



## UNVEILING MUCOCUTANEOUS MANIFESTATIONS IN CHILDHOOD MALNUTRITION

### Dermatology

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### ABSTRACT

Nutrition profoundly impacts children's health and development, particularly in preschoolers, where malnutrition lurks as a significant threat. Protein energy malnutrition (PEM) is prevalent among Indian children under five, manifesting in various mucocutaneous features, distinct in Kwashiorkor and Marasmus. This study aims to identify mucocutaneous manifestations in PEM and their correlation with socioeconomic status (SES). A cross-sectional study of 100 children (0.6–5 years) diagnosed with PEM was conducted, gathering data on anthropometry, demographics, and mucocutaneous indicators. Approximately 22%, 42%, and 36% of children were underweight, stunted, and wasted, respectively. Mucocutaneous signs included xerosis, angular cheilitis, hair and nail abnormalities. Sociodemographic factors such as religion and parental education were examined for their SES implications. Inadequate nutrition practices contribute to malnutrition and under-5 mortality. Understanding sociodemographic influences on SES is vital for targeted interventions. Early recognition of mucocutaneous signs facilitates timely intervention and underscores the necessity of a multidisciplinary approach to PEM management.

### KEYWORDS

PEM, Mucocutaneous manifestations, Sociodemographic factors

### INTRODUCTION

The role of nutrition in children is acknowledged as a cornerstone not just for optimal health but also for prevention of illnesses.<sup>1</sup> Malnutrition is often referred to as an invisible emergency due to its concealed nature, comparable to an iceberg where its perilous threat remains largely unseen.<sup>2</sup> Protein-energy malnutrition (PEM) is one of the most common causes of nutritional deficiencies in children under the age of 5 in India. There are several factors influencing the disease, like insufficient intake of protein or deficient calories or both leading to Kwashiorkor and Marasmus.<sup>3,4</sup> Mucocutaneous features of PEM - In Kwashiorkor, classic skin changes consist of areas of hyperpigmentation and occasional fissuring ('enamel paint'), erythema or erythroderma and desquamation are frequently present, shiny varnished-like skin, xerosis, residual hypochromia. Hyperchromia, superimposed bacterial and mycotic infections.<sup>5</sup> Flag sign is typically seen in dark hair and described as a red-brown or pale colour change of the hair during periods of undernutrition, resulting in alternating light and dark bands of hair.<sup>6</sup> In Marasmus there is loss of subcutaneous fat leads to dry, loose, and wrinkled skin. On the face loss of the buccal fat pads results in wizened, so called 'monkey faces' and prematurely aged appearance, lanugo-like hair. Also, fissured poorly growing nails and thin hair. Angular cheilitis, pale and atrophic or smooth tongue and mucous membranes.<sup>4,6</sup> Other cutaneous signs are erythema or erythroderma, desquamation, thinning, petechiae, ecchymosis and purpura.<sup>4</sup> In developing countries, there is a significant risk of malnutrition among under five-year children, particularly those in the process of being weaned from breast milk.<sup>7</sup> We conducted this study to find out the association of mucocutaneous manifestations in PEM.

### OBJECTIVES

To determine the mucocutaneous manifestations in protein energy malnutrition and its association with Socio-economic status (SES).

### METHODOLOGY

A one-year observational study in children aged 0.6 to 5 years, diagnosed with PEM and attending our hospital's pediatric OPD was conducted after approval from our college's ethics committee. Excluding those with PEM and other systemic illnesses, 100 children were included. PEM was assessed through underweight, stunting, and wasting. Data on demographics, anthropometry, and socio-economic factors were collected using a pre-formed questionnaire. Weight, height, and mid-upper arm circumference were measured. Sample size was calculated considering the underweight status (Low weight for age) - as per WHO classification for PEM between 0.6-5 years for which the prevalence of underweight was 64%.<sup>8</sup> Prevalence and trends of undernutrition were calculated using Excel.

### RESULTS

In this study, 100 children aged 0.6 to 5 years participated, with males comprising 66% and females 44%, indicating a significant gender disparity ( $p < 0.05$ ). The most prevalent age group was 3 to 4 years. Nutritional assessment revealed concerning rates of underweight (22%), stunting (42%), and wasting (36%), indicating widespread malnutrition. Severe protein energy malnutrition (PEM) cases varied significantly by gender ( $p < 0.05$ ). Mid-upper arm circumference analysis showed mild (28%) and severe (10%) malnutrition prevalence. Exclusive breastfeeding was received by only 38% of children. Socio-demographic factors, like Hindu affiliation and parental illiteracy, suggested potential socio-economic barriers. Immunization coverage was 78%, leaving 22% partially immunized. Mucocutaneous indicators reflected health status, with prevalent xerosis, angular cheilitis, and hair changes, suggesting nutritional deficiencies and poor hygiene. Bacterial and mycotic infections affected a significant proportion. Overall, the study emphasizes the need for comprehensive healthcare strategies addressing socio-demographic, nutritional, and clinical factors to optimize health outcomes.



**Figure 1: Loss of subcutaneous tissue** **Figure 2: Flaky paint dermatosis**

**Table – 1 Mucocutaneous Manifestations**

MUCOCUTANEOUS MANIFESTATIONS	GENDER			
	MALE		FEMALE	
	No.	%	No.	%
Hair changes – Flag sign, dry, lustreless hair.	30	45%	13	29.5%
Buccal fat loss	12	18%	9	20%
Subcutaneous fat loss	10	15%	7	16%
Angular cheilitis.	32	48%	21	47%
Pale and atrophic tongue	5	7%	2	4%
Mucous membrane changes	8	12.12%	6	13.6%

Superimposed bacterial and mycotic (Candida) infections	30	45%	17	37%
Xerotic skin	32	48%	23	52%
Desquamation & thinning of skin	13	20%	8	18%
Petechiae, purpura & ecchymosis	2	3%	1	2%
Nail changes	28	42%	18	40%
Pigmentary changes (Hyperchromia/ Hypochromia)	13	20%	10	15%
Other skin manifestations	2	3%	1	2%

**Table 2 Classification Of Malnutrition Indices**

Indices	Normal		Moderate		Severe		TOTAL	
	No.	%	No.	%	No.	%	No.	%
Weight for age	47	47%	22	22%	31	31%	100	100%
Height for age	61	53%	34	42%	5	5%	100	100%
Weight for height	50	50%	36	36%	14	14%	100	100%

## DISCUSSION:

Inadequate nutrition practices, like insufficient breastfeeding and inappropriate diet during illness, profoundly affect child growth. Malnutrition prevalence, especially in resource-poor regions, contributes to 50% of under-5 deaths annually.<sup>9-11</sup> Our study contrasts with Rytter et al.'s, showing <3% malnourished children with edema, possibly due to less frequent breastfeeding among edematous cases.<sup>13,14</sup>

The study sheds light on crucial SES influencing the lives of children, with a particular focus on their religious affiliation, parent's education levels and family structure. One of the objectives of the study is to explore the association of these factors with SES. The dominant presence of Hindu children in the sample 85 (85%) suggests how Cultural and religious backgrounds may influence SES as these practices often intersect with economic aspects, influencing access to resources and opportunities. In our study a high percentage of illiterate fathers (25%) and mothers (28%) emphasizes the importance of addressing educational disparities to uplift SES. A noteworthy finding was that relatively lower percentage of fathers with a college/degree education (10%). Indicating positive impact on nutrition with education. Type of family is another key variable, nuclear families represent majority of the sample (50%) in our study may imply lack of availability of care givers and resource, work distribution among the family. The findings highlight the complex interplay of religious, educational and familial factors in shaping the socioeconomic landscape for children. This study lays the groundwork for a comprehensive examination of the multifaceted relationship between sociodemographic factors and SES.

Another objective of our study was to explore the mucocutaneous manifestations linked to PEM, aiming to offer insights into the dermatological consequences of this nutritional deficiency. The ensuing discussion will analyse key findings, their clinical implications and potential interventions drawing support from pertinent literature. Our study had majority of the children exhibiting 55 (55 %) xerosis and scaling. This was described by William as an early feature of the crazy pavement or flaky skin dermatosis.<sup>15</sup> We found prevalence of angular cheilitis in individuals with PEM was less as compared to Dhale et al.'s study.<sup>17</sup> Our study also revealed alterations in hair texture and color in individuals with PEM. In our study, hair changes resembling Pandit V. S. et al.'s findings (56%) were observed.<sup>16</sup> Nail changes, including brittle nails and koilonychia, were noted in 42% of males and 40% of females. Severe wasting, described as muscular wasting and loss of subcutaneous fat, was less sensitive for diagnosing undernutrition, seen in 15% of males and 16% of females. Recognizing mucocutaneous PEM signs aids timely intervention, emphasizing nutritional evaluation's significance. A multidisciplinary approach is crucial for addressing PEM.

## Limitations-

Cross-sectional design limits establishing causal relationships. Future research needs longitudinal studies with larger samples..

## CONCLUSION

This cross-sectional study offers insights into PEM's mucocutaneous manifestations. Recognizing these signs enables targeted interventions for malnutrition. Even minor cutaneous indications should prompt consideration of malnutrition. Early detection

facilitates timely intervention with nutritional supplementation and skincare. These findings contribute to understanding nutritional dermatoses' evolution.

## REFERENCES:

1. Khargekar NC, Khargekar VC, Shingade PP. A cross-sectional study to assess the protein energy malnutrition in children between one to five years of age in a tribal area Parol, Thane district, Maharashtra, India. *Int J Community Med Public Health* 2016;3:112-20.
2. Lal S, Adarsh, Pankaj. Text book of Community Medicine; 3rd edition. New Delhi-C.B.S publishers,2011.
3. Dipasquale V, Cucinotta U, Romano C. Acute malnutrition in children: pathophysiology, clinical effects and treatment. *Nutrients*. 2020 Aug 12;12(8):2413.
4. Wong, C. Y., & Chu, D. H. (2021). Cutaneous signs of nutritional disorders. *International journal of women's dermatology*, 7(5Part A), 647–652.
5. McKinster d, Carola, Covarrubias o. Skin Manifestations of Nutritional Disorders. *Harper's Textbook of Pediatric Dermatology*, Fourth Edition. 2020. 831-9.
6. Darwin, R., Harahap, M., & Tjakradinata, D. (1970). Skin changes in protein caloric deficiency malnutrition. *International journal of dermatology*, 9(4), 247–252.
7. Jekel JF, Katz DL, Elmore JG, Wild DMG; Epidemiology, Biostatistics and Preventive medicine, 3rd edition. U.S.A- Saunders Elsevier Publisher, 2007.
8. Meshram II, Arlappa N, Balakrishna N, Laxmaiah A, Mallikarjun Rao K, Gal Reddy Ch, et al. Prevalence and Determinants of Undernutrition and its Trends among Pre-School Tribal Children of Maharashtra State, India. *Journal of tropical pediatrics*. 2012;58(2):125-32.
9. Al-Samerrae AS, Thamer JM. Impact of PEM on heart structure. *Int J Pharm Pharm Sci* 2014;6(6):110-4.
10. Pingale S, Patil VW, Patil S. Estimation of stunted, wasted and stunted children at town Dhadaon, district Nandurbar of Maharashtra state, India. *Int J Pharm Pharm Sci* 2015;7(2):529-31.
11. Ibrahim ZF, Aliyu I. When the skin changes in severe acute malnutrition appear as burns. *Indian J Burns* 2017;25:88-9.
12. Rytter MJ, Namusoke H, Babirekere-Iriso E, Kästel P, Girma T, Christensen VB, et al. Social, dietary and clinical correlates of oedema in children with severe acute malnutrition: A cross-sectional study. *BMC Pediatr* 2015;15:25.
13. Tolboom JJ, Ralitapole-Maruping AP, Kabir H, Molatseli P, Anderson J. Severe protein energy malnutrition in Lesotho, conditioning factors and death and survival in hospital. *Trop Geogr Med* 1989;41:1-8.
14. Laditan AA, Reeds PJ. A study of the age of onset, diet and the importance of infection in the pattern of severe PEM in Ibadan, Nigeria. *Br J Nutr* 1976;36:411-9.
15. Williams CD. A nutritional disease of childhood associated with a maize diet. *Arch Dis Child* 1933;8:423-33.
16. Pandit VS, Udaya K. A cross sectional study of nutritional dermatoses among malnourished children in a tertiary care centre. *Indian J Paediatr Dermatol* 2021;22:226-30.
17. Dhale S, Bhongade M, Susnerwala S. Study of prevalence of various cutaneous manifestations in children suffering from severe acute malnutrition (SAM). *J Med Sci Clin Res* 2016;4:12691-8.