

ASSOCIATION OF MATERNAL EDUCATIONAL, OCCUPATIONAL AND NUTRITIONAL KNOWLEDGE FACTORS WITH THE NUTRITIONAL STATUS OF PRESCHOOL CHILDREN AGED 3–6 YEARS”

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ABSTRACT

Background: Maternal factors play an important role in shaping children's dietary practices, growth and nutritional well-being during the preschool period. Maternal educational qualification, occupational status and nutritional knowledge may influence feeding practices and the nutritional status of young children. **Objective:** The present study aimed to assess the association between maternal educational qualification, occupational status and nutritional knowledge and the nutritional status of preschool children aged 3–6 years. It also aimed to assess the effectiveness of a nutrition education programme in improving maternal nutritional knowledge. **Methods:** A cross-sectional study with a pre–post nutrition education component was conducted among **130 preschool children aged 3–6 years and their mothers** in Dindigul, Tamil Nadu. Participants were selected using purposive sampling based on predetermined inclusion and exclusion criteria. Data were collected using a structured questionnaire covering demographic characteristics, maternal educational qualification, occupational status, maternal nutritional knowledge and the dietary pattern of children. Anthropometric measurements, including height, weight and waist circumference, were recorded using standardized procedures. Maternal nutritional knowledge was assessed before and after a structured nutrition education programme. Descriptive statistics and inferential tests were used to analyse the data, with $p < 0.05$ considered statistically significant. **Results:** Among the 130 mothers, **109 (83.8%) were graduates**, 10 (7.7%) had completed HSC and 11 (8.5%) had completed SSLC. Regarding occupational status, 88 (67.7%) were homemakers and 42 (32.3%) were working mothers. Maternal educational qualification was not significantly associated with children's height status ($p = 0.205$) or weight status ($p = 0.129$). Maternal occupational status was not significantly associated with height status ($p = 0.174$); however, a statistically significant association was observed with weight status ($p = 0.047$): with children of working mothers showing a higher proportion of normal weight. Maternal nutritional knowledge was significantly associated with both children's height status ($p = 0.006$) and weight status ($p = 0.007^*$). The mean maternal nutritional knowledge score increased from **7.08 ± 1.027 before nutrition education to 9.55 ± 0.558 after the intervention**, with a statistically significant improvement ($p < 0.001$). **Conclusion:** Maternal nutritional knowledge was significantly associated with the nutritional status of preschool children, whereas maternal educational qualification was not significantly associated with height or weight status. Maternal occupational status showed a significant association with children's weight status but not height status. The nutrition education programme significantly improved maternal nutritional knowledge. These findings highlight the importance of structured and practical nutrition education for mothers to strengthen knowledge and promote appropriate feeding practices during the preschool years. However, the cross-sectional design limits causal interpretation of the associations between maternal factors and child nutritional status.

KEYWORDS: Preschool children; Maternal education; Maternal occupation; Maternal nutritional knowledge; Nutritional status; Anthropometry; Food frequency; Nutrition education.

INTRODUCTION

Optimal nutrition during the preschool years is essential for healthy physical growth, cognitive development, and overall well-being. Preschool children experience steady physical growth and rapid cognitive development, making adequate nutrition indispensable for achieving their developmental potential. Improper dietary intake during this period may result in undernutrition, micronutrient deficiencies, overweight, or obesity, all of which have long-term health consequences.

The mother is the primary caregiver during early childhood and plays a vital role in establishing healthy dietary habits, ensuring adequate nutrient intake, and providing appropriate healthcare. Maternal knowledge regarding nutrition and childcare has a direct influence on children's feeding practices and nutritional status. Furthermore, children of educated mothers are more likely to receive nutritionally balanced diets that support optimal physical and cognitive development.

Maternal employment has been reported to influence child nutrition through both positive and negative pathways. Employment can improve household income and food security; however, working mothers may have limited time available for meal preparation, childcare, and healthcare practices, thereby influencing children's nutritional outcomes.

Malnutrition among preschool children remains a significant public health concern worldwide. Both undernutrition and overnutrition adversely affect physical growth, immune function, cognitive performance, and future productivity. Evidence also suggests that maternal nutritional knowledge is an important determinant of appropriate child-feeding practices and dietary behavior.

Despite numerous studies evaluating individual maternal factors, limited evidence has examined the combined influence of maternal educational qualification, occupational status, and nutritional knowledge on the nutritional status of preschool children in the local population. Therefore, the present study aimed to evaluate the association between maternal educational qualification, occupational status, and nutritional knowledge with the nutritional status of preschool children aged 3–6 years. In addition, nutrition education was provided to mothers to improve their nutritional knowledge and promote healthy feeding practices during early childhood.

METHODOLOGY

A cross-sectional study with a pre–post nutrition education component was conducted to assess the

association between maternal educational qualification, occupational status and nutritional knowledge and the nutritional status of preschool children aged 3–6 years. The study also assessed the change in maternal nutritional knowledge following a structured nutrition education programme. A total of 130 preschool children aged 3–6 years and their biological mothers were included in the study. Participants were selected using purposive sampling based on predetermined inclusion and exclusion criteria. Preschool children aged 3–6 years whose mothers were willing to participate and provide informed consent were included. Children with chronic illnesses, congenital abnormalities or medical conditions that could affect normal growth and development, as well as mothers who were unwilling to participate, were excluded from the study. The study was conducted at Shri Gurumuki Vidhyasshram and Nehru Vidhyalaya Nursery and Primary School, Dindigul, Tamil Nadu. Data were collected using a structured questionnaire consisting of demographic characteristics, maternal educational qualification, occupational status, dietary pattern of the child and maternal nutritional knowledge. The dietary pattern of the preschool children was assessed using a Food Frequency Questionnaire, which included information regarding type of diet, food allergy and the frequency of consumption of vegetables, fruits, millets, poultry, meat and eggs, and milk and milk products.

Anthropometric assessment was carried out to determine the nutritional status of the preschool children. Height, weight and waist circumference were measured using standardized procedures and compared with age- and sex-specific reference values. Maternal nutritional knowledge was assessed using a structured questionnaire consisting of ten questions related to preschool nutrition, including healthy food choices, recommended meals and snacks, packed fruit juice, protein-rich foods, introduction of new foods, use of food as a reward, alternative calcium sources, screen time, omega-3 fatty acid-rich foods and the role of nutrition in physical and cognitive development. Following the baseline assessment, a structured nutrition education programme was provided to the mothers, focusing on balanced nutrition during the preschool years, daily nutrient requirements, healthy snack choices and appropriate feeding practices. The same questionnaire was administered after the educational programme to assess changes in maternal nutritional knowledge.

The collected data were compiled, coded and analysed using appropriate statistical methods. Descriptive statistics, including frequency, percentage, mean and standard deviation, were used to summarize the demographic characteristics, dietary patterns, anthropometric measurements and maternal nutritional knowledge. The Chi-square test was used to determine the association between maternal educational qualification, occupational status and nutritional knowledge and the nutritional status of preschool

children. A paired t-test was used to compare maternal nutritional knowledge scores before and after the nutrition education programme. A p-value of <0.05 was considered statistically significant.

The study was conducted after obtaining informed consent from the participating mothers. Participation was

voluntary, and the participants were informed about the purpose and procedures of the study. Confidentiality of the information collected from the participants was maintained throughout the study, and the data were used solely for research purposes.

RESULTS AND DISCUSSION

Table 1: Sociodemographic Characteristics of the Study Participants.

Variable	Category	Frequency (n)	Percentage (%)
Age of child	3 years	3	2.3
	4 years	29	22.3
	5 years	29	22.3
	6 years	69	53.1
Gender	Male	66	50.8
	Female	64	49.2
Maternal education	Graduate	109	83.8
	HSC	10	7.7
	SSLC	11	8.5
Maternal occupation	Homemaker	88	67.7
	Working	42	32.3

Table 1 presents the sociodemographic characteristics of the 130 preschool children and their mothers included in the study. Among the children, 66 (50.8%) were males and 64 (49.2%) were females, indicating a nearly equal gender distribution. Regarding maternal educational qualification, the majority of mothers, 109 (83.8%): were

graduates, while 10 (7.7%) had completed Higher Secondary education and 11 (8.5%) had completed SSLC. With respect to maternal occupational status, 88 (67.7%) mothers were homemakers, whereas 42 (32.3%) were working mothers.

Table 2: Anthropometric Measurements of Preschool Children (n=130)

Anthropometric parameter	Mean $\pm$ SD	Minimum	Maximum
Height (cm)	113.12 $\pm$ 8.356	92.5	139.5
Weight (kg)	19.19 $\pm$ 4.552	11.3	43.5

The table 2 presents the anthropometric measurements of the preschool children. The mean height of the children was 113.12 $\pm$ 8.356 cm, with values ranging from 92.5 to

139.5 cm. The mean body weight was 19.19 $\pm$ 4.552 kg, with a minimum of 11.3 kg and a maximum of 43.5 kg.

Table 3: Distribution of Preschool Children According to Waist Circumference (n=130)

Waist circumference category	Frequency (n)	Percentage (%)
Normal	110	84.6
Obese	20	15.4

Table 3 shows the distribution of children according to waist circumference. Among the 130 children assessed, 110 (84.6%) had a normal waist circumference, whereas

20 (15.4%) were categorized as obese based on their waist circumference. Thus, most of the children had waist circumference within the normal range.

Table 4: Dietary Pattern and Food Frequency of Preschool Children (n = 130)

Dietary characteristic	Category/Frequency	Frequency (n)	Percentage (%)
Type of diet	Non-vegetarian	121	93.1
	Vegetarian	9	6.9
	Total	130	100.0
Food allergy	No food allergy	130	100.0
	Total	130	100.0
Vegetables	Daily	111	85.4
	Weekly	15	11.5
	Monthly	0	0.0
	Rarely	4	3.1

	Total	130	100.0
Fruits	Daily	79	60.8
	Weekly	46	35.4
	Monthly	1	0.8
	Rarely	4	3.1
	Total	130	100.0
Millets	Daily	11	8.5
	Weekly	63	48.5
	Monthly	14	10.8
	Rarely	42	32.3
	Total	130	100.0
Poultry	Daily	24	18.5
	Weekly	101	77.7
	Monthly	3	2.3
	Rarely	2	1.5
	Total	130	100.0
Milk and milk products	Daily	98	75.4
	Weekly	15	11.5
	Monthly	0	0.0
	Rarely	17	13.1

Table 4 presents the dietary pattern and food-frequency distribution of the 130 preschool children included in the study. The majority of children, **121 (93.1%):** followed a non-vegetarian diet, while **9 (6.9%)** followed a vegetarian diet. None of the children reported food allergies. Regarding food-frequency patterns, **vegetables were consumed daily by 111 (85.4%) children,** making them the most frequently consumed food group daily. Fruits were consumed daily by **79 (60.8%) children,** while 46 (35.4%) consumed fruits weekly. Millet consumption was relatively low, with only **11 (8.5%) children consuming millets daily.** The

majority, **63 (48.5%):** consumed millets weekly, while **42 (32.3%)** consumed them rarely. Poultry was predominantly consumed on a weekly basis, with **101 (77.7%) children** reporting weekly consumption, whereas only **24 (18.5%)** consumed poultry daily. Milk and milk products were consumed daily by **98 (75.4%) children,** while 15 (11.5%) consumed them weekly and 17 (13.1%) rarely. Overall, the findings indicate a relatively high daily intake of vegetables, fruits, and milk and milk products, whereas **millet consumption was comparatively low and predominantly weekly or occasional.**

Table 5: Maternal Nutritional Knowledge.

Nutritional knowledge	Frequency (n)	Percentage (%)
Poor	7	5.4
Good	123	94.6

The table 5 shows the distribution of mothers according to their nutritional knowledge scores. Among the 130 mothers, 123 (94.6%) demonstrated good nutritional

knowledge, whereas 7 (5.4%) had poor nutritional knowledge. Thus, the majority of mothers included in the study had good nutritional knowledge.

Table 6: Association Between Maternal Educational Qualification and Nutritional Status of Preschool Children.

Maternal education	Normal height n (%)	Under-growth n (%)	p-value	Normal weight n (%)	Underweight n (%)	p-value
Graduate	52 (47.7)	57 (52.3)		50 (45.9)	59 (54.1)	
HSC	2 (20.0)	8 (80.0)	0.205	2 (20.0)	8 (80.0)	0.129
SSLC	6 (54.5)	5 (45.5)		7 (63.6)	4 (36.4)	

The findings indicate that maternal educational status was not significantly associated with the nutritional status of preschool children. There was no statistically significant association between maternal education and height status ($p = 0.205$) or weight status ($p = 0.129$). Although variations in the proportions of normal height

and weight were observed across different maternal education levels, these differences were not statistically significant.

Table 7: Association Between Maternal Occupational Status and Nutritional Status of Preschool Children.

Maternal occupation	Normal height n (%)	Under-growth n (%)	p-value	Normal weight n (%)	Underweight n (%)	p-value
Homemaker	37 (42.0)	51 (58.0)	0.174	35 (39.8)	53 (60.2)	0.047
Working	23 (54.8)	19 (45.2)		24 (57.1)	18 (42.9)	

There was no statistically significant association between maternal occupational status and children's height status ($p=0.174$). However, a statistically significant association was observed between maternal occupational

status and children's weight status ($p=0.047$): with children of working mothers showing a higher proportion of normal weight compared with children of homemakers.

Table 8: Association Between Maternal Nutritional Knowledge and Nutritional Status of Preschool Children.

Maternal nutritional knowledge	Normal height n (%)	Under-growth n (%)	p-value	Normal weight n (%)	Underweight n (%)	p-value
Good	60 (49.2)	62 (50.8)	0.006	59 (48.4)	63 (51.6)	0.007
Poor	0 (0.0)	8 (100.0)		0 (0.0)	8 (100.0)	

A statistically significant association was observed between maternal nutritional knowledge and children's height status ($p=0.006$) and weight status ($p=0.007$).

Children of mothers with good nutritional knowledge had better height and weight outcomes compared with children of mothers with poor nutritional knowledge.

Table 9: Comparison of Maternal Nutritional Knowledge Scores Before and After Nutrition Education.

Assessment	Mean score	SD	Mean difference	p-value
Pre-test	7.08	1.027	2.47	<0.001
Post-test	9.55	0.558		

The mean maternal nutritional knowledge score increased from 7.08 ± 1.027 in the pre-test to 9.55 ± 0.558 in the post-test. The improvement was statistically

significant ($p<0.001$): indicating that the nutrition education programme significantly improved maternal nutritional knowledge.

Table 10: Item-wise Comparison of Maternal Nutritional Knowledge Before and After Nutrition Education.

Knowledge item	Pre-test n (%)	Post-test n (%)	Improvement
Flavoured yogurt as a healthy food	65 (50.0)	130 (100.0)	+50.0%
Recommended meals and snacks per day	129 (99.2)	129 (99.2)	No change
Packed fruit juice as a healthy choice	125 (96.2)	130 (100.0)	+3.8%
Identification of protein-rich foods	75 (57.7)	107 (82.3)	+24.6%
Introducing new foods repeatedly	98 (75.4)	130 (100.0)	+24.6%
Rewarding children with candies/chips	125 (96.2)	129 (99.2)	+3.0%
Alternative sources of calcium apart from milk	21 (16.2)	51 (39.2)	+23.0%
Limiting screen time during meals	31 (23.8)	130 (100.0)	+76.2%
Foods rich in omega-3 fatty acids	100 (76.9)	126 (96.9)	+20.0%
Role of nutrition in physical and cognitive development	130 (100.0)	130 (100.0)	No change

Table 10 demonstrates a **marked improvement in maternal nutritional knowledge following the nutrition education intervention**. The overall mean knowledge score increased from **7.08 ± 1.027 in the pre-test to 9.55 ± 0.558 in the post-test**, with the difference being highly statistically significant ($p < 0.001$).

The greatest improvement was observed in knowledge regarding **limiting screen time during meals**, which increased from **23.8% before the intervention to 100% after the intervention**, representing a 76.2 percentage-point improvement. Knowledge regarding **flavoured yogurt as a healthy food** also increased substantially, from 50.0% to 100%.

Knowledge regarding **protein-rich foods** improved from 57.7% to 82.3%, while awareness of the importance of **repeatedly introducing new foods** increased from 75.4% to 100%. Similarly, knowledge of **omega-3-rich foods** increased from 76.9% to 96.9%. However, the improvement in knowledge regarding **alternative calcium sources other than milk** was comparatively limited, increasing from only 16.2% to 39.2%. This indicates that although the intervention improved knowledge, **calcium alternatives remained an important knowledge gap among mothers** and may require greater emphasis in future nutrition education sessions. Knowledge regarding the recommended number of meals and snacks and the role of nutrition in physical and cognitive development was already very

high at baseline, at 99.2% and 100%, respectively. Therefore, there was little or no scope for further improvement in these areas.

The findings of the present study are consistent with previous research demonstrating that **nutrition education can significantly improve maternal nutrition knowledge**. A systematic review by **Yoyok Bekti Prasetyo et al. (2023)** reported that maternal nutrition education significantly improved mothers' knowledge, attitudes and skills and concluded that nutrition education can contribute to improved child nutritional outcomes. This supports the present finding of a highly significant improvement in maternal knowledge following nutrition education.

Similarly, a recent randomized controlled trial among mothers of preschool children with undernutrition found that a nutrition-focused intervention produced a significant improvement in maternal nutrition knowledge, feeding attitudes and nutrition practices. The study reported a significant time-by-group effect for maternal nutrition knowledge ($p < 0.001$). A 2024 quasi-experimental study among parents of preschool children also reported that **web-based nutrition education reduced children's nutritional risk**, demonstrating the potential value of structured nutrition education for parents of preschool-aged children. More recently, a randomized controlled trial from **Belagavi, India**, found significantly higher post-intervention maternal knowledge scores in mothers who received structured nutrition education compared with controls ($p < 0.01$). The intervention also improved maternal feeding practices.

CONCLUSION

The present study demonstrated that maternal nutritional knowledge was significantly associated with the nutritional status of preschool children aged 3–6 years. Significant associations were observed between maternal nutritional knowledge and both children's height status ($p = 0.006$) and weight status ($p = 0.007$). Maternal educational qualification was not significantly associated with either height status ($p = 0.205$) or weight status ($p = 0.129$). Maternal occupational status was not significantly associated with height status ($p = 0.174$); however, a statistically significant association was observed with weight status ($p = 0.047$): with children of working mothers showing a higher proportion of normal weight.

The nutrition education programme produced a significant improvement in maternal nutritional knowledge, with the mean knowledge score increasing from 7.08 ± 1.027 before the intervention to 9.55 ± 0.558 after the intervention ($p < 0.001$). Item-wise analysis demonstrated substantial improvements in knowledge related to limiting screen time during meals, identifying healthy food choices, protein-rich foods, introduction of new foods, and omega-3 fatty acid sources. However,

knowledge regarding alternative calcium sources remained comparatively low after the intervention, indicating an area requiring further educational emphasis.

Overall, the findings highlight the importance of strengthening maternal nutrition knowledge through structured and practical nutrition education programmes. Such programmes may support appropriate feeding practices and contribute to improved nutritional well-being among preschool children. However, because the primary study design was cross-sectional and the nutrition education component used a pre-post assessment without a control group, the findings should be interpreted as associations and evidence of improvement in maternal knowledge rather than proof of a causal effect on children's nutritional status.

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