

# Evaluation of Nutritional Status of Children below 5 Years of Age for Valuation of Rickets Caused by Nutritional Deficiency

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## ABSTRACT

**Aim:** To determine the nutritional status of children under five-years of age, the factors related to it and the degree of malnutrition.

**Study Design:** A cross-sectional study.

**Place and Duration:** In the department of Paediatrics, Hayatabad Medical Complex, Peshawar for the duration of six months from July, 2021 to Dec, 2021.

**Methods:** Using a non-probability-based convenient sampling technique, approximately 130 children under the age of five were selected. The nutritional status and physical development of children was assessed with simple anthropometric technique. A partially pre-tested organised survey form was given to collect the data by face-to-face interviews with the mothers of the children. SPSS version 22.0 was applied for data collection and to estimate percentages and numbers.

**Results:** Of 130 children, 80(61.5%) were male and 50(38.5%) were female. According to the classification of Gómez's, 102 children had Malnutrition out of 130 children; 55 (42.3%) had grade I, and 24 (18.5%) had grade II and 23 (17.7%) had grade III malnutrition. Of 80 children, 32.3% had mild stunted growth, 16.9% moderate stunted growth, and 12.3% severe stunted growth. When status of immunization was calculated, 32 (24.6%) were nonimmunized, partially immunization was seen in 65 (50%) children and fully immunization in 33 (25.4%) cases. Of the 98 uneducated mothers, 60(63.2%) had malnourished children, 70(71.4%) had Kwashiorkor, and 28(28.6) had marasmus. Of 130 children, 90 were breastfed and children on bottle-fed were 40.

**Conclusions:** The malnutrition rate was augmented among children <5 years of age (78.6%) due to inadequate eating habits. Accompanying influences were insufficient immunization and illiterate mothers. The education regarding health counting adequate weaning, exclusive breastfeeding, family planning and routine immunization via schedule of EPI should be encouraged.

**Keywords:** Nutritional status, Child, Risk factors, Protein and Energy malnutrition.

## INTRODUCTION

Malnutrition is a medical condition in which enough calories and protein are not used for common physiological purposes and the body growth<sup>1-2</sup>. This is because of a lack of diet, inability to consume calories, or excess caloric intake because of some disease or other pathology<sup>3-4</sup>. Acute malnutrition is accountable for the bereavement of over fifty percent of children below the age of 5 years worldwide, and it claims the lives of 3.5 million children each year. The vital influences accountable for malnourishment are civil wars, poverty, natural disasters, illiteracy and poor healthcare access<sup>5-6</sup>. The malnutrition of protein-energy is frequently related with low dietary protein content, infections, early weaning and typically occurs in 6-24 months of age child. In emerging countries, malnourished children make up almost a third of the population. The primary malnutrition cause is the lack of primary health care (PHC), counting additional environmental and social aspects, and the existence of other pathology result in secondary malnourishment<sup>7</sup>. Malnutrition is recognized as the leading reasons of mortality and morbidity worldwide. According to the UN, there are 8.40 billion malnourished individuals in the biosphere, most of whom (7.99 billion) live in emerging republics. Many of these malnourished persons live in Asia and Africa<sup>8</sup>. One analysis of preschool children in rural western Kenya found the prevalence of dwarfism, thinness, and weakness to be 31%, 22%, and 5%, correspondingly. Conferring to the National Nutrition Survey, it was institute that in 2017, 60.6% of the Pakistani population and 53 % of the urban residents suffers from food insufficiency. The Pakistan National Nutrition Survey 2011 shows that 43.7% of children in Pakistan are stunted, 31.1% are below the standard weight and 15.1% are wasted<sup>9-10</sup>. According to the National Nutrition Survey 2016, the incidence of dwarfism was 47.8%, the incidence of weight loss was 17.2%, and the incidence of weakness was 24.1%. Inadequate dietary practices and recurrent infections such

as acute respiratory infections, diarrheal diseases, pneumonia, measles, unsafe drinking water, poor sanitation, late and inadequate weaning and lack of vaccination are among the causes of malnutrition<sup>11-12</sup>. Childhood malnutrition is directly proportional to the parents' socio-economic status and in reverse proportional to their education level. Additional foremost aspect contributing to this worldwide problematic is food insufficiency<sup>13</sup>. Food insecurity conquers in the absence of long-lasting economic or physical access to hygienic, adequate, socially acceptable and healthy food<sup>14</sup>. The chief purpose of this study was to determine the nutritional status of children under five-years of age, the factors related to it and the degree of malnutrition.

## METHODS

This cross-sectional study was held in the Pediatric department of Hayatabad Medical Complex, Peshawar for the duration of six months from July, 2021 to Dec, 2021. Using a non-probability-based convenient sampling technique, approximately 130 children under the age of five were selected. Children over 5 years of age and were hospitalized to ICU and attended by relatives rather than their real parents were not included. After the purpose of the study was clarified, oral and written consent was obtained from the guardians. The sample size calculator of WHO was used for data collection. A partially pre-tested organised survey form was given to collect the data by face-to-face interviews with the mothers of the children and also included the children vaccination status. The malnutrition causative factors were analyzed and assessed by means of SPSS version 22.0. The relationship of all categorical variables was done with chi-square test. P<0.05 is taken as significant.

## RESULTS

Of 130 children, 80(61.5%) were male and 50(38.5%) were female. According to the classification of Gómez's, 102 children had Malnutrition out of 130 children; 55 (42.3%) had grade I, and 24 (18.5%) had grade II and 23 (17.7%) had grade III malnutrition. (Table 1).

Table-1: shows the Degree of Malnutrition (n 130)

Classes	Number	Percentage
Normal	28	21.5
1 <sup>st</sup> Degree Malnutrition	55	42.3
2 <sup>nd</sup> Degree Malnutrition	24	18.5
3 <sup>rd</sup> Degree Malnutrition	23	17.7

Additional health assessment parameter includes age-related height, showed a total of 80 children with stunted growth retardation. Of 80 children, 32.3% had mild stunted growth, 16.9% moderate stunted growth, and 12.3% severe stunted growth (Table 2).

Table-2: shows Numeral of children conferring to height for age distribution (n 130)

Categories	Number	Percentage
Normal	50	38.5
Mild stunted	42	32.3
Moderately stunted	22	16.9
Severely stunted	16	12.3

The weaning and breastfeeding in the studied inhabitants are presented in Tables 3 and 4, correspondingly.

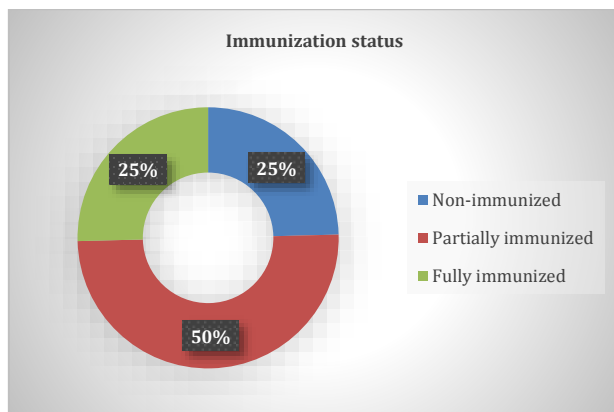
Table 3: Breast feeding status of Malnourished Children (n 130)

Breast Feeding Duration	Number	Percentage
0-4 months	51	39.2
5-6 months	48	36.9
Above 7 months	31	23.9

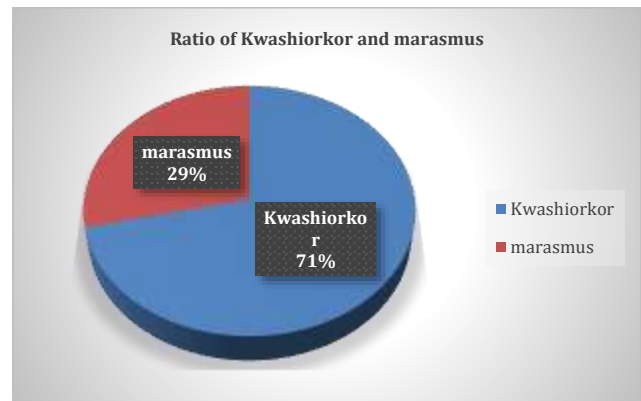
Table 4: Numeral of children conferring to age of start of weaning (n=130)

Months	Number	Percentage
4-6 months	40	30.8
7-12 months	70	53.8
Above 1 year	20	15.4

When status of immunization was calculated, 32 (24.6%) were nonimmunized, partially immunization was seen in 65 (50%) children and fully immunization in 33 (25.4%) cases. (Fig 1). The maternal rate of literacy was very less.



Of the 98 uneducated mothers, 60(63.2%) had malnourished children, 70(71.4%) had Kwashiorkor, and 28(28.6) had marasmus. The relationships between different nutritional status categories and different infections are presented in Fig-2.



## DISCUSSION

In 2018, the WHO stated that 55% of infant deaths were due to malnutrition. In this analysis, according to the classification of Gómez's, 102 children had Malnutrition out of 130 children; 55 (42.3%) had grade I, and 24 (18.5%) had grade II and 23 (17.7%) had grade III malnutrition. Sahibzada et al. reported that 54% of children in Sialkot County are malnourished, and that one in two children under the age of five is malnourished<sup>15-16</sup>. They testified 33% of malnutrition in the first year, 35% in the 2<sup>nd</sup> year and 35% in the 3<sup>rd</sup> year. This analysis found that 61.5% of the child had stunted growth, in comparison to Bhutt ZA study which showed 37% to 40% growth stunting<sup>17</sup>. Our study also found that 60.8% of babies are breastfed and 36.9% of them are exclusively breastfed until they are six months old. A 2017 study found that 14.5% of babies were exclusively breastfed for up to 6-months. This displays an improvement in the trend among exclusively breastfed babies for up to 6-months<sup>18-19</sup>. The mother's level of education has a great influence on the children nutritional status. A 2017 National Nutrition Survey in Pakistan found that malnourishment is less common among children whose mothers achieved higher education levels<sup>20-21</sup>. In this analysis, we also institute that 75.3% of mothers did not attain any proper teaching, and 63.2% of their children were malnourished. It has been practical that the advanced the education level of mothers, the improved the nutritional and vaccination status of their children. In addition, socioeconomic status directly affects a child's nutritional performance<sup>22</sup>. Previously, a 2016 study in Lahore found that the prevalence of malnutrition in the lowest socioeconomic class was 41%, compared with 20.88% in the higher socioeconomic category<sup>23-24</sup>. Likewise, in this analysis, cases of malnutrition were higher in families with lower monthly incomes.

## CONCLUSION

The malnutrition rate was augmented among children <5 years of age (78.6%) due to inadequate eating habits. Accompanying influences were insufficient immunization and illiterate mothers. The education regarding health counting adequate weaning, exclusive breastfeeding, family planning and routine immunization via schedule of EPI should be encouraged.

## REFERENCES

1. Radhamani KV, Rajeev SV. A study on nutritional status of Anganwadi children in a rural area of North Kerala. Indian Journal of child health. 2017 Sep 26;4(3):348-51.
2. Aguiar M, Andronis L, Pallan M, Högler W, Frew E. Micronutrient deficiencies and health-related quality of life: the case of children with vitamin D deficiency. Public health nutrition. 2020 May;23(7):1165-72.

3. Akseer N, Al-Gashm S, Mehta S, Mokdad A, Bhutta ZA. Global and regional trends in the nutritional status of young people: a critical and neglected age group. *Annals of the New York Academy of Sciences*. 2017 Apr;1393(1):3-20.
4. Lailasari D, Zenab Y, Herawati E, Wahyuni IS. Correlation between permanent teeth eruption and nutrition status of 6-7-years-old children. *Padjadjaran Journal of Dentistry*. 2018 Jul 31;30(2):116-23.
5. Hu Y, Chen J, Wang R, Li M, Yun C, Li W, Yang Y, Piao J, Yang X, Yang L. Vitamin D nutritional status and its related factors for Chinese children and adolescents in 2010–2012. *Nutrients*. 2017 Sep 15;9(9):1024.
6. Rowicka G, Strucińska M, Riahi A, Weker H. Diet and Nutritional Status of Children with Cow's Milk Protein Allergy, Treated with a Milk-Free Diet. *International Journal of Allergy Medications*. 2017;3(025).
7. Dhaarani Giri PV. Nutritional Status Assessment by Anthropometry in Children with Chronic Liver Disease aged 6 Months to 12 Yrs (Doctoral dissertation, Madras Medical College, Chennai).
8. Ahmed S, Goldberg GR, Raqib R, Roy SK, Haque S, Braithwaite VS, Pettifor JM, Prentice A. Aetiology of nutritional rickets in rural Bangladeshi children. *Bone*. 2020 Jul 1;136:115357.
9. Zhu J, Guo M, Yang T, Lai X, Tang T, Chen J, Li L, Li T. Nutritional status and symptoms in preschool children with autism spectrum disorder: a two-center comparative study in Chongqing and Hainan Province, China. *Frontiers in pediatrics*. 2020 Sep 3;8:469.
10. Karad SR. Assessment of Nutritional Deficiencies Among Paediatric Subjects of Known Population.
11. Ali NA. Nutritional Status of Ethiopian Children from 2-< 5 Years of Age Living in Khartoum, 2019 (Doctoral dissertation, جامعة إفريقيا العالمية).
12. Piloya T, Odongkara B, Were EM, Ameda F, Mworozzi E, Laigong P. Nutritional rickets among children admitted with severe pneumonia at Mulago hospital, Uganda: a cross-sectional study. *BMC pediatrics*. 2018 Dec;18(1):1-7.
13. Jones KD, Hachmeister CU, Khasira M, Cox L, Schoenmakers I, Munyi C, Nassir HS, Hüntner-Kirsch B, Prentice A, Berkley JA. Vitamin D deficiency causes rickets in an urban informal settlement in Kenya and is associated with malnutrition. *Maternal & child nutrition*. 2018 Jan;14(1):e12452.
14. Creo AL, Thacher TD, Pettifor JM, Strand MA, Fischer PR. Nutritional rickets around the world: an update. *Paediatrics and International Child Health*. 2017 Apr 3;37(2):84-98.
15. Flores A, Flores M, Macias N, Hernández-Barrera L, Rivera M, Contreras A, Villalpando S. Vitamin D deficiency is common and is associated with overweight in Mexican children aged 1–11 years. *Public health nutrition*. 2017 Jul;20(10):1807-15.
16. Karak P, Maiti R, Das P, Karmakar A. Assessment of nutritional status of school children in rural and urban areas of Bankura, West Bengal. *Int J Pharm Sci Res*. 2018 Jan 1;9(1):338-45.
17. Isa H, Almaliki M, Alsabea A, Mohamed A. Vitamin D deficiency in healthy children in Bahrain: do gender and age matter?. *Eastern Mediterranean Health Journal*. 2020;26(3):260-7.
18. Frew E, Pallan M, Aguiar M, Andronis L, Högler W. Micronutrient deficiencies and health-related quality of life (HRQoL): the case of children with Vitamin D deficiency.
19. Dahal D. ASSESSING THE HEALTH AND NUTRITIONAL STATUS OF CHILDREN IN WESTERN NEPAL PRIOR TO HYGIENE AND WATER QUALITY INTERVENTION (Doctoral dissertation, KATHMANDU UNIVERSITY).
20. Aguiar M, Andronis L, Pallan M, Högler W, Frew E. Micronutrient deficiencies and health-related quality of life (HRQoL).
21. Tayab A, Hasan J, Hassan K. FREQUENCY OF NUTRITIONAL RICKETS AMONG SUSPECTED RICKETS CASES IN DHAKA SHISHU (CHILDREN) HOSPITAL, SHER-E-BANGLA NAGAR, DHAKA.
22. Chaudhary SK. ASSESSMENT OF FACTORS AFFECTING THE NUTRITIONAL STATUS OF 6-59 MONTHS OF CHILDREN IN MUSAHAR COMMUNITY OF MADHELI VDC, SUNSARI (Doctoral dissertation).
23. Saggese G, Vierucci F, Prodam F, Cardinale F, Cetin I, Chiappini E, de'Angelis GL, Massari M, Miraglia Del Giudice E, Miraglia Del Giudice M, Peroni D. Vitamin D in pediatric age: consensus of the Italian Pediatric Society and the Italian Society of Preventive and Social Pediatrics, jointly with the Italian Federation of Pediatricians. *Italian journal of pediatrics*. 2018 Dec;44(1):1-40.
24. Sharmin R. Nutritional status of pre-school children among different socio-economic status in urban area of Dhaka city (Doctoral dissertation, University of Dhaka).