A Study to Assess the Effectiveness of Interventional Package on Knowledge Regarding Protein Energy Malnutrition Among Mothers of Under-Five Children in A Selected Community Area.

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***Abstract*—Introduction**
Protein-energy malnutrition (PEM) remains a major public health problem among under-five children and is strongly influenced by maternal knowledge regarding nutrition and feeding practices. The present study was conducted to assess the effectiveness of an interventional package on knowledge regarding protein energy malnutrition among mothers of under-five children in a selected community area of Pallithottam, Kollam.

Methods
A quasi experimental one-group pre-test post-test research design was adopted for the study. A total of 50 mothers of under-five children were selected from the community area. Data were collected using a structured questionnaire validated by experts. Pre-test knowledge regarding protein-energy malnutrition was assessed before administering the structured teaching programme. The post-test was conducted after seven days using the same questionnaire. Descriptive and inferential statistics were used for data analysis.

Results
The findings revealed that 2% of mothers had good knowledge regarding the protein energy malnutrition in the pre-test, whereas 78% demonstrated good knowledge in the post-test. The pre-test mean score was 6.58 with a standard deviation of 1.87, while the post-test mean score increased to 12.32 with a standard deviation of 1.38. The calculated t-value (25.15) was greater than the table value (2.06), indicating that the structured teaching programme was effective. There were no significant association between with pre-test knowledge and demographic variables such as education, occupation, sources of health information, number of children, family type, annual income of the family.

Discussion
The study concluded that the structured teaching programme significantly improved the knowledge of mothers regarding protein energy malnutrition among under-five children.

***Index Terms*—Assess, Effectiveness, Protein energy malnutrition, Interventional package, Mothers of Under-five children, Selected area**

I. INTRODUCTION

Children are considered the future of a nation, and their health and nutritional status reflect the overall health and socio-economic development of a country. Adequate nutrition during childhood is essential for optimal growth, development, and survival, especially during the first five years of life. The World Health Organization defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.Proper nutrition is essential for maintaining health and development.

II. BACKGROUND OF THE STUDY

Protein-Energy Malnutrition (PEM) remains a major public health problem globally, particularly in developing countries. Protein-Energy Malnutrition results from inadequate intake of proteins and calories necessary for normal growth and body

functions. Protein-energy malnutrition includes underweight, stunting, wasting, marasmus, and kwashiorkor.

Protein-energy malnutrition can lead to impaired growth, developmental delays, increased susceptibility to infections, reduced cognitive ability, and mortality. According to the National Family Health Survey (NFHS-5, 2019–2021), Kerala continues to report considerable levels of stunting, wasting, and underweight among under-five children.

Factors contributing to Protein-energy malnutrition include poverty, low socio-economic status, poor sanitation, recurrent infections, inadequate dietary intake, cultural beliefs, and insufficient maternal knowledge. Mothers play a vital role in maintaining the nutritional status of children. Maternal knowledge regarding balanced diet, prevention, and early identification of protein energy malnutrition significantly influences child health outcomes. Inadequate maternal knowledge often results in poor utilization of available health services. Previous research studies have shown that educational interventions such as planned teaching programmes, charts, pamphlet, booklets and discussions are effective in improving mothers' knowledge regarding protein energy malnutrition.

III. NEED FOR THE STUDY

Despite various health programme and services, protein energy malnutrition continues to affect under-five children. Insufficient maternal knowledge remains a significant contributing factor to childhood malnutrition. Educational interventions can help mothers acquire practical and evidence-based knowledge for preventing protein energy malnutrition. There is a need to evaluate the effectiveness of structured educational interventions in improving maternal knowledge regarding protein energy malnutrition. Therefore, the present study, "A study to assess the effectiveness of interventional package on knowledge regarding protein energy malnutrition among mothers of under-five children in a selected community area," was undertaken. The findings may help improve maternal awareness and contribute to the prevention and control of protein energy malnutrition among under-five children at the community level.

IV. MATERIALS & METHODS

Research Approach

In this study, a quantitative research approach was adopted to assess the effectiveness of a structured teaching programme on knowledge regarding Protein Energy Malnutrition among mothers of under- five children in a selected community area.

Research Design

The research design adopted for this study was quasi-experimental one group pre-test post-test design.

Setting of the Study

The setting for the present study was in the selected community area pallithottam, Kollam

Variables

Variables under this study

a) Dependent Variable

The dependent variable chosen for this study was the knowledge regarding Protein Energy Malnutrition

b) Independent Variable

The independent variable chosen for this study was the interventional package (Charts,Pamphlet,Booklet)

c) Demographic Variables

In this study the demographic variables were age of the mother, Education, Occupation, Monthly family income, Type of family, Number of the children and Source of health information.

Population

The population for this study was mothers of under-five children residing in Pallithottam area.

Sample

In this study, samples consisted of 50 Mothers of under – five children.

Sample Size

The sample size of this study was 50 Mother’s from pallithottam area.

Sampling Technique

A Convenience sampling technique was adopted for selecting the samples

Criteria for Selection of Sample

Inclusion Criteria

Mothers who:

1.Who are available at the study setting.

2.Who are willing to participate in the study.

Exclusion criteria:
Mothers who:
1.Who are health professionals.

Tool and techniques
Tool consists of three sections:
Section A: Socio-Demographic Proforma
This section includes demographic variables such as the Age of mother, Education, Occupation, Monthly family income, Type of family, Number of children and Source of health information.

Section B: Self-Structured Knowledge Questionnaire
This section consists of multiple-choice questions to assess the effectiveness of an interventional package on knowledge regarding Protein Energy Malnutrition. It includes 15 multiple-choice questions, each with four options. The Maximum score is 15 and the minimum score is 0. Each correct answer was awarded a score of "1" and incorrect answers were awarded "0".

SCORE	LEVEL OF KNOWLEDGE
12- 15	Good
6-11	Average
0-5	Poor

Content Validity
The Validity of the tool was established by submitting it to experts from the fields of nursing, pediatrics and linguistics.

Reliability
The reliability of the tool was determined using the test-retest method. The reliability coefficient "r" was calculated by using Karl Pearson's correlation coefficient formula. The obtained coefficient was r = 0.52 which indicates that the tool is reliable.

Pilot Study
The pilot study was conducted at Don Bosco Nagar, Kollam on 03-03-2026 to 09.03.2026. After obtaining permission from head of the institution and concerned authorities, 10% of total sample (n=5) was selected using convenience sampling technique. Participants were selected after explaining the purpose of the study and obtaining written informed consent from them for their willingness to participate in the study. On the first day the researcher collected the baseline information and assessed participant's knowledge regarding Protein Energy Malnutrition using structured knowledge questionnaire. On the 7th day, a post-test was conducted to assess the effectiveness of interventional package using the same tool. The study was found to be feasible and practicable.

Data Collection Process
The data collection for the present study was carried out from 16/03/2026 to 22/03/2026 in Selected community area pallithottam, Kollam. Prior to data collection, formal permission was obtained from the community health Centre. Ethical principles were strictly followed throughout the study period. After obtaining permission, the investigator explained the purpose of the study to the participants and obtained written informed consent. Confidentiality and anonymity of the participants were assured, and they were informed that participation was voluntary and that they had the right to withdraw from the study at any time. The participants who met the inclusion criteria were selected using a convenient sampling technique. On the first day of data collection, the investigator administered the demographic proforma and self-structured knowledge questionnaire on Protein Energy Malnutrition to assess the pre-test knowledge level of the participants. The questionnaire was administered individually, and adequate time was provided to respond to all questions. Following the pre-test, the investigator administered the interventional package to the participants. The post-test was conducted seven days after the pre-test using the same tool to assess the effectiveness of the interventional package. The post-tests were administered under similar conditions as the pre-test to maintain consistency.

Ethical Consideration
Ethical clearance and approval were obtained from the Institutional Ethics Committee of Bishop Benziger College of Nursing, Kollam. Informed consent was obtained from the participants by the researcher, and permission was taken from the concerned authorities prior to the study. The study was conducted after obtaining approval from the head of the institution, concerned authorities of the selected community area, and participants. Confidentiality was assured.

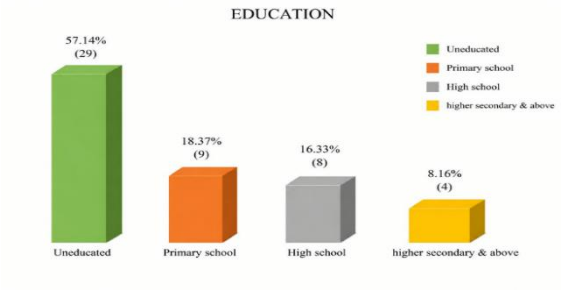
Data Analysis

The data obtained from the samples were organized, tabulated, analyzed and interpreted based on the objectives of the study by using descriptive and inferential statistics. Demographic data was analyzed using frequency and percentage. The level of knowledge was analyzed using frequency and percentage. The effectiveness of interventional package on knowledge regarding Protein Energy Malnutrition were analyzed using paired t-test. The association between the pre-test knowledge scores with selected demographic variables was analysed using chi-square test.

V. RESULT

Section A: Description of sample characteristics.

This section deals with the frequency and percentage distribution of sample characteristics.



(N=50)

Figure 1: Frequency and percentage distribution of education level of mothers of under five children.

The data presented in the figure 1 shows that, out of 50 samples,57.14% (29) of the mothers had uneducated,18.37% (9) of the mothers had primary school education, 16.33% (8) of the mothers had high school education, and 8.16% (4) of the mothers had higher secondary and above education.

(N=50)



Figure 2: Percentage distribution of mothers of under-five children according to occupation

The data presented in the figure 2 shows that out of 50 samples, 36% of mothers were private employees, 14% of mothers were professionals, 50% of mothers were housewives and 0% of mothers were government employees.

(N=50)

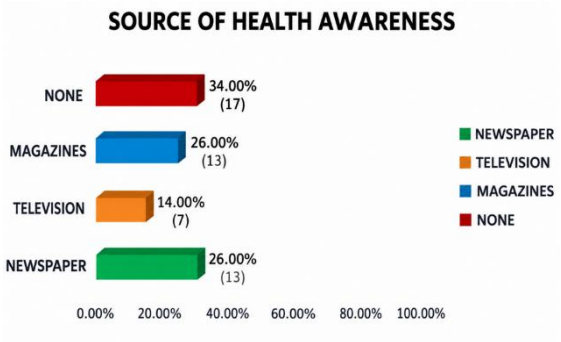


Figure3: Percentage distribution of mothers of under-five children according to sources of health awareness.

The data presented in the figure 3 shows that, out of 50 samples, 34% of mothers have no any sources for health awareness, 26% of mothers got knowledge from magazines, 14% of mothers got knowledge from televisions, 26% of mothers got knowledge from newspaper.

(N=50)

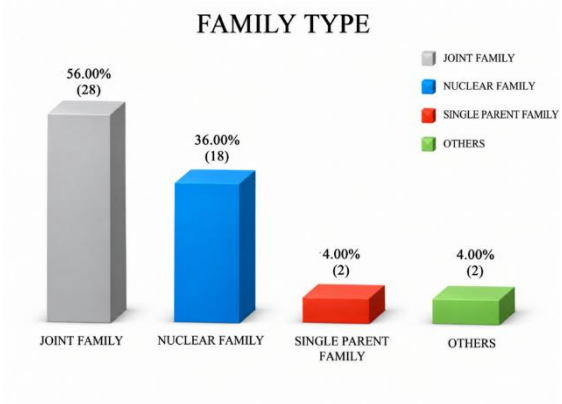


Figure4: Percentage distribution of mothers of under-five children according to family type

The data presented in the figure 4 shows that out of 50 samples, 56% of mothers were from joint family, 36% of mothers were from nuclear family, 4% of mothers were from single parent family, 4% of mothers were from other types of family.

(N=50)

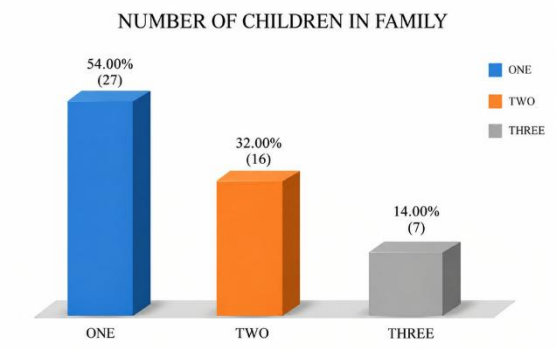


Figure5: Percentage distribution of mothers of under-five children according to number of children in family.

The data presented in the figure 5 shows that out of 50 samples, 54% of mothers had one child, 34% of mothers had 2 children, 14% of mothers had 3 children, 0% of mothers had no more than 3 children.

(N=50)

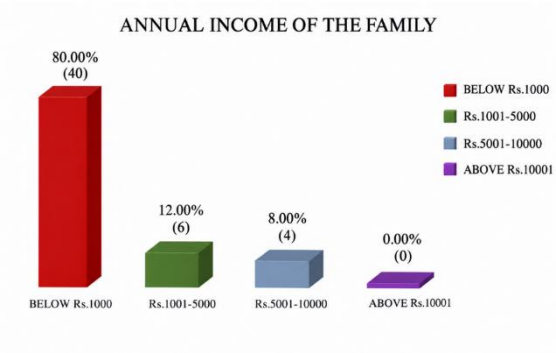


Figure6: Percentage distribution of mothers of under-five children according to Annual income of the family.

The data presented in the figure 6 shows that out of 50 samples, 80% of mothers had annual income of family were below Rs.1000, 12% of mothers had annual income of family were Rs.1001 to 5000, 8% of mothers had annual income of family were Rs.5001 to 10000, 0% of mothers had annual income of family above 10001.

Sample characteristics	frequency	Percentage (%)
Education		
Uneducated	29	57.14%
Primary school	9	18.37%
High school	8	16.33%
High secondary and above	4	8.16%
Occupation		
Private employee	18	36%
Professional	7	14%
Housewife	25	50%
Government employee	0	0%
Source of health information	13	26%
Newspaper	7	14%
Television	13	26%
Magazines	17	34%
none		
Family type		
Joint family	28	56%
Nuclear family	18	36%
Single parent family	2	4%
others	2	4%
Number of children(child)in the family	27	54%
1	16	32%
2	7	14%
3	0	0%
Above 3		
Annual income of the family RS	40	80%
Below Rs.1000	6	12%
Rs.1001-5000	4	8%
Rs.5001-10000	0	0%
Above Rs.10001		

Section B

Effectiveness of structured teaching program

Description of knowledge regarding protein-energy malnutrition among mothers of under-five children in selected community area.

Table 1: frequency and percentage distribution of pretest knowledge scores regarding protein energy malnutrition.

Score	Score range	Frequency	Percentage
0-5	poor	13	26%
6-11	average	36	72%
12-15	good	1	2%

The data presented in the table 1 show that, 26% mothers of under-five children had poor knowledge, 72% had average knowledge, and 2% had good knowledge.

Table 2: frequency and percentage distribution of post-test knowledge scores regarding protein energy malnutrition

Score	Score range	Frequency	Percentage
0-5	poor	0	0%
6-11	average	11	22%
12-15	good	39	78%

The data presented in the table 2 shows that,0% of mothers of under-five children had poor knowledge, 22% had average knowledge,78% had good knowledge.

Table 3: Mean and 't' value of pre-test and post-test knowledge scores regarding protein energy malnutrition.

	N	Mean	Median	SD	t
Pretest	50	6.58	6	1.87	25.15
Posttest	50	12.32	13	1.38	

The data presented in the table 3 shows that the mean post-test knowledge score 12.32 is greater than the mean pretest knowledge score 6.58 regarding protein energy malnutrition among mothers of under-five children. The calculated "t" value 25.15 is greater than the table value (2.06). Hence, the interventional package was effective.

Table 4: Association between pretest knowledge scores and selected demographic variables

Variables	Level of knowledge			X^2 value	Table value	df	Sig.
	P	A	G				
Education							
Uneducated	8	20	1				
Primary school	2	7	0	8.75	12.59	6	NS
High school	0	8	0				
High secondary and above	3	1	0				
Occupation							
Private employee	8	10	0				
Professional							
Housewife	2	5	0	6.43	9.48	4	NS
Government employee	3	21	1				
	0	0	0				
Source of health information							
Newspaper							
Television							
Magazines	5	12	0				
none	2	10	1	4.19	12.59	6	NS
	1	6	0				
	4	9	0				
Family type							
Joint family	7	20	1				
Nuclear family	5	13	0				
Single parent family	0	2	0	2.26	12.59	6	NS
others	0	2	0				
Number of children(child)in the family							
1							
2	7	19	1	1.60	9.48	4	NS
3	5	11	0				
Above 3	1	6	0				
	0	0	0				
Annual income of the family RS							
Below Rs.1000	9	30	1				
Rs.1001-5000	2	4	0	1.79	9.48	4	NS

Rs.5001-10000 Above Rs.10001	2 0	2 0	0 0				

*Sig.- level of significance, df- degree of freedom, VP- very poor, P- poor, A- average, G- good, S- significant, NS- not significant

Table 4: Association was computed by using the chi-square test.The results showed that there was no any significant association between pre-test knowledge scores and demographic variables such as education, occupation, sources of health information, family type, number of children in the family and annual income of family at 0.05 level of significance. Therefore, the null hypothesis was accepted for all selected demographic variables.

VI. DISCUSSION

The present study was conducted to assess the effectiveness of a structured teaching programme on mother's knowledge regarding protein energy malnutrition among mothers. To achieve the objectives of the study, quasi experimental one group pre-test-post-test design was adopted. The subject was selected using non-probability purposive sampling technique. The findings of the study are discussed in the light of the objectives and hypotheses stated earlier.

To evaluate the effectiveness of a structured teaching program on mother's knowledge regarding Protein-energy malnutrition.

In the present study the result showed that the mean of pre-test knowledge scores of mothers regarding protein energy malnutrition was 6.58 and SD was 1.87 and mean of post-test was 12.32 and SD was 1.38 The calculated 't'value was 25.15, which is greater than table value 2.06 at 0.05 level of significance. It can be concluded that there was a significant difference between effectiveness of structured teaching program on knowledge of mothers regarding protein energy malnutrition.

The Quasi experimental one group pre-test post-test study was conducted in Pallithottam to assess the effectiveness of structured teaching program on knowledge regarding protein-energy malnutrition among mothers. The findings revealed that, in the post-test majority of them 78% had good knowledge, while 22% had average knowledge regarding protein-energy malnutrition. The findings depict that there is enhancement between pre-test and post test scores and obtained paired 't' test value 25.15, it was highly significant at 0.05 level of significance. The results indicate that there is effectiveness of the structured teaching programme on knowledge regarding protein energy malnutrition among mothers.

To find the association between the pre-test knowledge of mothers and selected demographic variables

The association between pre-test knowledge of mothers and the selected demographic variables like education, occupation, family type, number of children in the family and annual income were analysed using chi-square test. The result showed that, the demographic variables such as mother's education, occupation, source of health information, family type number of children in the family and annual income of the family had no significant association with pre-test knowledge regarding protein energy malnutrition.

Nursing Implication

The findings of this study have practical implications for both Nursing practice, the field of Community Health Nursing and future Nursing research.

Nursing practice

Nurses play a vital role in educating the community regarding Protein Energy Malnutrition.

- Community health nurses can identify mothers who have inadequate knowledge regarding protein energy malnutrition (PEM).
- Nurses can provide health education and nutritional counselling to mothers of under-five children regarding prevention and management of PEM.
- Nurses can use interventional packages such as teaching programs, pamphlet, booklet, and charts to improve mothers' knowledge.
- Nurses can conduct regular nutritional assessment and growth monitoring of under-five children in the community.

- Nurses can educate mothers about balanced diets, locally available nutritious foods, and appropriate feeding practices.

Nursing Education
- Nursing curricula should include comprehensive content on protein energy malnutrition, its causes, prevention, and management.
- Nursing students should be trained in planning and implementing nutrition education programs for mothers and caregivers.
- The study findings can be used as teaching material in Community Health Nursing and Child Health Nursing.
- Nursing education should emphasize the importance of health education as a tool for preventing childhood malnutrition.

Nursing Administration
- Nursing administrators can plan and implement structured community nutrition education programs targeting mothers of under-five children.
- The findings can help in developing policies for regular maternal education on protein energy malnutrition (PEM) prevention.
- Administrators can ensure availability of educational materials such as charts, pamphlets, and audio-visual aids in community health centres.
- Nursing leaders can allocate sufficient staff and time for community-based nutrition counselling and awareness activities.

Nursing Research
- The study adds evidence to the existing body of knowledge on protein-energy malnutrition (PEM) prevention in community settings.
- It provides baseline data on mothers' knowledge regarding PEM and child nutrition practices.
- The research supports the effectiveness of structured interventional packages in improving maternal knowledge.
- It encourages further research on similar educational interventions in different community settings.
- The findings can be used as a reference for developing standardized tools to assess knowledge on PEM.

Delimitations
- The study was only a quasi-experimental study with limited number of sample (50).
- A Non probability purposive sampling method was used for this study which restricts the generalization of results.

Recommendations

In the light of the findings listed above the following recommendations are put forward
- The study can be done on large scale sample for better generalization of the findings.
- The study can be conducted in a variety of settings
- A study to assess both knowledge and practice can be conducted

VII. CONCLUSION

The present study concluded that interventional package was effective in improving the knowledge regarding Protein Energy Malnutrition among mothers of under-five children in selected community area. There was a significant improvement in post-test knowledge scores compared to pre-test scores. The calculated 't' value confirmed statistical significance at 0.05 level. The study also revealed that knowledge levels were influenced by certain demographic variables such as age, gender, education, occupation, family type, Annual income, and number of children.

Declaration by Authors
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