

Retrospective Evaluation of Anemia in Relation to Body Mass Index [BMI] in Women Presenting to Tertiary Care Hospital from Telangana

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Abstract: *Objective:* This is a retrospective analysis to investigate the prevalence, nature [Like megaloblastic vs Iron deficiency vs blood loss vs hemolytic etc.] and determinants of anemia among women in a tertiary care hospital during the period 2011-2014. We examined differences in anemia related to, urban/rural location, nutrition status as reflected by body mass index (BMI) and serum albumin levels and hemogram values

Methods: The Hb values of all women presenting to the OPD was captured along with the details of the Haemogram, Iron profile, as well as other clinical examination findings. Wherever the complete work up was performed, the details were also captured. The standard definitions were used for entering the data and MEDCALC version 7.0 was used for the statistical analysis.

Results: A total of 463 women aged 15–59 were analyzed. (Elderly were not included as the etiologic of the anemia will be different in them as well as multiple co-morbidities confounding the analysis) Prevalence of anemia was high among all women, however as compared to national statistics; this is slightly less in the current study. In all 28.4% of women had mild, 12.6% had moderate, and 5.2% had severe anemia. Both high and low BMI were associated with anemia, though very low BMI had mixed picture, Low BMI had Iron deficiency and high BMI had Megaloblastic variants of anemia.

Conclusion: Anemia still is an important health burden in women of both urban and rural origin, even-though the prevalence compared to a decade ago appears to be slightly less. New differential and tailored program strategies are needed for improving the hemoglobin for those with very low BMI [Iron supplements alone may not be enough and they need both Iron and B12 with folic acid]. Similarly in urban women, its essential to sensitize regarding the balanced diet, [especially if the BMI is high] with focus on the B12 and folate supplements [besides other dietary modifications].

Keywords: Megaloblastic, Iron deficiency, Hemogram, Folate supplements, Malnutrition.

INTRODUCTION

Anemia is a major public health problem globally, more so in females of developing countries. World Health Organization global estimates in 1992 for anemia averaged a prevalence of 56%, [35–75%] [1-3] depending on geographic location [1] with South Asia ranking highest in the world paralleling the malnutrition rates.

In the recent times the spectrum of malnutrition changed significantly with inclusion of obesity [predominantly in the urban sector], making the picture different from the past. Around one third of Indian women have a body mass index (BMI) <18.5 kg/m² with almost equal numbers expected by end of this decade. The old statistics suggest that prevalence of anemia among all women is 52% with 35% as mildly anemic, 15% as moderately anemic, and 2% as severely anemic. Multiple studies conducted so far have confirmed micro nutrient deficiency [2-7], with

these above data, we expect a change in the etiology of the anemia with B12 and folates taking some share along with Iron deficiency. Similarly it is expected that either spectrum of the malnutrition [High and low BMI] to have some degree of anemia owing to imbalanced diet. So far there is no such study reported in the high BMI women from this region to the best of our search and compared with low BMI. This retrospective analysis is to investigate the prevalence and nature as well as determinants of anemia among women in a tertiary care obstetrical department during the period of 2011-2014. We examined differences in anemia related to, urban/rural location, nutrition status as reflected by body mass index (BMI) and serum albumin levels [to act as surrogate marker to confirm malnutrition]

METHODS

This is a retrospective analysis to investigate the prevalence, nature [Like megaloblastic vs Iron deficiency vs blood loss vs hemolytic etc.] and determinants of anemia among women in a tertiary care hospital during the period 2011-2014. All the complete hemogram values for the patients were noted

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and based on the Hb, they were classified into mild moderate and severe anemia as per WHO definition [1]

- A hemoglobin concentration of less than 70 g/l was used to define severe anemia,
- 70–99.99 g/l for moderate anemia,
- and 100–109.99 g/l to correspond to mild anemia in pregnant women ($n=170$) and 100–119.99 g/l for non-pregnant women

Elderly patients were not included as the etiology of the anemia will be different in them as well as multiple co-morbid conditions confounding the analysis. As this is a retrospective study, the clearance was taken from the institutional board. Though Prealbumin is used as more sensitive marker for Malnourishment, we could not include this as this was not a routine practice at the hospital.

The demographics, base line diagnosis, symptoms as well as BMI were tabulated and the work up for the

Anemia included Serum Iron assay in conjunction with hemogram to confirm iron deficiency anemia. Megaloblastic anemia is confirmed with the help of peripheral smear as well as Serum B12 & Folate levels. BMI is calculated using height and weight of the patients. Results were tabulated

STATISTICAL ASSAY

MEDCALC version 7.0 was used for the statistical analysis. All the base line parameters were expressed as numerical and percentages with distribution as per rural vs urban and low BMI vs High BMI. Comparison was done with existing literature

RESULTS

A total of 1000 records were analyzed and of them 463 persons were found to have some degree of anemia. In all 28.4% of women had mild, 12.6% had moderate, and 5.3% had severe anemia making the

Table 1: Demographics and Symptoms

Variable	No Anemia	Mild	Moderate	Sever	P Value
Number	536	284	126	53	NA
Age [Mean + SD]	35+16	24+18	39+12	26+17	P=0.12
Diagnosis					
DUB*	15	34	43	16	P=0.25
PV# discharge	170	125	28	27	P=0.33
Pregnancy	286	80	32	8	P=0.30
Others	55	45	23	2	P=0.28
Symptoms					
Asthesnia	18	180	86	48	P=0.46
Weakness [Mild-mod]	22	134	42	8	P=0.38
Severe weakness	16	42	80	42	P=0.22
Breathlessness	2	86	56	36	P=0.16
Others	498	196	107	53	P=0.35
Hb** Value [Mean+SD]	12.6+2.8	10.3+1.3	8.4+1.2	6.8+2.3	P=0.27
MCV## <60	96	134	68	20	P=0.18
MCV60-99	398	48	27	14	P=0.24
MCV>100	42	102	31	19	P=0.35
Low Serum Iron	NA	178	91	32	P=0.16
B12 deficiency	NA	139	46	26	P=0.28
Folate deficiency	NA	46	32	18	P=0.25
Low BMI	89	34	10	25	P=0.10
Normal BMI	245	164	72	9	P=0.16
High BMI	139	86	34	19	P=0.22

*- DUB- Dysfunction Uterine Bleeding, #, PV- per Vaginal, **-Hb- hemoglobin ## MCV- Mean Corpuscular Volume

Table2: BMI Distribution among Anemic Patients Compared to Previous Publications

BMI	Existing Literature [8]		Present Observation	
	Rural	Urban	Rural [N=283]	Urban [N=180]
Low BMI [<18.5]	37%	12.1%	25% [n=71]	10% [n=18]
High BMI [>25]	7.3%	37%	10% [n=28]	56% [n=101]
Normal BMI	55.7%	51.9%	65% [n=184]	34%[n=61]

total as 46.3%. A total of 463 women aged 15–59 were finally analyzed as they form the target group [subjects with anemia]. Among them, 283 patients hail from the rural regions and 180 are from the urban regions. The commonest symptoms for the patients as well as demographics were shown in Table 1

DISCUSSION

This study looked into the prevalence and determinants of anemia in relation to their BMI and other variables. The results suggested that Prevalence of anemia was high among all women, however as compared to national statistics; this is slightly less in the current study. In all 28.4% of women had mild, 12.6% had moderate, and 5.2% had severe anemia. Both high and low BMI were associated with anemia. Predominant form of anemia in low BMI was-mixed picture, Low BMI was -Iron deficiency and high BMI was- Megaloblastic anemia. This is a new observation and is in lines with changing food habit. A comparison of the existing literature with current observations are tabulated. The BMI distribution among anemic patients compared to previous publications confirm a shift of etiology from predominance iron deficiency to dominantly B12 deficient state in this population.

The study re-emphasize that anemia still is an important health burden in women of both urban and rural origin, though the prevalence compared to a decade ago appears to be slightly less. New differential and tailored program strategies are needed, for

improving the hemoglobin for those with very low BMI [Iron supplements alone may not be enough and they need both Iron and B12 with folic acid]. Similarly in urban women, it's essential to sensitize regarding the balanced diet, [especially if the BMI is high] with focus on the B12 and folate supplements [besides other dietary modifications].

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