Determinants of Anaemia Among College Going Girls

[1]**Tandon Palak**, [2]**Prasad Ranu**, [3]**Verma Anisha**

[1]Ph.D Scholar, [2]Professor, [3]Assistant Professor
Department of Foods Nutrition and Public Health, Ethelind College of Community Sciences
Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, India

Abstract: The present study entitled "Determinants of Anaemia among College Going Girls" was carried out with the objective to find out the prevalence rate of anaemia among college girls. The study was done in Prayagraj, Uttar Pradesh. Data regarding general profile of the respondents were collected using the first part of the schedule. This section covered the aspects including respondent name, age and religion, types of family, family income, educational status. Anthropometric measurements were useful criteria for assessing nutritional status. Measurements technique used are: - height, weight and BMI and heamoglobin. A diet survey was conducted as the food consumption frequency were recorded in term of cereals, pulses, milk and milk product, green leafy vegetables, other fruit, vegetables, poultry, sugar, jaggery and salt intake was recorded by 24 hours dietary recall method. Clinical signs and symptoms like fatigue, Dizziness or weakness, Headache, Sore tongue, Pale skin, dry skin, or easily bruised skin were also asked from the respondents for the fulfilment of the study.

Index Terms - Anthropometric, Haemoglobin, Food consumption, Sign and symptoms

I. INTRODUCTION

Anemia is the common nutritional deficiency disorder in the world. About one third population of the world is suffering from anemia. Out of the world prevalence of anemia in the South Asian countries is highest. According to World Health Organization (WHO), out of the South Asian countries occurrence of anemia is highest in India. Moreover, frequency of anemia is high in all the states of India. The occurrence of anemia is high in India because of (I) low dietary intake of iron content (less than 20 mg/day) and folic acid intake (less than 70 mg/day); (II) poor bioavailability of iron content (3-4percent only) in phytate and fibre-rich Indian diet; and (III) chronic blood loss due to infection such as malaria and hookworm infestations. Anemia has major effects on the health of peoples living in the community. (**Singh** *et al.***, 2018).**

II. JUSTIFICATION

Nutritional anaemia is a worldwide problem with the highest prevalence in developing countries. It is found among women of child-bearing age, young children, during pregnancy and lactation. Nutritional anaemia though global in occurrence is more of concern in the developing countries because of the high prevalence. Anaemia is attributed to dietary inadequacy due to poor purchasing power, illiteracy, ignorance regarding nutritional value of available cheap food, cultural taboos, superstition, large families etc. Iron deficiency can arise either due to inadequate intake or poor bioavailability of dietary iron or due to excessive losses of iron from the body e.g. in women loss of considerable amount of iron during menstruation. Iron deficiency anaemia in adolescent girls is significant risk factor for maternal mortality, high incidence of low birth weight babies, high perinatal mortality and fetal wastage, which ultimately results in higher fertility. It can even cause lack of concentration, irritability and impair academic performance of students. Adolescence, a period of transition between childhood and adulthood, occupies crucial position in the life of human being. It is considered as most appropriate time to intervene. Behaviour change messages embarrassed by this group can contribute to sustained health impact (**Ghorpade** *etal.***, 2016**).

III.OBJECTIVES

1. To find out the prevalence rate of anaemia among college girls.

IV.Materials and Methods

The present study "**Determinants of Anaemia Among College Going Girls**" was conducted in the Department of Food Science and Public Health, Ethelind College of Community Science, Sam Higginbottom University of Agriculture, Technology and Science (SHUATS), Prayagraj. The details of the materials, procedures to be followed and techniques were adopted during the course of present investigation has been elaborated in this chapter under the following heads:

1. Sample Selection

1.1Selection of College
1.2Selection of Respondents

2.Data Collection
2.1 General Profile
2.2Nutritional Status
2.2.1 Anthropometric assessment
2.2.2 24 Hour's Dietary Recall
2.2.3Clinical Assessment
2.2.4Biochemical Profile

1.1Selection of College Going Girls

a. Design of the study
This study was community based cross-sectional study. Cross-sectional study which is also known as prevalence study is a type of observational study that analyse data collected from a population at a specific point of time.

b. Selection of College
The study was done in Prayagraj, Uttar Pradesh. In Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad University, Jagat Taran Girls Degree College, C.M.P Degree college.

1.2Selection of Respondents
Equal number of 565 girls, aged 18 years-28 years were selected randomly from these four college of Prayagraj, i.e. Allahabad University, Sam Higginbottom University of Agriculture Technology and Sciences, Jagat Taran Girls Degree College and C.M.P Degree college.

For calculating sample size, the Indian prevalence of anaemia for women is considered to be 57 per cent girls surveyed suffered from anaemia in 2023 (*Source: NFHS-5*). The sample size have obtained by using formula-

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

N=n×D
Where,
n=required sample size
t= Standard value (level of confidence) for 95% confidence limit, z= 1.96
p= Prevalence of anaemia based on previous studies
D=Design effect
N=Cluster sample size
m= Permissible error = 0.05(5%)
(*Source: J. H. Abramson, 1999. Survey Methods in Community Medicine, 5th edition, Page no.97*)
n=$\frac{3.8416 \times 0.57 \times 0.43}{0.0025}$

=376

N=n×D

=376×1.5

565

2.1 General profile:

Data regarding general profile of the respondents were collected using the first part of the schedule. This section covered the aspects including respondent name, age and religion, types of family, family income, educational status.

2.2.1 Anthropometric assessment

This technique was concerned with the variations of physical dimensions, the gross composition and degree of nutrition. Hence, anthropometric measurements were useful criteria for assessing nutritional status. Measurements technique used are: - height, weight and BMI **(Joshi, 2010).**

- **Height**

Height in centimeter of the subject was taken with the help of a measuring tape by sticking it to the wall. The subjects were made to stand erect looking straight, buttocks, shoulders and head touch in the wall, heels together, toes apart and hands hanging loosely by the sides. Three consecutive readings were taken and the mean value was recorded **(Srilakshmi, 2010).**

- **Weight**

The weighing scale with maximum capacity of 120 kg and the minimum division of 0.5kg was used to weight all the subjects. The respondents were made to stand erect on the weighing scale, with minimum clothes, without foot wear, not leaning against or holding anything and the weight was record in kilograms (kg). The measurement was making to the nearest 0.1 kilogram. Three consecutive readings were taken for all the subjects and the mean value were recorded the scale was adjusted to zero after each measurement **(Srilakshmi, 2010).**

- **BMI- (Body Mass Index)-**

The Body Mass Index (BMI) or Quetelet Index is a measure for human body shape based on an individual's mass and height was used to access the nutritional status of respondents.

$$BMI = \frac{Weight\ (kg)}{Height\ ^2(m)}$$

Source: WHO 2019

2.2.2 Dietary Intake (24 hrs. dietary recall method)

A diet survey was conducted as the food consumption frequency were recorded in term of cereals, pulses, milk and milk product, green leafy vegetables, other fruit, vegetables, poultry, sugar, jaggery and salt intake was recorded by 24 hours dietary recall method and nutrient intake in term of energy, protein, carbohydrates, fats, calcium, iron and vitamin A was also calculated.

2.2.3 Clinical Assessment

Clinical measurement is the most important part of nutritional assessment. This method is helpful to give direct information of the physical sign, which is the final event in the development of nutritional abnormalities and dietary deficiency. Clinical signs and symptoms like fatigue, Dizziness or weakness, Headache, Sore tongue, Pale skin, dry skin, or easily bruised skin, fast heartbeat **(Srilakshmi, 2010).**

2.2.4 Biochemical Profile

In the biochemical profile we have done haemoglobin estimation by Sahli's method. Sahli's method, also called as acid hematin method is the visual comparator method for the estimation of haemoglobin. As visual comparison may lead to unacceptable imprecision and accuracy, this method is not recommended nowadays and the use of spectrophotometric methods like Cyanmethemoglobin method is preferred to it.

V.Results

Table:3.1 Distribution of the respondents according to the general information

Variable		No of Respondents	Percentage
Religion	Hindu	328	58.05
	Muslim	147	26.02
	Christian	90	15.9
Type of Family	Joint	305	53.9
	Nuclear	274	48.5
Monthly Income in the family	Rs10000-20000	72	12.7
	Rs20001-30000	43	7.6
	Rs30001-40000	58	10.2
	More than Rs40000	392	69.3
No of earning members in the family	One	233	41.2
	Two	182	32.2
	Three	82	14.5
	Four or more than four	68	12

Table 3.1 reveals the general information of the respondents related to their Religion, Type of family, Monthly income in the family. Hindus (58.05%) and Muslims (26.02%) Christian (15.93%). The nuclear family set up has emerged as the main pattern of current yeas thus vanishing the joint setup. Maximum (48.5%) percentage belonged to nuclear family whereas (53.9%) subject belonged to joint family setup. As both the quality and quantity of food gets affected with number of members in the family especially with limited income source. Majority (69.3%) of the respondent's family income was 40000 per month. Maximum number of subjects belonged to low or lower middle-class group.
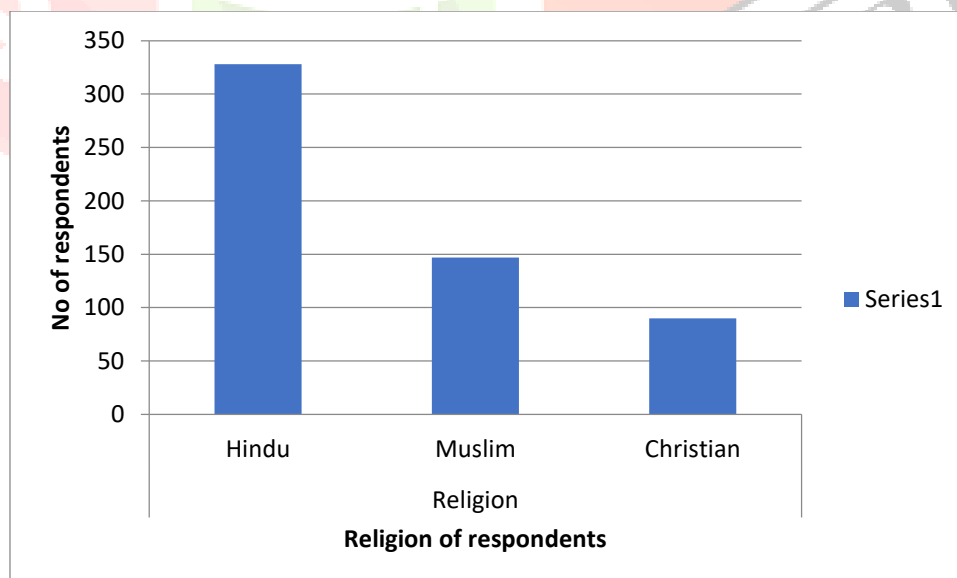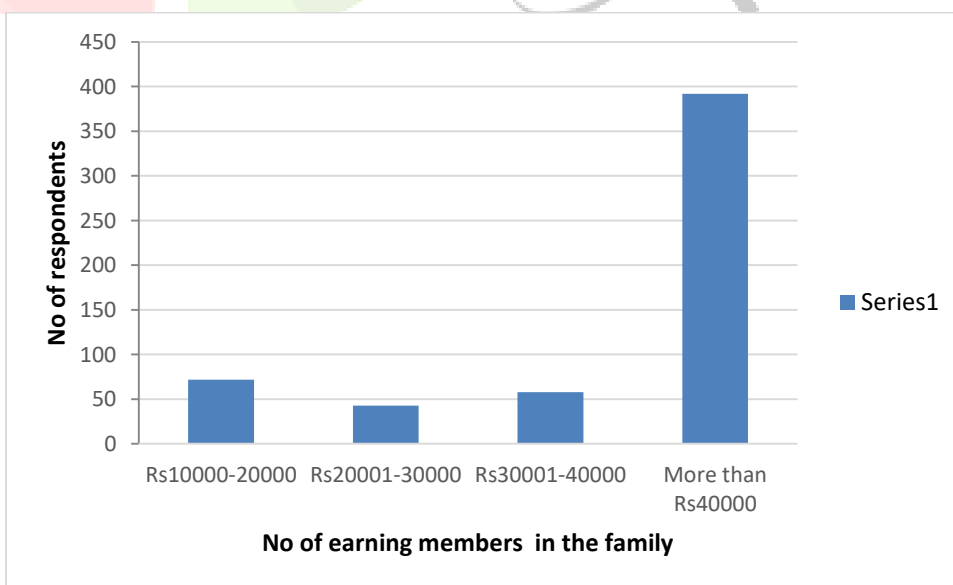

Fig 3.1(a) Distribution of the respondents according to Religion
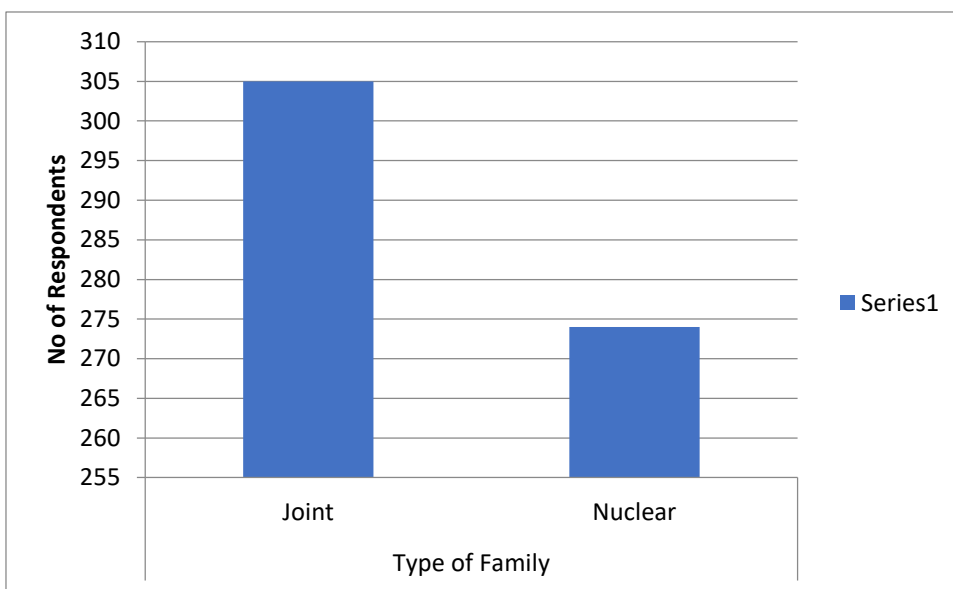
Fig 3.1(b) Distribution of the respondents according to type of family
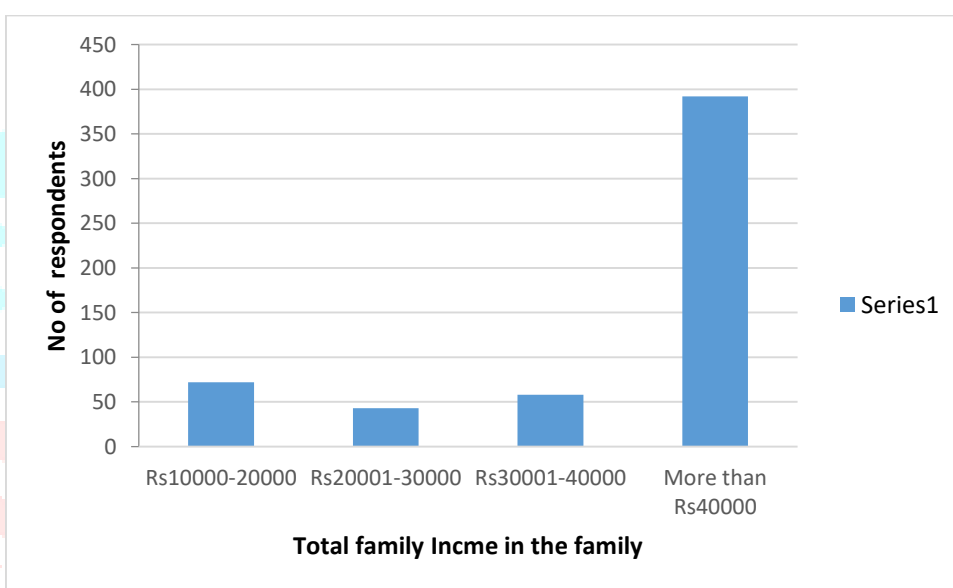
Fig 3.1© Distribution of the respondents according to monthly income in the family

Fig 3.1(d) Distribution of the respondents according to number of earning members in the family

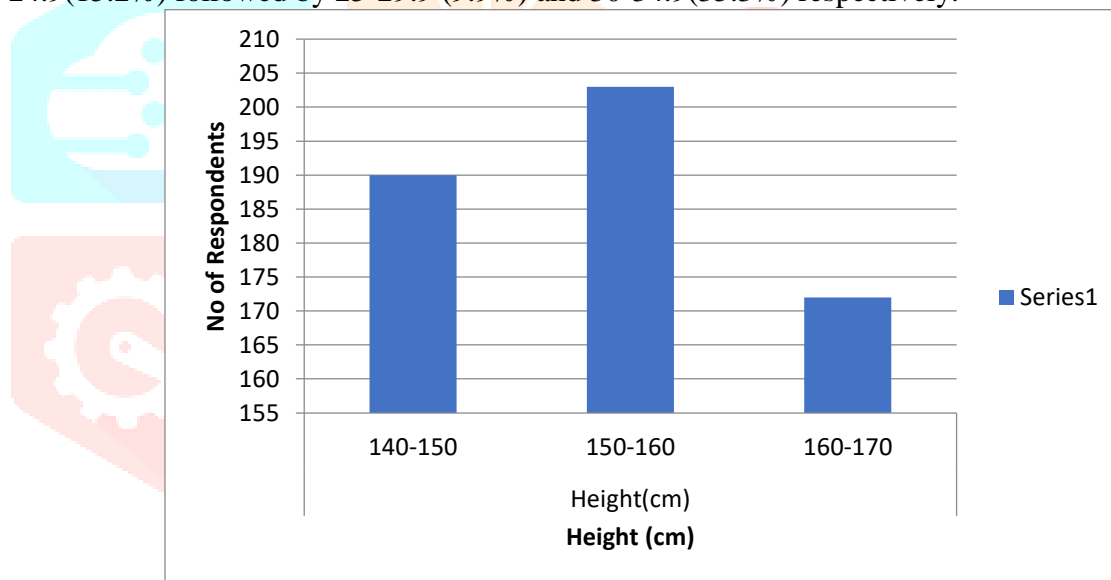**Table 3.2 Distribution of the respondents according to anthropometric measurement**

| Variables		No of respondents	Percentage	Total
Height(cm)	140-150	190	33.6	565
	150-160	203	35.9	
	160-170	172	30.4	
Weight(kg)	40-50	142	25.1	565
	50-60	321	56.8	
	60-70	102	18	
BMI	<18.5	200	35.3	565
	18.5-24.9	123	21.7	
	25-29.9	86	15.2	
	30-34.9	56	9.9	

   Table 3.2 reveals the anthropomorphic measurements of the respondents related to their height, weight, and BMI .

The maximum height of the respondents suffering from anemia and related lifestyle diseases were 150-160cm (35.9%) followed by 140-150cm (33.6%) and 160-170cm (30.4%).

The maximum weight of the suffering from anemia and related lifestyle disease were between 50-60kg (56.8%) followed by 40--50kg (25.1%) and 60-70kg (18%) respectively.

The maximum BMI of respondents suffering from anemia and related lifestyle diseases were between 18.5--24.9(15.2%) followed by 25-29.9 (9.9%) and 30-34.9(35.3%) respectively.

Fig 3.2(a) Distribution of the respondents according to Height.
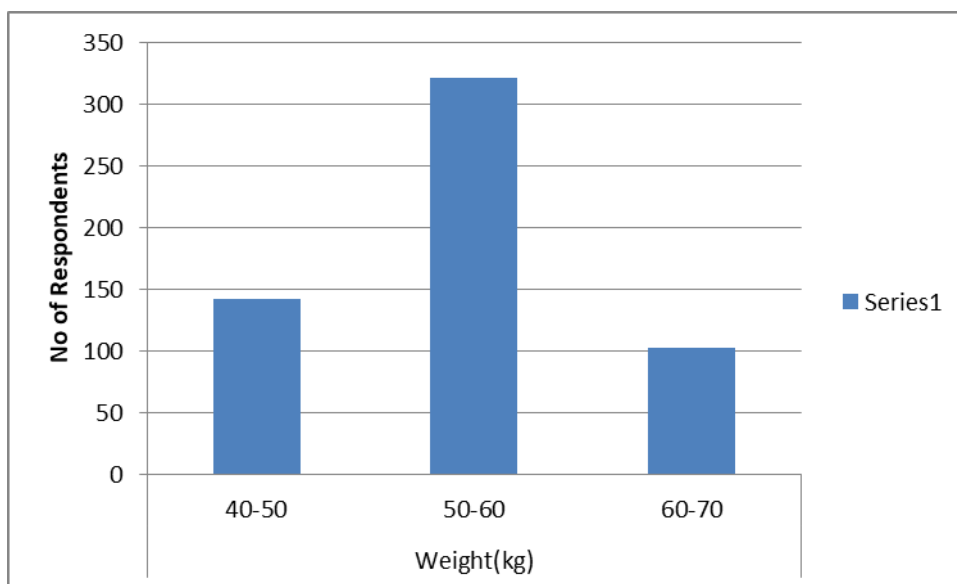
3.2(b) Distribution of the respondents according to weight
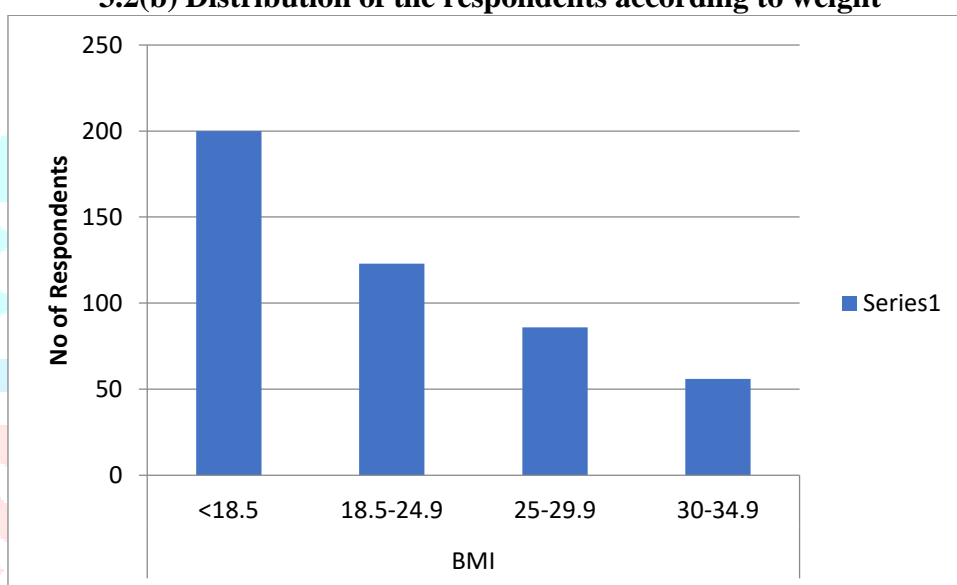
3.2(c)Distribution of the respondents according to BMI

Table 3.3: Distribution of the respondents according to 24 Hour's Dietary Recall

Variables	Particular	Never		Once a month		2-3 times a week		Daily	
Cereals		N	%	N	%	N	%	N	%
	Rice	0	0	0	0	115	20.3	450	79.6
	Wheat	0	0	45	7.9	100	17.6	420	74.3
	Semolina	80	14.1	180	31.8	223	39.4	82	14.5
	Millets	500	88.4	60	10.9	5	0.8	0	
	Puffed rice	43	7.6	102	18	205	36.2	115	20.3
	Rice Flakes	57	10	182	32.2	222	39.2	104	18.4
Pulses and Nuts	Whole	66	11.6	80	14.1	120	21.2	299	52.9
	Washed	16	2.8	24	4.2	64	11.3	461	81.5
	Sprouted	150	26.5	220	38.9	135	23.8	60	10.6

	Soy bean	235	41.5	250	44.2	80	14.1		
	Ground Nut	39	6.9	223	39.4	275	48.6	28	4.9
Fruits	Citrus	67	11.8	196	34.6	172	30.4	130	23
	Other	49	8.6	175	30.9	166	29.3	175	30.9
	Seasonal	29	5.1	175	30.9	159	28.1	202	35.7
Vegetables	GLV	82	14.5	169	40.1	227	40	87	15.3
	Cruciferous	104	18.4	178	31.5	215	38	68	12
	Roots	248	43.8	208	36.8	148	26.1	169	29.9
Dairy	Low fat	166	29.3	155	27.4	127	22.4	121	21.4
	Butter	95	16.8	268	47.4	122	21.5	80	14.1
Fats and oils	Ghee	88	15.5	205	36.2	139	24.6	133	23.5
	Refined oil	101	17.8	235	41.5	189	33.4	40	7
	Mustard oil	188	33.2	209	36.9	115	20.3	53	9.3
Sweets	Sugar	16	2.8	40	7	200	35.3	309	54.6
	Jaggery	148	26.1	187	33	160	28.3	70	12.3
Non-Veg	Eggs	100	17.6	197	34.8	215	38	53	9.3
	Fish	268	47.4	148	26.1	149	26.3	0	
	Poultry and Mutton	200	35.3	350	61.9	15	2.6	0	
	Pork and Beef	404	71.5	161	28.4	0		0	

Table 3.3 reveals the frequency of specific foods consumed by study participants was taken from items listed on the food frequency. The majority of participants, 79.6 % reported eating rice and wheat 74.3% daily. The majority of participants 81.5 % reported eating washed pulses (legumes daily whereas only 23 % eat citrus fruit daily and only 37.5 % ate seasonal fruits daily. Vegetables were eaten quite regularly, 1.3 % reported to eat green leafy vegetables daily. Only 15.3 % respondent cruciferous vegetables daily and other roots were consumed daily by 29.9 % subjects. Only 21.4% participants reported to have consumption of low fat milk daily and use ghee in our daily diet, 7 % use refined oil in our daily diet and 9.3 % respondent use mustard oil in our daily diet. Daily consumption of sugar and jiggery was found 54.6 % and 12.3 % respectively. 9.3 % of the participant's daily consumed eggs whereas 38 % reported to consume 2-3 times in a week, 26.3 % respondents were ate fish in 2-3 time in a week. Only 2.6% of the respondents reported to have poultry or mutton 2-3 times in a week, 28.4 % respondents were consuming pork and beef in one a month.

Table:3.4 Distribution of the respondents according to the clinical assessment

Variables	0	%	1	%	2	%	3	%	4	%
Dizziness or Weakness	268	47	162	28.6	135	23.8				
Sore tongue	424	75	141	24.9						
Pale skin	162	28.6	377	66.7	26	4.6				
Unintended movement in the lower leg	214	37.8	217	38.4	108	19.4	26	4.6		
Fatigue	297	52.5	82	14.5	24	4.2	26	4.6	136	24
Weakness	81	14.3	136	24	214	37.8	108	19.1	26	4.6
Irregular heartbeats	54	9.5	376	66.5	82	14.5	53	9.3		
Cold hands and feet	322	56.9	243	43						
Headache	162	28.6	261	46.1	81	14.3	61	10.7		
Leg cramps	187	33	162	28.6	162	28.6	54	9.5		
Insomnia	161	28.4	216	38.2	82	14.5	106	18.7		
Brittle nails	242	42.8	215	38	108	19.1				
Odd cravings for ice, dirt, starch	521	92.2	44	7.7						
Uncontrollable bleeding	240	42.4	161	28.4	136	24	28	4.9		

Regarding dizziness and weakness out of 565 respondents 47.8 per cent people do not feel any type of weakness; mild weakness was faced by 28.6 per cent peoples, whereas 23.8 percent respondents suffer from moderate symptoms.From the data it is observed that 75 per cent were not facing any type of sore tongue 24.9 percent were facing mild sore tongue as a symptom of anemia. In case of signs related to pale skin it was observed that none of the 94.7% out of 565 respondents were facing any problem related to skin, 4.6 percent respondents we facing moderate symptoms that were suffering from anemia.As far as symptoms related to unintended movement in legs were concerned, it was observed that none of the 37.5 percent respondents were suffering from anemia ,mild unintended movements were seen in legs 38.4 percent were seen in facing respondents who were suffering from anemia, moderate number of 19.18 percent were suffering and, 4.6 percent severe respondents were suffering from anemia and unintended movements in their leg.In case of fatigue 52.5 percent were non anaemic as they did not suffer from any anemia, 14.5 percent were suffering from mild fatigue and ere suffering from anemia ,4.2 percent were moderately suffering from anemia ,4.6 percent were severely suffering from fatigue ,Very severe respondents were suffering from 24 percent anemia.In case of symptoms related to weakness, it was found that 14.34 percent of respondents were not facing any type of weakness ,24.07 percent of respondents were facing mild weakness,37.8 percent respondents were suffering from moderate weakness ,19.12 percent respondent were severe weak ,4.60 respondents were facing very severe weakness.As far as signs and symptoms related to irregular heartbeats are concerned, results in present study revealed that 9.56 percent respondents were not facing any type of problem,66.55 percent were facing mild irregular heartbeat ,14.51 percent severe irregular heartbeat ,9.38 very severe irregular heartbeat.As far as symptoms related to cold hand and feet were concerned 56.99 percent was not facing any type of cold hand and feet whereas ,43.01 percent were facing mild symptoms.In case of headache is concerned 28.67 percent were not facing any type of headache

,46.1 percent were facing mild symptoms ,14.34 percent were facing moderate type of headache ,10.8 percent respondents were facing severe type of headache.In case of symptoms related to leg cramps 33.10 percent respondents were not facing any kind of leg cramps ,28.67 percent of respondents were mildly suffering from leg cramps, respondent 28.67 percent were moderately suffering from leg cramps,9.56were severely suffering suffering from leg cramps.As far as symptom related to Insomnia 28.5 percent was not facing any type of insomnia,35.2 percent were mildly facing insomnia,14.5 present was moderately facing insomnia ,18.7 percent were severely facing with insomnia.In case of anemia related to brittle nails 42.8 percent were not suffering from any brittle nails ,38 percent was mildly suffering from brittle nails ,19.1 percent of respondents were severely suffering with brittle nails.Odd cravings for ice, dirt, starch 92.2 percent was not suffering from any type of cravings, 7.78 percent respondents have odd cravings for ice dirt and starch. In case of uncontrollable bleeding 42.4,percent were not suffering from any type of bleeding 28.4percent were mildly suffering from uncontrollable,24 percent of the respondents were moderately sufferers ,4.9 percent were severely suffering with uncontrollable bleeding.
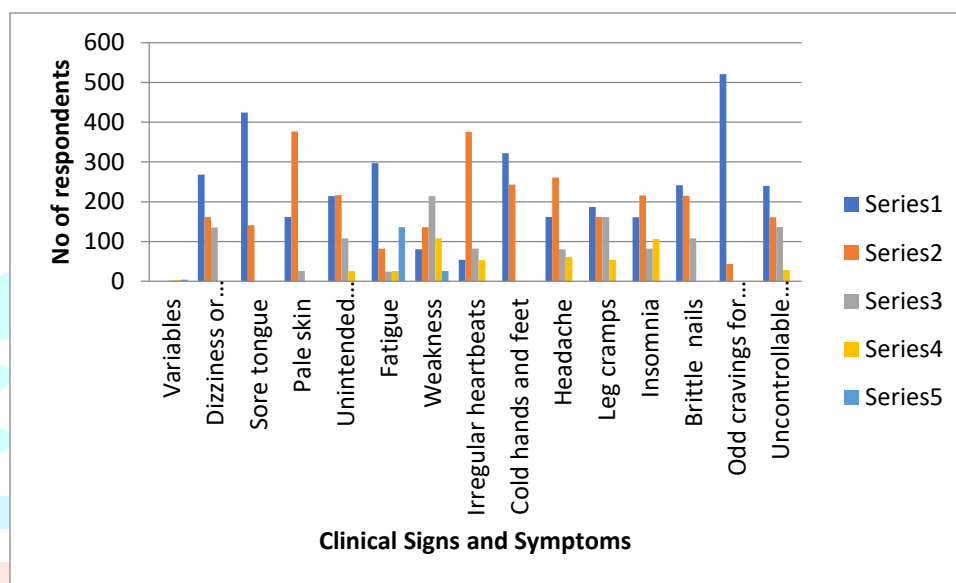

Fig:3.4 Graphical representation of clinical sign and symptoms

Table:3.5 Distribution of the respondents according to haemoglobin

Variables		No of respondents	Percentage	Total
Haemoglobin	Normal (>11)	403	71.5	565
	Mild (8-11)	102	18	
	Severe (>6.5)	60	10.5	

The maximum haemoglobin of respondents suffering from anemia and related lifestyle diseases are between normal (>11) 71.5% followed by mild (8-10) 17.8% and severe (>6.5) .10.7% respectively.
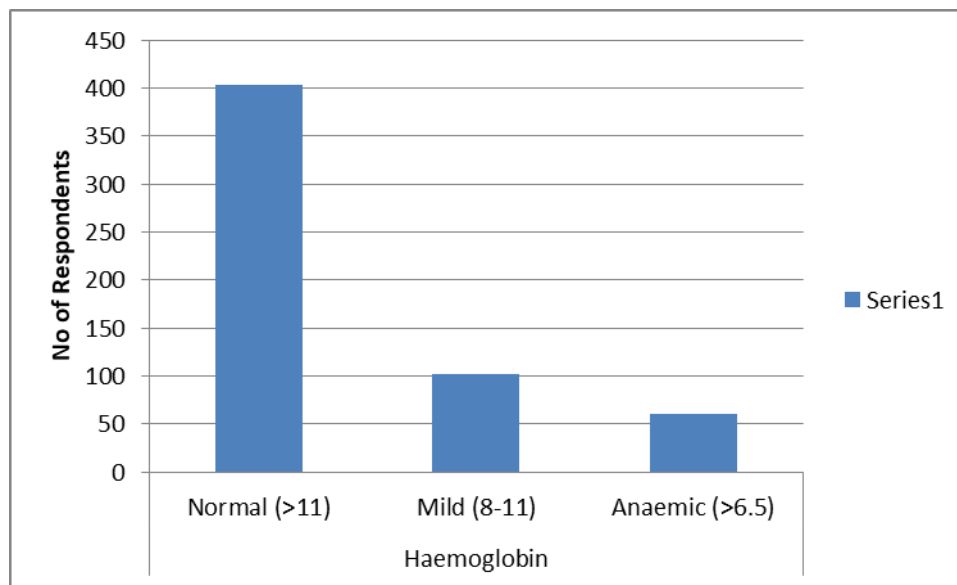
3.5 Distribution of the respondents according to haemoglobin.

VI.Conclusion

From the finding of the study undertaken, it is concluded that the study was done in Prayagraj, Uttar Pradesh. In Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad University, Jagat Taran Girls Degree College, C.M.P Degree college.The general information of the respondents related to their Religion, Type of family, Monthly income in the family. Hindus (58.05%) and Muslims (26.02%) Christian (15.93%). The nuclear family set up has emerged as the main pattern of current years thus vanishing the joint setup. Maximum (48.5%) percentage belonged to nuclear family whereas (53.9%) subject belonged to joint family setup. Majority (69.3%) of the respondent's family income was 40000 per month. Maximum number of subjects belonged to low i.e Rs 10000-20000 was 12.7% and or lower middle-class group was Rs 30000-40000 was 10.2% .Numbers of earning member in the family one was 41.2%,two was 32.2%,three were 14.5%and four or more than four were 12%.The frequency of specific foods consumed by study participants was taken from items listed on the food frequency.The majority of participants,79.6 %reported eating rice and wheat 74.3%daily.The majority of participants 81.5 %reported eating washed pulses (legumes daily whereas only 23 %eat citrus fruit daily and only 37.5 % ate seasonal fruits daily. Vegetables were eaten quite regularly, 1.3 % reported to eat green leafy vegetables daily. Only   15.3   %respondent cruciferous vegetables daily and other roots were consumed daily by 29.9 % subjects. Only 21.4% participants reported to have consumption of low fat milk daily and use ghee in our daily diet,7 % use refined oil in our daily diet and   9.3 % respondent use mustard oil in our daily diet. Daily consumption of sugar and jaggery was found 54.6 % and   12.3 % respectively.9.3 % of the participants daily consumed eggs whereas 38 % reported to consume 2-3 times in a week, 26.3 % respondents were ate fish in 2-3 time in a week. Only 2.6% of the respondents reported to have poultry or mutton 2-3 times in a week, 28.4 % respondents were consume pork and beef in one a month. Regarding dizziness and weakness out of 565 respondents 47.8 per cent people do not feel any type of weakness;75 per cent were not facing any type of sore tongue 24.9 percent were facing mild sore tongue as a symptom of anemia. In case of signs related to pale skin it was observed out of 565 respondents were facing any problem related to skin, 4.6 percent respondents we facing moderate symptoms that were suffering from anemia.As far as symptoms related to unintended movement in legs were concerned, it was observed that   4.6 percent severe respondents were suffering from anemia and unintended movements in their leg.In case of fatigue very severe respondents were suffering from 24 percent anemia.In case of symptoms related to weakness, it was found that 19.12 percent respondent were severe weak ,4.60 respondents were   facing very severe weakness.Symptoms related to cold hand and feet were concerned 43.01 percent were facing mild symptoms.In case of headache is concerned 10.8 percent respondents were facing severe type of headache.Symptoms related to leg cramps 9.56 were severely suffering suffering from leg cramps.In case of anemia related to brittle nails 19.1 percent of respondents were severely suffering with brittle nails.Odd cravings for ice, dirt, starch 7.78 percent respondents have odd cravings for ice dirt and starch. In case of uncontrollable bleeding 4.9 percent were severely suffering with uncontrollable bleeding.

VII.References

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