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## Prevalence of anaemia in a sample of pregnant women in Babylon Governorate, Iraq

Prevalencia de anemia en una muestra de mujeres embarazadas en la gobernación de Babilonia, Irak

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**ABSTRACT:**

Anemia in Pregnancy considered a significant public health problem. It has an essential role in disabled life and death of pregnant women and their future children, mainly in developing countries. The World Bank Group (WBG) estimates that the prevalence of Anemia among pregnant women in Iraq is nearly 38%, while the World Health Organization (WHO) estimates it approximately 31%. Hence, the primary objective of our study is to investigate the possible prevalence of Anemia among pregnant women in Babylon city by analyzing several primary health centres in this governorate. A cross-sectional descriptive survey runs in several primary health care centers in Babylon. Five centers are selected, two in the center and three in the centers of the peripheries. The sample was selected by a modified systematic sampling technique. Questions attempted to encompass the sociodemographic characteristics of the mother, and the menstrual and obstetrical history and the possible association of these characteristics with the presence of anaemia. The range of Hemoglobin identified between 6.0 to 15.0 with a mean of 10.61 gm/dL. The estimated prevalence of anaemia was 48.6% of the studied sample where mild anaemia appeared in 21.8%, while that of moderate and severe anaemia in 26.0% and 0.8% respectively. The younger age of the mother and good family income are protective factors while loneliness and having a Job are significant risk factors to its occurrence. Also, the occurrence of Anemia was associated significantly with heaviness rather than the regularity of the menstrual cycle with a higher number of pregnancies and/or abortions, irregularity or absence of antenatal care and previous rather than present antepartum hemorrhage. Anemia represents a great challenge to the community health in Iraq and require further governmental efforts to handle it by concentrated health education and promotion of antenatal care.

**KEYWORDS:** Prevalence of Anemia, Pregnant Women, Babylon Governorate.**RESUMEN:**

La anemia en el embarazo se considera un problema importante de salud pública. Tiene un papel importante en la vida y muerte con discapacidad de las mujeres embarazadas y sus futuros hijos, principalmente en los países en desarrollo. El último informe del Banco Mundial estima la prevalencia de anemia entre las mujeres embarazadas en Irak dentro del 38% y el informe de la OMS la estima dentro del 31% con una media de 11,7 g/dl, pero los estudios locales arrojaron tasas más altas, especialmente en las provincias periféricas distintas de la capital. , por lo que el objetivo de nuestro estudio es sacar una imagen sobre la posible prevalencia en Babilonia mediante una muestra de varios centros de atención primaria de salud en esta gobernación. Un estudio descriptivo transversal realizado en varios centros de atención primaria de salud en Babilonia. Se seleccionan cinco centros, dos en el centro y tres en los centros de las periferias. La muestra se seleccionó mediante una técnica de muestreo sistemática modificada. Las preguntas intentaron abarcar las características sociodemográficas de la madre, la historia menstrual y obstétrica y la posible

asociación de estas características con la presencia de anemia. El rango de hemoglobina identificado entre 6,0 y 15,0 con una media de 10,61 g/dL. La prevalencia estimada de anemia fue del 48,6% de la muestra estudiada donde apareció anemia leve en 21,8%, mientras que la anemia moderada y severa en 26,0% y 0,8% respectivamente. La edad más joven de la madre y los buenos ingresos familiares son factores protectores, mientras que la soledad y tener un trabajo son factores de riesgo importantes para su ocurrencia. Además, la aparición de anemia se asoció significativamente con la pesadez en lugar de la regularidad del ciclo menstrual con un mayor número de embarazos y/o abortos, irregularidad o ausencia de atención prenatal y hemorragia anteparto previa en lugar de presente. La anemia representa un gran desafío para la salud de la comunidad en Irak y requiere más esfuerzos gubernamentales para manejarla mediante la educación sanitaria concentrada y la promoción de la atención prenatal.

**PALABRAS CLAVE:** Prevalencia de anemia, mujeres embarazadas, gobernación de Babilonia.

## INTRODUCTION:

Anemia in Pregnancy considered a major public health problem and still has an important role in both mortality and morbidity of pregnant women, mainly in developing countries<sup>1</sup>. According to WHO reports, anemia affect (35-75)% of pregnant women in developing countries opposed by about 18% in developed ones<sup>2,3</sup>. WHO defined Anemia in Pregnancy as a hemoglobin concentration of less 11 gm/dl which could be mild (10.0-10.9 gm/dl), moderate (7.0-9.9 gm/dl) or severe (under 7 gm/dl)<sup>4,5</sup>. In Developing countries, underprivileged citizens often have poor socioeconomic status, excess parity, inadequate spacing, poor alimentation, and high rate of infectious diseases<sup>6</sup>. In addition, that population usually has poor access to medical care and preventive measures increasing their risk of developing Anemia with its subsequent complications<sup>7</sup>. In such countries, the main cause of Anemia during Pregnancy are iron, folic acid, vitamin A and B12 deficiency or parasitic infestation mostly malaria and hookworms or chronic diseases as TB and HIV<sup>8,9</sup>. Iron deficiency anemia account about 40-89% of Anemia among women<sup>10</sup>. Iron deficiency anemia tends to develop when there is inadequate dietary intake of iron, or not sufficiently absorbed, or upon increase body requirements or excessive losses<sup>11</sup>. Anemia in Pregnancy is commonly associated with many consequences as low birth weight, premature delivery in addition to increased risk of maternal mortality and morbidity<sup>12</sup>. Socially, Anemia is also negatively impacted the general health of the women and their ability to work primarily in the reproductive years of life<sup>13</sup>. Furthermore, children of anemic women often born with low iron stores and have a higher risk of developing Anemia during infancy accentuating the risk of mortality and morbidity<sup>14</sup>. WHO classified Anemia as a public health significance when 5% of the population or higher are anemic but when this reaches 40% or higher of the community, the condition is classified as a severe public health problem<sup>15</sup>. The last report of the World Bank estimates the prevalence of Anemia among pregnant women in Iraq within 38%<sup>16</sup> and WHO report estimates it within 31% with Hemoglobin mean of 11.7g/dl<sup>17</sup>. Therefore, this study aims to highlight the prevalence of Anemia in Babylon governorate by exploring a sample from the four territories of this governorate.

## METHODS:

A descriptive cross-sectional study run in several primary health care centers in Babylon. Babylon is an Iraqi governorate around 100 km south of the capital Baghdad. The study was extended from Jan 1 through Apr 30 2019. Five centers are selected, two in the center (Hilla city) and three in the centers of the peripheries (Almahaweel, AlMussaib and Alhashimiah). A predetermined sample size of 350 subjects was set depending on the estimated rate of 35% with a precision degree of 10% and a confidence level of 95%. The sample size was increased up to 500 subjects to involve 125 mothers from each health center. The sample was selected by a modified systematic sampling technique was the first pregnant lady consult the health center for antenatal visits or to vaccinate her older children was encountered and the time of the meeting (about 20 minutes)

was set as a system to involve the immediately next mother. The data was collected by a direct interview with the pregnant women attending the center. The consultation involved a predesigned questionnaire set by the researcher and filled by trained fourth stage medical students. First, they explain the purpose of the study and take permission to start the interview. The first group of questions attempted to encompass the sociodemographic characteristics of the mother while the second group enquired information about the reproductive, the past and present obstetric history. Then the lady was sent for hemoglobin estimation test, which was frequently done for estimation of Anemia, so any pregnant women presented with Hemoglobin level (Hg) less than 11 were considered as anemic. Anemia was classified into mild (if Hg was 10-10.9gm/dL), Moderate (if Hg level was 7-9.9gm/dL), and severe (if Hg level was less than 7gm/dL). Dietary habits were classified into good (if taking an egg, meat and poultry) daily, fair (2-4 times a week), poor (less than twice a week).

**Data Analysis:** SPSS version 21 was used for data entry and analysis, Chi-Square was used to estimate the association between the categorical variables. P-value significance was set at <0.05.

## RESULTS:

Five hundred mothers were involved in this study, with a response rate of about 96%. These were distributed evenly among the five centers. The mean age of these women was 26.88 years ( $\pm 6.42$ ), 8% of them are illiterate, and 13% were employers. Also, 70% of the sample were from urban, and 92% reported medium or good family income. The range of Hemoglobin identified between 6.0 to 15.0 with a mean of 10.61 ( $\pm 1.64$ ) gm/dL. The estimated prevalence of Anemia was 48.6% of the studied sample. The prevalence of mild Anemia was 21.8%, while that of moderate and severe Anemia was 26.0% and 0.8% respectively (presented in Figure 1).

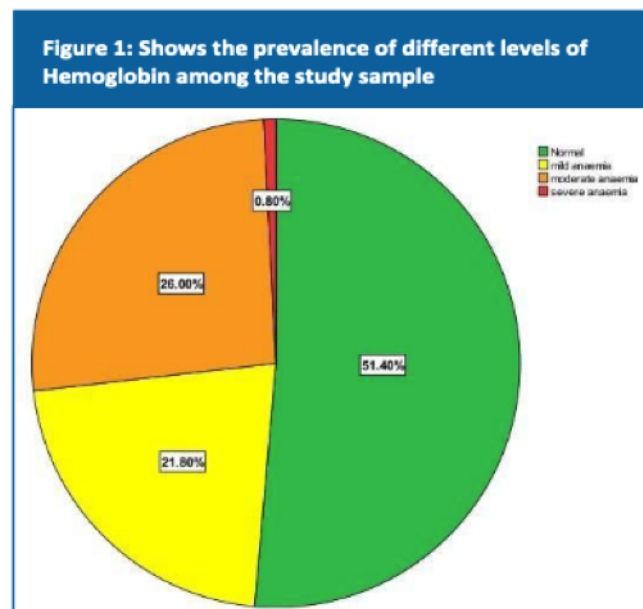


FIGURE 1

Shows the prevalence of different levels of Hemoglobin among the study sample

The prevalence of Anemia seems to be alike, whether in the center or at the peripheries with no significant difference between them as presented in table 1.

Table 1: Distribution of anemia prevalence among the 4 study provinces

TABLE 1  
Distribution of anemia prevalence among the 4 study provinces

| Province    | Mean ( $\pm$ SD)    | Normal      | Mild        | Moderate    | Severe    |
|-------------|---------------------|-------------|-------------|-------------|-----------|
| Total       | 10.61( $\pm$ 1.64)  | 257 (51.4%) | 109 (21.8%) | 130 (26.0%) | 4 (0.8%)  |
| AlHilla     | 10.79 ( $\pm$ 1.52) | 70 (56.0%)  | 29 (23.2%)  | 26 (20.8%)  | 0(0%)     |
| Alhashimiah | 10.66 ( $\pm$ 1.59) | 65 (52.0%)  | 28 (22.4%)  | 32 (25.6%)  | 0 (0%)    |
| Almahaweel  | 10.48 ( $\pm$ 1.64) | 61 (48.8%)  | 28 (22.4%)  | 35 (28.0%)  | 1 (0.08%) |
| Almussaib   | 10.50 ( $\pm$ 1.81) | 61 (48.8%)  | 24 (19.2%)  | 37 (29.6%)  | 3 (2.4%)  |

The sociodemographic characteristics of the study sample and their association with the development of Anemia are presented in table 2; shows that the younger age of the mother and good family income are protective factors against Anemia while loneliness and having a Job are significant risk factors to its occurrence.

TABLE (2):  
The association between different sociodemographic characteristics and the occurrence of Anemia

| Characteristic     | Group                           | No. (%) | Anemia      | Normal      | P value |
|--------------------|---------------------------------|---------|-------------|-------------|---------|
| Age                | <18 years                       | No. (%) | 9 (25.7%)   | 26 (74.3%)  | 0.012   |
|                    | 18-34.9                         | No. (%) | 196 (49.4%) | 201 (50.6%) |         |
|                    | >35 years                       | No. (%) | 38 (55.9%)  | 30 (44.1%)  |         |
| Residence          | Rural                           | No. (%) | 66 (44.9%)  | 81 (55.1%)  | 0.285   |
|                    | Urban                           | No. (%) | 177 (50.1%) | 176 (49.9%) |         |
| Education          | Illiterate or primary education | No. (%) | 89 (45.2%)  | 108 (54.8%) | 0.217   |
|                    | Secondary or high education     | No. (%) | 149 (49.2%) | 154 (50.8%) |         |
| Family Income      | Poor                            | No. (%) | 25 (59.5%)  | 17 (40.5%)  | 0.004   |
|                    | Medium                          | No. (%) | 141 (53.6%) | 122 (46.4%) |         |
|                    | Good                            | No. (%) | 77 (39.5%)  | 118 (60.5%) |         |
| social status      | Married                         | No. (%) | 227 (46.9%) | 257 (53.1%) | 0.0001  |
|                    | Widow or divorced               | No. (%) | 16 (100.0%) | 0 (0%)      |         |
| Occupation         | Employer                        | No. (%) | 46 (70.8%)  | 19 (29.2%)  | 0.0001  |
|                    | housewife                       | No. (%) | 197 (45.3%) | 238 (54.7%) |         |
| Use of tonics      | yes                             | No. (%) | 163 (51.1%) | 156 (48.9%) | 0.138   |
|                    | no                              | No. (%) | 80 (44.2%)  | 101 (55.8%) |         |
| Morning sickness   | yes                             | No. (%) | 126 (43.8%) | 162 (56.3%) | 0.01    |
|                    | no                              | No. (%) | 117 (55.2%) | 95 (44.8%)  |         |
| Diet of the mother | BAD                             | No. (%) | 26 (100.0%) | 0 (0%)      | 0.0001  |
|                    | Mod.                            | No. (%) | 90 (61.6%)  | 56 (38.4%)  |         |
|                    | Good                            | No. (%) | 127 (38.7%) | 201 (61.3%) |         |

The exciting finding is that the education of the mother did not play a role in the prevention of Anemia. The type of the diet also played a significant role in the presence of Anemia, together with the presence of morning sickness while usage of tonics does not affect the picture of Anemia. Regarding the obstetric and menstrual history, the occurrence of Anemia was associated significantly with heaviness rather than the regularity of the menstrual cycle Table 3.

TABLE (3):  
The association between different menstrual characteristics  
of the mother and the Occurrence of Anemia:

| Characteristic  | Group     | No.<br>(%) | Anemic         | Normal         | Total         | P-value |
|-----------------|-----------|------------|----------------|----------------|---------------|---------|
| Age of menarche | 9-11y     | No.<br>(%) | 14<br>(58.3%)  | 10<br>(41.7%)  | 24<br>(100%)  | 0.063   |
|                 | 12-14y    | No.<br>(%) | 194<br>(46.3%) | 225<br>(53.7%) | 419<br>(100%) |         |
|                 | >14y      | No.<br>(%) | 35<br>(61.4%)  | 22<br>(38.6%)  | 57(100%)      |         |
| Regularity      | regular   | No.<br>(%) | 221<br>(48.5%) | 235<br>(51.5%) | 456<br>(100%) | 0.846   |
|                 | irregular | No.<br>(%) | 22<br>(50.0%)  | 22<br>(50.0%)  | 44<br>(100%)  |         |
| Amount          | heavy     | No.<br>(%) | 18<br>(78.3%)  | 5<br>(21.7%)   | 23<br>(100%)  | 0.0001  |
|                 | medium    | No.<br>(%) | 206<br>(49.5%) | 210<br>(50.5%) | 416<br>(100%) |         |
|                 | light     | No.<br>(%) | 19<br>(31.1%)  | 42<br>(68.9%)  | 61<br>(100%)  |         |

Also, it is associated with a higher number of pregnancies and/or abortions, irregularity or absence of antenatal care and previous rather than present antepartum hemorrhage table 4. Using binary logistic regression presented that the most significant effective factors are heavy menses, poor diet, previous Antepartum haemorrhage (APH) and a higher number of pregnancies. In contrast, protective factors are enough spacing and regular Antenatal care (ANC).

TABLE (4):

The association between the recent and previous obstetrical history and the occurrence of Anemia

| Characteristic    | Group           | No.<br>(%) | Anemic         | Normal         | Total         | P value |
|-------------------|-----------------|------------|----------------|----------------|---------------|---------|
| No. of preg.      | ≤4              | No.<br>(%) | 148<br>(43.1%) | 195<br>(56.9%) | 343<br>(100%) | 0.0001  |
|                   | ≥5              | No.<br>(%) | 95<br>(60.5%)  | 62<br>(39.5%)  | 157<br>(100%) |         |
| No. of abortions  | ≤2              | No.<br>(%) | 223<br>(46.8%) | 253<br>(53.1%) | 476<br>(100%) | 0.0001  |
|                   | ≥3              | No.<br>(%) | 20<br>(83.3%)  | 4<br>(0.16%)   | 24<br>(100%)  |         |
| Spacing*          | < 2 years       | No.<br>(%) | 63<br>(70.8%)  | 26<br>(29.2%)  | 89<br>(100%)  | 0.0001  |
|                   | ≥ 2 years       | No.<br>(%) | 115<br>(47.5%) | 127<br>(52.5%) | 242<br>(100%) |         |
| Regularity of ANC | No or irregular | No.<br>(%) | 76<br>(67.8%)  | 36<br>(32.1%)  | 112<br>(100%) | 0.0001  |
|                   | Regular         | No.<br>(%) | 167<br>(43.1%) | 221<br>(56.9%) | 388<br>(100%) |         |
| Recent APH        | yes             | No.<br>(%) | 34<br>(60.7%)  | 22<br>(39.3%)  | 56<br>(100%)  | 0.054   |
|                   | no              | No.<br>(%) | 209<br>(47.1%) | 235<br>(52.9%) | 444<br>(100%) |         |
| Previous APH      | yes             | No.<br>(%) | 29<br>(76.3%)  | 9<br>(23.7%)   | 38<br>(100%)  | 0.0001  |
|                   | no              | No.<br>(%) | 214<br>(46.3%) | 248<br>(53.7%) | 462<br>(100%) |         |

\* Spacing tested for those women with 2 or more children

TABLE 5

Significant determinants of Occurrence of Anemia in Pregnant by logistic regression

|                     | Sig. | OR     | 95% CI for OR |         |
|---------------------|------|--------|---------------|---------|
|                     |      |        | Lower         | Upper   |
| Occupation          | .001 | 3.978  | 1.813         | 8.729   |
| No. of pregnancies  | .001 | 2.787  | 1.508         | 5.151   |
| Previous APH        | .005 | 5.296  | 1.638         | 17.124  |
| Heaviness of menses | .000 | 33.744 | 7.014         | 162.337 |
| Good Diet *         | .002 | .432   | .256          | .731    |
| Spacing*            | .000 | .340   | .202          | .574    |
| Regular ANC*        | .000 | .186   | .095          | .367    |

\* Protective factor

## CONCLUSION:

In this study, we discovered that the proportion of pregnant women who were anemic and had a hemoglobin level less than 11 gm/dl were about 49% which is considerably higher than the estimated rate of the WHO<sup>17</sup> and are nearly compatible with several local studies<sup>8, 19</sup>. By comparing the different sectors of Babylon governorate, the prevalence of Anemia and level of Hemoglobin of pregnant women seem to be within similar values reflects the universal distribution of the problem and the similarity of the living conditions across the governorate. This high level of anemia prevalence is considered a severe public health problem according to the classification of the WHO<sup>15</sup> due to its associated impact on the general health of the community. However, it was revealed that the percentage of moderate Anemia (hemoglobin level less than 10.0 gm/dl) is higher than the mild cases, which may be associated with chronicity and augmentation of the condition over time (P-value 0.012)<sup>20, 21</sup>. This condition contradicts many studies at different countries<sup>22- 24</sup>, where mild Anemia was predominant but seemed to be expected in Iraq according to the Khalil and Abdul-Fatah studies<sup>25, 26</sup>, which may demonstrate faltering of the health system in the manipulation of the problem by early diagnosis, treatment and monitoring<sup>27</sup>. Such condition was also followed by a connection of Anemia with low-income family and mother diet, which was observed in more than 50% of the samples (P-value=0.004 and 0.0001 respectively). It appeared as significant causes of maternal Anemia as in Ahmed and Siddiqui studies<sup>28</sup>. Another notable result was that the state of Anemia was not improved by the urban residence, or higher education level. Even it was higher among employed women in given many other studies<sup>20, 29</sup>, which may reflect the limited health messages and the crippled antenatal health services<sup>30</sup>. Indeed, Anemia represents a significant challenge to the community health in Iraq and require further governmental efforts to handle it by concentrated health education and promotion of antenatal care.

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