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## **Knowledge, Awareness And Prevalence of Anemia among Female in Rural Haryana -An Observational Study**

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### **ABSTRACT**

Anemia is a condition where the red blood cells or their oxygen-carrying capacity is not enough to meet the body's physiological requirements. The current challenges being faced in community outreach activities is non-compliance of participants for testing of anemia in field based setting. Hence, this study is poised to understand the prevalence of Anemia via Point of Care Device in community outreach programs or field based setting for Anemia screening in female's participants of rural villages. The study included screening 2612 females. Follow up testing of 952 females was performed. The awareness on causes of anemia was also low since 90.0% were not aware of any cause of anemia. The blood samples were collected using point of care digital method. The average Hb level was 10.9g/dl with Standard deviation 1.4g/dl. As to the anemia levels, about 75.0% women were anemic (Hb level < 11.9 g/dl). This study recommends the provision of anemia awareness & health education which can be implemented through role-plays, awareness sessions (Nukkad nataks and paushtik meals), educational and training interventions and other suggestions for improvement.

### **KEY WORDS**

Anemia, Hemoglobin, Point of Care testing, National Family Health Survey (NFHS), Adolescent

## INTRODUCTION:

Anemia is a severe problem in low and middle-income population of various countries. It is a condition where the red blood cells or their oxygen-carrying capacity is not enough to meet the body's physiological requirements. It can be different according to age, gender, altitude, smoking habits, and during pregnancy. In India, most of the population is anemic (Anemia Mukht Bharat policy , 2022). There can be many reasons for anemia but iron deficiency is the major reason for about 50 % of anemia in school children and among pregnant women and 80% in children of 2-5 years of age. India has major part in burden of anemia prevalence with the reason of its population size across south Asia (Joe W et al., 2022) According to NFHS-4, anemia prevalence varies from 30% to 69% among different age groups. In March 2018, the POSHAN strategy was launched, and the aim this to reduce the rate of anemia.

The National Family Health Survey -5 (2019-2021) reports that 67.1% of children aged 6-59 months, 57.0% of all women aged 15-19 years, 57.2% of all non-pregnant women aged 15-49 years, 52.2% of all pregnant women aged 15-49 years are anaemic. The prevalence of mild and moderate anemia was higher than severe anemia in adolescent girls (Kamble BD et al., 2021). The prevalence of anemia is higher in females than in males and the data describes that out of 53.2% of beneficiaries, 45.1% males and 54.9% females are anemic (Kishore S et al., 2020). Effective oral iron supplementation and eating healthy nutrients rich food improves anemia (Yadav K et al., 2020), (Bhadra P., & Deb, A 2020) and (Shah, M., et al., 2022). To combat the high burden of anemia in the country, Government of India has launched Anemia Mukht Bharat Strategy with an ambitious target of 3 percent annual reduction in the burden of anemia. A good health delivery system with proper planning, budgeting, and technical support to government policy are required to get the better anemia results (Saini A, et al.,2022).

National Family Health Survey (NFHS-5) conducted in 2019 found that Anemia condition is precarious in most of states in India, leading to a consensus among the public health community to build our health systems more caring towards anemia and creating a whole new structure to address the anemia among the vulnerable sections of society which has been defined by the ministry of health and Family welfare as expectant women, infants, girl children and women in their reproductive age group. A research endeavour has been undertaken to understand the

demographic determinants of anemia among reproductive and peri-reproductive age group in Haryana. As a demography Haryana offers a unique ensemble of social transformation. The rapid urbanization has transformed the landscape of Haryana leading to vast change in the pattern of food consumption, social rituals, physical movements and family practices leading to social order where diseases associated with lower economic strata is being presented with affluent communities and vice versa. The current challenges being faced in community outreach activities is non-compliance of participants for testing of anemia in field-based setting. Currently, there is no systematic practice for screening anemia (Rai RK et al., 2023), (National Health Policy 2017), (Akhtar N et al., 2021) and (Sharma, A. 2021). Hence, this study is poised to assess the prevalence of Anemia via Point of Care Device in community outreach programs or field based setting for Anemia screening in female's participants (Both Adolescent and adults) of rural villages. It was also planned to understand awareness on anemia causes and its symptoms among female participants

## **MATERIALS AND METHODS :**

### **Project Settings & Recruitment of study participants:**

Females of two villages of Gurugram Haryana, namely Bhondasi and Dhankot constituted our study participants. These villages have a mix population representing different socio-economic, cultural and ethnic groups.

### **Target Group:**

The women in the age group of 12 to 50 years

### **Study Duration:**

The study duration was February 2022 to March 2023.

### **Study design:**

Observational

### **Data collection:**

After obtaining approval from Medanta Institutional Ethics Committee (MIEC), this study was initiated with consultative rounds with social stake holders including government Medical

Officials, faculties of local institutes of higher education, local elected representatives, grass root level NGOs etc. A detailed structured questionnaires was developed and d by a committee of technical experts. The research work involved a door to door survey of the households with index women. The questionnaires included two sections relating to household and target women participants, . Medanta research team comprised of both a core team and a field team. Filed team was headed by a medical person, supported by social field worker & research students. All team members were trained on EC approved protocol and administering of survey questionnaires.

The ISO certified Accuster lab on wheels/ mobile lab was used for the anemia screening at doorstep of each households. Every survey participant was then encouraged to undergo free Hemoglobin check-up.

The result of Hemoglobin level studied from the perspective of the determinants and analysed to come up with descriptive insights into the character of the distribution of anemia in Bhondasi and Dhankot.

The study was conducted in accordance with the IEC approved protocol, Site-SOPs, ICH GCP guidelines, Indian Council of Medical Research Guidelines 2017 and the principles of Declaration of Helsinki and applicable regulatory requirements. Data of female participants from 1498 households (Table-1) was collected on day of screening. Total 2741 females were screened for anemia. The data comprised of : a Housing and Sanitation b. Demographic Characteristics in terms of Family Size and Number of Women; c. Women Characteristics in terms of women according to age, marital status, qualification and occupation; d. food preference, e. frequency of consumption of cereals, pulses, vegetables, milk and milk products, f. hand washing after defecation, before food, before cooking and after coming back home from outside g. Information relating to awareness of women about symptoms and causes of anemia and malignancy; h. Awareness on Anemia i. past history of anemia and related treatment was also collected. Data was collected in a pre-set proforma. Descriptive Statistics was applied to show the Mean  $\pm$  SD and frequency of the sample data. The profiling of patients included different demographic, past history & laboratory findings. The parameters were expressed as mean and standard deviation. Categorical data was expressed as absolute number and percentage. Cross tables were generated. All analysis was performed using SPSS software version 24.0.

## RESULTS:

The study included screening 2612 females from 1498 households. Follow up testing of 952 females was performed. Over 97% of households had pucca house, 6.6% semi pucca and only 1% as kuccha . The average number of rooms per household was 3, with 90% of households had separate room as kitchen; 92% of households were using LPG and 4% Kerosene for cooking; 78% of households had tap water at home, 13% using public tap. About half are using R.O; 97.5% of households had own flush toilets, 2.3% used community toilets. Open defecation was rare.

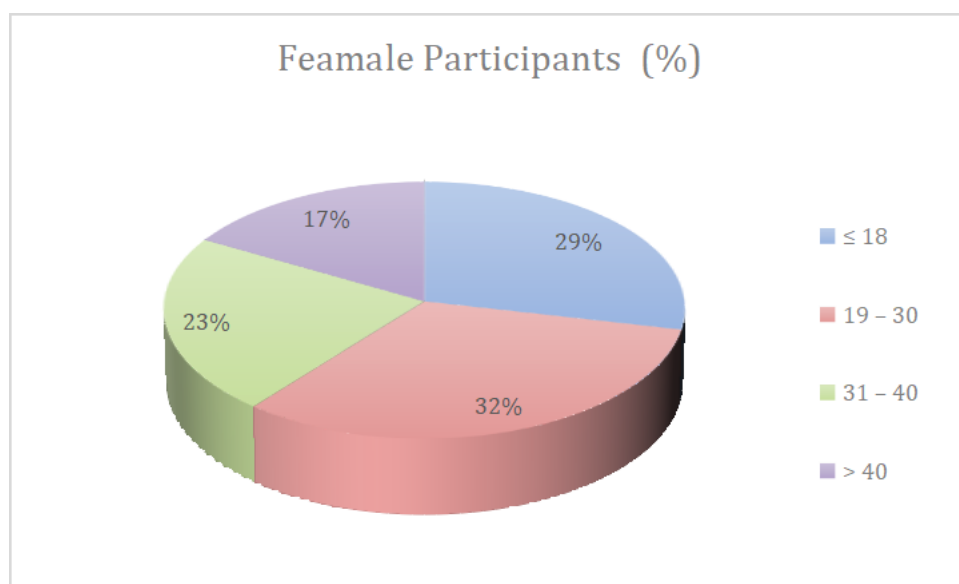


**Fig. 1: Age of Female participants in Gurugram Haryana**

It would be seen that the average family size was 5.3 which is comparable with the figure for Haryana (Census 2011). The number of households having family size up to four were 43.4% and five or more as 56.6%. The average number of females in the age groups 12 to 50 was 1.8. More than half of the households had only one female in the age group into 12 – 50 years and 30.0% had two females per households.

Study evenly covered women of all age groups in the range 12 – 50 years. Over 63.4% of women were married, 35.5% as unmarried and rest 1.0% as widowed/Divorced. Those with secondary and higher education were about 61.3%. Women without any formal education were 10.5%. Among study women, 60.5% were housewives and 34.7% as students. Those in job were few.(Table I)

|                                    | Number of Patients<br>(n = 2741) | Percent<br>(%) |
|------------------------------------|----------------------------------|----------------|
| <b>Marital Status</b>              |                                  |                |
| <b>Unmarried</b>                   | 974                              | 35.5%          |
| <b>Married</b>                     | 1739                             | 63.4%          |
| <b>Divorced/Widowed</b>            | 28                               | 1.0%           |
| <b>Qualification</b>               |                                  |                |
| <b>No formal education</b>         | 288                              | 10.5%          |
| <b>Primary</b>                     | 144                              | 5.3%           |
| <b>Middle</b>                      | 626                              | 22.8%          |
| <b>Secondary/ Higher Education</b> | 1683                             | 61.3%          |
| <b>Occupation</b>                  |                                  |                |
| <b>Student</b>                     | 951                              | 34.7%          |
| <b>Housewife</b>                   | 1659                             | 60.5%          |
| <b>Government Job</b>              | 23                               | 0.8%           |
| <b>Private Job</b>                 | 62                               | 2.3%           |
| <b>Self Employed</b>               | 29                               | 1.1%           |
| <b>Others</b>                      | 17                               | 0.6%           |

**Table 1: Demographic Details of Participants**

Little less than two thirds were pure vegetarians, 33.5% - eggitarian, 21% - chicken, 19% - Mutton and 15% of Fish eaters. Diet comprised of two major meals is (lunch and dinner), breakfast and evening snacks mainly home cooked. As to the daily meal, Wheat Roti was reported as main course by 96.4% and Rice by 20.9%. Millets were consumed occasionally (47.1%). The daily consumption of green leafy vegetables was reported by 75.0%and pulses by

59%. Ghee was part of daily meal for 83.0%, milk for 72.3%, and curd for 40.0%. Daily consumption of paneer and sweets was reported by (Table 2).

|                               | Daily        | Weekly       | Fortnightly | Monthly     | Occasionally |
|-------------------------------|--------------|--------------|-------------|-------------|--------------|
| <b>Wheat Roti</b>             | 2559 (96.4%) | 69 (2.6%)    | 10 (0.4%)   | 8 (0.3%)    | 8 (0.3%)     |
| <b>Rice</b>                   | 539 (20.9%)  | 1364 (52.8%) | 165 (6.4%)  | 204 (7.9%)  | 312 (12.1%)  |
| <b>Millets</b>                | 111 (4.9%)   | 740 (32.5%)  | 112 (4.9%)  | 243 (10.7%) | 1074 (47.1%) |
| <b>Pulses</b>                 | 1554 (58.9%) | 848 (32.1%)  | 59 (2.2%)   | 84 (3.2%)   | 94 (3.6%)    |
| <b>Green Leafy Vegetables</b> | 1985 (75.5%) | 573 (21.8%)  | 20 (0.8%)   | 26 (1%)     | 24 (0.9%)    |
| <b>Milk</b>                   | 1669 (72.3%) | 405 (17.5%)  | 56 (2.4%)   | 33 (1.4%)   | 146 (6.3%)   |
| <b>Curd</b>                   | 909 (40%)    | 801 (35.2%)  | 122 (5.4%)  | 74 (3.3%)   | 367 (16.1%)  |
| <b>Ghee</b>                   | 2093 (83.3%) | 216 (8.6%)   | 39 (1.6%)   | 43 (1.7%)   | 123 (4.9%)   |
| <b>Paneer</b>                 | 52 (2.1%)    | 717 (28.3%)  | 207 (8.2%)  | 248 (9.8%)  | 1312 (51.7%) |
| <b>Sweets</b>                 | 89 (3.6%)    | 519 (20.9%)  | 148 (6%)    | 205 (8.2%)  | 1524 (61.3%) |

**Table 2: Diet Pattern of participants**

Over 97.0% of women reported hand washing with soap and water.. The awareness of symptoms was low. As high as 82.6% were not aware of any symptoms of anemia. Only 13.4% reported symptoms of anemia as Tiredness, followed by 9.4% - Loss of Appetite, 8.9% - Light Headache, 5.6% - Pale Skin/eye/nails colour and 3.1% - Shortness of Breath at physical activity/work. Few (2%) knew all symptoms of anemia.

Similarly the awareness on causes of anemia was also low since 90.0% were not aware of any cause of anemia. Inadequate Nutrition Intake was reported by 6.2% followed by body Pain – 3.2%, Increase blood loss during menstrual cycle and Excessive intake of tea/coffee by 2.1%. Others causes of Anemia were reported by less than 2% each. Those aware of all causes of anemia were just 1%.

Around 11% of women reported past history of anemia for which treatment was availed. Among these 27.1% had blood transfusion. The consumption of IFA was reported by only 13.6%.

At the baseline blood samples were collected using point of care digital method. For this a lab was established in the village. In many cases blood samples were collected through visit to individual households. The samples were analysed for Hb levels. Based on this the study women were classified as normal, mild anaemic, moderate anaemic and Severe Anaemic. Both WHO criteria and Haryana criteria were used for this classification.

| Category              | Haryana Criteria |                             |             | WHO Criteria |                 |             |
|-----------------------|------------------|-----------------------------|-------------|--------------|-----------------|-------------|
|                       | Hb Range         | Number of Women             | Percent (%) | Hb Range     | Number of Women | Percent (%) |
| Normal                | >11.9            | 661                         | 25.3%       | >11.9        | 661             | 25.3%       |
| Mild                  | 9.0 – 11.9       | 1872                        | 71.7%       | 11.0 – 11.9  | 618             | 23.7%       |
| Moderate              | 8.0 – 8.9        | 55                          | 2.1%        | 8.0 – 10.9   | 1309            | 50.1%       |
| Severe                | <8.0             | 24                          | 0.9%        | < 8.0        | 24              | 0.9%        |
| <b>Hb Level</b>       |                  |                             |             |              |                 |             |
| Mean $\pm$ SD (range) |                  | 10.9 $\pm$ 1.4 (5.0 – 18.7) |             |              |                 |             |
| Median (IQR)          |                  | 10.9 (9.8 – 12.0)           |             |              |                 |             |

**Table 3: Anemia Levels at Baseline (n = 2612)**

At the baseline, the average Hb level was 10.9g/dl with Standard deviation 1.4g/dl, in terms of median Hb level it was 10.9g/dl with Inter quartile Range (9.8 – 12.0)g/dl (Table -3). As to the anemia levels, about 75.0% women were anaemic (Hb level < 11.9 g/dl), this is comparable to the anemia level for Gurugram i.e. 73.2% (Source: NFHS – 6 District Profile Gurugram). Those with mild and moderate anemia according to WHO criteria were 23.7% and 50.1% respectively, severely anaemic were less than 1% . But according to Haryana criteria, the level of anemia was mainly mild (71.7%).

## **DISCUSSION:**

The household survey questionnaires administration & anemia screening study was conducted from October 2022 to March 2023. This study was poised to understand the prevalence of Anemia via Point of Care Device in community outreach programs or field based setting for Anemia screening in female's participants of rural villages. It was also planned to assess the knowledge and awareness of female participants.

According to the statistical analysis report, about 75.0% women were anaemic (Hb level < 11.9 g/dl), this is comparable to the anemia level for Gurugram i.e. 73.2% (Source: NFHS – 6 District Profile Gurugram). Those with mild and moderate anemia according to WHO criteria were 23.7% and 50.1% respectively, severely anaemic were less than 1%. But according to Haryana criteria, the level of anemia was mainly mild (71.7%).

The awareness of symptoms was low. As high as 82.6% were not aware of any symptoms of anemia. Only 13.4% reported symptoms of anemia as Tiredness, followed by 9.4% - Loss of Appetite, 8.9% - Light Headache, 5.6% - Pale Skin/eye/nails colour and 3.1% - Shortness of Breath at physical activity/work. Few (2%) knew all symptoms of anemia.

## **CONCLUSION:**

Anemia is a public health problem affecting both developing and developed countries with major concerns for human health as well as social and economic development. As compared to men, females are more prone to anemia. They are at risk due to their busy schedules, irregular meal times, long working hours, etc... This study observed a significant lack of awareness was in females of rural haryana. This study recommends the provision of anemia awareness & health education which can be implemented through role-plays, awareness sessions (**Nukkad natak**s

and paushtik meals), educational and training interventions and other suggestions for improvement. The findings of study may support in modifying the intervention in the subsequent years.

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**CONFLICTS OF INTEREST:** The authors declare that they have no conflicts of interest.

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