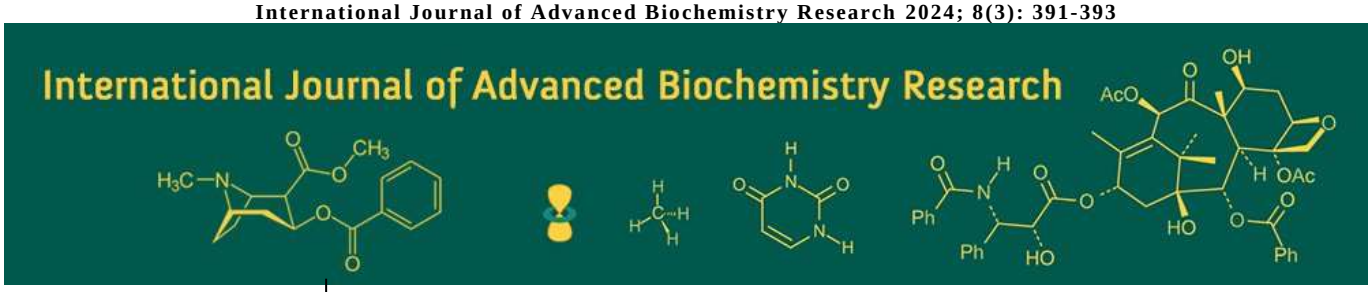

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Prevalence and severity of Anaemia among reproductive aged women (15-49 years)

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Abstract
Purpose: Anaemia is a global public health problem affecting developing countries with serious consequences upon human health, social and economic development. It is found at all stages in the life cycle, more prevalent among females of the reproductive age group (15-49 years). Anaemia is defined as the decrease in the concentration of red blood cells in the body, and the blood cells are not sufficient to meet the person's physiological requirements. The current study aims to determine the prevalence of anaemia among women of reproductive age (15-49 Years).
Materials and Methods: Blood level of respondents was estimated by using cyanmethaemoglobin method prescribed by Decie and Lewis (1984), INACG (1985), ICMR (2001). The WHO cut of ranges published by ICMR Task Force (2001) for assessment of anaemia.
Results and Discussion: The results show that severe anaemia was found in 1.7 (9) percent women. Similar results were obtained in a study conducted among Reproductive Age Group (15-45 Years). The mean difference of hemoglobin levels among mild, moderate and severe anaemic group was significant (p<0.05).
Conclusion: The research findings revealed that prevalence of anaemia in females were 57.5 (322) percent. Out of 560 studied women, only 42.5 (238) percent women were having normal haemoglobin value whereas 57.5 (322) percent women were affected with various grades of anaemia.

Keywords: Anemia, red blood cells, ICMR, and WHO

Introduction
Anaemia is highly prevalent globally, disproportionately affecting children and women of reproductive age. Anaemia is associated with poor cognitive and motor development, and work capacity. Among pregnant women, iron deficiency anaemia is also associated with adverse reproductive outcomes such as preterm delivery, low-birth-weight infants, and decreased iron stores for the baby, which may lead to impaired development. Iron deficiency is considered the most common cause of anaemia but there are other nutritional and non-nutritional causes. Blood haemoglobin concentration is used to diagnose anaemia and it is affected by many factors, including altitude (metres above sea level), smoking, trimester of pregnancy, age and sex. When blood haemoglobin concentrations are used in combination with other indicators of iron status, they provide information about the severity of iron deficiency. The prevalence of anaemia in a population can be used to classify the public health significance of the problem. Percentage of women aged (15-49) years with a haemoglobin concentration less than 120 g/L for non-pregnant women and lactating women, and less than 110 g/L for pregnant women, adjusted for altitude and smoking. Epidemiological studies pointed out that several influences for developing anaemia among reproductive women were found such as women's age, place of residence, and smoking habits. In developing countries, anaemia has several deleterious health risks associated with it: low dietary intake of iron, records of illness due to chronic disease, excessive menstrual bleeding, and history of malaria, history of abortion, genetic disorder, diarrhea, food fortification, and blood loss during labor, close-spaced of pregnancies. Besides the direct reason, there is also some indirect basis such as educational attainment; regional and biosocial factors, which include the BMI status of women. The National Family Health Survey of India (2016) is crucial as it showcases the national data on various characteristics related to the health of women who belong to the reproductive-age. It also provides useful data besides Anaemia child health, maternal health, and nutrition among women of

reproductive age. In India, recent rounds of NFHS-4 reported that the prevalence of anaemia was 53% among women of fertile age group. Study from Bangladesh, 43.4% of women who are less educated and undernourished were found to be anemic. Iron deficiency anaemia is another burden for pregnant and non-pregnant women in developing countries.

Materials and Methods

The biochemical evaluation was performed to haemoglobin concentration before intervention. The hemoglobin level of the subject was evaluated with the help of trained pathologist of area in order to avoid any health-related complications. The trained laboratory technician carried out for the estimation of hemoglobin that was also assisted by laboratory assistant. The cyanmethaemoglobin technique recommended by was used to estimate the participants' haemoglobin levels.

Details of Cyanmethaemoglobin method

(a) Principle

Blood is mixed with Drabkin's solution and vortexed in order to convert all the Hb in cyanmethaemoglobin. The concentration of Hb is determined by matching the color with a known standard in a colorimeter or by measuring the optical density by spectrophotometer against the reagent blank at 540 nm.

(b) Equipments

- Hb pipette (20 µl)
- Whatman No. filter paper 1.5X 1.5 cm.
- Disposable lancet
- Spirit swab
- Glass test tubes
- Drabkin's solution
- Photoelectric colorimeter
- Pipettes and scissor

(c) Reagents/ Chemicals (analytical grades only)

Drabkin's solution

Prepared Drabkin's solution was used for the blood estimation.

(d) Procedure

1. The subject's ring finger was pricked.
2. The haemoglobin pipette tip was promptly positioned over the laceration and filled (up to 0.02 ml up to marked level).
3. After absorbing any remaining blood on the filter paper, the pipette's exterior was cleaned with tissue or filter paper to ensure that the blood level was precisely 0.02 ml.
4. Poured the blood by the pipette on to what man No. 1 filter paper.
5. Allowed to the air dry and sign filter paper with the identification number with a lead pencil. Kept the dried filter paper in an envelope, which also bore the identification no.
6. The filter paper was placed into 5 ml of Drabkin's solution and vortexed it for 5 min. This was allowed to stand for 2 hours. Each the tubes were mixed and the carefully transferred the reactions in to cuvette. The osmosis was read colorimetrically, at 540 nm against reagent blank.
7. The haemoglobin was calculated in g/dl. A single basic reading was taken, and then the following formula was used for calculations:

$$\text{Hb conc.} = \frac{\text{OD of the sample}}{\text{OD of Hb standard}} \text{X} \frac{\text{Conc. of standard}}{1000} \text{Dilution factor}$$

$$\text{The dilution } \frac{\text{Volume of reaction mixture}}{\text{Volume of blood used}} = \frac{5 \text{ ml} + 0.02 \text{ ml}}{0.02 \text{ ml}}$$

$$= \frac{5.02 \text{ ml}}{0.02 \text{ ml}}$$

Precaution taken during the experiment

1. Hb estimation was done within six days of lot number of the sample.
2. To ignore variation, the time between collection of sample and elution was fixed for each sample.
3. 1.5 cm x 1.5 cm size filter paper pieces were prepared for the blood spot.
4. Reagents were not pipetted by orally.
5. Only neat and clean and dry pipettes and test tubes were used. Organic solvents were not used to dry the glassware.

Specification of skin puncture site

Skin puncture was made up on the center of the palmer base of the terminal segments of the ring finger. Ignore puncturing the tip too close to the nails or the side of finger.

Preparation of puncture site and method of puncture

- Reassured the patient. If the extremily was cold, the skin was warmed by vigorously rubbing the puncture site: this increased the blood flow and improved sampling.
- The choosen area was thoroughly cleansed with a spirit swab and allowed to dry (alcohol causes haemolysis in the sample).
- The finger was held in dependent posture, and brightness pressure was utilized just outside to the puncture site.
- The lancet was used to puncture the skin at a right angle to the direction of the skin's folds, allowed the blood to form a drop and prevented it from running into the creases.
- Wiped off the firstly drop and which was then collected into the pipette.
- Once collection was over, the finger was raised with pressure to the stop other bleeding.

Categorization of subjects as 'anaemics' and non-'anaemics'

According to the Hb levels of the adolescent girls, they were categorized as non-anaemics or anaemics as per classification shown in the Table.

Table 1: Hb level (g %) indicative of anaemia

Subjects	Non-Anaemic	Anaemic	Mild Anaemic	Moderate Anaemic	Severe Anaemic
Womben	≥ 12	< 12	10-11.9	7- 10	<7

Source: ICMR Task Force Study (2001)

Results and Discussion

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads.

Table 2: Prevalence and severity of anaemia among reproductive aged women (15-49 Years)

Degree of anaemia	Hb value (g/dl)	N=560	Percent (%)
Normal	>12	238	42.5
Anaemic	<12	322	57.5
Grading of anaemia (Hb in g/dl)			
Mild	10-11.9	218	38.9
Moderate	7-9.9	95	16.9
Severe	<7	9	1.7

This table shows the prevalence and severity of anaemia among reproductive age group women (15-49 Years). The research findings revealed that prevalence of anaemia among the women was found to be 57.5 (322) percent. Out of 560 studied women, only 42.5 (238) percent women were having normal haemoglobin value whereas 57.5 (322) percent women were affected with various grades of anaemia. Majority of them 38.9 (218) percent had mild anaemia, 16.9 (95) percent women suffered from moderate anaemia. Severe anaemia was found in 1.7 (9) percent women. Similar results were obtained in a study conducted among Reproductive Age Group (15-45 Yrs). Women in APHC of Rural Field Practice Area of MM Medical College, Ambala, India, when the level of anaemia is disaggregated by severity, the majority of anaemic cases were of mild (75.5%) followed by moderate (16.9%). The mean difference of hemoglobin levels among mild, moderate and severe anaemic group was significant (p<0.05) (Mishra *et al.*, 2012) [3]. This result is also in agreement with Siva *et al.*, 2016 [4] Prevalence of anaemia among the adolescent girls was found to be 21% (54/257). Majority of them 19.1% (49/257) had mild anaemia and rest moderate anaemia 1.9% (5/257). Similar study was conducted among tribal women in Wayanad district shown that the prevalence of anaemia was found to be 96.5%. A study which was conducted among women of reproductive age in Nepal reveled that overall prevalence of any anemia among women aged 15–49 years was 41% (95% CI, 38.6%–43.0%). Specifically, mild, moderate, and severe anemia was found in 33% (95% CI 31.5%–35.5%), 7% (95% CI 6.2%–7.9%), and 0.3% (95% CI 0.1%–0.5%) of the women, respectively (Gautam *et al.*, 2019) [2]. It frequently occurs due to inadequate iron intake, chronic blood loss or disease, mal-absorption, or a combination of all these factors. Similarly, data from NNMB surveys (2008) showed that iron and folic acid intake in the country in all the age groups was very low. It affects one's development, growth and resistance to infections, and is also associated with mortality among children younger than two years old. Iron deficiency usually develops in a sequential manner over a period of negative iron balance, such as periods of blood loss and/or prolonged iron-deficient diet, accelerated growth in children and adolescents as well as during pregnancy and lactation (WHO, 2002) [6]. Further research is recommended to identify the specific risk factors for anaemia. It may be helpful to implement measures to improve nutritional knowledge and awareness among mothers and health workers. Finally, nutrition education and intervention programs should address anaemia with a focus on both the dietary quantity. All of these interventions must be monitored for effectiveness (WHO, 2001) [8].

Conclusion

The research findings revealed that prevalence of anaemia in females were 57.5 (322) percent. Out of 560 studied women, only 42.5 (238) percent women were having normal haemoglobin value whereas 57.5 (322) percent women were affected with various grades of anaemia. Majority of them 38.9 (218) percent had mild anaemia, 16.9 (95) percent women suffered from moderate anaemia. Severe anaemia was found in 1.7 (9) percent women.

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