

Feeding practices among the child caregivers of 5 year-old children attended to for acute malnutrition at Nyangabgwe Hospital, Botswana

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Abstract

Infant and young child feeding practices have substantial consequences on the growth, development, and health of infants and children. Adequate nutrition depends on the proper feeding practices by mothers or caregivers. However, factors such as unemployment, household food insecurity, and cultural beliefs are some of the challenges in feeding young children. This study aimed to describe the feeding practices of caregivers of less than five-year olds. A descriptive quantitative survey was undertaken among caregivers of children less than five years attended to for malnutrition at Nyangabgwe Hospital, Botswana. Structured questionnaires were used to collect data on feeding practices and challenges faced by caregivers. Descriptive statistics were used to summarize data and determine the frequencies of events. Pearson Chi-square test was used to determine association between feeding practices caregivers and child characteristics. A total of 197 caregivers were recruited and almost all (189) were single females, 80.2% (158) were in the 21-40 year age group, about 59.4% (117) were rural dwellers; and 74.6% (147) reported not having enough to eat sometimes. Caregivers' education significantly played a role in starting complementary feeding. A significant association ($p < 0.05$) was observed between food security and the source of income, educational status, and the number of children in the household. This study has shown that food security in association with caregiver unemployment and education were the main challenges faced in feeding children less than five years at Nyangabgwe Hospital. This requires a home-based nutrition education for caregivers in order to improve child-feeding practices.

Key words: food security, caregivers, malnutrition, children

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Introduction

Acute malnutrition is a devastating public health problem of epidemic proportions. It is characterized by a child's weight for height measurement, which is less than 70% of the normal range for his/her weight for height Z score $<-3SD$ (WHO, 2010). Additionally, the child's Mid-Upper Arm Circumference (MUAC) would be less than 11 cm (UNICEF, 2008). About 11% of children worldwide suffer from acute or moderate malnutrition (Brown et al, 2009). Moreover, about 55 and 26 million of under-five children are acutely malnourished; most of these children live in Sub-Saharan Africa and South Asia. Severe acute malnutrition is responsible for an estimated 1 million deaths of children annually (Black et al, 2008).

Acute malnutrition arises from several causes including poor availability and control of resources (UNICEF 2004; Torun, 2006). Yet, adequate nutrition during the first two years of life is very important to ensure optimal, physical and mental development (Santika et al., 2009). The most crucial time to meet child's nutritional requirement is the first one thousand days of his/her life. Furthermore, underlying factors to malnutrition include household food security, maternal or child caring practices, and access to health services. These underlying factors themselves are influenced by the socio-economic status of parents/caregivers and political conditions of the country (Amsalu et al., 2008; Muller & Krawinkel, 2005). For example, poor knowledge on feeding practices and low education of mothers have been implicated in malnutrition of children (Appoh & Klekling, 2005; Mananga et al., 2014).

It is generally accepted that household food insecurity reflects a household's access, availability and utilization of food (Ivers et al., 2011; Saaka & Shaibu, 2013; Kalanda, 2006). Studies have been done to determine the factors affecting prevalence of malnutrition among children under three years of age in Botswana (Mahgoub et al., 2006; Madondo et al., 2012). However, data on caregivers feeding practices were not collected despite the fact that these play a major role in children's nutritional health. This study sought to investigate caregivers' practices in feeding the children less than five years.

Methodology

This was a descriptive quantitative study designed to assess the practices and challenges of the caregivers in the feeding of children less than five years. The study was conducted at Nyangabgwe Hospital, Francistown, Botswana at the paediatric medical ward and the Nutritional Rehabilitation Centre (NRC), a unit that deals with children that are suffering from malnutrition.

Data were collected using a researcher-administered structured questionnaire. This questionnaire was also translated into Setswana for the sake of those who did not understand/speak English. Data collection was carried out over a period of four months

(August 2014 to November 2014) from an estimated target population of 400 caregivers; a sample size of 197 was included for the study. Systematic sampling was used to select the participants by picking every second person after assigning numbers against their names of children in the clinic register. This was repeated until the sample size was attained. Anthropometric measurements were collated from the children's records using a data collection form.

In order to meet research ethics obligations, the proposal was passed through the University of Limpopo Research Ethics Committee of MEDUNSA campus (MREC) and Nyangabgwe Hospital Research Ethics Committee in Botswana. Additionally, institutional permission was sought formally from Botswana Ministry of Health and Development Committee. Informed consent was also obtained from the caregivers of the children after informing them on the necessary study details.

Data from the questionnaires was coded and entered in Microsoft excel spreadsheet. STATA software version 10.0 was used for data analysis. The data captured was double-checked manually for discrepancies against the original data. Descriptive statistics was used to summarize data and determine the frequencies of events. Data was presented in form of tables and figures. Chi-Square statistic was used to test the strength of association between the desired variables. P-values less than 0.05 were considered significant.

Results

Caregiver socio-demographics

Table 1 summarizes the demographic characteristics of the caregivers. The results showed that the caregiver's ages ranged from 15 to 67 years with the mean age of 31.2 years (SD9.9). Majority of the participants (n=168, 85.3%) were biological mothers of the children. The number of children the mothers had ranged from 1 to 8 with the mean number of 2 children. Majority of mothers (73.2%) had 1-3 children. A large proportion (n=166, 84.3%) of the caregivers were single, 25 (12.7%) were married. Only 7 (3.6%) of the caregivers had no educations and more than half (n=126, 64%) had attended secondary school. Of the caregivers who participated in the study, majority (n=117, 59.4%) lived in the rural area while 80 (40.6%) lived in urban area. Almost all caregivers (n=195, 99%) reported to be staying in brick houses.

The number of adults living in the same household ranged from 1 to 7 with the mean of 2 adults (SD 1.2). Majority of caregivers (n=82, 41.6%) reported living with two adults. Above half (n=125, 63.5%) of caregivers had running water in their houses, 162 (82.2%), and 105 (53.3%) had electricity in their houses. The majority (n=167, 84%) of the caregivers were unemployed.

Table 1: Socio-demographics characteristics of caregivers (N197)

Variable	Levels	Frequency (n)	Percentage %
Age (years)	15-20	13	6.6
	21-30	98	49.8
	31-40	60	30.4
	41-50	12	6.1
	over 50	14	7.1
Gender	Male	8	4.1
	Female	189	95.9
Relationship	Mother	168	85.3
	Caregiver	29	14.7
Marital status	Married	25	12.7
	Divorced	2	1.0
	Widowed	4	2.0
	Single	166	84.3
Religion	Christianity	160	81.2
	Not Christianity	37	18.7
Educational status	Never went to school	7	3.5
	Primary	47	23.9
	Secondary	126	64.0
	Tertiary	17	8.6
Dwelling	Urban	80	40.6
	Rural	117	59.4
Type of house	Shack	2	1.0
	Brick	195	99.0
Number of adults	1	42	21.3
	2	82	41.6
	3	40	20.3
	4	23	11.7
	5 and over	10	5.1
Water Access	Yes	125	63.5
	No	72	36.5
Toilet Access	Yes	162	82.2
	No	35	17.8
Electricity	Yes	92	46.7
	No	105	53.3
Cooking	Electricity	12	6.1
	Gas	38	19.3
	Paraffin	1	0.5
	Firewood	122	61.9
	>than 1 of above	24	12.2
Employment status	Employed	30	15.2
	Not employed	167	84.8
Food availability	Always enough	48	24.4
	Sometimes not	147	74.6
	Often not enough	2	1.0

When asked about food security, although about a quarter (n=48, 24.4%) stated they always had enough food in the house; 147 (74.6%) of the caregivers reported that sometimes they didn't have enough food to eat. Moreover, just over a third (n=72, 36.5%) had problem with accessing water; while (n=122, 61.9%) used firewood for cooking. Majority of those who did not have in-house toilets used the bush (48.6%) or neighbours' toilets (37.1%). The rest used clinic facilities or pit latrine. The range for income per months for those employed was P500.00 to P15 000.00 (P = Botswana

Pula). The employment rate for partners of married caregivers stood at 60% with income ranging from P500.00 to P30 000.00 per month.

Majority of the caregivers (n = 167, 85%) were unemployed. About one third of them (33.5%) sourced their income from piece jobs, 23.4% from Ipelegeng (meaning “be self-reliant”) a drought relief programme while the rest sourced income from husbands, parents and United Nations High Commissioner for Refugee (UNHCR). Ipelegeng is a government initiative or programme, whose main objective is to provide short term employment support and relief. Out of 168 participants who were mothers to the children, 46 (27.4%) had two children in total and only one had eight. The number of children the mothers had ranged from 1 to 8 with the mean number of 2 children.

Child demographics

The results showed that of the 197 children in the study, the most frequent age group was 13-24 years (38.6%) and the least, 49-60 months (6.1%). The youngest child was 5 months old and the oldest was 59 months old with the mean of 26.6 (SD12.9) (Figure 1). More than half 107 (54.3%) of the children in the study were males while the rest were females.

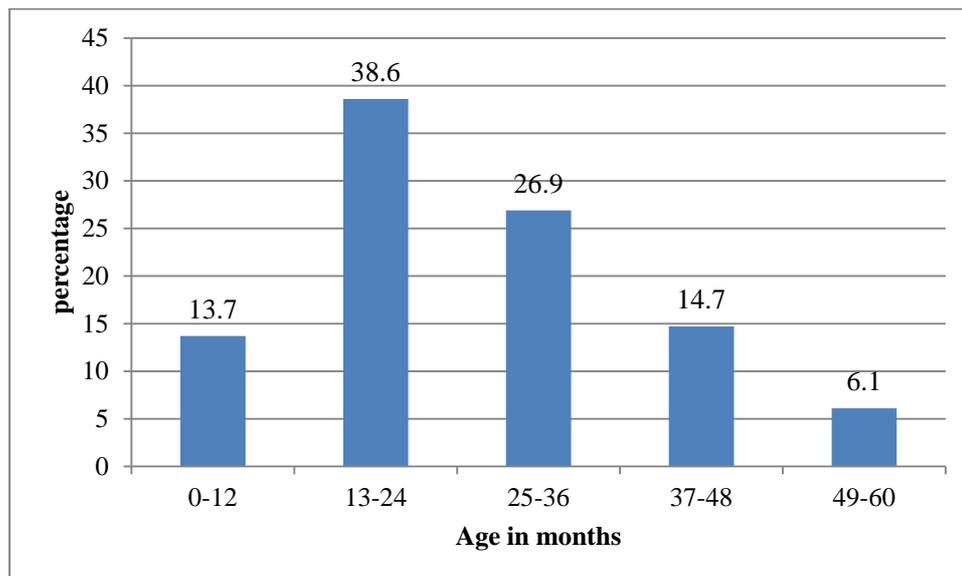


Figure 1: Distribution of children’s age (N197)

Most of the children 184 (93.4%) were not attending pre-school at the time of the study. Out of the children who were involved in the study, 144 (73.1%) were receiving social grant while 53 (26.9%) were not receiving any.

Anthropometric results showed that majority (n=143, 72.6%) of the children weighed between 6kg and 10kg. The children’s weight ranged from 4.5kg to 14.5kg with the mean weight of 9.2kg (SD 2.1). The analysis showed that half 99 (50.3%) of the children had Mid-Upper Arm Circumference (MUAC) of 13.1 to 14.0cm. The children’s MUAC ranged from 6.0cm to 16.0cm with mean of 13.6cm (SD 10.9).

Results showed that less than half (39.6%) of the children had a height between 71.0cm to 80.0cm but it ranged from 60.0cm to 108.0cm with the mean of 80.0 (SD 10.1) as shown in Table 2.

Table 2: Anthropometry of the children (N197)

Variable	Level	Frequency	Percentage %
Child's weight in kg	0-5	7	3.6
	6-10	143	72.6
	11-15	47	23.8
*MUAC(cm)	60-90	2	1.0
	101-110	1	0.5
	111-120	10	5.1
	121-130	33	16.8
	131-140	99	50.3
	141-150	42	21.3
	151-160	10	5.1
Height in cm	60-70	36	18.3
	71-80	78	39.6
	81-90	49	24.9
	91-100	32	16.2
	101-110	2	1.0

*MUAC - Mid-Upper Arm Circumference (MUAC)

Breastfeeding and complementary feeding practices for babies 0-12 months

Table 3 summarizes the breast and complementary feeding for babies 0-12 months. The results showed that out of 27 children aged between 0-12 months, 22 (81.5%) were exclusively breastfed while 5 (18.5%) were exclusively formula fed. Of the 27 caregivers who were exclusively breastfeeding, 21 (77.8%) adhered to their first initial feeding option for the first six months, 6 (22.2%) did not adhere to their initial option. Twenty five (92.6%) children were given sorghum soft porridge as their first solid or complementary while 2 (7.4%) gave purity. Twenty two (81.5%) of the children were given complementary foods for the first time at six months and only one was given at two months. The results showed that all children had sorghum porridge introduced to their diet.

Table 3: Feeding practices for children 0-12 months

Variables	Level	Frequency	Percentage
Initial feeding option	Exclusive breastfeeding	22	81.5
	Exclusive formula feeding	5	18.5
Adhere to initial option	Yes	21	77.8
	No	6	22.2
Current feeding practice	Formula milk and tsabana	11	40.7
	Formula milk and sorghum soft porridge	6	22.2
	Breast milk, formula milk and tsabana	5	18.5
	Formula milk, sorghum soft porridge and tsabana	3	11.1
	Breast milk, sorghum soft porridge and *tsabana	1	3.7
	Breast milk and sorghum soft porridge	1	3.7
First solid food	Soft sorghum porridge	25	92.6
	Purity	2	7.4
Age when solid food was first given	2 months	1	3.7
	4 months	2	7.4

	6 months	22	81.5
	7 months	2	7.4
Complementary food introduced to diet	Formula milk, tsabana and sorghum soft porridge	13	48.1
	*Tsabana and sorghum soft porridge	5	18.5
	Formula milk and sorghum soft porridge	5	18.5
	Formula milk, yoghurt, sorghum soft porridge	1	3.7
	Tsabana, yoghurt, sorghum soft porridge, purity	1	3.7
	Formula milk, Tsabana, yoghurt and sorghum soft porridge	1	3.7
	Formula milk, tsabana, sorghum soft porridge and purity	1	3.7

*Tsabana is a fortified sorghum soya-blend, provided as a supplement by the government.

Out of 22 children who were breast-fed, 12 (54.5%) stopped exclusively breastfeeding at six months. The results showed that, out of the six caregivers who did not adhere to the initial feeding option, four stopped exclusive breastfeeding at 2-4 months.

Feeding practices for children 13-60 months

Table 4 presents a summary of the responses to items reflecting caregiver’s feeding practices. The study indicated that, out of 170 children aged 13 to 60 months, 66 (38.8%) fed themselves, 57 (33.5%) were being fed by the mother or the caregiver, 46 (27.1%) usually feed themselves and by mothers or caregivers. Majority of the children (n=151, 88.8%) were eating all types of food while 19 (11.2%) were not. More than half (n=134, 78.8%) of the caregivers reported that they got information on how to feed their children from the health facilities. Majority (n=164, 96.5%) of the children were given fermented food and only 6 (3.5%) were not given any.

More than half (n=135, 79.4%) of the caregivers fed their children more than three times a day while 5 (2.9%) of them fed the children twice a day. Of the 170 caregivers whose children were 13-60 months old, 110 (64.7%) encouraged their children to eat when others are also eating, 60 (35.3%) encouraged their children to eat by giving them small frequent feeds. Majority (n=140, 82.4%) reported that there were foods that their children liked, 30 (17.7%) did not have food that they liked.

Table 4: Feeding practices for children 13-60 months (N170)

Variable	Level	Frequency	Percentage%
Who usually feed the child	Child feed self	66	38.8
	Mother/ caregiver	57	33.5
	Child and mother/caregiver	46	27.1
	House maid	1	0.6
Child eat all types of food	Yes	151	88.8
	No	19	11.2
Source of information on child feeding	Health facilities	134	78.8
	Elders at home	7	4.1
	Both health facilities and elders	29	17.1
Ever give fermented food	Yes	164	96.5
	No	6	3.5
How is child served	Alone	158	92.9
	Sharing	9	5.3
	Both alone and sharing	3	1.8
How many times is child fed	2	5	3.0
	3	30	17.6

	4	135	79.4
How child is encouraged to eat	When others are eating	110	64.7
	Giving frequent feeds	60	35.3
Any food child likes	Yes	140	82.4
	No	30	17.7
Any food child dislike	Yes	106	62.4
	No	64	37.6

Table 5 summarizes the fermented foods that children were fed. The study indicated that out of 164 children who were given fermented food, 50 (30.5%) of the caregivers gave their children sour sorghum porridge, papa with sour milk, mageu and yoghurt while 3 (1.8%) gave sour sorghum porridge only.

Food security

Food security was assessed by asking nine questions which were answered by “yes” or “no” responses. Table 5 presents a summary of the responses to items reflecting caregiver’s food security. Three-quarters (75.6%) of respondents reported that in the past 12 months they went hungry because they could not afford enough food. Additionally, all caregivers responded that they and other adults in their households rarely stayed the whole day without eating despite not having enough money for food in the household.

Table 5: Responses to items reflecting caregiver’s access to food (n = 197)

Variable	Level	Frequency	Percentage%
Worried that food would run out	Yes	150	76.1
	No	47	23.9
Food did not last	Yes	150	76.1
	No	47	23.9
Child not eating enough	Yes	150	76.1
	No	47	23.9
Caregiver and other adults ever cut size or skip meals	Yes	150	76.1
	No	47	23.9
Child ever skip meals	Yes	150	76.1
	No	47	23.9
Caregiver eat less than they should	Yes	150	76.1
	No	47	23.9
Caregiver ever hungry but did not eat	Yes	149	75.6
	No	48	24.4
Did caregiver lose weight	Yes	34	17.3
	No	163	82.7
Caregiver and other adults not eat the whole day	Yes	0	0
	No	197	100

Association between caregiver’s characteristics and feeding practices

The results showed a statistically significant association between the caregiver’s education level and the first complementary food given to the child ($p = 0.006$), and who feed the child ($p = 0.002$). The other variables which showed significant association included availability of food and how many times the child ate per day ($p = 0.002$).

The results showed a statistically significant association between the child attending pre-school ($p = 0.002$), the number of children in the household ($p = 0.026$) and the weight of the child. The child's age was significantly associated with weight, MUAC and height ($p = 0.000$). Results showed a statistically significant association between the caregiver's age and the height of the child ($p = 0.011$), the place where the caregiver dwells and the child's weight ($p = 0.016$) and height ($p = 0.047$), the number of children the mother has and the child's weight ($p = 0.026$). Other variables did not show significant association.

Association between caregiver's characteristics, child's characteristics and food insecurity

The status of food security was assessed through responses to questions such as "ever run out of food", "ever got hungry" and "ever lost weight"). There was statistically significant association between food security and educational status, source of income, and the number of children in the household ($p < 0.05$). Findings in this study showed a significant association between caregiver's education level and food insecurity ($p < 0.05$). Lower level of education of the head of household significantly reduces food insecurity. This is seen for both households headed by individuals with primary education ($p = 0.064$) and those with junior certificate ($p = 0.000$). Thus, as education level of the household head increases, chances of food insecurity decrease. This could be because education increases the likelihood of employment, which results in increased household income to acquire food and reduce food insecurity.

Discussion

The findings from this study revealed that over 95% of the caregivers were females and could be due to the fact that more than two thirds of the caregivers were the children's biological mothers. In this study, over 80% of the caregivers with malnourished children were single. Similar findings were reported in a previous study, undertaken in Botswana, where 76.4% of the mothers with malnourished children were single (Mahgoub et al, 2006). Maternal marital status may affect the child nutrition, with the married mothers being economically able to provide for their children's needs than the single, divorced and widowed caregivers who cannot. For example, a married mother, who stays with the child's father, has a family that may be considered economically stronger (Teller & Yimar, 2000). Marital status is also known to influence the quality of care given to the child because both the parents are able to contribute to the care of the child by providing the basic needs, psychological support and general welfare of the child (Kalanda et al., 2006). This may not always be the case as the study conducted by Kimani-Murage and colleagues (2011), in which the majority of childcare givers were married, reported a high number of under-nourished children. The current study showed also that more than half of the caregivers attended secondary school but this did not seem to contribute positively to alleviating undernutrition among the children.

This study specifically looked at children 0-60 months old and observed that over half of the malnourished children were below 3 months. This finding suggests inadequate breastfeeding that could have resulted in under-nutrition. However, a closer look at the age distribution of children sampled show that most of them were clustered at the age of 13 to 24 months. This is worrying as it is established that adequate breastfeeding enables children to grow normally in their first months of life (UNICEF, 2011). Thereafter, inadequate breastfeeding, improper weaning foods and high rate of infections are likely to cause subsequent increased rate of under-nutrition. Children at this age are in their active growth stage and therefore their diet should be adequate to meet their physiological needs.

The study by Abate et al (2001) found that in the malnourished group of children aged 3-36 months old, 51.2% were males and 48.8% were females which concurs with the findings of this current study where 54.3% of the malnourished children were males and 47.3% were females. Although the percentage difference was small in both studies, it could be attributed to the fact that male children are more vulnerable to health inequalities than their female counterparts in the same age group (Henry et al., 2007). Some literature shows that, in general, an increased attention is being paid to female children (Raphael et al., 2011). This observation is also similar to that reported in a Botswana study (Mahgoub et al., 2006), which found that malnutrition was more prevalent in male children aged 0-3 years than in females of the same age.

Certain cultural practices affect aspects of feeding such as taboos, beliefs and practices about when and how one can introduce complementary foods, belief about the colostrum in breast milk, and belief about breastfeeding patterns (Engle, 2002; Kakute et al., 2005). These cultural practices (traditional food practices and taboos) in most countries including Botswana have a great influence on what people eat, on how they prepare food, and on their feeding practices. These practices may contribute to nutritional deficiencies especially among infants and children. In Botswana negative cultural practices also play a role in causing malnutrition. Findings in this study showed that majority of the children were given sorghum soft porridge as their first complementary food because sorghum is a staple food for Botswana.

Anthropometric measurements in this current study showed that more than half of the children had a MUAC of between 131- 140mm, which is a sign of mild malnutrition, while less than 2% had a MUAC of less than 110mm. This may suggest that children admitted were not actually malnourished. However, this could be explained by the fact that although children with MUAC of less than 110 were admitted to the ward, those attended at the rehabilitation centre were mostly follow ups of those who had earlier been identified as malnourished and had a MUAC less than 110 mm. MUAC measurements less than 110 mm strongly suggests malnutrition in children. For example, in one Kenyan study, children in the 12-59-months category had clinical features associated with malnutrition and had a MUAC less or equal to 115mm (Berkley et al., 2005). Also, significant association was observed between the

number of children the mother had and the anthropometrics of the child. Similar findings were observed in a Nigerian study (Ukwuani & Suchindran, 2003), which examined the relationship between parity and child's nutritional status. The study reported that mothers with high parity leads to increased stunting of their infants. This study also found a significant association between the caregiver's age and the height of the child. Different socio-economic factors related to the age of the mother and her experience in raising children may affect child nutrition (Williams, 2013). A study carried out in Cameroon also reported similarly that malnutrition was related to mother's age (Pascale et al., 2007).

Notably, no significant association was observed between the level of education of the caregiver and the anthropometrics of the child. This is contrary to other findings which reported that mother's educational status is a strong predictor of child nutritional status (Mahgoub et al., 2006; Abuya et al., 2012). The possible reason for difference in this observation could be that majority of the mothers had more than one child in the current study. This could eventually confound the effect of educational status on child's nutritional status.

The study findings show that food insecurity was common among the caregivers in this study. This is deduced from the two-thirds of the caregivers who responded that they sometimes did not have enough food to eat. An earlier study conducted in Botswana by UNICEF (2009) found that 75% of households in Mabutsane and Bobirwa health districts had some degree of food insecurity. The same study also reported that at least one household member went without food the whole day and night in the last 30 days. However, in the present study no caregiver reported having not eaten the whole day and night in the past 12 months.

Also, increased number of dependents results in reduced per capita consumption and tends to strain food budgets especially in households with low income levels, resulting in inadequacy of food needed to meet the daily requirements (Ivers & Cullen, 2011; Ukwuani & Suchindran, 2003). This was demonstrated in this study by the significant association between the number of children the mother had and the food running out before they could have money to buy more ($p = 0.009$). It can be noted that the highest malnutrition rate coincided with the weaning period, which implies that there is inadequacy in either quantity or quality of the weaning foods in this current study. These findings similarly compare to those of Cartmell et al., (2005), who found an average age of 21.7 months being the age of highest malnutrition rate. The findings in this study showed that less than a third of children were receiving social grants. This has a negative impact on the nutritional status of the children especially that majority of the caregivers in this study were unemployed. This is in line with the findings of one study done in the rural districts of the Eastern Cape and Kwazulu-Natal provinces, showing that higher rates of malnutrition were increased, where less than 30% of unemployed families received social grants (Smuts et al., 2008). It is also known that family income is significantly associated with nutritional status of the under five children specifically wasting (Edris, 2007).

In this study, the majority of the caregivers with malnourished children lived in the rural area, a trend observed in an earlier study conducted in Botswana among children under three years old (Mahgoub et al., 2006). This finding confirms the fact that food insecurity is higher in the rural than urban areas. Most urban dwellers may afford to buy food as many of them are employed or do some informal small businesses.

Limitations of the study

Although the study has provided important information on practices and challenges of caregivers in feeding of children less than five years at the study site, the findings cannot be generalized as this was about a small group of children assessed in a cross-sectional study at one hospital.

Conclusion

This study has shown that feeding practices and challenges faced by caregivers in feeding children less than five years at Nyangabgwe Hospital are mainly centered around food security, caregiver education, number of children in the household and employment status. A home-based nutrition education intervention targeting caregivers and emphasizing improvement of child feeding practices as well as incorporating locally available and supplementary food into the meals of the children to improve their nutritive value is highly recommended.

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