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Profile and Prognostic Value of Mucocutaneous Lesions in Children Hospitalized for Severe Acute Malnutrition in Nouakchott, Mauritania

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Abstract

Introduction: Severe acute malnutrition (SAM) remains a major public health problem and an important cause of morbidity and mortality among children in resource-limited settings. Cutaneous and mucosal lesions are frequent clinical manifestations in children with SAM and result from multiple nutritional deficiencies and associated infections. These lesions may serve as early and visible markers of disease severity and poor prognosis. ***Objective:*** To describe the profile of mucocutaneous lesions in children hospitalized for Severe acute malnutrition and to analyze their prognostic value in relation to clinical complications. ***Methods:*** A retrospective descriptive and analytical study was conducted at the Inpatient Nutritional Rehabilitation and Education Center of the National Hospital Center in Nouakchott. Medical records of children under 59 months hospitalized for Severe acute malnutrition were reviewed. Associations between mucocutaneous lesions, sociodemographic variables, and clinical complications were analyzed using the chi-square test or Fisher's exact test ($p < 0.05$). ***Results:*** A total of 147 children were included, with a mean age of 14.6 months; 56.5% were boys. The prevalence of mucocutaneous lesions was 23.1%, predominantly oral (64.7%), mainly oral thrush (29.5%), aphthous ulcers (17.6%), and angular cheilitis (17.6%). No significant association was found with age, sex, or place of origin, whereas a significant association was observed with the quarter of hospitalization ($p = 0.01$). Children with lesions more frequently presented multiple complications, including anemia, cough, and dehydration, with a significant association with more than two concomitant complications ($p = 0.01$). ***Conclusion:*** Mucocutaneous lesions are common in children with Severe acute malnutrition and may serve as markers of increased morbidity, highlighting the importance of systematic screening at admission.

Keywords: ***Severe acute malnutrition; Child; Mucocutaneous lesions; Prognosis; Mauritania.***

Introduction

Severe acute malnutrition is a major public health problem in low-income countries. It significantly contributes to increased mortality among children aged 6–59 months [1]. According to the World Health Organization (WHO), malnutrition is described as a pathological condition resulting from a deficiency or excess of one or more essential nutrients, whether this condition is clinically evident or detectable through other analyses [2,3].

Malnutrition affects the immune system and thus increases susceptibility to infections. Infections, in turn, can weaken the body and lead to malnutrition, creating a vicious cycle between malnutrition and infection [4,5]. It is often associated with other conditions, including dermatoses, which may have nutritional deficiency or infectious origins. Dermatoses are characterized by hypo- or hyperpigmentation, skin desquamation, and, in severe cases, ulcerations on any part of the skin [6].

Dermatoses in children account for 20% to 31.5% of consultation cases according to various studies conducted in Africa [7-10]. The dermatoses commonly reported among children in sub-Saharan Africa are of infectious origin (29.2% to 55.1%), whether observed in dermatological consultations or community-based studies of the general pediatric population [8-11]. Despite the generally benign nature of most of these skin infections, early and

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appropriate management is necessary to prevent potentially serious complications [12].

Children suffering from severe acute malnutrition with complications are hospitalized for stabilization in accordance with the national treatment protocol. This management process occurs in several phases. However, in Mauritania, there is very limited data on dermatoses associated with acute malnutrition, which highlights the relevance of the present study.

The objectives of this study are to:

- Describe the profile of mucocutaneous lesions in children with severe acute malnutrition (SAM) hospitalized at the CRENI of Nouakchott;
- Estimate their prevalence;
- Assess their association with acute complications observed at admission.

Materials and Methods

Study setting

The study was conducted at the Center for Nutritional Rehabilitation and Education for Hospitalized Patients (CRENI) of the National Hospital Center (NHC) in Nouakchott, a national referral facility for the management of severe acute malnutrition (SAM). It was a retrospective, descriptive, and analytical study based on the analysis of medical records of hospitalized children between January and December 2023.

Study population

All children under 59 months of age hospitalized for severe acute malnutrition, confirmed according to World Health Organization (WHO) criteria [13], were included:

- Mid-upper arm circumference (MUAC) < 115 mm,
- Or weight-for-height Z-score < –3 standard deviations,
- Or presence of bilateral nutritional edema.

Inclusion criteria

- Diagnosis of SAM consistent with WHO criteria;
- Medical records containing demographic data, clinical examination findings, and documentation of complications at admission.

Exclusion criteria

- Medical records lacking key clinical data;
- Absence of any documented dermatological or mucosal manifestations.

Studied variables

- Sociodemographic data: age, sex, and place of origin (urban/rural);
- Mucocutaneous manifestations: site (oral/cutaneous) and type of lesion (oral thrush, aphthous ulcers, angular cheilitis, etc.);
- The hospitalization quarter
- Associated complications: anemia, diarrhea, cough, dehydration, infections.

Statistical analysis

Data were entered using Excel and analyzed with SPSS version 27. Qualitative variables were described as frequencies and percentages. Associations were tested using Pearson's Chi- square test or, when theoretical frequencies were insufficient (<5 in ≥20% of cells), Fisher's exact test. The significance threshold was set at $p < 0.05$.

Ethical Consideration

This retrospective study was conducted in accordance with ethical principles for medical research. The study protocol was reviewed and approved by the competent Health Research Ethics Committee of Nouakchott and authorized by the head of the department at Nouakchott Hospital.

Results

1. Characteristics of the study population:

The study we conducted involved 147 children hospitalized in the CRENI unit of the Nouakchott hospital center. The majority of these children came from urban areas, representing 91,8% (n=135). The mean age was 14.65 months, with extremes ranging from 1 month to 48 months. Our sample consisted of 56.5% boys and 43.5% girls, with a sex ratio of 1.29 (**Table 1**).

2. Prevalence and Profile of Mucocutaneous Lesions

2.1. Overall Prevalence

Among the 147 children hospitalized for SAM, 34 presented with mucocutaneous lesions, representing a prevalence of 23.1%.

2.2. Distribution by Location

The lesions are mainly oral (64,7%), accounting for nearly two-thirds of the cases, while cutaneous locations are less frequent but still significant (one-third of the cases) (**Figure 1**)

2.3. Typology of Observed Lesions:

In this sample, oral lesions account for the majority of cases, affecting 64.7% of the patients. Among these, oral thrush is the most common lesion, observed in 29.5% of the patients, followed by aphthous ulcers and angular cheilitis, each representing 17.6% of the cases. Cutaneous lesions are less common, totaling 35.3% of the observations (**Table2**).

3. Factors Associated with Mucocutaneous Lesions:

3.1. Sociodemographic Factors

The association between cutaneous-mucosal lesions and demographic characteristics (age, sex, geographical origin) shows no statistically significant relationship (**Table 3**)

3.2. Seasonal Variation

According to the hospitalization quarter, most cases were recorded during the first quarter, which accounted for 44.1% of the lesions (**Table 4**). A statistically significant association was observed ($p = 0.01$*).

4. Complications Associated with Mucocutaneous Lesions

4.1. Frequency of Complications

The most frequently observed complications in children with cutaneous-mucosal lesions are anemia (88.2%), followed by cough (82.4%) and dehydration (76.5%) (**Table 5**).

Note: Patients could present more than one complication.

4.2. Association with the Multiplicity of Complications

The association between skin lesions and the number of complications is statistically significant ($p = 0.01$*). (**Table 6**).

Table 1: Sociodemographic characteristics of children hospitalized for severe acute malnutrition (n = 147)

Parameter	Category	Frequency (n)	Percentage (%)
Age (months)	Mean (range)	14.6 months (1–48)	–
	0–6	25	17
	7-12	47	32
	13–24	59	40.1
	25–59	16	10.9
Sex	Male	83	56.5
	Female	64	43.5
	Sex ratio (M/F)	1.29	–
Place of origin	Urban	135	91.8
	Rural	12	8.2

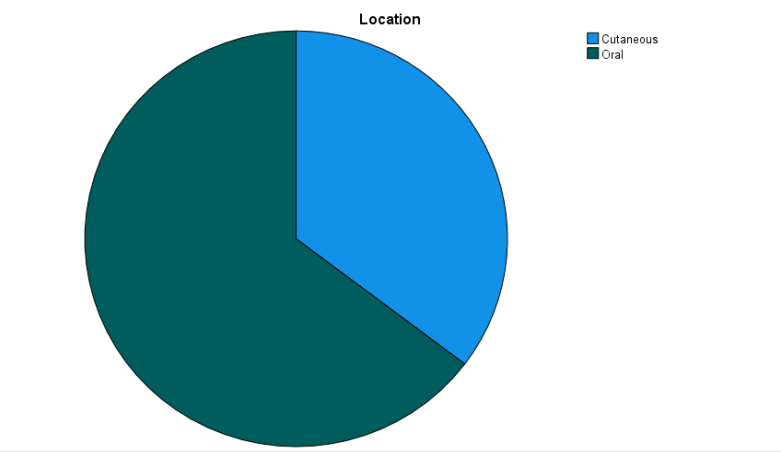

Figure 1: Distribution of lesions according to anatomical location (n=34)

Table 2: Distribution of the types of mucocutaneous lesions (n=34)

Type of Lesion	Number (n)	Percentage (%)	Location
Oral thrush	10	29,5	Oral
Aphthous ulcers	6	17,6	Oral
Angular cheilitis	6	17,6	Oral
Erythema	2	5,9	Cutaneous
Tinea	2	5,9	Cutaneous
Papular lesions	2	5,9	Cutaneous
Others (cutaneous, unspecified)	6	17,6	Cutaneous
Total	34	100	—

Table 3: Association between mucocutaneous lesions and demographic characteristics

Variable	With lésions (n=34)	without lesions (n=113)	p-value
Age 13-24 months	15(44,1%)	44(38,9%)	0,4
Male Sex	21 (61,7%)	62 (54,8%)	0,4
Urban origin	32 (94,1%)	103 (91,1%)	0,5

Table 4: Distribution of mucocutaneous lesions according to the quarter of hospitalization

Quarter	Period	With lesions (n=34) (%)	without lesions (n=113) (%)	p-value
1st quarter	January–March	15(44,1%)	22(19,5%)	0,01
2nd quarter	April–June	6(17,6%)	18(16%)	
3rd quarter	July–September	11(32,3%)	47(41,5%)	
4th quarter	Octobre-Decembre	2(6%)	26(23%)	
Total	-	34(100%)	113(100%)	

Table 5: Complications observed in children with mucocutaneous lesions (n=34)

Complication	Number	Percentage (%)
Anemia	30	88,2
Cough	28	82,4
Dehydration	26	76,5
Vomiting	23	67,6
Diarrhea	13	38,2
Fever	5	14,7

Table 6: Association between skin lesions and the number of complications

Number of complications	With lesions (n=34) (%)	without lesions (n=113) (%)	p-value
≤2	4(11,8%)	39(34,5%)	0,01
>2	30(88,2%)	74(65,5%)	
Total	34(100%)	113(100%)	

Discussion

In our series, 40.1% of the children were aged between 13 and 24 months, making this the most affected age group. This finding is comparable to that reported by Crouma (41%) [14]. This vulnerability may be explained by the weaning period, during which children are exposed to inappropriate complementary feeding and increased susceptibility to infections. Complementary foods introduced at weaning are often insufficient in both quality and quantity to meet the nutritional requirements of rapid growth, leading to nutritional deficiencies and greater vulnerability to infections. These infections, in turn, exacerbate immune dysfunction and contribute to the development of malnutrition [15].

A male predominance was observed (56.5%), consistent with findings reported by Diarra S. in Mali (51.3% boys; sex ratio = 1.05) [16] and Aminata F. (50.7% boys; sex ratio = 1.03) [17]. This trend, described in several studies, suggests a greater susceptibility of boys to malnutrition, potentially related to early hormonal, metabolic, or behavioral differences [16,17].

Mucocutaneous lesions were observed in 23% of the children, a frequency similar to that reported by Aimé M. et al. (22.91%) [18].

Regarding lesion localization, 65% were oral and 35% cutaneous. These proportions differ from those reported by Moctar M., who found a predominance of cutaneous involvement (53%) over oral lesions (44%) [19], as well as from the findings of Vishalakshi S., who reported oral lesions in only 20% of cases [20]. In our study, the most frequent mucocutaneous manifestations were oral thrush (29.4%), aphthous ulcers (17.6%), and angular cheilitis (17.6%). These results contrast with those of Diarra S., who described a predominance of eczema (23.3%), followed by pyodermatitis (15.3%) and miliaria (13.3%) [16].

The diversity of dermatological manifestations observed among malnourished children reflects the multifactorial nature of severe acute malnutrition. Deficiencies in macronutrients (proteins, essential fatty acids, and energy) and micronutrients (zinc, iron, copper, and vitamins A and B) impair immune function and skin integrity, thereby promoting secondary bacterial and fungal skin and mucosal infections. In our setting, poor hygiene conditions and climatic factors likely further contribute to the occurrence of these lesions [21].

Although admissions for severe acute malnutrition peaked during the third quarter (39.4%), the highest proportion of malnourished children presenting with mucocutaneous lesions was observed during the first quarter (44.1%), with a statistically significant association according to the quarter of hospitalization (p = 0.01). This seasonal discrepancy may be partly explained by difficulties in maintaining adequate hygiene during the winter season, which may facilitate the transmission of skin infections. In addition, malnutrition-related immunosuppression increases vulnerability to bacterial and fungal skin infections, contributing to the higher frequency of lesions during this period.

Furthermore, a significant association was observed between the presence of mucocutaneous lesions and the number of medical complications. Most affected children presented with more than two complications, particularly anemia, diarrhea, dehydration, and cough. This finding suggests that mucocutaneous involvement may serve as a marker of malnutrition severity and reflect an advanced state of immunodeficiency.

Limitations

This study has limitations inherent to its retrospective design. Data collection relied on the accuracy and completeness of medical records, which may have resulted in variability in the level of clinical detail reported. In six cases, cutaneous lesions were documented as desquamation or non-specific skin lesions, precluding precise dermatological classification. However, these lesions were clearly identified as cutaneous in origin and were included accordingly in the analysis. While this may have limited the detailed characterization of specific cutaneous subtypes, it does not affect the overall assessment of mucocutaneous manifestations in children with severe acute malnutrition.

Conclusion

Mucocutaneous lesions are common among children hospitalized for severe acute malnutrition in Nouakchott, particularly among infants under one year of age and males. Their occurrence is significantly associated with the period of hospitalization and the presence of multiple complications such as anemia, diarrhea, cough, and dehydration. These lesions constitute not only a clinical sign of severity but also an aggravating factor for nutritional and infectious prognosis.

Early recognition and appropriate management of mucocutaneous lesions should be an integral part of the treatment protocol for severe acute malnutrition. Strengthening prevention, nutritional education, and dermatological monitoring in pediatric settings is essential to improve survival and quality of life among these children in Mauritania.

Declarations

Authors Contributions

The work was carried out under the supervision and guidance of Ahmed El Bara and Ahmed Feil. All authors contributed to the completion of the work and to the writing of the manuscript.

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This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Ethical Approval

The study protocol was reviewed and approved by the competent Health Research Ethics Committee of Nouakchott and authorized by the head of the department at Nouakchott Hospital.

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