Journal of Health and Rehabilitation Research 2791-156X JHRR

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Review Article

Anemia Association with Socio -Demographic and Dietary Related Factors among Women of Childbearing Age: A Review Article

Husan Bano Channar[1]*, Munawer Ul Islam[2], Amber Halepoto[1], Muhammad Rahimon[1], Waqar Ahmed Abbasi[1], Qurban Ali[1]

[1]Liaquat University of Medical and Health Sciences Jamshoro.

[2]Peoples University of Medical and Health Sciences for Women (PUMHSW).

Corresponding Author: Husan Bano Channar; Assistant Professor; Email: husan.channar@gmail.com

Conflict of Interest: None.

Channar HB., et al. (2023). 3(2): DOI: https://doi.org/10.61919/jhrr.v3i2.256

ABSTRACT

Anemia is a common condition that significantly impacts women of reproductive age and is recognized as one of the most prevalent nutritional deficiency conditions globally. This review study aimed to evaluate the prevalence and severity of anemia and its association with contributing factors among women of reproductive age. The key causes of anemia identified are age between 25-35, low income, residing in remote areas, and limited access to healthcare. The study proposes that preventing low birth weight, perinatal, and maternal mortality is contingent upon effectively treating anemia in women of childbearing age. It is essential for women of reproductive age, particularly those in disadvantaged circumstances, to improve their financial and educational status, alter their eating habits, and enhance their overall health. Consuming meals rich in rice, tea, and plant-based foods should be minimized as they contribute to the increased incidence of anemia. The study emphasizes that national nutrition programs should focus on developing strategies to promote the consumption of fruits and vegetables, particularly in rural areas of Pakistan, to address anemia among women of reproductive age.

Keywords: Anemia Prevalence, Reproductive age, nutritional factors

INTRODUCTION

Anemia is a significant global public health problem that disproportionately affects the largest number of females in the non-pregnant women population group (1). The prevalence of anemia among non-pregnant women of reproductive age in underdeveloped countries varies widely, ranging from 20.8% (2) to as high as 73% (3). A substantial part of this burden is evident in South Asia and Africa, regions with limited resources. This prevalence is attributed to a combination of factors, including poverty, inadequate dietary intake, and a high incidence of diseases (4). The 2018 National Nutrition Survey reported that 18% of non-pregnant women of reproductive age suffer from iron deficiency anemia (5).

The adverse effects of anemia are notable. Pregnant and non-pregnant women of reproductive age experience various types and degrees of anemia (6), which has been linked to several morbidities in women aged 15–49. These include miscarriage (7), placental abruption (8), preterm delivery (9), and low birth weight (10, 11). Furthermore, anemia is associated with an increased risk of maternal and prenatal death (7). Anemic individuals often exhibit reduced capacity for vigorous activities (8) and heightened susceptibility to infections (9, 10). Additionally, factors such as suboptimal living conditions, multiple pregnancies, and limited access to healthcare services exacerbate the risk of developing this condition. Research indicates that the rural population is more prone to anemia than the urban population (5, 11-13).

Hemoglobin (Hb) concentration has been conclusively established as a reliable indicator for determining and monitoring anemia in the general population (14). In premenopausal women, dietary iron deficiency is frequently either the primary or a significant contributor to anemia. Factors such as a low frequency of consumption of animal source foods (15), fruits/juices (16, 17), vegetables (17), and increased intake of rice (18, 19), wheat flour, and plant-based foods (20, 21), along with socioeconomic risk factors like women's education (22), income (23), race (18), and occupation (15), are associated with lower Hb levels in non-pregnant women of reproductive age.

Given the data and the lack of studies focusing on women of reproductive age in this region, the current review study aims to evaluate the prevalence and grades of anemia and its association with contributing factors among women of reproductive age.

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LOCAL SITUATION ANALYSIS

Women of reproductive age in South-East Asia experience a high prevalence of anemia, recorded at 41.9%, followed by Africa and the Eastern Mediterranean (24). In Pakistan, an alarming 51% of women of childbearing age are anemic. Interestingly, the prevalence of anemia is notably lower in non-pregnant women compared to pregnant women (25). The National Nutritional Survey of Pakistan in 2018 reported that 41.7% of women of reproductive age suffer from anemia (5). This persistent health issue has been acknowledged in numerous regional studies at the national level (26).

A comprehensive report on the prevalence and risk factors of anemia in women of reproductive age (15 to 45 years) revealed a prevalence range from 18.1% to 75%, averaging at 46.5%. The identified contributing factors included maternal age, low education levels, high parity, low socioeconomic status, poor nutrition, and illness. A separate analysis using data from the National Nutritional Survey (NNS) 2011–2012, which included 7,491 non-pregnant women aged 15–49, found that the prevalence of iron deficiency anemia (IDA) was 18% among non-pregnant women. This study highlighted that not using iron folic acid supplementation during the last pregnancy, a history of four or more pregnancies, household food insecurity, and the presence of clinical anemia were linked to a higher prevalence of anemia (13).

Additionally, a cross-sectional study was conducted among female medical students at the University of Faisalabad. The study found an overall prevalence of anemia at 39.2%, with mild cases at 28.7%, moderate cases at 9.8%, and severe cases at 0.7%. In contrast, the overall prevalence among female day scholars was lower at 23%, with mild cases at 20.5%, moderate at 2.6%, and no severe cases reported (0.0%) (27).

The Pakistan Dietary Guidelines for Better Nutrition recommended the following dietary allowances for adults in 2018.

Table: 1. Food and serving size for adults (19-60 years)(28).

SNo	Food Group	No. of Servings /day	Serving size and description
1	Milk and milk products	2-3	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk. 1 cup of whole milk will provide 15 g carbohydrates, 8 g protein, 8 g fat and 160 calories.
2	Cereal grains and grains products	4-5	1 cup of cereals equivalent to nutrients supplied by 2 slices of bread. One serving of chapatti or 2 slices of bread (2 toast x 28 g=56 g) will provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal. Starchy Vegetables: 1 potato (100 g) or corn (1/2 cup), peas (1/2cup) pumpkin (1cup), sweet potato (1/2cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories
3	Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad). One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories.
4	Fruits	2-3	1 serving=1 small size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 15 g carbohydrates and 60 calories.
5	Meat, pulses and eggs	2-3	1 serving of meat (28 g lean meat=1-2 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories

ANEMIA DEFINITION AND CLASSIFICATION ACCORDING TO ITS SEVERITY

According to the World Health Organization (WHO) reference criteria, anemia is diagnosed in a woman when her blood hemoglobin level falls below 12.0 g/dl if she is non-pregnant, or below 11.0 g/dl if she is pregnant (29). Anemia is classified into three levels based on severity: mild, moderate, and severe. Mild anemia is characterized by hemoglobin (Hb) levels of 10.0-10.9 g/dl for pregnant women and 11.0-11.9 g/dl for non-pregnant women. Moderate anemia is defined by Hb levels of 7.0-9.9 g/dl for pregnant women and 8.0-10.9 g/dl for non-pregnant women. Severe anemia is identified when Hb levels are less than 7.0 g/dl in pregnant women and less than 8.0 g/dl in non-pregnant women (30). It's important to note that the reference range for normal blood hemoglobin levels can vary depending on an individual's age, gender, ethnicity, region, and dietary habits.

The development of anemia in non-pregnant women of reproductive age is influenced by a combination of several contextual factors. These include socio-demographic characteristics, socio-economic status, dietary patterns, and health-related factors.

AGE

Anemia is most commonly found during the preschool years, puberty, and old age (31-33). The majority of studies have shown that women between the ages of 25 and 35 are more likely to suffer from anemia (13, 34). However, a few studies have indicated that individuals under the age of 25 are most affected (35, 36). Additionally, several studies have identified a significant correlation between age and the prevalence of anemia (22, 34, 37).

RESIDENCE

Research indicates that, compared to their urban counterparts, rural populations are more susceptible to anemia (5, 38). Various studies focusing on non-pregnant women have confirmed that poverty in rural areas is linked to a higher frequency of anemia due to factors such as illiteracy and financial constraints (39-41).

LOW SOCIO-ECONOMIC STATUS

Nutritional anemia is predominantly found among individuals with low socio-economic status (31). Numerous studies have supported the notion that anemia among non-pregnant women of reproductive age is strongly correlated with dietary inadequacy and lower socio-economic status (34, 36, 42). This is likely because individuals with lower socio-economic status may not be able to afford as much or as high-quality food as those with higher socio-economic status.

KNOWLEDGE OF ANEMIA

Illiteracy and a lack of awareness about anemia are more likely to lead to undernourishment. Studies have shown a connection between women's knowledge about anemia and the prevalence of the condition (34, 37).

TRADITIONAL CULTURAL PRACTICES

Traditional dietary patterns might contribute to the development of anemia. Moreover, traditional cultural practices could exacerbate the prevalence of anemia in women by prioritizing men over women, especially in matters of food distribution (37, 43).

NUTRITIONAL FACTORS

MEAL FREQUENCY

Multiple studies have established that anemia is significantly more prevalent in individuals who consume their main meal only once per day compared to those who have it three times per day. However, it is also noted that anemia is more common among those who eat two meals per day (44-46). A majority of studies involving women have found a correlation between meal frequency and the incidence of anemia (45, 47, 48).

BEHAVIOR OF MEAL SKIPPING

Research conducted in Pakistan indicates that skipping meals is a strong predictor of anemia in females. It has been observed that most women of childbearing age skip breakfast more frequently than lunch and dinner (49). A study in India on women of reproductive age also revealed that the majority of women often skip breakfast rather than lunch and dinner (46). University-based studies on young adults have shown that those who regularly skip breakfast are more prone to iron deficiency anemia (IDA) compared to those who do not (47, 50-52). Furthermore, meal skipping is associated with a higher prevalence of anemia (37). A nutritious breakfast that includes both heme and nonheme iron should ideally contain fat, meat, proteins, bread, fiber-rich grains, pulses, legumes, fruits, and vegetables for optimal energy and iron absorption.

MEAT

Red meat is a crucial source of heme iron. Women and young adults who consume meat only once per week or less frequently are more likely to develop anemia compared to those who eat meat more than twice per week (37, 45, 47, 53). Conversely, reports from various studies have shown that women who consume red meat two or more times a week have higher hemoglobin concentrations

(33, 54). A secondary analysis survey of non-pregnant women of reproductive age revealed that 61.5% of respondents ate meat more than once or twice per week, 25.1% consumed meat once or twice per week, and 12.2% did not consume meat at all (13).

FRUITS/GREEN LEAFY VEGETABLES

Consumption of green leafy vegetables is known to increase mean hemoglobin concentration, thereby reducing the risk of anemia. Research indicates that diets rich in fresh fruits and vegetables, typical of Mediterranean cuisine, are beneficial (43). Studies have shown that women who consume fewer than five servings of fruits and vegetables per day are at a higher risk of developing moderate to severe anemia compared to those who eat at least five servings (17). Numerous studies have established a link between a poor vegetable diet and iron deficiency anemia (17, 37, 47, 50, 52). Additionally, the high cost often discourages non-pregnant women from consuming fruits and vegetables regularly (40).

ANIMAL-BASED FOOD

Consuming less animal-derived food can lead to anemia. The high casein and calcium content in milk impedes the absorption of non-heme iron. Previous research has demonstrated that milk consumption negatively impacts blood iron levels and iron reserves (55). Moreover, it has been observed that a majority of people consume milk daily or more than three times per week (40, 45). Analyses of urban and rural women indicate that the consumption of milk and dairy products in both areas falls below the recommended amount (39). A recent study highlighted that poverty limits access to and consumption of foods of animal origin (56). In addition, numerous studies from various locations have found no correlation between milk consumption and products like curd, paneer, lassi, and buttermilk (38, 40, 57-59).

TEA

Several studies have established that university students and women of reproductive age who regularly drink tea after meals are significantly more likely to develop anemia (21, 25, 37, 47, 60, 61). It is also confirmed that avoiding tea during meals enhances iron absorption from the intestines (62, 63).

CONCLUSION

This review paper examines the prevalence and contributing factors of nutritional anemia in women of reproductive age. The prevalence of Iron Deficiency Anemia (IDA) among non-pregnant women (NPW) of reproductive age is reported to be 18.2%. In Pakistan, the highest rate of anemia was observed in the age group of 25 to 35 years. It was found that residents of rural areas, especially those with low socio-economic status and income, are significantly more likely to suffer from anemia compared to their urban counterparts. Factors such as a low frequency of meals, skipping breakfast, and reduced consumption of fruits, vegetables, and animal-derived foods have a substantial impact on the prevalence of anemia among these women. Additionally, high consumption of plant-based foods and tea, traditional dietary practices, and a lack of awareness about anemia contribute to its prevalence. The infrequent consumption of fruits, vegetables, and animal-based foods by non-pregnant women is attributed to the high cost of these items.

This study suggests that the reduction of anemia in NPW could be achieved through improved socio-economic conditions, enhanced health education about the importance of nutritional risk factors, and routine screening throughout their childbearing years. These findings hold significant implications for national public health initiatives aimed at preventing anemia. Based on these results, national nutrition programs should focus on developing strategies to promote the consumption of fruits and vegetables. This policy is particularly pertinent for rural areas of Pakistan, especially the Sindh province, which has the highest prevalence of anemia compared to other provinces in the country.

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