

PREVALENCE OF ANAMIA AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN HEALTH FACILITIES, SANGA LOCAL GOVERNMENT AREA OF KADUNA STATE.

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ABSTRACT

This study is on prevalence of anemia among pregnant women attending antenatal care in health facilities at Gwantu-Sanga Local Government Area of Kaduna State. It adopted survey research designed as well as experimental design. The population population for the study were 300 diagnosed anemic pregnant women that attended antenatal care services in health facilities in Gwantu-Sanga Local Government Area of Kaduna State. This was done for a period of 3 months. The population served as the sample size of for the study. Two instruments were used for the study. The first instrument was the checklist sucht for information on the prevalence of anemia among pregnant women (signs and symptoms), health problems associated with anemia among pregnant women, ranges of packed cells volume among the anemic pregnant women, and the risks factors associated with pregnant women having anemia. The second instrument used was the hematocrit centrifuge machine. The first one was given to 3 experts in health whose correction helped in producing what was used for the study in collecting data. The instrument was try-tested using 20 patients with similar characteristics that were not part of the main study. Cronbach's alpha method was used in analyzing results of the pre-test which gave an index of 0.81 which was considered high for the study. The result showed that the prevalence of anemia among pregnant women to include; dizziness (92.3%), fatigue (89.7%), shortness of breath (82.7%), fast heart rate (Palpitation) (65.3%), low oxygen in the body (63.3%), loss of appetite (67.3%), headaches (50%) and pale skin (34.7%); and the health problems associated with anemia among pregnant women included extreme fatigue (89.3%), low birth weight (20.7%), heart problems (18%), spontaneous abortion (17%), prenatal mortality (15.7%) and fatal death (14.7%). The ranges of packed cells volume (PCV) among the anemic pregnant women included PCV from 30-32.9% (53%), PCV from 21-29.9% (33%), and PCV less than 21% (13.7%). The risks factors associated with pregnant women having anemia included; distance to the health facility stops them from attending ANC (65.7%), low socioeconomic status (poor living) (62.7%), nutritional deficiency (47.3%), second trimester gestational stage (46.7%), Multiparity (frequent pregnancy) (45.7%), third trimester gestational stage (34.7%), non-utilization of Antenatal Care services (iron supplement) (28.7%) and ingestion of alcohol (3.7%). Based on some of the findings, it was recommended among others that there should be continuous awareness creation and health education on the importance of utilization of Ante natal Care services, education and economic empowerment of women and PCV/Hb value of 39% or 13g/dl and above in the second trimester should be cause for concern.

INTRODUCTION

Pregnancy is always welcome by married couples in Africa and especially in Nigeria. However, some of this pregnancy maybe accompanied with certain health issue, one of which is anemia.

According to Lebso, Anato and Loha (2017) anemia is describe as a condition in which there is less than the normal hemoglobin (Hb) level in the body. They further emphasized that during pregnancy, iron deficiency is associated with multiple adverse outcomes for both mother and infant. In line with these, Ugwu and Uneke (2020) describe edit as a condition of low

circulating hemoglobin (Hb) in which concentration has fallen below a threshold lying at two standard deviations below the median of a healthy population of the same age, sex and stage of pregnancy causing decreases oxygen carrying capacity in a pregnant woman.

Furthermore, world health organization (WHO) (2021) defines anemia in pregnancy as the hemoglobin concentration of less than 11g/dl. According to WHO, anemia is considered to be a public health significance or problem of anemia of than 40% in a population is classified as a severe public health problem.

To buttress the fact as presence of anemia among pregnant women Lebso et al (2017) discovered that the prevalence of anemia was 23.2% (95% CI: 19.5%- 26.9%) factors associated with anemia were low socioeconomic status(AOR= 2.03, 95% CI: 1.67 -8.08) gravidity three to five(AOR= 1.78, 95% CI: 1.03 – 3.07) and six and above (AOR = 2.59, 95%CI: 1.37 – 4.92), not supplemented with iron (AOR = 1.72, 95% CI: 1.02-2.91), low dietary diversity score (AOR = 3.18, 95% CI 1.37 – 7.37) and hookworm infection (AOR = 2.69, 95% CI 1.34 – 5.39).

In addition, Ugwu and Uneke (2020) in their study discovered that, a total of six relevant studies that fulfilled the study inclusion criteria were identified out of 36 studies found. All the studies reported a high prevalence of iron deficiency anemia among pregnant women and risk factors associated with iron deficiency anemia in pregnancy include multiparity, third trimester of pregnancy, and low socioeconomic status. Risk factor associated with noncompliance to routine iron therapy include poor utilization of Ante natal services, low educational attainment, distance to the health facilities, single or teenage pregnancy, increasing age of the pregnant women, and living in the rural areas. The prevalence of iron deficiency anemia among pregnant women was reported to be high. Some of these factors are considered in this work.

Pregnancy according to medical dictionary defines it as the progression of stages from conception to birth, the condition of being pregnant. The period of time this condition prevails. Discussing on pregnancy Mamman (2014) explained that two-third (2/3) of all pregnant and half of all non-pregnant women in Africa have anemia. Anemia in pregnancy arises from a variety of factors which include the physiological hemo-dilution of pregnancy, increased demand of the fetus on material stores of iron and folic acid, poor nutritional diet, infection and infestation such as malaria and hookworm and some adverse cultural practices. Iron deficiency anemia account for 70 -85% of cases of anemia in pregnancy all over the world and more especially in Africa. Anemia in pregnancy is associated with maternal problems such as hemorrhage and increased maternal morbidity and mortality. Anemia in pregnancy is also associated with adverse fetal outcomes such intrauterine growth retardation, pre-term delivery low birth weight and fetal death.

Anemia in pregnancy in Nigeria is not different from other parts of Sub-Saharan Africa. In the neighboring Republic of Niger, Murray et al, found that about 47%of breast-feeding women were iron deficient. Harrison, (2001) showed that about 40% of pregnant women are anemic. Isah et al (1985) found a prevalence of anemia of 46% in non-pregnant and 52%of pregnant women respectively in Zaria. Iron deficiency was found in 54%and 25% of non-pregnant and pregnant women by Isah et al. Gwarzo, et al (1994) in Kano from a prevalence of iron deficiency of 17% among pregnant women in Kano.

As expressed by Balarajan, Ramakirshnan, Ozaltin, Shankar and Subramanran (2011), globally 1.62 billion people(25%) are anemic, among which 56million are pregnant women, around 40% of women begins their pregnancy with low or absent iron stores (serum ferritin 30mg/L and up to 90% have iron store of 500mg (serum ferritin 70mg/L) worldwide which is insufficient to meet the increased iron needs during pregnancy and postpartum, (Berymann, 2013). In Africa the prevalence of anemia among pregnant women was 57% which is associated with adverse health outcomes for both mother and infant, like maternal mortality, prenatal mortality, growth restriction and low birth weight (kumar premarjan, & kar, 2013).

Ante natal care (ANC) as explained by Ali, Elbarazi, Alabboud, Almaskari, Loney and Ahmed (ANC) is the care provided by skilled healthcare professional to women throughout their pregnancy. It includes risk identification and screening, prevention and management of pregnancy related or

concurrent disease and health education and promotion obasi, & Nwachukwu, 2013 Global guidelines recommend frequent medical care visits during the antenatal period to decrease the risk of maternal and perinatal mortality. (Pattinson, saving babies, 2017). Women are recommended to initiate their ANC appropriately during pregnancy as it will help to reduce complications, provide wider platforms for a healthier pregnancy and maximize the benefits of monitoring fetal and maternal health (Tuncalp, Pena-Resas, Lawrie, Bucagu, Oladapo, Portela et al, 2017).

On the use of antenna, I PandelJha and Mehata (2017), discovered that overall, 70% of the women had started their first ANC at 4 months or earlier. Among participants who had never attended school, just more than half (52%) recovered first ANC at 4 months or earlier, while majority of participants (97%) who had received higher education received first ANC at recommended time. Similarly, 89% of those from richest quintile and 48% of those from poorest quintile received first ANC at recommended time. In adjusted analyses, women from richest wealth quintile were significantly aware likely to initiate ANC early (AOR: 3.74, 95% CI: 0.35 – 0.90) compared to the poorest. Similarly, women with higher level education were significantly more likely (AOR: 11.40, 95% CI: 5.05 – 25.73) to initiate ANC early compared to women who had never attended school. A significantly lower odds of early ANC take up was observed among Madhesi other caste (AOR: 0.056, 95% CI: 0.35 – 0.70) compared to Brahmin/Chletri women. Women whose pregnancy was unwanted were significantly less likely to attend first ANC at 4 months or early (AOR: 0.73, 95% CI: 0.58 – 0.93) in compare to women whose pregnancy was wanted. Some of the variables are used in this work.

Accessing on health facilities alfars & Brooks , Seyedi, Syan (2011) posited that it is generally any location where healthcare is provided. Health facilities range from small clinics and doctors' offices to urgent care center and large hospitals with elaborate emergency rooms and trauma centers. The number and quality of health facilities in a country or region is one common measure of that area prosperity and quality of life. In many countries, health facilities are regulated to some extent by law, licensing by a regulatory agency is offer required before a facility may open for business. Health facilities maybe owned and operated by for-profit business non-profit organization, governments and in some cases by individuals with properties varying by country. In this case Nigeria is not an exception.

Several studies have shown that women who started ANC attendance early and attended frequently were more likely to be assisted during childbirth by a skilled attendance compared to those who initiated ANC late and attended only few visits (Belayneh, Adefris, Andargie, 2014). Late or no ANC has been reported to be associated with poor outcomes for mothers and fetus such as premature birth, still birth, low birth weight and increased complication during pregnancy and childbirth (Beauclair, Petro, and Myer, 2014). Evidence suggests not knowing the right gestation age at which to start the first ANC visit was most common reason for late attendance (Kisuule, Kaye, Wajjuka, SseMatimba, Arinda, Nakitende et al 2013). Studies have shown cultural factors, quality of care, economic factors, women's educational status, poor knowledge on timing of first ANC visit and access to ANC (Kisuule, Kaye, Najjuka, Ssematimba, Arinda, Nakitende et al, 2013) to be determining when a woman starts her ANC checkup. The findings suggest adequate provision of information and counseling concerning early attendance of ANC could have an important role Community based intervention involving community volunteers have been found to be effective to promote early and adequate ANC visit (Gross, Alba, & Glass, 2012).

Pregnant women think all pregnancies are same so no needs to attend ANC. The routine drugs giving at ANC irritate some of them so sometimes the find hard to take it. Some skip ANC due to proximity to health facilities; some said the need to go to farm first since that their source of livelihood. That is why a study of these natures is very important in the area anemia is one of the most frequent complications related to pregnancy. The word implies a decrease in the oxygen carrying capacity of the blood and is best characterized by a reduction in hemoglobin concentrations. The plasma volume starts to increase at about six weeks of pregnancy in a healthy

woman. This increase, which is disproportionally greater than the corresponding changes on the red cell mass, accounts for the physiologic fall in the Hb concentration during pregnancy as a consequence, there is a significant reduction in arteries venous oxygen carrying capacity of the pregnant women, despite the fall in the Hb level.

The most frequent causes of time or absolute anemia are nutritional deficiency frequently, these deficiencies are multiple and the clinical presentation may be complicated by attendant infections, generally poor nutrition or hereditary disorders such hemoglobinopathies. However, the fundamental source of nutritional anemia embodies insufficient intake, inadequate absorption, increased losses, expanded requirements and insufficient utilization of hemopoietic nutrients. Approximately 75% of all anemia diagnosed during pregnancy is due to iron deficiency. Significant deficiency of iron leads to characteristic hypochromic, microcytic erythrocytes on the peripheral blood smear. Other causes of hypochromic anemia, even rare, must be considered, including hemoglobinopath, inflammatory process, chemical toxicity, malignancy and pyridoxine responsive anemia. However, the greater percentage of the remaining cases of anemia in pregnancy other than the iron deficiency type consists of the megaloblastic anemia of pregnancy over to folic acid deficiency and, to a lesser extent, to vitamin B12 deficiency. Hence the present study on prevalence of anemia among pregnant women attending ante natal care in health facilities in Gwantu- Sanga local Government Area of Kaduna State.

Research Questions

To give directive to this work, the following research question werestated

1. What are the signs of the prevalence of anemia among pregnant women in Gwantu- Sanga local Government Area of Kaduna State?
2. What is the health problem associated with anemia among pregnant women in Gwantu- Sanga local Government Area of Kaduna State?
3. What are the ranges of oxygen carrying capacity of hematocrit (PCV) /hemoglobin (Hb) estimation among anemic pregnant women in Gwantu- Sanga local Government Area of Kaduna State?
4. What are the factors associated with pregnant women in Gwantu- Sanga local Government Area of Kaduna State?

METHODS

This study utilized a descriptive survey. A survey gathers data at a particular point in time with the intention of describing the nature of existing conditions of the respondents. The research population comprise of the pregnant women attending antenatal care in health facilities in Gwantu- Sanga LGA Kaduna state. It is an estimate of 1200 patients who attended ANC and were diagnosed with anemia in pregnancy that formed the population of the study. The sample size of this study is three hundred patients, drawn out of populace of 1200 using Slovin's Formula; giving a margin error of 0.05. The researcher considered this sample size large enough for this study for this study, a random sampling technique was used in the selection of 300 pregnant women sample size drawn out of 1200 population of pregnant women diagnosed of anemia on attendance of antenatal care in different health facilities in the local government in a period of of about three (3) months. It allows equal the opportunity of the sample variables to be selected and participate in the study. Two instruments used for data collection. One is structured checklist developed by the researcher after a careful review of relevant literature on the topic and hematocrit centrifuge machine. The face and content validity of the instrument was obtained through experts in research. Two of who were in the Department of Health Science and one from the Department of Physical and Health Education that are not below the rank of senior lecturer for the University of Jos.

The checklist was designed by the researcher to collect information from the Respondents. There were four sections of the checklist; Section 1: prevalence of anemia among pregnant women (signs and symptoms), section 2: health problems associated with anemia among pregnant

women, section 3: ranges of packed cell volume (PCV) among anemic pregnant women and Section 4: risks factors associated with pregnant women having anemia.

three experts validated the instrument. Two of who were for the department of health science and one from the department of physical and health education, all of the University of Jos. A draft copy of the check-list was given to them for face and content validity for the appropriateness of the items, clarity of statement and whether or not the item were related to the subject matter under study. Based on their observation, necessary corrections were made.

A sample of 20 women with similar characteristics with those studied were used who were not part of the main study from Jama'a Local Government Area were used to try-test the instrument the data obtained were coded and analyzed using cronbach-alpha method in order to determine the reability of the instrument. This was done using split-half method which gave a reliability coefficient index of 0.78. which was considered high enough for the study.

Method of Data Collection

The researcher used checklist as the instrument for data collection from both primary and secondary hospital facilities in Gwantu-Sanga Local Government Area of Kaduna State.. The sampled Respondents were then required to respond to those statements in the checklist. The checklist comprised of four sections. Section 1: prevalence of anemia among pregnant women (signs and symptoms) which contained 7 statements. Section 2: health problems associated with anemia among pregnant women, which contained 8 statements. Section 3: ranges of packed cell volume (PCV) among anemic pregnant women which contained 3 statements and blood samples were drawn using venous blood collection for testing/assay of packed cells volume for data collection for this study. Section 4: risks factors associated with pregnant women having anemia which contained 9 statements

Second phase of data collection, that is in section 3; the venous blood sample that were collected from each of the 300 pregnant women diagnosed of anemia for laboratory test using hematocrit centrifuge machine. By filling the capillary tube to $\frac{3}{4}$ of its volume. Sealed one opened edge of the tube with flame and centrifuge for 12000 revolutions per minutes for 5 minutes. Afterward the spin capillary tubes are place on the micro-hematocrit card reader to check for the percentage volume of the packed red cells from the whole blood sample. Pregnant Patients with Anemia from ranges hematocrit of 30–32.9% indicated anemic, 21-29.9% was considered mild anemic and less than 21% indicated severe anemia in pregnancy. Frequency and percentage were used in analyzing the data that emanated from the Respondents, which were used in answering the research questions raised.

Results

Table 1: Signs of the Prevalence of Anemia Among Pregnant Women

N= 300

S/N	ITEM	YES		NO	
		.f	%	.f	%
1	I used to have shortness of breath	248	82.7	52	17.3
2	I used to feel dizziness most times	277	92.3	23	7.7
3	I used to feel tired (weakness mostly)	269	89.7	31	10.3
4	I used to feel like I have low oxygen in the body	190	63.3	110	36.7
5	I have fast heart rate / beat (palpation)	196	65.3	103	34.7
6	I have headaches	150	50	150	50
7	I have pale skin	104	34.7	196	65.7
8	I use to feel loss of appetite	202	67.3	98	32.7

The results in table 1, showed that dizziness 277(92.3%) responses, fatigue 269 (89.7%) responses, shortness of breath 248 (82.7%)responses, fast heart rate (Palpitation) 196 (65.3%) responses, low oxygen in the body 190 (63.3%) responses, loss of appetite 202 (67.3%)

responses, headaches 150 (50%) responses, and pale skin 104 (34.7%) responses were the signs of the prevalence of anemia among pregnant women attending antenatal care in health facilities in Gwantu-Sanga Local Government Area of Kaduna State.

Table 2: Health Problems Associated With Anemia Among Pregnant Women

N=300

S/N	ITEM	YES		NO	
		.f	%	.f	%
9	Extreme fatigue	268	89.3	32	10.7
10	Premature birth				
11	Low birth weight	62	20.7	278	79.3
12	Spontaneous abortion	51	17.0	249	83.0
13	Fetal death	44	14.7	256	85.3
14	Prenatal mortality	47	15.7	253	84.3
15	Heart problems	54	18.0	246	84.0

The results in table 2 revealed that extreme fatigue 268 (89.3%) responses, low birth weight 62 (20.7%) responses, heart problems 54 (18%) responses, spontaneous abortion 51 (17%) responses, prenatal mortality 47 (15.7%) responses and fatal death 44 (14.7%) responses were the health problems associated with anemia among pregnant women attending antenatal care in health facilities in Gwantu-Sanga Local Government Area of Kaduna State.

Table 3: Ranges of Packed Cells Volume (PCV) Among the Anemic Pregnant Women .

N=300

S/N	ITEM	YES		NO	
		.f	%	.f	%
16	PCV or respondent less than 21%	41	13.7	258	86.3
17	PCV of respondent from 21-29.9%	99	33.0	201	67.0
18	PCV of respondent from 30-32%	159	53.0	141	47.0

The results in table 3 revealed that PCV from (30-32.9%) 159 (53%) responses, PCV from (21-29.9%) 99(33%) responses, and PCV less than 21% 41 (13.7%) responses were the ranges of packed cells volume (PCV) among anemic pregnant women attending antenatal care in health facilities in Gwantu-Sanga Local Government Area of Kaduna State.

TABLE 4: Risks Factors Associated With Pregnant Women Having Anemia

N= 300

S/N	ITEM	YES		NO	
		.f	%	.f	%
19	Are having nutritional deficiency	142	47.3	158	52.7
20	Distance to the health facility stops you from attending ANC	197	65.7	103	34.7
21	Are you in first trimester gestational stage	63	21.0	237	79.0
22	Are you in second trimester gestational stage	140	46.7	160	53.3
23	Are you in third trimester gestational stage	104	34.7	196	65.3
24	Multiparity (frequent pregnancy)	137	45.7	163	54.3
25	Low socioeconomic status (poor living)	188	62.7	112	37.3
26	Non utilization of Ante-natal care services (iron supplement)	86	28.7	214	71.3
27	Ingestion of alcohol	11	3.7	289	96.3

The results in table 4 revealed that distance to the health facility stops them from attending ANC 197 (65.7%) responses, low socioeconomic status (poor living) 188 (62.7%) responses, nutritional deficiency 142(47.3%)responses, second trimester gestational stage 140(46.7%) responses,

Multiparity (frequent pregnancy) 137(45.7%) responses, third trimester gestational stage 104 (34.7%) responses, non-utilization of Ante natal Care services (iron supplement) 86(28.7%) and ingestion of alcohol 11 (3.7%) responses were risks factors associated with pregnant women having anemia in health facilities in Gwantu-Sanga Local Government Area of Kaduna State.

DISCUSSION

The results in table 1 showed that dizziness, fatigue, shortness of breath, fast heart rate, low oxygen in the body, loss of appetite Headaches and pale skin (92.3%, 89.2%, 82.7%, 65.3%, 63.3%, 67.5%, 50%, and 34.7% respectively) were the prevalence of anemia among pregnant women. This results were expected because anemia is a disease of the red blood and a reduction in this hemoglobin concentration (<7g/dl) is responsible for all the afore mentioned signs and symptoms and this is a severe public health problem (WHO, 2008). Global data shows that 56% of pregnant women in low and middle income countries (LMIC) posses some if not all of this symptoms (Beck, & Walker, 2003)

The prevalence of anemia is highest among pregnant women in Sub-Saharan Africa (57%), followed by pregnant women in Southeast Asia (48%) and lowest prevalence (24.1%) was found among pregnant women in South America (WHO, 2008)

The results in table 2 Revealed that extreme fatigue, low birth weight, heart problems, spontaneous abortions, prenatal mortality and fatal death (89.3%, 20.7%, 18%, 17%, 15.7% and 14.7%) respectively were the health problems associated with anemia among pregnant women. These results were not surprise because in line with WHO (2012) anemia consequence on maternal health include less exercise tolerability, perpetual infection, thromboembolic problems, post-partum hemorrhage, pregnancy-induced hypertension, placenta previa and cardiac failure. The morbidity and mortality rate of the mother/child pair resulting from maternal anemia is alarming.

According to the WHO (2010 - 2013, 40% of maternal death in South Africa were associated with these health problems fetal consequences associated with anemia in pregnancy are not limited to still-births, low-weight babies and neonatal sepsis. Anemia affects human health, social and economic development (WHO and UNICEF, 2004).

Anemia can lead to prenatal mortality (15.7%) and fetal death (14.7%). This is inline with Allen (2000) that anemia can contribute up to 40% of maternal mortality I which the majority of this happens in under developed countries.

The results in table 3 revealed that the ranges of PCV/Hb estimation were from 10-10.9g/dl (53%), PCV/Hb estimation were from 7-9.9g/dl (33%) and PCV/Hb estimation less than 7g/dl (13.7%). These results are in accordance to the Centre for Disease Control and Prevention. Anemia in pregnancy is defined as hemoglobin/PCV level less than 11g/dl(33%) (Koyuncu, Turgay, Sukur, & Yildirim, 2017).

Also in line with Salhan, Tripathi, Singh, Galkwad (2012) anemia in pregnancy ranges from mild hematocrit 30-32.9% or 10.0-10.9g/dl) moderate (21-29.9% or 7-9.9g/dl) to severe (less than hematocrit of 21% or <7g/dl). Maternal anemia is multi-factorial with to possible causes.

The results in table 4 showed the various risks factors associated with pregnant women having anemia to include distance to the health facility (65.7%), low socioeconomic status (62.7%), nutritional deficiency (47.3%), second and third trimester gestational stage (46.7 and 34.7% respectively), Multiparty (45.7%), non-utilization of ANC services (28.7%) and ingesting of alcohol (3.7%). These results were expected the prevalence of anemia in pregnancy varies considerably because of the difference in socioeconomic conditions, lifestyles and health seeking behaviors across different cultures (Mekonnem, Ambaw and Ner, 2018). Anemia is a common problem in Nigeria with iron-deficiency anemia as it commonest cause (Hassan, Mamman, Adaji, Musa and Kene, 2014).

Also in accordance with Okafor, Dieiomaoh, Oronsaye, (2018), Multiparity is an important risk factor associated with iron deficiency anemia. Pregnancy consumes a lot of iron, hence too frequent pregnancies within short intervals will result in iron deficiency, (AL-farsi, Brooks, Werler, Cabral, Al-Shafei and Wallenberg, 2013). The gestation iron demand is 3-4 folds the requirement of the non-pregnant woman (ZavaLeta, Canfield and Garcia, 2000). Although it can be mobilized from the maternal stores to meet this requirement, women in general, are found to have low iron stores probably due to the monthly loss of blood in menstruation (Okojekwa, Nnanm, Okolie, & Lugos, 2018). Once these stores are depleted, the mother will develop iron deficiency

CONCLUSION

Based on the findings of the study, the following conclusions were drawn. Anemia was prevalent, health problems like Extreme fatigue, low birth weight, heart problems, spontaneous abortions, prenatal mortality and fetal death. low socioeconomic status, nutritional deficiency, second trimester gestational stage, multiparity/ frequent pregnancy, third trimester gestational stage, non-utilization of Antenatal Care services and ingestion of alcohol.

RECOMMENDATIONS

Based on the summary and conclusions of the study, the following recommendations were made;

1. There should be comprehensive Antenatal Care (ANC) services, where individualized dietary programs can be drawn for identified pregnant women all direct at reducing anemia and improving pregnancy outcomes.
2. There should be ongoing education about effects of anemia especially of adolescent women and women of reproductive age in general.
3. Women latent iron deficiency should raise the need for iron supplementation in all women of child-bearing age through fortification of food and also the need for prenatal assessment of women of child-bearing age when they contemplate becoming pregnant.
4. There should be continuous awareness creation and health education on the importance of utilization of Antenatal Care services, education and economic empowerment of women.

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