

## NUTRITIONAL ANAEMIA AMONG CURRENTLY MARRIED FEMALES IN THE REPRODUCTIVE AGE GROUP IN RURAL JAMMU.

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**ABSTRACT: BACKGROUND:** More than one-third of world's women are anaemic with majority residing in developing countries and that too in rural areas. The most highly affected population in the decreasing order is pregnant women, school age children, non-pregnant women and preschool children. Nutritional anaemia has recently been ranked as the third leading problem among the women of reproductive age group. Most of the studies conducted so far have focused on pregnant ladies only so it was decided to take all the females in the reproductive age group as the study subjects. **AIMS:** To find out the prevalence of nutritional anaemia among married females of reproductive age group i.e., 15-49 years of age in a rural area of Jammu District. **SETTINGS AND DESIGN:** Across-sectional study was undertaken in rural settings. **METHODS AND MATERIAL:** House to house visits were made and 288 married females in the reproductive age group were interviewed and their blood samples were taken for necessary haematological investigations which were done at GMC Jammu. **STATISTICAL ANALYSIS:** Percentages and chi-square test. **RESULTS AND CONCLUSION:** More than 90% of the females were suffering from anaemia. Majority of them were having microcytic hypochromic blood picture. More than 50% of the subjects were having moderate anaemia as per WHO classification. Nutritional anaemia was seen in 70.47% of the study subjects while the remaining females were having either no anaemia or anaemia due to other medical reasons. The prevalence of nutritional anaemia was even more among pregnant and lactating females and this finding was found to be statistically significant.

**KEY WORDS:** Prevalence, nutritional anaemia, reproductive age group, cross-sectional, peripheral blood picture.

**INTRODUCTION:** Nutritional anaemia remains a major public health problem in nearly all the developing countries, including India where it affects almost 50% of the population. They not only affect the women of reproductive age group, but also both sexes and all age groups in most of the states of India. Its prevalence in adolescent girls ranges from 74%-98%, in pregnant women from 82% to 98% and in women of reproductive age from 74%-99%. Males, especially elderly, have a high rate of anaemia<sup>1</sup>.

Studies well indicate the association of anaemia with maternal morbidity and mortality. Worldwide, anaemia contributes to 20% of all maternal deaths<sup>2</sup>. Anaemia in pregnancy also leads to premature births, low birth weight, foetal impairment and infant deaths. It reduces the productivity of women which places an economic burden on the families, communities and societies<sup>2</sup>. Recently, mental impairment of children, who were anaemic in the very beginning of their life, has been reported in many studies and all these studies stressed on the necessity of special control program for anaemia in vulnerable population<sup>2-4</sup>.

There is need for identifying the magnitude of anaemia and its determinants in high risk groups, such as women of child bearing age, which is essential for evidence based intervention modalities, particularly in developing countries, where the social conditions pose serious challenges to women. The nutritional status of women in India, as in other developing countries, is low and their daily workload is often enormous because of reproducing and ensuring the survival of their children.

Although the National Nutritional Anaemia prophylaxis programme has been in operation since 1970, under which iron-folic acid tablets are distributed to pregnant women, the evaluation of the programme conducted during 1985-1986 showed no impact on the prevalence of anaemia<sup>5</sup>. In fact, prevalence rates are essentially the same as those reported in earlier studies carried out during the 1940s, 1950s and 1960s. In practice, the efficiency of large-scale programmes has been limited for various reasons such as poor access to prenatal care, insufficient counseling on the need for and the benefits of iron supplements and unwillingness by pregnant women to take iron supplements.

Most studies of iron deficiency anaemia have been undertaken in pregnant women or hospitalized patients, where the markers were influenced by physiological hemodilution or metabolic and patho-physiological changes. Reliable data on the prevalence of nutritional anaemia is not available; also the problem is more intense in rural areas as compared to urban areas. Pre-pregnancy evaluation, i.e., among women of childbearing age and adolescent girls provide information that may prove critical for the development of effective intervention strategies against anaemia in developing countries. The present study was planned keeping in view the above mentioned facts and it was decided to conduct it in a rural area of Jammu district.

**MATERIALS AND METHODS:** A cross-sectional study was conducted in a rural area of RS Pura block of Jammu district which is also the field practice area of the department of Community Medicine, Govt. Medical College (GMC), Jammu. The list of all the villages in that block was procured from the office of the Block Development Officer and the village with the largest population of around 1900 i.e. the village Kotli Mian Fateh was selected for the study. All the currently married women of reproductive age (15-49 years) residing in that village were contacted. House to house visits were made from the month of February 2010 to April 2010. 427 females were found to be in the reproductive age group. Among them 313 were currently married and constituted the study group. The remaining 114 females were unmarried, widowed or divorced and were not contacted as it was decided to include only the currently married women only.

Before conducting the study, permission from the ethical committee was sought. Anganwadi workers and ASHA worker of the village were also informed about the study so that they could better motivate the females and inform them about our visit in advance to ensure better participation. Each and every subject was well explained about the purpose of the study. Further she was assured that the information obtained from her during the interview would be kept confidential. An oral informed consent was also taken before interviewing and investigating her. All the 313 females could not be contacted as 25 of them were either not available at the time of visit or refused to participate. More than one visit was made to the houses of these females to convince them to participate but they still refused due to lack of interest in the study or fear of pain as their blood sample was to be taken. A total of 288 females were therefore interviewed and examined. Out of them 18 females were pregnant and 34 were lactating.

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The bio-data of the female was also taken which included her name, age (in completed years), her husband's name, caste, religion, occupation and literacy status of both husband and wife. The menstrual and obstetrical history like information about her menstrual cycle (duration, regular or irregular, flow, associated dysmenorrhea, polymenorrhea or other menstrual disorders), whether the subject was pregnant, non-pregnant or lactating at the time of visit. Any other medical complaint of the female if present was also noted to co-relate it with the clinical findings in order to find out the causes of anaemia other than nutritional. Females with history of polymenorrhea, menorrhagia, bleeding from any other site, hypothyroidism, chronic diseases, fever, jaundice etc. will be taken in anaemia due to other causes and shall not be taken in nutritional anaemia.

Then the blood sample from each female was drawn for the necessary haematological investigations. She was made to sit comfortably & under all aseptic precautions, with the help of a disposable syringe 3ml of blood sample was taken from the cubital vein after applying the tourniquet above. A drop of blood from the syringe was put on the glass slide and with the help of another slide a smear was made which was then air dried. The rest of the sample was transferred to an EDTA coated vacutainer tube after labeling it with the identification data of the female. The tube was then shaken well so that the blood mixes well with the EDTA to avoid its clotting. All the blood samples and the slides were then brought to the Pathology Department of GMC Jammu on the same day for the necessary investigations.

The slides were stained with the Leishman stain after which they were studied for peripheral blood picture to see the morphological type of anaemia i.e., microcytic hypochromic, macrocytic normochromic, normocytic normochromic, combined morphology or any other. Similarly the blood samples were tested in an automated cell counter which was being calibrated from time to time by the concerned staff in order to avoid any error in the readings. Automated cell counter works on the principle of impedance method (also known as Coulter's method), whereby it counts and sizes cells by detecting and measuring changes in the impedance when a particle in the conductive liquid passes through a small aperture. The blood samples were shaken thoroughly & then tested for haemoglobin estimation, RBC count, packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) & mean corpuscular haemoglobin concentration (MCHC). After co-relating the history, findings of the examination and the results of the investigations (haemoglobin, PBF and red cell indices) we could make out the likely cause of anaemia whether nutritional (iron deficiency, B12 or folate deficiency) or pathological or any other. Subjects with Hb <12 g/dl (11g/dl in case of pregnant females) and apparently healthy shall be taken as suffering from nutritional anaemia. Those with Hb <12g/dl and having history of gynaecological/obstetrical problems (menorrhagia, polymenorrhea, spacing of less than two years between two consecutive pregnancies, history of abortion in the near past, history of childbirth within last 6 weeks), history of hypothyroidism, history of chronic diseases like tuberculosis, renal failure, diabetes etc. shall be taken as suffering from anaemia due to non-nutritional causes. For the purpose of classifying the subjects according to the severity of anaemia, WHO classification of anaemia was used<sup>6</sup>. It is given as under:

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GRADING OF ANAEMIA	NON PREGNANT FEMALES	PREGNANT FEMALES
No Anaemia	>12 g/dl	>11 g/dl
Mild Anaemia	10-11.99 g/dl	10-10.99 g/dl
Moderate Anaemia	7-9.99 g/dl	7-9.99 g/dl
Severe Anaemia	<7 g/dl	<7 g/dl

All the data thus collected was compiled, tabulated and statistically analysed. The analysis was done using standard and appropriate statistical techniques like percentages and Chi square test (with Yates correction wherever applicable) using Epi info 6.04 version.

**RESULTS:** The prevalence of anaemia among the married females of reproductive age (15-49 years) was 90.97% (table 1). 32.64% were having mild anaemia, 56.59% moderate and 1.74% were suffering from severe anaemia. Rest 9.03 % of the study subjects were non anaemic. Peripheral blood picture was done in case of all the subjects as the slides were taken from all the females. Most of the females (60.07%) under study were having microcytic hypochromic blood picture i.e. due to iron deficiency followed by normocytic normochromic (29.51%) which is seen in individuals having no anaemia or anemias other than iron, vitamin B<sub>12</sub> and folic acid deficiency. Macrocytic anaemia seen in vitamin B<sub>12</sub> and folic acid deficiency was found among 8.68% of the females and 1.74% of the study subjects were having combined morphological blood picture found among individuals who are suffering from dual deficiency i.e. both due to iron, B<sub>12</sub> and folic acid<sup>7,8</sup> (table 2). 26 females who were non anaemic were having normocytic normochromic blood picture and rest of the 59 females with normocytic normochromic blood picture were having anaemia not due to iron and B<sub>12</sub> deficiency but due to other reasons. Similarly as per the red cell indices (table 3) i.e. PCV, 87.8% of the subjects were anaemic. 58.68% subjects were having microcytic anaemia and 6.94% were having macrocytic anaemia (MCV). According to MCH values, 62.15 % were having microcytic anaemia and 6.6% were having macrocytic anaemia. The prevalence of nutritional anaemia was found to be 70.49% (table 4) while 20.48% of the females were having other reasons for anaemia like gynaecological and obstetrical causes, hypothyroidism, chronic diseases like tuberculosis, diabetes mellitus, renal failure, hemorrhoids, jaundice, fever etc. The prevalence was more among pregnant and lactating females as compared to non-pregnant/non-lactating females and this finding was found to be statistically significant (p < 0.05).94.44% of the pregnant, 76.47% of the lactating and 67.8% of the non-pregnant/non-lactating females were suffering from nutritional anaemia (table 5).

WHO classification of anaemia	Hb levels (g/dl)	No. of subjects N	Percent Prevalence (%)	
Severe anaemia (7g/dl)	<7	05	1.74	
Moderate anaemia (7-9.9g/dl)	7-7.9	20	6.94	56.59%
	8-8.9	61	21.18	
	9-9.9	82	28.47	
Mild anaemia (10-11.9g/dl)	10-10.9	59	20.49	32.64%
	11-11.9	35	12.15	
No anaemia	>12	26	9.03	
	Total	288	100	

**TABLE 1: PREVALENCE OF ANAEMIA AMONG THE WOMEN OF REPRODUCTIVE AGE BASED ON HAEMOGLOBIN LEVELS**

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Peripheral blood picture	Study subjects	
	N	%
Microcytic hypochromic	173	(60.07)
Normocytic normochromic	85	(29.51)
Macrocytic anaemia	25	(8.68)
Combined morphology	05	(1.74)
Total	288	(100)

**TABLE 2: DISTRIBUTION OF STUDY SUBJECTS  
BASED ON PERIPHERAL BLOOD PICTURE**

Red blood cell indices (normal range)	No. of subjects					
	Within normal range		Less than normal		More than normal	
	n	(%)	n	(%)	n	(%)
PCV (45-52%)	35	(12.2)	253	(87.8)	-	
MCV(84-96fl)	99	(34.38)	169	(58.68)	20	(6.94)
MCH (27-32pg)	90	(31.25)	179	(62.15)	19	(6.6)
MCHC (30-35g/dl)	213	(73.95)	38	(13.2)	37	(12.85)

**TABLE 3: DISTRIBUTION OF THE SUBJECTS AS PER THEIR RED BLOOD CELL INDICES**

PCV (Packed cell volume), MCV (Mean corpuscular volume), MCH (Mean corpuscular haemoglobin), MCHC (Mean corpuscular haemoglobin concentration)

Type of anaemia	No. of subjects	
	n	(%)
Nutritional anaemia	203	(70.49)
Anaemia due to other reasons	59	(20.48)
No anaemia	26	(9.03)
Total	288	(100)

**TABLE 4: PREVALENCE OF NUTRITIONAL ANAEMIA AMONG  
THE MARRIED WOMEN OF REPRODUCTIVE AGE**

Obstetrical status	Subjects with nutritional anaemia		Subjects with no nutritional anaemia	
	n	%	n	%
Pregnant	17	(94.44)	01	(5.56)
Lactating	26	(76.47)	08	(23.53)
Non-pregnant	160	(67.8)	76	(32.2)
Total	203	(70.49)	85	(29.51)

**TABLE 5: PREVALENCE OF NUTRITIONAL ANAEMIA  
AMONG WOMEN AS PER THEIR OBSTETRICAL STATUS**

$\chi^2 = 6.37, df=2, p = 0.041$  i.e., significant

\*includes subjects with no anaemia also.

**DISCUSSION:** Worldwide many studies have been conducted to find the prevalence of anaemia but few have focused on anaemia due to nutritional deficiencies among the women of reproductive age. The studies which have been conducted so far on nutritional anaemia have taken pregnant women, school children and adolescents as the study group. Little data is available on the nutritional status of the married women of reproductive age and that too living in rural areas as the rural married women are poor and pay little attention towards their own nutrition. Moreover their nutritional status is further affected by frequent child births and large family size which is often more than 4 in rural areas.

In the present study the prevalence of nutritional anaemia among the married women of reproductive age was 70.49% which is quite high and as per WHO standards<sup>6</sup> it is a public health problem (prevalence >40%). In a similar study conducted among the tribal women of Kolkatta, India (Ghosh R and Bharati P)<sup>9</sup>, 90.5% prevalence of nutritional anaemia was reported. The difference might be due to the fact that the females with some disease or suffering from excessive blood loss due to gynaecological/obstetrical/other problems were ruled out from the present study. If they were also included the prevalence of anaemia would have risen to 90.97%.

Bentley and Griffith<sup>10</sup> analysed the data of NFHS-2 and found 49.5% prevalence of anaemia among the married women in Andhra Pradesh, India. The difference in the prevalence of anaemia could be due to the fact that the present study was conducted in rural area of Jammu while females from both urban and rural areas were included in the Andhra Pradesh study. This is supported by the fact that when they compared the prevalence among rural and urban women, it was more among rural females. Many other studies were conducted by several authors in India<sup>11-17</sup> which also reported a high prevalence of nutritional anaemia among the women of reproductive age ranging 56% to 95%.

In a similar study conducted by Haider J<sup>18</sup> (2010) in Ethiopia, the prevalence of nutritional anaemia among women of reproductive age came out to be 30.4%. The study was conducted on a large scale and included 9 out of 11 regions of Ethiopia. This low prevalence of anaemia as compared to the present study might be due to the difference in socio-cultural and eating habits of the people among the two countries.

In a study conducted by Hyder SMZ et al<sup>19</sup> (2001) in a rural area of Bangladesh, the prevalence of anaemia among apparently healthy non pregnant women of reproductive age came out to be 73%. This was in accordance with the present study which has also been conducted in a rural area. Slightly higher prevalence of nutritional anaemia i.e., 80% was reported among the non-pregnant women of reproductive age in China by Ronnenberg AG et al<sup>20</sup> (2000) as compared to the present study. The differences could be because all the females in that study were workers in a textile industry and belonged to low socio-economic status while in this study most of the females were in the upper middle class.

A prevalence of 30-50% was reported among the women of reproductive age by several authors,<sup>14, 15, 19-30</sup> in their studies conducted in various parts of the world.

The prevalence of nutritional anaemia among pregnant and lactating women in our study was more as compared to non-pregnant/non-lactating and this finding was statistically significant ( $p < 0.05$ ). 94.44% of the pregnant, 76.47% of the lactating and 67.8% of the non-pregnant/non-

lactating females were suffering from nutritional anaemia. This is because the nutritional demands of pregnant and lactating women are more as compared to non-pregnant and non-lactating females and they are more likely to suffer from nutritional anaemia and this was evident from the results of the present study. In pregnancy and lactation, extra nutrients are required to meet the demands of the growing foetus or breast feeding infant. The pregnant and lactating women in the study area were not taking any supplements or extra diet to meet their demands. Few of the pregnant women were taking iron-folic acid tablets but compliance among them was also not good.

Mengi V et al<sup>31</sup> in their study conducted in Srinagar i.e., in the same state also reported high prevalence of anaemia among the pregnant females as compared to non-pregnant. But the prevalence among pregnant was 43% only as compared to 94.44% in the present study. The difference in the prevalence rates might be due to dietary factors as the people in Srinagar consume non-vegetarian diet more often as compared to the people in Jammu. Singh MB et al<sup>15</sup> in Rajasthan, India, reported similar findings i.e., prevalence among pregnant and lactating women was more as compared to non-pregnant/non-lactating. Other studies in India<sup>5, 12,13,17,23,26,32,33</sup> also reported high prevalence of nutritional anaemia among pregnant and lactating females.

Studies outside India by Herberg et al<sup>34</sup> (1987) also reported a high prevalence of 45% among pregnant as compared to 39% among non-pregnant females. Similar findings were observed in Burkina Faso by Meda N et al<sup>21</sup> (1993). Many other authors<sup>19, 20, 23, 24, 27, 28, 35-37</sup> reported similar findings in different parts of the world.

Based on the WHO classification of severity of anaemia, majority of the subjects (56.59%) in the present study were having moderate anaemia i.e., Hb < 10g/dl, followed by mild anaemia (32.64%) i.e., Hb < 12g/dl and severe anaemia (1.74%) i.e., Hb < 7 g/dl. This shows that the problem of anaemia in our state especially rural areas is really large and needs to be addressed. While in other states like Andhra Pradesh<sup>10</sup>, India, majority of the females were suffering from mild anaemia (32.4%). While two more studies, one from rural Bangladesh<sup>19</sup>, and other from Venezuela<sup>22</sup> also reported higher prevalence of mild anaemia as compared to moderate and severe anaemia. The difference could be due to the different methods employed for Hb estimation in the two studies.

60.07% of the subjects in the present study were having microcytic hypochromic blood picture followed by normocytic normochromic (29.51%), macrocytic (8.68%) and combined morphology (1.74%). Similarly Mehnaz et al<sup>33</sup> in their study in Aligarh, India among the women of 15-49 years reported microcytic hypochromic blood picture as the most common type while Karaoglu et al<sup>37</sup> reported normocytic normochromic blood picture among 56.5% of the study subjects.

From the above discussion it was concluded that the prevalence of nutritional anaemia was high (70.49%). It was more among pregnant and lactating females as compared to non-pregnant/non-lactating females and this finding was significant ( $p < 0.005$ ). Moreover majority of the study subjects were having microcytic hypochromic blood picture which is seen mostly in iron deficiency anaemia.

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