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PREVALENCE AND ASSOCIATED FACTORS OF ANAEMIA AMONG PREGNANT WOMEN ATTENDING ANTENATALCARE AT YIRGALEM GENERAL HOSPITAL, SOUTTHERN ETHIOPIA: A HOSPITAL BASED CROSS SECTIONAL STUDY

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ABSTRACT

Background: Anemia is a medical condition in which the red blood cell count or haemoglobin is less than normal. Globally, 41.8% pregnant women and close to one third of non-pregnant women (30.2%) are anaemic. Anaemia during pregnancy contributes to 20% of all maternal deaths and it increases the risks of fatal, neonatal and overall infant mortality. In Ethiopia, the prevalence of anaemia is 20-39%.for pregnant women. Methods: - A Hospital based cross-sectional study design was conducted from 1st May to 30th June 2018. Systematic random sampling method was used to select 283 pregnant women. Mothers who attended ANC during the study period was interviewed. A capillary blood sample was taken. Haemoglobin level was determined by using CBC. Data were cleaned, coded and filled into SPSS Version 21.0. Descriptive statistics were used to describe selected variables. Pearson's chi-square test and odds ratio (OR) with corresponding 95% confidence intervals (CI) computed to find association between independent and dependent variables. Multivariate analysis was done to determine factors associated with anaemia during pregnancy. Results: - The finding of this study revealed that the prevalence of anaemia among the pregnant women was 37.2 %. Pregnancy on married women (AOR = 5.85; 95% CI = 2.04-16.56; P = 0.01) than single pregnant women, Non-employed/Housewives (AOR = 3.184; 95% CI = 1.48- 6.84; P = 0.003) compared to employed pregnant women and blood loss during current pregnancy (AOR = 17.06; 95% CI = 2.099 - 139.23; P = 0.004) were found to be predictors of anaemia. Conclusion: - According to World Health Organization classification of anaemia. Pregnancy on married women, non-employment and blood loss during current pregnancy were significantly and independently associated with anaemia during pregnancy. Thus, special attention should be given to pregnant women who are non-employed and blood loss during pregnancy. Moreover, they should be educated on the importance of ANC follow up and pregnancy related problems.

KEYWORDS: Anaemia, Prevalence, Cross sectional study, pregnant women Associated Factors, Yirgalem General Hospital, Southern Ethiopia.

BACKGROUND

Anemia is a medical condition in which the red blood cell count or hemoglobin is less than normal.; For men, anemia is typically defined as hemoglobin level of less than 13.5 gram/100 ml and in women as hemoglobin of less than 12.0 gram/100 ml. It is one of the most common nutritional deficiency diseases observed globally and affects more than a quarter of the world's population. Anemia is a global public health problem affecting both developing and developed countries with major consequences on human health as well as social and economic development. Anemia in pregnancy is defined as an Hb<11 g/dl in the first and third trimester, and a Hb<10.5 g/dl in the second trimester.[1,2]

It is estimated that roughly 43% of children, 38% of pregnant women, and 29% of non-pregnant women and 29% of all women of reproductive age have anemia globally, corresponding to 273 million children, 496 million non-pregnant women and 32 million pregnant women. During pregnancy anemia may lead to haemorrhage, puerperal infection, thromboembolic problems, premature labor, low birth weight and maternal and perinatal mortality.[3-5]

It is estimated that 41.8% of pregnant women worldwide are anemic. In Africa, 57.1% of pregnant women are anemic.[3] In Ethiopia, the prevalence of anemia is highest (40-59.9%) in infants and children aged 6-59 months, and for pregnant women it is around 20-39%.[6] Anemia during pregnancy is considered severe when Hb concentration is less than 7.0 g/dl, moderate when Hb level is 7.0 - 9.9 g/dl, and mild when Hb level is 10.0 - 10.9 g/dl. Anemia is a major cause of morbidity and mortality of pregnant women and increases the risks of fetal, neonatal and infant mortality. Anemia during pregnancy contributes to 20% of all maternal deaths.[1,6,7]

In developing countries, the cause of anemia during pregnancy is multifactorial and includes nutritional deficiencies of iron, folate, and vitamin B12 and parasitic diseases, such as malaria and hookworm. Iron deficiency is the cause of 75% of anemia cases during pregnancy. HIV infection is also implicated with high prevalence of anemia in sub-Saharan Africa. Iron deficiency anemia affects the development of the nation by decreasing the cognitive and motor development of children and productivity of adults.[1,3,7]

According to EDHS 2016, In Ethiopia, anaemia prevalence among women age 15-49 declined from 27% in 2005 to 17% in 2011 but then increased to 24% in 2016.[4] Knowing the prevalence and associated factors of Anaemia will motivate antenatal care provider towards early detection, management and prevention of Anaemia in pregnancy and determining the existing significant variables related to Anaemia will help to plan programs that prevent and treat Anaemia among pregnant women. Thus, this research will help planners, programmers, designers and policy makers to scale up early detection, prevention and management of Anaemia among pregnant women at national level and used as a base line at Yirgalem General Hospital.

METHODS

Study Area
This study was conducted in Yirgalem General Hospital which is located in sidama zone, southern Ethiopia. Yirgalem General Hospital is one of the pioneer public Hospital in southern Ethiopia which was established in 1963 by Norwegian and changed into general hospital in 2007 which is serving for 5000000 populations in its catchment area. The hospital has 11 specialists these are: 2 surgeons, 2 internists, 3 gynecologists, 1 pediatrician, 1 ophthalmologist, and 1 radiologist. There are 21 General Practitioners, 10 HO, 27 Bsc nurses, 79 clinical nurses, 8 Bsc midwives, 12 diploma midwives, 45 laboratory technicians, 7 laboratory technologists, 12 ophthalmic nurses and 284 non health professionals of them 26 administration workers and 258 supportive staff in aggregate organized by a total staff of 516.[31]

Study period
The study was conducted in Yirgalem Hospital from May1 to June 30, 2018.

Study Design and Participants
A hospital based cross-sectional study was conducted. The study population included in this study was all pregnant women attending ANC at Yirgalem General Hospital during study period.

Inclusion and Exclusion Criteria
All pregnant women who attend ANC follow-up in Yirgalem General Hospital was included in the study. But pregnant mothers who were severely sick that require urgent medical attention; pregnant mothers who already started management for anemia and pregnant mothers those who were not completed investigation was excluded from the study.

Sample Size Determination
The sample size was determined by using single population proportion formula ($n = Z^2pq/d^2$) by considering 95% CI, 55 % proportion of anemia during pregnancy from the study (5), and absolute precision of 0.05 which gives a sample size of 380. However, since the population during the study period was below 10,000, sample size adjustment was done using the following formula, nf = n/1+n/N resulted in 258 subjects.

Where
nf= The desired sample size (when the study population is less than 10,000);
N = Total population (around 800 antenatal mothers, in 10-week period);
n = the desired sample size (when the study population is more than 10,000) which is 380. By adding 10% for none response, the final sample size was equals to 283

Sampling Technique
A review of ANC attendance register showed that about 12 pregnant women attend ANC at Yirgalem General Hospital daily. Accordingly, the study was designed to be performed for ten Weeks during which period an estimated 800 women was expected to visit for antenatal Care. Systematic random sampling method was used to select study participants. The estimated number of 800 pregnant women in10-week period was divided by the minimum adjusted sample size 258 to give the sampling interval of 3. The first pregnant woman include in the sample was chosen randomly by blindly picking one of three pieces of paper named for the first three visitors. After that, every third pregnant woman who came for antenatal care was recruited in the study until the desired sample size was attained. To avoid double participant recruitment, the research assistants confirmed that whether the participants previously visited the ANC at the hospital, and was participated in the study during the data collection period.

Data Collection
A pre-tested semi-structured questionnaire was used to collect data by trained research assistants. Data regarding participants' demographic and socio-economic characteristics, obstetric, Gynecologic and medical

history was obtained. Hemoglobin concentration Mean Corpuscular Volume was measured using CBC laboratory result.

Data Analysis
The quality of data was assured through careful designing, translation, and pre-testing of the questionnaire. It was also assured by giving training for the data collectors and supervisors. Before the actual data collection; every day after data collection, the filled questionnaire was checked for its completeness and relevance by the principal investigator and supervisor and correction was made accordingly for next day. The hard copy of field questionnaires was kept in safe place to prevent damage and accessed by individuals.

Data was analysed by using SPSS Version 21. Descriptive statistics such as frequency, percentage, mean and standard deviation was used to describe selected variables. Pearson chi-square test and odds ratio (OR) with corresponding 95% confidence intervals (CI) was computed to check association between independent and dependent variables. A P-value of <0.05 was considered statistically significant. Variables having a P-value <0.05 in the bivariate analysis was subjected into a multivariate analysis to determine factors independently predicting anemia during pregnancy.

RESULTS
Socio-Demographic and Economic Characteristics of Respondents
The mean age of the women was 24.7 years (SD ± 4.6). Out of the 258 participants, 128 (49.7%) and 104 (40.3%) were in the age group of 18 - 24 years and 25 - 30 years respectively. The remaining 26 (10.2%) were 31 years and above. 148(57.4%) of the participants were from Yirgalem town and the rest 110(42.6%) were from different woreda of Sidama zone. Majority of the women were married 238(92.2%), Self-employed 115(44.6%) and Christian followers 222 (88.4%). Regarding educational level of the participants 126 (48.8%), 53(20.5%), 19(7.4%) were attended primary, secondary and college level of education respectively whereas 60(23.3%) were not educated. The highest percentage 125 (48.4 %) of the participants had monthly income between 1000 – 4999ETB. About a quarter 69 (26.7%) of them had monthly income of less than 1000 ETB and the rest 61(23.6%) and 3(1.2%) were unknown income and greater or equals to 5000 ETB respectively.

Obstetric and gynaecologic History of the Pregnant Women
The obstetric and gynaecologic history of the participants is presented in Table 2. The majority 148 (57.4%) of the participants were in the third trimester of pregnancy, 95 (36.8%) were in the second trimester of pregnancy and the rest 15(5.8%) were in the first trimester. One hundred and four (40.3%) of the women were prim gravida while 154 (59.7%) were Multigravida. Among the

Multigravida women 99 (64. %) had an inter-pregnancy interval of less than two years and the remaining 56(36.0%) had interval of two years or more. Concerning blood loss during current pregnancy 9(3.5%) had history of blood loss but 249(96.5%) had no history of blood loss.

Health Conditions of the Women during the Current Pregnancy
When asked majority 203 (78.7%) of them reported they did not experience any health problem during current pregnancy. Very small number 9 (3.5%) and 24 (9.3%) of the women reported they had diarrhea and febrile illnesses for the last one month respectively preceding the study. 65(25.2%) and 24(9.3%) had treatment history of intestinal parasitosis and malaria respectively for the last 6 months preceding the study period. Majority of the women 155(60.1) % were not knowing their sero status and only 2 (0.8%) were sero-positive.

Haemoglobin, MCV Levels, stool and HIV test results
One Hundred Eight (41.8%) of the respondents were at the hemoglobin level of < 11 g/dl. From these 71(27.5%) were with mild anaemia (Hgb level 10-10.9g/dl), 20 (7.8%) moderate anaemia (Hgb level 7-9.9 g/dl) and 5(1.9%) severe anaemia (Hgb level less than 7 g/dl) respectively. From one hundred eight anemic women to differentiate the underlying cause of anaemia based on Mean corpuscular volume (MCV), 14(5.4%) were MCV less than 80 fl.

Based on the stool examination, 21(8.2 %) of the respondents had intestinal parasite. of these, the major type of intestinal parasites found in the stool were Hook worm and Ascaris lumbricoid 11 (4.3%). Four (1.6%) pregnant mothers were reactive for HIV and in thirty four (13.2%) HIV test was not done (table 4).

Prevalence of Anaemia
The cut-off point of Hgb concentration for diagnosis of anaemia during pregnancy was taken at 11 g/dl (6). The overall prevalence of anaemia (Hgb< 11 g/dl) was 37.2 % with 95% CI. The mean Hgb concentration was 10.41 gram/deciliter (g/dl) with a SD of ±1.82 g/dl. In terms of severity, mild anaemia was 27.5%, moderate anaemia was 7.8 % and severe anaemia was 1.9 %.

In the bivariate analysis, participants' age, marital status, Religion, employment status, inter pregnancy interval, blood loss and malaria were significantly associated with anaemia among the pregnant women. However, following multivariate analysis marital status, employment status, and blood loss during the current pregnancy remained significantly and independently associated with anaemia.

Married pregnant women were about 5 fold more likely to be anaemic [AOR = 5.85; 95% CI = 2.04 - 16.56; P = 0.01] compared to those not married. Pregnant women who were housewives had 3 times more likely to develop

anaemia [AOR = 3.184; 95% CI = 1.48 - 6.84; P = 0.003] than those who were Governmental or self-employed. Pregnant women who had blood loss during current pregnancy were 17 times more likely to develop anaemia (AOR= 17.06; 95% CI=2.099-139.23; P=0.004) than those who had no blood loss (Table.5).

Table 1: Socio demographic and Obstetric characteristics among pregnant women attending Antenatal care clinic at Yirgalem General Hospital, southern Ethiopia, and May 1-June 30, 2018.

Variables		n = 258	%
Age in years	18 – 24	128	49.7
	25 – 30	104	40.3
	31 and above years	26	10.2
Residence	Yirgalem	148	57.4
	Out of Yirgalem	110	42.6
Marital status	Single	20	7.8
	Married	238	92.2
Occupation	House wife	81	31.4
	Employed (governmental)	62	24.0
	Employed (self/private)	115	44.6
Religion	Christian (Orthodox, catholic and protestant)	228	88.4
	Muslim	30	11.6
Level of education	Not educated	60	23.3
	Primary education	126	48.8
	Secondary education	53	20.5
	College/University	19	7.4
Family monthly income	Unknown	61	23.6
	Less than 1000 ETB	69	2.7
	1000 – 4999 ETB	125	48.4
	Greater or equals to 5000 ETB	3	1.2
Number of pregnancy(gravidity)	First pregnancy	104	40.3
	Second pregnancy	61	23.6
	Third pregnancy	53	20.5
	Fourth and above	40	15.5
Gestational age(Trimester)	First trimester	15	5.8
	Second trimester	95	36.8
	Third trimester	148	57.4
Number of children(parity) n=134	One child	68	50.7
	Two children	34	25.3
	Three and above	32	23.9
Inter pregnancy interval, n=154	Less than 2 years	99	64.0
	Greater than 2 years	56	36.0
History of abortion	Yes	35	13.6
	No	223	86.4
If yes number of abortions, n=35	One	28	80.0
	Two and above	7	20.0
History blood loss during this pregnancy	Yes	9	3.5
	No	249	96.5

Table 5: Factors associated with anemia using unadjusted and adjusted logistic regression among pregnant women attending Antenatal care clinic at Yirgalem General Hospital, southern Ethiopia, and May 1-June 30, 2018.

Variables		n	Anemic n (%)	Non- anemic n (%)	COR(95%CI)	P-value	AOR(95% CI)	P-value
Age (year)	18-24	128	50(48%)	78(52%)	0.441(0.142-1.373	0.158		
	25-30	104	39(40.6%)	65(50.4%)	0.482(0.1598-1.459)	0.197		
	30 and above	26	7(7.3%)	19(92.3%)	Reference			
Religion	Christian	228	89(39.1)	139(60.9)	2.664(0.958-7.407	0.060		
	Muslim	30	7(23.3)	23(76.6)	Reference			
Residence	Yirgalem	148	58(39.1)	90(60.1)	1.103(0.636-1.912)			
	Out of Yirgalem	110	38(34.5)	72(65.4)	Reference			
Marital status	Single	20	15(75.0)	5(25.0)	6.379(2.078-19.580)	0.001	5.815(2.041-16.568)	0.001
	Married	238	81(34.0)	157(66.0)	reference			
Occupation	Housewife	81	43(53.0)	38(47.0)	3.393(1.520-7.575)	0.003	3.194(1.498-6.849)	0.003
	Employee(Gov't)	62	17(27.4)	45(72.5)	2.444(1.269-4.707)	0.008	2.333(1.260-4.320	0.007
	Self employee	115	36(31.3)	79(68.6)	Reference			
Education	Not educated	60	25(41.6)	35(58.3)	0.882(0.444-1.752)	0.720		
	Primary school	126	48(38.0)	78(62.0)	1.314(0.568-3.041)	0.523		
	Secondary school	53	16(30.1)	37(69.8)	1.053(0.326-3.397)	0.931		
	College/university	19	7(36.8)	12(63.1)	Reference			
Monthly income	Not known	61	25(40.9)	36(59.1)	1.309(0.636-2.697)	0.465		
	<1000ETB	69	26(37.6)	43(62.3)	1.500(0.780-2.887)	0.225		
	1000-4999ETB	125	41(32.8)	84(67.2)	0.440(0.35-5.491)	0.524		
	5000ETB and above	3	2(66.6)	1(33.3)	Reference			
No. of pregnancy	1st pregnancy	104	37(35.5)	67(64.4)	0.758(0.122-4.721)	0.766		
	2nd pregnancy	61	269(42.6)	35(57.3)	0.715(0.146-3.565)	0.680		
	3rd pregnancy	53	18(33.9)	35(66.1)	0.915(0.218-3.840)	0.904		
	4th pregnancy and above	40	15(37.5)	25(62.5)	Reference			
No. of children	One child	68	33(48.5)	35(51.5)	1.343(0.204-8.836)	0.759		
	Two children	34	14(41.2)	20(58.8)	1.637(0.326-8.220)	0.549		
	Three children	32	12(37.5)	20(62.5)	0.942(0.197-4.504)	0.940		
Gestational	1st trimester	15	3(20.0)	12(80.0)	2.140(0.565-	0.263		

age					8.111)			
	2nd trimester	95	39(41.0)	57(59.0)	0.795(0.456-1.386)	0.419		
	3rd trimester	148	42(28.3)	106(71.6)	Reference			
Inter-pregnancy interval	<2 years	99	46(46.5)	53(53.5)	1.682(0.729-3.881)	0.223		
	2 years and above	56	13(23.3)	43(76.7)	Reference			
History of abortion	Yes	39	10(25.6)	29(74.3)	1.031(0.93-11.408)	0.980		
	No	115	49(42.6)	66(57.3)	Reference			
If yes, No. of abortion	One	35	9(25.7)	26(74.3)	0.545(0.20-15.041)	0.720		
	Two and above	4	1(25.0)	3(75.0)	0.873(0.79-9.691)	0.912		
Hx. of blood loss	Yes	9	(100%)	0(0%)	17.443(1.949-156.138)	0.011	18.175(2.154-153.370)	0.008
	No	249	0(0%)	249(100%)	Reference			
Any health problem	Yes	55	7(12.7)	48(87.2)	1.480(0.98-2.742)	0.213		
	No	203	89(43.8)	114(56.2)	Reference			
Occurrence of diarrhea	Yes	8	3(37.5)	5(62.5)	0.938(0,213-4.126)	0.933		
	No	250	93(37.2)	157(62.8)	Reference			
Occurrence of AFI	Yes	24	10(41.6)	14(58.3)	1.131(0.463-2.762)	0.787		
	No	234	86(36.7)	148(63.2)	Reference			
Treatment of intestinal parasitosis	Yes	65	24(36.9)	41(63.1)	0.735(0.389-1.389)	0.343		
	No	193	72(37.3)	121(62.7)	Reference			
Treatment of malaria	Yes	24	8(33.3)	16(66.6)	0.490(0.169-1.423)	0.189		
	No	234	88(37.6)	146(62.4)	Reference			
HIV status	Sero-positive	2	1(50.0)	1(50.0)	1.758(0.033-92.969)	0.781		
	Sero-negative	101	29(28.7)	72(71.3)	1.000(0.020-50.397)	1.000		
	Not known	155	66(42.6)	89(57.4)	Reference			
Stool	No Ova/ parasite	237	87(36.7)	150(63.3)	0.774(0,306-1.959)	0.588		
	Intestinal parasite	21	9(42.8%)	12(57.2%)	Reference			
PHICT	Positive	4	2(50.0)	2(50,0)	1.426(0.86-23.734)	0.805		
	Negative	220	76(34.5)	144(65.5)	0.774(0.306-1.959)	0.588		
	Not done	34	18(52.9)	16(47.1)	Reference			

DISCUSSION

The main purpose of this study was to assess prevalence of anemia during pregnancy and factors associated for anemia among pregnant mothers. The study indicated that prevalence of anemia among pregnant mothers was found to be 37.2%. When compared to previous studies in various settings in Ethiopia, the result of this study was lower than the studies done to determine anemia and its risk factors among pregnant women in Gilgel Ghibe dam area, southwest Ethiopia 53.9% and was reported from Gode, southeast Ethiopia 56%.[8,9]

On the other hand, the current finding is comparable with a 32.8% report from Arba Minch Town, Gamo Gofa Zone, South Ethiopia,[10] 38.2% report from Jimma University hospital, Southwest Ethiopia.[11] and 39.9% from Wolayita Sodo, southwest Ethiopia.[12]

The result of this study was higher compared to what was obtained in similar studies conducted to assess the prevalence and risk factors of women with anemia during pregnancy. For instance, a prevalence of 19.3% from Mekelle, northern Ethiopia,[13] 15.8% was reported from Bahir Dar town, northwest Ethiopia,[40] and 16.3% prevalence of Anemia among Pregnant Women Attending Antenatal Care at Selam Health Center, Addis Ababa, Ethiopia.[15] It was also much higher than similar studies done outside Ethiopia, for instance, the prevalence of anemia was 4.7% among pregnant women in Iran and 17% Nigeria.[2,16] The variations may be explained by factors such as malaria endemicity particularly in Ghibe and Gode, study design and sample size, socio-economic and other baseline characteristics of the study populations as well as altitudinal differences. Further, early antenatal care follow-up, and better healthcare awareness among the participants might have contributed towards the observed differences in anemia prevalence. Also, in countries like Iran iron and folate supplements are routinely prescribed for pregnant women and that might be among the reasons for the apparent very low prevalence rate in the country.[2] The result shows that anemia is a moderate public health problem among the women as there were few severe cases (1.9%). It is much lower than the reports by Gedefaw and co-workers (2013) from Wolaita Soddo and Alemayehu and co-workers (2016) from Arbaminch. However, 26 the result is markedly different from the reports by Kefiyalew and co-workers (2014) from southeast Ethiopia where the prevalence of severe anemia was 12.5%. This might be due to differences in socio-economic and level of health awareness differences. The presence of lower severe cases and overall moderate anemia status in this study is a good indication that the disorder could be further reduced if control efforts are scaled up. Although the Bivariate analysis indicated that individuals aged 18-24 years are 1.25 times more likely to have anemia than 24-30 years old, in the multivariate model no association was detected. In contrast other reports from Ethiopia.[8,17] as well as elsewhere,[15] found significant association between age pregnancy anemia.

Women who were single had higher prevalence of anemia than married this is may be due to lack of care and support by partners and other associated factors. Similarly, 53.0 % of non-employed participants were anemic. This might be due to lower incomes to buy foods that can supply sufficient nutrient to the body. Hence, they face nutritional deficiency. From socio-demographic and economic characteristics of the women, occupation and marital status were associated with anemia in multivariate analysis.

The study result showed the prevalence of anemia increased as the number of pregnancy increased. However, multivariate analysis did not reveal statistically significant association between anemia and number of pregnancy. This is in contrast with Gautam and co-

workers (2002), Obse and co-workers (2013), Kefyalew and co-workers (2014), Abriha and co workers (2014) and Gedefaw and coworkers (2015) in which number of pregnancy had statistically significant association with anemia. The present study has also identified that pregnant women who had <2 years IPG (or birth interval) were more likely to have anemia than those that had two and above years gap. The observations may be explained by differences in health awareness of the women, the use of contraception to have planned pregnancies thus, The body will have enough time to recover from nutrient loss that resulted from the previous pregnancy.

This study also found significant association between anemia and blood loss during current pregnancy. Pregnant women with current blood loss were 17 times more likely to have anemia than those who had blood loss in agreement with previous reports.[17] The high prevalence of anemia in pregnant women who had blood loss during current pregnancy might be due to RBC loss and low haemoglobin in the body.[5]

CONCLUSIONS

The present study revealed that the prevalence of anaemia among pregnant women was 37.2%. Anaemia is a moderate public health problem in Yirgalem General Hospital, which is by far higher than the national prevalence, 23%. Marital status, employment and blood loss during the current pregnancy were significantly and independently associated with Anaemia during pregnancy. Based on findings of this study, we recommend awareness creation program for community on pregnancy, risk factors of Anaemia and Nutritional counselling on consumption of more diversified and extra meal and iron-rich foods to prevent Anaemia in pregnant women. Special care should be given to women who had history of current blood and for non-employed pregnant women to prevent Anaemia. In addition, concern should be given to women empowerment for adequate income in order to fulfil nutritional requirement during pregnancy. Further research on risk factors of Anaemia during pregnancy including urban and rural communities should be carried out to strengthen and broaden these findings.

Abbreviations and Acronyms
AOR: Adjusted odds ratio
ANC: Antenatal care
CI: Confidence interval
COR: Crude odds ratio
CSA: Central Statistical Agency
ENA: Essential Nutritional Action
Hct: Hematocrit
Hgb: Hemoglobin
HIV: Human Immune Virus
IDA: Iron Deficiency Anemia
MD: Medical Doctor
MI: Medical Intern
MPH: Master in Public Health

RBC: Red Blood Cells
SNNPR: Southern Nations and Nationalities Peoples Region
SPSS: Statistical package for social science
WHO: World Health Organization
YGH: Yirgalem General Hospital
YHMC: Yirgalem Hospital Medical College.

Declarations
Ethical Approval: - Before starting the data collection, process, and ethical approval was obtained from Yirgalem Hospital Medical College. Official letter of cooperation was also obtained from Yirgalem General Hospital Administration office. Data collection then was conducted after explaining the aim of the study and its possible benefits to the study participant and the heath institution at large. Verbal consent was obtained after explaining their right not to answer any of the questions or terminate the interview and would not give laboratory specimens, if they will not be comfortable. In order to keep confidentiality of Information; in addition, there was not being disclosure for any name of the study participant in relation to the finding.

Consent for publication: - Consent for publication refers to consent for the publication of identifying images or other personal or clinical details of participants that compromise anonymity. Seeing, as this is not applicable to your manuscript please state "Not Applicable" in this section.

Competing interests
There is no competing interest with the presented data as external data collectors collected it. There was not financial interest between the funder and the research institution and us. We, the researchers, have no any form of competing financial and non-financial interest between us.

Availability of data and materials
The datasets generated using SPSS version 20.0 and/or analyzed during the current study are not publicly available due unable to generate in web link to datasets, but are available from the corresponding author. Data will be provided in a supplementary file.

Authors' contributions
TW, AB, GM , MA and MC the five authors have made significant contribution in the idea Conception and proposal development, MC, AB and GM participated data collection tool development, supervised data collection process and Report writing, TW an MA participated in data analysis, and manuscript preparation process of this work. GM and MC participated in manuscript comment review. All authors read and approved the final manuscript.

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