



## IRON DEFICIENCY ANAEMIA IN FEMALES - INDIA

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**ABSTRACT**

Effect of veggie lover diet at the hazard of creating frailty amongst Indian women and suggest activities for tending to abstain from meals associated iron-insufficiency paleness. Singular level components and circle of relatives unit stage financial qualities, every day usage of meat, fish, and eggs was associated with decrease possibilities of being decently or seriously susceptible. financial attributes like better riches quintiles, being in paid business, and provincial habitation diminished the possibilities of having iron-lack paleness amongst Indian girls. As a massive extent of Indians ,iron-bad vegan abstains from food for non secular, financial, social motives, enormous scale iron supplementation and fort of frequently gobbled veggie lover groceries include an possible, socially fitting, and realistic approach for tending to this enormous preferred scientific problem. Iron-deficiency anaemia (IDA) among women in India is a problem of major public health significance. Using data from three waves of the National Family Health Survey, this article discusses the burden of and trend in IDA among women in India, and discusses the level of iron and folic acid (IFA) supplementation and its potential role in reducing the burden of IDA. Usage of modest iron-rich staples must be superior .effective neediness mitigation and hookworm anticipation projects are likewise massive. full-size scale accomplice and intercession research are direly required to similarly represent the impact of vegetarianism on iron insufficiency sickliness in India.

**KEYWORDS :** Diet factors, Haemoglobin, Adolescent, Nutrition**INTRODUCTION:**

The world health company characterizes iron-lack weak point as a circumstance whereby both singular hemoglobin levels are two well known deviations beneath the conveyance imply, or over 5% of a given population has hemoglobin ranges which can be fashionable deviations below the distribution mean, in another wise normal population of individuals from the same gender and age, dwelling on the same attitude. Anaemia, defined as a reduction in haemoglobin concentration, red-cell count, or packed-cell volume below established cut-off levels, is a widely discussed public health challenge that India is facing. According to the World Health Organization (WHO), anaemia among women is defined as a haemoglobin concentration of <120 g/L for non-pregnant women aged 15 years and above, and a haemoglobin concentration of <110-g/L for pregnant women. In particular, a persistently high level of anaemia among women in India (53% of all women have anaemia as per the National Family Health Survey 2015–20163) is of great concern, and the 2017 National Health Policy tabled by the Ministry of Health and Family Welfare, Government of India, acknowledges this high burden. Iron-deficiency anaemia (IDA) is a common problem among women, primarily due to their recurrent menstrual loss. Demand for iron is higher among pregnant women, and women with anaemia in combination with early onset of childbearing, a high number of births, short intervals between births and poor access to antenatal care and supplementation are likely to experience poor pregnancy outcome [1].

Prevention and management of IDA demands adequate iron intake and provision of bioavailable iron. The most recent estimates reflect an unacceptably low consumption of iron (median: 13.7 mg/day per person) among women in India aged  $\geq 18$  years and 51–83% of pregnant women in India are deprived of the recommended daily allowance of iron of 15–18 mg/day. Women in India largely derive iron from non-haem, inorganic sources, including grains, plants, cereals, lentils and vegetables; and, to a small extent, from iron supplements, such as iron or iron and folic acid (IFA) tablets for pregnant women, and iron-fortified foods, as compared to sources of haem iron such as meat and fish, which have a higher rate of absorption. Thus, it is not surprising that India has the highest

number of women with anaemia globally, which increases the probability of maternal and child mortality and has significant economic implications for the nation's development. A recently published study on the burden of disease in India concluded that the burden of IDA is 3.0 times higher than the average globally for other geographies at a similar level of development, and that women are disproportionately affected [2].

**DISCUSSION:**

Iron is an important micronutrient which is essential for various functions in human body. It is essential for cellular growth and differentiation, oxygen binding, transport and storage, enzymatic reactions, immune function, cognitive function, mental and physical growth etc. So, deficiency of iron due to either physiological or pathological reason can affect mental and physical growth resulting in decreased learning capacity and work productivity. IDA is characterized by a defect in haemoglobin synthesis, resulting in hypochromic and microcytic red blood cells [1]. Iron deficiency can result either due to less nutritional supply, increased demand or blood loss due to any reason.

Frailty impacts 800 million girls around the sector. In India, it is known as a noteworthy preferred clinical problem as it's miles assessed that 52% of nonpregnant girls of conceptive age are pale [1]. Despite the fact that the vital motive force of pallor is iron-lack, it's far only once in a while present in seclusion. extra frequentlyitcoexistswithnumberofothercauses,suchasmalaria, parasiticinfection,nutritional lacks, and haemoglobinopathies. The significance of iron-inadequacy as reason for paleness modifications through district. even as as low as 1/2 of frailty in sub-Saharan Africa might be owing to press deficiency (duetohighprevalence of HIV, hookworm, malaria, and other infectious diseases) the proportion of anaemia caused by iron- deficiency increases to over70% among premenopausal women in India[2,three] according to the arena health company's 2009Global well being dangers' report [4], iron-insufficiency paleness represented four hundred,000 passings and 1.five% of the global disability Adjusted life Years in 2004. This rate is disproportional borne by using developing countries as 60% of the bleakness and 95% of the mortality diagnosed with iron-inadequacy are

gotten from the most unfortunate countries of the arena. South Asia and sub-Saharan Africa bear approximately 70% of the global mortality burden attributable to iron- deficiency anaemia. Iron deficiency also has important ramifications for the who and what is to come back ,as iron inadequacy pallor expands the threat for preterm paintings, low birth weight, infantmortality.

Vegetarianism, characterized as the select utilization of plant-based ingesting regimens, is a standard dietary example in India, going returned to in any event 2500 years. within the united states of america, in which approximately 7% of the populace is evaluated to be veggie lover, protecting much less normal qualities and an increasing number of unselfish characteristics are related with a excessive possibility of vegetarianism [five]. In India, vegetarianism is affected to a restrained volume through adherence to the moral classes of ahimsa or "peacefulness" innate in Hinduism, Buddhism, and Jainism.

Vegetarian tylediets constitute a common dietary pattern in India,relationship back to in any event 2500 years, with Indians comprising about 70% of the total populace who adhere to vegetarian- stylediets. About 75p.c of Indian vegetarians are lacto vegetarians(i.e.,do not consume me at or eggs,with no prohibition for milk or other dairy products),withupto25%being lactovo vegetarians (who don't eat meat, with no forbiddance on eggs and dairy objects). below 1% of Indians are veggie fanatics, who do not devour any creature objects in any respect [6]. Vegetarianism has giant ramifications for maternal iron-inadequacy in India, as a ways because the accessibility and concoction type of iron in plant-based totally nourishments. regardless of the truth that a vegan weight loss plan is probably going to comprise iron in amounts equivalent to that in omnivorous diets, animal-based haemoglobin iron is better absorbed (15–40% ingestion) contrasted and plant-based non-hemoglobin iron (1–15% retention), despite variations in body iron stores[7].Nutritionists recommend that vegetarians need to increase nutritional iron by using eighty% to make up for a lower iron accessibility of 10% from a veggie lover diet contrasted and 18% from an omnivorous consuming habitual [8]. This inspiration accommodates a noteworthy test in India where maximum of veggie fans subsist on missing quantities of iron-poor staples, for example, lentils, wheat bread, inexperienced peppers, and rice. Iron lack likewise has great ramifications for the who and what is to come back,as iron inadequacy sickness expands the danger for preterm work, low birth weight, new child baby mortality. There are many reasons of iron deficiency and IDA in adolescent girls. These may be deficient intake or absorption of iron, increased demand during adolescence, heavy blood loss during menstruation, parasitic infestation etc. More than half of the world's undernourished population lives in India [2]. Although IDA occurs at all age and involves both the sexes, adolescent girls are more prone to it. The World Health Organization (WHO) defined adolescent as the population of 10-19 years of age [3]. About three fourth of adolescent females do not meet the dietary requirements [4].

Anaemia is a multi-factorial disorder that requires a multipronged approach for its prevention and treatment. Prevalence of anemia in various region in India, Tamilnadu and Puducherry statbe by different authors is shown above indicate that the failure of national and WHO programmes to address this problem. In India till date very few studies have been done to know the prevalence of iron deficiency using serum ferritin or/and transferrin saturation criteria.

This review, therefore, is an attempt to examine the current burden of anemia in India, its epidemiology, and the various issues regarding its prevention and control. This research

appears on the impact of maternal weakness in India. The combination of high prevalence rates and inadequate preventive programmes highlight the need for new effective sustainable strategies to control IDA.

#### Symptoms:

At the start, iron inadequacy weak point may be mellow to such an quantity that it goes disregarded. anyways, as the frame seems to be gradually inadequate in iron and paleness intensifies, the signs and indicators heighten, Iron inadequacy weak spot signs and symptoms may additionally consist of:Extreme fatigue, weak spot, Pale skin, Chest torment, quick heartbeat or brevity of breath, Headache, wooziness or light headedness, Cold hands and feet, Inflammation or soreness of your tongue, Brittle nails, Unusual longings for non-nutritive substances, for example, ice, soil or starch, Poor craving, particularly in newborn children and kids with iron deficiency anaemia.

Iron deficiency anemia occurs when your body doesn't have enough iron to produce hemoglobin. Hemoglobin is the piece of pink platelets that gives blood its purple shading and empowers the red platelets to bring oxygenated blood in the course of your body at the off chance which you are not expending enough iron, or if you're dropping an excess of iron, your body cannot deliver enough hemoglobin, and iron inadequacy frailty will in the end create.

#### Iron inadequacy:

Blood mis fortune. Blood includes iron inside crimson platelets. So at the off threat which you lose blood, you lose some iron. Ladies with tremendous intervals are in threat of iron inadequacy sickness on account that they lose blood throughout month-to-month cycle. Slow, endless blood misfortune inside the body, such as from a peptic ulcer, a hiatal hernia, a colon polyp or colorectal ailment can purpose iron inadequacy frailty. Gastrointestinal draining can end result from customary utilization of some over the counter torment relievers, especially aspirin. A absence of iron on your eating recurring. Your frame automatically receives iron from the nourishments you eat. Within the occasion that you eat excessively minimal iron, after some time your frame can end up iron insufficient. Model saffron-wealthy sustenance comprise meat, eggs, verdant inexperienced veggies and iron-sustained nourishments. For suitable improvement and improvement, newborn children and children want iron from their diets, too. A powerlessness to ingest iron. Iron from sustenance is retained into your stream machine on your small digestive tract. An intestinal problem, as an example, celiac contamination, which affects your digestive tract's capability to keep dietary supplements from processed sustenance, can spark off iron insufficiency pallor. On the off chance that piece of your small digestive machine has been avoid or evacuated precisely, which can affect your capability to ingest iron and other nutrients. Pregnancy. without iron supplementation, iron insufficiency pallor takes place in many pregnant ladies seeing that their iron stores want to serve their very own expanded blood volume just as be a wellspring of haemoglobin for the growing foetus.

#### Iron homoeostasis:

Iron homoeostasis is tightly controlled to avoid the toxic effects of excess iron in the form of harmful reactive oxygen species. Thus, the human body evolved with no means for iron excretion (except for those lost due to cell shedding amounting to around 1 mg per day), with daily absorption limited to 1–2 mg to compensate for daily iron losses. However, the body requires around 25 mg of iron daily, mostly used for the production of haemoglobin in erythrocytes. Iron is also a crucial element for several cellular and tissue functions including respiration, mitochondrial function, energy production, especially in skeletal and cardiac muscles, as

well as cell proliferation and DNA repair [3-4]. To achieve this aim, the body recycles most of the required iron from the breakdown of senescent erythrocytes by macrophages in the spleen to make it available to plasma transferrin. This tight control of iron absorption and recycling is mediated through the hepatic hormone hepcidin, but can be easily disturbed leading to various forms of ID and subsequent anaemia. Additional recycling mechanisms also exist in skeletal muscle fibres and in hepatic macrophages (in cases of intravascular haemolysis) [3-4].

#### Warning factors:

These gatherings of individuals might also have an improved threat of iron lack paleness, women. on account that ladies lose blood during feminine cycle, women by using and big are at extra extreme risk of iron deficiency anaemia, toddlers and children, new child kids, mainly the those who have been low birth weight or conceived rashly, who do not get sufficient iron from bosom milk or equation is probably at risk of iron lack. Youngsters want additional iron throughout development spurts. on the off danger that your youngster isn't ingesting a valid, fluctuated eating regimen, the character in question is probably in threat of pallor. Vegetarians. folks who don't devour meat may additionally have a extra critical chance of iron deficiency weakness on the off chance that they don't eat different iron-rich foods. Frequent blood benefactors. Individuals who routinely supply blood may have an elevated chance of iron inadequacy frailty on the grounds that blood gift can exhaust iron shops. Low haemoglobin diagnosed with blood gift is probably a transitory issue cured via ingesting steadily iron-rich sustenance's. if you're knowledgeable which you cannot deliver blood in view of low haemoglobin, ask your number one care physician whether you ought to be concerned.

#### Complexities:

Mellow iron inadequacy frailty extra regularly than no longer would not purpose difficulties. Any ways, left untreated, iron lack pallor can become serious and lead to medical issues, which include the accompanying. Coronary heart troubles. Iron inadequacy paleness might also prompt a short or sporadic heartbeat. Your heart must pump extra blood to make up for the absence of oxygen conveyed for your blood when you're frail. this could prompt an augmented coronary heart or heart sadness. Troubles during being pregnant. In pregnant ladies, severe iron insufficiency anemia has been connected to untimely births and low delivery weight toddlers. Be that as it can, the situation is preventable in pregnant women who get iron enhancements as a main component of their prenatal care. Growth issues. In babies and kids, extreme iron insufficiency can prompt anemia as nicely as postponed development and development. additionally, iron insufficiency anemia is related with an elevated helplessness to infections.

#### Iron-rich sustenances:

Sustenance's wealthy in iron include. pork, red meat and poultry, Sea food, Beans, darkish green verdant greens, such as spinach, dried organic product, as an example, raisins and apricots, Iron-invigorated oats, breads and pastas, Peas. Your body keeps greater iron from meat than it does from exceptional resources. at the off chance that making a decision to not consume meat, you can want to build your admission of iron-wealthy, plant based totally nourishments to keep a similar degree of iron as does someone who eats meat. you may upgrade your body's retention of iron by means of drinking citrus squeeze or consuming different nourishments wealthy in nutrient C while you consume excessive-iron sustenance's. Nutrient C in citrus juices, much like squeezed orange, causes your frame to all of the much more likely assimilate dietary iron.

#### Nutrient C is likewise determined in:

Broccoli, Grape fruit, Kiwi, Leafy greens, Melons, Oranges, Peppers, Strawberries, Tangerines, Tomatoes substances.

The urban and provincial examples drawn independently, and the example inner each country became dispensed extraordinarily to the size of the kingdom's city and United States of America populaces. The research on this paper relies upon on inquiries from the ladies' survey, in which data was accrued on haemoglobin tiers, own family unit stage monetary attributes, statistic and paintings economic conditions, and the nutritional propensities for female respondents. The guarantee of the general instance length through the dimensions of the key suggestions, the subgroups for which the markers are required. An underlying objective example length of 1,500 finished conferences with ever-hitched girls in states with a 2001 Census population under 5 million, three,000 finished conferences with evermarried ladies in states with a 2001 Census population someplace in the variety of 5 and 30 million, and 4000 completed meetings with ever-hitched girls in states with a population of in extra of 30 million. The underlying objective instance size in Uttar Pradesh, the biggest Indian nation with about 16% of the kingdom's populace, changed into constant at 10,000 at any factor wedded women. The goal instance size for the 8 city communities with discrete ghetto and non-ghetto checks become fixed at the least 2,000 meetings with ever-hitched girls (similarly conveyed amongst ghetto and non-ghetto territories of each city).

#### Techniques:

India's countrywide circle of relatives health Surveys (NFHS) are usually viewed as reliable garage facilities of statistic and health facts [nine]. The NFHS-3 is the 0.33 in a development of throughout the u .s .go-sectional overviews in which conferences have been directed with 124,385 girls matured 15–49 years from all the 29 Indian states.

Haemoglobin fixation is a widely used proportion of iron deficiency. A drop of blood was amassed in a micro cuvette for pallor trying out, making changes for peak. Haemoglobin estimations are viewed as much less valid than serum ferritin as a percentage of iron-lack and iron-insufficiency pallor, a strong connection exists between haemoglobin consciousness and serum ferritin stages [10,11] . Haemoglobin attention gazing is an increasing number of useful in checking the viability of intercessions to treatment iron-inadequacy, and haemoglobin levels are easier to quantify underneath field situations [12].

Vegetarianism, defined as the exclusive consumption of plant-based diets, is a common dietary pattern in India, dating back to at least 2500 years. In the United States, where about 7% of the population is estimated to be vegetarian, holding less traditional values and more altruistic values are associated with a high likelihood of vegetarianism . In India, vegetarianism is influenced in part by adherence to the ethical teachings of ahimsa or "nonviolence" inherent in Hinduism, Buddhism, and Jainism. Vegetarian-style diets constitute a common dietary pattern in India, dating back to at least 2500 years, with Indians constituting about 70% of the world's population who adhere to vegetarian-style diets. About 75% of Indian vegetarians are lactovegetarians (i.e., do not consume meat or eggs, with no prohibition for milk or other dairy products), with up to 25% being lactovovegetarians (who do not eat meat, with no prohibition on eggs and dairy products). Less than 1% of Indians are vegans, who do not eat any animal products at all [12]. Vegetarianism has important implications for maternal iron-deficiency in India, in terms of the availability and chemical form of iron in plant-based foods. Although a vegetarian diet is likely to contain iron in amounts equivalent to that in omnivorous diets, animal-based haemoglobin iron is better absorbed (15–40% absorption)



compared with plant-based nonhaemoglobin iron (1–15% absorption), despite variations in body iron stores [13]. Nutritionists recommend that vegetarians need to increase dietary iron by 80% to compensate for a lower iron availability of 10% from a vegetarian diet compared with 18% from an omnivorous diet [14]. This recommendation constitutes a major challenge in India where the majority of vegetarians subsist on inadequate quantities of iron-poor staples such as lentils, wheat bread, green peppers, and rice. A modified food guide pyramid for vegetarians entails obtaining 32–36 mg of iron daily in a 2000 calorie diet containing 8 servings of grains, 3 of vegetables, 2.5 of green leafy vegetables, 1.5 of fruit, 2.5 of beans and protein foods, 3 of dairy or nonfortified dairy, 1.5 of nuts and seed, and 2.5 of oils [14]. The authors' lived experience in India indicates that the vast majority of Indian vegetarians are unable to afford to eat such varied vegetarian meals in the quantities suggested. In addition, affordable foodstuffs such as wheat bread contain high levels of phytates, while tea, a popular beverage in India, is high in tannic acid content. Phytates and tannins inhibit iron absorption [14-15].

#### Indian Scenario:

Prevalence of anaemia in all the groups is higher in India as compared to other developing countries. In India, anaemia affects an estimated 50% of the population. The problem becomes more severe as more women are affected with it as compared to men. It is estimated that about 20%-40% of maternal deaths in India are due to anaemia and one in every two Indian women (56%) suffers from some form of anaemia. According to National consultation on control of nutritional anemia in India, anemia is defined as the hemoglobin of less than 12 g/dl in females. Mild anemia is defined as hemoglobin level of 10-11.9 g/dl, moderate anemia as haemoglobin level of 7-9.9 g/dl and severe anemia was defined as hemoglobin level of less than 7g/dl among females. Data from National Nutrition Monitoring Bureau (NNMB) 2002, Indian Council of Medical Research (ICMR) 2004 and District Level Household Survey (DLHS) 2006 surveys have shown that prevalence of anaemia is very high (ranging between 80->90%) in preschool children, pregnant and lactating women and adolescent girls. Low birth weight infants, young children and women of childbearing age are particularly at risk of anaemia. That way Anaemia begins in childhood, worsens during adolescence in girls and gets aggravated during pregnancy. In India, adolescent girls, who constitute a sizable segment of its population form a vulnerable group are at a greater risk of morbidity and mortality. It is the shaping period of life when maximum amount of physical, psychological and behavioral changes take place [16-17]. This is a vulnerable period in the human life for the development of nutritional anaemia. Adolescent girls are particularly prone to iron deficiency anemia because of increased demand of iron for hemoglobin, myoglobin and to make up the loss of iron due to menstruation and poor dietary habits.

Anemia among women in this large, southern Indian state cuts across social class, place of residence, and other factors that normally discriminate health status. Rich or poor, fat or thin, urban or rural—the prevalence of anemia is high among women in all these groups and differences are only relative. More than 40% of women in the highest socioeconomic group are anemic, as are 62% of urban poor and 54% of rural poor women. We had expected to find the highest prevalence of anemia among rural women, who are also the poorest, based on the standard of living index. However, the poorest rural and urban women both had the greatest risk of anemia and had similar probabilities of being anemic, with the exception of the poorest urban women who were more likely than poor rural women to be anemic. This supports the findings of other studies in the 1980s and 1990s which revealed a great

diversity in the extent and depth of poverty within the urban sector in developing countries and poor health outcomes for the most marginalized urban groups. Despite greater opportunities for health care in urban areas, the urban poor are often more marginalized than rural populations in their ability to access health services because of constraints in financial and administrative resources that are necessary to access the services in urban areas [18-22]. Likewise, although urban areas theoretically have greater access to a wide variety of food and nutrients through close access to markets, extreme poverty limits the ability of the urban poor to purchase them.

The urban poor may also experience higher rates of infection related to poor sanitation or high rates of reproductive tract infections, gynecological morbidity, or sexually transmitted diseases. Dimensions of autonomy such as freedom of movement, decision-making power and control over finances can also exert a strong influence over service use and service choice in the South Asian setting. This results in inappropriate treatment of illnesses. Prevention of both iron deficiency and anaemia require approaches that address all the potential causative factors. Interventions to prevent and correct iron deficiency and IDA, therefore, must include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron; iron supplementation and improved health services and sanitation. Special emphasis should be given for nutrient supplement especially iron and vitamins in all age group as there are chances of iron deficiency. Firm policies should be developed for vitamin and mineral supplementation in adolescents with political commitment. Prevention and control of anaemia requires a coordinated response among multiple stakeholders and partners. For the anemia analysis, we found that poor, urban women have the highest rates and risk of anemia compared to the other groups, including poor rural women [20-22]. The results reflect the effect of poverty on women's nutrition and anemia status, regardless of whether they live in the rural or urban areas. The finding of the highest risk of anemia among very poor urban women should focus attention on this group for intervention purposes. While most health indicators in India do show that rural women are disadvantaged relative to urban women.

We believe that improving women's overall nutrition status and their access to resources (income) will have the greatest impact on reducing anemia in India. Very thin and very poor women, particularly in urban areas, have the highest risk of moderate and severe anemia. In the short-term, combined food and iron supplementation programs would be most effective to address both anemia and underweight. The alarming 10% prevalence of moderate and severe anemia among obese women is cause for concern and we need to learn more about the determinants of this outcome among this subgroup of women for prevention purposes. A nutrition-awareness intervention with intense monitoring of IFA distribution and uptake, especially among prospective mothers and pregnant women. Intensified action of community-level health workers (such as accredited social health activists and auxiliary nurse midwives) could help to target women with severe IDA, who need urgent attention, to reduce the rate of anaemia more quickly. Above all, strengthening the health system, and monitoring and evaluation of interventions for the prevention and treatment of anaemia are the most urgent needs, but are clearly not being done rigorously at present.

#### Conclusion:

The high prevalence of anemia among women in India is a burden for them, for their families, and for the economic development and productivity of the country. Iron supplementation programs, for a variety of reasons, have not

been effective in reducing anemia prevalence. From the above alternate, a excessive weight of IDA is plain in India and the statistics on IFA enhancements expended are debilitating. patterns in iron deficiency since 1998–1999 provide purpose behind suspicion approximately the future effect of an IFA intercession alone on IDA in India. New program strategies are needed, particularly those that improve the overall nutrition status of women of reproductive ages.

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