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Effectiveness of a Structured Teaching Programme in Enhancing Maternal Knowledge of Milk Biscuit Syndrome among Toddlers

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Abstract: ***Background: Appropriate complementary feeding during early childhood is essential for optimal growth and development. Milk Biscuit Syndrome (MBS), a faulty feeding practice in which milk and commercially available biscuits are routinely used as meal substitutes, is increasingly observed among toddlers and contributes to nutritional deficiencies, anemia, and growth faltering. Maternal knowledge plays a crucial role in preventing such practices. Objective: To evaluate the effectiveness of a structured teaching programme on mothers' knowledge regarding the impact of Milk Biscuit Syndrome among toddlers. Methods: A quantitative, pre-experimental one-group pre-test–post-test design was adopted. The study was conducted among 30 mothers of toddlers aged 1–3 years enrolled in a selected preschool at Borsi, Durg, Chhattisgarh, using non-probability purposive sampling. Data were collected using a self-structured knowledge questionnaire. Following the pre-test, a structured teaching programme on Milk Biscuit Syndrome was administered. Post-test assessment was conducted after seven days. Descriptive and inferential statistics, including paired t-test and chi-square test, were used for data analysis. Results: The mean pre-test knowledge score was 6.4 (32%), which increased to 14.2 (71%) in the post-test, showing a mean difference of 7.8. The calculated paired t-test value ($t = 10.90$, $p < 0.05$) indicated a statistically significant improvement in knowledge following the structured teaching programme. In the post-test, 73.33% of mothers demonstrated excellent knowledge, while none remained in the average category. No significant association was found between knowledge scores and selected sociodemographic variables. Conclusion: The structured teaching programme was effective in significantly improving mothers' knowledge regarding the impact of Milk Biscuit Syndrome among toddlers. Educational interventions by nursing professionals can play a vital role in preventing faulty feeding practices and promoting healthy nutritional behaviors during early childhood.***

Keywords: Milk Biscuit Syndrome, Structured Teaching Programme, Maternal Knowledge, Toddlers, Feeding Practices, Child Nutrition

1. Introduction

Optimal nutrition during early childhood is critical for physical growth, cognitive development, and immune competence. However, inappropriate feeding practices remain a major contributor to childhood malnutrition, particularly in low- and middle-income countries. One such emerging and preventable problem is Milk Biscuit Syndrome (MBS)—a faulty feeding practice in which milk and commercially available biscuits or similar processed snacks are routinely given as a substitute for balanced meals among infants and toddlers.

Milk Biscuit Syndrome is widely observed in urban and semi-urban communities due to its convenience, affordability, and high acceptability among children. Milk is often perceived by caregivers as a complete food, while biscuits are viewed as harmless snacks. In reality, excessive reliance on this combination leads to a nutritionally inadequate diet that is deficient in iron, fibre, essential micronutrients, and high-quality proteins. Prolonged adherence to this feeding pattern has been associated with iron deficiency anemia, protein-energy malnutrition, stunted growth, poor weight gain, dental caries, recurrent infections, and delayed developmental outcomes. Excessive milk intake further inhibits iron absorption, compounding the risk of anemia during the most critical period of brain development.

Recent literature indicates that Milk Biscuit Syndrome contributes significantly to under-nutrition and functional health problems in young children and is increasingly recognized in paediatric and community health settings. MBS, though increasingly observed, lacks formal recognition as a medical diagnosis…"

MBS, though increasingly observed, lacks formal recognition as a medical diagnosis", leading to under-recognition and misattribution of symptoms such as poor appetite, constipation, recurrent respiratory infections, and growth faltering. Studies conducted in India have reported a high prevalence of milk-biscuit-dominant feeding practices, alongside inadequate maternal knowledge regarding balanced complementary feeding. Evidence also suggests that a substantial proportion of mothers possess only moderate to poor awareness of the long-term nutritional consequences of this practice.

Mothers play a pivotal role in shaping children's dietary habits during early life. Lack of nutritional awareness, socio-economic constraints, cultural beliefs, and misinformation contribute to the persistence of Milk Biscuit Syndrome. Structured teaching programmes have been shown to be effective in improving maternal knowledge and promoting positive feeding behaviours. However, limited interventional studies have specifically focused on educating mothers about the impact of Milk Biscuit Syndrome among toddlers, particularly in community and preschool settings.

Therefore, the present study was undertaken to assess the effectiveness of a structured teaching programme on mothers' knowledge regarding the impact of Milk Biscuit Syndrome among toddlers. Enhancing maternal awareness is

essential to prevent harmful dietary habits, reduce the burden of childhood malnutrition and anemia, and promote healthy growth and development. The findings of this study are expected to provide evidence for nursing professionals and public health practitioners to design targeted nutrition education strategies, strengthen parental counselling, and support policy-level interventions aimed at improving child nutrition outcomes.

2. Methodology

Study Design
A **quantitative, pre-experimental one-group pre-test–post-test design** was adopted to evaluate the effectiveness of a structured teaching programme on mothers' knowledge regarding the impact of Milk Biscuit Syndrome among toddlers.

Study Setting
The study was conducted at a selected preschool in **Borsi, Durg district, Chhattisgarh, India**. The setting was chosen based on feasibility, accessibility of the study population, and administrative approval.

Study Population
The study population comprised **mothers of toddlers (1–3 years)** enrolled in the selected preschool.

Sample Size and Sampling Technique
A total of **30 mothers of toddlers** were selected using a **non-probability purposive sampling technique**. Mothers who were present during data collection and willing to participate were included in the study.

Inclusion Criteria
- Mothers of toddlers aged 1–3 years
- Mothers available at the time of data collection
- Mothers who provided informed consent

Exclusion Criteria
- Mothers of children above toddler age
- Mothers who were unavailable or unwilling to participate

Intervention: Structured Teaching Programme
A **structured teaching programme (STP)** on Milk Biscuit Syndrome was developed based on literature review and expert consultation. The programme covered:
- Concept and definition of Milk Biscuit Syndrome
- Causes and risk factors
- Nutritional consequences and health impact
- Preventive strategies and appropriate feeding practices

The teaching session was delivered using **lecture-cum-discussion method** supported by visual aids and lasted approximately **30 minutes**.

Tool for Data Collection
Data were collected using a researcher-designed questionnaire, developed by the investigator. The tool consisted of two sections:
Section A: Sociodemographic variables (age, gender, religion, type of family, place of residence)
Section B: Knowledge questionnaire related to Milk Biscuit Syndrome (20 multiple-choice items

Knowledge scores were Categorized as:
Average: 0–33%
Good: 34–66%
Excellent: 67–100%

Validity and Reliability
Content validity of the questionnaire and teaching programme was established by a panel of experts from child health nursing and community health nursing. Reliability of the knowledge questionnaire was assessed using **Karl Pearson's correlation coefficient**, yielding a reliability coefficient of **r = 0.90**, indicating high reliability.

Data Collection Procedure
Data collection was carried out in three phases:
- **Pre-test:** Baseline knowledge assessment using the structured questionnaire
- **Intervention:** Administration of the structured teaching programme
- **Post-test:** Knowledge reassessment conducted **7 days after the intervention** using the same questionnaire

Data Analysis
Data were analyzed using **descriptive and inferential statistics**:
Frequency, percentage, mean, and standard deviation were used for descriptive analysis
Paired t-test was applied to determine the effectiveness of the structured teaching programme
Chi-square test was used to assess the association between knowledge scores and selected sociodemographic variables

Ethical Considerations
Ethical approval was obtained from the institutional authority prior to the study. Written informed consent was secured from all participants. Confidentiality and anonymity were maintained throughout the research process.

Distribution of participants with regards to demographic variables.
A convenient sample of 30 subjects was drawn from study population who were from selected areas.

Table 1: Percentage-wise distributions of participant with regards to age

Age	Frequency	Percentage
20 – 21 years	0	0%
22 – 23 years	0	0%
24 – 25 years	3	10%
25 years and above	27	90%
Total	30	100%

Table 1 Displayed the percentage-wise distribution of participants concerning their age in a research study. The table contained a total of 30 participants, and their ages were categorized into 4 distinct groups. At the youngest end of the spectrum, 0 participants fell within the age range of 20 – 21 years, representing 0% of the total sample. The second age group, there were no participants within the age range of 22 – 23 years, resulting in a 0% of the total cohort. The next

age group, 24 – 25 years, comprises of 3 participants, making up 10% of the total sample. In the final age category of 25 years and above, comprises the largest segment with 27 participants,

Table 2: Presents the distribution of participants by gender

Gender	Frequency	Percentage
Male	0	0%
Female	30	30%
Total	30	100%

Table 2 Presented the percentage-wise distribution of participants based on their gender in a research study that include a total of 30 participants. The table was instrumental in providing a clear overview of the gender demographics within the study sample. Among the participants, 0 were identified as male, representing 0% percentage of the total cohort. In contrast, the female participants accounted for a larger portion, within 30 individuals, constituting 100% of the overall sample.

Table 3: Percentage-wise distribution of participants with regards to religion

Religion	Frequency	Percentage
Hindu	29	96.7%
Muslim	1	3.3%
Christian	0	0%
Sikhism	0	0%
Total	30	100%

Table 3: A percentage-wise distribution of participants based on their religion in a research study, encompassing a total of 30 participants. This table offers a comprehensive overview of the religious affiliations within the study group. The over wellbeing majority of the participants, 29 in total, identified as Hindu, representing a substantial 96.7% of the entire cohort. In contrast, there was only 1 participants (3.3%) who identified as Muslim, while there was no participants were identified as Christians and Sikhism. This table served as a concise and informative summary of the participant distribution by religion, highlighting the prominent presence of Hindu participants in the study, and the limited representation of other religious groups.

Table 4: Outlines the distribution of participants by family type

Type of family	Frequency	Percentage
Small Family	12	40%
Joint Family	14	46.67%
Single Family	3	10%
Extended Family	1	3.33%
Total	30	100%

Table 4 Outlined the percentage-wise distribution of participants with respect to the type of family they belong to in a research study involving 30 participants. This table offered a clear overview of the family structures within the study group. The majority of participants, 14 individuals, were part of joint family, making up 46.67% of the total cohort. Small family were also well represented, with 12 participants, constituting 40% of the overall sample. In contrast, there were 3 participants from single family, resulting in a 10% representation. Lastly, 1 participants (3.33%) belonged to an extended family.

Table 5: Percentage-wise distribution of participants with regards to place of residence.

Place of residence	Frequency	Percentage
Rural	12	40%
Urban	18	60%
Total	30	100%

Table 5 Depicted the percentage-wise distribution of participants with respect to their place of residence in a research study involving a total of 30 participants. The table was instrumental in providing a clear overview of the place of residence demographics within the study sample. Among the participants, 12 participants were from rural area, representing 40% of the total cohort. In contrast, 18 participants were from the urban area, constituting 60% of the overall sample.

Table 6: Shows the effectiveness of pre-test and post-test knowledge scores. (N=30)

Effectiveness	Mean	Mean percentage	Mean difference	SD	df	Paired 't" test value	Inference
Pre-test	6.4	32	7.8	6.08	29	10.90	Significant
Post-test	14.2	71		13.48			

Table 7: To find out the pre-test and post- test knowledge scores of mothers regarding impact of milk biscuit syndrome among toddlers

S. No.	Criteria	Grade
1	Average	0 - 6
2	Good	7 - 12
3	Excellent	13 - 20

This section deals with the assessment of existing knowledge regarding the impact of milk biscuit syndrome among toddlers in Little Stars Preschool, Borsi, Durg, Chhattisgarh. The level of knowledge is divided under following heading of average, good, excellent of analysis of frequency percentage.

Table 8: Frequency and percentage distribution of pre- test knowledge scores N = 30

S. No.	Criteria	Total Score	Percentage
1	Average	13	43.33%
2	Good	17	56.67%
3	Excellent	0	0%

Table 8 shows the pre-test knowledge scor**es** among mothers of toddlers that is 43.33% mothers has average knowledge, 56.67% mothers has good knowledge and 0 % mothers has excellent knowledge

Table 9: Frequency and percentage distribution of post-test knowledge scores.

S. No.	Criteria	Total Score	Percentage
1	Average	0	0%
2	Good	8	26.67%
3	Excellent	22	73.33%

Table No. 9 Depicts that post-test knowledge score among mothers of toddlers that is 0% mothers has average knowledge, 26.67% mothers has good knowledge and 73.33% mothers has excellent knowledge.

To find out the association between pre-test and post-test scores on selected demographical variables.

Table 4: Association between pre-test knowledge scores with their selected sociodemographic variables

SN	Socio-demographic variables	Level of knowledge			χ^2 Value	P Value	Table Value	Inferences
		Excellent	Good	Average				
		N=30	N=30	N=30				
1.	Age				0	p>0.05	df=6 12.59	Not Significant
	20 – 21 Years	0	0	0				
	22 – 23 Years	0	0	0				
	24 – 25 Years	0	2	1				
	25 Years &Above	0	18	9				
2.	Gender				0	p>0.05	df=4 9.49	Not Significant
	Male	0	0	0				
	Female	0	19	11				
3.	Religion				0.58	p>0.05	df=6 12.59	Not Significant
	Hindu	0	19	10				
	Muslim	0	1	0				
	Christian	0	0	0				
	Sikhism	0	0	0				
4.	Types of Family				0.60	p>0.05	df=6 12.59	Not Significant
	Small Family	0	8	4				
	Joint Family	0	9	5				
	Single Family	0	2	1				
	Extended Family	0	1	0				
5.	Place of Residence				0.095	p>0.05	df=2 5.99	Not Significant
	Rural	0	8	4				
	Urban	0	11	7				

It depicts that there is association between pre-test knowledge scores with their selected sociodemographic variables. The table reveals that;

1) There is no significant association between pre-test knowledge scores on among mothers of toddlers and their age as the calculated value i.e. 0 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
2) There is no significant association between pre-test knowledge scores on among mothers of toddlers and their gender as the calculated value i.e. 0 is less than the table value of chi square (9.49**)** at 0.05 level of significance.
3) There is no significant association between pre-test knowledge scores on among mothers of toddlers and their religion as the calculated value i.e. 0.58 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
4) There is no significant association between pre-test knowledge scores on among mothers of toddlers and their types of family as the calculated value i.e. 0.60 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
5) There is no significant association between pre-test knowledge scores on among mothers of toddlers and their place of residence as the calculated value i.e. 0.095 is less than the table value of chi square (5.99**)** at 0.05 level of significance.

Table 5: Association between post-test knowledge scores with their selected- sociodemographic variables

SN	Socio-demographic Variables	Level of Knowledge			χ^2 Value	P Value	Table Value	Inferences
		Excellent	Good	Average				
		N=30	N=30	N=30				
1.	Age				5.308	p>0.05	df=6 12.59	Not Significant
	20 – 21 Years	0	0	0				
	22 – 23 Years	0	0	0				
	24 – 25 Years	2	1	0				
	25 Years &Above	19	8	0				
2.	Gender				0	p>0.05	df=4 9.49	Not Significant
	Male	0	0	0				
	Female	19	11	0				
3.	Religion				2.86	p>0.05	df=6 12.59	Not Significant
	Hindu	22	7	0				
	Muslim	0	1	0				
	Christian	0	0	0				
	Sikhism	0	0	0				
4.	Types of Family				2.505	p>0.05	df=6 12.59	Not Significant
	Small Family	9	3	0				

	Joint Family	10	4	0				
	Single Family	2	1	0				
	Extended Family	0	1	0				
5.	Place of Residence				0	p>0.05	df=2 5.99	Not Significant
	Rural	8	4	0				
	Urban	12	6	0				

Table No. 5 Association between post-test knowledge scores with their selected sociodemographic variables.

It depicts that there is association between post-test knowledge scores with their selected sociodemographic variables. The table reveals that;

1) There is no significant association between post-test knowledge scores on among mothers of toddlers and their age as the calculated value i.e. 5.308 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
2) There is no significant association between post-test knowledge scores on among mothers of toddlers and their gender as the calculated value i.e.0 is less than the table value of chi square (9.49**)** at 0.05 level of significance.
3) There is no significant association between post-test knowledge scores on among mothers of toddlers and their religion as the calculated value i.e. 2.86 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
4) There is no significant association between post-test knowledge scores on among mothers of toddlers and their types of family as the calculated value i.e2.505 is less than the table value of chi square (12.59**)** at 0.05 level of significance.
5) There is no significant association between post-test knowledge scores on among mothers of toddlers and their place of residence as the calculated value i.e. 0 is less than the table value of chi square (5.99**)** at 0.05 level of significance.

3. Recommendation

Based on the finding of the study, the following recommendation that-

- The study can be replicated using a large sample to validate the findings on generalization.
- The similar study can be conducted by using comparative approach and comparison can be made between mothers of toddlers with their pre-test and post-test knowledge scores.
- The study can be conducted using various research design.

4. Conclusion

The present study was to assess the effectiveness of structure teaching programme on knowledge of mothers regarding the impact of milk biscuit syndrome among toddlers at selected playschool. Through statistical analysis, the structured teaching programme regarding the impact of milk biscuit syndrome was effective in improving knowledge of mothers of toddlers.

The result revealed that there was a highly statistical difference between pre-test and post-test knowledge scores among mothers of toddlers. The results also revealed that there was no association between demographic and dependant variables of mothers of toddlers with knowledge level.

References

Books

[1] Spock, B., & Needlam, R. (1998) "Dr. Spock's Baby and Child Care" (8th ed.). New York: Pocket Books. (p. 340).
[2] Mahan, L. K., Escott-Stump, S., & Raymond, J. L. (2012)."A Comprehensive Textbook on Nutrition and Dietetics: Krause's Food & the Nutrition Care Process" (13th ed.). St. Louis, MO: Saunders/Elsevier.
[3] Elakkuvana Bhaskara Raj, D. (2017) "Nursing Research & Biostatistics" (1st ed.). Emmess Medical Publishers Pvt. Ltd. (pp. 5–27).
[4] Faure, C., Thapar, N., & Di Lorenzo, C.(2017). "Textbook of Pediatric neurogastroenterology: Gastrointestinal motility and functional disorders in children" (2nd ed.), (pp. 342 - 348).
[5] Polit, D. F., & Beck, C. T. (2019) "Textbook of Nursing Research" (10th ed.). Wolters Kluwer. (pp. 45–98).
[6] Wyllie, R., Hyams, J. S., & Kay, M. (2020). "Textbook of Pediatric gastrointestinal and liver disease" (6th ed.,) (pp. 890–895).
[7] Sharma, S. K. (2021) "Nursing Research and Statistics" (4th ed.). Elsevier Publications Pvt. Ltd. (pp. 38–106).
[8] Guandalini, S., Dhawan, A., & Branski, D (2021) "Textbook of Pediatric Gastroenterology, Hepatology and Nutrition" (2nd ed.),(pp.51-64)
[9] Rentala, S. (2023) "Basics in Nursing Research and Biostatistics" (3rd ed.). Jaypee Publications Pvt. Ltd. (pp. 41–207).
[10] Nelson, W. E., et al. (2024) "Nelson Textbook of Pediatrics" Disorders of serum minerals: Hypercalcemia (milk-alkali syndrome). (22nd ed.).Elsevier Health Sciences.(pp. 45-89)
[11] Fox, G., Watts, T., & Hoque, N. (Eds.). (2017). "Oxford Handbook of Neonatology" (2nd ed., pp. 235–273)
[12] Kliegman, R. M., St. Geme, J. W., Blum, N. J., Shah, S. S., Tasker, R. C., & Wilson, K. M. (Eds.). (2016). "Nelson Textbook of Pediatrics" (20th ed., Vol. 2, Chapter 326: Foreign Bodies and Bezoars,pp. 1290–1300).

Journals

[13] Burnett, C. H., Common, R. R., Albright, F., & Howard, J. E. (1949) "Hypercalcemia without hypercalciuria or hypophosphatemia, calcinosis and renal insufficiency: A syndrome following prolonged intake of milk and alkali." The New England Journal

of Medicine, 240(21), 787–794. Massachusetts Medical Society.
[14] Randall, R. E., Jr., Strauss, M. B., & McNeely, W. F. (1961) "The milk-alkali syndrome." A Journal of Archives of Internal Medicine, 107(2), 211–222. Published by American Medical Association.
[15] Pansar, S., & Somer, T. (1963) "The milk and biscuit syndrome." A Journal of Acta Medica Scandinavica, 173, 379–388. Wiley-Blackwell.
[16] Wagener, S., Cartwright, D., & Bourke, C. (1968) "The milk curd syndrome: An as yet little known cause of intestinal obstruction in neonates." German Journal of Pediatrics, 103(4), 279–286. Springer.
[17] Yusoff, N. A., & Harmtom, S. (2004). "The effects of milk in management." Journal of the Royal Society for the Promotion of Health, 124(2), 74–82.
[18] Tougas, G., & Hunt, D. H. (2005) "Awake nocturnal gastroesophageal reflux: Clinical relevance and approaches to management." American Journal of Gastroenterology, 100(2), 509–514.
[19] Felsenfeld, A. J., & Levine, B. S. (2006). "Milk biscuit syndrome and dynamics of calcium homeostasis." Clinical Journal of the American Society of Nephrology, 641–654
[20] Beall, D. P., Henslee, H. B., Webb, H. R., & Scofield, R. H. (2006) "Milk biscuit syndrome." American Journal of the Medical Sciences, 233–242.
[21] Rona, R. J., et al. (2007) "The prevalence of food allergy: A meta-analysis." Journal of Allergy and Clinical Immunology, 120(3), 638–646.
[22] Agostoni, C., et al. (2008) "Complementary feeding: A commentary by the ESPGHAN Committee on Nutrition." Journal of Pediatric Gastroenterology and Nutrition, 46(1), 99–110.
[23] Medarov, B. I. (2009). "Milk-alkali syndrome." The medical journal of Mayo Proceedings, 84Clinic (3), 261–267. Elsevier on behalf of the Mayo Clinic.
[24] Peerkhan, N., & Abul, H. (2010) "Milk biscuit effects in pediatrics." Italian Journal of Pediatrics, 36, 18.
[25] Srivastava, B., Verma, A., & Neerubala. (2016) "Milk biscuit syndrome." Asian Journal of Dairy & Food Research, 35, 319–322.
[26] Rahman, S., Ghribi, A., Alabdulghani, M. H., & Gad, M. T. (2019) "Perforated bowel after obstruction in a neonate with milk curd syndrome following ready-to-feed infant formula." Dr. Sulaiman Al Habib Medical Journal, 1, 81–82.
[27] Vanderhout, S. M., & Corsi, D. J. (2020). "Milk biscuit consumption and childhood anthropometric failure in India: Analysis of a national survey." A Journal of Maternal & Child Nutrition, 17(3), e13090. John Wiley & Sons Ltd.
[28] Upadhayay, R. P., Taneja, S., Strand, T. A., Hysing, M., Koshy, B., Bhandari, N., & Bahl, R. (2022) "Milk intake and child nutrition." British Journal of Nutrition, 130, 868–877.
[29] Vasandha, S., & Manimala, S. (2023). "Milk biscuit syndrome: A free disease." TNNMC Journal of Pediatric Nursing, 11(2), 46–50.
[30] Antony, D. M., et al. (2024) "A descriptive study to assess the knowledge on milk and cookie disease among mothers of under five children.".International Journal of Creative Research Thought (IJCRT), 12(10).
[31] Priyadarshani, S., & Bharti, K. (2024), Milk biscuit syndrome: A review. Journal of Pediatric Nursing Planning (MAT Journal Publication), 6(3).
[32] Gosai D., Vaishnav J., Mishra P. (2025). "Gastric Lactobezoar: A Rare Cause of Intestinal Obstruction in Neonates." Journal of Indian Association of Pediatric Surgeons, 30(3), 401–402.