

# A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Prevention of Iron Deficiency Among Pregnant Mothers in A Selected Hospital at Mangalore, Karnataka, India

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**Abstract—Background:** Anaemia is a global health challenge, especially in developing countries, with serious short- and long-term effects on maternal health. It impacts billions worldwide, reducing quality of life and productivity, and, if untreated, increases morbidity and mortality linked to chronic conditions.

**Objective:** To assess the pre-test knowledge of primigravida mothers regarding anaemia prevention. To implement a structured teaching program. To evaluate the post-test knowledge of primigravida mothers on anaemia prevention after administering the structured teaching program. To determine the effectiveness of the structured teaching program.

**Methodology:** This study used a one-group pre-test post-test design to assess pregnant mothers' knowledge on anaemia prevention, with a pre-test, followed by a Structured Teaching Program (STP), and a post-test conducted 7 days later.

**Results:** The study analysed demographic variables, knowledge of anaemia prevention, the effectiveness of a Structured Teaching Program (STP), and associations between knowledge and demographics. Most participants (54%) were aged 20–29 years, with 68% having only primary education, 58% working as daily wage labourers, 54% living in urban areas, and 62% earning less than Rs. 3000 per month. Additionally, 54% were first-time pregnant mothers. In the pre-test, 60% had average knowledge, 30% had good knowledge (scores 21–28), and 10% showed poor knowledge. Notably, 63% were unaware that anaemia could be prevented through diet and supplementation. After the STP, the mean knowledge score significantly increased from 6.26 to 22.88, with the highest improvement in understanding anaemia incidence (100%). These statistically significant results ( $t_{99} = 43.01$ ,  $p < 0.05$ ) demonstrate the effectiveness of the STP. Findings align with similar studies in Baroda and Mumbai, which also showed that STPs effectively improved maternal

knowledge and skills, highlighting their value in increasing awareness among women. The study findings indicate no significant association between pre-test knowledge scores and selected demographic variables, including age ( $\chi^2=0.911$ ), educational status ( $\chi^2=0.618$ ), occupation ( $\chi^2=1.422$ ), locality ( $\chi^2=0.593$ ), parity ( $\chi^2=2.680$ ), and monthly income ( $\chi^2=0.363$ ), at the 0.05 level of significance.

**Index Terms—**Iron deficiency anaemia, Pregnant mothers, Prevention, Structured teaching program.

## I. INTRODUCTION

Anaemia is a major public health issue globally, particularly in developing countries like Malaysia. The World Health Organization defines anaemia during pregnancy as having a haemoglobin level below 11 g/dL (1).

Iron deficiency anaemia, defined as a serum ferritin level of less than 15  $\mu\text{g/L}$ , is the most common cause of anaemia during pregnancy (2). Hereditary anaemias, such as thalassemia and haemoglobin E, are also widespread, particularly in the South-East Asian region, and can contribute to anaemia in pregnant women (3). In Malaysia, the prevalence of  $\alpha$ -thalassemia and haemoglobin E or  $\beta$ -thalassemia is estimated at 17% and 34%, respectively (3–5). Additionally, infections like malaria, HIV, and tuberculosis, along with chronic conditions such as chronic renal disease and certain cancers, can cause anaemia in pregnant women (6). These various types of anaemia, including inherited and chronic conditions, can lead to poor maternal and perinatal outcomes. Therefore, pregnant women with anaemia should be

referred to specialists and continue with routine antenatal care (7).

Two key factors contribute to the development of iron deficiency anaemia (IDA) during pregnancy: the woman's iron stores at conception and the amount of iron absorbed throughout gestation. The prevalence of anaemia in pregnant women, particularly in developing countries, suggests that preexisting iron stores are often insufficient, and physiological changes during pregnancy are inadequate to meet the increased iron demands (8).

Iron supplementation during pregnancy has become a standard preventive measure for iron deficiency anaemia in developing countries. In light of this, a study was conducted with the objectives of assessing the pre-test knowledge of primigravida mothers on anaemia prevention, implementing a structured teaching program, evaluating the post-test knowledge of primigravida mothers after the program, and determining the effectiveness of the structured teaching program.

## II. METHODOLOGY

A pre-experimental, one-group pre-test post-test design was used for this study. The pre-test (O1) was conducted to assess the knowledge of pregnant mothers on preventing iron deficiency anaemia, followed by the administration of the Structured Teaching Program (STP) on the same day. The post-test (O2) was carried out on the 7th day after the pre-test and STP.

Study Design: One group pre-test Post-test design			
Subjects	Pre-test	Treatment	Post-test after 7 days
Pregnant mothers	O <sub>1</sub>	X	O <sub>2</sub>

- O1: Administering a structured knowledge questionnaire to assess pregnant mothers' understanding of iron deficiency anaemia prevention.
- X: Providing a structured teaching program to pregnant mothers on preventing iron deficiency anaemia.
- O2: Administering the structured knowledge questionnaire to pregnant mothers after the STP.

The setting referred to the location where the study was conducted and where the population being studied was situated. The study was carried out in the antenatal ward of Govt. Lady Goschen Hospital, Mangalore, chosen for the investigator's convenience. Formal permission was obtained from the relevant authorities to conduct the study.

### A. Analysis of data

The data was analysed and presented under the following headings:

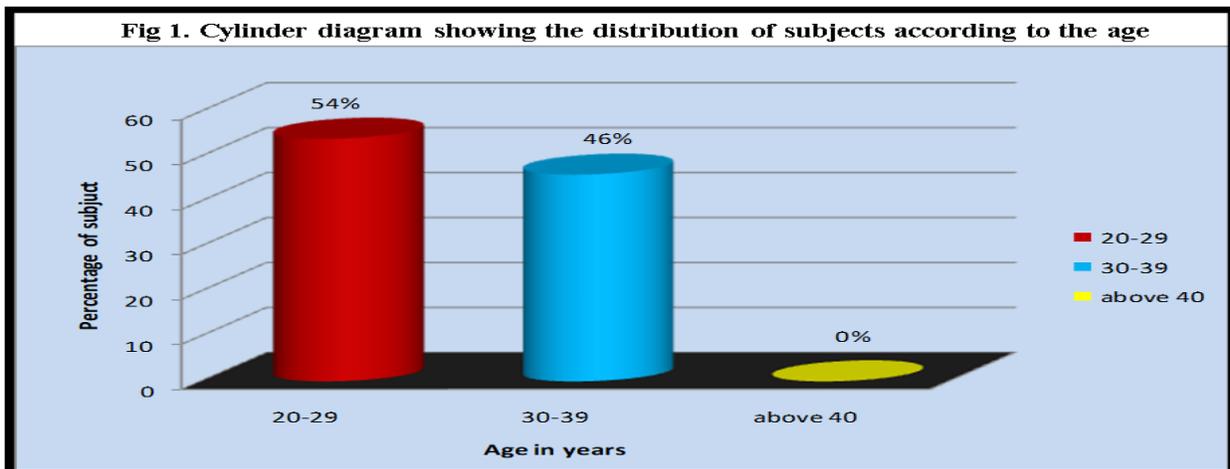
- Section I: Distribution of sample characteristics based on the demographic variables of the respondents.
- Section II: Distribution of knowledge among pregnant mothers on the prevention of iron deficiency anaemia.
- Section III: Evaluation of the effectiveness of the STP in terms of the gain in post-test knowledge scores regarding the prevention of iron deficiency anaemia.
- Section IV: Data describing the association between knowledge of anaemia prevention and selected demographic variables.

## III. RESULTS

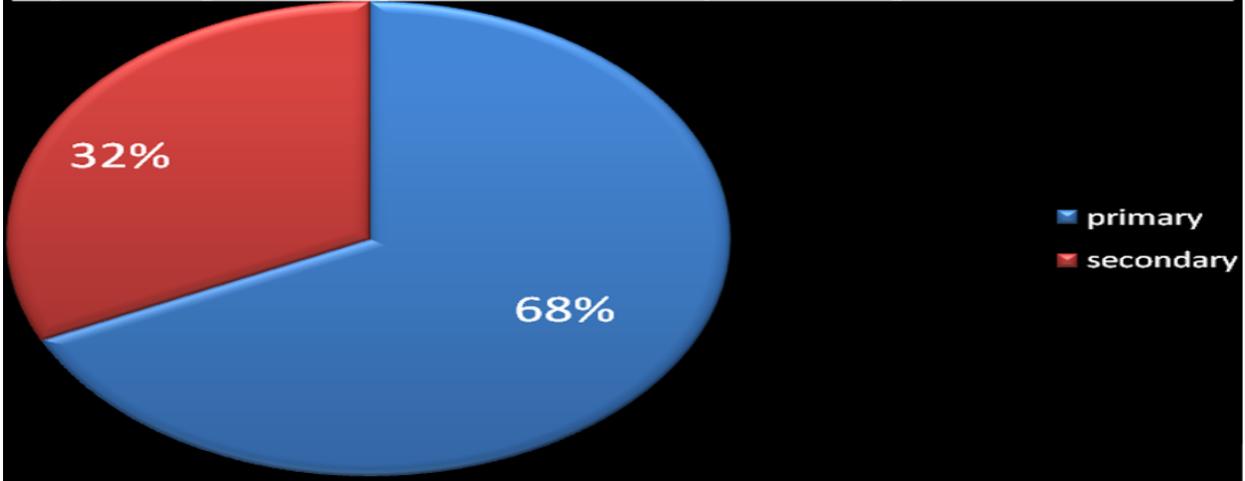
- Section I: Distribution of sample characteristics based on the demographic variables of the respondents (See Table 1 & Fig 1-6).

Table 1: Distribution of sample according to age, educational status of mothers, occupation of mothers, locality, parity of mothers, and monthly income of the family

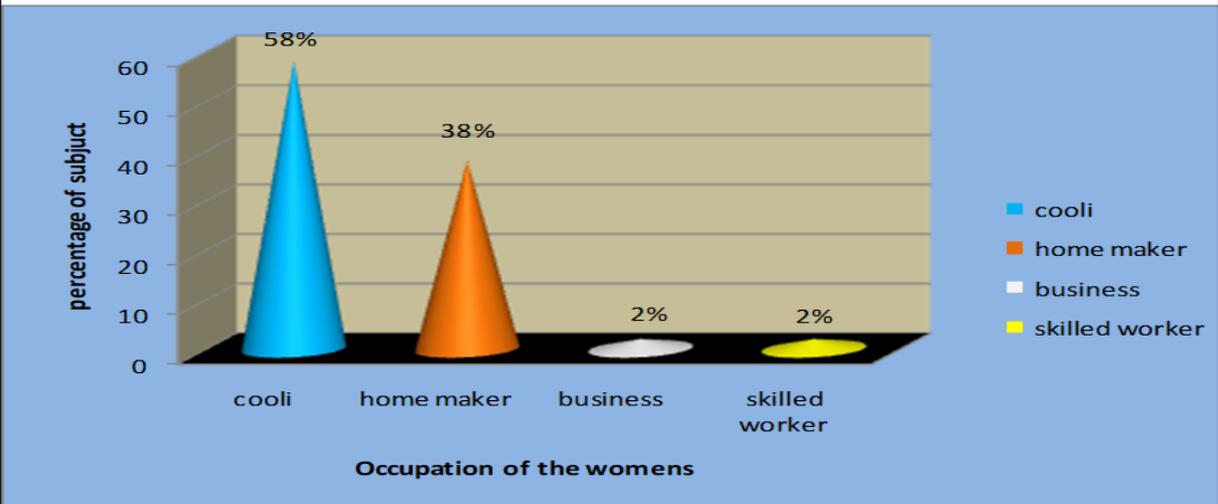
	Variable	Frequency	Percentage
1.	Age		
a.	20-29	27	54%
b.	30-39	23	46%
c.	Above 40	-	-
2.	Educational status of mother		
a.	Primary	34	68%
b.	Secondary	16	32%
c.	Degree and above	-	-
d.	Graduation	-	-
e.	Any other	-	-
3.	Occupation of mother		
a	Cooli	29	58%
b.	Home maker	19	38%
c.	Business	1	2%
d.	Professional	-	-
e.	Skilled worker	1	2%
f.	Any other	-	-
4.	Locality		
a	Urba2	27	54%
b	Rural	23	46%
5.	Parity		
a	1 <sup>st</sup> time pregnancy	29	58%
b	2 <sup>nd</sup> time pregnancy	12	24%
c	Pregnancy for 3 <sup>rd</sup> or more	9	18%
6.	Monthly income of the family		
a.	≤ 3000	31	62%
b.	3001-5000	19	38%
c.	5001-7000	-	-
d.	≥ 7001	-	-



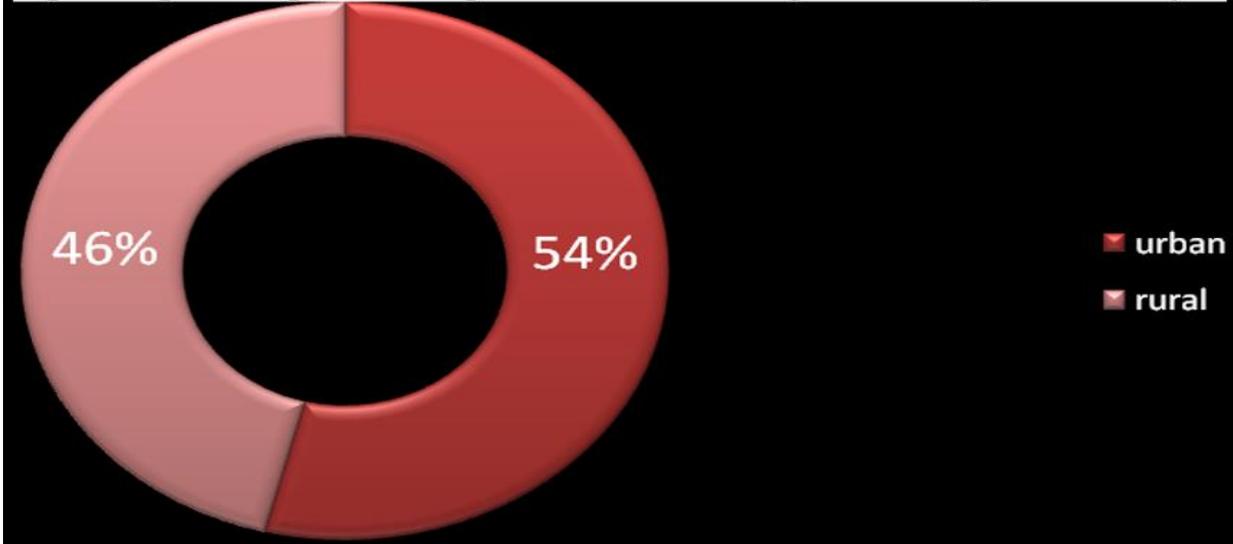
**Fig 2: Pie diagram showing the distribution of subjects according to the education status**



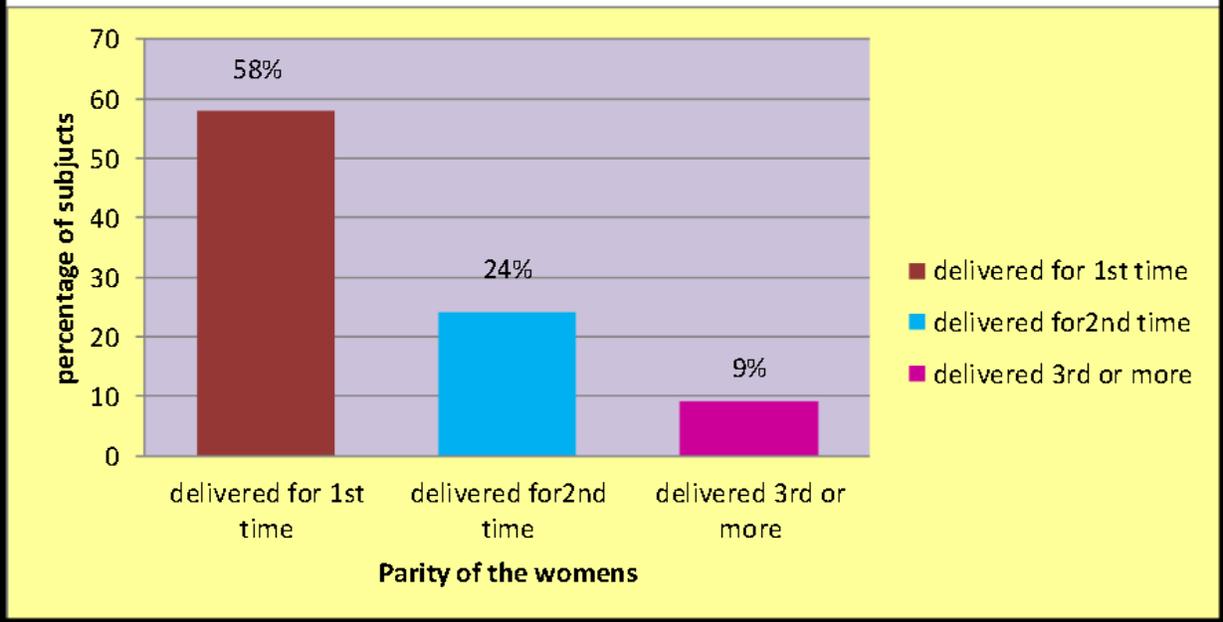
**Fig 3. Cone diagram showing the distribution of subjects according to the occupation**



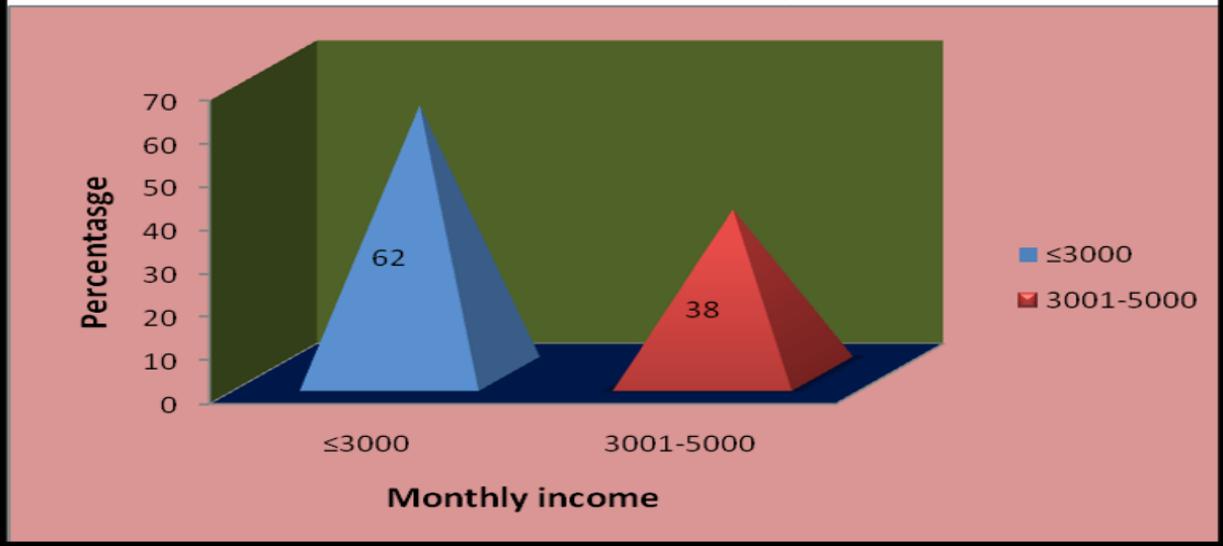
**Fig 4. Doughnut diagram showing the distribution of subjects according to the locality**



**Fig 5. Bar diagram showing the distribution of subjects according to parity of the women**

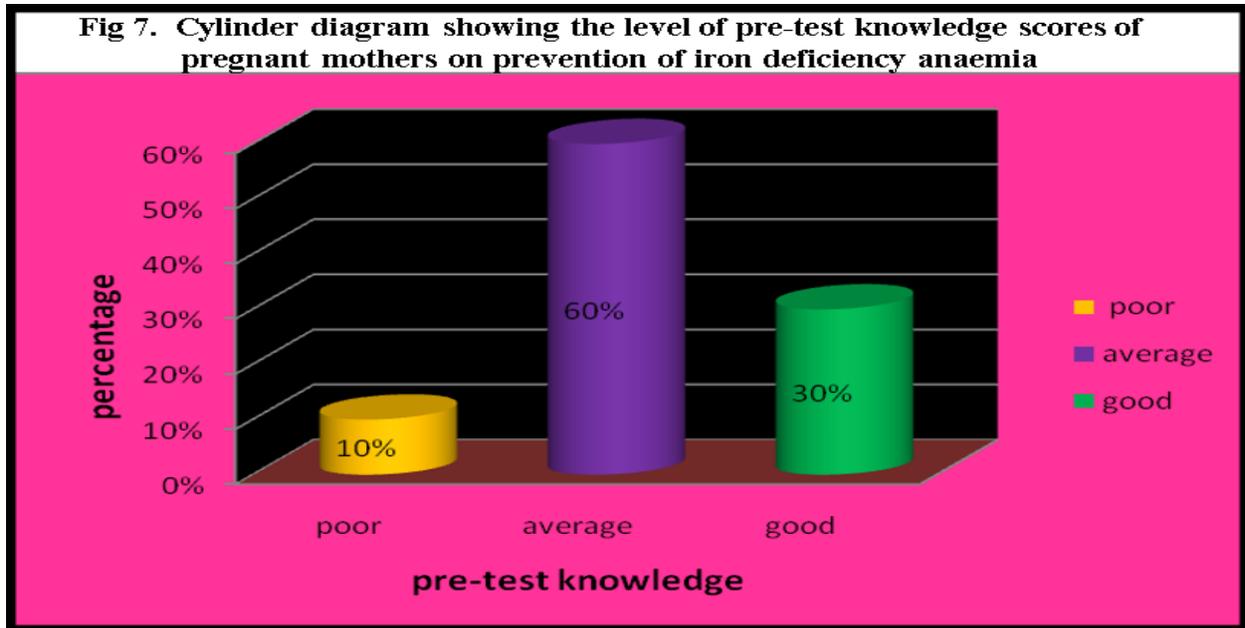


**Fig 6. Pyramid diagram showing the distribution of subjects according to the income of the family**



- Section II: Distribution of knowledge among pregnant mothers on the prevention of iron deficiency anaemia (See Table 2, 3 & Fig 7).

Knowledge Score	Pre-test knowledge Score				
	Grade	Frequency	Percentage	Cum. freq.	Cum. %
0-10	Poor	5	10	5	10
11-20	Average	30	60	35	70
21-30	Good	15	30	50	100



**Table 3: Range, Mean, Median and standard deviation of pre-test knowledge scores of pregnant mothers**

Knowledge	Mean	Median	S. D	Mean % Score
Pre- test	6.26	6	2.489	20.87

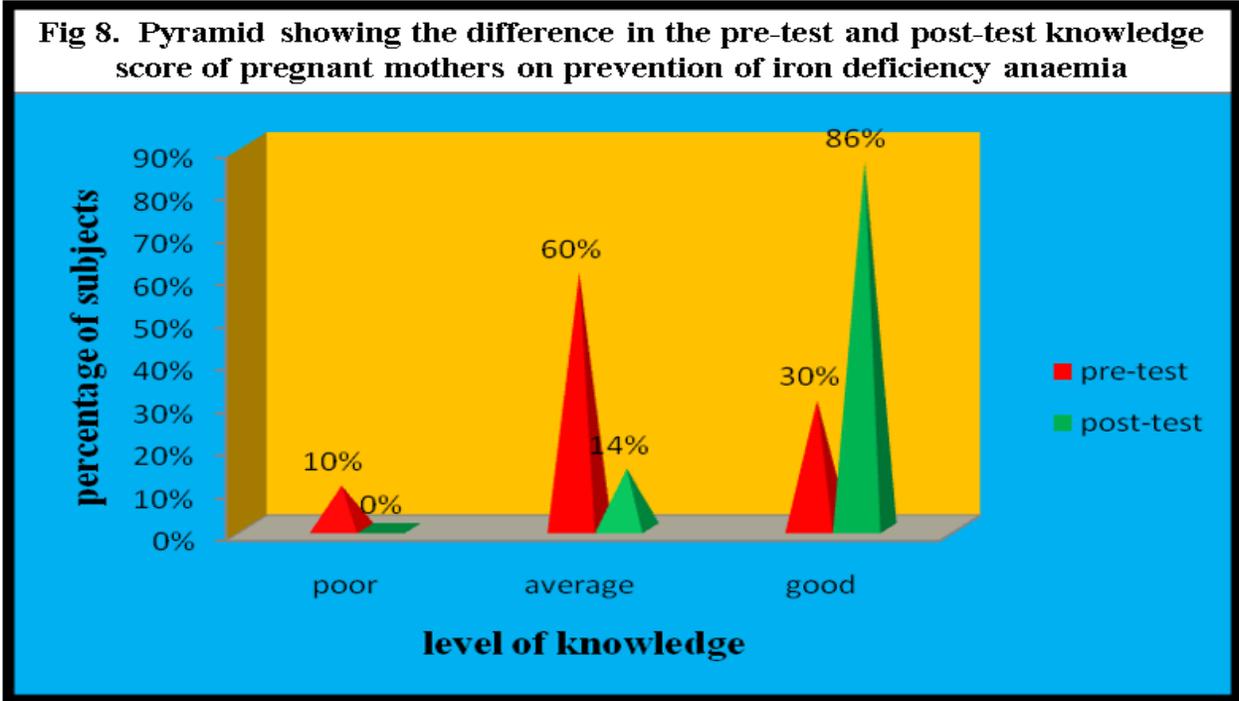
**Table 4: Area-wise Mean, SD, and Mean percentage of pre-test knowledge score of pregnant mothers on prevention of iron deficiency anaemia**

Area	Maximum score	Mean	Standard deviation	Percentage mean
Anatomy and physiology	4	.98	.714	24.50
Definition	2	.50	.544	25.00
Incidence	1	.20	.404	20.00
Causes and risk factors	3	.52	.505	17.33
Signs& Symptoms	3	.62	.567	20.67
Diagnosis	2	.32	.471	16.00
Complication	1	.38	.490	38.00
Management	6	1.30	.863	21.00
Prevention	8	1.44	.884	18.00

Section III: Evaluation of the effectiveness of the STP in terms of the gain in post-test knowledge scores regarding the prevention of iron deficiency anaemia (See Table 5, 6, 7, 8 & Fig 8, 9 & 10).

**Table 5: Pre-test and post-test knowledge score of pregnant mothers on prevention of iron deficiency anaemia in terms of frequency and percentage**

Knowledge score	Grade	Pre-test				Post-test			
		f	%	cf	c%	F	%	cf	c%
0-10	Poor	5	10	5	10	-	-	-	-
11-20	Average	30	60	35	70	7	14	7	14
21-30	Good	15	30	50	100	43	86	50	100



**Table 6: Comparison of Mean, Median and Standard Deviation of Pre- and Post-test knowledge score of pregnant mothers on prevention of iron deficiency anaemia**

	Mean	Median	SD
Pre-test	6.26	6	2.489
Post-test	22.88	23	1.757

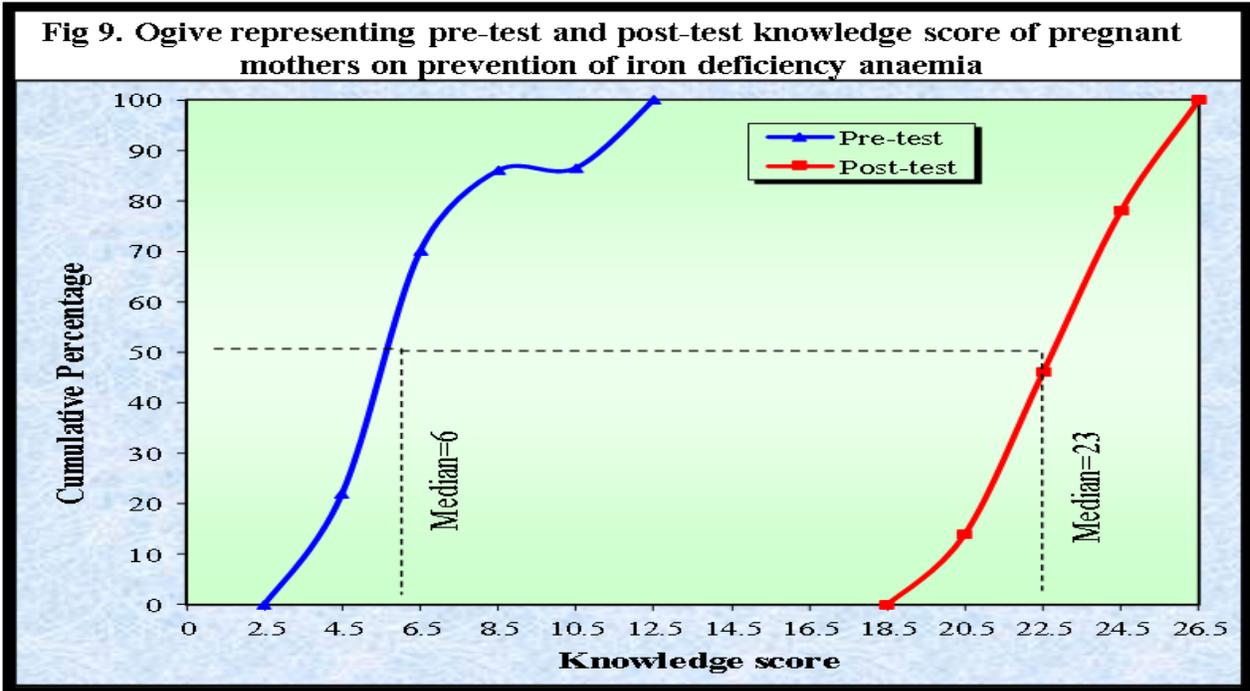


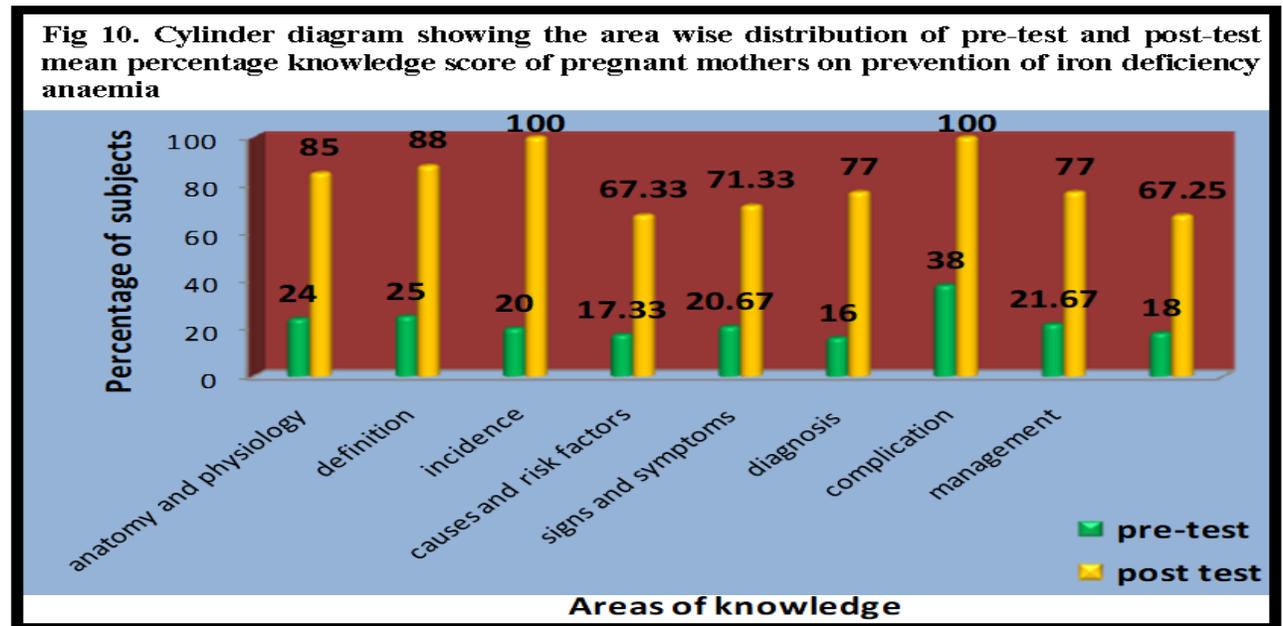
Table 7: Paired ‘t’ test showing the significance of mean difference between pre-test and post-test knowledge score of pregnant mothers after the teaching programme

Group	Mean		Mean difference	SD difference	‘t’ value
	Pre-test	Post-test			
Pregnant mothers	6.26	22.9	16.62	2.73	43.01*

$t_{49} = 1.675, P \leq 0.05$  \* Significant

Table 8: Area-wise Comparison of Mean percentage of the Pre-test and Post-test knowledge score of pregnant mothers on prevention of iron deficiency anaemia

Area	Max. score	Pre –test			Post-test		
		Pre –test			Post-test		
		Mean	SD	Mean %	Mean	SD	Mean %
Anatomy and physiology	4	.98	.714	24.50	3.42	.538	85.50
Definition	2	.50	.544	25.00	1.76	.431	88.00
Incidence	1	.20	.404	20.00	1.00	.000	100.00
Causes and risk factors	3	.52	.505	17.33	2.02	.742	67.33
Signs and symptoms	3	.62	.567	20.67	2.14	.670	71.33
Diagnosis	2	.32	.471	16.00	1.54	.503	77.00
Complication	1	.38	.490	38.00	1.00	.000	100.00
Management	6	1.30	.863	21.67	4.62	.753	77.00
Prevention	8	1.44	.884	18.00	5.38	.667	67.25



Section IV: Data describing the association between knowledge of anaemia prevention and selected demographic variables (See Table 9).

Table 9: Chi-square values showing the association of pre-test knowledge score of the pregnant mothers on prevention of iron deficiency anaemia						
Sl. No.	Variables	< median	≥ median	Df	$\chi^2$	
1	Age					
	a. 20-29	13	14	1	.911	NS
	b. 30-39	8	15			
2	Educational status of mother					
	a. Primary	13	21	1	.618	NS
	b. Secondary	8	8			
3	Occupation of mother					
	a. Home maker	10	9	1	1.422	NS
	b. Other	11	20			
4	Locality					
	a. Urban	10	17	1	.593	NS
	b. Rural	11	12			
5	Parity					
	a. Pregnant for 1 <sup>st</sup> time	15	14	1	2.680	NS
	b. Other	6	15			
6	Monthly income of the family					
	a. ≤ 3000	12	19	1	.363	NS
	b. 3001-5000	9	10			

IV. DISCUSSION

The data in Table I shows that the majority of pregnant mothers (54%) were aged 20-29 years, with 46% in the 30-39 age group. No respondents were above 40 years old. Most mothers (68%) had primary education, while 32% had secondary education. A significant proportion (58%) worked as daily wage labourers, 38% were homemakers, 2% were involved in business, and 2% were skilled workers. Regarding location, 54% lived in urban areas, while 46% were from rural areas. Most respondents (58%) were pregnant for the first time, 24% for the second time, and 18% for the third time or more. Additionally, 62% had a monthly income of less than Rs. 3000, while 38% earned between Rs. 3001-5000. Table 2 shows that in the pre-test, 60% of pregnant mothers had average knowledge, 30% had good knowledge, and 10% had poor knowledge. Table 3 presents the pre-test knowledge scores, while Table 4 displays the distribution of pregnant mothers based on their area-wise mean percentage of pre-test knowledge scores. The highest mean percentage (38%) was observed in the area of complications, with a mean±SD of 0.38±0.490, and the lowest (16%) in the area of

diagnosis, with a mean±SD of 0.32±0.471. The overall mean pre-test knowledge score was 6.26±2.489.

Table 5 shows that in the pre-test, 60% of pregnant mothers had average knowledge, 30% had good knowledge, and 10% had poor knowledge about preventing iron deficiency anaemia. After the structured teaching program (STP), 86% of mothers had good knowledge, and 14% had average knowledge. Table 6 indicates that the mean post-test knowledge score (22.88) was significantly higher than the pre-test score (6.26). The post-test ogive, shown in Fig. 9, lies to the right of the pre-test ogive, confirming this improvement. The knowledge score increase is further confirmed by the median comparison (6.26 vs 22.88). Table 7 presents a significant difference in the scores, with a calculated 't' value of 43.01 (p<0.05), rejecting the null hypothesis and accepting the research hypothesis. The structured teaching program was found to be effective in improving pregnant mothers' knowledge on iron deficiency anaemia prevention. Table 8 shows the area-wise mean percentage distribution of pre-test and post-test knowledge scores, with the highest post-test scores (100%) in the areas of incidence and complications, and the lowest in management. In contrast, the pre-test

showed the highest knowledge in complications (38%) and the lowest in diagnosis (16%). Table 9 shows that the chi-square values for age, education, occupation, locality, parity, and monthly income were not significant at the 0.05 level. Therefore, it can be concluded that there is no association between the pre-test knowledge score and the selected demographic variables.

#### V. CONCLUSION

Most subjects had an average knowledge level in the pre-test. The Structured Teaching Program effectively enhanced pregnant mothers' knowledge on preventing iron deficiency anaemia. There was no significant association between pre-test knowledge scores and demographic variables.

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