GSC Biological and Pharmaceutical Sciences

eISSN: 2581-3250 CODEN (USA): GBPSC2

Cross Ref DOI: 10.30574/gscbps

Journal homepage: https://gsconlinepress.com/journals/gscbps/

(RESEARCH ARTICLE)

Check for updates

Obstetric factors associated with anaemia in pregnancy in a primary health center in south-south Nigeria

Ndukwu Geraldine *, Dienye Paul and Adesokun Bolanle

Department of Family Medicine, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria.

GSC Biological and Pharmaceutical Sciences, 2021, 14(03), 042–049

Publication history: Received on 12 January 2021; revised on 25 February 2021; accepted on 27 February 2021

Article DOI: https://doi.org/10.30574/gscbps.2021.14.3.0028

Abstract

Anaemia has been reported as one of the commonest medical complications associated with pregnancy in the developing countries. It increases maternal, fetal and neonatal morbidity and mortality significantly. In Nigeria, maternal anaemia usually predates the period of pregnancy in the life of most of the mothers. These women succumb to early unprepared marriage, give birth to many children with poor child spacing and due to poverty and ignorance they book late for antenatal. This study determines the obstetric factors associated with anaemia in pregnancy in a primary health centre in Port Harcourt in order to create awareness on maternal anaemia and the need to institute preventive and therapeutic measures.

Methods: This is a cross-sectional; hospital- based study. A total of two hundred and twenty-seven pregnant women attending the antenatal clinic were enrolled into the study at booking in a primary health centre. Data was collected by administrating questionnaires. Blood sample was collected for haemoglobin estimation. Means were compared using z-test and statistical significance was set at $P<0.05$.

Results: Out of the 227, 111(48.9%) were primigravida, most of whom were anaemic (65.8%). Majority of the women booked in the second trimester 135 (59.3%) and those that booked at the third trimester were more anaemic (70.9%). Pregnant women with birth interval of <1(66.7) and > 4years (78.6%) were mostly anaemic

Conclusion: Anaemia in pregnancy especially for those living in developing countries can be reduced if women are educated on the need for proper nutrition before pregnancy and on early ante-natal booking.

Keywords: Maternal health; Anaemia; Primary health care; Ante-natal booking; Parity

1. Introduction

Anaemia in pregnancy although preventable is a known public health problem world-wide especially in developing countries [1, 2]. It has been reported as one of the commonest medical complications associated with pregnancy in the third world countries [1, 2]. Among the 58.27million pregnant women estimated to be anaemic in the world, 96% of them are living in the developing countries and only 4% in developed nations [3]. According to the world health organisation (WHO), anaemia is said to occur whenever the haemoglobin level is less than 12 g/dl or a haematocrit of 36% in a non-pregnant woman at sea level. Due to the physiological changes in pregnancy, the equivalent value for pregnant women is 11 g/dl or a haematocrit less than 33%. [4, 5].

In pregnancy, anaemia has been shown to be associated with an increased risk of maternal mortality and morbidity [6-9]. About 99% of deaths that occur each year from pregnancy related causes are mostly in the developing countries and

* Corresponding author: Ndukwu Geraldine
Department of Family Medicine, University of Port Harcourt Teaching Hospital, Rivers State, Nigeria.

2- 12% of these deaths in Africa is primarily due to anaemia [10,11]. In Nigeria, studies have proved that anaemia contributes to the high rate of maternal mortality and morbidity recorded in the country [2,12-14]. Maternal deaths attributed to anaemia in pregnancy in Nigeria ranges from 14.6% to 20% [11,15,16]. Other maternal complications linked with anaemia are: poor weight gain, premature labour, increase in operative delivery, blood transfusion and poor anaesthetic risk [7,8]. Maternal anaemia also affect the baby in the womb. Such fetal complications include preterm delivery, low birth weight and perinatal mortality [7,9,17].

The causes of anaemia in pregnancy are multiple especially in developing countries like Nigeria. [18-20]. Mostly the cause of anaemia in pregnancy in these areas is attributed to dietary deficiency especially iron, folate and vitamin B12. [17,21,22]. Many of these women start out in life with insufficient iron store which is further compromise by exposure to repeated infection and infestation from malaria, other micro-organisms, helminthiasis and HIV lately. [23-27]. The problem of insufficient iron store in females early in life is not peculiar to developing nations like Nigeria only but is more pronounce in these areas because of poverty [28,29]. Several studies reported that many women and young adolescent are already anaemic by the time they become pregnant and a great percentage of them are from developing nations when compared to women in wealthier countries [28,29].

There are obstetric factors that are associated with maternal anaemia. Such factors are maternal age at index pregnancy, gestational age of index pregnancy, parity, booking status and birth interval [11,30,31]. It is a well-documented fact that extremes of age (adolescent and women above 40 years) have been associated with anaemia in pregnancy with many of these studies showing that anaemia is more common in adolescence than adult women [11,30,32,33]. Apart from the maternal age the association between gestational age of pregnancy and anaemia has been widely studied [11,30,32-35]. In normal pregnancy, there is an increase in the total blood volume different from that in the non-pregnant state. This starts by the first and reaches its peak by the second trimester (20 weeks). The haemoglobin concentration remains fairly constant up to 30 weeks and then rises slightly thereafter, although not usually getting to pre- pregnancy or early pregnancy level. These changes lead to an increase in the red cell volume by 18-25% above the non-pregnant state depending on the iron status of the individual and the plasma volume increases by 46-55% [36,37]. Thus it can be seen that there is an unequal plasma/red cell volume expansion leading to haemodilution. [38]. This is also called the physiological anaemia of pregnancy [36-38].. In most of the studies, because of the effect of physiological haemodilution, of pregnancy the relationship of gestational age of pregnancy with development of anaemia shows a U shape curve being highest by the second trimester [39].. However, the requirement for micro-nutrients increases as pregnancy progresses and with inadequate intake will result in anaemia even in the later part of pregnancy this was in accordance with the WHO report in which anaemia is said to be significantly higher in the third trimester of pregnancy [40,41]. In most studies carried out in Nigeria, it was evident that anaemia is more common in the second trimester [42,43]. Parity have also been associated with maternal anaemia with studies reporting increased incidence of anaemia in primigravidae than grand-multiparity [11,30]. In developed countries with universal access to ante-natal care and skilled attendant at delivery, high parity is no longer considered a risk marker for pregnancy complication [40,44]. However, women, especially those in the low socioeconomic group, who embark on successive pregnancies at too frequent intervals, have been found to develop anaemia in pregnancy [44,45]. This is because Pregnancy and childbirth usually deplete iron and folic acid stores and a woman needs time after delivery to replenish stores of these micronutrients [45,46].

Reduction of maternal mortality is a priority under goal three of the sustainable development goals (SDG) which is "ensure healthy lives and promote well-being for all at all ages." In 2015, the World Health Organization published a direction-setting report outlining global targets and strategies for reducing maternal mortality under the SDG. The national target is for countries to have their maternal mortality ratio reduced by at least two-thirds by 2030 from their 2010 baseline [47]. Anaemia having been shown to be one of the causes of maternal mortality can be prevented by simple cost effective interventions [2]. The knowledge of the different causes of maternal anaemia and their relative importance should form the basis for intervention and strategies to control anaemia [1,18]. Few studies have been carried out in the area of current study on the factors associated with anaemia in pregnancy and most of them were done at the level of tertiary and secondary health institution. No studies have been done at the primary care level on anaemia and on obstetric factors that lead to it in pregnancy in the area of current study. The present study therefore, is carried out to determine the association between some obstetrics factor and anaemia in pregnancy in a Primary health care centre in Port Harcourt, Rivers state.

2. Methodology

2.1. Study design

This is a cross-sectional; hospital- based study.

2.2. Study area

The primary health centre is located within the premises of the Rivers State College of Health Science and Technology, KM 6 Ikwerre road Rumueme, Port Harcourt Nigeria. Port Harcourt is the capital of Rivers State. It is located in the South-South geopolitical zone of Nigeria along the Bonny River. [48].

2.3. Sample collection

Pregnant women attending ante-natal clinics in the primary health care centre were enrolled in the study at the time of booking. Only subjects who gave their consent and booking for the index pregnancy were admitted into the study. Two hundred and twenty-seven pregnant women were selected by simple random sampling using a computer-aided table of random numbers. Questionnaires were administered to the pregnant women to obtain their demographic and obstetrics history. Blood samples were taken from the women for haemoglobin estimation. This was done using a portable hemoCue machine.

2.4. Ethical consideration

Approval for this study was obtained from the Ethical Committee of College of Health Sciences and Technology, Port Harcourt before the commencement.

2.5. Data analysis

Responses to questionnaires and levels of haemoglobin were coded and entered into a data base using SPSS version 23 for analysis and graphs were drawn using Excel software. Means were compared using z-test. The association between anaemia and obstetric factors were compared using chi-Square test and statistical significance was set at $P<0.05$.

3. Result

3.1. Age distribution of the respondents

Two hundred and twenty-seven pregnant women were involved in the study. The ages of the respondents ranges from 16 – 40 years with a mean age of 26.8 ± 4.3. Most of the women that booked for ante-natal care were between the ages of 26 – 30 years (42.3%).

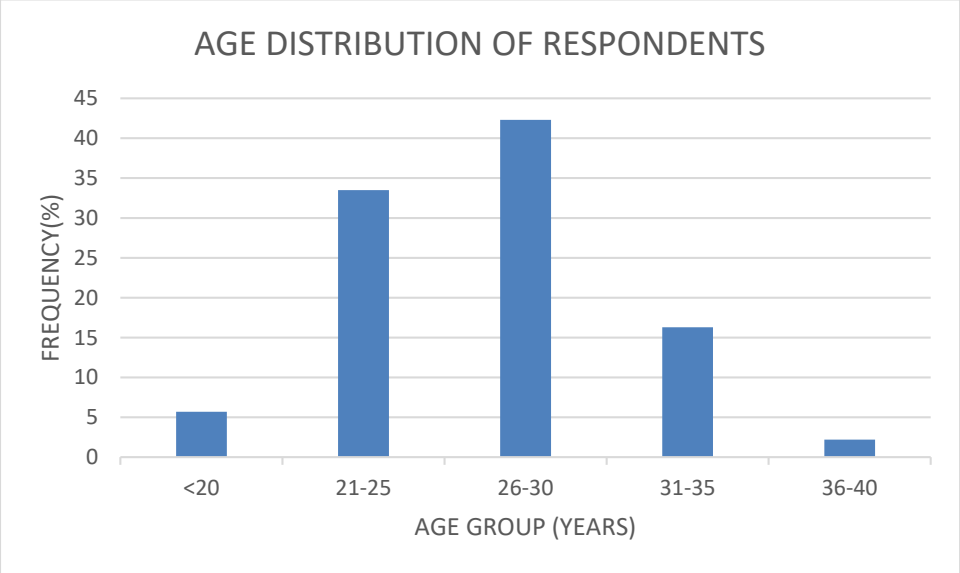

Figure 1 Age distribution of respondent

3.2. Obstetric history of respondents

Majority of the pregnant women in the hospital booked for ante-natal care in the second trimester. Half of the pregnant women that booked for ante-natal in the centre were primigravidae. A birth interval of 1 - 2 years was predominant among the respondents and Birth interval of less than one year was not very common.

Table 1 Obstetric history of respondents.

Characteristic	Number	Percentage (%)
Gestational age of Respondents		
First trimester	37	16.4
Second trimester	135	59.3
Third trimester	55	24.3
Parity		
Primigravidae	111	48.9
Multigravidae	116	51.1
Birth interval		
<1year	6	5.2
1-2years	79	68.1
3-4years	17	14.7
>4years	14	12.0

3.3. Association between obstetric factors and anaemia in pregnancy

Anaemia was found to be predominant in women who booked for ante-natal in the third trimester than the other trimesters. However, the association between gestational age at booking and anaemia in pregnancy was not statistically significant. (X^2 = 2.42, p = 0.30). In the current study, anaemia in pregnancy was found to be more predominant in primigravidae than in multigravidae. Anaemia was observed to be more common in women with birth interval of less than 1year and more than 4years. The association between birth interval and anaemia in pregnancy was not statistically significant (X^2 =3.386, p = 0.336).

Table 2 Association between obstetric factors and anaemia in pregnancy.

Character	Number (%) anaemic	Number (%) not anaemic	X^2	P-value
Gestational Age				
First trimester	21 (56.8)	16 (43.2)		
second trimester	81 (60.4)	53 (39.6)	2.417	0.299
third trimester	39 (70.9)	16 (29.1)		
Parity*				
Primigravidae	73 (65.8)	38 (34.2)	1.23	0.267
multigravidae	68(58.6)	48(41.4)		
Birth interval:				
< 1 year	4 (66.7)	2 (33.3)		
1-2 years	46 (58.)	33 (41.8)	3.386	0.336
3-4years	8 (47.1)	9 (52.9)		
>4 years	11 (78.6)	3 (21.4)		

Odds ratio for parity is 1.35; 95% CI = 0.791- 2.324

4. Discussion

Majority of the pregnant women in this study booked for ante-natal care in the second trimester [49]. This is similar to reports from studies in this country and other developing nations in which it was found that the mean gestational age at booking in Africa is from 20-28 weeks [11,49,50]. Although, pregnancy is a short time to correct maternal anaemia adequately especially if patients book late however, Ante-natal care has been shown to reduce the incidence of anaemia in pregnancy when education on nutrition, social and behavioral services is provided along with medical care [41]. On the other hand, early booking by pregnant women will provide a time interval adequate enough to allow the full benefits of ante-natal care to manifest [11,30].

The late booking for ante-natal care might be connected with the high prevalence of anaemia recorded in the developing nations. This was also the case with the current study with the prevalence of anaemia high among women that booked in the third trimester [70.9%]., followed by those that booked in the second trimester [60.4%]. compared to those that booked in the first trimester [56.8%].. The physiological haemo-dilution that takes place during pregnancy reaches its peak during the second trimester and may account for the increase in anaemia seen at this time in pregnancy. Also the increased demand for micro-nutrient in pregnancy increases as the pregnancy progresses.

The relationship between parity and pregnancy complications continues to be of interest to obstetricians. [11,30,31]. However, studies have reported increased incidence of anaemia in primigravidae than multiparity. [11,30]. this is similar with the findings in this study in which primigravidae were found to be at a higher risk of developing anaemia in pregnancy than multigravidae (Odds ratio for parity is 1.35; 95% CI = 0.791- 2.324). Although, some other researchers found no association between parity and maternal anaemia [42].

Various studies have revealed that the prevalence of anaemia was significantly higher in those women with less than a year interval between pregnancies. [51,52]. Pregnancy and childbirth usually deplete iron and folic acid stores and a woman needs time after delivery to replenish stores of these micronutrients. However, women, especially those in the low socioeconomic group, who embark on successive pregnancies at too frequent intervals, do not give their bodies enough time to do this and this may be responsible for the high prevalence of anaemia found among them. [51,52]. The current study however, did not find any significant association between anaemia and birth interval, although anaemia was high in women that had more than 4years and less than 1year.

5. Conclusion

This study has shown that majority of the pregnant women booked for ante-natal care in the second trimester and the risk of developing anaemia was higher among the primigravidae, women with less than a year interval between pregnancies and those at the third trimester. Anaemia in pregnancy can be successfully eradicated especially in developing countries if women are encouraged and made aware of the need to book for antenatal early and proper child spacing by utilizing the family planning methods. Also, emphasis needs to be placed on pre-pregnancy programmes which will gear towards educating women on healthy life style which also includes healthy eating that can lead to increase maternal iron stores. Women empowerment is very important, so that the women on their own can take care of their health and basic nutritional needs.

Compliance with ethical standards

Acknowledgments

We wish to thank the management and staff of the Primary Health Centre of the Rivers State College of Health Science and Technology, Rumueme, Port Harcourt Nigeria for approving the commencement of this study.

Disclosure of conflict of interest

There are no conflicts of interest.

Statement of informed consent

The details of the study were thoroughly explained to all women booking for ante-natal care during the health talk session at the beginning of the clinic. Informed written consent of the respondents was obtained before involving them in the study.

References

[1] Öztürk M, Öztürk Ö, Ulubay M, Karaşahin E, Özgürtaş T, Yenen M, et al. Anemia prevalence at the time of pregnancy detection. Turkish J Obstet Gynecol. 2017; 14(3): 176–80.

[2] Maternal Health in Nigeria: Facts and Figures [Internet].. [cited 2019 Apr 15]..

[3] World Health Organisation Eastern Mediterranean Regional Office. Anaemia. Health topics [Internet].. [cited 2018 Sep 5]..

[4] Agarwal K, Chaudhary V, Agrawal VK, Agarwal A, Kumar R, Sharma M. Prevalence and determinants of anemia in pregnancy at private hospital of Bareilly district. NJIRM. 2011; 2(4): 29-32.

[5] World Health Organisation. WHO recommendation on the method of diagnosing anaemia in pregnancy. World Heal Organ. 2018.

[6] Haider B, Olofin I, Wang M, Spiegelman D, Ezzati M, Fawzi W. Anaemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. BMJ. 2013; 346-367.

[7] Kalaivani K. Prevalence & consequences of anaemia in pregnancy. Indian Journal of Medical Research. 2009; 130: 627–33.

[8] O'Dwyer SL, Gupta M, Anthony J. Pulmonary edema in pregnancy and the puerperium: a cohort study of 53 cases. J Perinat Med. 2015; 43(6): 375-381.

[9] Ahmad MO. Effect of maternal anaemia on APGAR score of newborn. Journal of Rawalpindi Medical College (JRMC). 2015;19(3): 239-43.

[10] World Health Organisation. Anaemia prevention and control. World Heal Organ [Internet].. 2011.

[11] Olatunbosun O, Abasiattai A, Bassey E, James R, Ibanga G, Morgan A. Prevalence of anaemia among pregnant women at booking in the university of Uyo teaching hospital, Uyo, Nigeria. Biomed Res Int. 2014;1–8.

[12] Nnamdi Mojekwu, Uche Ibekwe J. Maternal mortality in Nigeria:examination of intervention methods.International Journal of Humanities and Social Science. 2012; 2(20): 135-139.

[13] Okoh DA, Iyalla C, Omunakwe H, Iwo-Amah RS, Nwabuko C. A retrospective study of the prevalence of anaemia in pregnancy at booking in Niger Delta, Nigeria. J Obstet Gynaecol. 2016; 36(5): 594–7.

[14] Owolabi M, Owolabi A, OlaOlorun D. Sociodemographic factors in anaemia in pregnancy in south-western Nigeria. South African Fam Pract. 2012; 54(3): 222–7.

[15] Sageer R, Kongnyuy E, Adebimpe W, Ogunsola E, Sanni B. Causes and contributory factors of maternal mortality:evidence of maternal and perinatal death surveillance and response in Ogun state, Southwest Nigeria. BMC pregnancy and childbirth. 2019; 19(1): 63-70.

[16] Usman N, Abdullahi H, Nmadu A, Omole V, Ango J. Estimation of maternal mortality by sisterhood method in two rural communities in Kaduna state, Nigeria. J Med Tropics. 2019; 21(2): 62-66.

[17] Sharma JB, Shankar M. Anemia in Pregnancy. JIMSA. 2010; 23(4): 253-260.

[18] Srilatha J. Prevalence of anemia in pregnant mothers and their outcome: a study in a semi urban area. Int J Reprod Contraception, Obstet Gynecol. 2017; 6(11): 4886-4887.

[19] Ndukwu GU, Dienye PO. Prevalence and socio-demographic factors associated with anaemia in pregnancy in a primary health centre in Rivers State, Nigeria. African J Prim Health Care Fam Med. 2012; 4(1): 328-334.

[20] Hambali UI, Kodomi GQ, Nelson L, Martins SD, Hambali MU, Kodomi YG, et al. Factors contributing to non-compliance to routine ante-natal hematinics among pregnant women attending ante-natal clinic in University of Maiduguri teaching hospital, Borno,Nigeria. Int J Reprod Contracept Obs Gynecol. 2016; 5(11): 3824–3831.

[21] Longo DL, Camaschella C. Iron-deficiency anemia. N Engl J Med. 2015; 372(19): 1832–1843.

[22] Osungbade KO, Oladunjoye AO. Anaemia in developing countries: burden and prospects of prevention and control. Anemia. 2012; 3: 116–129.

[23] Tarning J. Treatment of malaria in pregnancy. N Engl J Med. 2016 Mar 10 [cited 2017 Jun 30].; 374(10): 981–982.

[24] Onoh R, Lawani O, Ezeonu P, Nkwo P, Onoh TJ, Ajah L. Predictors of anemia in pregnancy among pregnant women accessing antenatal care in a poor resource setting in south eastern Nigeria. Sahel Med J. 2015;18(4):182.

[25] Federal Ministry of Health. Integrated national guidelines for HIV prevention treatment and care 2016. Federal Ministry of Health, Abuja, Nigeria.

[26] Joob B, Wiwanitkit V. HIV and anemia among pregnant. N Am J Med Sci. 2012; 4(2): 107.

[27] Ezugwu E, Mbah B, Chigbu C, Onah H. Anaemia in pregnancy: a public health problem in Enugu, south-east Nigeria. J Obstet Gynaecol. 2013; 33(5): 451–454.

[28] Anlaakuu P, Anto F. Anaemia in pregnancy and associated factors: a cross sectional study of antenatal antendants at the Sunyani municipal hospital, Ghana. BMC research notes. 2017; 10(1): 402-409.

[29] Kidanto H, Mogren I, Lindmark G, Massawe S, Nystrom L. Risks for preterm delivery and low birth weight are independently increased by severity of maternal anaemia. South African Med J. 2009; 99(2): 98-102.

[30] Gwarzo M, Ugwa E. The pattern of anaemia in northern Nigerian pregnant women. J Med Med Sci. 2013; 4(8): 319–323.

[31] Kavak E, Kavak S. The association between anemia prevalence, maternal age and parity in term pregnancies in our city. Perinat J. 2017; 25(1): 6–10.

[32] Adanikin AI, Awoleke JO. Sociodemographic factors associated with anaemia in pregnancy at booking for antenatal care. J Obstet Gynaecol. 2016; 36(1): 44–47.

[33] Buhari H, Imoru M, Erhabor O. Anaemia in pregnant women of Sokoto residents in north western Nigeria. J Blood Disord Transfus. 2016; 7(5): 1–4.

[34] Sholeye OO, Animasahun VJ, Shorunmu TO. Anemia in pregnancy and its associated factors among primary care clients in Sagamu, southwest, Nigeria: a facility-based study. J Fam Med Prim care. 2017; 6: 323-329.

[35] Zama I, Argungu IB, Yakubu A, Taylor JR, Erhabor O, Suzette U. Socio-demographic and obstetric factors associated with anaemia among pregnant women in Sokoto. Health Sciences Research. 2014; 1(5): 119-126.

[36] Chan M. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. World Heal Organ. 2011; 1–6.

[37] Sanghavi M, Rutherford J. Cardiovascular physiology of pregnancy. Circulation. 2014; 130(1): 1003-1008.

[38] Gebreweld A, Tsegaye A. Prevalence and factors associated with anaemia among pregnant women attending antenatal clinic at St. Paul's Hospital Millennium medical college, Addis Ababa, Ethiopia. 2018; 1: 1-9.

[39] Randall D, Patterson J, Gallimore F, Morris J, McGee T, Ford J, et al. The association between haemoglobin levels in the first 20 weeks of pregnancy and pregnancy outcomes. PLoS ONE. 2019; 14(11):1-12.

[40] Esike C, Anozie O, Onoh R, Sunday U, Nwokpor O, Umeora O. The prevalence of anemia in pregnancy at booking in Abakaliki, Nigeria. Trop J Obstet Gynaecol. 2016; 33(3): 332-336.

[41] WHO. Recommendations on antenatal care for a positive pregnancy experience. [cited 2018 Sep 2]..

[42] Alene K, Dohe A. Prevalence of anaemia and associated factors among pregnant women in an urban area of western Ethiopia. Anaemia. 2014; 1: 1-7.

[43] Afolabi B, Olukosi A. Malaria and anaemia among pregnant women living in communities along the coast of Lagos Lagoon, South-West Nigeria. 2018; 4(6):175-182.

[44] Nwizu E, Iliyasu Z, Ibrahim S, Galadanci H. Socio-demographic and maternal factors in anaemia in pregnancy at booking in Kano, northern Nigeria. Afr J Reprod Health. 2011; 15(4): 33–41.

[45] Wendt A, Gibbs CM, Peters S, Hogue CJ. Impact of increasing inter-pregnancy interval on maternal and infant health. Paediatr Perinat Epidemiol. 2012; 26(1): 239–258.

[46] Accrombessi M, Massougbodji A, Koura G, Ouédraogo S, Bodeau-Livinec F, Cot M. Maternal anemia at first antenatal visit: prevalence and risk factors in a malaria-endemic area in Benin. Am J Trop Med Hyg. 2012; 87(3): 418–424.

[47] Jolivet R, Moran A, O'Connor M, Chou D, Bhardwaj N, Newby H et al. Ending preventable maternal mortality:phase II of a multi-step processto develop a monitoring framework, 2016-2030. BMC Preg and Childbirth. 2018; 18(1): 258-271.

[48] NDHS. Nigerian Demographic and Health Survey 2013. Niger Demogr Heal Surv 2013. Natl Popul Comm Fed Repub Niger [internet].. 2014; 1-400.

[49] Okunade K, Adegbesan-Omilabu M. Anaemia among pregnant women at the booking clinic of a teaching hospital in south-western Nigeria. Int J Med Biomed R. 2014; 3(2):114-120.

[50] Warri D, George A. Perception of pregnant women of reasons for late initiation of antenatal care. BMC Preg and Childbirth. 2020; 20(1): 70-81.

[51] Bekele A, Tilahun M, Mekuria A. Prevalence of anaemia and its associated factorsamong pregnant women attending antenatal care in health institutions of Arba Minch Town, Gamo Gofa zone, Ethiopia : a cross sectional study. Anaemia. 2016; 1:1-9.

[52] Ajepe A, Okunade K, Sekumade A, Daramola E, Beke M, Ijasan O, et al. Prevalence of foetomaternal effects of iron deficiency anaemia among pregnant women in Lagos, Nigeria. PLoS ONE. 2020;15(1): 1-13.