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Prevalence of Anemia in Pregnant Women w.s.r.t. Socio-economic Status: Observational Study

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Abstract

Anaemia is defined as the condition in which there is a reduction in the concentration of hemoglobin in the blood stream to a level below 11%gm for pregnant women [1,2]. 40% of all maternal peri-natal deaths are linked to anaemia [3]. In India, up to 88% of pregnant women are affected [4]. Anaemia in pregnancy, particularly iron deficiency is a prominent problem in developing countries. A high prevalence of anemia in pregnancy was observed (96.5%) of which 22.8% had mild, 50.9% had moderate & 22.8% had severe anaemia in a study conducted in Delhi [5,6]. The consequences of anaemia for women include increased risk for low birth weight or prematurity, peri-natal & neonatal mortality, inadequate iron stores for the new born, increased risk of maternal morbidity & mortality & lowered physical activity, mental concentration & productivity [8]. The study was an observational study which comprised of 100 pregnant woman of age between 18 to 40 years attending the ante-natal care unit (Prasooti & Streeroga OPD) at K.L.E Society's Ayurveda Hospital, Shahapur, Belagavi being diagnosed as anemic as per Hb value, irrespective of caste, religion, socio-economic status& who gave consent were included in the study. The subjects suffering from any chronic illnesses, bleeding disorders, tuberculosis & other immunological diseases were excluded from the study. Chi square test was used to test the significance of the data. The study revealed that, health services were available and accessible in general, but a major constraint was that the people could not afford to utilise it, because of the quality of the service, delivered - there was poor quality awareness of women about the health services. The prevalence was higher in poorly educated women, women with large family size, and those who do not use family planning services.

Introduction

Anaemia is a late manifestation of deficiency of nutrient(s) needed for hemoglobin synthesis. Most of the anaemia are due to inadequate supply of nutrients like iron, folic acid & Vit-B_{12}, protein, amino acid, Vit-A, C & vitamins of B-complex group ie, Niacin & pantothenic acid are also involved in the maintenance of hemoglobin level [8]. In recent years, the contribution of B_{12} deficiency has been highlighted [9]. In India, the prevalence of anaemia is high because of low dietary intake, poor iron & folic acid intake, poor bio-availability of iron in phytate & fibre rich Indian diet & chronic blood loss due to infection such as malaria & hook worm infestation [10,11]. Anaemia gets aggravated by increased requirements during adolescents & during pregnancy [12]. However iron stores in these neonates are low, iron contents in breast milk in anemic women is low because of these factors substantial proportion of infants become anemic by 6 months [13]. Thus maternal iron deficiency and anaemia rendered the offspring vulnerable for developing iron deficiency & anaemia right from infancy [14]. Most of the studies suggest that a fall in maternal hemoglobin below 11gm /Dl is associated with a significant rise in perinatal mortality rate [15,16]. Women with moderate anaemia have substantial reduction in work capacity & find it difficult to cope with household chores & child care. They are more susceptible to infection and recovery

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from infection may be prolonged [17]. Women with severe anaemia have higher maternal mortality rates when Hb level fall below 5gm/Dl.In urban primary health care institutions, it is possible to screen pregnant women for anaemia, identify those with Hb between 5.0 and 7.9 g/dl and give them in therapy as outpatients. Anaemia in pregnancy is associated with adverse consequences both for the mother and the foetus [15,16]. Effective implementation of the Tenth Plan strategies for combating anaemia can go a long way in reducing the short- and long- term adverse consequences of anaemia [16,17]. Hence the aim of this study was to identify the prevalence of anaemia among pregnant women in relation with their Socio-economic status.

Material and Methods

Setting of the Study

K.L.E Society's Ayurveda Hospital, Belagavi.

Study Population

Pregnant woman attending ante-natal care unit (Prasooti & Streeroga OPD) at K.L.E Society's Ayurveda hospital, Shahapur, Belagavi.

Sample Size

100

Study Design

Observational Study.

Inclusion Criteria

The pregnant women of age between 18 to 40 years of age who were diagnosed as anemic as per Hb value, irrespective of caste, religion, socio-economic status & who gave consent were included in the study.

Exclusion Criteria

The pregnant women with the age less than 18 years & more than 40yrs & those who were suffering from any chronic illnesses, bleeding disorders, tuberculosis & other immunological diseases were excluded from the study.

Study Period

The total study period was 3-4 months ie, from June 2015 to September 2015.

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Laboratory Investigation

Haemoglobin estimation, Pregnant women with a hemoglobin level less than 11g/dl and non-pregnant women with a level less than 12g/dl are considered anemic (WHO, 2001; WHO, 2006).

WHO (2000) has defined anemia as mild, moderate, or severe based on the following cut-off values (g/dl) for hemoglobin level [59].

	Mild*	Moderate	Severe
Pregnant	10-10.9	7.0-9.9	<7.0
Non-pregnant	11-11.9	8.0-10.9	<8.0

*The level of anemia termed 'mild' is still a serious condition given iron deficiency is already advanced by the time anemia is detected and deficiency can have functional consequences even when anemia is not clinically apparent (WHO, 2006).

Statistical Analysis

Relevant statistical test were applied to analyze the relation between Socio-Economic Status & Anemia in pregnancy.

Data Collection

A study proforma was used to collect the required data & information. In this study all questions were answered with full consent of respondents. Subjects were interviewed at the ante-natal OPD regarding demographic & socio-economic characteristics & pregnancy history. The hemoglobin estimation of these women was done by Sahli's method. Anemia was classified as per WHO criteria. The data obtained was tabulated using MS EXCEL. Frequency distribution, Percentages, mean, standard deviation& averages were used to present the data. Chi square test was used to test the significance of the data.

Results

Table 1: Age distribution of mothers

Age	Number (percentage)
18-25yrs	(65%)
26-35yrs	(22%)
36-40yrs	(13%)

As shown in Table 1, women differed in their ages from very young mothers (18-25 years old) to peri-menopausal women (40 years old). The majority of the mothers were in the age range of 18-25 years old (65%) which reflects the traditional marriage age of women in the province. Mothers of age range of 26-35 years old & 36-40yrs represented percentages of 22% and 13% of the examined mothers, respectively.

Religion

In this study, a maximum of 71% of patients were Hindu, 20% of patients were Muslims, 4% were Christians & 5% were belongs to other religions.

Table 2: Table showing of populations of pregnant women according to Religion

Religion	Number (Percentage)
Hindu	(71%)
Muslim	(20%)
Christian	(4%)
Others	(5%)

Occupation

In the study group of 100 patients, 32% were working while 68% were housewives.

Area

Among 100 patients, 28% were from rural &72% were from urban area.

Table 3: Occupations in pregnant women

Occupation	Number (percentage)
Working	(32%)
Housewives	(68%)

Table 4: Area wise distribution of pregnant women

Area	Number (percentage)
Rural	(28%)
Urban	(72%)

Education Level of Mothers and Husbands

Table 5: Educational levels of pregnant women

Parameter	Number (percentage)	
Educational level	Women	Men (Husbands)
Illiterate	(2%)	(3%)
Primary	(5%)	(7%)
Secondary	(19%)	(11%)
University	(66%)	(69%)
Postgraduate	(8%)	(10%)

Table (V) demonstrate the percentage of women and their husbands receiving different levels of education. The most interesting notice that from these data is the fact that about 2% of women and 3% of their husbands were illiterate without any level of education which represents an obstacle for health-improvement programs. Moreover, about 66% of women and 69% of husbands were under university education level meaning that the majority of women and their husbands was either illiterate or just receiving secondary and primary educations.

In addition, women receiving postgraduate education was only 8%; meanwhile husbands entered this high level of education was 10%. Indeed, these unoptimistic figures indicated that hindered features could be expected from the examined society as will be explained later in the association section between education and presence of anaemia. At the same time maternal education had a significant influence on nutritional status.

Effect of Age and Education Level

Table 6: Influences of age & education on anemia level on pregnant women

Terms of influence	Percentage of women with anemia					
	Normal >11.0g/dl	Mild anemia11.0 – 9 g/dl	Moderate Anemia 9.0 – 7.0 g/dl	Severe anemia 7.0 - 4.0 g/dl	Very severe anemia< 4.0 g/dl	Total no(n=100)
Age						
18-25yrs	-	-	24	-	-	24
26-35yrs	-	18	-	-	32	50
36-40yrs	-	-	-	26	-	26
Total	-	-	-	-	-	100
Women education						
Illiterate	-	-	-	-	28	28
Primary	-	-	-	23	-	23
Secondary	-	-	22	-	-	22
University	-	15	-	-	-	15
Postgraduate	-	12	-	-	-	12
Husband education						
Illiterate	-	-	-	-	26	26
Primary	-	-	-	23	-	23
Secondary	-	-	20	-	-	20
University	-	18	-	-	-	18
Postgraduate	-	13	-	-	-	13

Table 6 shows anaemia levels among the interviewed women aged from 18 to 40 years old. The level of anaemia was very severe in about 32% of women, while 18% and 24% had a mild and a moderate level of anaemia and 26 % of the examined women had severe level of anaemia, respectively. Statistical analysis indicated that age was strongly associated with anaemia levels and it was inversely related to the presence of anaemia with older women being somewhat more likely to be moderately or severely anemic than younger women. For instance, women older than 35 years old (in the age category of 36-40 yrs) were all suffering from anaemia from mild to very severe conditions. Strictly speaking, the rate of severe and very severe anaemia condition among women aged 36-40 years was almost five times as high as among women age 18-25 years. On the other hand, As shown in the second part of Table 6, about 28% of the illiterate women had anaemia from mild to very severe levels with about 23% having anaemia from moderate to very severe level. Women with a higher education are less frequently anemic than illiterate women or women with a primary or secondary education. Surprisingly, 12% women who had postgraduate study was suffering from mild level of anaemia but this could be attributed to some other factors not to her educational level. In spite of this misleading result, women with university, secondary and primary educations had moderate to very severe level of anaemia of 15, 22, 23% respectively indicating that when the women were well educated the anaemia level reduced significantly. Now, the question that should be investigated is that whether the husband education also affects the anaemia level of the interviewed women or not. The third part of Table 6 has the answer of this question. In general, husband education has a significant effect on anaemia level of the interviewed women. About 26% of illiterate husband their wives had anaemia from mild to very severe conditions. On the contrary, educated wives of highly educated husband had a lower rate of anaemia. Wives of husbands with postgraduate education had the lowest level of anaemia.

Types of Mothers' Diet

As exposed, in Table 7, the majority of the mothers had a poor diet (36%) or a very poor diet (40%) indicating the very poor nutritional conditions of the interviewed mothers. Some factors influencing pregnancy outcomes 24% of the studied women knew the right types of foods they were supposed to eat during pregnancy.

Table 6: Types of diet in pregnant women

Diet	Number (percentage)
Adequate	(24%)
Poor	(36%)
Very poor	(40%)

Percentages of Folic Acid Intake by Mothers

Table 7: Folic acid intake in pregnant women

Folic acid intake	Number (percentage)
Positive	(82%)
Negative	(18%)

The percentage of mothers who were practicing folic acid intake during their pregnancy stage is shown in Table 8. It is very obvious to notice that the majority of mothers (82%) were practicing folic acid intake; meanwhile the rest (18%) did not take folic acid at all.

Influence of Awareness, Diet and Folic Acid

Table 8: Influences of age & education on anemia level on pregnant women

Terms of influence	Percentage of Women with Anemia					
	Normal >11.0g/dl	Mild anemia 11.0 – 9 g/dl	Moderate Anemia 9.0 – 7.0 g/dl	Severe anemia 7.0 - 4.0 g/dl	Very severe anemia < 4.0 g/dl	Total no (n=100)
Awareness						
Very aware	-	16	-	-	-	16
Aware	-	-	31	-	-	31
Aware to some Extent	-	-	-	29	21	50
Not aware	-	-	-	-	3	3
Diet						
Adequate	-	12	5	3	4	24
Poor	-	9	13	10	4	36
Very poor	-	-	-	-	-	40
Folic acid						
Intake	-	26	31	18	7	82
Not intake	-	-	-	-	18	18

The results shown in Table 9 revealed that awareness had a very significant effect on the presence of anaemia among pregnant women. In fact, it was not an astonishing matter to find that more than half of the interviewed women (about 18%) were not aware or had a little awareness about the danger of anaemia due to that fact that the majority of these women was either illiterate or had a primary or secondary education as described before.

The awareness of these facts responded by the interviewed women is shown in te previous table. It is obvious that the majority of mothers were either not aware (3%) or aware to some extent (50%) about the danger of anaemia. Table 7 shows that the prevalence of anaemia was higher among women who have intake of very poor diet. The ratio of women having very poor diet with presence of anaemia (in all levels altogether) was 90, 89.55 and 98.55 % for women having adequate, poor and very poor diet respectively. Actually, it was unusual to notice that even women having adequate diet were also suffering from anaemia which could be attributed to some other interacted factors.

As declared in Table 8, although the percentage of women taking folic acid during pregnancy stages was much higher than those who did not acquire it, there is no significant difference among women in their response to folic acid during all stages of pregnancy. This could be attributed to the little uptake of folic acid by the interviewed women.

Hemoglobin Level

Table 9: Ranges of Hemoglobin level in pregnant women

Hemoglobin level	Number (percentage)
11.0 – 9g/dl	(29%)
9.0 – 7.0 g/dl	(39%)
7.0 - 4.0 g/dl	(22%)
< 4.0 g/dl	(10%)

As shown in Table 10, about 22% (22 women) were suffering from severe and 10% were very severeanaemia. The problem of anaemia makes women feel cold, weak, dizzy and irritable during pregnancy. In addition, about 68% of the investigated

women sample was suffering from mild and moderate anaemia. In total, more than 95% of the examined women had anaemia during pregnancy leading to a negative influence on their ordinary life activities.

Child Spacing

Table 10: Child spacing in pregnant women

Child Spacing	Number (Percentage)
>2yrs	(63%)
<2yrs	(37%)

The collected data indicated about 63 % of mothers had more than two years between repetitive pregnancies and 37% of women had a child spacing of less than two years.

Discussion

Although the sample of mothers was not normally distributed in an ideal manner, the wide range of their ages gave a better change to study the influences of age on anaemia conditions related to eating habits, education and overall awareness. Most of the subjects are hindus as the area where the study conducted is Hindu dominant. The hospital, where the study is conducted is situated in urban area & this can be the reason of this prevalence. Indeed, these unoptimistic figures indicated that hindered features could be expected from the examined society as will be explained later in the association section between education and presence of anaemia. At the same time maternal education had a significant influence on nutritional status. The rate of moderate to very severe anaemia in wives of husbands who had postgraduate, university, secondary and primary educations were 13,18, 20 & 23% respectively indicating that when the education level of women's husband was high the anaemia level reduced considerably. women education has a great influence on their attitude of hemoglobin deficiency leading to anaemia disaster. In brief, anaemia decreases steadily with the increases in the level of educational attainment in the interviewed women. Low education level has indirect effects on the understanding of nutrition and food aspects as well as improvement of the socio-economic conditions. Family income was another important factor related to the anaemia level since it improves some other related factors such as nutrition, education, awareness and hygienic conditions. Diet and nutritional status of the pregnant women is another angle of the problem that has been dealt with in this study because it is well known that there are differentials in the anaemia rates by nutritional characteristics. The result probably can explain the very high percentages of anemic mothers in this study since it is extremely associated to the nutrition condition of the mothers.

The main aspect of care for persons affected by anaemia involves early treatment intervention of preventable health problems such as analgesics, antibiotics, vitamins; folic acid supplementation and high fluid intake are periodically used.

Having a healthy baby means that mothers must be healthy too. Folic acid, sometimes called folate, is a B vitamin (B9) found mostly in leafy green vegetables like kale and spinach, orange juice, and enriched grains. Mothersbodyneeds folate to make normal red blood cells and prevent anaemia. One of the most important things mothers can do to fulfil their body needs and to help prevent serious problems is to get enough folic acid every day- especially during early pregnancy. Folic acid is also essential for the formation and maturation of red blood cells and necessary for cell growth and repair. Deficiency of folate reduces the rate of DNA synthesis with consequent impaired cell proliferation and intramedullary death of resulting abnormal cells; this shortens the lifespan of circulating red blood cells and results in anaemia. There is, however, little evidence that folic acid deficiency may be a public health problem in many developing countries. Awareness in this context indicated to the state and the ability to perceive the danger of anaemia and its negative consequences during and after pregnancy. The only way to realize the dangers of anaemia would be throughout better awareness either during education or by increasing this knowledge by organized campaigns. Maternal education level therefore influences the food choices and feeding patterns of family members.

Majority of the women in this study had attained only primary level education. Marital status has been reported to influence pregnancy outcome. Generally speaking, awareness had an inverse effect on the presence of anaemia, when the awareness increased the existence of anaemia among women decreased significantly. As a matter of fact, the inadequate nutritional practices usually lead to anaemia particularly in pregnant women. On the other hand, adequate amounts of protein, fat, carbohydrates, vitamins, and minerals are required for a well-balanced diet.

Considering differentials by women's nutritional

status, the greatest variation in anaemia was observed when the diet was rather poor. When the diet enhanced the haemoglobin level in the interviewed women was improved very significantly.

In general, poverty has a negative effect on the consumption of nutritious types of food. Women in households with a low standard of living are less likely than other women to eat various foods, and their diet is particularly deficient in fundamental element. It was foreseen that women residing in urban areas should be less likely for substantial anaemia conditions than women residing in rural areas because they have access to every type of food in their diet, particularly nutritious foods, and access to more advanced public and private clinics. The dietary intake of rural pregnant women was lower than the recommended level. Because anemia usually results from a nutritional deficiency of iron, folate, vitamin B12, or some other nutrients, it is quite vital to look after of the women's diet especially during pregnancy. The consumption of a wide variety of nutritious foods is important for women's health. For example, green, leafy vegetables are a rich source of iron, folic acid, vitamin C, carotene, riboflavin, and calcium. It is reported that riboflavin deficiency may be quite common in developing countries where intake of animal products is low, and especially during seasons when there is less intake of vegetables. Vitamin B12 is necessary for the synthesis of red blood cells and its deficiencies have been associated with anaemia. Therefore, diets with little or no animal protein, as it is often the case in the developing world, coupled with malabsorption related to parasitic infections of the small intestine, might result in Vitamin B_{12} deficiency.

Usually, iron and folic acid tablets are provided to pregnant women in order to prevent anaemia during pregnancy. The provision of iron and folic acid supplements to pregnant women has undoubtedly reduced the overall prevalence of anaemia in pregnant women. However, the result tabulated in Table 8 revealed that intake of folic acid was insufficient for reducing the prevalence of anaemia in the interviewed women because both women who intake or did not intake folic acid are suffering from anaemia.This result could be elucidated to the low amount of folic acid taken by the women which was not enough to beat this epidemic dominant problem. Supplementation of iron during pregnancy is one of the main components of the anaemia control and prevention strategy. The provision of iron and folic acid supplements to pregnant women will undoubtedly reduce the overall prevalence of anaemia in pregnant women. Because folic acid is an essential element that usually used to alleviate the problem of anaemia, this strategic component was investigated in the current study.

Anaemia in pregnancy is defined by World Health Organization as hemoglobin level of less than 11.0 g/dl and often classified as: Mild degree (9.0-11.0g/dl), Moderate (7.0-9.0g/dl), Severer (7.0-4.0g/dl), Very Severe (<4.0g/dl). Based on this classification, the examined women samples were classified according to the measured hemoglobin in their blood analyses. Hemoglobin is the protein molecule in red blood cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues to the lungs. Hemoglobin levels indicate the oxygen carrying capacity of the blood. Anaemia occurs when the blood does not have enough hemoglobin because the blood does not carry enough oxygen to the rest of the women's body. Therefore, anaemia is a medical condition in which the red blood cell count or hemoglobin is less than normal. The normal level of hemoglobin is generally different in males and females as well as in pregnant females. For women, anaemia is typically defined as hemoglobin level of less than certain thresholds.

Time interval between pregnancies strongly influences the outcome of the subsequent pregnancies. Short birth interval does not give the mother enough time to recuperate from the nutritional burden of the previous pregnancy, which may lead to poor pregnancy outcomes. This interesting distribution will be associated with anaemia in the subsequent part of this study. Good pregnancy outcomes are expected when there is a gap of at least 18 – 23 months between the consecutive pregnancies. Child spacing means the period between two consecutive pregnancies of the same mother. Because the nutritional burden on the mother between pregnancies depends on the extent of breastfeeding, the inter-pregnancy interval and the 'recuperative interval' (duration of the non-pregnant, non-lactating interval) could measure whether the mother has had a chance to recover from the pregnancy. Therefore, it is expected an increased risk for maternal anaemia when the inter-pregnancy interval is very short.

Conclusion

In this study, the prevalence of anaemia among pregnant women was investigated under the influence of some nutritional and socio-economic factors. The health services is available and accessible in general, but a major constraint is that the people could not afford to utilise it, because of the quality of

the service, delivered there is poor quality awareness of women about the health services. The prevalence was higher in poorly educated women, women with large family size, and those who do not use family planning services.

The study revealed that the prevalence of anaemia was the same among women who attend clinical units and using iron supplementation and women who do not attend or use iron supplementation. These findings strongly raise the issue of the awareness of mothers towards their health and family. More studies are needed to explore the causes of the failure to prevent anaemia among pregnant women. It is recommended to redistribute the health services according to needs of the population, to train clinical providers to deliver services up to the standard of the guidelines recommended by the World Health Organization, to increase the awareness of midwives regarding diagnosis, treatment and referral system of anaemia cases, to implement advocacy program to increase the utilization of family planning services, and iron supplementation in reproductive age and to revitalize the cooperation and coordination between school health and health education departments to raise the awareness of women in reproductive age, particularly girls in secondary schools for better anaemia prevention.

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