MALNUTRITION: MISSED OPPORTUNITIES FOR DIAGNOSIS

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SUMMARY

Introduction: Malnutrition is a serious public health problem particularly in developing countries where it is responsible for 54% of under 5s mortality. Anthropometric measurements are key tools for the assessment of nutritional status and diagnosis of malnutrition. Height and weight measurements are not routinely done in most clinics and hospitals in Ghana. Children therefore miss the opportunity for accurate nutritional assessment and detection of malnutrition.

Objectives: To determine the prevalence of wasting among children <5 years and to document extent of under-diagnosis.

Method: From June to August 2004, children aged >3 months to <5 years attending the outpatient clinic of Komfo Anokye Teaching Hospital were systematically assessed for wasting using weight-for-height standard deviation score (Z-score).

Results: Of 1182 children (mean age 24.9 months), 251 (21.2%) were wasted, 48 (4.1%) of them severely. Only 15 (5.9%) of the 251 children with wasting were so identified by the attending physician.

Conclusion: Malnutrition is widespread yet under-diagnosed. Anthropometric measurements should be promoted in all child health clinics.

Keywords: wasting, malnutrition, weight-for-height, Z-score, missed opportunities

INTRODUCTION

Nutritional disorders stem from imbalance between supply of protein-energy and the body's demand for them to ensure optimal growth and function. This imbalance includes both inadequate and excessive nutrient intake; the former leading to malnutrition in the form of wasting, stunting and underweight whilst the latter results in overweight and obesity.

Malnutrition, defined in this context as nutritional deficiency, is a serious public health problem that has been linked to a substantial increase in the risk of mortality and morbidity.[1] It is estimated that 9% of children below 5 years of age globally suffer from wasting.[2] In developing countries, however, prevalence of malnutrition among the under 5s is estimated at 27%.[3] Malnutrition is responsible for 54% of all deaths among children <5 years of age.[4] It is important, therefore, that children are properly assessed for evidence of malnutrition.

The assessment of nutritional status according to weight-for-height, height-for-age and presence of nutritional oedema is summarised in Table 1. Whilst the child with oedematous malnutrition could easily be identified by most clinicians, wasting as a form of malnutrition could easily be missed if anthropometric measurements are not done. Growth assessment in terms of anthropometry is routinely done at child welfare clinics.

In Ghana, however, it is a common practice for parents to discontinue attending these clinics after completion of their children's vaccination at 9 months of age. The clinical setting therefore offers the best opportunity for the nutritional status of these children to be assessed. Evidence on the ground, however, shows that anthropometric measurements are not routinely done in most clinics in Ghana. These children thus miss the opportunity for nutritional assessment and detection of malnutrition.

Table 1* Classification of malnutrition

Index	Classification	
	Moderate malnutrition	**Severe malnutrition (type)**
Symmetrical oedema	No	Yes (oedematous malnutrition)**
Weight-for-height	-3 ≤ SD-score <- 2	SD-score < - 3 (severe wasting)
Height-for-age	-3 ≤ SD-score <- 2	SD-score < - 3 (severe stunting)

* Adapted from Reference 2.   ** Includes kwashiorkor and marasmic-kwashiorkor in older classification.

For an institution like Komfo Anokye Teaching Hospital (KATH) with a well resourced nutritional rehabilitation center, identifying malnourished children becomes a priority so that appropriate referrals to these units could be made. This study was therefore undertaken among children <5 years of age who were being evaluated for febrile illness in a parallel study to determine the prevalence of wasting and to document the extent of under-diagnosis.

SUBJECTS AND METHODS
A 3-month prospective study was carried out at the paediatric out-patient department of the polyclinic of KATH from June to August 2004. Children aged >3 months to <5 years were enrolled consecutively after they had completed consultation with the physician on duty. Informed verbal or written consent were obtained by parents/guardians. Oedematous children were not included in this study. Weight and height measurements of each child were recorded to the nearest 0.1kg and 0.1cm respectively. Height measurements were done in the recumbent position (i.e. length) for children < 2 years of age using a stadiometer. Standing height was done for others. The weight-for-height standard deviation (SD) score (Z-score) were computed using the United States National Center for Health Statistics (NCHS)/World Health Organisation (WHO) reference chart. Children whose Z-score were < -2SD but ≥ -3SD in the absence of oedema were classified as moderately malnourished whilst those below -3SD score were classified as severely malnourished. The diagnoses made by the attending physician for each child were recorded.

This study, which ran in parallel with a urinary tract infection study, was approved by the Ethical Review committee of Kwame Nkrumah University of Science and Technology, Kumasi. Informed consent were obtained from the parents/guardians of study subjects.

RESULTS
A total of 1182 children were enrolled out of whom 638 (53.9%) were males and 444 (46.1%) females. The mean age was 24.9 months. The mean weight was 10.5 kg (range 5.1-19.0, 95% CI 10.3-10.7) and the mean height 83.4 cm (range 59-110, 95% CI 82.7-84.2). Two-hundred and fifty-one (21.2%) of the 1182 study population were wasted (Z-score < -2 SD), 48 (4.1%) of them being severely (Z-score < -3 SD). Table 2 shows the Z-score of the study population. The prevalence of wasting type of malnutrition (Z-score < - 2 SD of NCHS/WHO reference chart) in this study was thus 21.2%. When the diagnosis of the consulting physician were evaluated, only 15 (5.9%) out of the 251 study children with malnutrition were so identified.

Table 2: Z-score of study population

Age	Weight-for-height (Z-score)		
	≥ - 2 SD	-3≤SD< - 2 moderate wasting (moderate malnutrition)	< -3 SD severe wasting (severe malnutrition)
3 mo - < 1 yrs	239	43	6
1 yrs - < 2 yrs	232	83	23
2 yrs - < 3 yrs	179	39	5
3 yrs - < 4 yrs	144	19	8
4 yrs - < 5 yrs	137	19	6
Total	931	203	48

DISCUSSION
Anthropometric indices are used as the main criteria for assessing the nutritional status of children by comparing them to a reference growth chart[6]. Deficits in the anthropometric indices from the median value of the population are regarded as evidence of malnutrition.[6] In children, the 3 most commonly used anthropometric indices are weight-for-height, height-for-age, and weight-for-age. Deficit in height-for-age is called stunting or shortness and indicates chronic malnutrition. Deficit in weight-for-height is called wasting and indicates acute malnutrition.[6] Deficit in weight-for-age is often referred to as underweight and reflects low weight-for-height, low height-for-age, or both (global malnutrition). Weight-for-age is thus not a good indication of recent nutritional stress in the population.[6]

The prevalence of wasting/malnutrition identified in this study was 21.2% and is consistent with the 22.1% reported by the World Food Programme -Ghana[4]. That 1 out of every 5th child in Ghana is malnourished confirms the magnitude of the problem in Ghana and developing countries in general. According to United Nations Children's Fund (UNICEF) report, 27% of children < 5 years of age in developing countries suffer from wasting[3]. This is against the background evidence that malnutrition contributes to 54% of all deaths among children < 5 years of age[4]. In Ghana, malnutrition accounts for 40% of under 5 mortality[7]. The contribution of malnutrition to morbidity and mortality has been shown to be synergistic rather than additive[8]. Thus mortality increases exponentially with declining nutritional status.

The concept of Integrated Management of Childhood Illnesses (IMCI) is based on the premise that sick children usually present with more than one medical condition to health facilities.[4] It is therefore expected of health practitioners that all children who present to

health facilities are well assessed so that the child could be managed in a holistic manner. Surveys of management of sick children at these facilities revealed that many of these children are not properly assessed and treated[9]. That only 15 (5.9%) out of the 251 malnourished children were so identified by the attending physician support this observation. Though weight measurements are recorded as routine practice in this out patient clinic, heights are never measured to allow for computation of weight-for-height Z-scores and thus for detection of wasting. It is likely, also, that even in clinics where height measurements are made, they are never computed on any reference growth chart for nutritional assessment. Anthropometric measurements such as weight alone or height alone are themselves meaningless unless they are interpreted on a reference chart with respect to age.[6] It is therefore important that physicians caring for children do not omit this aspect of care if malnutrition is not to be missed. For less developed countries where age is often not known, weight-for-height (which is age-independent index for nutritional assessment) offers additional advantage in assessing nutritional status.

Forty-eight (4.1%) out of the 1221 study children were severely malnourished (Z-score < -3 SD). Children with severe form of malnutrition are at risk of dying from many, yet inapparent, complications such as hypothermia, hypoglycaemia, sepsis, dehydration and shock[2]. WHO therefore recommends that all such children be admitted to hospital where they can be observed, treated and fed day and night[2]. Stunted children on the other hand may be satisfactorily managed in the community, rather than in hospital.[2] The 4.1% of study children who were severely malnourished were all managed on out patient basis contravening this recommendation by WHO and putting these children at increased risk of dying.

Pelletier et al[8] has reported that 45-83% of all malnutrition-related deaths occur in the mild-moderate category of weight-for-age 60-80% of the median. For public health purposes, malnutrition death rate will therefore not be reduced if nutritional programmes were directed solely towards treatment of the severely malnourished. The greatest impact on reduction in mortality can therefore be achieved when attention is paid to all grades of malnutrition by appropriately identifying them. This recognition of all grades of malnutrition is only possible if anthropometric measurements are routinely done at all child health clinics.

Limitations
1. This study assessed for only wasting type of malnutrition (representing acute malnutrition). Thus the true prevalence of malnutrition in its totality (i.e. wasting, oedematous malnutrition, and chronic malnutrition) is not represented in this study and could have been under-estimated.

2. The reference chart used in this study was the United States National Center for Health Statistics (NCHS) standard which was then the standard chart recommended by World Health Organisation and the Center for Disease Control and Prevention. This reference chart has since been recognized to have some irregularities[6] and could have resulted in higher estimates of malnutrition in this study. Since then a WHO multicentre growth reference standards have been developed including those for African children.

CONCLUSION AND RECOMMENDATIONS

Malnutrition is indeed widespread in developing countries like Ghana with a prevalence of 21.2% in this study. This high prevalence rate notwithstanding, most malnourished children miss the opportunity for being diagnosed in clinical settings largely due to lack of routine measurements of anthropometric indices, particularly height.

Efforts should be made to improve the diagnostic skills of health practitioners/clinicians in the area of malnutrition by incorporating weight and height measurements into paediatric clinics as well as the provision of appropriate growth reference charts. This is particularly important as more clinical nutritionists turn out of the country's universities so that their expertise could be utilized in the management of malnutrition even as the country strives to achieve the millennium development goals by 2015. There is the need to update health practitioners/clinicians in the recognition and management of malnutrition.

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