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Original article

Prevalence and determinants of malnutrition among children consulting at the Buea Regional Hospital, South West Cameroon

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ABSTRACT

Malnutrition is a public health problem worldwide. It has a negative impact on human performance, growth and development, especially in children. An estimated 925 million people worldwide are affected by malnutrition, majority of who are found in the developing world. Malnutrition is responsible for the death of about 9 million children below 5 years old annually. It is both a cause and consequence of disease. However, it is largely underdiagnosed and overlooked in hospital settings. This study was carried out to determine the prevalence of malnutrition among children between 6 and 59 months presenting for consultation or immunization at the Buea Regional Hospital (BRH). We also sought to determine the proportion of children with a record of malnutrition in their consultation, immunization or admission records, as well as the socioeconomic and dietary factors associated with malnutrition. A descriptive cross sectional study involving 201 consecutively selected children was carried out at the Buea Regional Hospital over a period of 3 months. Structured questionnaires were used, and measurements of weight and height were recorded. The WHO classification of Z-scores was used to determine nutritional status. The overall prevalence of malnutrition obtained was 23.4%, while the prevalence of underweight, wasting and stunting was 6%, 14.4%

and 9.5% respectively. Only 8.5% of malnourished children had malnutrition recorded as a diagnosis or part diagnosis during consultation or admission. Change in hair colour and respiratory tract infection were the major clinical findings that were significantly associated with malnutrition (0.001 and 0.01 respectively), while the employment status of the parent was the only socioeconomic factor significantly associated with malnutrition (P=0.004). The results showed that malnutrition is high among paediatric patients, yet underdiagnosed or overlooked at the Buea Regional Hospital. Hospital personnel ought to pay more attention to its diagnoses and hence management.

1. Introduction

The global prevalence of malnutrition is 13.6%, with the greatest proportion of the affected population found in the developing world (FAO, 2011). One of the key targets of the Millennium Development Goals (MDG) by the World Health Organization is to reduce the prevalence of underweight among children younger than five years by half between 1990 and 2015 (Patwari, 2013). The prevalence of underweight is forecasted to decline worldwide from 26.5% in 1990 to 17.6% in 2015 and in the developing world from 30.2% to 19.3%, but in Africa, it is forecasted to rise from 24% to 26.8% (de Onis et al, 2004). Such trends give evidence to the failure to meet the target. Malnutrition is the most important risk factor for illness and death globally especially in children, and is involved in more than half of child deaths worldwide, as well as directly responsible for 300.000 deaths per year in children less than five years old in developing countries (Shashidhar et al, 2013).

Malnutrition is one of the most important underlying causes of mortality in children in developing countries especially during the first five years of life (Rodriguez et al, 2011). Several studies have demonstrated that the most frequent causes of death in children less than five years old are gastrointestinal and acute respiratory tract infection, and malnutrition has been found to be associated with these deaths (Caulfield et al, 2004; Rice et al, 2011). One of such studies carried out in 2008 by the Child Health Epidemiology Research Group showed that, of the 8,795 million deaths in children less than 5 years old worldwide, infectious diseases caused 68% (5,970 million) with the highest percentages due to pneumonia (18%) and diarrhoea (15%) and malaria (8%), with malnutrition strongly associated with most deaths (Rodriguez et al, 2011).

Despite the high prevalence of malnutrition among children in the developing world, estimated at 26% in Africa and 58.1% in the South West Region of Cameroon (de Onis et al, 2000; Nkuoh-Akenji et al, 2008), little is known about the attention given to malnutrition and its prevalence among children consulting in hospitals in Cameroon and at the Buea Regional Hospital. Moreover, the diagnosis of malnutrition is often overlooked, underdiagnosed or untreated by health care providers during hospital consultations or admissions; hence it has been described as the “skeleton in the hospital’s closet” (Barker, 1994; Marino et al, 2006). Among several studies carried out to demonstrate this, is a study at the Ninewells Hospital and Medical School, Scotland which revealed that 40% of the patients admitted during the period of study were malnourished. However, the information from their medical records indicated that only 19.2% of the patients were malnourished. This implies that only 48% of the malnourished population had records that indicated the diagnosis of malnutrition (McWhirter and Pennington, 1994).

2. Materials and methods

2.1. Research procedure

This study was a descriptive cross sectional study conducted from July 2013 to September 2013. It recruited children from 6 to 59 months of age who presented for consultation or immunization at the Buea Regional Hospital. Buea Regional Hospital is the second regional hospital in the South West Region, covering Buea Health

District with a population of 130,000 inhabitants and receiving referred cases from other district hospitals within the region.

Ethical approval No. 2013/0108/UB/FHS/IRB was obtained from the University of Buea Institutional Review Board (IRB), and administrative clearance No. R11/MINSANTE/SWR/RDPH/PS/439/191 was provided by the Regional Delegation of Public Health, South West Region.

Using convenient consecutive sampling, 201 children were recruited at the Out Patient Department (OPD), Infant Welfare Clinic (IWC) and paediatric ward within 12 hours of admission. After consent was granted by the accompanying parent or guardian, a structured questionnaire was filled, based on sociodemographic, and dietary information, including clinical history. Physical examination was carried out on all the children, followed by recording of anthropometric parameters, weight and height. All participants from the OPD were interviewed and examined only after the regular consultation with the staff on duty. Medical documents and files of children from the OPD and in the paediatric ward were reviewed and their diagnoses were copied.

2.2. Data analysis

Data was analyzed using EPI-INFO version 3.5.1 and MICROSOFT EXCEL-2007. Descriptive statistics were presented using absolute numbers, percentages, ranges and measures of central tendency as appropriate. The WHO classification of z-scores was used to group participants as normal, moderately or severely malnourished. Chi square and Fisher exact tests were used to examine association between factors and malnutrition. Statistical significance was set at $p<0.05$.

3. Results

Two hundred and one children were recruited (100 males and 101 females). The ages ranged between 6 and 59 months with a mean age of 18.19 month (SD=15.3). The infant, toddler and preschool age groups represented 59.2%, 23.45% and 27.4% respectively.

The overall prevalence of malnutrition was 24.3%, with 14.4% and 9.0% found to be moderately and severely malnourished respectively. Among the acutely ill children seen at the OPD and paediatric ward, 28.1% (27/96) were found malnourished as oppose to 19% (20/105) of apparently healthy children seen at the vaccination unit. Out of the 100 males, 24% of them were found malnourished while 22.8% of the 101 females were malnourished (p=0.43). Malnutrition was most prevalent among the preschool age group (37 – 59 months) with a prevalence of 34.3%. The prevalence of wasting, underweight and stunting were 14.4%, 6% and 9.5% respectively. Stunting was most prevalent among the preschool age group while wasting found to be most prevalent among the infants as shown on Figure 1.

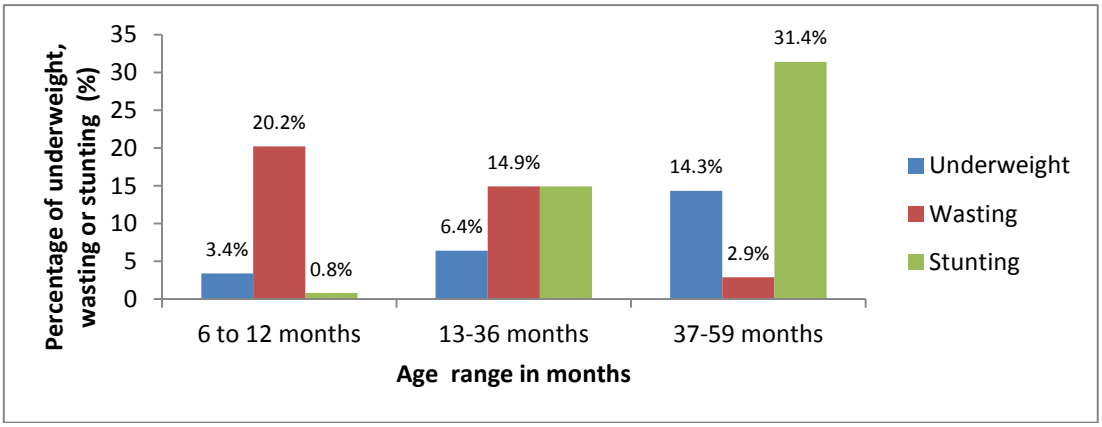

Fig. 1. Prevalence of underweight, wasting and stunting in the various age groups.

Of the 47 malnourished children identified, only 4 (8.5%) of them had the diagnosis of malnutrition mentioned in their records by the attending physician or health worker as shown on Figure 2. Two of these diagnoses were recorded upon admission, one at the OPD and one at the IWC unit. There was a significant

difference between the prevalence of malnutrition obtained from participants' records and that obtained from the use of anthropometric measurements (p=0.003).

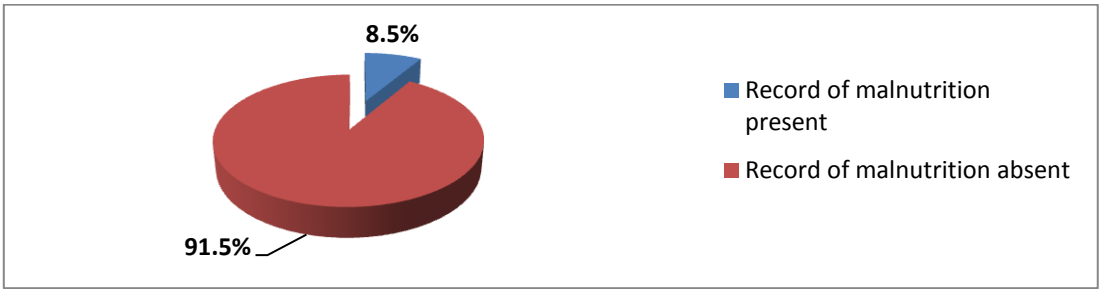

Fig. 2. Proportion of malnourished children diagnosed during consultation.

Among the clinical signs and symptoms studied were duration and frequency of diarrhoea and vomiting, loss of appetite, oedema, skin lesions and altered hair colour. Altered hair coloration was found to be a significant identifier of malnutrition in general and severe malnutrition in particular, as14 (63.3%) of the children who presented with this sign were malnourished (Figure 3) (p=0.0001, RR= 3.7; CI: 1.33-10.18).

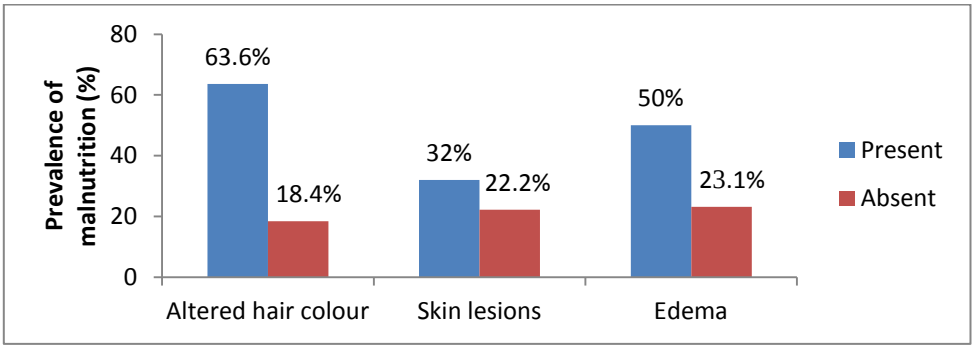

Fig. 3. Association between presenting clinical signs and malnutrition.

The three most frequent diagnoses in the study population were malaria, gastrointestinal tract (GIT) infection and respiratory tract infection (RTI) as shown on Figure 4. There was a significant association between the medical diagnosis and malnutrition as malnutrition was found significantly most prevalent among children who presented with respiratory tract infection (p=0.01).

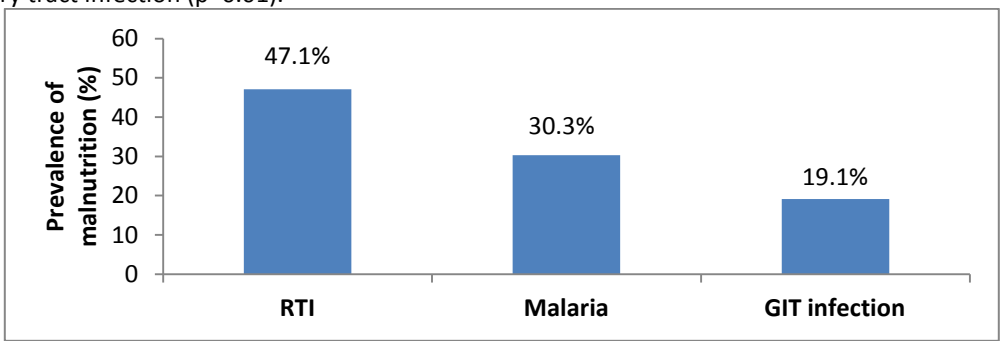

Fig. 4. Prevalence of malnutrition among children with RTI, malaria and GIT infection.

Parent's employment status of was a significant determinant of nutritional status as observed on Table 1. Malnutrition was most prevalent among children with both parents unemployed, while it was least prevalent among children with one of the parents unemployed.

Table 1
Association between socio-economic factors and malnutrition.

Socioeconomic factor	Malnourished (%)	Risk ratio (95% CI)	Fisher Exact
Parents' marital status:			
Married	28 (20.1)	0.66	0.08
Not married	19 (32.2)	(0.39 – 1.08)	
Maternal level of education:			
No formal education	1 (16.7)		
Primary	18 (37.5)		0.08
Secondary	16 (18.4)		
Tertiary	12 (20.0)		
Parents' employment status:			
None employed	11 (52.5)		
One parent employed	17 (17.2)		0.004
Both parents employed	19 (23.5)		
Household size:			
≤ 5	25 (20.5)	0.73	0.15
>5	22 (27.8)	(0.45 – 1.21)	
Monthly income available for each household member:			
<15,000FCFA (30 USD)	10 (28.6)	1.71	0.15
≥15,000FCFA	8 (16.7)	(0.75 – 3.89)	
Number of siblings:			
≤ 2	42 (23.6)	1.09	0.54
>2	5 (21.7)	(0.48 – 2.46)	
Age difference between child and direct elder sibling:			
<2 years			
≥2 years	2 (33.3)	1.27	
	30 (26.3)	(0.39 – 4.09)	0.71

Among the dietary factors studied, none had a significant association with malnutrition as shown on Table 2.

Table 2
Association between dietary factors and malnutrition.

Dietary Factor	Malnourished (%)	Risk Ratio(95% CI)	Fisher Exact p-value
Breastfed:			
Yes	45 (23.0)	0.57	0.11
No	2 (40.0)	(0.19 – 1.73)	
Duration of exclusive breastfeeding:			
< 6 months			
≥ 6 months	28 (22.0)	0.89	0.40
	17 (24.6)	(0.53 – 1.51)	
Dietary Diversity Score			
≤ 4	26 (26.0)	1.25	0.24
>4	21 (20.8)	(0.76 – 2.07)	
Number of meals daily:			
< 3	3 (25.0)	1.05	0.74
≥ 3	45 (23.8)	(0.39 – 2.96)	

4. Discussion

The overall prevalence of malnutrition among under-fives obtained from this study is 23.4%. This is close to the 24.1% obtained by Pawellek et al (2008) in a hospital-based study in Germany, but lower than the 58.1% obtained by Nkuoh-Akenji et al (2008) in a rural community in the same health district. This discrepancy might have arisen from the wider age range (0 to 14 years) used in the latter study, as well as the fact that the area is a rural setting and the inhabitants are predominantly peasant farmers with lower socioeconomic standards. Among the malnourished children, the prevalence of wasting is highest at 14.4%, while stunting and underweight are 9.5% and 6% respectively. This trend is different from that observed from the results of the Demographic and Health Survey in Cameroon in 2011, where the prevalence of stunting was highest at 33%, underweight 15%, and wasting lowest at 6%. The national survey covered the entire territory and a wider age range, and was not hospital based. This study was carried out among children presenting at the hospital, most of whom were already sick at the time of consultation, either as a consequence of malnutrition or the cause of the malnutrition. Furthermore, an increasing trend of stunting was observed from the infant age group (0.8%), through the toddler age group (14.9%) to the preschool age group (31.4%), a finding similar to that by Sebanjo and colleagues (2011) in Nigeria and by Olack and collaborators (2011) in Kenya. Furthermore, a decreasing trend in the prevalence of wasting with age was observed, as it was highest among infants and lowest among the preschool population. Stunting reflects chronic malnutrition and becomes more apparent as age increases. This could be associated with frequent diarrhoea probably due to poor weaning as well as frequent respiratory and gastrointestinal tract infections among the infants. There was no significant association between malnutrition and gender in this study ($p=0.43$), a finding similar to that of Ghazi et al (2013) in Baghdad, Iraq ($p=0.79$) but different from the findings of Maghoup et al (2006) in Botswana, who observed a higher prevalence of malnutrition among males than females ($p<0.01$).

The fact that only 8.5% of the malnourished population had a diagnosis or part diagnosis of malnutrition noted in their consultation, admission or vaccination records by the attending health worker may reflect the level of attention that is given to the nutritional state of children received in the given hospital. The absence of adequate attention on nutritional status during medical consultations has been observed by Antwi in a hospital in Ghana (2008), by McWhirter and Pennington (1994) in Scotland, and Hamer et al (2004) in a hospital in Gambia. These comparisons show that underdiagnosis of malnutrition is a problem in both developed and developing world, though more alarming in the latter. This can be explained by the fact that most signs and symptoms of malnutrition are non-specific, especially edematous protein energy malnutrition, hence easily overlooked, missed or mistaken by most clinicians. It can also be explained by the fact that, besides weight measurements, recording other anthropometric measurements are hardly ever a routine at consultation. Clinicians are usually interested in the weight values more for drug dose calculations than for nutritional assessments. The high level of underdiagnosis of malnutrition at consultation and on admission highlights the continuous presence of the problem of lack of awareness on malnutrition.

5. Conclusion

The prevalence of malnutrition among paediatric patients presenting at the Buea Regional Hospital is 23.4%. However, malnutrition is significantly underdiagnosed, overlooked, missed or mistaken for other conditions, and hence undertreated by the attending health worker, since only 8.5% of malnourished children had the diagnosis of malnutrition mentioned in their hospital records.

Altered hair coloration was a significant clinical sign of severe malnutrition, with respiratory tract infection (RTI), malaria and gastrointestinal tract infections being the most common clinical conditions associated with poor nutritional status. The highest prevalence of malnutrition was found among children diagnosed with respiratory tract infection.

The prevalence of wasting, underweight and stunting were 14.4%, 6% and 9.5% respectively. Stunting was most prevalent among the preschool age group while wasting was the most prevalent among infants.

Systematic screening for malnutrition should be carried for all children consulting in the Buea Regional Hospital, and special attention should be given to children who present with altered hair coloration, including those diagnosed with respiratory tract infection, malaria and gastrointestinal tract infection.

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Competing interests

The authors declare that they have no competing interests.

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