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Prevalence of Anemia Among Pregnant Women Availing Antenatal Care at Brack General Hospital

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Abstract This study aimed to determine the prevalence of anaemia in pregnant women of various age groups and at different gestation periods visiting antenatal clinic at Brack General Hospital. The ages of recruited participants ranged from 15 to 48 years with a mean age of 28.54 ± 4.3 years. Total of 213 blood samples was collected from the visitors to the antenatal clinic, and the age and stages of each pregnancy of each participant were recorded. Hemoglobin estimation was done using a HemoCueR B-Hemoglobin system and positive anemia cases were classified as mild, moderate, severe and very severe based on the world health organization criteria. The hemoglobin concentrations ranged from 6.5 - 15.5 g/dl with a mean of 10.2± 1.3g/dl. Collected data were analyzed using the Chi-square test and Odds ratio. Out of all blood samples analyzed, 62 cases were anaemic of which 62.9% were mildly anaemic, whereas 37.1% were moderately anaemic and no severe anaemic cases were detected. Anemia was more prevalent (30.30% - 36.70%) in second and third trimesters of pregnancy. Anemia levels reported are low but persistent and present a potentially serious public health problem to mothers, foetal growth and delivery outcome. We recommend health authorities to initiate free iron supplementation and enlist services of extension nutritionists in an integrated programme for the prevention and management of pregnancy related anemia.
Keywords: Anemia, Case of anemia, Prevalence Pregnant Women, Hemoglobin Trimester of pregnancy, Antenatal Care.

نسبة انتشار حالات فقر الدم بين النساء الحوامل المترددات على مستشفى براك العام

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الملخص هدف هذه الدراسة هو تحديد مدى انتشار فقر الدم بين النساء الحوامل المترددات على عيادة النساء والولادة بمستشفى براك العام وذلك خلال فترات الحمل المختلفة، تراوحت أعمار النساء بين 15 إلى 48 سنة بمتوسط عمر 28.54 بانحراف معياري ± 4.3 سنة. جُمعت 213 عينة دم من النساء الحوامل في مراحل الحمل الثلاث وسُجلت بيانات: العمر ومراحل الحمل. وأجري تقدير الهيموغلوبين باستخدام جهاز HemoCueR B-Hemoglobin، ثم صُنفت حالات فقر الدم إلى: خفيفة، معتدلة، شديدة وشديدة جدًا بناءً على معايير منظمة الصحة العالمية.تباينت تراكيز الهيموغلوبين من 6.5 جم /ديسيلتر – 15.5جم / ديسيلتر بمتوسط 10.2 ± 1.3 جم / ديسيلتر وتم تحليل البيانات إحصائياً باستخدام اختبار Chi-square ونسبة الأرجحية. حيث سجلت 62 حالة (29.11٪) تعاني من فقر الدم، صنفت منها n = 39 (62.9٪) حالة ضمن فقر الدم الخفيف، بينما عانت n = 23 (37.1٪) حالة من فقر دم متوسط أو معتدل الشدة. ولم يتم تسجيل أي حالة تعاني من فقر دم شديد، ووجد ان فقر الدم أكثر انتشارا (30.30 ٪ – 36.70 ٪) في الثلث الثاني والثالث من الحمل. إن نسبة فقر الدم المسجلة فى هذه الدراسة إلى حد ما منخفضة ولكنها تمثل خطرا كمشكلة صحية تعاني منها الأمهات ومواليدهن، ولهذا يجب على السلطات الصحية وضع خطط وبرنامج متكامل لتوفير الأدوية الوقاية من فقر الدم واتخاذ التدابير الصحية للتعامل مع فقر الدم في النساء الحوامل.
الكلمات المفتاحية: النساء الحوامل، الهيموجلوبين، انتشار المرض، ثلث الحمل، حالات فقر الدم، رعاية ما قبل الولادة، فقرالدم.

Introduction:

Anemia is a global public health problem affecting over 1.62 billion people, 80% of them are pregnant women [1], [5] It affects all age groups of people but pregnant women and children are more vulnerable. Iron deficiency is the leading cause of anemia among pregnant women globally [2]. Less often, it is caused by folic acid deficiency, [3-5]. Other causes of anemia in pregnancy are heavy blood loss as may occur during menstruation and parasitic infections, conditions such as malaria and HIV which lower blood haemoglobin (Hb) concentrations, and micronutrient deficiencies [6]. Low intake and poor absorption of iron especially during growth and pregnancy when iron requirements are higher remaining risk factors for anemia [7]. Severe maternal anemia increases the

risk of reproduction-related mortality at delivery and during the perinatal period [8]. The World Health Organization (WHO) defines anemia in pregnant women as Hb concentration less than 11.0 g/dl [9]. Anemia is diagnosed by estimating the hemoglobin concentration and examining a peripheral blood smear for the characteristic red blood cell changes [5]. Iron and folate supplementation is indicated during pregnancy to prevent complications [10].

According to the recent standard laid down by (WHO), anemia is present when the Hemoglobin (Hb) concentration in the peripheral blood is less than 11 gm/dl [5], [9]. Anemia is regarded as a major risk factor for an unfavourable outcome of pregnancy, with an increased risk of a number of adverse birth outcomes including preterm birth (PTB), low birth weight (LBW), maternal and perinatal mortality and low neonatal iron stores at birth [4], [11-12]. Also, it can affect the ability of women to cope with the stresses of pregnancy and decreases her resistance to infection [13-15]. Anemia in pregnancy is considered as one of the major risk factors for contributing to 20-40% of maternal deaths directly or indirectly through cardiac failure, preeclampsia, antepartum haemorrhage, postpartum haemorrhage and puerperal sepsis [4].

The prevalence of anemia during pregnancy shows considerable variations in different parts of the world. A study from a remote area of Hyderabad Pakistan shows that 63.15% of pregnant women have a Hb of less than 11 g/dl [16], whereas between 9 - 18% of pregnant women are anemic in developed countries [6], [17]. In the Arab Gulf countries, maternal anemia, especially iron-deficiency anemia has been considered as one of the most important health problems with a prevalence ranging from 22.6% to 54.0%, [18], [19], whereas, (WHO) estimates that more than 40% of non-pregnant women and over 50% of pregnant women in developing countries are affected. The majority of the cases occur in sub-Saharan Africa and South-East Asia [20]. In pregnant women, anemia has negative consequences on the cognitive and physical development of children [21], and on work productivity [22], [23]. Severe anemia is associated with fatigue, weakness, breathlessness, dizziness, drowsiness and perceived paleness of the skin [24].

The WHO further divides anemia in pregnancy into three stages: mild anemia (haemoglobin 10-10.9g/dl), moderate anemia (Hb 7.0- 9.9g/dl) and severe anemia (Hb < 7g/dl) [25]. It has recommended a cut off value of 11.0 g/dl hemoglobin to define anemia at any time during pregnancy. Many authors advocated the use of specific–trimester cut-off points for anemia and intensified research for anemia has been encouraged [9].

This study aimed to assess the prevalence of anemia among pregnant women (during 3 trimesters of pregnancy) who attended the government antenatal care services at Brack Central Hospital. The results of this study will help to motivate antenatal care providers towards early detection and management of anemia in pregnancy and to provide data that can be used to design interventions to lower the incidence of anemia in pregnancy.

Subjects and Methods:

This study was conducted in 2018 at Brack General Hospital and included two hundred and thirteen (213) carried out on the pregnant women who attended the antenatal care at the hospital and independent of their stage of pregnancy. Among them, 31.92% in their 1st trimester, 30.98% in the 2nd trimester, and 37.08% in the 3rd trimesters, with the age group of 15 – 48 years is the reproductive years or the childbearing age. The mean age is 28.54 (± 4.3) years old. Complete Blood Count and red cell indices where obtained on venous blood samples from each subject and carried out for hemoglobin concentration using the electronic cell counters and chemical analyser, the BC-3000 plus Auto Hematology Analyser. The values obtained after the examination were tabulated and compared between trimesters with the standard values of WHO recommendation.

For the purpose of this study, the (WHO, 2008) standard (Hb <11g/dl, RBC <4.4 1012/l, MCV <86 fl) was used to determine anemia status in pregnancy based on hemoglobin levels.

The mean, frequency, and percentile distribution had calculated using the Stata program software for Windows to analyse the collected data.

Results:

Table (1) shows that the average Hb concentration for pregnant women in the first trimester ranged from 6.2- 15.2g/dl, with an average of 12.26 g/dl, and the RBC count ranged from 3.42 -5.23 x 1012/l with an average of 4.21 x 1012/l, and the MCV varied from 53.1 – 95.3 fl with an average of 76.99 fl.

Table 1. the average haemoglobin concentration for pregnant women in the first trimester

First Trimester Hematologic Results (N= 68)	Average	Range
Hb Concentration	12.26 g/dl	6.2- 15.2g/dl
RBC Count	4.21 x 10^{12}/l	3.42 -5.23 x 10^{12}/l
MCV	76.99 fl	53.1 – 95.3 fl.

This further proved that among 68 pregnant women in their first trimester, 13 was found to have anemia.

Table 2. the average haemoglobin concentration for pregnant women in the second trimester

Second Trimester Hematologic Results (N= 66)	Average	Range
Hb Concentration	11.41g/dl	5.4 – 14.5g/dl

RBC Count	3.70 x 10^{12}/l	2.5 – 4.7 x 10^{12}/l
MCV	83.16 fl	52.8- 94.3 fl

The result of the second trimester of pregnancy (table-2) was found to have an average hemoglobin concentration of 11.41g/dl and ranged 5.4 – 14.5g/dl), the RBC count was 3.70 x 10^{12}/l ranging from 2.5 – 4.7 x 10^{12}/l), and the MCV ranged from 52.8 to 94.3 fl with an average of 83.16 fl.
It is concerning to note that out of 66 samples who are in this stage of pregnancy, 20 are confirmed to be anemic.

Table 3. the average haemoglobin concentration for pregnant women in the third trimester

Third Trimester Hematologic Results (N=79)	Average	Range
Hb Concentration	11.41g/dl	9 – 13.2g/dl
RBC Count	3.79 x 10^{12}/l	2.95 – 4.62 x 10^{12}/l
MCV	81.83 fl	34.5 -97.2fl

The mean hemoglobin concentration for pregnant women in the third trimester, as shown in Table-3 was 11.41 g/dL with a range of 9 - 13.2 g/dL, the average RBC count was 3.79 x 10^{12}/l ranged from 2.95 – 4.62 x 10^{12}/l), and the average MCV was 81.83 fl the range was 34.5 -97.2fl.
Among the 79 samples of women in the third trimester of pregnancy, 29 of those are found to be anemic.
The prevalence of anemia among the study sample was (29.11%). The highest rate of anemia was in the third trimester of pregnancy (13.6%), followed by (9.3% - 6.1%) in the second and first trimester of pregnancy, respectively.

Table 4. Prevalence of anemia in each trimester

Stages of Pregnancy	Number of Pregnant Women	Anemic (cases)	Prevalence (%)	Non-anemic
1st trimester	68	13 (6.1%)	19%	55
2nd trimester	66	20 (9.3%)	30.30%	46
3rd trimester	79	29 (13.6%)	36.70%	50
Total	213	62 (29.11 %		151

Discussion:
The overall prevalence of anemia (Table 4) among the 213 pregnant women in this study population using a cut-off level of Hb less than 11 g/dl is 62 cases out of 213 samples, representing 29.11%. According to each trimester classified, the prevalence of anemia is 19%, 30.30%, and 36.70% in the first, second, and third trimesters, respectively.
The data reveals that the highest prevalence of anemia was in the 3rd trimester. The relationship between Hb and gestational age was generally attributed to physiological hemodilution. The risk of anemia will appear to be higher when dilution is at its maximum (seven to eight months). Prevalence of anemia among pregnant women in Libya had reported at 28% [26]. In this study, the prevalence rate of 29.11% of anemia among pregnant women is lower than that reported in other studies. In a recent study conducted in Derna city, Libya, the prevalence of anemia (Hb<11.0g/dl) among pregnant was 54.6% which was higher than the prevalence reported by WHO [27]. The anemia of prevalence during pregnancy in Port Blair, Andaman, and the Nicobar Islands had recorded at 55.9%, anemia severity was classified into mild, moderate, and severe with the percentage of 24.8%, 24.8%, and 1.3%, respectively [28], while in the Rufiji district of Tanzania was about 69% [29], however, in Saudi Arabia recorded 41.3% in Al-Khobar [18] and 20.4% in Riyadh [30]. The results show that the MCV and RBC values varied in the three trimesters and ranged from 76.99 to 83.16 fl., 3.70x1012 – 4.21x1012/L, respectively, indicating the MCV and RBC results were within the allowable limit of the WHO. This study is compatible with the results [31, 32].

Conclusions and Recommendations:
The result of the study showed an alarming number of anemias among pregnant women and poses as a major challenge to antenatal care givers. The 29.11 % prevalence rate of anemia gives a clear conclusion that there is an increase need for education among pregnant mothers as well as the antenatal caregivers and specialized program must be designed specifically to alleviate the number of anemia cases among pregnant women.
More research on anemia in pregnancy needs to be conducted and documented as there is a lack of published data on this problem. Further research needs to be done to assess the ongoing factors that contribute to anemia in pregnancy, specifically, a closer look at the associated factors and underlying causes of anemia among pregnant women is necessary to develop a true understanding of the condition. Increased documentation of research can help to determine what kinds of interventions would be effective among pregnant women.

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