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Role of Clinical Pharmacist in Detection and Management of Iron Deficiency Anemia among Pregnant women in rural areas- A Community based study

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ABSTRACT

In developing countries like India, Iron deficiency anemia is measured as one of the foremost problems in antenatal mothers. According to World Health Organization, 40% of pregnant women worldwide are anemic. Anemia in pregnancy is identified by WHO as Hb levels less than 11g/dl and is divided into three levels of severity (mild anemia: Hb level 9-10.9 g/dl), (moderate: Hb 7-8.9 g/dl) and (severe: Hb level 7-4.5 g/dl). Oral iron replacement with continuing replenishment of iron stores and restoration of hemoglobin is the gold standard for treatment of mild to moderate Iron deficiency anemia. This is a prospective Interventional study conducted in rural areas of Sangareddy, Telangana to detect and manage iron deficiency anemia in pregnant women by assessing the effect of nutritional education on haemoglobin levels of pregnant women and find out the association between hemoglobin levels with selected demographic variables. 202 pregnant women are assigned on performing physical examination for Iron deficiency anaemia. The estimation of Hb was done by using strip based hemoglobin meter. Moderate Iron deficiency anemia was found in majority of study subjects. Data were analyzed using SPSS (version 22.0, Statistical Package for the Social Sciences) software. Paired t test was used to compare baseline and end line levels. At the end of nutritional education, the change in Hb levels and knowledge scores on anemia was found to be significantly high. Endowment of nutrition education was significantly associated with improved Hb levels and Nutritional knowledge on anemia and iron rich foods.

Keywords: Iron deficiency anemia, pregnant women, Hemoglobin, Hemoglobin meter, Knowledge

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INTRODUCTION

Anemia can be defined as a decline in hemoglobin (less than 13.5 g/dL in males; less than 12.0 g/dL in females) or hematocrit (less than 41.0% in males; less than 36.0% in females) or red blood cell (RBC) count [1]. Main manifestations of this condition are pallor of the mucous membrane, fatigue, dizziness, headache, shortness of breath, tachycardia and palpitation. In developing countries like India, Iron deficiency anemia is measured as one of the foremost problems in antenatal mothers [2]. During pregnancy, iron deficiency is comparatively common because of the increased iron demand, with a mean iron requirement of 4.4 mg/day and the requirements of other vitamins rise due to the physiological burden of pregnancy. The inability to meet the demand for these nutrients is a consequence of either dietary deficiency or infection which gives rise to anemia [3].

According to World Health Organization, 40% of pregnant women worldwide are anemic. As per NFHS-5 survey, 66.4% women suffered from anemia[5]. Anemia in pregnancy is identified by WHO as Hb levels less than 11g/dl and is divided into three levels of severity (mild anemia: Hb level 9-10.9 g/dl), (moderate: Hb 7-8.9 g/dl) and (severe: Hb level 7-4.5 g/dl) [4].

The common causes of iron deficiency anemia are insufficient consumption of dietary iron, multi parity, deprived socio economical and educational status and lack of knowledge on anemia [6]. Anemia in pregnant women has been considered as detrimental for the fetal growth and fetal outcome. It is an indicator of nutritional insufficiency that significantly contribute to low birth weight, increased maternal and perinatal morbidity, preterm birth, impaired cognitive development in newborns and diminished adult work productivity [7]. Women in low- or middle-income countries usually enter prenatal period with more restricted iron stores and poorer Hb concentrations compared with those who live in developed countries, consequently, an increased demand for iron in these females may thus enrich intestinal absorption, trying to recompense the iron deficiency, absorbing all iron available from diet.

Supplementary iron is needed for all pregnant mothers from 16 weeks on wards [8]. Oral iron replacement with continuing replenishment of iron stores and restoration of hemoglobin is the gold standard for treatment of mild to moderate Iron deficiency anemia. The National Nutritional Anemia Prophylaxis program (NNAPP) recommended 60mg of elemental iron and 500mg of folic acid daily for 100 days to all antenatal mothers [9].

A good dietary habit throughout pregnancy plays a major role in determining the long-term nutritional status of both the mother and unborn baby. Deprived dietary practices and patterns include consuming excess tea, coffee or cocoa during meal times, reducing the number of meals per day (<meals), and lack of dietary diversity[10]. Therefore the purpose of this study was to assess the knowledge, dietary habits associated with anemia in pregnant women and also to assess the impact of these factors and other socio demographic variables on Hb levels of these vulnerable groups of women.

MATERIAL AND METHODS

This is a Prospective study conducted on pregnant women according to inclusion criteria in and around the rural areas of Sangareddy district, Telangana. The patients are selected after explaining in detail about study design and written consent is taken.

Pre Counseling

Pretested Questionnaire was used to obtain Socio demographic information and present and past obstetric history in pregnant women. To obtain dietary habit, questionnaire adjusted for local food item was adopted and used to evaluate the usual intake of various food groups for the past one month with their respective consumption frequency. Different eating habits include eating animal foods, green leafy vegetables, taking fruit after meal, and drinking tea/coffee; this is measured by using food frequency questioner.

Weight and height were measured for computing Body Mass Index (BMI) [11]. The blood for hemoglobin measurement was done on the Standard Operational Procedures (SOPs) using portable strip based hemoglobin meter.one drop of capillary blood via finger prick was obtained to test hemoglobin concentration. Hemoglobin (Hb) level was analyzed based on the WHO classified levels of anemia (mild 10-11.9, moderate: 7-9.9, severe :< 7 g/dL). Beck Depression Inventory scale was use to evaluate the maternal depression levels in study population

Counseling:

Nutritional education standard on anemia with face to face lessons was developed. Key message on nutrition education to the study subjects comprised of causes of IDA, Consequences of IDA in pregnancy, iron rich foods, enhancers and inhibitors of iron absorption and iron rich food based diet. The nutrition education counseling was held approximately 1hour. At the completion of the session, Information material called counseling leaflets were circulated. In every two weeks phone call of about 3-5 minutes was done as follow up to recognize the condition of pregnant women and deliver key messages.

Post Counseling

Improvement if any about the knowledge of anemia prevention and Hb levels were reassessed by Hb estimation after a gap of 2 months. Comparison was made between the result of pre- and post –test to evaluate the increased levels of Hemoglobin (primary outcome). Secondary outcome include knowledge on IDA and nutrition. Individuals in our study were selected based on the physical examination like presence of brittle nails, pallor, glossitis, weakness, leg cramps and then by using questionnaires patients were further evaluated. Self-administered questionnaires were disseminated, which was developed based on extensive literature review and adopted to consider cultural prospective. The questionnaire was developed in English and then translated into Telugu language for simplicity all subjects who agreed to participate in the study were explained about the study. Informed consent was obtained from all the participants included in the study.

Statistical analysis:

Data were analyzed using SPSS (version 22.0, Statistical Package for the Social Sciences) software. Descriptive statistics were used to designate the characteristics of the study subjects (e. g. Frequency, percentage). Cross tabulation and Pearson chi-square test was used to compare magnitudes for variables.

RESULT

A total of 202 pregnant women participated in the current study. Average Hemoglobin level was found to be 8.48g/dL. It was observed that out of 202 women, 30(14.85%) was mild, 141(69.8%) was moderate and 31(15.34%) was severe as per WHO. (Figure1).

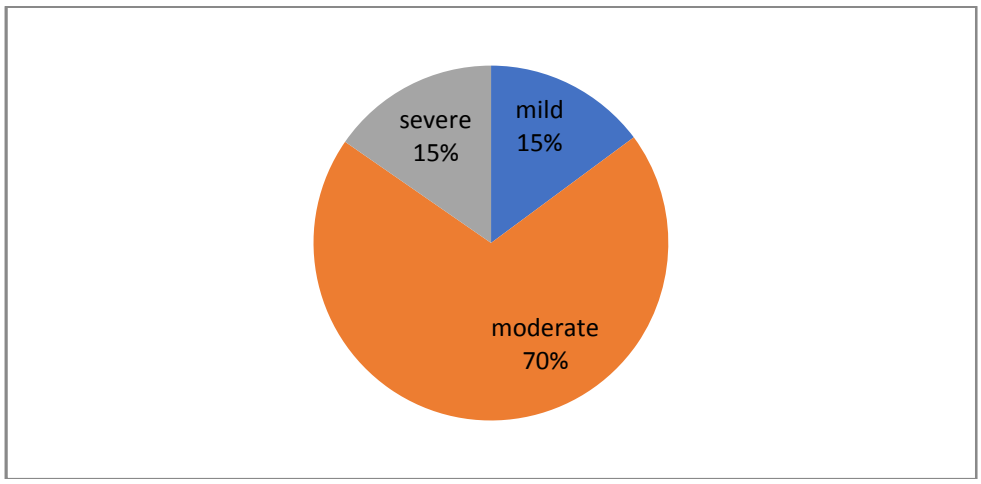


Figure 1.Distribution of study subjects based on degree of IDA

Table 1 shows characteristics of studied women and their association with anemia.. BMI is used as a standard to classify underweight, normal and overweight. The study results showed that, Out of 202 pregnant women, 46(23%) were underweight, 147(73%) were normal and 9(4%) were overweight. In the terms of their financial status, 16.8% were in low class. Subjects who had household family size of >5 were more (67%) than household family size <=5(33.1%). On their educational status, majority 114(56.4%) were illiterate. About 49% of respondents had child spacing interval of < 2 years.68% took iron supplementation regularly.

Table 1: characteristics of studied women

Characteristics		Mild	Moderate	Severe	Total(%)	P
Educational status	Literate	13	77	24	43.5 (43.5)	0.01
	Illiterate	17	64	7	56.4 (56.4)	
Monthly income	Low	6	15	12	34 (16.8)	0.0413
	Middle	21	107	17	144 (71.3)	
	high	3	19	2	24 (11.9)	
trimester	1	5	17	8	30 (14.8)	0.786
	2	17	89	31	123 (60.8)	
	3	8	17	10	49 (24.2)	
Iron supplements	Yes(regular)	11	112	6	40 (19.8)	<0.05
	Yes(Irregular)	1	8	24	129 (63.86)	
	No	18	21	1	33 (16.3)	
Time span b/w pregnancy	<=2 years	13	65	21	99(49)	0.203
	>2 years	11	60	9	80 (39.6)	
	First pregnancy	7	6	10	23 (11.38)	
No. of previous pregnancies	0	8	27	5	40 (19.8)	0.054
	1	13	73	8	94 (46.5)	
	2	9	38	16	63 (31.1)	
	>2	0	3	2	5 (2.4)	
BMI	Underweight	7	33	6	46 (22.7)	0.965
	Normal	22	101	24	147 (73)	
	Overweight	1	07	1	9 (4.4)	
Family size	<=5	10	27	4	67 (33.1)	0.030
	>5	20	88	27	135 (66.8)	

Figure 2 represents dietary habits of study participants. Out of these 46% consumed fruits/fruit juices frequently, 80.1% took tea/coffee post meal, 66.83% had green leafy vegetables frequently, 46% and 91% had eggs and pulses frequently respectively. More than 60% of the study participants don't consume meat frequently and surprisingly 22.2% were in the habit of taking junk food frequently.

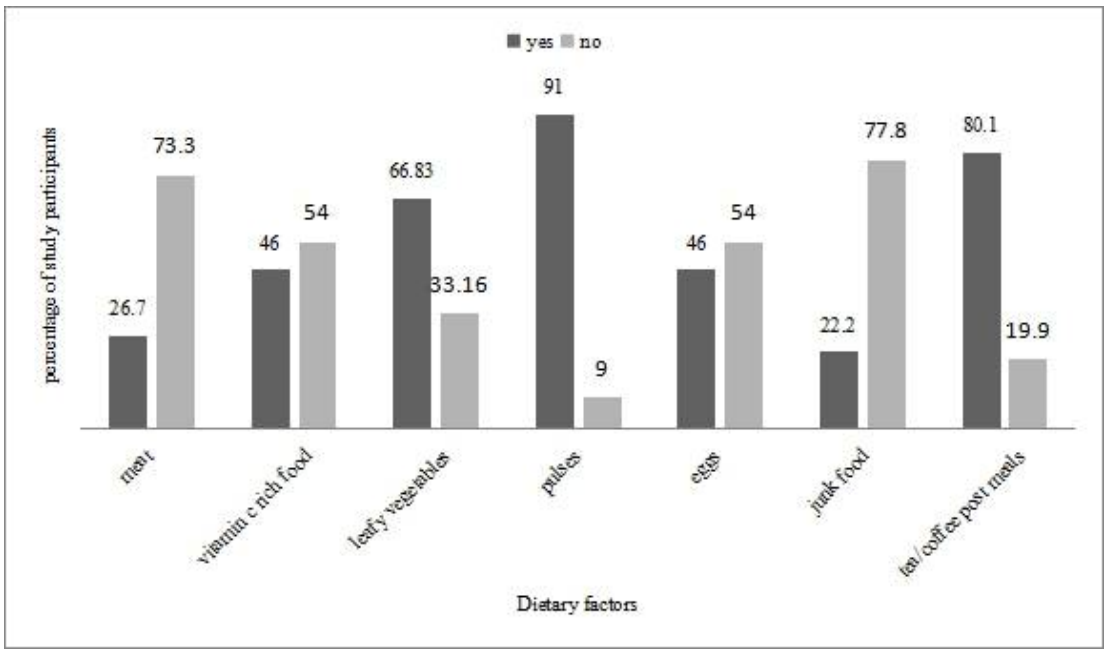


Figure 2. Distribution of study participants based on Dietary factors

Knowledge on Iron deficiency anemia shows that 53% of participants had satisfactory knowledge on anaemia followed by poor knowledge 741%. Only 6% had good knowledge on anaemia (table no.5).

Table 2: Distribution of study participants based on Knowledge on IDA:

Knowledge	Mild (%) n=30	Moderate (%) n=141	Severe (%) n=31	Total (%) n=202	p
Poor	1(3%)	60(42.5%)	21(67.7%)	82(40.5%)	<0.00001*
Satisfactory	21(70%)	77(54.6%)	9(29%)	107(52.9%)	
Good	8(27%)	4(2.83%)	1(3%)	13(6.4%)	

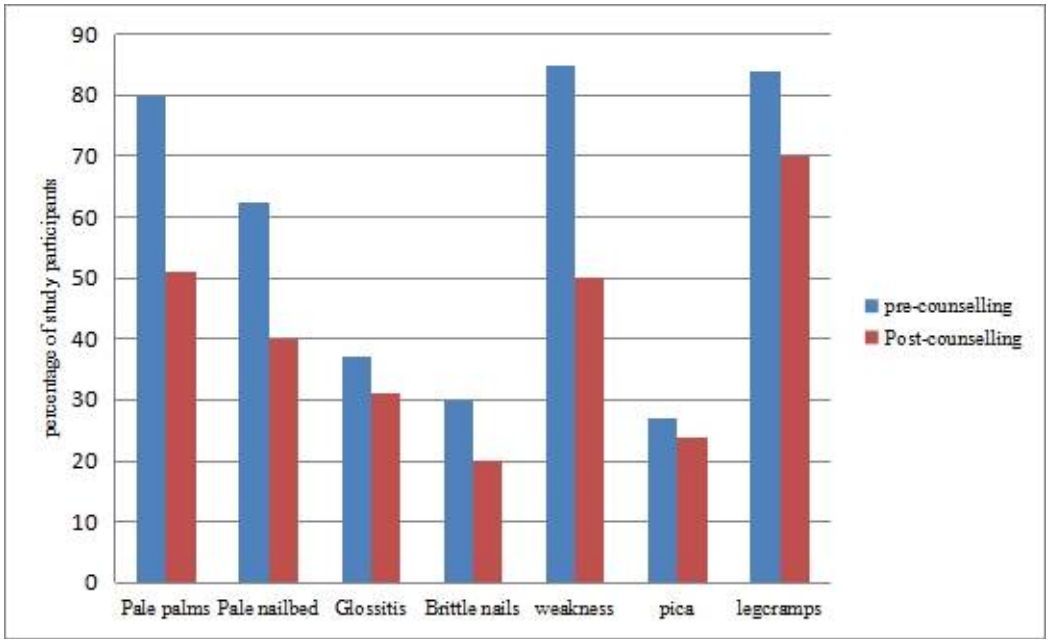


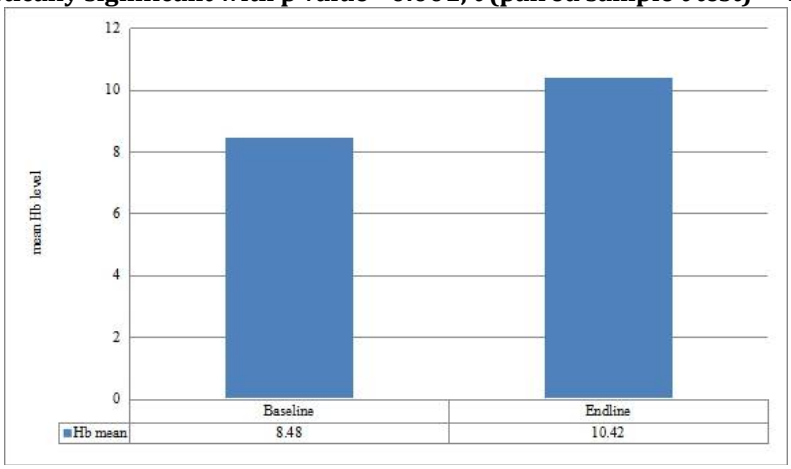
Figure 3 represents clinical history of study participants before and after counseling.

By using Beck depression inventory scale, study participants were classified into mild (38%), moderate (34%) and severe (16%) depression. (table 3)

Table 3: Distribution of study participants based on Depression (n=202)

Depression	IDA(n=202)			P
	Mild	Moderate	Severe	
Mild	16	54	7	0.014
Moderate	9	44	14	
Severe	1	21	10	
Nil	5	21	1	

Figure 4 shows mean hemoglobin 8.48 (SD=1.24) pre counseling and 10.42 (SD=6.60) post counseling in study subjects and therefore a rise by 1.94 (SD=6.54) in two months. This is statistically significant with p value <0.001, t (paired sample t test) =-4.213



Mean difference of post 8.47 (SD=4.37) and pre 5.58 (SD=3.44)counseling knowledge score on iron deficiency anemia is found to be 2.89 (SD=5.02) T= -8.157and found significant at p=<0.001

DISCUSSION

The current study assessed the degree of anemia and its associated risk factors among pregnant women in rural areas of Sangareddy, Telangana State, India. Moderate anemia was found to be common and followed by severe anemia. Consistent result was reported from studies conducted in Hyderabad [12] (Telangana). Rajamouli et al., reported [13].

Many factors were associated with or have been implicated in an increased risk of developing IDA. The study found number of previous pregnancies, Pregnancy trimester, average spacing time between pregnancies were not all significantly related to the anemic women in this study. While other previous studies indicated several influencing factors for IDA during Pregnancy, including number of previous pregnancies [13], lack of birth spacing [15] and gestational age [16].

Monthly income was significantly associated with anemia in pregnancy in pregnant women who had low monthly family income were more likely to be anemic as compared to those with high monthly family income. This finding is consistent with a study conducted in Vizianagaram [17] and Ethiopia [18]. Hence, pregnant women with low income groups could not get adequate nutrition so that they were at risk of anemia.

Pregnant women who have had no iron supplementation or irregular iron supplementation on their current pregnancy were in about two times higher risk of developing anemia as compared to those who have had iron supplementation regularly this finding is consistent with the findings from goed town [19] and Vietnam [20], which indicated lack of iron supplementation was among the most significant risk factors for a developing anemia during pregnancy. This is likely due to the fact that the requirement for iron increases for pregnant women as compared to non-pregnant women; this is associated with the reality that blood volume increases by 50% during pregnancy and the requirement of iron to growing fetus and placenta. Therefore, supplementation of iron during pregnancy is crucial to fulfill this need.

In this study, family size was also significantly associated with anemia; pregnant women with family size greater than 5 were at higher risk of developing anemia than those with family size less than five. This finding is comparable with a study conducted in Shala Woreda [21] in which the prevalence of anemia was higher among women with family size >5 as compared to their counterparts. The direct relationship of family size with anemia in this study could be associated with food insecurity for large family size.

In the present study majority of pregnant women with anemia were illiterate who were unaware of iron supplementation and importance of nutritious diet during pregnancy. Rate of illiteracy was 43.5% in our study. Bereka *et al* [22] observed in their study that 72.2% had no formal education while the remaining 27.8% were educated till primary level and above. Rajamouli *et al* [13] observed that in the education category, majority of the patients suffering with anemia were illiterates (46.4%) as compared with other education levels.

In the present study, Depression was significantly associated with depression by using Beck depression inventory which can serve as a rapid screening test for depression during pregnancy found by study conducted by W L Holcomb Jr *et al*, [23]. This is in agreement with the study findings reported by Lukose *et al* [24]; However Yilmaz *et al*. depicted the existence of such an association between depressive symptoms and anemia and third trimester in pregnancy [25]. The importance of screening for depression during pregnancy is that prenatal depression, if not treated and diagnosed early, may continue as post-natal depression [26], later on and could also result in an adverse influence on birth outcomes and offspring development.

The present study indicates that the nutrition education and iron rich foods based diet plan during pregnancy led to improved hemoglobin level .Similar results were reported by Garg & kasyap [27], showing that Individual counselling significantly improved mean Hb levels in pregnant women in pretest posttest study.(0.97 vs. 1.58,P<0.001) .Likewise a randomized control trial among the Nepalese pregnant women the education program only seen to be significantly higher Hb change (0.23gm/dl) compare to the control group (p<0.01) [28].

CONCLUSION

Our study concludes the provision of nutrition education and iron rich food based diet for pregnant women was found to be associated with improved hemoglobin levels. Provision of nutritional education and knowledge on IDA was significantly associated with Improved Knowledge score on IDA. Monthly income, family size, educational status and iron supplementation were significantly associated with anemia and indirectly contribute to anemia of pregnancy. Education and awareness about anemia in pregnancy can lead to better fatal and maternal outcomes. We recommend awareness creation on birth spacing and nutritional counseling on consumption of iron-rich foods and iron supplementation to prevent anemia among pregnant women with special emphasis on those from low income group and large family size. This information can be beneficial for public health policy makers and women's health studies as it can help developing certain strategies to enhance women's antenatal care as well as national programs highlights the importance of IDA preventions and treatment over along the reproductive age for women .social and cultural perspectives of care during pregnancy need to be further explored based on this study results so as to highlight the importance of social and cultural perspective as well.

CONFLICT OF INTEREST

The authors have no conflicts of interest regarding this study.

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