

Community Based Study: Relationship Between Maternal and Children Nutritional Status

Chintan K Dasharatha¹, Nikulkumar R Thakkar², Mayankkumar Javia³, Kalpeshkumar V Vadher⁴, Punit Patel⁵

¹Assistant Professor, Department of Community Medicine, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India

²Assistant Professor, Department of Pediatrics, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India

³Professor, Department of Anatomy, Shantabaa Medical College and General Hospital, Amreli, Gujarat, India

⁴Assistant Professor, Department of Obstetrics and Gynaecology, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India

⁵Assistant Professor, Department of Community Medicine, Banas Medical College and Research Institute, Palanpur, Gujarat, India

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Corresponding author: Dr. Kalpeshkumar V Vadher

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Abstract

Background: Maternal and child undernutrition and micronutrient deficiencies affect approximately half of the world's population. Nutritional status of children influences their health status, which is a key determinant of human development. About 45% of deaths of children under 5 are related to malnutrition.

Objective: To assess the relationship between the nutritional status of the mother and the nutritional status of the children.

Materials and Methods: A community based study was conducted on a total of 110 children and their mother. Data were collected using a pre-tested structured questionnaire and anthropometric measurements were performed using calibrated equipment and standardized techniques. Maternal nutritional status was determined by BMI using the WHO recommendation. The weights and heights of the children were converted to z-scores with WHO Anthro Software.

Results: The difference of wasting among male children (20.7%) and female children (17.3%) was not significant ($p>0.05$). Number of wasted children were maximum (35.7%) in the age group of 6 to 12 months. The number of participants decreased as the age increased and the difference was statistically significant ($p<0.05$). Children whose mothers had underweight nutritional status were significantly more wasted as compared to children of mothers who had normal nutritional status.

Conclusion: The interrelationship between maternal and infant nutritional status was significantly associated and highlights the importance of improving maternal nutritional status to achieve better maternal and child health outcomes.

Keywords: Body Mass index, Child nutrition, Maternal nutrition, Wasting, Weight for Height Z-Score

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Introduction

Nutritional status has several implications for the health and well-being of populations, especially during periods of rapid growth and development, such as pregnancy and infancy. [1] Maternal nutrition refers to the nutritional needs of women during the prenatal and postnatal periods and sometimes even the period before conception. [2] Maternal undernutrition is defined as having a body mass index (BMI) <18.5. Worldwide, an estimated 45 million were wasted in 2020. About 45% of deaths of children under 5 are related to malnutrition. [3] As a result, the three forms of malnutrition in India were 35.5, 32.1, and 19.3 percent stunting, underweight, and wasting, respectively. [4]

It is prevalent in low- and middle-income countries, leading to a substantial increase in mortality and the overall burden of disease. [5] Emerging evidence reinforces the importance of maternal nutritional status, both for maternal health and for ensuring healthy fetal growth and development. It also strengthens the case for constant attention to the crucial 1000-day window of life. [6]

The consequences of malnutrition in children under five years of age indicate pregnancy and the period preceding it, as well as childhood, right from birth, as a window of opportunity in which an adequate nutritional intervention can provide adequate growth and development. [7],[8] The mother therefore represents an important link between the child and its environment, since an intimate mother-child relationship is established from gestation and throughout life. childhood, up to the biological and social independence of the child. [9],[10] Therefore, the aim of this study was to assess the relationship between the nutritional status of the mother and the nutritional status children.

Materials and Methods

Study area and design: This community based study was conducted August 2021 to January 2022 at field practice area of tertiary care hospital, North Gujarat. A total of 128 children were selected from the community during the study period. Among them, 18 children were excluded because they could not be measured or weighed. Children with congenital malformations delaying psychomotor development and chronic conditions affecting nutritional status were also excluded.

Data collection: Before data collection, permission was obtained from the Ethical Review Committee. Prior to entry into the study, the mothers gave oral consent after the benefits of the study had been explained to them. Sick and severely malnourished children were referred to health facilities and advice was given to their parents. Data were collected using a pre-tested structured questionnaire to assess demographic characteristics. The nutritional assessment protocol included measurement of weight and length/height according to international recommended methodology and technique.^[11] Anthropometric measurements were performed using calibrated equipment and standardized techniques. Weight was measured to the nearest 0.1 kg with an electronic scale, with the children wearing a light t-shirt without shoes. Lying length was measured to the nearest 0.1 cm with a length measuring board. Nutritional status was classified according to predefined threshold values.^[12] Maternal nutritional status was determined by BMI using the WHO recommendation.^[13]

Data analysis: The data were entered and analyzed with SPSS, version 20. The weights and heights of the children were converted to z-scores with WHO Anthro Software. In all tests, $P < 0.05$ was considered to indicate statistical significance.

Result

Table 1: Age and gender wise distribution of children

Characteristic (n = 110)	Category	Number	Percentage
Children's Gender	Male	58	52.7
	Female	52	47.3
Children's Age	6 to 12	28	25.5
	12 to 18	45	40.9
	18 to 24	37	33.6

Of the 110 children studied, the majority (52.7%) belonged to the male sex. The majority of children (40.9%) was between 12 to 18 months of age group.

Table 2: Nutritional status of Mothers and Children

Characteristic (n = 110)	Category	Number	Percentage
Children's Nutritional status	Wasting (WHZ)	21	19.1
	Normal weight	89	80.9
Mother's Nutritional status (BMI)	Underweight	19	17.3
	Normal	69	62.7
	Overweight	22	20.0

Of the total sample, wasting was present in 19.1% of the children. Of the total 110 mothers of children, the majority of mothers had a normal BMI (62.7%), 20% of them were overweight and 17.3% of them were underweight.

Table 3: Nutritional status of children in relation to their age and gender

Characteristic (n = 110)	Category	Wasting (WHZ)		Total	P value (chi square)
		Yes (n = 21)	No (n = 89)		
Children's Sex	Male	12 (20.7%)	46 (79.3%)	58 (100%)	0.8355
	Female	9 (17.3%)	43 (82.7%)	52 (100%)	
Children's Age	6 to 12	10 (35.7%)	18 (64.3%)	28 (100%)	0.0211
	12 to 18	7 (15.6%)	38 (84.4%)	45 (100%)	
	18 to 24	4 (10.8%)	33 (89.2%)	37 (100%)	

Of the male children 20.7% were wasted while 17.3% wasted among the female children and the association between children's gender and nutrition was not significant ($p > 0.05$).

Number of wasted children were maximum (35.7%) in the age group of 6 to

12 months, since only 15.6% and 10.8% children belonged to 12 to 18 months and 18 to 24 months of the age group. The number of participants decreased as the age increased and the difference was statistically significant ($p < 0.05$).

Table 4: Nutritional status of children in relation to Mother's Nutritional status

Mother's Nutritional status	Wasting (Weight for Height)	Total	P value (chi square)
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	Yes	No		
Underweight	7 (36.8%)	12 (63.2%)	19 (100%)	0.0579
Normal	9 (13.0%)	60 (87.0%)	69 (100%)	
Overweight	5 (22.7%)	17 (77.3%)	22 (100%)	
Total	21 (19.1%)	89 (80.9%)	110 (100%)	

Based on the results, children whose mothers had underweight and overweight nutritional status were more likely to be wasted (36.8% & 22.7% respectively) as compared to children of mothers who had normal nutritional status. There are significant associations between the nutritional status of mothers and the percentage of children with wasting ($p < 0.05$).

Discussion

Childhood malnutrition, as a multifactorial disease resulting from the interrelation of factors such as poverty, infections and reduced energy and protein intake, remains a major public health problem in children under 5 years of age in countries in development. In the present study, the prevalence of malnutrition was higher, as in other studies, in children under 24 months. [10,14-16] This study showed that the level of wasting was higher in children of underweight mothers than in children of normal weight mothers. This has also been observed in other studies conducted in Ethiopia [17] and countries in sub-Saharan Africa [18].

The results of this study show that maternal anthropometry predicts the nutritional status of children, i.e. the normal maternal BMI (18.5 to 24.9 kg/m²) predicts the weight for the score of Z-height (WHZ). A significant association was observed between maternal and child nutritional status, with a higher prevalence of wasting (weight for height < -2 Z-score) in children of malnourished mothers. Also, wasting (weight for height $< -2SD$) was

more common in children of thin mothers (whose BMI is less than 18.5), according to the 2011 Ethiopian Demographic and Health Survey. [19] In a study conducted in a daycare center in Brazil, the weight and height of the mother had a significant impact on the nutritional status of babies. [20]

The multiplicity of malnutrition indicators identified in other population studies leads to linking malnutrition solely to the lack of economic and/or food resources in a reductionist vision of the problem [10], making it necessary to have in-depth knowledge of the socio-economic and social aspects. the culture of the context, as well as an understanding of the complexity of their interactions, in order to establish timely strategies to address the problem of malnutrition in childhood. [21]

The early nutritional assessment and orientation of the mother and the child makes it possible to identify the potential risk situations of malnutrition and to prevent the appearance of negative consequences resulting from the synergy between malnutrition and infection, to reduce the prevalence acute malnutrition and avoid chronic malnutrition. Therefore, it is believed that it should be a priority in public health policies, especially in countries where the prevalence of childhood malnutrition is high. [7],[21]

Several studies have observed that children with adequate nutritional monitoring show significant improvements in their nutritional and health status, resulting in reduced risks associated with malnutrition.

[16],[22] Therefore, counseling and monitoring maternal and infant nutritional status is an investment with proven benefits for present and future generations. [7],[10],[23]

Priority interventions include promotion of breastfeeding, appropriate complementary feeding, supplementation with essential vitamins and minerals, and management of severe acute malnutrition. Proper care for low birth weight babies, including proper nutrition, hygiene and hygiene, as well as early diagnosis and treatment of complications, can significantly reduce mortality in this highly vulnerable group. [24]

Conclusion

A significant association was identified between maternal malnutrition and wasting in children. The interrelationship between maternal and infant nutritional status highlights the importance of improving maternal nutritional status to achieve better maternal and child health outcomes. A broader and more effective nutritional intervention would be desirable, with particular attention to women of childbearing age, pregnant women and the first years of a child's life.

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