



# THE PROSPECTIVE STUDY ON SCREENING RISK FACTORS AND ASSESSMENT OF KNOWLEDGE ATTITUDE PRACTICES AMONG WOMEN AT REPRODUCTIVE AGE WITH ANEMIA

Priyadarshini M<sup>1</sup>, RakshaS<sup>1</sup>, Rupesh Reddy H R <sup>1</sup>, Chaithra M<sup>1</sup>, Parthasarathy G<sup>2\*</sup>

Department of Pharmacy Practice, The Oxford college of Pharmacy, Bengaluru, India.

**\*Corresponding Author**

**Name : Dr.Parthasarathy G**

Address: Professor and Head, Department of Pharmacy Practice,

The Oxford College of Pharmacy, Hongasandra,

Bangalore-560068, Karnataka, India.

## ABSTRACT

**Objectives:** This study aims to screen risk factors and assess knowledge attitude practices among women at reproductive age with anemia.

**Methods:** A prospective and interventional study was carried out in The Oxford Medical College , Hospital and Research Centre over a period of 6 months. All the patients of age group 15-49 (women at reproductive age) of pregnant and non pregnant women admitted in OBG and General Medicine Department were included with consent. The modified DDQ Questionnaire was used to screen risk factors in patients with anemia. The KAP questionnaire was constructed and validated by panel of members, to assess the impact in patients before and after counseling. The essential data required for analysing the DDQ and KAP were collected using data entry form, scores were evaluated using chi square and paired t test respectively.

**Results:** The study included 108 subjects, consisting non pregnant[67% ] and pregnant [41%] women. From the findings of DDQ ,the most observed risk factors associated with anemia were **heavy menstrual bleeding, pregnancy, abnormal uterine bleeding ,hypothyroidism and nutritional deficiency**. On validation of Self constructed KAP QUESTIONNAIRE of anemia, the overall reliability Cronbach's alpha coefficient was found to be 0.75% indicating the questionnaire is acceptable and validated. The Knowledge attitude and practice of patients were evaluated in patients and **post counselling Knowledge(84.4%) ,Attitude(85.50%),Practice(84.48%)** were significantly improved when compared to **pre counselling knowledge(37.50%),Attitude(39.50%), Practice(39.50%)** ,Thus the study was effective to accomplish better patient understanding, perception, implementation and lifestyle habits through counselling about anemia ,its risk factors,treatmentstrategie and ,government program .

**Conclusion:**From the findings of this study we conclude that the major risk factors for causing anemia in WRA were **heavy menstrual bleeding, pregnancy, abnormal uterine bleeding ,hypothyroidism and nutritional deficiency** .On comparing and analyzing KAP in pre and post counselling ,the results showed that Knowledge ,Attitude, Practice after counselling were improved. Thus the study shows that by reinforcing the importance and awareness regarding anemia, reform the belief, practices in society and helps in providing positive effects on patient's attitude level for achieving better health outcomes.

**KEY WORDS:**Anemia, Women At Reproductive Age(WRA), Dietary Diversity Questionnaire(DDQ), Knowledge Attitude Practice(KAP) Questionnaire.

## **INTRODUCTION**

Anemia is defined as a condition in which blood has a lower-than-normal amount of red blood cells or hemoglobin resulting in decrease in oxygen carrying capacity to tissues. It is also referred to as erythrocytopenia. World Health Organization (WHO) has defined anaemia in pregnancy as the haemoglobin (Hb) concentration of less than 11 g/dl and in women at reproductive age group as lower than 12g/dl .<sup>[1]</sup> During the course of pregnancy, there is increase in blood volume and plasma volume than RBC mass leading to a mild decrease in haemoglobin levels called as physiologic(or dilutional) anemia in pregnancy.<sup>[2]</sup>

Though anemia is easily treatable and largely preventable disease if timely detected, it still continues to be significantly prevalent among pregnant women. Females were consistently at greater risk of anemia than men across almost all geographic regions and in most age groups.,India started the **National Nutritional Anemia**

**Prophylaxis Program (NNAPP)** In view of dietary deficiency of iron and folic acid, and high prevalence of anemia among pregnant women. To contribute WHO global nutrition target for 2025 for achieving zero world hunger.

WHO global health observatory data report prevalence of anemia in India is found to be 52%.<sup>[3]</sup>

Risk factors for anemia is any attribute or exposure that increases the probability of disease occurrence or exacerbation of anemia. They include nutrition deficiency, menorrhagia, pregnancy, multiparity, lactating mothers, use of contraceptive methods, early age marriage, improper spacing between pregnancy, comorbidities such as peptic ulcer, worm infestation, chronic kidney disease, cardiovascular disease, malaria etc.

**signs and symptoms:** pallor, fatigue, tachycardia, koilonychia, brittle nails, mouth sores, pica, pagophagia, giddiness, restless leg syndrome, menstrual disturbances, weight loss,

Women are more vulnerable to anemia and it poses a threat to quality of life, society. Anemia is commonly considered a risk factor for poor pregnancy outcomes which has been associated with negative health and development outcomes, including neonatal and perinatal mortality, low birth weight, premature birth and delayed child development, spina bifida and maternal consequences of anemia including: maternal cardiovascular strain, reduced physical and mental performance, reduced peripartum blood reserves, increased risk for peripartum blood product transfusion, Postpartum depression and increased risk for maternal mortality. The key for safe motherhood is reduction of maternal anemia. The risk factors of anemia particularly during pregnancy are multifactorial and complex. So, knowledge of these risk factors and compliance of respondents towards implemented government program is very much essential to prevent anemia and its consequences.

## **METHODOLOGY**

### **Study type**

The prospective interventional study on screening risk factors and assessment of knowledge attitude practices among women at reproductive age with anemia

### **Study location**

The clinical study was conducted on the patients admitted in the OBG and G M department of The Oxford Medical College hospital and Research Centre, Attibele, Bangalore.

## Duration of clinical study

This study was conducted for 6 months of duration from MAY 2022 to OCTOBER 2022.

## Study sources

- Informed consent form
- Patient case records
- DDQ(Dietary diversity questionnaire)
- KAP(Knowledge Attitude Practice)QUESTIONNAIRE
- Patient interview

## Sampling calculation and Sampling method

Based on the prevalence<sup>[5]</sup> rate of anemia the sample size was calculated.<sup>[6]</sup>A calculated sample size of 108 patients were included in the study through Simple random sampling technique.

## Inclusion criteria

- Women at reproductive age (15-49y)<sup>[29]</sup> with Anemia.
- Patients who are willing to enroll in the study with consent.

## Exclusion criteria

- Patients with acute bleeding.
- Emergency and unconscious patients.

## Ethical approval

This study was approved by the Institutional Ethics Committee of The Oxford Medical College Hospital and Research Centre, Attibele, Bangalore. (Reference number:IEC/TOMCHRC/200/2022-23 Date: 04/07/2022)

## MODIFIED DIETARY DIVERSITY QUESTIONNAIRE (DDQ)<sup>[11]</sup>

A validated questionnaire was used to obtain participant information on socio-demographic factors, obstetrics characteristics, menstrual characteristics, nutrition-related characteristics, worm infestation, contraceptive usage and comorbidities. The Dietary Diversity Questionnaire (DDQ) was used to assess the typical dietary intake of

pregnant and non pregnant women with anemia .This comprised a detailed review of their typical intake of various food groups, and the quantity per day, week, or month. The questionnaire was initially developed in English and translated to the local language.

## **KAP STUDY AND ITS SIGNIFICANCE**

Knowledge Attitude and Practice survey is a quantitative tool, which uses a standardized questionnaire that measures the required domains in a predefined population. It fundamentally records an opinion and is based on the declaration (statements). KAP study in individuals helps in evaluating the understanding, perception, implementation and lifestyle habits. Since some of the factors that contribute to anemia include poor knowledge, ignorant behavior, failure to inculcate healthy lifestyle habits, it becomes necessary to improve the knowledge by reinforcing the importance and awareness regarding anemia, thus can reform the belief, practices in society and helps in providing positive effects on patient's attitude level for achieving better health outcomes.

The KAP questionnaire [in English and Kannada] consisting of 18 questions which were divided into three parts such as Knowledge [6] abbreviated as K1,K2,K3,K4,K5,K6.Attitude [6] abbreviated as A1,A2,A3,A4,A5,A6 and Practice [6] abbreviated as P1,P2,P3,P4,P5,P6. The patients' Knowledge, Attitude And Practice towards anemia is known through the questionnaire. The KAP QUESTIONNAIRE was used before and after counselling to interpret the impact of counselling in patients.

Knowledge, attitude and practice pertaining to the use of medications have an effect ultimately on the success of the treatment. "For appropriate drug taking behaviour, it is very important that the patients have good knowledge about the disease and medications. KAP QUESTIONNAIRE is used as a tool to record and compare the Knowledge Attitude and Practice regarding the disease and its management. Inadequate knowledge regarding medications is likely to influence its use.

## **METHODOLOGY FOR VALIDATION OF KNOWLEDGE, ATTITUDE PRACTICE QUESTIONNAIRE DEVELOPED FOR PATIENTS WITH ANEMIA IN WOMEN AT REPRODUCTIVE AGE.**

The development of the questionnaire and validation study will take place in two phases. Phase 1 consisted of the questionnaire development stage1, and phase 2 comprised validation studies.

The steps involved in validation of KAP questionnaire developed for Patients with anemia in women at reproductive age are,

### **Phase 1: Questionnaire development**

A thorough review of the literature will be conducted to ascertain existing questionnaire, as well as to identify relevant items and scales in existing questionnaires regarding anemia in women at reproductive age.

Preparation and selection of questions on anemia in women at reproductive age from the various published articles.

### **Phase 2: validation**

- Questionnaire will be circulated among experts, lay person and patients.
- Total of 20-member panel consist of 3 Health care professionals, 7 Assistant professors,10 members consist of lay person and patients.
- Questionnaires were collected back and scored for its relevance, simplicity, clarity and ambiguity.
- The relevance, simplicity, clarity and ambiguity of each question in assessing the knowledge, Attitude and practice were reviewed and scores are entered in Microsoft excel sheets. Internal content validation of the item will be validated by expert panel consist of health care professionals and Assistant professor. Face validation of the item will be validated by panel member consist of lay persons and patients.
- Cronbach's alpha is calculated by using SPSS software and Cronbach's alpha co-efficient should be 0.7 or greater for corrected items . Total score co-relation will be carried out to examine the co-relation of item with overall domain. A correlation value less than 0.2 indicated that the corresponding item did not correlate with overall scale and would be discarded.
- Cronbach's alpha coefficient acceptability criteria is as follows:
  - ❖  $\alpha \geq 0.9$  indicates excellent internal consistency.
  - ❖  $0.9 > \alpha \geq 0.8$  indicates good internal consistency.
  - ❖  $0.8 > \alpha \geq 0.7$  indicates acceptable internal consistency.
  - ❖  $0.7 > \alpha \geq 0.6$  indicates questionable internal consistency.

- ❖  $0.6 > \alpha \geq 0.5$  indicates poor internal consistency.
- ❖  $0.5 > \alpha$  indicates unacceptable internal consistency.
- Entire comments from content and face validation was considered and thoroughly discussed by the research team. The items were either edited, removed or improved for its reliability . The final questionnaire will be developed based on the analysis results and expert's consensus.

### **SCORING OF KAP QUESTIONNAIRE:**

- The KAP questionnaire consist of 18 questions with choices which was divided into 3 parts;
- Knowledge based (6 question), Attitude based (6 question) and Practice based (6 question). The patients' knowledge, attitude towards the disease and daily practice towards lifestyle modifications is known through the questionnaire. Based on the choices made by the study subjects, scores were given for each question and the total overall score is given as follows:
  - ✓  $>9$  – Good
  - ✓  $<9$  – Poor

### **INDIVIDUAL SCORING OF KAP**

CATEGORY	KNOWLEDGE SCORE	ATTITUDE SCORE	PRACTICE SCORE
<b>POOR</b>	1-2	1-2	1-2
<b>FAIR</b>	3-4	3-4	3-4
<b>GOOD</b>	5-6	5-6	5-6
<b>OVERALL</b>	6	6	6

### **METHODS OF DATA COLLECTION**

Consent was obtained from the patient through Informed consent form in their preferred language either English or Kannada. A total of 108 subjects, The medical records of the patient with anemia were collected from patient's case file and patient interview from OBG and GM department who were admitted in the hospital during the period of 2021-22. Demographic details like name, age, sex, address, contact number, occupation, family income,

educational status, average hours of rest. Medical and medication history, menstrual history ,dietary information were collected.

Modified DDQ was used to obtain information to screen risk factors for anemia and KAP questionnaire was used to assess and evaluate the impact of counselling in subjects before counselling and reassessment was done after 2 weeks using the same tool. The obtained data was subjected to Wilcoxon signed rank test using SPSS software version 20.

## RESULTS

In our study 108 subjects were enrolled based on inclusion criteria, among them non pregnant [67% ] and pregnant [41%] were found.

To screen the most observed risk factors associated with anemia, Modified Dietary Diversity Questionnaire [DDQ] was used which consisted 12 items of Socio- demographic factors and 13 items on Dietary diversity.

### Table 1:

Most observed risk factors associated with anemia in WRA group included were determined by using the findings modified DDQ questionnaire.

The result shows that out of 108 pregnant and non-pregnant patients with anemia from OBG and General Medicine Department, the 5 major risk factors were found to be Heavy Menstrual Bleeding [38.8%], Pregnancy [21.2%], Abnormal Uterine Bleeding [20.3%], Hypothyroidism [11.1%] and Nutritional Deficiency [10.1%].

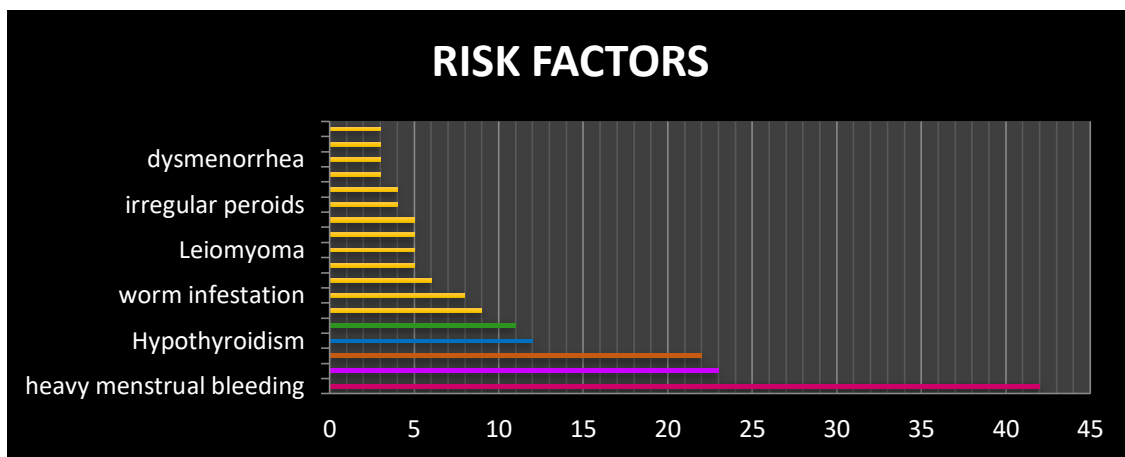
*Table 1 :Risk Factors Of Anemia*

RISK FACTORS	NUMBER OF PEOPLE	PERCENTAGE
Heavy Menstrual Bleeding	42	38.8%
Pregnancy	23	21.2%
AUB	22	20.3%
Hypothyroidism	12	11.1%
Nutritional Deficiency	11	10.1%
Fibroids	9	8.3%
Worm Infestation	8	7.4%
Kidney Disease	6	5.5%



<b>Inflammatory Bowel Disease</b>	5	4.6%
<b>Leiomyoma</b>	5	4.6%
<b>PCOD</b>	5	4.6%
<b>Vegan Diet</b>	5	4.6%
<b>Irregular Periods</b>	4	3.7%
<b>Polymenorrhea</b>	4	3.7%
<b>Amenorrhea</b>	3	2.7%
<b>Dysmenorrhea</b>	3	2.7%
<b>Malaria</b>	3	2.7%
<b>stress</b>	3	2.7%

*Graphs showing risk factors of anemia*

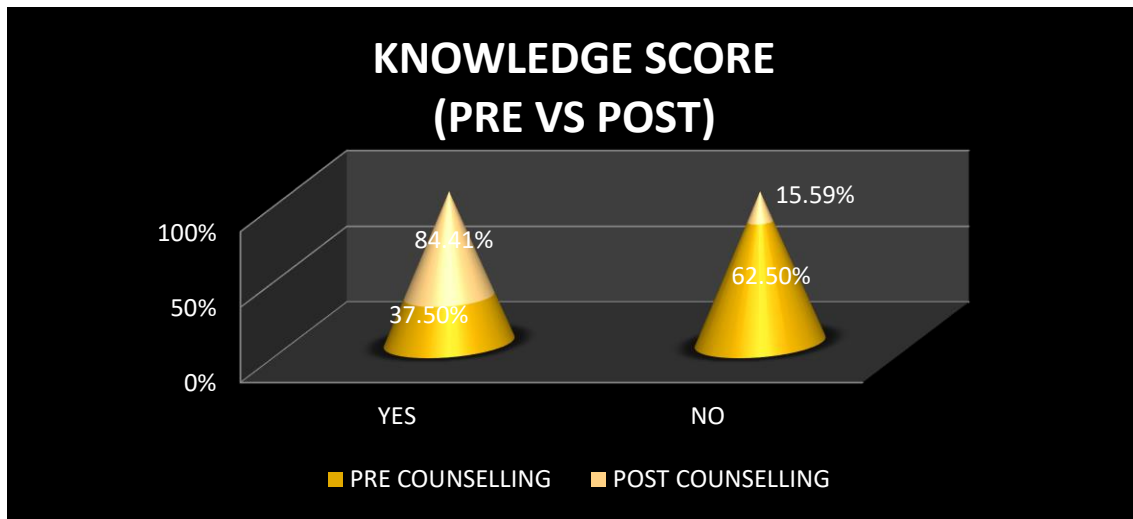


A validated KAP questionnaire was prepared which consisted of 6 Knowledge, 6 Attitude and 6 Practice questions. This questionnaire was used to interview the patients before and after the counselling regarding anemia using patient leaflet. The results were used to compare the extent of knowledge, attitude and practice of the patient towards the disease both before and after the counselling.

**Table 2** shows from the findings of KAP study we found that post counselling score of knowledge for yes (84.41%) was greater than pre counselling score (37.50%). Thus indicating improved knowledge after counselling on anemia.

*Table 2 :Knowledge (Pre Vs Post)*

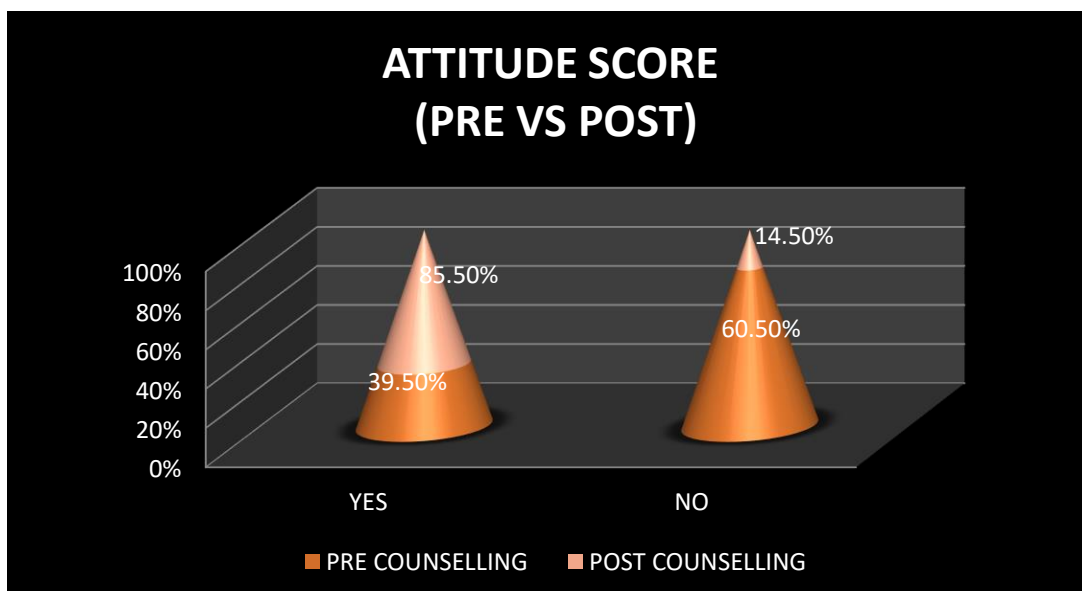
<b>KNOWLEDGE SCORE</b>	<b>YES</b>	<b>NO</b>
<b>PRE-COUNSELLING</b>	37.50%	62.50%
<b>POST COUNSELLING</b>	84.41%	15.59%



**Table 3 :**From the findings of KAP study for Attitude shows that post counselling score for yes (85.50%) was greater than pre counselling score (39.50%), thus indicating improved attitude after counselling on anemia.

*Table 3 :Attitude (Pre Vs Post)*

ATTITUDE SCORE	YES	NO
PRE-COUNSELLING	39.50%	60.50%
POST COUNSELLING	85.50%	14.50%

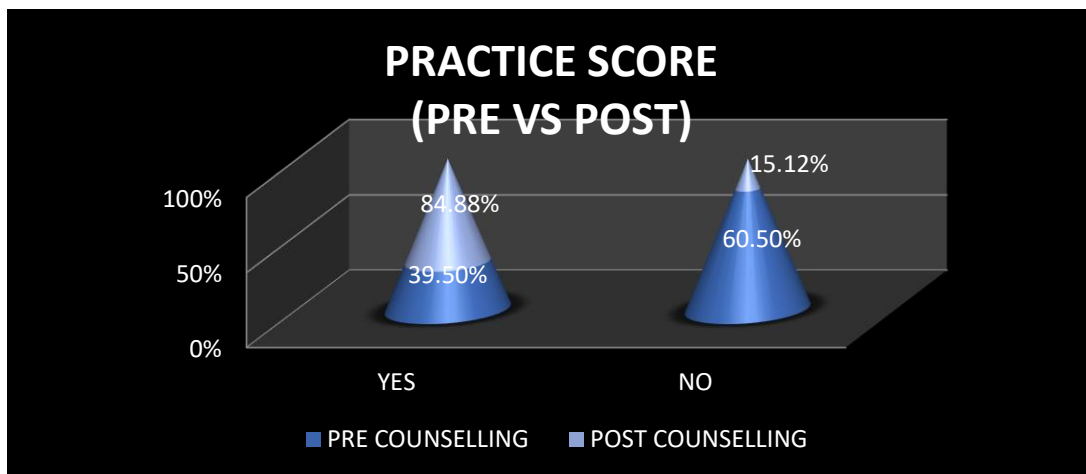


**Table 4** shows from the findings of KAP study we found that post counselling score of Practice for yes

(84.48%) was greater than pre counselling score (39.50%), thus indicating improved Practice after counselling on anemia.

*Table 4 :Practice (Pre Vs Post)*

PRACTICE SCORE	YES	NO
PRE-COUNSELLING	39.50%	60.50%
POST-COUNSELLING	84.88%	15.12%



## DISCUSSION

This study aims to screen risk factors for anemia and assess knowledge attitude practices among women at reproductive age.

The modified DDQ Questionnaire was used to screen risk factors in patients with anemia consisting of 12 items on Socio-demographic factors and 13 items on Dietary Diversity.

A chi square test was performed which revealed that there was a significant difference in mean score. The results indicate that there is association between risk factors and anemia and that most observed risk factors associated with anemia were heavy menstrual bleeding, pregnancy, abnormal uterine bleeding hypothyroidism and nutritional deficiency.

A prepared and validated KAP questionnaire consisting of 6 Knowledge, 6 Attitude and 6 Practice questions was used. Patients were interviewed before counselling to assess pre counselling KAP and then Patient counselling

was provided to the patients regarding anemia using patient information leaflet and was reassessed using the same questionnaire.

A paired t test was performed which revealed that there was a significant difference in mean score of counselling between pre counselling and post counselling. This results indicate that the Counselling had significant effect on the scores of KAP and have improved knowledge attitude and practice .

From the findings of KAP study we found that post counselling score of knowledge for yes (84.41%) was greater than pre counselling score (37.50%), post counselling score of attitude for yes (85.50%) was greater than pre counselling score (39.50%), post counselling score of practice for yes (84.48%) was greater than pre counselling score (39.50%) thus indicating improved knowledge improved attitude ,improved Practice after counselling on anemia.

The overall grading of subjects KAP are as follows:

a) Knowledge of subjects in pre counseling was found to be poor (61.11%), fair (38.89%), good (0%) and of post counselling was poor (0%), fair (17.59%), good (82.41%).

b) Attitude of subjects in pre counseling was found to be poor (58.33%), fair(40.74%), good(0.93%) and of post counselling was poor(0%), fair(15.74%) good(84.26%).

c) Practice of subjects in pre counseling was found to be poor(55.56%), fair(43.52%), good(0.93%) and post counseling was poor(0%), fair(18.52%), good(81.48%).

Thus this study was effective enough to accomplish that awareness about anemia, its risk factors, treatment strategies, government program.

The demographic and clinical characteristics of this study population were similar to the reports of other studies on Anemia, its risk factors and KAP studies. Total number of 108 patients were enrolled in the study. The maximum number of patients enrolled were from rural (52.77%) residency areas which is similar to the study conducted by Stephen G., et al that showed that, the main risk factors were found to be the place of residence and education level of the pregnant woman. Patients in rural areas also had low economic status and the study showed that, poor income leads to limited access to nutritious diets and is associated with poor eating habits that might lead to anaemia.

Education has been reported to reduce the risk of being anaemic in several studies. Educated pregnant women have better income and eat nutritious food. About 37.03% of the patients enrolled in this study were illiterates, 32.40% and 22.22% were matriculate and pre-university patients respectively with lesser educational status and 8.33% were graduates. A similar study conducted by Jenitosborn. A et al showed that illiterates have about three times higher risk of becoming anemic. Better educated women enjoy the privilege of higher paying jobs and live in better environment, which will have a positive influence on their nutritional status thereby reducing the prevalence of anemia.

About 38.8% of house wife were enrolled in this study with 28.70% labours, 14.81% agriculture and 17.59% other occupation. This study showed that house wives were majorly affected. A similar study conducted by Obai et al showed that being a housewife is an independent risk factor for anaemia. Owing to financial needs housewives are dependent on their husband earnings, the majority of them tend to be of low socioeconomic status which has been reported as a known determinant of anaemia.

In this study, KAP of anemia was done and results showed that pre-counselling scores of KAP was lesser when compared to post-counselling KAP scores. These results showed similarities with the study conducted by Dr. Sandhya rani mohanty et al. The study reflects that the difference in mean score of KAP are higher after post-test than pre test scores.

## CONCLUSION

The study findings reveal that majority of patients with anemia belong to the age group of 15-49 years. Considering the status of pregnancy, the prevalence of anemia in non-pregnant group was predominant. Most of the patients had moderate socio-economic status. The study shows that majority of the population has a low education status in which most of them were either illiterates or matriculate patients and hence they had very less knowledge regarding anemia, its risk factors, complications and management.

The risk factors which were found to be prominent in causing anemia in women who were non pregnant were Heavy menstrual bleeding (38.88%), AUB (20.37%), Nutritional deficiency (10.18%), hypothyroidism (11.11%) and in pregnant women (21.29%) was due to nutritional demand, socio-economic status and residency. The study findings reveal that majority of patients with anemia belong to the age group of 20-24year, non-pregnant subjects

were 62.03% and pregnant were 37.96%. Most of the patients had moderate socio-economic status. The study shows that majority of the population has a low education status in which most of them were either illiterates or matriculate patients and hence they had very less knowledge regarding anemia, its risk factors, complications and management. Housewives were most commonly affected. The severity of anemia in subjects were moderate anemia (55.55%). On comparing and analyzing KAP in pre and post counselling, the results showed that Knowledge, Attitude, Practice after counselling were improved when compared to pre counselling. to improve the knowledge by reinforcing the importance and awareness regarding anemia, thus can reform the belief, practices in society and helps in providing positive effects on patient's attitude level for achieving better health outcome

## ACKNOWLEDGEMENT

We would like to express our sincere gratitude to the Lord Almighty , our parents, friends and the Principal, Guide and Staff of The Oxford College of Pharmacy, Bengaluru. The HOD and Doctors of Department of General medicine and the Hospital Authorities of The Oxford Medical College and Research Centre, Bangalore for providing facility to complete our research and for the constant support and cooperation.

## REFERENCE

- [1] Anemia. World Health Organization:[cited 2022 November 2] Available from URL: [https://www.who.int/health-topics/anaemia#tab=tab\\_1](https://www.who.int/health-topics/anaemia#tab=tab_1)
- [2] Gupta V Gandhi M. Physiology, maternal blood. National Center for Biotechnology Information. U.S. National Library of Medicine; Jan 2022. [cited 2022 November 2] Available from URL: <https://pubmed.ncbi.nlm.nih.gov/32491715/>
- [3] Anemia. Wikipedia Foundation. [cited 2022 November 2] Available from URL: <https://en.m.wikipedia.org/wiki/Anemia>
- [4] Management of anemia. [cited 2022 November 2] Available from URL: [http://www.slideshare.net/Farahsou/management-of-anemia-in-community-setting?from\\_m\\_app=android](http://www.slideshare.net/Farahsou/management-of-anemia-in-community-setting?from_m_app=android)
- [5] Sembulingam,K et al, Essentials of medical physiology: Signs and symptoms,6th edition. New Delhi: JAYPEE :2012. pg:93-4

- [6] Sembulingam,K et al, Essentials of medical physiology: Classification of Anemia,6th edition. New Delhi: JAYPEE :2012. pg:89
- [7] Sembulingam,K et al, Essentials of medical physiology: severity classification,8th edition. New Delhi: JAYPEE :2019. pg:79
- [8] Overview of anemia. [cited 2022 November 2] Available from URL: [http://www.slideshare.net/MedicinePoints/overview-of-anemia?from\\_m\\_app=android](http://www.slideshare.net/MedicinePoints/overview-of-anemia?from_m_app=android)
- [9] anemia complications. [cited 2022 November 2] Available from URL: [http://www.slideshare.net/ssuser05c231/anemia-complication?from\\_m\\_app=android](http://www.slideshare.net/ssuser05c231/anemia-complication?from_m_app=android)
- [10] Tripathi KD. Drugs affecting blood. In; Pharmacological Classification of Drugs with Doses and Preparations. Jaypee Brothers Medical Publishers(P) Ltd.;2014,p.105-105.
- [11] Osman MO et al. Risk factors of anemia among pregnant woman.2022. Available from URL: <https://in.docworkspace.com/d/sIPe27uUm2sLJmgY?sa=00&st=0t>
- [12] Muhammad GM et al. Prevalence and correlates of Anemia among women at reproductive age. Journal of Education and Health Promotion. Wolters Kluwer Medknow Publications; 2021.Available from URL: <https://doaj.org/article/f3f0f4c2201840a6a506bfafbd20837a>
- [13] Sinha A et al. A study on anemia and its risk factors among pregnant women attending antenatal clinic of a rural medical college of West Bengal. J Family Med Prim Care 2021; 10:1327–31.
- [14] Stephen G et al. Anemia in pregnancy: Prevalence, risk factors, and adverse perinatal outcomes in northern Tanzania. Anemia. U.S. National Library of Medicine;2018. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/29854446/>
- [15] Gerald O et al. Prevalence of Anemia and associated risk factors among pregnant woman. 2015. Available from URL: <https://in.docworkspace.com/d/sIL-27uUm0MTJmgY?sa=00&st=0t>
- [16] Li Lin et al. Prevalence, risk factors and associated adverse pregnancy outcomes of anemia in Chinese pregnant women: A Multicenter retrospective study. BMC pregnancy and childbirth. U.S. National Library of Medicine;2018. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/29685119/>

- [17] Ashis Talukder et al. Risk factors associated with anemia among women of reproductive age (15–49) in Albania: A quantile regression analysis. 2022; 10:0948
- [18] Abbasi A et al. Causes of anemia in pregnant women of the state of azad kashmir: A cross-sectional survey. Health 2013; 05:35–44.
- [19] Hakizimana D et al. Identifying risk factors of anemia among women of reproductive age in Rwanda - a cross-sectional study using secondary data from the Rwanda demographic and Health Survey. BMC public health. U.S. National Library of Medicine; September 2019. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/31829161/>
- [20] Kulkarni K.Kap studies among Indian antenatal women. Journal of obstetrics and gynaecology of India. U.S. National Library of Medicine;2014. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/26405402/>
- [21] Abu B et al. The impact of nutrition education on knowledge, attitude, and practice regarding iron deficiency anemia among female adolescent students in Jordan. Heliyon. U.S. National Library of Medicine; 2021. Available from URL: <https://pubmed.ncbi.nlm.nih.gov/33718648/>
- [22] Mohanty DSR et al. A study on knowledge, attitude and practice (KAP) on anemia and socio economic characteristics of rural adolescent girls in Odisha. International Journal of Trend in Scientific Research and Development.2021. Available from: <https://www.ijtsrd.com/papers/ijtsrd45033.pdf>
- [23] Singh M et al. Knowledge, attitude and practice change about anemia after intensive health education among adolescent school girls of Delhi: An intervention study. International Journal of Medicine and Public Health. 2019; 93:71–3.
- [24] Afzal HA et al. Factors affecting Knowledge attitude and practices of pregnant women regarding iron deficiency Anemia. 2018. Available from: [https://www.researchgate.net/publication/335464620\\_Knowledge\\_Attitude\\_and\\_Practices\\_of\\_Pregnant\\_Women\\_Regarding\\_Iron\\_Deficiency\\_Anemia\\_in\\_A\\_Rural\\_Area\\_of\\_Lahore](https://www.researchgate.net/publication/335464620_Knowledge_Attitude_and_Practices_of_Pregnant_Women_Regarding_Iron_Deficiency_Anemia_in_A_Rural_Area_of_Lahore)
- [25] Ashraf H et al. Factors affecting knowledge and attitude regarding iron deficiency Anemia in pregnancy among pregnant females. 2018. Available from: <https://www.iiste.org/Journals/index.php/JMPB/article/viewFile/43496/44812>



[26] Jalambo M et al. Improvement in knowledge, attitude and practice of iron deficiency anaemia among iron-deficient female adolescents after nutritional educational intervention. Global Journal of Health Science. CCSE; 2017. Available from: <https://econpapers.repec.org/RePEc:ibn:gjhsjl:v:9:y:2017:i:7:p:15>

[27] Upadrasta VP et al. Knowledge, attitudes and practices of adolescent school girls regarding prevention of iron deficiency Anemia.2019. Available from: [https://www.researchgate.net/publication/333414802\\_Knowledge\\_attitudes\\_and\\_practices\\_of\\_adolescent\\_school\\_girls\\_regarding\\_prevention\\_of\\_iron\\_deficiency\\_anaemia/fulltext/5cec9561299bf109da7508a8/Knowledge-attitudes-and-practices-of-adolescent-school-girls-regarding-prevention-of-iron-deficiency-anaemia.pdf](https://www.researchgate.net/publication/333414802_Knowledge_attitudes_and_practices_of_adolescent_school_girls_regarding_prevention_of_iron_deficiency_anaemia/fulltext/5cec9561299bf109da7508a8/Knowledge-attitudes-and-practices-of-adolescent-school-girls-regarding-prevention-of-iron-deficiency-anaemia.pdf)