

Research Article

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Anemia prevalence, severity level and its predictors among Antenatal care attending pregnant women in Butajira General Hospital Southern Ethiopia

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Abstract

Background: Anemia is continued to be the major public health problem in the developing world. Anaemia in pregnancy may lead to premature births, low birth weight, foetal impairment and infant deaths. It is especially prevalent in women of reproductive age, particularly during pregnancy. Therefore, the aim of this study was to assess anaemia prevalence, severity level and its predictors among pregnant women attending Antenatal care Clinic in Butajira General Hospital, Southern Ethiopia.

Methods: An institution based cross-sectional study was conducted among pregnant women attending Antenatal care Clinic in Butajira General Hospital with 208 samples. Data was entered and analysed by using SPSS version 20. Bivariate and multivariate logistic regression analysis was used for identifying the predictors of anaemia.

Result: The prevalence of anemia among pregnant women attending Antenatal care in Butajira General Hospital was 31.7% and from anaemic pregnant women 50.8% Mildly anemic, 42.6% Moderately anemic and 6.6% were Severely anemic. In pregnant women, Age of women from 25-34 years (AOR=9.5;95% CI: 1.12,80.8), Muslim religion (AOR=4.15;95% CI: 1.35,12.75), No Education (AOR=4.35;95%CI:1.25,15.15) and Primary Education (AOR=3.72;95%CI:1.18,11.7) and women who had history of Contraceptives use (AOR=2.97;95%CI: 1.31,6.72) were the predictors for anaemia.

Conclusion: In the study area anemia is a public health significant problem among pregnant women. Age of women, religion, educational status and history of contraceptive use were identified as significant predictors. We need to give due attention for designing and apply dietary guideline for pregnant women which includes consumption of iron rich diets, enhancing facility-based counselling sessions and media-based nutrition education to address all segments of pregnant women to bring behaviour change. Although, we need to expand safe and acceptable birth control methods with direct involvement of religious and community leaders to prevent anemia and its consequences.

Key word: Anemia; Severity level; Pregnant women; Antenatal care; Southern Ethiopia

Abbreviations

ANC: Antenatal Care; AOR: Adjusted Odd Ratio; APGAR: Appearance Pulse Grimace Activity and Respiration; COR: Crude Odd Ratio; EDHS: Ethiopian Demographic and Health Survey; Hgb: Hemoglobin; IDA: Iron Deficiency Of Anaemia; SPSS: Statistical Package for Social Science; WHO: World health organization.

Background

Anemia in pregnancy remains one of the most intractable public health problems in developing countries. Anaemia affects the lives of more than 2 billion people globally, accounting for over 30% of the world's population. It is one of the most recognized nutritional disorders which affect millions of life in developing countries like Ethiopia [1]. According to World Health Organization (WHO), anaemia is defined as haemoglobin below 11g/dl as the lower limit acceptable during pregnancy. Anemia can further be classified in to mild (10-10.9g/dl), moderate (7-9.9g/dl), and severe (<7g/dl). The main cause of anemia in developing countries include: inadequate iron rich food intake and poor absorption of iron, existence of infections such as malaria, hookworm infestation, diarrhoea, and also other infections, genetic disorders (e.g.; sickle cell and thalassemia), blood loss during labour and delivery, heavy menstrual blood flow and closely spaced pregnancies [2].

Globally the prevalence of anaemia at 41.8% among pregnant women, as in America and Europe where prevalence is projected at 24.1% and 25.1% respectively but this burden is twice in south east Asia and Africa the prevalence of anaemia among pregnant women 52.5% and 61.3% respectively [3]. In sub-Saharan Africa, the cause of anaemia during pregnancy is multifactorial. These include an iron-folate deficient diet and infections such as malaria, hook worms and increasingly human immune deficiency virus. Sub-Saharan Africa is the most affected region, with anaemia prevalence among women estimated to be 17.2 million, which corresponds to approximately 30% of total globally health case [4]. Maternal anaemia is associated with adverse pregnancy outcome such as increased risk of maternal mortality and prenatal mortality, premature delivery, low birth weight, low Appearance Pulse Grimace Activity and Respiration (APGAR) scores, fetal physical growth and mental impairment and infant deaths. Anaemia may worsen the cause of postpartum hemorrhage and predispose to puerperal infection both of which are leading causes of maternal mortality in developing countries. Anaemia rates have not improved substantially on the past two decades [5-7].

According to the Ethiopian Demographic and Health Survey report, 17% of reproductive age women are estimated to be anemic and 22% of the pregnant women are anaemic in 2011 [8]. Likewise, the current EDHS report 2016 indicated that, about one-fourth of women age 15-49 (23%) are anaemic [9]. In spite of its known effect anaemia among pregnant women and on the population, there is paucity of research evidence in this area. Therefore, the

aim this study was to assess anaemia prevalence and its predictors among pregnant women attending Antenatal Care Clinic in Butajira General Hospital, Southern Ethiopia.

Methods and Materials

Study Area, Design, and Period

The study was conducted in Butajira town which is found in Meskane woreda of Gurage Zone southern Ethiopia. Butajira General Hospital is located in Butajira town 135 km far from Addis Ababa, the capital city of Ethiopia. An institution based cross-sectional study was done at Butajira General Hospital from January 10 to February 10, 2017.

Populations

All pregnant women attending first antenatal care follow up visits at Butajira General Hospital were the source population of this study and pregnant women who were attended ANC visit follow up and who included in our sample during the study period were our sample population. All pregnant mothers who were attended ANC visit follow up not recently blood transfused; who had no chronic medical diseases, no diagnosed was included in the study. However, pregnant women who were seriously ill during the study period were excluded.

Sample Size and Sampling Technique

Sample size was determined using single population proportion formula taking 32.8% the prevalence of anemia among pregnant mothers attending antenatal care in Arbaminch [10], with 5% marginal error and 95% Confidence Interval (CI) of certainty ($\alpha = 0.05$). In this study, 10% of the non-response rate was taken and after adjustment based on average, 420 pregnant women have been registered in the ANC follow up, the final sample size was determined as 208.

A systematic random sampling method ($k = N/n = 420/208 = 2.01$) was used, every second ($k = 2$) pregnant women who fulfilled our inclusion criteria were carefully chosen.

Data collection tools and procedures

Data was collected by using a pre-tested interviewer administered questionnaire and the collection was done by trained data collectors and also regular supervision was done to control the quality of the data. The laboratory procedures were performed using strict standard operating procedures. Hemoglobin estimation was done and the result was expressed in g/dl. Hemoglobin value was adjusted by considering altitude of the study area. Lastly, severity of anemia was defined as non-anaemic (hemoglobin level ≥ 11.0 g/dl), mild anaemia (hemoglobin level of 10.0-10.9 g/dl), moderate anaemia (hemoglobin level of 7.0-9.9 g/dl), and

severe anaemia (hemoglobin level of <7 g/dl [2] and all laboratory diagnostic procedure were done by laboratory technician.

Statistical Analyses

After cleaning and coding data was entered and analyzed by using SPSS version 20. The descriptive statistic was carried out to compute the difference frequency, percentage and different diagrams. To determine the actual predictors for anaemia, binary logistic regressions analysis was applied and the variables ($p \leq 0.25$) found to have association with the outcome variable were entered into multivariate analysis which uses to control confounding factors. Finally, the variables which have significant association were identified on the basis of p -value ≤ 0.05 and AOR, with 95% CI to measure the strength of the associations.

Ethical Considerations

Ethical clearance was obtained from Wachemo University Ethical Review Committee. Letter of permission to conduct the study was obtained from Butajira General Hospital ANC clinic. Written informed consent was obtained from each study

participant. The purpose of the study was clearly described to the study participants including the benefits and risks of the study. Any information concerning the participants was kept confidential and the specimen collected from the participants was only analyzed for the intended purposes. Those clients with hemoglobin value below accepted value were communicated with the respective health professionals of Butajira General Hospital ANC clinic for possible interventions.

Results

Socio-Demographic and Economic Characteristics

A total of 208 pregnant women attending first ANC were included in analysis with response rate 100%. The mean age was 25.6 and $SD \pm 5.1$ years. From pregnant, 114(50.0%) were found in the age group 25-34 years and majority (90.9%) were married. Half (50%) of pregnant women were orthodox and 122(58.7%) were Gurage in the ethnic group. Also, housewife represented 76.5% (57.2%) of women and 94(45.2%) had primary educational status. Concerning household monthly income, 141(67.8%) of pregnant women live-in low-income households. [Table.1].

Table 1: Socio-demographic characteristics of pregnant women attending Antenatal care Clinic in Butajira General Hospital, Southern Ethiopia, 2018 (n=208)

Variables	Frequency	Percent
Age in years		
15-24	92	44.2
25-34	114	50.0
35-49	12	5.8
Marital status		
Married	189	90.9
Divorced	5	2.4
Widowed	5	2.4
Single	9	4.3
Ethnicity		
Gurage	122	58.7
Silte	30	14.4
Amhara	22	10.6
Kembata	12	5.8
Oromo	10	4.8
Hadiya	8	3.8
Religion		
Orthodox	104	50
Muslim	60	28.8
Protestant	44	21.2
Educational status		
No education	53	25.5
Primary	94	45.2

Secondary	33	15.9
Above secondary	28	13.5
Occupational status		
Housewife	119	57.2
Merchant	37	17.8
Government employee	30	14.4
Self-employee	17	8.2
Farmer	5	2.4
Household Monthly Income		
High Income	67	32.2
Low Income	141	67.8

Health Care and Obstetric Characteristics

One hundred seven (51.4%) of pregnant women were became pregnant for the first time during teenage (15-19years). Among the study participated pregnant women 153(73.6%) had less than three parity and 85(40.9%) had two years and above pregnancy

interval. Out of the pregnant women,117(56.2%) had less than five family size and majority (76%) preferred health facility for delivery of their baby. In addition, half (52.4%) of pregnant women had a history of contraceptive use and 28(13.5%) pregnant women had previous abortion history [Table.2].

Table 2: Health care and Obstetric characteristics of pregnant women attending Antenatal care Clinic in Butajira General Hospital, Southern Ethiopia, 2018 (n=208)

Variables	Frequency	Percent
Age at first pregnancy in years		
15-19	107	51.4
20-24	92	44.2
25-29	9	4.2
Family size		
Less than five	117	56.2
Five and more	91	43.8
Parity		
Less than three	153	73.6
Three and above	55	26.4
Gravidity		
Less than three	104	50.0
Three and above	104	50.0
Pregnancy interval		
First	44	21.2
Less than two years	79	38.0
Two years and above	85	40.9
Age of current pregnancy in weeks		
12-15	2	1.0
16-19	196	94.6
20-23	10	4.8
Place of delivery of recent child		
Health facility	158	76.0
Home	50	24.0
History of contraceptive use		

Yes	109	52.4
No	99	47.6
Previous abortion history		
Yes	28	13.5
No	180	86.5

Dietary and Life Style Characteristics

Majority (81.2%) of pregnant women received Iron-folate supplementation. One-hundred fifty-eight (76%) of pregnant women feed less than three meal per day. Concerning dietary

consumption, 118(56.7%) consumed vegetables less than three days, 115(55.3%) consumed fruits three and above days and also 208(100%) of pregnant women consumed meat less than three days in a week. All pregnant women in this study did not smoke cigarette [Table.3].

Table 3: Dietary and life style characteristics of pregnant women attending Antenatal care Clinic in Butajira General Hospital, Southern Ethiopia, 2018 (n=208)

Variables	Frequency	Percent
Iron-folate supplementations		
Yes	169	81.2
No	39	18.8
Vegetables consumption in a week		
Less than three days	90	43.3
Three and above days	118	56.7
Fruit consumption in a week		
Less than three days	93	44.7
Three and above days	115	55.3
Meat consumption in a week		
Less than three days	208	100
Three and above days	0	0
Frequency of meal per day		
Less than 3	50	24.0
3 and more	158	76.0
Cigarette smoking		
Yes	0	0
No	208	100

Anaemia Prevalence and Severity Among Pregnant Women

The prevalence of anemia and educational status of pregnant women attending Antenatal care in Butajira General Hospital showed, anemic pregnant women with primary education was 18.3% [Figure 1]. The over all prevalence of anemia among

pregnant women was 31.7%, from all pregnant women 17.0% were mildly anemic, 13.0% were moderately anemic and severely anemic pregnant women accounts [Figure 2]. However, specific to anemic pregnant women severity level showed that, 50.8% Mild anemia, moderate anemia 42.6% and 6.6% were severely anemic.

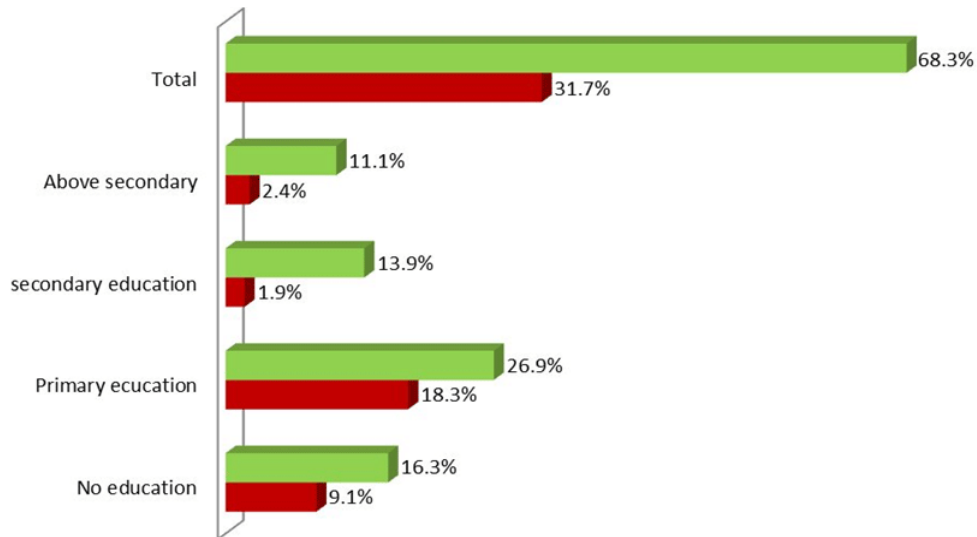


Figure 1: Anemia prevalence and educational status of among pregnant women attending ANC in Butajira General Hospital southern Ethiopia, 2018

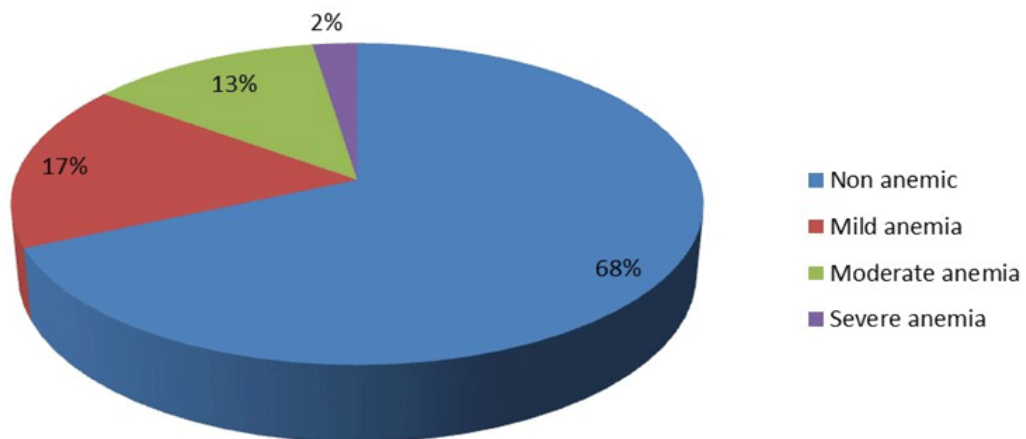


Figure 2: Severity of anemia among pregnant women attending ANC in Butajira General Hospital southern Ethiopia, 2018

Predictors of Anaemia Among Pregnant Women

In the study Age of women, religion, educational status, household monthly income, birth interval, History of contraceptives use, gravidity, parity, vegetable consumption per week, frequency of meal per day was significantly associated anaemia status in bivariate analyses. In this study, the multivariate analysis indicated that age of women, religion, educational status contraceptive use and frequency of meal per day were identified as predictors of anaemia among pregnant women attending ANC in the study area.

Age of women was one of the risk factors of Anaemia in the study area. The result indicated that, pregnant women within the age group 25-34 years were 9.5 times more likely to be anaemic than pregnant women aged 35-49 years (AOR=9.5;95% CI: 1.12,80.8). Comparing from pregnant women who had protestant religion, women who had Muslim religion were 4.15 times more likely to develop anaemia (AOR=4.15;95% CI: 1.35,12.75).

The result of analysis confirms that educational status of pregnant women is one of the significant predictors, in this study pregnant women who had no education were 4.35 times

(AOR=4.35;95%CI:1.25,15.15)and those pregnant women who had primary education were 3.72 times (AOR=3.72;95% CI:1.18,11.7) more likely to be anaemic than pregnant women who had above secondary educational status. History of contraceptive use is

also the significant predictor in the study. Pregnant women who had history of contraceptives use were 2.97 times more likely develop anaemia than those women who not used contraceptives (AOR=2.97;95%CI: 1.31,6.72) [Table.4].

Table 4. Predictors of Anemia among pregnant women attending Antenatal care Clinic in Butajira General Hospital, Southern Ethiopia, 2018 (n=208)

Explanatory Variables	Anemia status		COR 95% CI	AOR 95% CI	P-Value
	Anemic	Non-Anemic			
Age in years					
15-24	25	67	4.10(0.50,33.5)	4.75(0.54,41.7)	0.160
25-34	36	68	5.82(0.72,46.9)	9.5(1.12,80.8)	0.039*
35-49	1	11	1	1	
Religion					
Orthodox	29	75	1.22(0.55,2.72)	1.40(0.53,3.72)	0.495
Muslim	23	37	2.14(0.9,5.03)	4.15(1.35,12.75)	0.013*
Protestant	10	34	1	1	
Educational status					
No education	19	34	2.57(0.84,7.87)	4.35(1.25,15.15)	0.021*
Primary	34	60	3.12(1.09,8.93)	3.72(1.18,11.7)	0.025*
Secondary	4	29	0.63(0.15,2.64)	0.49(0.09,2.44)	0.383
Above secondary	5	23	1	1	
History of contraceptive use					
Yes	37	72	1.49(0.82,2.68)	2.97(1.31,6.72)	0.009*
No	25	74	1	1	

*Statistically significant at p-value<0.05; 1 is Odds ratio for reference category.

Discussion

In this study Anemia status among pregnant women who attended Antenatal care was 29.3%. Anemia status in this study was higher than study conducted In Gulu and Hoima Regional Hospitals in Northern and Western Uganda 22.1 % [11], In Tikur Anbessa Specialized Hospital in Addis Ababa , 21.3% [12], Aymiba Health Center in northwest Ethiopia, 25.2% [13], In Debre Berhan health institutions, 9.4% [14], In Mizan-Tepi University Teaching Hospital, 23.5% [15]. However this anemia status was lower than study in India, 86.37% [16], Dhaka city of Bangladesh, 37 % [17] Kenya , 57% [18], in North Western Zone of Tigray, 36.1% [19] In Nekemte Health Center, 52% [20] in Asossa Zone Public Health Institutions, 31.8% [21], in Health Institutions of Arba Minch Town , 32.8% [10], In Wolayita Soddo Otona Hospital, 39.94% [22]. The reason for this discrepancy might be attributed to difference in geographical, dietary intake maternal health care utilization mainly ANC and sampling characteristics among these studies.

In the study severity level of anemic pregnant women showed that, 50.8% mild anemia, moderate anemia, 42.6% and 6.6% were severely anemic. The level of mild anemia in this study was higher than study conducted in Kenya, 26.5% [18]; Assosa

northwest Ethiopia, 45% [21] but the finding is in-line with study in Arbaminch southern Ethiopia, 50.8% [10]. Moderate anemia level was lower than study in Kenya, 70.7% [18]; while, higher than Assosa northwest Ethiopia, 54% [21]. Whereas severe anemic pregnant women in this study was higher than study in Kenya, 2.7% [18]; Arbaminch southern Ethiopia, 3.7% [10] and 1% in Assosa northwest, Ethiopia [21]. The difference in severity level might associate with difference in maternal health care and leaving in hygienic environment, disparity in iron rich food consumption, topographic difference and population characteristics.

In multivariate analysis the predictors of anemia among pregnant women indicated that, the odds of pregnant women within the age group 25-34 years were 10 times higher than pregnant women aged 35-49 years. This finding was supported by study conducted in India [16] and Dhaka city of Bangladesh [17]. The possible justification for this might be due to early age is a period for an active pregnancy and birth for women. Thus, this may lead to reducing maternal iron reserves at every pregnancy and by causing blood loss at each delivery than the older age. The finding was nevertheless in disagreement with a study in Pumwani Maternity Hospital, Kenya [18].

Comparing from pregnant women who had protestant religion, women who had Muslim religion were 4 times higher odds to develop anemia. This might be due to those Muslim pregnant women may gave birth more children with decreased birth interval and their iron store depletes more than their counter parts. In the present study, it was found that anemia increases steadily with decrease in the level of educational status. Those pregnant women who had no education were 4.35 times and those who had primary education were 3.72 times higher odds to be anemic than pregnant women who had above secondary educational status. This finding was in-lined with study in India [16], Dhaka city of Bangladesh [17] Tikur Anbessa Specialized Hospital [12] and North Western Zone of Tigray [19]. The possible reason for his study might be due to those pregnant women who no formal education or lower educational level had low awareness about the importance of antenatal care services, birth spacing and take some preventive measures like eating iron-rich food and taking iron and folic acid supplements.

History of contraceptive use is also the significant predictor in the study. Pregnant women who had history of contraceptives use were 3-fold higher odds to develop anemia than those women who not used contraceptives. This might be due to those pregnant women who had history of contraceptives use due to the side effect of some contraceptives such as excess bleeding might lead to anemia. In contrary a study In Tikur Anbessa Specialized Hospital Addis Ababa [12] and Wolayita Soddo Otona Hospital, Southern Ethiopia [22], those women who had no history of contraceptive usage were more likely to be anemic. In this study limitation includes since we used cross sectional designs with its inability to make causality and we didn't include altitude data to adjust anemia level. Although we didn't use other tests to specify anemia causes.

Conclusion

The prevalence of anemia had moderate public health significance among pregnant women in the study area. Age of women, religion, educational status and history of contraceptive use were identified as significant predictors of anemia among pregnant women in the study area. We need to give due attention for designing and apply dietary guideline for pregnant women which includes consumption of iron rich diets for the pregnant women, enhancing facility-based counseling sessions and media-based nutrition education to address all segments of pregnant women to bring behavior change. Although, we need to expand safe and acceptable birth control methods with direct involvement of religious and community leaders to prevent anaemia and its consequences.

Declarations

Ethics approval and consent to participate

Approval for this study was provided by the Wachemo

University, collage of medicine and health sciences research and community service review committee. Permission to access patients was obtained from the clinical director of Butajira General Hospital Southern Ethiopia. All study participant including adolescent mothers provided written informed consent to participate in the study by signing or applying a thumb print.

Consent to publish

Not applicable

Availability of Data and Materials

The datasets developed and/or analyzed during the current study are available from the first author or from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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The research was not received any fund.

Authors' Contributions

GM, TB and MG were involved in the conception, designing, analysis and interpretation of data of the study. GO BA and BM were contributed to the design, interpretation of the data, and writing of the study. BM and BA wrote the final manuscript. All authors read and approved the final manuscript.

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