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ARTICLE

Profile of mothers whose children are treated for malnutrition at a rural district hospital in the North West province, South Africa

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Objective: This study profiled mothers whose children were admitted to hospital for malnutrition in a rural hospital in the North West province.
Method: A quantitative and cross-sectional design, using a researcher-developed questionnaire, was used to collect data from 94 mother and child pairs who were admitted to hospital for malnutrition. Stata statistical software was used to analyse the data.
Results: The ages of the mothers ranged from 17 to 48 years. Most (83%) lived in dwellings that had electricity, and 92% had running water in their households. Some 83% were not married and 97% were unemployed. Mothers between the ages of 21 and 25 years had the highest number of children with malnutrition (37%, $n = 34$), followed by mothers between the ages of 26 and 30 years (28%, $n = 26$). Severe acute malnutrition was experienced by children whose mothers were comparatively young (age group 16–20), accounting for 44.4% of malnourished children. The association between category of malnutrition and maternal age was not statistically significant.
Conclusion: Although malnutrition of the children cuts across all maternal age groups, severe acute malnutrition tends to occur among children whose mothers are either young or relatively older, which suggests a need for specific community-based interventions among these groups of mothers.

Keywords child malnutrition, child mortality, maternal factors, nutrition, Rural settings

Introduction

High child mortality remains a key health challenge in developing countries, where it is estimated that 45% of all deaths in children aged under 5 years are attributable to under-nutrition.[1] Although child malnutrition has decreased in most areas of the world in the past two decades, its prevalence among children younger than five years has increased in sub-Saharan Africa, and in South Africa the mortality in children younger than five years has shown a steady increase.[2] The situation highlights the important role of adequate and appropriate child nutrition as key to the prevention of child morbidity and mortality. With South Africa being one of the most unequal societies, and having pockets of poverty-stricken communities, caregivers within impoverished communities and households often change their food consumption patterns to cope, which often results in compromised nutrition rather than providing optimum nutrition to their children.

In South Africa, as in many other developing economies, malnutrition mostly presents as under-nutrition,[3] and commonly occurs among children between six months and five years. Malnutrition is associated with health risks, which include low immunity, which predisposes the child to life-threatening infections such as pneumonia, tuberculosis and diarrhoea. In the long term, malnutrition results in the child not able to reach its full developmental potential.[4]

Contributory factors to child malnutrition include young maternal age,[5] lack of knowledge of the nutritional value of foods[6] and low level of education of the mother,[7] as well as unemployment and poverty.[8,9] Although in South Africa child support grants make a significant difference in families that live in impoverished circumstances,[2,10] many children from such households are still malnourished. This occurs either because the amount of money from these grants is not adequate to meet food requirements, or the parents/guardians are not able to make appropriate choices in the purchasing of food to support their children's nutritional needs.

Maternal factors affect a child's nutritional status, which implies that women's social status impacts on child nutrition and health.[11] This further highlights the need to address the socio-economic conditions of women, as this has a direct impact on the health and well-being of their children. Institutional measures to curb malnutrition include strengthening primary healthcare institutions such as primary health clinics, the provision of adequate human and material resources, the early identification and treatment of severely malnourished children, maternal education and reproductive health strategies, and poverty reduction strategies that improve food security.[12] On the other hand, community measures to curb child malnutrition include large-scale community nutrition interventions, which have produced substantial beneficial effects.[13] Such measures contrast with individualised interventions for mothers whose children are malnourished.

Contributory factors to malnutrition are complex and multifaceted,[14] and cut across dietary factors, feeding practices, maternal education, maternal mental health status, family socioeconomic and environmental factors, which may be associated with malnutrition in children.[15] However, most cases of child malnutrition are due to poverty, which emanates from societal inequities.[2]

A common indicator for child malnutrition is highlighted by comparing a child's weight and height to the expected weight and height, and is expressed as follows: a *Z* score of ≤ 2 depicts acute malnutrition, ≤ 2 to −3 is moderate acute malnutrition and ≤ 3 severe acute malnutrition.[16,17]

Micronutrient deficiency results from an inadequate intake of a variety of nutrients including iron, folate, iodine and various vitamins such as vitamins A, B and D. These deficiencies lead to anaemia, goitre, bone deformities and night blindness.[18] Chronic deficiencies result in malnutrition, preventing children from reaching their full physical and mental potential, and are responsible for approximately 60% of the deaths of children under five years of age in sub-Saharan Africa.[14]

Studies have reported a strong association between household poverty and child malnutrition,[19] as well as differences in malnutrition rates between rural and urban settings.[20] Thus, key determinants of child malnutrition are social and economic factors in the family and community from which the child comes, and strategies to prevent malnutrition and improve the nutritional status of children require the understanding of these factors. Within South Africa there are differences in child deprivation patterns,[21] thus there is a need to conduct malnutrition studies in different areas of the country, hence this study, which focused on a rural area of North West province.

Materials and methods

Study setting and population

This was a quantitative and cross-sectional study, conducted at a district hospital in a rural area of the North West province of South Africa. The hospital has 168 beds, 33 of which are reserved for paediatric patients. The population consisted of mother–child pairs, with the children admitted for malnutrition, and who reside in villages around the hospital catchment area and access health services from the district hospital. Most are indigenous African individuals, poverty is rife and most are involved in sustenance agriculture. Most of the households in the population have electricity and use pit latrines.

Sampling

A survey of all mother–child pairs admitted for malnutrition ($n = 94$), and who meet the inclusion criteria, in the paediatric section of the hospital was conducted within a period of six months. The inclusion criteria were that the children be younger than five years of age during data collection. Patient records were used to identify the mother-and-child pairs that met the inclusion criteria, and the mothers were recruited for the study by the research assistant and the researcher.

Data collection

Data were collected using a researcher-developed close-ended questionnaire. Informed consent was obtained from the mother, which was followed by the administering of the questionnaire for each mother by a research assistant who was fluent in Setswana, which is the local language. Data collected included age of the mother, age of the child, gender of the child, and weight and height of the child, from which *Z* scores were calculated. Data were collected from the mother, which was followed by anthropometric measurements of the child, using the World Health Organization (2017) classification of nutritional status of infants and children.

Data entry and analysis

The data were captured on an Excel spreadsheet (Microsoft Corp, Redmond, WA, USA) and descriptively analysed using the Stata® statistical software, version 11 (StataCorp, College Station, TX, USA), and presented as proportions to profile the sociodemographic variables of the mothers. Univariate analysis was used to explore the association between the anthropometric status of the child and characteristics of the mother, which included age, marital status, employment status, financial support, level of education and whether or not the mother received a child support grant. Chi-square was used to explore associations between the anthropometric status of the children and characteristics of the mothers.

Ethical considerations

The proposal obtained ethics clearance from the Ethics Committee of the Department of Health Sciences, University of South Africa. Permission to undertake this study was obtained from the management of the hospital, and informed consent was obtained from each mother who participated in the study.

Results

Anthropometric status of the children

The majority (62.2%) of the children were female with ages ranging from 1 to 36 months, a mean of 14.15 months and a mode of 15 months. A significant majority (80%) came from households who were receiving South African Government child support grants, either for the child concerned or for other children who live in the same household, or both.

The anthropometric status of the children was assessed by using the World Health Organization (2017) classification of nutritional status of infants and children scores, which compares the anthropometrics of the children with the median of the WHO child growth standards. The following cut-off values were used to categorise the level of malnutrition: ≤ 2 depicts acute malnutrition, ≤ 2 to −3 is moderate acute malnutrition and ≤ 3 severe acute malnutrition.

Figure 1 shows that 36.6% ($n = 34$) of the children had acute malnutrition, 27.9% ($n = 26$), had moderate acute malnutrition, 33.3% ($n = 31$) had severe acute malnutrition and 2.2% ($n = 2$) could not be determined because of missing data.

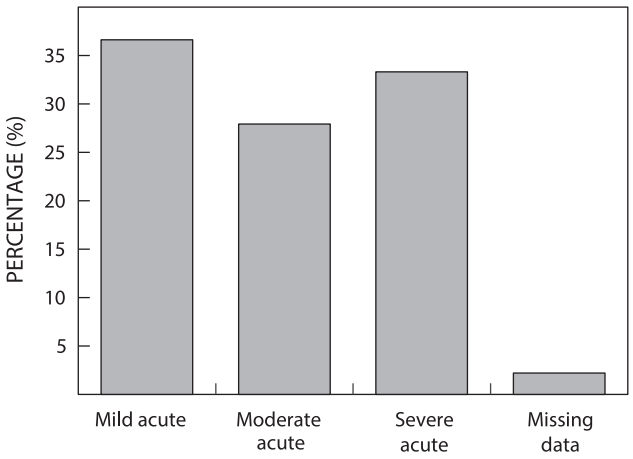

Figure 1. Malnutrition categories of the children.

Table 1. Sociodemographic characteristics of the mothers

Variables	Categories	Frequency	%
Mother's age ($n = 94$)	< 25	53	56
	≥ 25	41	44
Marital status ($n = 94$)	Cohabiting	14	15
	Ever married	2	2
	Single	77	83
Employment status ($n = 94$)	Unemployed	91	97
	Employed	3	3
Receiving child grant ($n = 94$)	No	20	21
	Yes	74	79
Level of education ($n = 87$)	Primary	28	32
	Secondary	59	68
Household information of the mothers:			
Type of setting	Rural	66	71
	Urban	27	29
Number of children ($n = 93$)	1–2	52	56
	≥3	41	44
Access to electricity ($n = 93$)	Yes	77	83
	No	16	17
Access to water ($n = 93$)	Yes	86	92
	No	7	8

Characteristics of the mothers

Table 1 lists the characteristics of the 94 mothers who participated, which shows that 7% had no formal education, 30% had a primary school education and 63% had a secondary school education. Some 83% of the mothers were not married, 15% were co-habiting and 2% were married. A significant 97% of the sample were unemployed.

The number of other children in the households ranged from 0 to 14, with a mean of 3.3, and five households did not have any other children. In total, 55% of the households had three or more children and 41% of households had two or fewer children.

The majority (71%) of mother-and-child pairs lived in a rural area while 21% lived in an urban area. Most (83%) of the mother-and-child pairs lived in dwellings that had electricity, and 92% had running water. The ages of the mothers ranged from 17 to 48 years; 37% ($n = 34$) of the cases of malnutrition were in children of mothers aged between 21 and 25 years, followed by cases where the mothers were between the ages of 26 and 30 years (28%, $n = 26$). The proportions of age groups 16–20 and 31–40 were 19% ($n = 18$) and 14% ($n = 13$) respectively. Only 2% ($n = 2$) of malnutrition cases involved mothers aged between 41 and 50 years of age.

Figure 2 shows the age distribution of the mothers and the number of malnutrition cases in the sample.

Maternal age and severe acute malnutrition are displayed in Figure 3.

In the age group 16–20 years, 44.4% of the mothers had their children admitted with severe acute malnutrition, compared with the 21–25-year age group where 32.3% of the mothers had their children admitted with severe acute malnutrition. In the 26–30-year age group, 23.1% had their children admitted with severe acute malnutrition. Although younger mothers, i.e. aged 20 and below, tend to have children admitted with severe acute malnutrition, there was no statistical significance between the anthropometric status of the children and the age of the mothers. There were only two children whose mothers fell in the 41–50-year age group, thus the total of 50% ($n = 1$) of children with severe malnutrition is interpreted with caution.

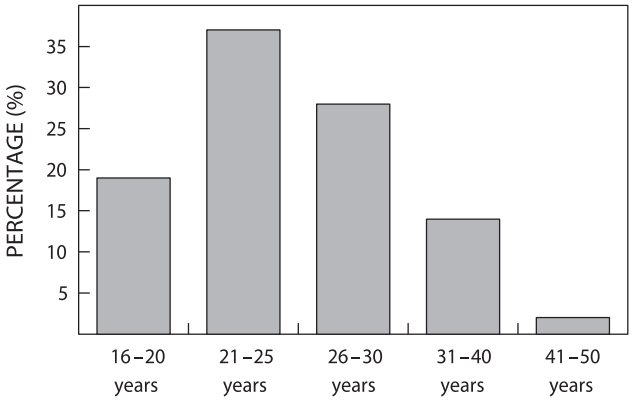

Figure 2. Age distribution of maternal ages and number of malnutrition cases for each age group.

The chi-square tests did not yield significant associations between any category of child malnutrition and maternal characteristics.

Discussion

The profile of the mothers is typical of the norm in many communities in South Africa, specifically as it relates to unemployment, recipients of child grants and related poverty (as depicted by child malnutrition). The typical nature of the profile of these mothers also makes it difficult to identify specific interventions for this sample. Of concern is that many of the mothers have other children in their households, who are probably also nutritionally compromised but are not receiving due attention because they are not yet sick enough to be admitted to hospital. This high prevalence and severity of child malnutrition in communities frustrates efforts to decrease child mortality in the country.

The lack of significant associations between the anthropometric status of the children and any of the characteristics of the mothers is a result of the homogeneous characteristic of the children because all of them were admitted to hospital because of malnutrition.

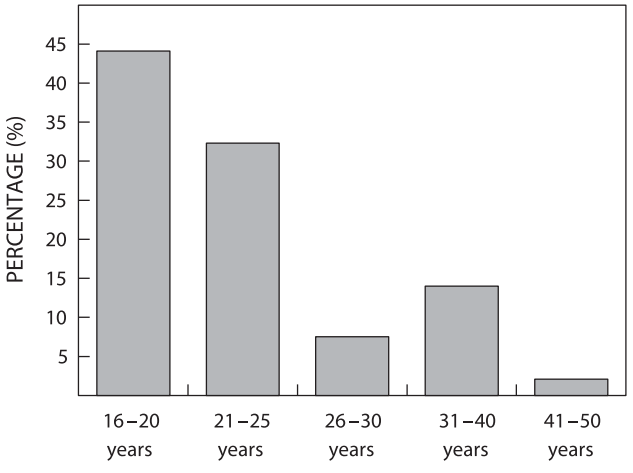

Figure 3. Severe malnutrition and maternal age.

The majority of the sample in this study live in a rural setting, where malnutrition is reported to be higher, compared with urban settings, which have more favourable socioeconomic conditions that lead to better caring practices for children and their mothers. Also, the conditions in urban areas are often more conducive to the promotion of child health.[22,23]

Although child malnutrition commonly occurs among children older than six months,[3] in this sample, 8% of the affected children were younger than six months, which suggests nutritional vulnerability at an even earlier age. Although receipt of a state child support grant has been reported to be a protective factor against child malnutrition in South Africa,[24] it was not the case in this sample because the children were malnourished to the extent that they were admitted to hospital, despite 80% of them coming from households that received grants.

Although the Child Support Grant (CSG) in South Africa has often been reported to improve the nutritional status of children, some have argued that the amount is too small to improve child nutrition and well-being,[25] especially in the face of a high unemployment rate and extreme poverty. This is because, in impoverished families, the child grant is often the only income, which has to be spread to cater for basic household needs like electricity, clothes and other needs. Among such competing needs, the purchasing of nutritional foods ceases to be a priority, which leaves the children still malnourished despite being recipients of the CSG. The inadequacy of the CSG has also been shown by reports that 62% of social grant recipients use their funds within a week, 82% within two weeks and 92% within three weeks,[26] which explains why children in very poor households are likely to be malnourished despite being CSG recipients. On the other hand, the intention to make a significant difference to the lives of poor children and their families shows this inadequacy, which results in child malnutrition persisting despite the CSG. The CSG will therefore need additional poverty alleviation interventions to make a significant difference in the lives of poor children and their families.[27]

The higher proportion of girls admitted for malnutrition in this study aligns with other studies that reported a higher prevalence of malnutrition among girls.[28] Although the study identified all three categories of malnutrition in the sample, mild malnutrition was the most prevalent at 36.6%, followed by severe acute malnutrition at 33.3% and moderate acute malnutrition at 27.9%. The implications are that other children who are in the mild malnutrition category are less likely to be identified as being malnourished (unless they present with other symptoms), which may delay health-seeking behaviour by their mothers.

The finding that the sample consisted of a high number of malnourished children among younger mothers is similar to other findings which showed that the prevalence of malnutrition was more prevalent where the mother was young[11], with more severe and acute malnutrition occurring in children whose mothers are in their teens.[29] This indicates a need for social and other support for young mothers.

Although child malnutrition is an immediate threat to the health of the affected child, it also has long-term impacts, some of which may last a lifetime. The physical health manifestation of such impacts includes risks of acquiring a variety of childhood infectious diseases,[30,31] cardiovascular diseases[32] and anaemia.[33]

Intellectually, child malnutrition is one of the barriers to child development, as it has been associated with suboptimal levels of mental function,[34] and poor academic performance,[35,36] specifically in mathematics and English.[37] Poor academic performance compromises career development and even employment prospects, which results in a cycle of poverty and malnutrition for the children born to such parents. The situation suggests that the cycle between poverty and malnutrition can be broken by preventing malnutrition and thus promoting human capital health and productivity, so escaping poverty.[9]

Socially, child malnutrition has been associated with later antisocial behaviour,[38] compromised cognition and psychiatric illness[39] and even criminal behaviour.[40] This suggests that a certain amount of violence and antisocial behaviour can be prevented and be reduced by addressing malnutrition and contributory factors at an early age of children's lives,[41] as failing to do so subjects the affected children to negative lifetime social and health consequences. The profile of mothers who are likely to have children with malnutrition in this study suggests interventions for this specific groups of mothers, for targeted child malnutrition prevention programmes for specific groups identified to be at risk.

Although mothers are encouraged by healthcare workers to breastfeed their children for at least six months, for the nutritional benefit of the children, the extent to which this recommendation was applied by this sample of mothers was not assessed. Of concern is that some of the children in this sample were younger than six months, which would not be the case if such children were breastfed. Breastfeeding is one of the key public health strategies to prevent child malnutrition, especially among poor communities, as it does not require monetary resources to implement. However, the factors contributing to malnutrition are diverse and complex and are not limited to poverty.[42] Amongst these are the association between child malnutrition and postnatal depression (PND),[43] which was not assessed in this study.

Strengths of the study

A major strength of the study is that it focuses on the mothers of children who are treated for malnutrition, which is a significant determinant of child morbidity and mortality.

Limitations

The homogeneous characteristic of the children (admitted to hospital due to malnutrition) did not enable the analysis to determine associations between the anthropometrics and the characteristics of the mothers. The second limitation of the study was that both the gestational age and the birthweight of the children were not assessed. This is relevant because prematurity and/or low birthweight affect both growth patterns and weight gain for age, and thus has a bearing on the classification of z-scores using WHO growth standards. Lastly, the feeding practices of the mothers, which influences the nutrition status and the resultant z-scores, was not documented and thus its impact has not been discussed.

Conclusion

Innovative interventions such as the Paraprofessional Mentor Mothers programme,[44] and/or Visiting Moms programme[45] are recommended to empower mothers with skills to provide adequate nutrition for their children, even in the context of limited resources. The finding that younger and older women had more children with malnutrition indicates the need for

both child feeding and reproductive health interventions in this community, because the profile of children with malnutrition reflects the socioeconomic status of the rural communities served by the hospital.

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