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Original Article

Nutritional Status and its Association with Breastfeeding and Complementary Feeding Practices Among Children visiting Tertiary Care Health Centre

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ABSTRACT

Objective: To assess the nutritional status of children (up to 2 years of age) visiting the National Institute of Child Health (NICH) Karachi and to determine its association with breastfeeding and complementary feeding practices.

Study Design: Cross-Sectional Study.

Place and Duration of Study: Outpatient Department, National Institute of Child Health, Karachi Pakistan, from Jan to Jun 2021.

Methodology: Children aged 1 to 24 months were included. Demographic information, weight, height, weight for height and grade of malnutrition using WHO criteria were checked and categorized as median, -1S.D, -2S.D, -3SD and -4 SD. Face-to-face interview with the mother was conducted using a semi-structured questionnaire based on WHO Infant and Young Child Feeding guidelines to find out the breastfeeding and complementary feeding practices of the mother.

Results: A total of 355 children were enrolled with a mean age of 9.18±5.90 months. Median SD was attained by 65(18.3%) children, 177(49.9%) infants lied within -1SD(mild malnutrition), 77(21.4%) within -2SD(moderate malnutrition) while 36(10.1%) had severe malnutrition including 26(7.3%) within -3SD and 10(2.8%) within -4SD. Exclusive breastfeeding for up to 6 months had a significantly lower frequency of severe malnourishment (p-value<0.001). Complimentary feeding practices, including the age of initiation, dietary diversity and food frequency, also had a significant association with nutritional status (p-value<0.01).

Conclusion: Inappropriate breastfeeding and complementary feeding lead to poor health and malnutrition. Exclusive breastfeeding till six months and the introduction of complementary feeding on time with adequate diversity and frequency are critical to the infant's health.

Keywords: Breastfeeding, Children, Complementary feeding, Infants, Malnutrition, Nutrition.

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INTRODUCTION

Breastfeeding enhances cognitive development, optimizes the immune system and decreases the risk of some allergic and autoimmune disorders.[1] Recent survey estimated that 823,000 deaths of less than five years of age were preventable by optimal breast-feeding.[2] According to WHO guidelines, childhood mortality can be reduced by 20% in the first two years of life with appropriate breastfeeding and comple-mentary feeding in low-income countries.[3,4]

According to the global breastfeeding scorecard in 2018, only 23% of countries had a rate of exclusive breastfeeding, and 60%5 UNICEF reported a 36% rate of exclusive breastfeeding in Pakistan.[6] According to WHO, 45% of infant mortality is associated with undernutrition.[7] According to the agenda in 2030 for sustainable development goals adopted by United Nations, the aim is to boost exclusive breastfeeding by up to 50%.[8,9]

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Based on the benefits of optimal breastfeeding and appropriate complementary feeding practices, it is essential to identify practices, factors influencing these practices and their impact on the nutritional status of infants to make effective interventional programs to promote optimal breastfeeding and complementary feeding practices.[10] However, the data on the impact of these practices on the nutritional status of children has yet to be made available. The present study was designed to investigate the nutritional status and its association with breastfeeding and complementary feeding practices in children less than two years of age.

METHODOLOGY

The cross-sectional study was conducted at the Outpatient department of the National Institute of Child Health (NICH), Karachi, in January-June 2021. The sample size was calculated using EPI sample size calculator based on UNICEF data of exclusive breast-feeding in Pakistan, as 38% in 2006-2007.[11] Approval from the Ethical Committee (IERB No. 35/2019).

Inclusion Criteria: Children of either gender, aged 1 to 24 months attending the OPD of NICH were included in the study.

Exclusion Criteria: All patients with significant birth anomalies and chronic illnesses were excluded.

Convenient sampling was used to recruit children from OPD, and written informed consent was taken from the mothers after explaining the purpose of the study. Data were collected using a questionnaire based on WHO Infant and Young Child Feeding (IYCF) guidelines.[12] Information was recorded regarding age, gender, type of feeding at birth and afterwards, age of starting complementary feeding, type of complementary feeding, minimal dietary diversity and minimal meal frequency.

Minimal dietary diversity (MDD) was considered adequate in infants between 6 to 24 months of age if it was 4 out of 7 dietary groups defined by WHOInfant and Young Child Feeding (IYCF) guidelines.[2] Minimal meal frequency (MMF) was defined as the average consumption of solid, semi-solid or soft food by the infant, ages ranging from 6 to 24 months, including milk feeds for non-breastfed children. It was considered adequate or inadequate as explained by WHO IYCF guidelines according to the age of the child.[2]

Child's weight, height, MUAC and weight for height and grade of malnutrition using WHO criteria were checked, and children were categorized into nutrition grades as median,-1 SD, -2 SD, -3 SD and -4 SD. Maternal and paternal education status was asked, along with family income.

Statistical Package for Social Sciences (SPSS) version 24.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

Three hundred fifty-five children were enrolled with mean age was 9.18±5.90 months (Table-I).

Table-I: Demographic features of Children (n = 355)

Variables	Categories	n(%)
Gender	Male	210(59.2)
	Female	145(40.8)
Maternal Age	<20	75(21.1)
	20-30	236(66.5)
	>30	44(12.4)
Maternal Education	Illiterate	77(21.7)
	Below matriculation	242(68.2)
	Matriculation or above	36(10.1)
Paternal Education	Illiterate	44(12.4)
	Below matriculation	171(48.2)
	Matriculation or above	140(39.4)
Working status of mother	Working mother	110(31.0)
	House Wife	245(69.0)
Family income (PKR)	<20,000	136(38.3)
	20000-50000	177(49.9)
	>50000	42(11.8)

Table-II: Association of different Demographic factors with Nutritional Status (n=355)

Variables	Subcategories	Nutritional Status			*p*-value
		Normal n(%)	Mild Malnutrition n(%)	Moderate/Severe Malnutrition n(%)	
Gender	Male	42(20.0)	106(50.5)	62(29.5)	0.426
	Female	23(15.9)	71(49.0)	51(35.2)	
Maternal Age	<20	15(20.0)	35(46.7)	25(33.3)	0.629
	20-30	43(18.2)	123(52.1)	70(29.7)	
	>30	7(15.9)	19(43.2)	18(40.9)	
Maternal Education	Illiterate	13(16.9)	39(50.6)	25(32.5)	0.075
	Below matriculation	39(16.1)	124(51.2)	79(32.6)	
	Matriculation or above	13(36.1)	14(38.9)	09(25.0)	
Paternal Education	Illiterate	3(6.8)	15(34.1)	26(59.1)	0.001
	Below matriculation	30(17.5)	88(51.5)	53(31.0)	
	Matriculation or above	32(22.9)	74(52.9)	34(24.3)	
Working status of mother	Working mother	15(13.6)	29(26.4)	66(60.0)	<0.001
	House Wife	50(20.4)	148(60.4)	47(19.2)	
Number of children	1-3	42(17.8)	124(52.5)	70(29.7)	0.676
	3-6	21(19.6)	47(43.9)	39(36.4)	
	>6	2(16.7)	6(50.0)	4(33.3)	
Family income (PKR)	<20,000	10(7.4)	55(40.4)	71(52.2)	<0.001
	20000-50000	33(18.6)	104(58.8)	40(22.6)	
	>50000	22(52.4)	18(42.9)	2(4.8)	
Family members	<5	9(22.5)	20(50.0)	11(27.5)	0.716
	5-10	38(18.2)	108(51.7)	63(30.1)	
	>10	18(17.0)	49(46.2)	39(36.8)	

Physical health evaluation of infants showed that only 65(18.3%) children had attained median SD, 177(49.9%) infants lay within -1SD (mild malnutrition), 77(21.4%) within -2SD (moderate malnutrition) while 36(10.1%) had severe malnutrition including 26(7.3%) within -3SD and 10(2.8%) within -4SD. Paternal education, working status of the mother and family income were found to have a statistically significant association with the nutritional status of infants (Table-II). Feeding practices were observed to have a statistically significant association with the nutritional status of children (Table-III). It was observed that exclusively breastfed children up to 6 months of age were less likely to have moderate or severe malnutrition (*p*-value <0.001). Among those who received top feed, the health status of children receiving animal feed was significantly compromised compared to formula milk (*p*-value <0.001).

The nutritional status of children was observed to be significantly associated with the age of complementary feeding introduction, dietary diversity and food frequency (Table-IV). Children whose complementary feeding was started between 6-8 months of age, those served nutritionally diverse food and those who received adequate servings of food as per WHO IYCF guidelines had significantly lower malnutrition rates.

Table-III: Association of feeding Practices with Nutritional Status (n=355)

Variables	Subcategories	Nutritional Status			*p*-value
		Normal n(%)	Mild malnutrition n(%)	Moderate/severe Malnutrition n (%)	
Feeding practice up to 6-months	Exclusive Breastfeed	50(32.1)	82(52.6)	24(15.4)	<0.001
	Top feed	5(8.3)	28(46.7)	27(45.0)	
	Combination (Breast & top) feed	10(7.2)	67(48.2)	62(44.6)	
Top feed type	Formula Milk	16(10.5)	86(56.6)	50(32.9)	<0.001
	Animal milk	0(0.0)	7(15.2)	39(84.8)	

Table-IV: Association of Weaning Practices with Nutritional Status (n=355)

Variables	Subcategories	Nutritional Status			*p*-value
		Normal n(%)	Mild malnutrition n(%)	Moderate/Severe Malnutrition n(%)	
Complimentary feeding Age (months)	<6	2(12.5)	9(42.9)	10(47.6)	<0.001
	6-8	28(32.2)	51(58.6)	8(9.2)	
	8-10	9(12.0)	36(48.0)	30(40.0)	
	>10	0(0.0)	1(6.3)	15(93.8)	
Minimal Dietary diversity for CF	Inadequate (<4)	8(8.4)	52(54.7)	35(36.8)	<0.001
	Adequate (4 or more)	31(32.0)	40(41.2)	26(26.8)	
Minimal meal Frequency for CF	Adequate	31(36.0)	38(44.2)	17(19.8)	<0.001
	Inadequate	8(7.5)	54(50.9)	44(41.5)	

DISCUSSION

In our study, 81.7% showed malnutrition, out of which 10.1% were with severe malnutrition. This could be attributed to the reason that our studied population mainly belonged to lower socioeconomic status, which is identified as a factor contributing to malnutrition, similar findings noted in other studies.[13,14]

The frequency of exclusive breastfeeding was observed to be 43.9% till six months of age. This perception needs to be corrected, with counselling sessions in the antenatal and postnatal periods and electronic media campaigns to promote awareness regarding exclusive breastfeeding and sufficiency of breast milk production as per the baby's need during this period. Besides this, there is a need to train staff and health care workers to help the mother to breastfeed in the immediate postpartum period, as 32% of babies could not receive breast milk as their first feed.[15]

Among exclusively breastfed babies, 15.4% of children had moderate or severe malnutrition; this frequency increased to 44.6% in children whose mothers did not breastfeed. Different studies have reported similar findings.[16] Among those receiving the top feed, infants receiving animal milk were more prone to malnutrition (84.8%) than formula milk-fed babies (32.7%). Other studies also suggest that children on animal milk were more likely to have health issues and 1.65 times more likely to be developmentally delayed than those who consume formula feed.[17]

Complimentary feeding practices were also found to be variable among our studied population. Malnutrition rates were tremendously high (93.8%) among infants in whom complementary feeding was delayed (> ten months of age) as compared to those in whom

complementary feeding was introduced at the recommended age of 6 to 8 months (9.8%).[18]

Among socio-demographic features working status of the mother was observed to be associated with a significant risk of malnutrition. Studies have reported that the working status of mothers impacts the feeding practices of mothers.[19] Similarly, low paternal education and lower family income were found to have significant associations with the child's nutrition status. These findings are in concordance with other studies which indicate that poor knowledge and economic status of the family affect health status.

RECOMMENDATION

Antenatal and postnatal counselling sessions and social awareness programs regarding infant and young child feeding may improve breastfeeding, and complementary feeding practices are required to improve these practices to reduce the prevalence of malnutrition. Policymakers should work on plans and direct programs to implement WHO IYCF guidelines for breastfeeding and complementary feeding.

CONCLUSION

Childhood malnutrition is common and is associated with inappropriate breastfeeding and complementary feeding practices. Lack of exclusive breastfeeding, delayed and improper complementary feeding practices, parental illiteracy, working status of the mother, and low family income are common factors contributing to childhood malnutrition in our studied population.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

FA: & MA: Data analysis, drafting the manuscript, critical review, approval of the final version to be published.

SB: & AK: Data acquisition, concept, approval of the final version to be published.

SS: & AS: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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