Assessment of the Anemic Conditions during Pregnancy: A Study of Sukkur City, Sindh, Pakistan

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Authors’ contributions
This work was carried out in collaboration among all authors. Author MQ conceived idea, designed research methodology, data analysis and manuscript writing. Author BS data interpretation and Statistical analysis. Authors WA and FQR managed literature review and data collection. Authors RAA and MUF managed literature search, data collection and english grammatical setting. Authors AD, MAG, MIA and BS authors read and approved the final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Anemia is pathological disorder caused by mal nutrition and it is very common among feminine gender during gestational period.
Objective: To investigate the prevalence of anemia among pregnant women, and identify the risk factors and symptoms of anemia in pregnancy.

Methodology: Descriptive cross-sectional study was carried out for 12 months from June 2018 to June 2019 at Sukkur Blood and Drugs donating Society Hospital in Sukkur Sindh. A total of 300 pregnant women with anemic condition were selected by purposive sampling method. Structured questionnaire was designed in order to collect nominal and ordinal information after getting consent from included patients. The collected information was interpreted by using statistical software SPSS version 24.00

Results: The result revealed that 82.3% of the women were diagnosed as anemic, categorized as mild, moderate and severe. Anemic condition was common among pregnant women with ages 26-35 years, 63.9%. Women with primary or secondary education were more prone to anemia. The pregnant women belongs to rural areas were more forwarded to anemia, 86.6%. The numbers of patients were seen more in second and third trimester of gestation while rate of anemia in primary gravid was 75.0% that increased to 81.8% in multigravida, and further increased to 91.5% in grand multiparity.

Conclusion: The prevalence of anemia was high in rural area of Sindh. Haemoglobin concentration was very much low in most of the pregnant female. The major cause of anemia in pregnant women was mal nutrition.

Keywords: Anemia; mal nutrition; gestational period; pregnancy; gravid.

1. INTRODUCTION

Anemia is a disorder of the vital fluid of body which can be defined as reduction in amount or quality of haemoglobin in blood [1]. According to the WHO, majority of population is affected by this fast growing disease around the globe. [2] Anemia affects the population of all ages but its prevalence is more among children of less than 05 years of age and women with pregnancy [3]. Major cause of anemia among pregnant women is nutritional deficits including Iron, Folate, Vitamin A and B12 among other factors are including genetic haemoglobin disorders and infectious diseases such as malaria, tuberculosis and worm infections [4]. With recent development in medical science, it is believed that anemia is not only a disease but actually it is indicator for many other diseases [5,6]. Different researchers reported the different factors responsible for influencing anemia during pregnancy. Identification of these underlying factors is very important for prevention and appropriate management of anemia in pregnancy [7-9]. Some of the important factors are given in Fig. 1. Presence of anemia in pregnancy is commonly known as anemia in pregnancy (AIP). It is believed that anemia

![Fig. 1. Causes of anemia in pregnancy](Image)

Maternal age, education, food habits, lifestyle factors

Socio-economic factors

Maternal health

Iron-folic acid/other dietary supplement intake

Prepregnancy Nutritional status

Socio-demographic factors

Infectious, Malaria, haemoglobinopathies, other diseases

Socio-cultural factors

Obstetric factors

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is affecting approximately one fourth population of the world (25.0%) that almost becomes 1.62 billion people, and from this population 32 million are pregnant women. According to WHO, almost half of the pregnant women suffer from anemia during their pregnancy [10]. During women pregnancy; anemia is categorized into mild, moderate, and severe anemia, when haemoglobin concentration decreases below from 7.0 g/dl, or concentration of haemoglobin is observed between 7.0-9.9 and 10.0-11 g/dl respectively. During pregnancy anemia is considered as one of the primary reason of increasing morbidity and mortality worldwide, [11-13] that not only affecting the mother during pregnancy but also affects the children. It is estimated that maternal and perinatal deaths are increasing due to anemia world widely [14,15]. WHO defined the anemia in pregnant women on the basis of their pregnancy level and concentration of haemoglobin. These are; AIP is confirmed in 1st half of pregnancy when concentration of haemoglobin decreased from 11.0 g/dl. AIP is confirmed in 2nd half of pregnancy when concentration of haemoglobin decreased from 10.5 g/dl [2,16,17]. The main purpose of this research is to evaluate the incidence of anemia, related risk issues, hindrances, dietary and investigational management.

2. METHODOLOGY

The descriptive cross-sectional study was carried in Sukkur Blood and Drugs donating Society Hospital in Sukkur from June 2018 to June 2019. During study period 300 pregnant women were selected by purposive sampling method from gynecology ward. A structured questionnaire was designed that used for collection of data including demographic data of patients, previous medical history, current medical history, and medical records. A pregnant women with concentration of haemoglobin (Hb) < 11.0 g/dl was labeled as anemia. The patient's lab report was checked to classify them into mild, moderate and severe type of anemia on the bases of haemoglobin concentration in blood. Pregnant women not willing to participate in the study or suffering from chronic diseases such as kidney problem, heart problem etc., were excluded from the study. Data was interpreted with statistical package for social science (SPSS) version 24.

3. RESULTS

After collecting the data of 300 pregnant women by visiting the gynecology ward of Sukkur Blood and Drugs donating Society Hospital in Sukkur, data was interpreted, and results were as; anemia was diagnosed in 247 (82.3%) pregnant women, while other 53 (17.7%) observed in good health without anemia. Beside this, frequency of anemia was measured by using standards of WHO with mild anemia 64 (25.9%), moderate anemia 85 (34.4%), and severe anemia 98 (39.7%) by inspecting the haemoglobin ratio in pregnant woman. Anemia was diagnosed in 207 (86.6%) pregnant women belonged from rural area, and 40 (65.6%) from urban area (p=0.001). According to research data women were categorized into various age groups, total 103 women were categorized in the age group of (16-25)years, 183 women were grouped in the age group of (26-35) years, and 12 women were assembled in the age group of (36-45)years whereas only 02 women were reported in the age group of (46-55)years. The number of women with and without anemia in various age brackets (p=0.03) is described in below given Table 1. It was observed that number of anemic condition also depends upon the knowledge and qualification as literate people knows better, how to overcome the mal nutrition during the period of gestation. So education also matters for the management of anemia and the number of patients (p=0.001), who had primary qualification, was 48, patients with secondary education (middle, matric) was 77, 34 women were having intermediate education whereas only 31 were having graduation, however 110 women were those who were illiterate. It was observed that anemic condition was very much common among women with second or third trimester as compared to first trimester and they were categorized as in Table 1. Furthermore, current study shows that diet of pregnant women is an important risk factor in development of anemia. Study reports that 90.1% pregnant women with low level of diet developed the anemia, whereas 55.2% pregnant women with good level of diet developed the anemia. As anemia is nutritional disease so poor diet playing a major role in development of anemia in pregnant women. Rate of anemia in primigravida was 75.0% that increased to 81.8% in multigravida, and further increased to 91.5% in grand multiparity (p=0.02) (Table 1). Out of 148 pregnant women having past disease history, majority of the pregnant women were suffering from anemia 52 (35.1%), followed by hypertension (HTN) 31 (20.9%), hepatitis 13 (8.8%), anemia + HTN 13 (8.8%), hypotension 9 (6.1%), diabetes mellitus (DM) 8 (5.4%), cardiac problem 6 (4.1%), thalassemia 3 (2.0%), fever 1 (0.7%), anemia + fever 1 (0.7%), stomach problem 1 (0.7%), asthma + stomach problem 1 (0.7%), anemia + DM + HTN 1 (0.7%),
epilepsy 1 (0.7%), anemia + insomnia 1 (0.7%), malaria 1 (0.7%), cardiac problem + malaria 1 (0.7%), hepatitis + HTN 1 (0.7%), HTN + fever 1 (0.7%), anemia + cardiac problem 1 (0.7%), and thrombocytopenia 1 (0.7%) (Table 2). On the basis of evaluating the haemoglobin level in pregnant women, anemia was diagnosed in 247 (82.3%) pregnant women, whereas remaining 53 (17.7%) were healthy and non-anemic (Table 3). On the basis of haemoglobin level, anemia was diagnosed in 247 pregnant women. Similarly, on the basis of haemoglobin level anemia was classified as; mild anemia 64 (25.9%), moderate anemia 85 (34.4%), and severe anemia 98 (39.7%) (Table 4).

4. DISCUSSION

In accordance with current research the frequency of anemic women during pregnancy was 82.3% that demonstrate the burden of anemia in rural areas of the Sindh. And our research concludes the elevated in occurrences of anemic condition among women as compared to the studies conducted internationally. On the other hand resemble study was carried out in Karachi by Karim S.A., which shows the rates of anemia during pregnancy is about 64.0% [18]. In addition to this comparative research was also carried out by Sohail R et al, in Lahore and according to their results the frequency of AIP was 73.0% [19]. Similar type of study was also carried out in Multan that reports 76.0% of AIP and a study related to our research was carried out in Hyderabad by Baig-Ansari that show maximum frequency that is up to 90.5% in AIP [20,21]. On the behalf of various causes' current research elaborate the maximum frequency of anemic condition as anemic condition among women was more common in second or third trimester. Second major reason for anemic condition was poverty observed among AIP patients as due to very limited resources of income AIP patients were unable to manage healthy foods and control mal nutrition during their gestation period, and majority of population due to poverty was not able to afford the expenses of medication used for anemia in pregnancy these reason are most common in Pakistan especially in remote areas. Number of pregnancies, gestational status (trimester wise) is the most conjoint factors for emerging anemia (p=0.08). Current research concludes that with the enhancing the pregnancies number chances for anemia are also increased accordingly. Current study reports that anemic rate was 61.5% in 1st trimester, 72.2% in 2nd trimester whereas 85.8% was observed in 3rd trimester. As the time passed the pregnant women requires number of healthy foods including green vegetables and fruits and proper medication that eradicate the disorder of anemia and same conclusion was given by majority of scholars.

Table 1. Demographic and clinical characteristics of study subjects (N=300)

| Variables          | Anemia | Total | Pearson Chi-Square | P-Value |
|--------------------|--------|-------|--------------------|---------|
|                    | Yes    | No    |                    |         |
| Age                |        |       |                    |         |
| 16-25              | 76     | 27    | 103                | 8.339   | 0.001 |
| 26-35              | 158    | 25    | 183                |         |       |
| 36-45              | 11     | 1     | 12                 |         |       |
| 46-55              | 2      | 0     | 2                  |         |       |
| Residence          |        |       |                    |         |
| Rural              | 207    | 32    | 239                | 14.786  | 0.001 |
| Urban              | 40     | 21    | 61                 |         |       |
| Educational Level  |        |       |                    |         |
| Illiterate         | 103    | 7     | 110                | 22.066  | 0.001 |
| Primary            | 42     | 6     | 48                 |         |       |
| Middle             | 22     | 7     | 29                 |         |       |
| Matric             | 35     | 13    | 48                 |         |       |
| Intermediate       | 24     | 10    | 34                 |         |       |
| Graduate           | 21     | 10    | 31                 |         |       |
| Trimester          |        |       |                    |         |
| First              | 8      | 5     | 13                 | 9.627   | 0.008 |
| Second             | 39     | 15    | 54                 |         |       |
| Third              | 200    | 33    | 233                |         |       |
| Diet               |        |       |                    |         |
| Good level         | 37     | 30    | 67                 | 43.586  | 0.001 |
| Low level          | 210    | 23    | 233                |         |       |
| Parity Status      |        |       |                    |         |
| Primigravida       | 60     | 20    | 80                 | 7.312   | 0.026 |
| Multigravida       | 122    | 27    | 149                |         |       |
| Grand multiparity  | 65     | 6     | 71                 |         |       |
Table 2. Diseases in pregnant women (N=300)

| Diseases                     | Frequency | Percent | Valid Percent | Cumulative Percent |
|------------------------------|-----------|---------|---------------|-------------------|
| Valid Anemia                 | 52        | 17.3    | 35.1          | 35.1              |
| Thalassemia                  | 3         | 1.0     | 2.0           | 37.2              |
| Hepatitis                    | 13        | 4.3     | 8.8           | 45.9              |
| Cardiac Problem              | 6         | 2.0     | 4.1           | 50.0              |
| Diabetes Mellitus (DM)       | 8         | 2.7     | 5.4           | 55.4              |
| Hypertension (HTN)           | 31        | 10.3    | 20.9          | 76.4              |
| Fever                        | 1         | 0.3     | 0.7           | 77.0              |
| Anemia + Fever               | 1         | 0.3     | 0.7           | 77.7              |
| Hypotension                  | 9         | 3.0     | 6.1           | 83.8              |
| Stomach Problem              | 1         | 0.3     | 0.7           | 84.5              |
| Asthma + Stomach Problem     | 1         | 0.3     | 0.7           | 85.1              |
| Anemia + DM + HTN            | 1         | 0.3     | 0.7           | 85.8              |
| Epilepsy                     | 1         | 0.3     | 0.7           | 86.5              |
| Anemia + Insomnia            | 1         | 0.3     | 0.7           | 87.2              |
| Malaria                      | 1         | 0.3     | 0.7           | 87.8              |
| Cardiac Problem + Malaria    | 1         | 0.3     | 0.7           | 88.5              |
| Hepatitis + HTN              | 1         | 0.3     | 0.7           | 89.2              |
| Anemia + HTN                 | 13        | 4.3     | 8.8           | 98.0              |
| HTN + Fever                  | 1         | 0.3     | 0.7           | 98.6              |
| Anemia + Cardiac problem     | 1         | 0.3     | 0.7           | 99.3              |
| Thrombocytopenia             | 1         | 0.3     | 0.7           | 100.0             |
| Total                        | 148       | 49.3    | 100.0         |                   |

Missing System                | 152       | 50.7    |               |                   |
Total                          | 300       | 100.0   |               |                   |

Table 3. Anemia in Pregnant Women (N=300)

| Anemia | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------|-----------|---------|---------------|-------------------|
| Valid  | Yes       | 247     | 82.3          | 82.3              |
|        | No        | 53      | 17.7          | 100.0             |
| Total  |           | 300     | 100.0         |                   |

Table 4. Types of Anemia in Anemic Pregnant Women (N=300)

| Anemia Types        | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------|-----------|---------|---------------|-------------------|
| Valid               | Mild      | 64      | 21.3          | 25.9              |
|                     | Moderate  | 85      | 28.3          | 34.4              |
|                     | Severe    | 98      | 32.7          | 60.3              |
|                     | Total     | 247     | 82.3          | 100.0             |
| Missing System      | 53        | 17.7    |               |                   |
| Total               |           | 300     | 100.0         |                   |

5. CONCLUSION

It was concluded that increased rate of frequency of pregnancy was very much common among rural areas of Sindh as compare to urban areas, level of haemoglobin was very low in most of study subjects and severity of anemia was found mostly in third trimester. Education matters a lot in the management of anemia; if the patients were educated they can easily manage the deficiencies of mal nutrition, number of repeated pregnancies can also enhance the chances of anemia among pregnant women.
CONSENT

All the patients appearing in the study were given a questionnaire and a cover letter explaining the importance of the study with consent form attached.

ETHICAL APPROVAL

The Sukkur Blood Bank and Drug Donating Society/SBDSS Sukkur Hospital Ethics Committee approval (No.SBDSS/ERC/01/2018) has been collected and preserved by the author. The approval for data collection was obtained from SBDSS Sukkur Hospital, a written approval was given by the Chairman Ethical Review Committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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