



## **THE FACTORS CONTRIBUTED TO PRESENCE OF ANAEMIA AMONG THE PREGNANT WOMEN IN EL-OBIED CITY-NORTH KORDOFAN STATE-SUDAN**

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### **ABSTRACT**

**Background:** This study was conducted at the Obstetrics and Gynecology Hospital in Elobied City - North Kordofan State, West of Sudan, in the period from December 2017 to December 2019, to detect the presence of anaemia and the factors contributed to its presence among the pregnant women.

**Methods:** Systematic random sampling method was used to select 384 pregnant women. Data were collected by questionnaire and a blood samples were taken from all women chosen and analyzed by Mindray haematology analyzer to measure the hemoglobin level to detect the presence of anaemia. The data of questionnaire were analyzed by SPSS. The results presented in tables and figures showing to the percentages. The Chi-square test (McNemar's test) was used to find the relation between the presence of anaemia and some variables.

**Results:** It found that 23.4% of the pregnant women had marked anaemia, 51.6% of them had early anaemia. Also 44% of the pregnant women were affected by malaria during pregnancy period. Most pregnant women (93.2%) were exposed to mosquitoes bite. The majority of the pregnant women (98.96%) have insufficient monthly income (few and middle).

**Conclusion:** the study concluded to that most pregnant women (75%) were have anemia (marked and early anemia). The factors that contributed to the presence of anaemia among the pregnant women are: The insufficient monthly income (few and middle) contributed with 74.22% , The exposure to mosquitoes bite (70.3%), Lack of knowledge of pregnant women about anemia (45.3%) and the affecting by malaria during pregnancy period (32.3%).

**KEY WORDS:** Anaemia, Pregnant, Women, El-Obied , Sudan



## INTRODUCTION

Anaemia, defined as a decreased concentration of blood hemoglobin, is one of the most common nutritional deficiency diseases observed globally and affects more than a quarter of the world's population [1]. Anaemia is a major cause of morbidity and mortality of pregnant women and increases the risks of foetal, neonatal and infant mortality [2]. Anaemia during pregnancy contributes to 20% of all maternal deaths [3]. Iron deficiency is the cause of 75% of anaemia cases during pregnancy [4,5]. Even though there may be many causes of anaemia, dietary iron deficiency is usually either the main or a major contributing factor. Other significant nutritional deficiencies (e.g. low intakes of folic acid and vitamins A, B<sub>12</sub>, and C) and infectious diseases (e.g. malaria and hookworm) may also contribute to anaemia (6). Several other possible causes should be noted. These include haemolysis occurring with malaria; glucose-6-phosphate dehydrogenase deficiency; congenital hereditary defects in haemoglobin synthesis; and deficits in other nutrients, e.g. vitamins A, B<sub>12</sub>, and C, and folic acid. Blood loss such as that associated with schistosomiasis, hookworm infestation, can also result in both iron deficiency and anaemia (6). Iron deficiency is most common among groups of low socioeconomic status. The prevalence of iron deficiency varies greatly according to host factors: age, gender, physiological, pathological, environmental, and socioeconomic conditions (6). Poor socio-economic status and low family income may have also contributed to high prevalence of anemia in the study location. The prevalence was higher in poorly educated women, women with large family size, and those who had poor income. Women's employment has the potential to benefit household nutrition through increased household income. Large family sizes and increased number of children as seen in this study affected the food available to the family. With more people sharing limited quantity of food, the portion size available to each member of the family will definitely be reduced. When food is not enough, mothers usually gave up their share for their children. These findings strongly raise the issue of the awareness of mothers towards their health (7).

**Objectives:** To detect the presence of anaemia among the pregnant women. To determine the factors contributed to the presence of anemia among the pregnant women.

## METHODOLOGY

**Study type and design:** descriptive- cross sectional study.

**Study Area:** The study was conducted at Obstetrics and Gynecology Hospital in Elobied city, Sudan. The hospital includes the departments of accidents, intensive care, laboratory, pharmacy, and ante natal care clinic (ANC).

**Study population :** All the pregnant women attending ante natal care clinic (ANC) at Obstetrics and Gynecology Hospital in Elobied city during the study period.

**Inclusion criteria :** Mothers who attended antenatal care clinic (ANC) during the period from 15<sup>th</sup> August to 15<sup>th</sup> September, 2019, and who met the choosing criteria (systemic random sample) had chosen.

**Sampling :**

a / **Sample size :** The sample size was determined according to Le [8] by the following formula:

$$n = \frac{z^2 pq}{d^2}$$

**Where:**

n is sample size.

Z is the value of the standard normal variable corresponding to 95% level of significance (z = 1.96).

P is the prevalence of VL (p = 0.5) and (q = 1 - p) since no prior information exist.

d is a marginal error (d = 0.05)

Accordingly, a sample of 384 persons was obtained.

b / **Sample Technique :** The systematic random sample was used.

## DATA COLLECTION METHODS AND TOOLS

In this study a structured pre-coded and close-ended questionnaire was used to collect data. Some health workers were trained to assist in filling the questionnaire. Blood samples were collected in (2.5ml).

### Data analysis

The blood samples were analyzed in the laboratory of the hospital by Mindray haematology analyzer to measure the level of hemoglobin. The cut-off points for the diagnosis of anaemia was according to the hemoglobin level as mentioned by Park (9), where A hemoglobin level of 10 to 11 g/dl has been defined as early anaemia; a level below 10 g/dl as marked anaemia. The data of questionnaire were analyzed by statistical package for social sciences (SPSS). The results were presented in figures and



tables showing the percentages. The relation between some variables and the the presence of anaemia was done according to Al-Qassas (10) and Le (8) by McNemar's test ( Chi- square ( $X^2$ ) test) for the correlative percentages in the table (2x2) by the formula:

$$X^2 = \frac{(B - C)^2}{B + C}$$

**Where:** B and C are cells in the table 2x2 (without the cells of the total) as in the following shape:

A	B
C	D

The value of  $x^2$  obtained from this formula compared with the value of  $x^2$  obtained from the table of  $x^2$ . The result have statistical significance when the calculated value is larger than the tabulated value under significance level (0.05). The null hypothesis is rejected at the 0.05 level when  $X^2 \geq 3.84$ .

### Ethical Considerations

Permissions for the study was obtained prior to collect data, by contacting and receiving the approvals from the competent directors in the

Obstetrics and Gynecology Hospital, also the participants women in the study had assured with that the data needed from them will be in complete confidence, and used only for scientific research purposes.

### RESULTS

As illustrated in table 1, anemia was found in 75% of pregnant women ( 23.4% of them have marked anemia and 51.6% of them have early anemia). Table 2 shows that 93.2% of pregnant women had exposed to mosquitoes bites (70.3% of them were anaemic as in table 3). Table 4 shows that 44% of pregnant women were affecting by malaria during pregnancy period (32.3% of them were anaemic as in table 5). Table 6 shows the monthly income for pregnant women, where 10.42% of them have few income, 88.54% of them have middle income and 1.04% of them have high income (74.22% of non high income [few and middle income] were anaemic as in table 7).

**Table (1): Distribution of pregnant women attending ANC in Elobeid City according to the hemoglobin level - September, 2019**

Hemoglobin Level (g/dl)	Frequency	Percentage	Diagnosis of anaemia
5-9.9 g/dl	90	23.4%	Marked anaemia
10- 11 g/dl	198	51.6%	Early anaemia
<11 g/dl	96	25%	Normal
<b>Total</b>	384	100%	-

**Table (2) :Distribution of pregnant women attending ANC in Elobeid City according to exposure to the**

The exposure to mosquitoes bite	Frequency	Percent
Yes	358	93.2
No	26	6.8
<b>Total</b>	384	100%

**mosquitoes bite - September, 2019**

**Table (3):The relation between the presence of anemia and the exposure to mosquitoes bite among the pregnant women in Elobied city - September, 2019**

The presence of anemia	The exposure to mosquitoes bite		Total
	Yes	No	
<b>Present</b>	270(70.3%)	18(4.7%)	288(75%)
<b>Not present</b>	88(22.9%)	8(2.1%)	96(25%)
<b>Total</b>	358(93.2%)	26(6.8%)	384(100%)

N = 384, McNemar,s test ( $X^2$ ) : calculated = 48 and tabulated = 3.84 , Significant level = 0.05.



**Table (4): Affecting by malaria during pregnancy period among pregnant women attending ANC in Elobeid City - September, 2019**

Affecting by malaria during pregnancy period	Frequency	Percent
Yes	169	44
No	215	56
Total	384	100%

**Table (5) :The relation between the presence of anemia and the affecting by malaria among the pregnant women in Elobied city - September, 2019**

The presence of anemia	Affecting by malaria during pregnancy period		Total
	Yes	No	
<b>Present</b>	124(32.3%)	164(42.7%)	288(75%)
<b>Not present</b>	45(11.7%)	51(13.3%)	96(25%)
Total	169(44%)	215(56%)	384(100%)

N = 384, McNemar's test (  $X^2$  ) : calculated = 17.66 and tabulated = 3.84 , Significant level = 0.05

**Table (6): Distribution of pregnant women attending ANC in Elobeid according to monthly income - September, 2019**

Monthly income	Frequency	Percent
Few	40	10.42
Middle	340	88.54
High	4	1.04
Total	384	100%

**Table (7): The relation between the presence of anemia and the monthly income among the pregnant women in Elobied city - September, 2019**

The presence of anemia	Monthly income		Total
	High	Not high ( Few + Middle)	
<b>Present</b>	3 (0.78%)	285(74.22)	288(75%)
<b>Not present</b>	1(0.26%)	95(24.74%)	96(25%)
Total	4(1.04%)	380(98.96%)	384(100%)

N = 384, McNemar's test (  $X^2$  ) : calculated = 73.44 and tabulated = 3.84, Significant level = 0.05

**Table (8):Distribution of pregnant women attending ANC in Elobeid City according to the knowledge about anemia - September, 2019**

The knowledge about anemia	Frequency	Percent
Yes	151	39.4
No	233	60.7
Total	384	100%

**Table (9): The relation between the presence of anaemia and the knowledge about anemia among the pregnant women in Elobied city – September, 2019**

The presence of anaemia	knowledge about anaemia		Total
	Yes	No	
Present	114(29.7%)	174(45.3%)	288(75%)
Not present	37(9.6%)	59(15.4%)	96(25%)
Total	151(39.3%)	233(60.7%)	384(100%)

N = 384 , **McNemar's test ( X<sup>2</sup> )** : calculated = **23.2** and tabulated = **3.84** . Significant level = **0.05**.

## DISCUSSION

The results of table 2 explained that 93.2 % of the pregnant women had exposed to mosquitoes bite, and the results of table 3 showed that the high percentage (70.3%) of the presence anemia among pregnant women belongs to the exposure to mosquitoes bite, this result explains that there is strong relation between the exposure to mosquitoes bite and presence of anemia among the pregnant women. This is similar to what mentioned by WHO (6): 'Blood loss ... can also result in both iron deficiency and anaemia'. and the exposure to mosquitoes bite contributed to presence of anemia with 70.3%. Statistically, this results were have statistical significance, because the calculated value of X<sup>2</sup> was larger than the tabulated value (48 > 3.84) under the significance level 0.05.

As illustrated in table 4, there is 44% of the pregnant women were affected by malaria during pregnancy period. The results illustrated in table 5 showed that there is a relation between affecting by malaria during pregnancy and the presence of anemia among the pregnant women, where it found that 32.3% of the women affected by malaria during pregnancy period have anemia. This means that the affecting by malaria during pregnancy contributed to the presence of anemia by 32.3%. This agree with what mentioned by Oguizu and Chigbundu (3): "Malarial infection leads to anemia through the destruction of red blood cells by the malaria parasites". Statistically this result were have statistical significance, because the calculated value of **McNemar's test ( X<sup>2</sup> )** was larger than the tabulated value ( 17.66 > 3.84) under the significance level 0.05.

The results of table 6 showed that 1.04% of pregnant women were have high monthly income. The results of table 7 showed that the minimum percentage (0.78%) for the presence of anemia belongs to the high monthly income, while the higher percentage (74.22%) for the presence of anemia belongs to the few and middle monthly income (not high income). This results indicate that there is a relation between the presence of anemia and the monthly income among the pregnant

women, where that the insufficient monthly income( few and middle) contributed to the presence of anemia with 74.22%, and the high monthly income reduced the cases of anemia. This results correspond with what mention by Oguizu and Chigbundu(3): "The prevalence of anaemia was higher in those who had poor income" . Statistically this results were have statistical significance, because the calculated value of McNemar's test ( X<sup>2</sup> ) was larger than the tabulated value (73.44 > 3.84) under the significance level 0.05.

As it demonstrated in table 8, there is 60.7% of the pregnant women have no knowledge about anemia. The results of table 9 showed that the high percentage (45.3%) of the presence of anemia belongs to lack of knowledge about anemia, the minimum percentage (29.7%) of the presence of anemia belongs to the knowledge about anemia. Those results confirm that lack of knowledge about anemia increases the presence of anemia in the pregnant women. Statistically this results were have statistical significance, because the calculated value of X<sup>2</sup> was larger than the tabulated value ( 23.2 > 3.84) under the significance level 0.05, therefore the lack of knowledge about anemia is consider one of the most important factors contributed to anemia in pregnant women in Elobeid City. These results proved that the lack of knowledge about anemia contributes to the presence of anaemia in pregnant women.

## CONCLUSION

Most pregnant women (75%) were have anemia (marked and early anemia). The factors that contributed to the presence of anaemia among the pregnant women are: The insufficient monthly income( few and middle) contributed to the presence of anemia with 74.22%. The exposure to mosquitoes bite contributed to presence of anemia with 70.3%. Lack of knowledge of women about anemia contributed to the presence of anemia with 45.3%. The affecting by malaria during pregnancy contributed to the presence of anemia by 32.3%.



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