 STATEMENT OF THE PROBLEM 2
1.3 SIGNIFICANCE OF THE STUDY 3
CHAPTER TWO 4
Literature review 4
2.1 PREVALENCE OF ANEMIA 4
2.2 SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE PREGNANT WOMEN 5
2.3 OBSTETRIC AND NUTRITION RELATED CHARACTERISTICS OF THE PREGNANT WOMEN 6
CONCEPTUAL FRAM WORK 7
CHAPTER THREE 8
Objectives 8
3.1 GENERAL OBJECTIVES 8
3.2 SPECIFIC OBJECTIVES 8
CHAPTER FOUR 9
Methods and Material 9
4.1 STUDY AREA 9
4.2 STUDY DESIGN AND PERIOD 9
4.3 Source populations 9
4.4 Study population 9
4.4 ELIGIBILITY CRITERIA 9
4.4.1 Inclusion criteria 9
4.4.2 Exclusion criteria 9

4.5 SAMPLE SIZE DETERMINATION AND SAMPLING TECHNIQUE 10
4.5.1 Sample size 10
4.5.2 Sampling technique 10
4.6 STUDY VARIABLE 12
4.6.1 Dependent variable 12
4.6.2 Independent variable 12
4.7 OPERATIONAL DEFINITONS 12
4.8 DATA COLLECTION TOOLS AND TECHNIQUES 12
4.9 DATA QUALITY CONTROL 12
4.10 DATA PROCESSING AND ANALYSES 13
4.11 ETHICAL CONSIDERATION 13
CHAPTER FIVE 14
Result 14
CHAPTER SIX 22
Discussion 22
LIMITATION OF THE STUDY 24
CONCLUSION AND RECOMMENDATION 24
Conclusion 24
Recommendation 24
Reference 25
Annex 1 30
Annex 2 31
Annex 3 35
Amharic Questionniare 35

List of table

Table 1:- Socio–demographic and economic characteristics of pregnant mothers attending antenatal care in durame governmental health center (n = 403)..... 14
Table 2:- Associated factor of anemia in pregnant mothers attending antenatal care in durame governmental health center (n = 403) 16
Table 3:- Anemia by socio demographic, dietary and reproductive characteristics of pregnant women attending antenatal care in in durame governmental health center (n = 403) 19
Table 4:-Factors associated with anemia among pregnant mothers attending antenatal care in durame governmental health center (n = 403) 20

List of figure's

Figure 1:-Fig 1:-conceptual frame work showing relationship of independent variable of anemia during pregnancy 7
Figure 2:-Figure2: Sampling procedure of the study from the governmental health institution of Durame town. 11
Figure 3:- Prevalence of anemia among pregnant women attending antenatal care in durame town, southern Ethiopia, 2021 (n=403). 17
Figure 4:-Fig:- severity of anemia in durame town 19

ACKNOWLEDGMENT

First and foremost, we would like to thank God whom has been the source of our strength and wisdom throughout this research writing. Then we would like to express our deepest thank to Wolkite University College of Medicine and Health Science Department of Midwifery for giving us this great opportunity. We would also like to express our deepest gratitude and appreciation to our advisors Mr. solomon Shitu and Mr. Yohannes Fekadu for their encouragement and constructive comments during this research writing. We would like grateful thanks to the study participants who took off their time and willingly filled out the lengthy questionnaire and for their overall participation. Lastly but not the least we would like to thank Durame town office from the bottom of our heart for giving us all the necessary information which are important for the research.

ABBREVATION AND ACRONONYM

ANC	Antenatal care
AOR	Adjusted Odds Ratio
CDC	Center of disease control and prevention
CI	Confidence Interval
COR	Crude Odd Ratio
EDHS	Ethiopian Demographic and Health Survey
GC	Gregorian calendar
HCT	Hematocrit
Hgb	Hemoglobin
ID	Iron Deficiency
IDA	Iron deficiency anemia
LBW	Low birth weight
RBC	Red blood cell
SD	Standard Deviation
SNNPR	Southern nations nationalities and peoples representative
SPSS	Statistical Package for Social Science
WHO	World Health Organization

ABSTRACTE

BACKGROUND: Anemia is a significant public health problem in developing countries, especially in pregnant women. Anemia affects the life of greater than 2 billion people worldwide, accounting for over 30% of the world's population which is the most common public health problem especially in developing countries occurring at all stages of the life cycle It may complicate pregnancy, sometimes resulting in tragic outcomes, also Anemia impairs cognitive development, reduces physical work capacity, preterm delivery and in severe cases increases risk of mortality particularly during prenatal period. Globally, anemia contributes to 20% of all maternal deaths; Anemia in pregnancy may also lead to premature births, low birth weight, and fetal impairment and infant deaths. Anemia in pregnancy has a significant global public health threat especially in developing countries that contribute to maternal and perinatal morbidity and mortality.

OBJECTIVE: To assess the prevalence and associated factors of anemia among pregnant women attending ANC in durame governmental health institutions from June 14 – July 11 in 2021GC.

Method: Institutional based cross sectional studies were conducted among pregnant women attending ANC in durame governmental health institutions and a total of 403 study participants were selected by Quota sampling technique. The data were checked and coded. Then Entered and analyzed using Epi-info version 3.1 and SPSS version 25 respectively, then multivariate analysis was done to assess the association between independent and dependent variables. P value < 0.05 with 95% CI was declared statistically significant in the in final model.

Result: The overall prevalence of anemia among pregnant was 31.8%; of this 26.6% and 5 % had mild and moderate anemia respectively; But there is no sever anemic pregnant. The result of multivariable analysis revealed that the likelihood of anemia was less among pregnant women who had no iron supplement and history of abortion.

Conclusion: The overall prevalence of anemia among pregnant women attending antenatal care in the study area was 31.5% were anemic. Nutritional status meal frequency and history of abortion was significantly associated with anemia in pregnant women.

Key words: *Anemia, Hemoglobin,*

CHAPTER ONE

Introduction

1. BACKGROUND

Anemia during pregnancy 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, when hemoglobin level between 7.0 and 9.9 g/dl moderate, and mild When hemoglobin is from 10.0 to 10.9 g/dl (1–3).

Anemia is defined as decreasing the Red blood cell (RBC) volume or hemoglobin (Hgb) concentration below the range of normal values in healthy persons. It is also a condition that occurs when our blood lacks enough healthy red blood cells (RBC) both in quality as well as quantity or hemoglobin concentration in circulation to carry adequate oxygen to tissue (4–6).
Because of increased volume of water in the blood, resulting in hemo-dilution and rapid fetal growth pregnant women are highly vulnerable to several type of anemia during prenatal period. This includes folic acid and iron deficiency diet and vitamin B12 deficiency and infections such as malaria, hookworm, and increasing human immunodeficiency virus (7–9).
Anemia affects the life of greater than 2 billion people worldwide, accounting for over 30% of the world population which is the most common public health problem especially in developing countries occurring at all stages of the life cycle. It occurs at all stages of the life cycle, with its highest prevalence among children under five year and pregnant women (10–12).
Globally, anemia contributes to 20% of all maternal deaths, Anemia in pregnancy may also lead to premature births, low birth weight, fetal impairment and infant deaths (13,14).
According to World Health Organization World Health Statistics 2013 the average prevalence of anemia in the world is 41.8%. Many studies show that anemia in pregnancy is globally common but Africa and Asia bear the greatest burden (15).
In Africa and Southeast Asia, the prevalence is estimated at 57.1% and 48.2% respectively. This is twice as common as in America and Europe where prevalence is estimated at 24.1% and 25.1% respectively. In sub-Saharan Africa, iron and folic acid deficiencies are the most common cause of anemia in pregnant women (16–18).

Sub Saharan Africa bears the major burden of disease. Prevalence of anemia in pregnancy in Nigeria is between 30-40%. In Ethiopia, overall prevalence of anemia was found to be 41.9% with urban areas having prevalence of 35.9% compared to the rural population at 56.8%. Factors include, low socio-economic status, illiteracy, ignorance, Infection with Hook worm and intestinal helminthes causes gastro-intestinal blood loss resulting in depletion of iron stores and consequently impaired erythropoietin and also lead to mal-absorption and inhibition of appetite, there by worsening micronutrient deficiency and maternal anemia (15,19).

Therefore, the objective of this study will be to assess the prevalence and associated factors of anemia among pregnant women attending ANC in durame governmental health institutions, 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 (18).

The prevalence of occurrence anemia in developing and developed countries is assessed to be 43% and 9%, respectively (20).

In pregnancy, anemia has significant impact on the health of fetus as well as that of mother. 20% of maternal death in Africa has been attributed to anemia. Fetus is at risk of low birth weight (LBW), morbidity and prenatal mortality due to impairment of oxygen delivery to placenta and fetus (21,22).

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 (23).

In the developing world, pregnant women and their child are frequently exposed to parasitic infections like malaria and intestinal helminthes, 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 (24).

WHO estimates that more than half pregnant women in the world wide have hemoglobin level indicative of anemia (<11g/dl), the prevalence may be however as high as 56 or 61% in developing countries. 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 world cases (25,26).

Prevalence of anemia during pregnancy differed from 18% in developed countries to 75% in south East Asia. The prevalence of anemia can be as high as 61% in developing countries with high incidence rate and severity occurring among prim-gravid who living in malaria endemic areas (27,28).

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 (29).

Therefore, this study aimed to assess and identify the magnitude and associated factors of anemia among pregnant women attending ANC in durame governmental health instructions, Southern Ethiopia, 2021G.C.

1.3 SIGNIFICANCE OF THE STUDY

In Ethiopia the occurrence of anemia in pregnant are high with its complication (29).

This research has great role in creating awareness on associated factors, assessing the magnitude of anemia during pregnancy. This study was used as base line data to concerned body who want to conduct further study on the pregnant women regarding this topic. This study will help policy makers and health planners to design strategies to improve the health of mother and fetus during her prenatal period. It was also be used to recommend primary concerned body to maintain behavioral change in pregnant women through health education.

Therefore the aim of this study was to assess the prevalence and associated factor of anemia among pregnant women attending ANC in Durame governmental health institution SNNPR, Ethiopia.

CHAPTER TWO

Literature review

2.1 PREVALENCE OF ANEMIA

A research was conducted in Nablues district, Palestine, the prevalence of anemia in pregnant women were 21.7%. A research was conducted in 2011 to anemia and the mean Hb concentrations in the investigated sample were found to be 56.7% (30,31).

A research was conducted to assess the prevalence and effect on prenatal outcomes of anemia among pregnant women attending ANC in Moshi Municipality in northern Tanzania were recorded during delivery and one week after delivery, from 2654 participant 47.4% had anemia (Hb<11g/dl), 35.3% had mild anemia (Hb=9-10.9g/dl), 9.9% had moderate anemia (Hb=7-8g/dl) and 2.1% had severe anemia (Hb<7g/dl). Anemia was significantly more prevalent in HIV-positive (56.4%) than in HIV-negative women (46.7%) (32).

A cross-sectional study conducted in West Gojjam Zone, revealed that the overall prevalence of anemia 10.6% of this, mild anemia was 99.8%, moderate anemia was 0.1% and severe anemia was 0.1%. Although there have been different studies conducted across the nation, except for a secondary data analysis from EDHS 2011 which was identified the prevalence of anemia in Benishangul Gumuz was 27.8%. Another study conducted in Assosa zone revealed that the prevalence of anemia was 31.8% (33–35).

In Gondar town with a similar study design conducted in University of Gondar Hospital showed that the prevalence of anemia was 16.6% of this, 6% were severe, 30% moderate and 64% were mild anemic. Tikur Anbessa Specialized hospital indicate that the overall prevalence of anemia was 21.3%, Out of all pregnant women about 80.95% were mildly anemic,17.86% were moderately anemic and 1.19% were severely anemic (36,37).

A research conducted in Gonder town North West Ethiopia, A cross sectional Study was conducted at Azezo health center Red blood cell morphology, Hb level determination and intestinal parasite were assessed following the standard procedures. Socio demographic data was collected by using structural questionnaires. Among the 384 study participants the prevalence of anemia was 83 (21.6%) (38).

2.2 SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE PREGNANT WOMEN

A research conducted in 2012 to assess the prevalence of anemia among a sample of pregnant females attending primary health care center in makkah, Saudi Arabia, was highly among females from 25 to less 35 years, house wives. Study done in Bangladesh showed that age of the mothers was significant and indicate that the age group > 25 have the likelihood of becoming anemic is lower among pregnant women age less than <25yrs relatively (39,40).

Studies conducted in Adigrat, northern Ethiopia and West Ethiopia revealed that residence, educational status occupation of pregnant and incomes of pregnant were significant association with anemia and pregnant women living in rural areas were 3.72 times more likely to be anemic as compared to those living in urban areas, Pregnant women who did not get formal education were 2.25 times more likely for anemic than from those who got formal education (33).

Study in Gonder town, Northern Ethiopia**,** Pregnant women with age >34 rural residences, history of malaria attack, hook worm infection and absence of iron supplementation are significantly associated with increased risk of anemia (37).

A cross-sectional study conducted in Northwest Ethiopia and a similar study design conducted in West Gojjam Zone showed that malaria in pregnancy and intestinal infestation with hook worm independently significant with anemia (33).

Study conducted in Dera District, South Gondar Zone, northwest Ethiopia Pregnant women's who were rural residents, had no latrine, low monthly income, five or above parity and did not prenatal take iron supplementation were the pridisposing factors of anemia among the pregnant women respectively (41).Study conducted on pregnant women attending governmental antenatal care center in Nablues district, Palestine, pridisposing factors of anemia during pregnancy was Younger age group (≤24) (42). Study conducted on Gilgel Gibe dam, in south western Ethiopia, Pregnant women's who were rural residents, not using Insecticide Treated Bed Nets during the study period, those who were plasmodium malaria infected and those with Soil Transmitted Helminthes infections had higher odds of being anemic than those who were urban residents using ITNs, free of plasmodium malaria and STH infection respectively. There was a significant correlation between increasing Hook worm parasite load, Ascarislumbricoides and Tricuiristrichiura and decreasing hematocrit value (43).

A facility based cross-sectional study involving 258 pregnant women, on the prevalence of anemia and associated factors among pregnant women attending antenatal care (ANC) at Bisidimo Hospital in southeast Ethiopia, residence in rular area, intestinal parasitic infection and history of heavy menstrual cycle(> 5 days of menses) were the pridisposing factors of anemia among the pregnant women (44).

2.3 OBSTETRIC AND NUTRITION RELATED CHARACTERISTICS OF THE PREGNANT WOMEN

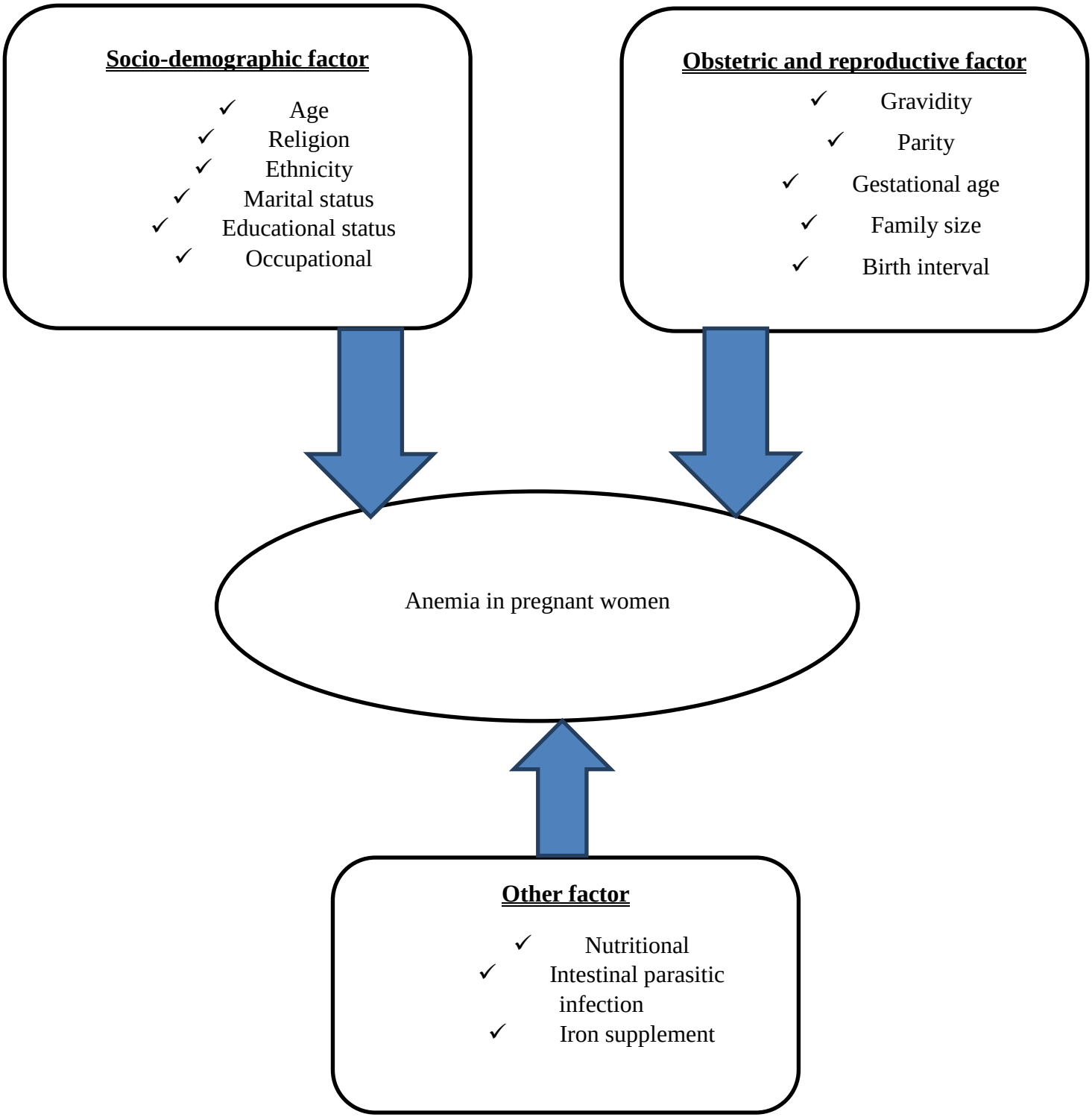
A study conducted in North Ethiopia showed that meal frequency, food diversity and frequent consumption of meat were significantly associated with anemia (45). The study conducted in northern Ethiopia identified that gestational age was directly related to the prevalence of anemia in pregnancy (46). Pregnant women who were in the second and third trimester more anemic than first trimester pregnant women (34).

Study conducted in New Halfa Teaching hospital eastern Sudan, 744 pregnant women who were attending ANC were studied, the prevalence of anemia was significantly high in grandmulti gravidae, Malaria and pica were the risk factor for anemia (47). Study in west Arsi zone, Oromia region, Ethiopia, according to this finding, family size of five or more were found to be significantly associated with the occurrence of anemia in pregnancy (48). Study show in Gode town Eastern Ethiopia, the total of 577 pregnant women was participants. From these more than half of (76.8%) of the anemic study participants were from large families (>5 family members), and most of them are multiparous (>2) and multigravidas (>3) (49).

A research conducted in Nablues district, Palestine indicates that the prevalence of anemia was most prevalent in the third trimester (69%) (30).

CONCEPTUAL FRAM WORK

Figure 1:-Fig 1:-conceptual frame work showing relationship of independent variable of anemia during pregnancy



CHAPTER THREE

Objectives

3.1 GENERAL OBJECTIVES

- ✓ To assess prevalence of anemia and its associated factor among pregnant women who come for ANC in durame governmental health institutions SNNPR, Ethiopia, 2021GC.

3.2 SPECIFIC OBJECTIVES

- ✓ To determine the prevalence of anemia in pregnant women attending ANC in durame governmental health institutions.
- ✓ To identify the associated factors of anemia during pregnancy attending ANC in durame governmental health institutions.

CHAPTER FOUR

Methods and Material

4.1 STUDY AREA

The study was conducted in Durame governmental health institutions, Kembata Tembaro Zone, SNNPR, Ethiopia Kembata Tembaro has a total population of 962,815 (50). Durame is the administrative center of Kembata Tembaro Zone of the SNNPR which is about 335 km South-West of Addis Ababa and 125 km far from Hawassa. Durame town has a total population of 39,459 of whom 51% are female and 49% are male. Durame town has one general hospital and 2 health center. In the study area the average ANC follows up were 408 women per month in Durame governmental health institution.

4.2 STUDY DESIGN AND PERIOD

Institution based Cross-sectional study was conducted from June 14 to July 11.

4.3 Source populations

All pregnant women attending ANC follow up in Durame governmental health institutions.

4.4 Study population

All pregnant women who had selected by quota sampling method.

4.4 ELIGIBILITY CRITERIA

4.4.1 Inclusion criteria

Pregnant Women who had ANC follow up in Durame governmental health institutions at the time of the study period in our study.

4.4.2 Exclusion criteria

Pregnant women who had sign of labor were excluded from the study.

4.5 SAMPLE SIZE DETERMINATION AND SAMPLING TECHNIQUE

4.5.1 Sample size

The minimum required sample size of this study was determined by using single population proportion formula.

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

Where

n=desired sample size of the population.

z=usually 1.96 which corresponds with 95% confident interval

p= proportion for target population 39.94% which is taken from the study conducted in Wolayita soddo town among pregnant women attending ANC (51).

d=margin of error =5%=0.05

q= 1-p = (1-0.39) =0.61

$$\frac{1.96^2 xo.3994x0.61}{0.o5^2}= 369$$

10 % of 369 =37

Non-response rate 10%=37

The total sample size: - 369+37= 406

4.5.2 Sampling technique

All the three governmental health institutions in the Durame town were included in the study. Sample size was proportionally allocated to each health institutions according to patient flow. Then, Quota sampling method was used to select the participants.

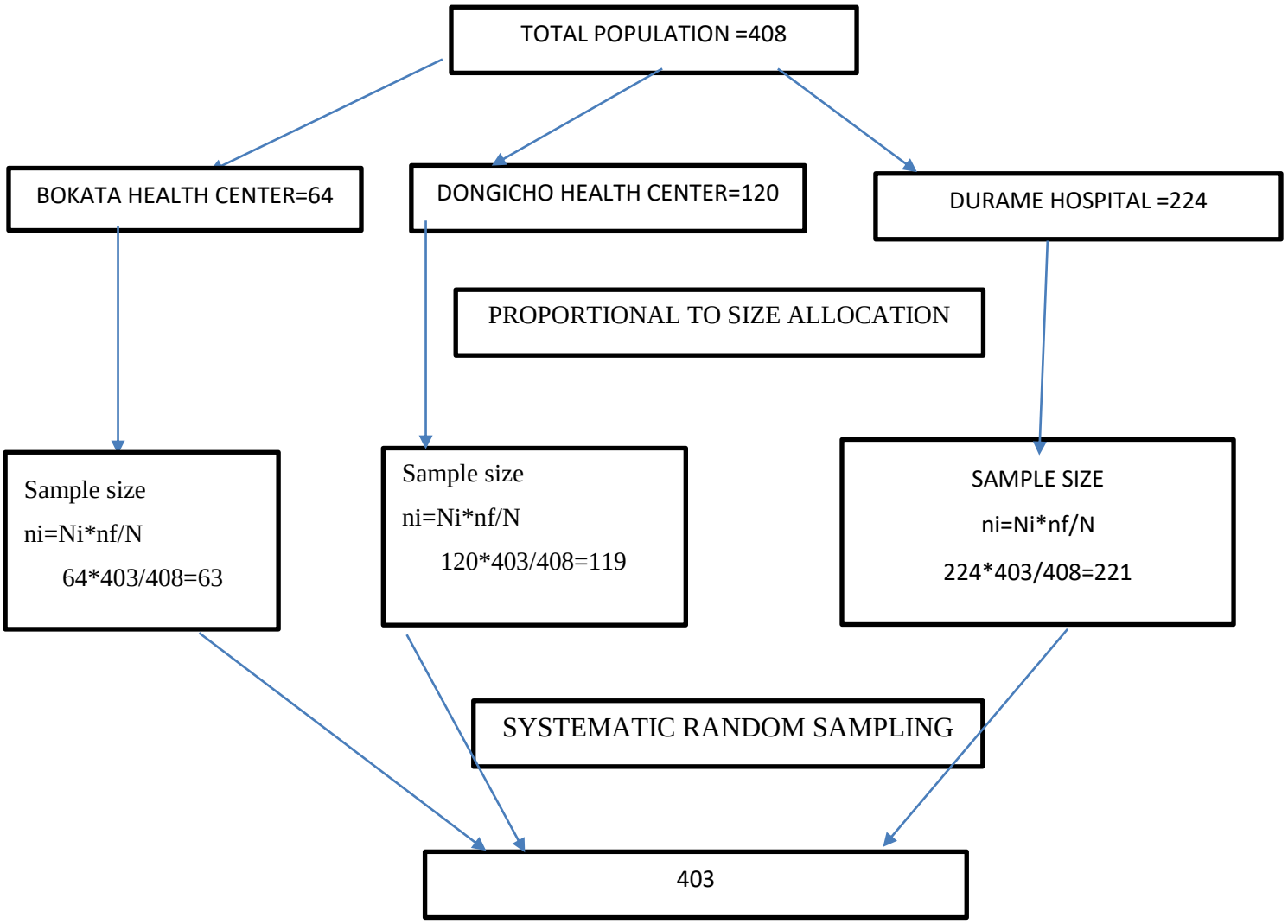


Figure 2:-Figure2: Sampling procedure of the study from the governmental health institution of Durame town.

Hint; N=Total subjects in study site,

Ni= Total subjects in each institution,

ni =study subjects in each facility,

nf =total sample size obtained from single proportion population formula

4.6 STUDY VARIABLE

4.6.1 Dependent variable

- Anemia

4.6.2 Independent variable

- ***Socio-demographic Characteristics***: Age**,** Sex**,** Residence**,** Education status**,** Occupational status**,** Monthly income**,** Family size
- ***Maternal Factor:*** Pregnancy interval**,** Family planning utilization history**,** Trimester during visit**,** Grand multipara,
- ***Nutritional Factor:*** iron intake**,** substance use**,** Nutritional frequency**,** Parasitic infection

4.7 OPERATIONAL DEFINITONS

- **Dietary diversity score -** is a qualitative measure of food consumption that reflects household access to a variety of foods. Categorized as low dietary diversity (≤ 3 food groups), medium dietary diversity (4 and 5 food groups) and high dietary diversity (≥ 6 food groups) ate with in 24hrs [54](51).
- **Anaemia: -** is a reduction of the hemoglobin level of the blood due to decrease in Red blood cell. Level of hemoglobin mild 10-11g/dl, moderate 7-9.9 g/dl and severe anemia less than 7g/dl**.**
- **Monthly income**: - Monthly income of the family, monthly income of the family is <2000 Ethiopia birr [low], >2000 Ethiopia birr [high]. (41)

4.8 DATA COLLECTION TOOLS AND TECHNIQUES

Data was collected by three BSc midwifery graduating student using the questionnaire, face to face interview was done with the pregnant women who was come for ANC follow up during the study period and laboratory investigation was done by laboratory physician to know the Hgb concentration.

4.9 DATA QUALITY CONTROL

The questionnaire was prepared in English then it was translated to Amharic for interview purpose. After collecting the data it was retranslated to English. The quality of the data was assured through careful designing of the questionnaires. Before the actual data collection, pretest was done in halaba health center which is 95km far from Durame general hospital. The

investigator was checked the collected data for completeness and corrective measures was taken accordingly.

4.10 DATA PROCESSING AND ANALYSES

Data was checked for completeness, edited, coded and entered into Epi data version 3.1 and exported to SPSS version 25 statistical software for analysis. Descriptive statistics such as mean, median, frequency and percentage was used and presented using charts and tables. Bivariate analysis was done and all explanatory variables which had association with the outcome variable with P-value less than 0.25 were included in multivariable analysis. Multi variable analysis was employed to determine independent factor among explanatory variables. Adjusted odds ratio (AOR), 95% confidence interval and P-value less than or equal to 0.05 was used to decide statistically significant association with outcome variable.

4.11 ETHICAL CONSIDERATION

Support letter were obtained from Wolkite University, college of health science and medicine, department of midwifery. Every interviewee was informed about the objective of the study and their consent was obtained verbally. The information was obtained from the study participant and amount of Hgb from secondary data in lab result with permission of concerned bodies (hospital and laboratory head).

CHAPTER FIVE

Result

Socio-demographic characteristics

A total of 406 pregnant women participated making a response rate 99.3%. The mean (±SD) age of the study participants were 28.92 (±5.023). Two hundred forty two (60 %) of the study participants were protestant followed by, Orthodox 112 (27.8%). Majority, 283 (70.2%) study participants were residing in urban area and the rest 120 (29.8%) participants were residing in rural. *Table 1*

Table 1:- Socio–demographic and economic characteristics of pregnant mothers attending antenatal care in durame governmental health center (n = 403)

Variable	Category	Frequency	Percent (%)
Age	<20	4	1 %
	20-24	80	19.9 %
	25-29	132	32.8 %
	30-34	135	33.5 %
	35-39	40	9.8 %
	>40	12	3 %
Religion	Protestant	242	60 %
	Orthodox	112	27.8 %
	Catholic	39	9.7 %
	Muslim	7	1.7 %
	Adventist	3	0.7 %
Residence	Urban	283	70.2 %
	Rural	120	29.8 %
Educational	Can’t read & write	26	6.5 %
	Primary (1-8)	217	53.6 %

status	Secondary (9-12)	126	31.3 %
	Higher class (>12)	34	8.7 %
Occupational status	Farmer	12	3 %
	Housewife	187	46.4 %
	Private	82	20.3 %
	Daily labor	7	1.7 %
	Government	103	25.6 %
	merchant	12	3 %
Marital status	Married	398	98.8 %
	Single	5	1.2 %
Monthly income	<=2000	56	13.9 %
	> 2000	347	86.1 %
Family number	<=2	40	9.9 %
	3-5	265	65.8 %
	>=6	98	24.3 %

Obstetric and Nutrition Related Characteristics of the Pregnant Women

The mean current gestational age (±SD) of the study participants was 29.4 ± 4.65 weeks. Above two-thirds of the participants were multigravidas 303 (75.2%). Around half (49.4%) of the study participants were in their third trimester. From the participant 78 (44.2%) of did not have iron supplementation during pregnancy. *(Table 2)*

Table 2:-Associated factor of anemia in pregnant mothers attending antenatal care in durame town.

Variable	Category	Frequency	Percentile (%)
Gestational age	1st trimester	40	9.9 %
	2nd trimester	174	43.2 %
	3rd trimester	189	46.9 %
Gravidity of the mother	Two and less	100	24.8 %
	Three and above	303	75.2 %
Parity of the mother	Para two and less	163	40.4 %
	Para three and above	198	49.1 %
Pregnancy interval	<= 2	279	69.2 %
	>=3	82	20.3 %
History of abortion	Yes	98	24.3 %
	No	305	75.7 %
Iron supplement	Yes	225	55.8 %
	No	178	44.2 %
Meal frequency	<=3	35	8.7 %
	>3	239	59.3 %

Prevalence of anemia among pregnant women attending antenatal care

The overall prevalence of anemia in this study was 127 (31.5 %) were anemic (95% CI). The mean ± SD hemoglobin concentration among the study participants was 11.71 ± 1.24 g/dL. Of the anemic pregnant women, 107 (26.6%) and 20 (5 %) had mild anemia (Hb ranges 10.0–10.9 g/dL) and moderate anemia (Hb ranges 7.0–9.9 g/dL), respectively

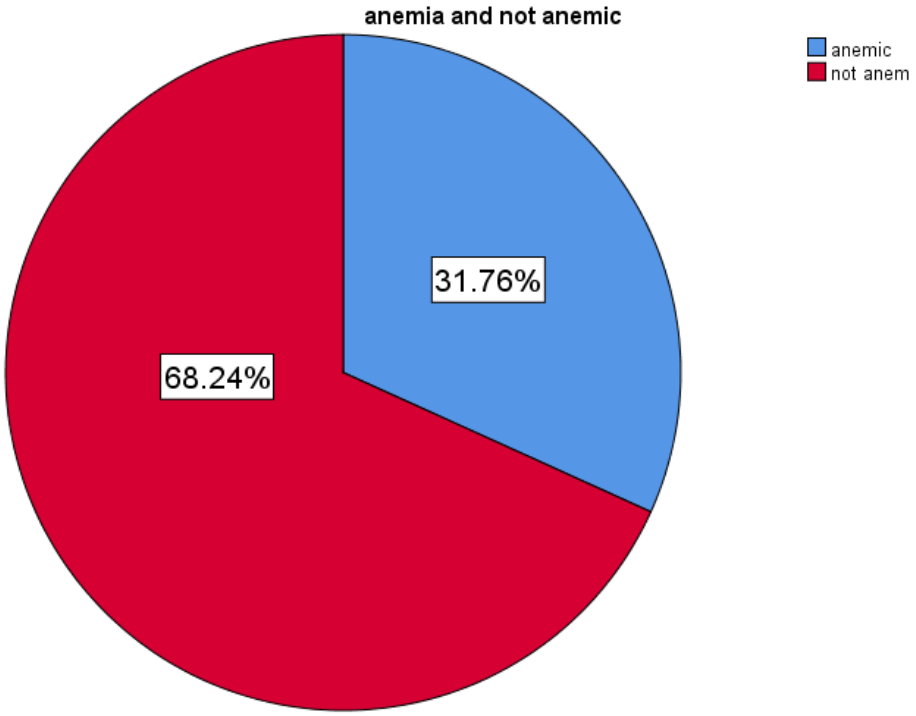


Figure 3:- Prevalence of anemia among pregnant women attending antenatal care in durame town, southern Ethiopia, 2021 (n=403).

Prevalence of Anemia by socio demographic, dietary and reproductive characteristics of pregnant Mother

Prevalence of anemia among pregnant women by residence was 76 (18.9%) of study participants were rural and 52 (12.9%) were urban. by age, 38(9.4%) of them were included under age 25-29, from the total anemic pregnant women 126 (31.3%) were married and based. On the basis of meal frequency per day, 118 (30%) of anemic pregnant women fed <=3 times per day and 75 (18.6%) of them were not take iron in current pregnancy.

variable	Category	Anemia		Total (%)
		Yes (%)	No (%)	
Residence	Urban	52 (12.9)	243 (60.3)	295 (73.2)
	Rural	76 (18.9)	32 (7.9)	108 (26.8)
Age (year)	<20	4 (50)	4 (50)	8 (2)
	20-24	19 (25)	57 (75)	76 (18.9)
	25-29	38 (28.8)	94 (71.2)	132 (32.8)
	30-34	43 (31.9)	92 (68.1)	135 (33.5)
	35-39	16 (40)	24 (60)	40 (9.9)
	>40	8 (66.7)	4 (33.3)	12 (3)
Education status	Can't read & write	11 (42.3)	15 (57.7)	26 (6.5)
	Primary (1-8)	71 (32.7)	146 (67.3)	217 (53.8)
	Secondary (9-12)	38 (30.2)	88 (69.8)	126 (31.3)
	Higher class (>12)	8 (23.5)	26 (76.5)	34 (8.4)
Income of family	<=2000	17 (30.4)	110 (31.7)	127 (31.5)
	>2000	39 (69.6)	237 (68.3)	276 (68.5)
Marital status	Single	2 (25)	3 (75)	5 (1.2)
	Married	126 (31.7)	272 (68.3)	398 (98.8)
Meal frequency	<=2	35 (77.8)	10 (22.2)	45 (11.2)
	3	84 (35.7)	151 (64.3)	235(58.3)
	>=4	8 (6.5)	115 (93.5)	123(30.5)
Gravidity of the mother	Two and less	35 (35.0)	65 (65.0)	100 (24.8)
	Three and above	93 (30.7)	210 (69.3)	303 (75.2)
Parity of the mother	Para two and less	55 (33.7)	108 (66.3)	163 (45.2)
	Three and above	61 (30.8)	137 (69.2)	198 (54.8)

History of abortion	Yes	81 (82.7)	17 (17.3)	98 (24.3)
	No	47 (15.4)	258(84.6)	305 (75.7)
Iron supplement	Yes	53 (23.6)	172 (76.4)	225 (55.8)
	No	75 (42.1)	103 (57.9)	178 (44.2)

Table 3:- Anemia by socio demographic, dietary and reproductive characteristics of pregnant women attending antenatal care in in durame governmental health center (n = 403)

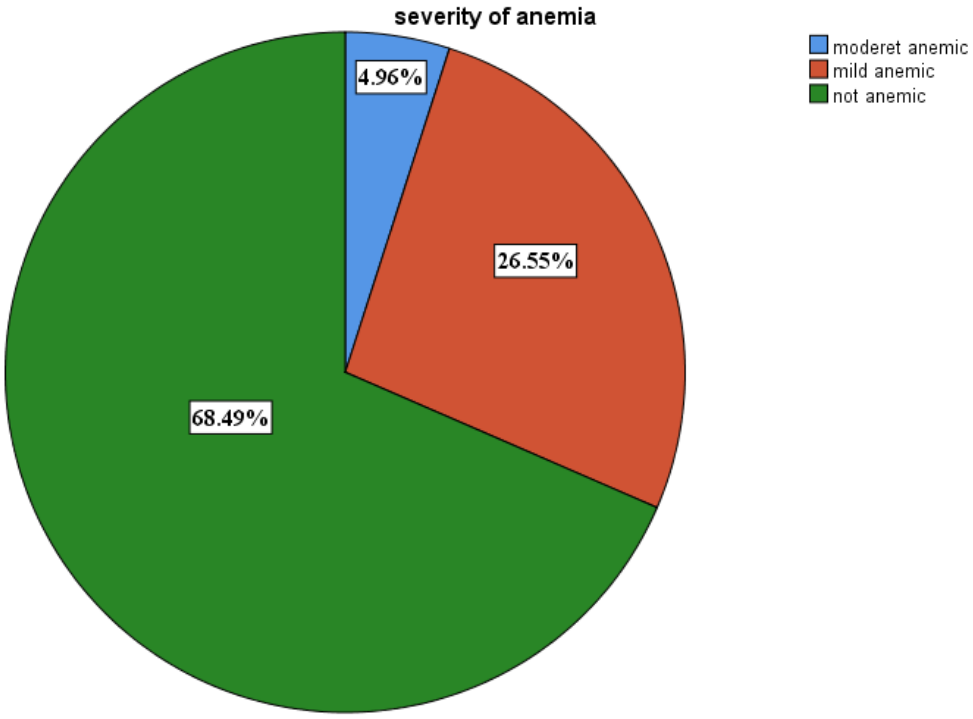


Figure 4:-Fig:-Anemia severtyin pregnant women attending ANC in durame town 2021 GC

Factors associated with anemia among pregnant women

First a bivariate logistic regression was performed to identify factors that are associated to anemia. Then those independent variables p-value ≤0.25 were fitted in to multivariable logistic regression. On bivariate analysis, residence, iron supplement, meal frequency and History of Abortion were associated with anemia. Multivariable analysis was performed to determine the factors which were independently associated with anemia during pregnancy. After multivariable analysis < 3 time eat in 24 hr had the occurrence of anemia increase by three times from meal

frequency >3 eat per 24 hr [AOR=3.437, 95% CI 1.634-5.934], history of abortion had two times higher to develop anemia than those who had no history of abortion [AOR= 2.543, 95% CI 1.139-5.530] and not tack iron supplement were significantly associated with anemia in pregnant women. Consequently, the odds of anemia were higher among pregnant women who did not take iron supplementation [AOR = 1.923; 95% 1.043, 3.87].*table 4*

Table 4:-Factors associated with anemia among pregnant mothers attending antenatal care in durame governmental health center (n = 403)

Category	**Anemia**		**P-value**	**COR (95%CI)**	**AOR (95% CI)**
	Yes (%)	**No (%)**			
Educational status					
Can't read & write	11(42.3)	15(57.7)	0.125	1	1
Primary (1-8)	71(32.7)	146(67.3)	0.286	0.663(0.273-1.468)	0.845(0.414-2.918)
Secondary (9-12)	38(30.2)	88(69.8)	0.450	0.588(0.296-1.716)	0.145(0.014-2.918)
Higher class (>12)	8(23.5)	26(76.5)	0.004	0.419(0.138-1.274)	0.915(0.442-2.118)
Residence					
Urban	52(17.6)	243(82.4)	0.000	1	1
Rural	76(70.4)	32(29.6)	0.000	11.099(6.663-18.48)	1.015(0.642-3.118)
Family number					
<=2	12(30.0)	28(70.0)	0.389	1	1
3-5	79(29.8)	186(70.2)	0.151	0.99(0.579-2.322)	1.015(0.642-3.118)
>=6	37(37.8)	61(62.2)	0.016	1.415(0.642-3.118)	2.015(0.642-4.118)
Gestational age					
1st trimester(1-16 weeks)	18(45.0)	22(55.0)	0.528	1,717(0.858-3.435)	0.415(0.042-1.118)
2nd trimester(17-28weeks)	49(28.2)	125(71.8)	0.041	0.822(0.531-2.225)	1.001(0.642-2.118)
3rd trimester(29-40weeks)	61(32.3)	128(67.7)	0.127	1	1

Gravidity of mother					
Two and less	35(35.0)	65(65.0)	0.423	1.215(0.543-2.258)	0.915(0.042-1.118)
Three and above	93(30.7)	210(69.3)	0.000	1	1
Parity of mother					
Para two and less	55(33.7)	108(66.3)	0.553	1	1
Para three & above	61(30.8)	137(69.2)	0.000	0.874(0.561-1.362)	0.645(0.114-1.918)
Pregnancy interval					
<=2	96(34.4)	183(65.6)	0.090	1.623 (0.984-2.302)	0.845(0.214-2.918)
>=3	20(24.4)	62(75.6)	0.000	1	1
Abortion					
Yes	50(33.5)	48(18.9)	0.000	2.167(1.236-4.543)	**2.543(1.139-5.530)***
No	99(66.5)	206(81.1)	0.000	1	1
Iron supplement					
Yes	53(41.4)	172(62.5)	0.000	1	1
No	75(58.6)	103(37.5)	0.000	2.36(1.064-4.231)	**1.923(1.043-3.873)***
Meal frequency					
<=3	35(77.8)	44(16)	0.000	6.87(3.234-13.875)	**3.437(1.634-5.934)***
>3	9(7.3)	80(29.1)	0.000	1	1

Note:- * p-value <0.05, 1.00, reference

COR- crude odd ratio, AOR- adjust odd ratio CI- confidence interval

CHAPTER SIX

Discussion

In this study, the overall prevalence of anemia among pregnant was 31.5% [95% CI 26.3-36.57]. However, this was lower than the studies done in Nekemt town, 52% (23), study done in Gode, somali region 56% (34), study conducted in Ghana was 57.1% (44) also in Nigeria study show that prevalence of anemia 54.5% (15). This variation might be due to good birth interval during pregnancy and child birth spacing and that might be among the reasons for the apparent very low prevalence rate in the study area and also socio economic which affect nutritional status, differences in health seeking behavior and geographic differences among nations.

On other side this prevalence was higher than other reports in Ethiopia, such as study conducted in Gondar District (16.6%) (36), Hwaassa (15%) (39), In Mekelle (19.7%) (18) and other research done in Iran (13.6%) (40) The observed discrepancy might be due to rural residence of women, which is (70.4%) of anemic women live in rural area in current study. Pregnant women living in the rural areas were more likely to be affected with community belief towards poor feeding practices, and had lower access to nutrition education and counseling (31).

In this study, the multivariable logistic regression analysis revealed that history of abortion, iron supplementation during pregnancy, and meal frequency per day were significantly associated with anemia among the pregnant women at value ≤ 0.05 (Table 3). However, maternal residence, gestational age of the mother showed significant association with bivariate analysis but not with the multivariable analysis.

In the present study, the prevalence of anemia was 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 greater than 3 times per day in which the pregnant women having a meal frequency of less than 3 times per day were high likely to develop anemia during pregnancy by 88% compared to pregnant women who had a meal frequency of greater than 3 times per day. This might be due to the reason that pregnancy is a critical period with increased energy and nutrient demand for the mother which should be fulfilled with increased meal frequency per day. This result is consistent with other studies conducted in Mekelle[3] and also the result was supported by what was reported in West Arsi [17].

In this study the odds of anemia were lower among pregnant women who did take iron supplementation as compared to their counterparts. The result was supported by what was reported in Vietnam (18). Though iron requirement increases during pregnancy, poor dietary intake of iron rich food is observed in this study and the 2011 Ethiopia Demographic and Health Survey report (18). supplementation of micronutrients, for instance iron and folic acid during pregnancy is not only used to prevent anemia, but it could also help to break the intergenerational cycle of low birth weight, stunting and future child and adult under nutrition (41).

In the present study, the prevalence of anemia was higher among pregnant women who had history of abortion has high likely to develop anemia during pregnancy compared to who have no history of abortion. The result was supported by research conducted in west Arsi zone. [41] The reason for this might be pregnant women who have history of abortion could have blood loss.

LIMITATION OF THE STUDY

The cross-sectional nature of the data made it impossible to reach at the causal relationship between the different independent and outcome variables.

CONCLUSION AND RECOMMENDATION

Conclusion

Nearly one-third (31.5%) of pregnant mothers were anemic in durame town. The overall prevalence of anemia among pregnant women attending antenatal care in the study area was found to be a moderate public health problem. Nutritional status meal frequency and history of abortion was significantly associated with anemia in pregnant women

Recommendation

There are interventions to consider like health education about anemia up should be given top priority to ensure the sustainability of low prevalence of anemia by health professional in durame town. We recommend to durame zone health office and SNNPR health bureau and other districts including health centers and NGOs should be emphasize on health Education for pregnant women on additional meal, fluid intake, proper intake of prescribed ferrous sulfate tablets, consequence of abortion, early detection and seeking care behavior, activities that promote health and prevent disease etc… during pregnancy. Prescribed ferrous sulfate for all pregnant women routinely.

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Annex 1

Consent form

My name is ---------- (Interviewer) I am candidate of Bachelor degree of Midwifery from Wolkite University, College of Medicine and Health science. This is a study to be conducted with the objective assessing the prevalence anemia in pregnant women and associated factor. You are kindly requested to participate in this study and provide the information required from you.

We would like to ask you a few questions if you may, but you can refuse to answer any question we ask. You can also refuse to participate in the study entirely. The interview will last approximately 25minutes. Your responses will be kept confidential and privacy of respondent will be protected. We would like to inform you that the responses that you provide to the questions are very essential, not only for the successful accomplishment of the study, but also for producing relevant information which will be helpful in assessing and identifying the magnitude and associated factors of anemia among pregnant women.

Are you voluntary to respond to the questions?

If Yes; proceed with the interview

No; thank her and End.

Name of interviewer who sought the consent: _____ Date_____

Signature: _____

Annex 2

Date _____ Code no _____

Questioner

Part 1.

Socio demographic and economic characteristics of the respondent.

1. Age _____in years.

2. Where do you live?

   A. Urban

   B. Rural

3 Educational level

   A. Illiterate
   B. Primary
   C. Secondary
   D. Higher
   E. Other, specify _____

4. What is your occupation?

   A. Farmer
   B. Housewife
   C. Daily laborer
   D. Governmental Employee
   E. NGO employee
   F. Other, specify _____

5. Religion

   A. Protestant
   B. Orthodox
   C. Catholic
   D. Muslime
   E. Other, specify _____

6. Ethnicity

A. Kembata
B. Hadya
C. Oromo
D. Wolayta
E. Other, specify _____

7. What is your marital status?

A. Never married/Single
B. Married/Living together
C. Widowed
D. Other _____

8. Family Monthly income (specify) _____

9. Family numbers_____

10. Number of children _____

Part ll. **Obstetric and reproductive factors of anemia.**

11. Number of pregnancy _____

12. Number of delivery _____

13. How many children do you have? _____

14. How many of them delivered in hospital? _____

15. Gestational age of current pregnancy?

A. < 3 month
B. 3-6 month
C. > month

16. Time interval between the last recent two births_____.

17. Place of last delivery

A. Health institutions
B. Home

18. Is there any blood loss in your previous delivery?

A. Yes
B. No

19. Did you follow antenatal care in your previous pregnancy?

A. Yes B. No

20. If you say yes for question 19, how many times_____?

21. Any abortion in your life in the last five year?

A. Yes

B. No

22. What are medicines you have taken in this pregnancy?

A. antibiotics,

B. iron and folic acid tablets(Iron)

C. ant malarial,

D. multivitamins

E. Never taken any drug

F. Had taken other medicines, specify

23. Do you have history of heavy menstrual bleeding?

A. Yes

B. No

24. If yes for No 32, at what time interval do you change you pad?

A. < 3 hours interval

B. > 3 hours interval

Part lll, Nutritional and other factors of anemia

25. Do you use contraceptive?

A. Yes

B. No

26. Did you experience fever, chill, sweating in the last one year?

A. Yes

B. No

27. Do you use ITN?

A. Yes

B. No

28. Have you taken iron supplement in current pregnancy?

A. Yes

B. No

29. If yes for No 21, how many tablets do you take totally? .....

30. Do you have previous surgery?

A. Yes B. No

31. Do you have Habit of walking bare foot?

A. Yes

B. No

32. How often do you eat per day?.....

33. HIV status (from record/patient response)

A. Positive

B. Negative

34. Do you use substance (alcohol)?

A. Yes

B. No

35. If you say yes for question 34, when do you start?

A. < 2 years before current pregnancy

B. >2 years before current pregnancy

C. During this pregnancy

36. How often do you use it?

A. Once per day

B. 2-3 times per day

C. Occasionally

D. Specify_____

Part lV, **Laboratory Test**

37. Hemoglobin level of the respondent

Specific …….

Annex 3

Amharic Questionniare

መጠይቅ

መጠይቅ

ይህ መጠይቅ የ ደም ማነ ስ በ ነ ፍሰ ጡር እ ና ቶ ች መካ ከ ል በ ምን ያ ክ ል መጠን ይ ገ ኛ ል እ ን ዲ ሁ ም ተ ያ ያ ዥ ች ግ ሮ ች ን በ ማ ጥ ና ት ላ ይ ያ ተ ኩ ራ ል ። እ ር ስ ዎ ም የ ዚ ህ ጥ ና ት ተ ሳ ታ ፊ እ ን ዲ ሆ ኑ እ ና ት ክ ክ ለ ኛ ውን መ ረ ጃ በ መ ስ ጠ ት እ ን ዲ ተ ባ በ ሩ ን በ አ ክ ብ ሮ ት እ ን ጠ ይ ቃ ለ ን ፡

ለ ም ን ጠ ይ ቃ ች ሁ ጥ ቂ ት ጥ ያ ቄ ዎ ች መ ል ስ መ መ ል ስ አ ል ያ ም ደ ግ ሞ ጥ ያ ቄ ው ን ው ድ ቅ ማ ድ ረ ግ ይ ች ላ ሉ ፡ ፡ እ ን ዲ ሁ ም በ ዚ ህ ጥ ና ታ ዊ ጽ ሁ ፍ ው ስ ጥ አ ለ መ ሳ ተ ፍ ም ት ች ላ ላ ች ሁ ፡ ፡ ቃ ለ –መ ጠ ይ ቁ ለ 25 ደ ቂ ቃ የ ሚ ቆ ይ ሲ ሆ ን ሚ ስ ጥ ራ ዊ ነ ቱ የ ተ ጠ በ ቀ ይ ሆ ና ል ፡ ፡ የ ሚ ሰ ጡ ት ም ላ ሽ የ እ ና ቶ ች ጤ ን ነ ት በ ማ ሻ ሻ ል ላ ይ ት ል ቅ አ ስ ተ ዋ ጽ አ እ ን ዳ ለ ው ለ ማ ሳ ወ ቅ እ ወ ዳ ለ ሁ ፡ ፡

በ ቃ ለ መ ጠ ይ ቁ ላ ይ ለ መ ሳ ተ ፍ ፈ ቃ ደ ኛ ነ ዎ ት

አ ው ፈ ቃ ደ ኛ ነ ኝ _____

ፈ ቃ ደ ኛ አ ይ ደ ለ ሁ ም _____

ጥ ያ ቄ

ክ ፍ ል 1

1.እ ድ ሜ …….

2.የ ት ነ ው ም ት ኖ ሪ ው

1. ከ ተ ማ
2. ገ ጠ ር

3.የ ት ም ህ ር ት ደ ረ ጃ

1. ማ ን በ ብ ና መ ጻ ፍ
2. የ መ ጀ መ ሪ ያ ደ ረ ጃ
3. የ ሁ ለ ተ ኛ ደ ረ ጃ
4. .ኮ ሌ ጅ ና ከ ዛ በ ላ ይ

4. የ ስ ራ ሁ ኔ ታ

1. የ ግ ል ስ ራ
2. የ መ ን ግ ስ ት ስ ራ
3. የ መ ን ግ ስ ት ያ ል ሆ ነ ተ ቋ ም
4. የ ቤ ት እ መ ቤ ት
5. ስ ራ ያ ላ ገ ኘ ቸ

5. ሐ ይ ማ ኖ ት

1. ፕ ሮ ተ ስ ታ ን ት
2. አ ር ቶ ዶ ክ ስ
3. ሙ ስ ሊ ም
4. ካ ቶ ሊ ክ
5. ሌ ላ ……

6.ብ ሔ ር

1. ከ ም ባ ታ
2. ሃ ድ ያ
3. ወ ላ ይ ታ
4. አ ሮ ሞ
5. አ ማ ራ
6. ሌ ላ ……..

7. የ ት ዳ ር ሁ ኔ ታ

1. ያ ላ ገ ባ
2. ያ ገ ባ
3. የ ፈ ታ
4. ባ ሏ የ ሞ ተ ባ ት

8. የ ገ ቢ መ ጠ ን ……

9. የ ቤ ተ ሰ ብ ቁ ጥ ር ……

10.የ ል ጆ ች ቁ ጥ ር በ ቤ ተ ሰ ብ ው ስ ጥ ?……

ክ ፍ ል 2

11. ስ ን ተ ኛ እ ር ግ ዝ ና ሽ ነ ው?……..

12.ስ ን ት ል ጅ ወ ል ደ ሻ ል ?…….

13. ስ ን ት ል ጆ ች ኣ ሉ ሽ ?…….

14. ከ ል ጆ ች ሽ ስ ነ ቱ ን ነ ው በ ማ ህ ጸ ን የ ወ ለ ድ ሽ ው?……..

15. የ ኣ ሁ ኑ እ ር ግ ዝ ና ው ስ ን ት ሳ ምን ቱ ነ ው ?.....

17. የ መ ጨ ረ ሻ ል ጅ ሽ ን የ ት ነ ው የ ወ ለ ድ ሽ ው?

1. ህ ክ ም ና ቦ ታ
2. ቤ ት ው ስ ጥ

18. ከ ዚ በ ፊ ት በ ወ ለ ድ ሻ ቸ ው ል ጆ ች ብ ዙ ደ ም ፈ ሶ ሻ ል ?

1. ኣ ዎ
2. ኣ ል ፈ ሰ ሰ ኝ ም

19.ከ ት ት ል ነ በ ረ ሽ ል ጆ ች ሽ ን ስ ት ወ ል ጂ ?

20. 19 ጥ ያ ቄ ኣ ዎ ካ ል ሽ ስ ን ት ጊ ዜ …….

21. ኣ ስ ወ ር ዶ ሽ ያ ው ቃ ል ?

1. ኣ ዎ
2. ኣ ያ ው ቅ ም

22. ም ን ኣ ይ ነ ት መ ድ ሃ ኒ ት ወ ስ ደ ሻ ል ባ ሁ ኑ እ ር ግ ዝ ና ሽ ?

1) ፀ ረ -ባ ክ ቴ ሪ ያ
2) የ ደ ም ማ ነ ስ መ ድ ሃ ኒ ት
3) የ ወ ባ
4) ቫ ይ ታ ሚ ኖ ች ን
5) ም ን ም ኣ ል ወ ሰ ድ ኩ ም
6) ሌ ላ …….

23. በ ወ ር ኣ በ ብ ጊ ዜ ብ ዙ ደ ም ይ ፈ ስ ሻ ል ?

1) ኣ ዎ
2) ኣ ይ ፈ ሰ ኝ ም

24. ኣ ዎ ካ ል ሽ ለ 23 ጥ ያ ቄ በ ም ን ያ ክ ል ሰ ኣ ት ል ዩ ነ ት ነ ው ሞ ዴ ስ የ ም ት ቀ ይ ሪ ው?

1) ከ 3ሰ ዓ ት ባ ነ ሰ ጊ ዜ

2) ከ 3ሰ ዓ ት በ ላ ይ

ክ ፍ ል 3

25. የ ቤ ተ ሰ ብ ም ጣ ኔ ት ተ ቀ ሚ ያ ለ ሽ ?

1) አ ዎ

2) አ ል ጠ ቀ ም ም

26. ከ ባ ለ ፈ ው አ መ ት ጀ ም ሮ ራ ስ ም ታ ት ፣ ማ ን ቀ ጥ ቀ ጥ እ ና ማ ላ ብ ነ በ ረ ?

1) አ ዎ

2) አ ል ነ በ ረ ም

27.አ ጎ በ ር ት ጠ ቀ ሚ ያ ለ ሽ ?

1) አ ዎ

2) አ ል ጠ ቀ ም ም

28.የ ደ ም ማ ነ ስ መ ድ ሃ ኒ ት ወ ስ ደ ሻ ል በ ዚ ኛ ው እ ር ግ ዝ ና ሽ

1) አ ዎ

2) አ ል ወ ሰ ድ ኩ ም

29. 28 ጥ ያ ቄ አ ዎ ካ ል ሽ ም ን ያ ክ ል ፍ ሬ ……..

30. ቀ ዶ ጥ ገ ና ተ ደ ር ገ ሽ ታ ው ቂ ያ ለ ሽ ?

1) አ ው

2) አ ላ ው ቅ ም

31. በ ባ ዶ እ ግ ር የ መ ሄ ድ ል ማ ድ አ ለ ሽ ?

1) አ ዎ

2) የ ለ ኝ ም

32.በ ቀ ን ው ስ ጥ ስ ን ት ጊ ዜ ት መ ገ ቢ ያ ለ ሽ ?…….

33. በ ደ ም ሽ ው ስ ጥ HIV አ ለ ብ ሽ ?

1) አ ለ ብ ኝ

2) የ ለ ብ ኝ ም

34. አ ል ኮ ል ት ጠ ቀ ሚ ያ ለ ሽ ?

1) አ ዎ

2) አ ል ጠ ቀ ም ም

35. ለ 34 ተ ያ ቄ አ ዎ ካ ል ሽ መ ች ነ ው የ ጀ መ ር ሽ ው

1) ከ አ ሁ ኑ እ ር ግ ዝ ና ከ 2 አ መ ት በ ፊ ት

2) ከ አ ሁ ኑ እ ር ግ ዝ ና ከ 2 አ መ ት በ ኃ ላ

3) በ አ ሁ ኑ እ ር ግ ዝ ና ነ ው የ ጀ መ ር ኩ ት

36.መ ች መ ች ነ ው ም ት ጠ ቀ ሚ ው

1) በ ቀ ን 1 ጊ ዜ

2) በ ቀ ን ከ 2-3 ጊ ዜ

3) አ ል ፎ አ ል ፎ

4) ል ላ

ክ ፍ ል 4

37. የ ሄ ሞ ግ ሎ ቢ ን መ ጠ ን ……..