Short Communication

Nutrition and Anaemia in Women in Reference to Odisha

Puspanjali Mishra*

IMS & SUM Hospital, SOA University, Odisha, India

***Corresponding Author:** Puspanjali Mishra, IMS & SUM Hospital, SOA University, Odisha, India.*

Anaemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary with age, sex, attitude, smoking and pregnancy status, if any [1] Today anaemia is a big health problem of many people as it causes mortality. Major causes of anemia depend on many factors such as intake, food and its nutritional status, environment, social-economic and educational status. Besides Malaria, hookworm infestations are also one of the causes of anaemia.

According to the WHO, in the whole world 42% of children less than 5 years of age and 40% of pregnant women are affected by anaemia [1]. The highest prevalence of anaemia exists in the developing countries where it's causes are multi-factorial [2]. National Family Health Survey statistics report of world reveals that every second one Indian women is anaemic and one in every five maternal deaths is directly due to anaemia [3]. It affects half a billion women of reproductive age worldwide.

According to Down To Earth the study 'Severe anaemia declined by over 7% in India' it was found that 75 per cent severely anaemic individuals in South Asia are in India. The magnitude of anaemia is less than 2 per cent in Kerala, Nagaland, Himachal Pradesh and Goa. The percentage has declined from 10.6 to 3.1 per cent in Bihar. Besides this in Haryana it has declined from 12.3 to 4.9 percent. The instance of severe anaemia varies widely across states. The magnitude is lower (less than 2 per cent) in Kerala, Nagaland, Himachal Pradesh and Goa. In Bihar, the percentage has declined from 10.6 to 3.1 per cent. Similarly, in Haryana, this number has fallen from 12.3 to 4.9 per cent. In economically better states like Telangana and Andhra Pradesh severe anaemia is high such as 8 - 10% and 6 - 8% respectively [4].

Tata YC (2019) made a cross sectional study on 'Dietary intake, forest foods, and anemia in Southwest Cameroon' revealed that to-tal 247 women of reproductive age group were taken out of which n = 126 were from four non-forest villages and n = 121 were from four forest-based villages. Data regarding haemoglobin level, anthropometric status, diet (24-hour recall method) as well as anaemia-related morbidity and socio-demographic characteristics were recorded. After statistical analysis it was found that women living in forest communities had better haemoglobin status as compared to women living in non-forest communities. a leafy green vegetable that grows in forests of the Congo, vitamin-A rich fruits, and vegetables, animal sources foods that found in forests by the women living in forest communities showed better haemoglobin level as compared to women of non-forest communities.

Gautam S (2019) conducted a study on 'Determining factors for the prevalence of anemia in women of reproductive age in Nepal: Evidence from recent national survey data' revealed that this study was made to know the association of women's decision-making autonomy regarding healthcare and experience of intimate partner violence (IPV) with anemia. A battery-operated portable HemoCue was used to measure hemoglobin and detect anemia. The mean haemoglobin concentration was 12.13 g/dL (± 1.48). Overall, about 41% (95% CI 38.6 - 43.0%) of women aged 15 - 49 years were anemic. Overall, about 41% (95% CI 38.6 - 43.0%) of women aged 15 - 49 years were anemic. Datas were collected in 2016 by Nepal Demographic and Health Survey (NDHS). Complex sample logistic regression analysis shows that Women in households with wells as the source of drinking water (aOR 1.93; 95% CI 1.58 - 2.37) were significantly associated with an increased risk of developing anemia. While women who were currently using hormonal contraceptives (aOR 0.63, 95% CI 0.52 - 0.76) were significantly less likely to be anaemic.

In many places iron is given in the form of fortified double salt. Ramírez-Luzuriaga MJ (2018) conducted a systematic review and meta-analysis from randomized and quasi-randomized controlled trials to 1) assess the effect of Double Fortified Salt (DFS) on bio-markers of iron status and the risk of anemia and iron deficiency anemia (IDA) and 2) evaluate differential effects of DFS by study type (efficacy, population subgroups, iron formulation (ferrous sulfate, and ferric pyrophosphate), iron concentration, duration of intervention, and study quality. All studies were conducted in LMICs: 10 in India, 2 in Morocco and 1 each in Côte d'Ivoire and Ghana. The result revealed that there was a significant effect of DFS on haemoglobin concentration and anaemia was reduced particularly among school-age children and women of childbearing age, including pregnant women at p < 0.001.

In India, considering the anaemia in pregnant ladies, a recent survey study reported that severe anaemia during pregnancy is associated with a twofold risk of maternal mortality [4]. However, the consequences of anaemia is not limited to death but to other micronutrients such as folic acid and vitamin B_{12}, intestinal inflammation caused by illness, blood loss and inherited genetic disorders etc [5]. Prevalence of anaemia is higher in India in all age groups as compared to other developing countries. 50% of population of India is affected by anaemia. About 20 - 40% of pregnant women and one in every two Indian women (56%) are affected by anaemia [7-18].

Khajuria N and Kaur M (2019) conducted a cross sectional study on 'Haemoglobin status and prevalence of anaemia in women of Jammu and Kashmir population' and reported that data about the haemoglobin status and the percentage, collected from the department of oral pathology, IGGDC JAMMU. According to the data women were divided in two groups. Group 1 and Group II of which Group I consisted of 250 female of 10 - 20 years age group and group 2 consisted of 250 female of 21-35 years age group. WHO classification of anaemia was used for classification of the women according to the severity of anaemia. The highest prevalence of mild anaemia was seen in both the age groups and least prevalence of severe anaemia was also seen in both the age groups. The highest Hb recorded was 12.4%. They suggested that a large comprehensive study including data on anthropometric measurement, biochemical profile, pattern of dietary intake in young women may help in eradication of anaemia.

Simialry Chandrakumari A (2019) conducted a study on 'Prevalence of anemia among adolescent girls in a rural area of Tamil Nadu, India' and in the cross sectional study, 255 adolescent girls were taken.' After getting consent the information regarding age, sociodemographic status, menstrual history and short clinical details were recorded. Their blood samples were collected and analysed by an automatic haematology analyser. The overall prevalence of anaemia was 48.63% (n = 124) and 55.64% girls had mild degree of anaemia. Out of total 255 girls, 188 (73.73%) were from early adolescent age group (10 - 14 years). Prevalence of anaemia was higher in late adolescent age group and those belonging to low socio-economic class (52.24%). Socioeconomic status, dietary modification, nutritional supplementation and helminth control are the some of the causes associated with anaemia.

Jagati P (2017) from Odisha state (India) studied about prevalence of anemia in pregnant women from an exclusive area of Cuttack Municipality Corporation i.e. patra………. From the study it was inferred that nearly 41% and 30% respondents were suffering from mild and moderate anaemia respectively with other infections and deficiencies. 72% had several numbers of pregnancies and among them 40% have number of abortions; 67% women were affected by different food taboos; 90% had zero knowledge about different food groups. Hence it is suggested that proper awareness about the nutritional status of the food that they take should be done to eradicate the anaemia in these people. Table 1 gives the percentage of women with anaemia which reveals that in Odisha more than 60% women are having anaemia.

Sachdev and Jothipriya (2017) conducted a study on 'Effect of Green Tea on Haemoglobin' and reported that 20 individuals (12 females and 8 males). They consume 300 ml green tea for 30 days. Sallie's haemoglobinometer was used for measuring the haemoglobin level before and after the study period. The average haemoglobin level before the study was 11.76 g/dl and after the study it was 12.585 g/dl. Many people have a habit of taking Tea and coffee. But Tea and coffee interfere with iron absorption. So, it should be taken 2 hours after intake of iron rich foods and supplements.

Behera and Bulliyya (2016) conducted a study on 'Magnitude of Anemia and Hematological Predictors among Children under 12 Years in Odisha, India' reported that total 313 children of 0-12 years age group from Khurda district of Odisha were taken which con-

Year	All India/State	Women, 14-59, with anaemia (%)
1998-99	India	52
	Odisha	63
2005-06	India	55.3
	Odisha	51
2015-16	India	53.1
	Odisha	61.1

Table 1: The percentage of women with anaemia in Odisha vs of India.

sisted of 0-5 years of preschool children and 6-12 years of school children. Different haematological parameters like red blood cell (RBC), white blood cell (WBC) and plasma ferritin were measured by standard procedures. It was found that their mean haemoglobin was 10.43 ± 3.33 g/dL. Prevalence of anaemia was 62%. Boys had a lower mean haemoglobin value than girls. All grades of anaemia were higher among school children than preschool children. Mean plasma ferritin was higher among school age boys than girls. The mean WBC among preschool boys was higher than school age boys ($p = 0.025$).

Nayak and Chand (2015) studied the nutritive values of different types of healthy and disinfected and wild edible fruits collected from various forest reserves of Odisha. Nutritive values of different healthy and disinfected 8 wild edible fruits collected from various forest reserves of Odisha. These fruits were preserved under -20ºC temperature after thorough washing. The nutrient were analysed by various standard methods. One of the fruit named as *Dillenia pentagyna*, showed highest content of carbohydrate (18.5%), total sugar (16.8%) and iron content (16 mg/100g). With regard to the mineral content, it also contains iron, manganese, copper and calcium. Besides *Dillenia pentagyna*, nutritive values of *Streblus asper, Melastoma malabathricum, Calamus guruba* etc. were studied and found that par with apple, mango, banana and guava. Similarly many such fruits are also available in different forest in India and It has been seen that women from forest community are richer in Iron and other vitamins and are healthier than the non-forest community.

Besides the above reports, this paper reports anemia status during pregnancy, risk factors, and possible treatments using different types of foods with rich in nutritional status is described below.

Anaemia status during pregnancy

Anaemia during pregnancy is associated with a number of maternal and fetal complications. It also associated with increased risk of intra uterine growth retardation, premature delivery, low birth weight and maternal and child mortality. In 2016, according to WHO data, 40.1% of pregnant women worldwide were anemic. India contributes to about 80% of the maternal death due to anaemia in South Asia.

Risk factors

Due to blood loss through menstruation, long term illness, GI bleeding due to injury and surgery, iron deficiency due to lack in diet (iron deficiency, phytate content of iron rich foods, intake of more foods that deficient in folic acid, vitamin B_{12}) are the common causes of anaemia. During pregnancy anemia is common due to increased demand of iron for the growing fetus and placenta; and increased red blood cell mass (with expanded maternal blood volume in the third trimester), which is further aggravated with other factors such as child bearing at an early age, repeated pregnancies, short intervals between pregnancies and poor access to antenatal care and supplementation. Malaria, hookworm infestation are cause of anaemia. Mostly due to poverty, back of awareness and illiteracy are the primary reason behind the increased rate of anaemia throughout India.

Treatment

Aanaemia treatment can be done using nutritional items of different varieties of food product containing iron. Iron rich foods are pomegranate juice, spinach, dark green leafy vegetables, tofu, peas, lentils, chickpeas etc. Besides this, vitamin B_{12} rich foods are liver, poultry, fish, eggs, dairy products such as milk, cheese and curd. Folic acid rich foods are bread, spinach, other dark green leafy vegetables, black eyed peas, dried beans, eggs, bananas, oranges, orange juice by use of vitamin supplement iron absorption is improved. By taking folic acid and vitamin $B_{12,}$ one can eradicate anaemia in pregnant women.

In breakfast Rice flakes, banana with jaggery can be used Ragi with home/made curd is also a good option for breakfast. Besides different types of chutneys in meal time like coriander leaf chutney, mint chutney, tomato chutney etc. can be used. Roti made of up boiled spinach with wheat flour, Lettuce, drumstick leaf and fruit

good for nutrition Beet root juice and pomegranate juice, rare good source of iron roasted plantain green or cofta, laddu made of up dry coconut, Parboiled rice with green gram dal mixed khichdi, Sprouted green gram, lotus stem bhaji and besan chakuli and pithas of Odisha such as "Arisa, Kakara" made of up rice powder and jiggery, rich in iron are helpful in increasing iron level. Besides these now people of odisha are using fortified salt containing iron in their meal. Currently Govt. of Odisha has planned special programs for promotions of nutrition in tribal areas of Odisha, Age old processes of cultivating different types of millets such as Finger millets, Great millets, spiked millets, Italian millets, little millets (suan) barnyard millets and kodo millets etc. These millets are very rich in iron and proteins and other minerals. For better health, Govt. is providing nutritional supplements to infants and women through Anganwadi centres under various nutrition programmes. Figure 1 shows the photographs of some of the above food items.

Figure 1: Iron rich food sources.

Precaution of taking iron, and calcium containing food items

Many people have a habit of taking Tea and coffee. But Tea and coffee interfere with iron absorption. So, it should be taken 2 hours after intake of iron rich foods and supplements. Besides if somebody wants to have iron rich food with calcium rich foods like milk, cheese, curd, whole grain cereals, then it creates trouble in iron absorption for which, these should (calcium rich food) be consumed 1 hour before or 2 hour after iron supplement. Vitamin-C rich foods like oranges, lemon, papaya, spinach, broccoli and dark green leafy vegetables help in iron absorption. As malaria and hookworm

infestation cause anaemia [19]. Educating children at school and educating people at campaign and if possible, regular follow up is best option of anaemia prevention. Moreover, social media should involve in this direction to improve the individual people also take interest in preventing anaemia.

Conclusion

The data on World and Indian scenario on prevalence of anemia in women staying in different places are given and some causes and remedies of Anaemia using different local foods available in Odisha and other states of India are cited with their nutritional status. By using different varieties of local foods containing iron it can be prohibited. The remedies of Iron non absorption in the body are also cited here. Women from forest community taking fruits, leafy vegetables, different varieties of millets rich in iron, protein as well as minerals, are healthier in comparison to women in non forest areas. Different types of foods, fruits, vegetables and millets rich in nutritional value as well as education can prevent womens from having anaemia.

Bibliography

1. World Health Organization: Global Nutrition Policy Review 2016-201: https://www.who.int.

2. Tolentino K and Friedman FJ. "An Update on Anemia in Less Developed Countries". *American Society of Tropical Medicine and Hygiene* 77.1 (2007): 44-51.

3. National Family Health Survey 2015-16 (NFHS-4) International Institute of Population Science (IIPS) updated (2019): 1-6.

4. Jain A: Severe anaemia declined by over 7% in India: Study; Down To Earth (2019).

5. Kumari S., *et al.* "Maternal and severe anaemia in delivering women is associated with risk of preterm and low birth weight: A cross sectional study from Jharkhand, India". National Center for Biotechnology Information 8 (2019).

6. Nguyen HP., *et al.* "Trends and drivers of change in the prevalence of anaemia among 1 million women and children in India, 2006 to 2016". *BMJ Global Health* 3.5 (2018): 1-12.

7. Bhimrao NJ. "A critical review on iron deficiency anemia in female population of developing India". *International Journal of Fauna and Biological Studies* (2016): 116-119.

8. Khajuria N and Kaur M. "Hemoglobin status and prevalence of anemia among the women of Jammu and Kashmir population: A cross sectional study". *International Journal of Medical and Health Research* 5.3 (2019): 01-02.

9. Gautam S., *et al.* "Determining factors for the prevalence of anemia in women of reproductive age in Nepal: Evidence from recent national survey data". *Plos One* 14.6 (2019): 1-17.

10. Tata YC., *et al.* "Dietary intake, forest foods, and anemia in Southwest Cameroon". *Plos One* 14.4 (2019): 1-18.

11. Chandrakumari SA., *et al.* "Prevalence of anemia among adolescent girls in a rural area of Tamil Nadu, India". *Journal of Family Medicine and Primary Care* 8.4 (2014): 1414-1417.

12. Ramírez-Luzuriaga MJ., *et al.* "Impact of Double-Fortified Salt with Iron and Iodine on Hemoglobin, Anemia, and Iron Deficiency Anemia: A Systematic Review and Meta-Analysis". 9.3 (2018): 207-218.

13. Jagati P. "Prevalence of nutritional anemia in pregnant women in selected slum areas under the Cuttack municipal corporation - A field study". *International Journal of Home Science* 3.2 (2017): 147-150.

14. Sahadev AN and Mrs Jotipriya. "Effect of Green Tea on Haemoglobin". *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 16.5 (2017): 116-118.

15. Behera Shuchismita and Bulliyya Gandham. Magnitude of Anemia and Hematological Predictors among Children under 12 Years in Odisha, India. Hindawi Publishing Corporation: 1-10.

16. Nayak J and Basak CU. "Analysis of some nutritional properties in eight wild edible fruits of Odisha, India". *International Journal of Current Science* 14 (2015): E 55-62.

17. Srilakshmi B. "Nutritional Anaemia". Text Book of Dietetics: New Age International (P) Ltd (2014): 163-179.

18. Kaur K. "Anaemia 'asilent killer' among women in India: Present scenario". *European Journal of Zoological Research* 3.1 (2014): 32-36.

19. https://www.odishatv.in.https://www.hoacny.com.https://www.healthxchange.sg.https://www.slideshare.net. malyalam. boldsky.com