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Magnitude of Anemia and Associated Factors among Pregnant Women attending Antenatal Care Service in Hetosa District Health Centers, Arsi Zone, Oromia Regional State, Ethiopia

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Abstract

Background: Anemia is a major public health problem especially for pregnant women in developing countries. During pregnancy anemia is an important contributor to maternal mortality. The main aim of the present study was to assess the prevalence of anemia and associated risk factors among pregnant women receiving antenatal care at Hetosa district health centers, Arsi zone, Ethiopia.

Objectives: To assess the magnitude of anemia and associated factors among pregnant women attending Antenatal service in Hetosa district health centers, Ethiopia from 2018.

Methods: Facility based cross sectional study design was used. The sample size was proportionally allocated for 4 health centers; Face to face interview was conducted to collect data using pre tested, structured questionnaire and Hemoglobin test was also carried out.. Data was entered, coded and checked by Epi-Info version 07and analyzed using Statistical Package for Social Science (SPSS) version 21 computer software was used for data analysis. Logistic regression analysis was performed to identify factors associated with anemia. Crude and adjusted Odds ratio with its 95%confidence interval was used as a measure of association. P-value < 0.05 was used to declare statistically significant.

Result: The magnitude of anemia in this study is 34.6%. Gestational age >6 months [Adjusted Odds Ratio (AOR): 1.5; 95%CI: 2.24, 3.71), family size ≥5 [AOR: 1.21; 95%CI: 1.3, 1.87)) and number of delivery ≥3 [AOR: 1.41; 95%CI: 3.46, 5.48)] are significantly associated with anemia.

Conclusion and recommendation: The overall magnitude of anemia in this study indicated that it was high health problem. Extended family, multi parity and gestational age were significantly independent predictors for maternal anemia among the pregnant women in the study area. Even if, all pregnant women were at risk of anemia, health providers need to give greater emphasis on decreasing the risk of anemia during late pregnancy because the risk was higher at later stages of pregnancy and each facility should have to screen all pregnant women for Anemia.

Keywords: Anemia; Pregnancy; Magnitude; Hetosa

Introduction

Background

Anemia during pregnancy is defined as a hemoglobin concentration less than 11 g/dl and classified as mild (10.0–10.9g/dl), moderate (9.9g/dl) and severe <7g/ dl. Anemia is a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body's physiologic needs. Specific physiologic needs vary with a person's age, gender, residential elevation above sea level (altitude), smoking behavior, and different stages of pregnancy [1]. Maternal anemia is associated with increased risk of miscarriages, stillbirths, prematurity and low birth weight of the infant, neonatal and maternal mortality [2]. Failure to reduce anemia worldwide has impaired the health and quality of life of millions of women, leading to generations of children with impaired development and learning, and communities and nations with impaired economic productivity and development [3].

More than 40% of pregnant women are anemic worldwide [4]. Globally, the prevalence of anemia in South Asia and Central/West Africa was the highest [5]. The prevalence of anemia is ranged from 33% to 29% in non-pregnant women and 43% to 38% in pregnant women between 1995 and 2011 [6]. In 2011, 29% of non-pregnant women were anemic [7].

Anemia is a major public health problem, which has an effect on both developing and developed countries with major consequences for human health as well as social and economic development. It affects over 2 billion people globally and One fifth of maternal death refers to anemia worldwide but the problem is very high and serious in children, non-pregnant women and pregnant women mainly in the developing countries of Asia and Africa [8]. Although Ethiopia has different climatic conditions and grows a variety of cereals, root crops and vegetables, the dietary habit of the society is poor and depends on single staple food rather than dietary diversity and this results nutritional deficiency in pregnant women [9]. Pregnant women are particularly at high risk of iron deficiency due to increased nutrient requirement during pregnancy [10]. It is highly prevalent in less developed countries, where in addition to poor nutrition, parasitic and bacterial infections can contribute to depletion of iron reserves [11].

Anemia prevalence among pregnant women is around 24.1% in the Americas, 48.2% in South East Asia, 25.1% in Europe, 44.2% in Eastern

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Mediterranean, 30.7% in the Western Pacific, and the highest in Africa at 57.1% [12]. According to the World Health Organization (WHO), 12.8% and 3.7% of maternal mortality in Asia and Africa, respectively, are directly attributable to anemia. In Ethiopia, higher proportions of pregnant women are anemic (22%) than women who are breastfeeding (19%) [12].

The major strategy to reduce iron deficiency anemia in pregnancy is iron supplementation. The World Health Organization has recommended a 6-month regimen of a daily supplement containing 60mg of elemental iron along with 400 μg of folic acid for all pregnant mothers. In areas with a higher prevalence of anemia, it is recommended that supplementation continues for three months postpartum [13]. Accordingly, in Ethiopia, the national guideline for control and prevention of micronutrient deficiencies highlights the need of daily iron supplementation for at least 6months during pregnancy and 3months postpartum. Despite this program, in Ethiopia, <1% took an iron supplement for the recommended period (90 days or more) during their last pregnancy [14].

Statement of the problem

Globally 56 million pregnant women are anemic and one fifth of maternal death refers anemia world widely. Thirty-five up to seventy five percent of pregnant women in developing countries and 18% in developed countries are anemic, the highest rate found in Africa (61.3%) and South East Asia (52.5%). Anemia remained as a major public health problem among children, pregnant women and non-pregnant women lead to morbidity and mortality related from infection in tropical and subtropical countries. In Asia anemia is a key public health problem among pregnant women those belonging to nutritional problem. Lower socio-economic communities are at high risk of anemia, 20-40% maternal death in India due to anemia [15]. Another study conducted in Bangladesh, anemia during pregnancy is the commonest medical disorder that occurs in developing country and it directly causes maternal death for about 20% and act as a predisposing factor for another 20%. Perinatal mortality is higher in anemic women and cardiac failure during labor due to severe anemia is an important cause of mortality. Anemia also affects maternal weight gain, immune status, more chance of infection and delayed wound healing [16]. All of those showed the necessity of special control program for anemia in vulnerable population. In sub-Saharan Africa, 17.2 million pregnant women are anemic which counts 30% of total anemia prevalence among pregnant women in the world. In Ethiopia, the magnitude of anemia among pregnant women was 22% and the prevalence of anemia in pregnant women living in rural area is 1.75 times higher as compared to those who live in urban area. Ethiopia is among the country in Africa with high rates of food insecurity and malnutrition which commonest is iron deficiency anemia. Anemia can result from non-nutritional factors, such as hemorrhage, infection, chronic disease states. In addition, the prevalence of anemia increased from (2005 -2011) the contributing factors for this increment is not known. Anemia affects both physical and mental cognitive of the individual this lead to non-productive so it has been a significant public health problem in the country. Anemia remains a critical health problem for Ethiopia public health problem ranging between moderate to severe. According to different studies, the prevalence of anemia is very high especially in rural areas of Ethiopia [17]. However, there was no previous study that has been conducted in the study area with this purpose. Therefore, the aim of this study was to determine prevalence of Anemia and identify associated factors with Anemia among pregnant women attending antenatal care Hetosa district Health centers.

Significance of the study

This study will provide basic data on the issue that may help policy makers and as baseline data for Arsi Health Department to reduce the maternal mortality rate in the catchment area secondary to Anemia. The result of this study will help to understand how to plan health services and to set strategies on how to reduce Anemia during Pregnant as whole [18].

The information from the research will also help to identify gaps in the provision iron supplementation. This study will also be used by researchers as a base line data. This information will also help to improve on the ways of providing information to Antenatal mothers that will help to increase awareness on Anemia and factors associated with Anemia during pregnancy. The findings should help and guide the development of focused behavioral change strategies for pregnant women. It can also serve as an input for further research in this area in the future [19].

Conceptual frame work

This framework considers the person related factors include the mother's socio-demographic characteristics as well as socio – economic factors. It also considers maternal factors, dietary and Health related influence on Anemia (Figure 1).

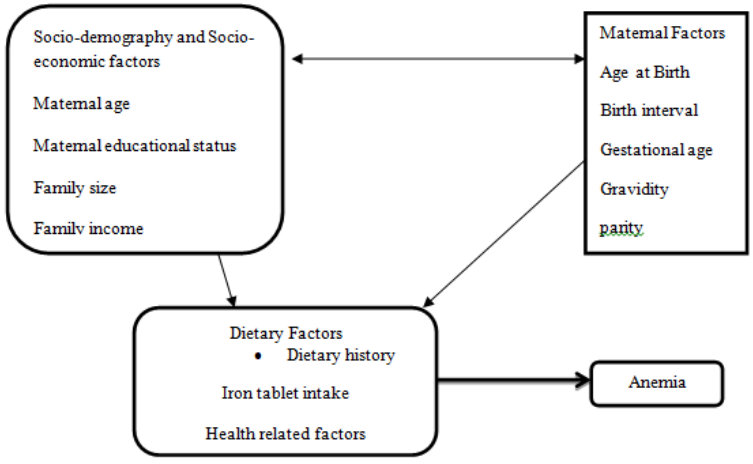

Figure 1: Conceptual frame work showing the linkage between independent and dependent variable adopted from UNICEF.

OBJECTIVES

General objective

To assess magnitude of Anemia and associated factors among pregnant women attending Antenatal care service in Hetosa district Health centers, Arsi zone, Oromia regional state, Ethiopia, 2018.

Specific Objective

1. To assess magnitude of Anemia among pregnant women attending Antenatal care service in Hetosa district Health centers, Arsi zone, Oromia regional state, Ethiopia, 2018.

2. To identify factors associated with Anemia among Pregnant Women attending Antenatal Care Service in Hetosa district Health centers, Arsi zone, Oromia regional state, Ethiopia, 2018.

Methods and Materials

Study area and period

The study was conducted in Hetosa district; Hetosa is located 150 km from Addis Ababa the capital city of Ethiopia and 50 km from Adama the capital city of East shewa zone. The total geographical area and elevation was about 2215 meters above sea level. It has Kola, Weina Dega and Dega climatic zone. The total population of the district is 164028 and total households are estimated to be 35,658. For the majority of the population Agriculture is their source of income. The main staple food of the population was wheat and some part barley. It Organized into 23 rural and 4 urban kebeles. The district has 4 functional public health centers (Iteya, Boru Jawi, Welarg and Sibu Abader) each health centers has one antenatal care unit. Daily in these health centers Antenatal care activities are conducted except weekend day [20]. The study was conducted, from February to June, 2018.

Study Design

Institutional based cross-sectional study design was used.

Source and study population

Source population: All pregnant women attending Hetosa District Health Centers.

Study population: Pregnant Mothers attending Antenatal Care (ANC) clinic of Hetosa district health centers from February to June, 2018.

Inclusion criteria:-Pregnant women who are not seriously ill during the study period.

Exclusion:-Pregnant women who have serious illness and women from malaria stable area.

Sample size and sampling procedures

Sample size determination: For objective 1: Magnitude of anemia, the minimum sample size (n) was computed by single population proportion formula by assuming 95% confidence level of Zα/2 =1.96, margin of error 5% and proportion (p) based on the assumptions: study was conducted from April to May 2013 in Gode, Eastern Ethiopia, which revealed 56.8% magnitude of anemia in pregnant women [8].

Therefore, $n=\frac{(z\alpha/2)^2 p(1-p)}{d^2}$ $n= (1.96)^2 *0.568(1-0.568)/(0.05)^2$

n=377 Adjusting for non -response rate of 10%, the final calculated minimum adjusted sample size will be 414.

For objective 2: Sample size for factors associated with Anemia.

The sample size was calculated using the sample size determination formula of two population proportions of Epi info version 07 by considering the following factor as significant factors associated with Anemia which was reported by study conducted in Gode, Eastern Ethiopiaas follow Table 1 [21].

At the end the largest sample size which is 414 was taken because it can be representative of all.

Sampling procedure

In Hetosa district there are 4 public health centers, all of those institutions was included in the study. By using the flow of pregnant women visiting ANC clinic in the previous 4 months as a baseline namely; Etaya, Boru Jawi, Sibu Abadir and welarg health centers. There are 932 pregnant women in those public health facilities (who were fulfilling the eligibility criteria) for four months. Accordingly, the total number of pregnant women who was studied for each health centers was calculated and Systematic random sampling technique was used to include a sample of 414 study participants. The total number of pregnant women (932) was divided by the sample size of 414 to give the sampling interval of two. To avoid double participation of participant, the data collectors were confirmed whether the participants had previously visited the ANC at the health centers and participated in the study during data collection period. Then total number of pregnant women was divided by the sample size equal to two, to select the study participants from each health centers as below Figure 2.

Variables of the study

Dependent variable: Anemia among Pregnant Women

Independent variables: Socio-economic and demographic factors: age, educational status, family size, Income of the household

Maternal factors: Birth interval, Gestational age and age at birth

Dietary factors: Number of meals, Dietary history (meat, fish etc...), Iron tablet intake

Health related factors: -previous malaria Infection and Previous intestinal helmetless

Operational definitions

Anemia: refers Hemoglobin concentration of pregnant women <11g/dl

Non-Anemic: refers Hemoglobin concentration of pregnant women ≥11g/dl

Data collection procedures

The semi- structured questionnaire was prepared and used in English and translated in to Afaan Oromo to check for its consistency. Data was collected by using Semi- structured interviewer administered questionnaire at the time of exit from ANC clinic. The three Diploma laboratory technicians were data collectors; one Health officer and BSC nurse were participated in the study. The questionnaire was pre- tested at Dera health center, which was not included in the actual study, in order to assess the appropriateness of the questionnaire. Hemoglobin concentration was measured using portable Hem Cue® Hb 301. One drop of capillary blood via finger prick was used to estimate hemoglobin level.

Standard procedures used were as follows:

Factors	Assumptions	Proportions	Sample size after 10% added
Number of pregnancy	Power=80% CI= 95% 1:1 Ratio	% of anemia among pregnant women who had greater than and equal two pregnancy =25.2(p1) % of anemia among pregnant women who had less than two pregnancy =12.3(p1)	348
Animals products	Power=80% CI= 95% 1:1 Ratio	% of anemia among pregnant women who were consuming animal product less than three times per week =37 % of anemia among pregnant women who were consuming animal product greater than three times per week = 23	400

Table 1: Sample size for factors associated with Anemia.

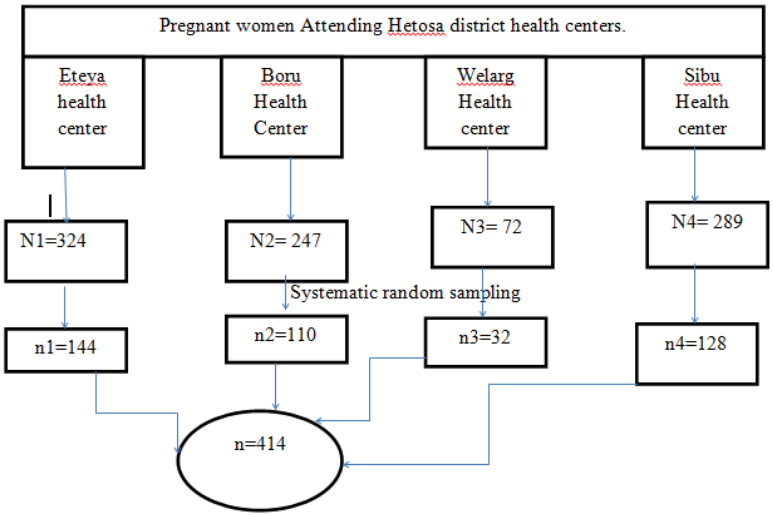

Figure 2: Schematic presentation of sampling procedure for Study in Hetosa District Health centers 2018.

1. The name of the lab technician & code of the volunteer were recorded at the top of form.

2. After start-up, the holder should be in its loading position. The display was show how three flashing dashes and the Hemo cue symbols.

3. Make sure the client's hand is warm and relaxed. Use only the middle or ring finger for sampling. Avoid fingers with ring on.

4. Clean with disinfectant and allow drying.

5. Using your thumb, lightly press the finger from the top of the knuckle towards the tip. This stimulates the blood flow towards the sampling point.

6. For best blood flow and least pain, sample the side of the fingertip. Not in the center.

7. Whilst lightly pressing toward the fingertip until another drop of blood appears.

8. Wipe away the first two drops of blood.

9. Re-apply light pressure towards the fingertip until another drop of blood appears.

10. When the blood drop is large enough, fill the microcuvette in one continuous process.

11. Wipe out excess blood on the outside of the microcuvette during this procedure.

12. Look for air bubbles in the filled microcuvette. If present, take a new sample.

13. Place the filled microcuvette in the cuvette holder. This should be performed within 10 minutes after filling the microcuvette.

14. Push the cubette holder to its measuring position

15. After 15-60 seconds, the Hgb value of the sample is displayed. The result will remain on the display as long as the cuvette holder is in the measuring position.

16. Discarding of the lancet with an open container was made and readings performed immediately and the result was recorded on in the questionnaire.

Data quality assurance

To ensure quality of data, two days training was provided to data collectors and data collection material was pretested on 5% (21pregnant women) of similar population of Dera health center. Regular supervision was made during data collection. Collected data was manually checked for completeness, accuracy and clarity on daily basis. Questionnaire was assessed for its clarity, length and completeness and the necessary correction was done. Confidentiality and privacy of the respondents was respected. The internal consistency of the tool was checked by conducting reliability test (cron bach's Alpha with result of α=0.86). The quality of blood samples and Hem Cue® Hb 301 was maintained and checked by senior laboratory technologist [22-24]. In addition Hemo Cue® was calibrated at the factory against the cyanomethemoglobin (HiCN) method, which is the international reference method for determining hemoglobin levels in the blood. In addition to the factory calibration, however, the HemoCue® was calibrated daily using the calibration micro cuvette provided by the manufacturer before working. The control micro cuvette is an optical interference filter, which was used to verify that the calibration is stable. The HemoCue® comes with technical documentation on how to measure the control micro cuvette. It also has a troubleshooting guide [25].

Data processing and analysis

Data was entered into a computer by Epi info version 07 and analyzed using Statistical Package for Social Science (SPSS) version 21. Binary logistic regression analysis was done to see the association of each independent variable with the outcome variables and those found to have an association was entered in to Multivariable and binary logistic regression model to identify the effect of each explanatory variable on the outcome variables. A P-value ≤ 0.05 was considered as statistically significant variables and adjusted odds ratio with 95% CI will be calculated to ascertain the association. Hosmer Lemeshow goodness of fit was used to check model fitness.

Ethical considerations

Ethical clearance and permission was obtained from Adama General Hospital and Medical College Institutional Health Research Ethics Review Committee (IHRERC). Then the Permission was obtained from Hetosa district health Office. Confidentiality and the right of respondents were respected. Subsequently, the health center was communicated with official letter of permission that obtained from the district Health Office. More over the objective of the research was well explained to each facility management, maternal and child health clinic coordinator and clients who was involved in the study [26]. The study participants have a right to voluntary participate and right to withdraw anytime during the interview. The study participants was informed participating in this study would not have emotional stress or other foreseeable risks associated with the research & taking part in this research study may not benefit them personally. Data was collected after informed and signed consent is obtained from the study participants. The collected data was used only for intended purpose and the confidentiality of the information was kept. Data collection tools used in this study would not have patient identifiers. Data collectors were informed about the issue of the confidentiality and privacy by principal investigator and appropriate measures would be taken to assure confidentiality of the information both during and after data collection period [27-29].

Results

Socio demographic characteristics of pregnant women

The response rate is 402 (97.1%), the mean (± SD) age of respondents is 25.7 (± 4.5) years. Two hundred twenty six (56.2%) of them are in the age group of 25-34 years. The median monthly income of the family is 1000 birr. More than half of respondents, 243 (60.4%) of the study participants are Muslim in religion. The majority 332(82.6%) of respondents are housewives, 382(95.0%) of them got married. Out of the total study respondents 64 (15.9%) of them are illiterates and 300(74.6%) are living with less than five family members (Table 2).

Dietary Habits of study participants: In this study, 349 (86.8%) of the respondents ate meal less than or equal to 3 times daily. Respondents' reported that they consumed both animal and plant products. Three hundred twenty nine (81.8%) of the respondents reported taking tea after meal (Table 3).

Reproductive and health related characteristics: The mean and SD of age at first pregnancy of the respondent are 21 ± 1.92 years

Variables	Category	Frequency	Percent
Age	15-24	156	3 8.8
	25-34	226	56.2
	≥35	20	5
Religion	Orthodox	133	33.1
	Muslim	243	60.4
	Protestant	26	6.5
Educational Status	unable write and read	64	15.9
	able to write and read	10	2.5
	primary school(1-8)	281	69.9
	Secondary(9-12)	37	9.2
	College and Above	10	2.5
Marital status	Married	373	95
	Others****	20	5
Occupational status	House wife	332	82.6
	Governmental employee	18	4.5
	Merchant	37	9.2
	Others***	15	3.7
Income/month	<500	45	11.2
	500-1000	160	39.8
	1000-5000	193	48
	5000-10000	4	1
Family size	<5	300	74.6
	≥5	102	25.4

***=daily laborer and private employee
****=single, divorced and widowed

Table 2: Socio-demographic and economic characters of pregnant women attending Antenatal care in Hetosa district, 2018. (402).

Variables		Frequency	Percent
	2-3 times per week	9	2.2
	Weekly	80	19.9
	Monthly	213	53.0
	Seldom	92	22.9
	Never	8	2.0
Time of consuming an egg	Daily	7	1.7
	2-3 times per week	11	2.7
	Weekly	141	35.1
	Monthly	127	31.6
	Seldom	108	26.9
	Never	8	2.0
Frequency of Vegetables eating	Daily	72	17.9
	2-3 times per week	128	31.8
	Weekly	178	44.3
	Monthly	18	4.5
	Seldom	6	1.5
Times of Consuming fruit	Daily	14	3.5
	2-3 time per week	30	7.5
	Weekly	146	36.3
	Monthly	159	39.6
	Seldom	49	12.2
	Never	4	1.0
frequency of consuming Milk and milk products	Daily	45	14.6
	2-3 per week	59	19.2
	Weekly	108	35.1
	Monthly	46	14.9
	Seldom	50	16.2
Frequency of legumes and food made from legumes	Daily	165	41.0
	2-3 times per week	207	51.5
	once per week	26	6.5
	once per month	2	.5
	Seldom	2	.5
Food made from Cereals and Cereals eaten time	Daily	187	46.5
	2-3 times	199	49.5
	one times per week	15	3.7
	once per month	1	0.2
Time of fat and oil consumption	Daily	147	36.6
	2-3 times per week	236	58.7
	1 per week	18	4.5
	1 per month	1	0.2
Drinking tea with meal	yes No	329 73	81.8 18.2

Table 3: Dietary habits of pregnant women attending Antenatal care in Hetosa District, 2018(402).

respectively. Two hundred eighty six (71.1%) of the study subject were pregnant < 3 times (median=3) and 60 (14.9%) respondent experienced abortion. Two hundred nineteen (54.5%) of the respondents were stayed < 24 months for child spacing. The majority 256(63.7%) of the pregnant women were in third trimester, while 114 (28.4%) of them were in the second trimester. Majority of the participants started ANC While they were above 4 months in their current pregnancy. Two hundred fourteen (59.7%) of the respondents ever used family planning methods (Table 4).

Magnitude of anemia among pregnant women

The magnitude of Anemia is 139 (34.6), Based on World Health Organization classification hemoglobin level< 11g/dl. According to WHO classification Severe Anemia 3 (.7%), Moderate 40 (10%) and mild anemia 96 (23.9) (Figure 3).

Result of multinomial logistic regression of factors significantly associated anemia: Pregnant women in third and second trimester are 1.3 and 1.5 times more likely to be affected by anemia as compared to pregnant women in the first trimester AOR=1.3(1.41,3.47) and AOR 1.5(2.24,3.71) respectively. Similarly, those pregnant women who had greater than three deliveries are 1.4 times more likely to be anemic, compared with those who had less than 3 pregnancies AOR=1.4(3.4,5.4). The pregnant women who were living with greater than five families were1.21 more likely develop anemia than pregnant women who are living with families less than five AOR=1.21(1.3,1.87) (Table 5).

In the final study by Harding et al., a sample of N=22 former prisoners was used to examine their processes by which they a in a randomized control trial, Ramaswamy attained economic security

Variables		Frequency	Percent (%)
Age at first pregnancy in year	<20	152	37.8
	≥20	250	62.2
Number of pregnancy	1-3	287	71.4
	>3	115	28.6
Number of Birth	0-3	334	83.1
	>3	68	16.9
Birth Spacing between in year	<24	219	54.5
	≥24	183	45.5
Gestational Age/months	<4	32	8
	4-6	114	28.4
	≥6	256	63.7
Starting time of ANC	≤4	180	44.8
	>4	222	55.2
Family Planning Used	yes	240	59.7
	No	162	40.3

Table 4: Reproductive health related characteristics of pregnant women attending Antenatal care in Hetosa District, 2018 (402).

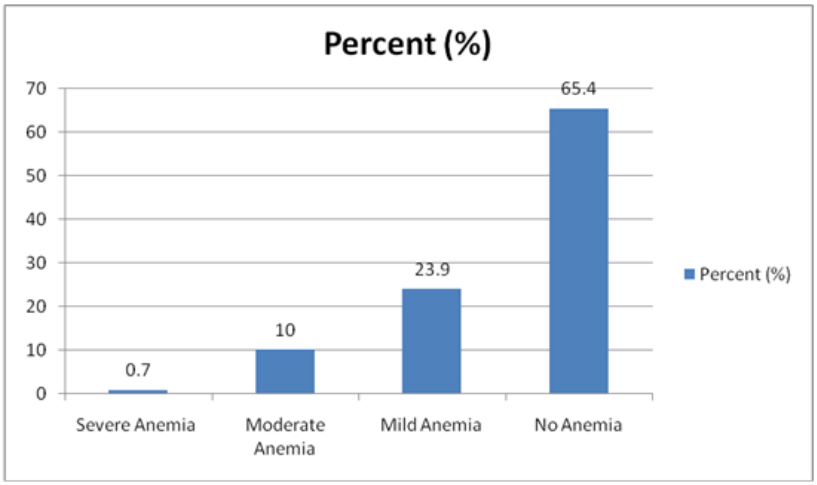

Figure 3: Magnitude and degree of anemia among pregnant mothers attending antenatal care at Hetosa district health center, 2018.

Variables		Anemia		AOR(95%CI)
		Yes	No	
Gestational age	<4months	7(5.0)	25(9.5)	1
	4-6 months	32(23.0)	82(31.2)	1.3(1.41,3.47)*
	>=6	100(71.9)	156(59.3)	1.5(2.24, 3.71)*
Number Of delivery	<3	110(79.1)	224(85.2)	1
	≥3	29(20.9)	39(14.8)	1.41(3.465,5.483)*
Total family size	>=5	24.4%	50.2%	1.21(1.3,1.87) **
	<5	10.2%	15.2%	1

Table 5: Socio-demographic and economic characters of pregnant women attending Antenatal care in Hetosa district, 2018. (402).

and met basic material needs whilst achieving upward mobility over time after release from prison [30]. It was found that employment was not enough to establish economic security, with other forms of material support needed as supplements, such as social ties and access to long-term public benefits. Barriers identified were legal and policy restrictions on former offenders, such as bans from food stamps, SSI, and public housing. Most of these restrictions apply to drug offenders, which mean that mostly female offenders are disproportionately affected by these restrictions. In sum, the study found that stigmas and these legal restrictions were the largest barriers to making ends meet during post-release.

Discussion

The magnitude of Anemia in this study population is 34.6 % in pregnant women attending ANC service, which was less than the study result from Gode which reported about 56.8%, Kolar district India 64%, Gilgel Gibe dam south east Ethiopia 53.9% [19]. This might be due to variation in sample size and presence of high malaria infection. For instance, the prevalence of malaria in the study done around Gilgel Gibe and Gode were (11.6%), (63.4) respectively. So it might have contributed to the high prevalence of anemia.

However, the prevalence of anemia obtained in this study was higher than reports from Gondar (21.6%) [30], Bisidimo Hospital (27.7%) [17]. This might be due difference in the socio-demographic factors and lack of awareness about the consequences of anemia in our study participants.

Approximately this result was consistent with the study result from Nigeria 32.5% [31-33], Tigray 35.1% [16], Arsi 36.6% [34] and Tikur Ambesa Specialized Hospital 35.6% [22].

This study has assessed socio-demographic variables associated with anemia, from that family size greater than five (AOR=1.21) had shown statistically significant association with Anemia in the study area, which was less than study done in Tikur Ambessa Hospital (AOR=2.04) this discrepancy might be resulted from pregnant women with history blood loss was significantly association with Anemia in Tikur Ambessa Hospital [35]. Similar study conducted on prevalence and risk factors of anemia in Turkey showed statically significant association between anemia and large family size which was consistent with this study [36].

Age of current pregnancy (trimester) were important variables, which have shown a significant association with anemia in the current study. The risk of developing anemia increases with the age of pregnancy (trimester). The risk of developing anemia was higher in third and second trimester when compared with those in the first trimester. In the present study, anemia was 1.5 times more likely to be affected by anemia as compared to pregnant women in the first trimester. This might be due to hemo dilution but, it might also indicate poor prenatal care.

This result was less likely when compared with study done in the Tikur Ambessa and Gode, which was (AOR= 2.04) [8], (AOR=3.32) respectively . This could be due to the fact that when the gestational age increases the mother becomes weak and the iron in the blood is shared with the fetus in the womb therefore decreasing the iron binding capacity of the mother's blood.

The other important variable significantly associated with anemia is number of parity. The risk of developing anemia in multiparous women with greater than 3 deliveries was increased when compared with those who had less than 3 deliveries. Anemia was 1.4 times prevalent in multiparous. This is may be due the fact that multi-parity induce anemia by reducing maternal iron reserves at every pregnancy and by causing blood loss at each delivery. This finding was consistent with study done in Gode [37]. Additionally, studies conducted in Saud Arabia, Addis Abebe, Mekele Town, India found that increased parity was significantly associated with the risk of developing anemia respectively [38-41]. The reason for this discrepancy might be attributed to difference in methodology including sampling technique among these studies.

Strength and Limitation of the Study

Strength of the study

In this study we measured the hemoglobin level of each client in spite of hemoglobin level which gives good reliability.

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

First, cross sectional nature of the study limits measuring the cause and effect relationship due to the cross sectional study design used, whether anemia preceded the predisposing factors or the vice versa could not be verified in this study.

Second, there was both social desirability and re call bias while subjects were requested to give dietary information and monthly income.

Conclusion and Recommendation

Conclusion

The overall magnitude of anemia in this study indicated that it was high health problem. Extended family, multi parity and gestational age were significant predictor for maternal anemia among the pregnant women in the study area. This emphasizes the need for continuing strengthening of interventions on factors associated with anemia.

Recommendation

- Federal Ministry of Health (FMOH)

Availing adequate Iron and folic acid for health facility and they should have to follow its utilization.

Even if they have strategy to promote family planning still now mothers were mult parous so they should have invest more on family planning utilization

- District and Health Centers

The health center should have to conduct regular laboratory studies to identify problems during ANC follow up to pregnant women.

Advocating proper antenatal services in the early stage of pregnancy

They should have to promote public health education on reproductive health, monitoring the compliance of women with antenatal-care services and strengthening of their Health Care

- Health Extension workers

Screening pregnant women at early stage and refer to health center for further investigation.

- To avail and strengthen family planning service.

- To promote Iron folite supplementation and encourage pregnant women to take tablet greater than 90+.

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