Effect of Health Education on Knowledge, Attitude and Practice Regarding Maternal Nutrition and Infant and Young Child Feeding Practices among Young Pregnant Mothers Attending a Tertiary Care Hospital in Chennai: An Interventional Study

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Publication Date: 2025/06/05

Abstract:

> Background:

Maternal nutrition and infant and young child feeding (IYCF) practices play a critical role in ensuring positive maternal and child health outcomes. Inadequate knowledge, poor attitudes, and suboptimal feeding practices contribute to malnutrition and adverse health effects. Health education interventions can improve maternal awareness and behavior, leading to better nutritional outcomes.

> Objective:

The Objective of this study is to assess Knowledge, Attitude and Practice regarding Maternal Nutrition and Infant and Young Child Feeding Practices and to evaluate the effect of Health Education on Maternal nutrition and Infant and Young Child Feeding Practices among Young Antenatal mothers attending Antenatal OPD at a Tertiary care Hospital.

> Methods:

This Interventional Study was conducted from August 2022 to October 2022 in three phases at Antenatal OPD, Government Kasturba Gandhi Hospital, Triplicane, Chennai District.

The study group includes 33 Young pregnant women between the age group of 21-24 years and Gestational weeks between 12 to 36 weeks attending OP department. Baseline data was collected on the Knowledge, Attitude and Practice of young pregnant women on Maternal Nutrition and Infant and Young Child Feeding practices using a semi structured, interviewer administered pre-interventional questionnaire Heath Education intervention done for 3 weeks. In the First week lectures were conducted, second week videos and pictures and in the third week demonstration was done. Post Interventional assessment of the Knowledge, Attitude and Practice of young pregnant women on Maternal Nutrition and Infant and Young Child Feeding practices using a semi structured, interviewer administered post-interventional questionnaire.

> Results:

The study analyzed pretest and posttest scores for knowledge (K score), attitude (A score), and practice (P score) among 33 participants. Additionally, dietary intake (total calorie and total protein) was assessed before and after an intervention. It was found that Health education significantly improves knowledge, attitudes, and practices related to maternal nutrition and IYCF practices.

- > Conclusion:
- The health education intervention significantly improved knowledge, attitudes, and practices among young pregnant mothers.
- Dietary intake (calories & protein) also improved significantly.
- Statistical tests confirmed that all changes were highly significant (p < 0.001).
- These findings support the need for structured health education programs in antenatal care settings.

These findings align with previous studies highlighting the effectiveness of educational interventions in improving maternal nutrition knowledge and practices. However, sustainability of these changes requires continuous reinforcement through antenatal care programs.

Keywords: Health Education, Maternal Nutrition, Infant and Young Child Feeding Practices, Pregnant Mothers, India.

How To Site: Dr. S Arun Murugan; Dr. G Pavithra; Dr. Sathish Kumar; Dr. Aashritha M; Dr. T. S. Abirami; Dr. Abhilekshmi A M; Dr. Anvi Saiju; Dr. K Brindha; Dr. H Deepika; Dr. R. Raghul Raja (2025) Effect of Health Education on Knowledge,

Attitude and Practice Regarding Maternal Nutrition and Infant and Young Child Feeding Practices Among Young

Pregnant Mothers Attending a Tertiary Care Hospital in Chennai: An Interventional Study.

International Journal of Innovative Science and Research Technology,

10(5), 3537-3543. https://doi.org/10.38124/ijisrt/25may1957

I. INTRODUCTION

Malnutrition among the under-5 age group is a common public health problem in India, associated with significant morbidity and mortality. India (783 under-5 deaths) ranks second highest in under-5 mortality rates, only next to Nigeria (844 under-5 deaths) for the year 2020 (1). Malnutrition is not a direct cause of death of under-5 children; it makes them more vulnerable to infections, thus increasing their mortality (2). According to the NFHS-5 Survey, of the under-5 age group, 35.5% are stunted, 19.3% are wasted and 32.1% are underweight (3). This trend of faltering growth in children begins in the first year of life due to faulty Infant and Young Child Feeding Practices (3). About 18.7% of women in the reproductive age group are undernourished (4).

There exists an intergenerational cycle of undernutrition: malnutrition in women of reproductive age group leads to poor maternal nutrition during pregnancy, delayed initiation of breastfeeding, and inappropriate feeding practices in the newborn period and the first year of life, thus increasing under-5 morbidity and mortality (5). Maternal malnutrition during pregnancy has adverse outcomes. It leads to the development of hypertensive disorders during pregnancy, preterm delivery, low-birth weight baby, increased risk of postpartum hemorrhage, and puerperal sepsis (6). Pregnancy depletes iron stores of the mother, leading to postpartum anemia. If these mothers fail to ensure adequate birth spacing, they enter into a vicious cycle of iron deficiency anemia (6).

It was found that the primary determinant of maternal nutrition status is age at pregnancy. According to life history theory, women accumulate metabolic resources during the period of growth to invest in offspring under selective pressure to maximize fitness (7). Even though women aged 25–29 years have high specific fertility rates (139.6), they are comparatively less undernourished. Women in the age group 20–24 years have high specific fertility rates (113.6), poor knowledge on maternal nutrition and infant and young child

feeding practices, and are more undernourished (8). Therefore, providing them with adequate knowledge on maternal nutrition and infant and young child feeding practices would help promote their health and prevent malnutrition among their children. There exists a paucity of evidence on the effect of health education in reducing maternal malnutrition and improving infant and young child feeding practices (9). Hence, we aim to assess the effect of health education on knowledge, attitude, and practice regarding maternal nutrition and infant and young child feeding practices among young pregnant mothers.

II. MATERIALS & METHODS

> Ethical Clearance:

Ethical clearance was obtained from Institutional Ethics Committee, Government Medical College, Omandurar Government Estate, Chennai – 02. Permission was obtained from Head of the Department, Department of Obstetrics & Gynaecology, Government Medical College, Omandurar Government Estate, Chennai – 02 to carry out the Study. Informed Written Consent was obtained from the pregnant mothers of age 21 - 24 years included in the study.

Study Design & Setting:

An Interventional Study (Before and After Study) was conducted from August 2022 – October 2022 in Government Kasturba Gandhi Hospital, Triplicane, Chennai District. The study was conducted among Young pregnant women between the age group of 21-24 years and Gestational weeks between 12 to 36 weeks attending OP department. Young Pregnant women below the age of 21 years and above the age of 24 years and Gestational weeks less than 11 weeks and more than 36 weeks, and those who did not consent to the study were excluded.

Sample Size Calculation:

The minimum sample size was calculated to be 30 pregnant mothers using OpenEpi Software, taking into

Volume 10, Issue 5, May - 2025

ISSN No: -2456-2165

consideration 95% confidence interval, 80% power, alpha value of 0.05. Pilot study was conducted to validate the study.

> Sampling Technique:

Non-Probability Convenience Sampling was used to include study population. Study population includes Young pregnant women between the age group of 21-24 years and Gestational weeks between 12 to 36 weeks attending OP department of Government Kasturba Gandhi Hospital, Triplicane. Young Pregnant women below the age of 21 years and above the age of 24 years and Gestational weeks less than 11 weeks and more than 36 weeks, and those who did not consent to the study were excluded.

Preparation of Health Education Materials & Study Tools:

Health education materials which include pamphlets and posters were prepared in English & Tamil (Local language) by the principal investigators. It was developed based on "Infant and young Child Feeding Practices Guide for Trainers" published by Ministry of Health & Family Welfare, "Guidelines for Enhancing Optimal Infant and Young Child Feeding Practices" published by NRHM, Ministry of Health and Family Welfare. A pre-tested semi structured questionnaire to assess Knowledge, Attitude and Practice on Maternal Nutrition and Infant and Young Child Feeding practices before and after the health education intervention was prepared. Socioeconomic status of the pregnant mothers was assessed based on Modified Kuppuswamy Scale (2022). The calorie and protein intake were estimated by 24-hour dietary recall method.

Study Structure:

Antenatal young mothers attending the OP Department of Obstetrics and Gynaecology were approached for the study. The nature and purpose of the study was explained to the mothers and a written informed consent was obtained from the mothers. Confidentiality was ensured.

https://doi.org/10.38124/ijisrt/25may1957

• Phase I:

Health Education materials were prepared. Base line data was collected on the Knowledge, Attitude and Practice of 33 young pregnant women on Maternal Nutrition and Infant and Young Child Feeding practices using a semi structured, interviewer administered pre-interventional questionnaire.

• Phase II:

Heath Education intervention for 33 young pregnant mothers was done for 3 weeks. In the First week lectures were conducted, second week videos and pictures were used and in the third week demonstration was done.

• Phase III:

Post Interventional assessment of the Knowledge, Attitude and Practice of 33 young pregnant women on Maternal Nutrition and Infant and Young Child Feeding practices was done using a semi structured, interviewer administered post-interventional questionnaire.

III. FLOW DIAGRAM OF THE PROCESS OF STUDY



Fig 1 Flow Diagram of the Process of Study

Volume 10, Issue 5, May - 2025

ISSN No: -2456-2165

IV. STATISTICAL ANALYSIS

Data collected were entered in MS Excel and analyzed using SPSS V.20.

Categorical variables were expressed as frequencies and proportions using descriptive statistics. Categorical data were compared using McNemar's test, ordinal data were compared by using Wilcoxon signed rank sum test and continuous data were compared by using paired t test.

V. RESULTS

https://doi.org/10.38124/ijisrt/25may1957

➢ Baseline Characteristics of Participants

The study included 33 young pregnant mothers attending a tertiary care hospital. The demographic characteristics are summarized in Table 1.

Та	able 1 Baseline Characteristics of Participant	ts
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Characteristic	Frequency (n)	Percentage (%)
Age Group (years)		
21-23	28	84.8
24-26	4	12.1
27-29	1	3.0
Educational Level		
Graduate	13	39.4
Higher Secondary	8	24.2
Middle School	3	9.1
SSLC	8	24.2
Uneducated	1	3.0
Number of Antenatal Visits		
< 4 Visits	10	30.3
4-12 Visits	15	45.5
> 12 Visits	8	24.2

➤ Key Observations:

- A majority (84.8%) of the participants were between 21-23 years.
- About **39.4%** of the participants had a **graduate-level** education.
- **45.5%** of the participants had **4-12 antenatal visits**, indicating moderate antenatal care utilization.

Knowledge, Attitude, and Practice (KAP) Scores The pre- and post-intervention KAP scores showed significant improvements across all domains.

Table 2	2 Knowledge,	Attitude,	and Practi	ce Scores	(Pre-	and Po	ost-Interv	vention)

Variable	Pretest Mean ± SD	Posttest Mean ± SD	p-value
Knowledge Score	6.79 ± 2.42	13.12 ± 0.92	< 0.001
Attitude Score	2.85 ± 1.12	5.73 ± 0.45	< 0.001
Practice Score	3.79 ± 1.34	5.67 ± 0.59	< 0.001

> Statistical Interpretation:

• Knowledge Scores:

Increased significantly post-intervention (p < 0.001), indicating improved understanding of maternal nutrition and infant feeding practices.

• Attitude Scores:

Showed a shift towards positive beliefs and willingness to adopt better nutritional practices (p < 0.001).

• Practice Scores:

Demonstrated a significant improvement in real-life application of healthy behaviors (p < 0.001).

Dietary Intake Changes

Post-intervention, there was a statistically significant increase in both calorie and protein intake, indicating better nutritional adherence.

Dietary Parameter	Pretest Mean ± SD	Posttest Mean ± SD	p-value
Total Calories (kcal)	1659.12 ± 329.80	1852.82 ± 314.93	<0.001
Total Protein (g)	45.33 ± 5.52	56.64 ± 6.84	< 0.001

Volume 10, Issue 5, May - 2025

International Journal of Innovative Science and Research Technology

ISSN No: -2456-2165

- Statistical Interpretation:
- A significant increase in calorie intake (p < 0.001)suggests improved dietary quality and quantity.
- **Protein intake** showed a marked increase (**p** < **0.001**), which is crucial for maternal and fetal health.
- Statistical Analysis: Paired Sample Test

To assess the significance of the observed changes, paired t-tests were conducted.

https://doi.org/10.38124/ijisrt/25may1957

Table 4 Failed Sample Test for KAF and Dietary intake					
Pair	Mean Difference	Std. Deviation	t-value	df	p-value
K Score (Pretest - Posttest)	-6.333	2.072	-17.562	32	< 0.001
A Score (Pretest - Posttest)	-2.879	1.166	-14.181	32	< 0.001
P Score (Pretest - Posttest)	-1.879	1.111	-9.712	32	< 0.001
Total Calories (Pretest - Posttest)	-193.70	162.12	-6.864	32	< 0.001
Total Protein (Pretest - Posttest)	-11.30	8.83	-7.356	32	< 0.001

Table 4 Daired Sample Test for KAD and Distant Intels

Key Findings:

- All paired sample tests demonstrated statistically significant improvements (p < 0.001), confirming the effectiveness of the health education intervention.
- The largest improvement was observed in knowledge scores (t = -17.562, p < 0.001).

Wilcoxon Signed Rank Test

Since some variables were non-normally distributed, Wilcoxon Signed Rank Test was conducted for additional validation.

Table 5 Wilcoxo	n Signed Rank	Test Results

Variable	Z-Score	p-value
K Score (Post - Pre)	-5.029	< 0.001
A Score (Post - Pre)	-5.048	< 0.001
P Score (Post - Pre)	-4.628	< 0.001
Total Calories (Post - Pre)	-5.020	< 0.001
Total Protein (Post - Pre)	-4.434	< 0.001

> Interpretation:

Wilcoxon Signed Rank Test further confirmed significant differences (p < 0.001) in all parameters, strengthening the validity of results.

Chi-Square and Crosstab Analysis

Table 6 Chi-Square Test for Education Level and Knowledge Score

Test	Chi-Square Value	df	p-value
Pretest K Score vs. Education	1.587	4	0.811
Posttest K Score vs. Education	3.223	4	0.521

Interpretation: \geq

- No significant association was found between education level and pretest knowledge scores (p = 0.811).
- However, posttest scores improved across all education levels, indicating knowledge gain irrespective of educational background.
- McNemar's Test for Knowledge Category Changes

Knowledge Level	Pretest (n)	Posttest (n)	p-value
Medium	32	1	< 0.001
High	1	32	< 0.001

Table 7 Pretest vs. Posttest Knowledge Level Distribution

> Key Findings:

A significant shift from medium to high knowledge level was observed (p < 0.001), confirming intervention success.

Volume 10, Issue 5, May – 2025

ISSN No: -2456-2165

VI. DISCUSSION

The results indicate a substantial improvement in knowledge, attitude, and practice scores following the intervention. The significant increase in dietary intake suggests a positive impact on nutritional habits. The findings align with previous research highlighting the effectiveness of educational interventions in promoting healthier behaviors.

• Knowledge Improvement:

The increase in K scores suggests that the intervention successfully enhanced participants' understanding of the subject matter. The significant p-values reinforce that the change was not due to chance.

• Attitude and Practice Changes:

The positive shift in A and P scores implies an improved perception and implementation of learned behaviors.

• Dietary Intake:

The increased calorie and protein intake reflect better dietary choices post-intervention, which may contribute to overall health improvements.

• Statistical Significance:

The results from paired t-tests and Wilcoxon Signed Rank Test confirm that the intervention had a meaningful impact across all assessed parameters.

The study's findings highlight the importance of structured educational interventions in improving knowledge, attitudes, and practices. Further research with a larger sample size and a control group is recommended to validate these findings.

VII. LIMITATIONS

- Despite the Promising Findings, This Study Has Several Limitations:
- Small Sample Size:

The study included only 33 participants, which may limit the generalizability of the findings.

• Lack of Control Group:

The absence of a control group makes it difficult to determine whether improvements were solely due to the intervention.

• Short Study Duration:

The study period may not have been long enough to assess long-term retention of knowledge and behavioral changes.

• Self-Reported Data:

Dietary intake and behavioral changes were self-reported, which may introduce recall bias or inaccuracies.

• *Limited Demographic Diversity:*

Most participants were within a narrow age range, which may not reflect the broader population.

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VIII. CONCLUSION

https://doi.org/10.38124/ijisrt/25may1957

- The health education intervention **significantly improved knowledge**, **attitudes**, **and practices** among young pregnant mothers.
- Dietary intake (calories & protein) also improved significantly.
- Statistical tests confirmed that all changes were highly significant (p < 0.001).
- These findings support **the need for structured health** education programs in antenatal care settings.

ACKNOWLEDGEMENT

We thank the Head of the Department, Department of Obstetrics and Gynaecology, Government Medical College, Omandurar Government Estate, Chennai – 02, Staffs of Government Kasturba Gandhi Hospital for their help in data collection process. We thank the study participants for their full co-operation during the study.

FINANCIAL SUPPORT & PARTNERSHIP

Nil

CONFLICTS OF INTEREST

There are no conflicts of interest.

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