

**DIETARY PATTERN, HOUSEHOLD HUNGER, COPING STRATEGIES AND  
NUTRITIONAL STATUS OF CHILDREN IN SEKHUKHUNE DISTRICT OF  
LIMPOPO PROVINCE, SOUTH AFRICA**

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## ABSTRACT

Globally, approximately one out of every nine people do not get enough food to eat. The situation is more persistent in the sub-Saharan region of Africa with an estimated 23.2% of the population experiencing food deprivation. The aim of this study was to determine the dietary pattern, prevalence of hunger, the association between household hunger and nutritional status of children under 12 years, and the coping strategies that mothers use to adapt to periods of food deprivation in their households in Sekhukhune district. An analytical study design was used. A structured, interviewer-administered questionnaire was used to survey mothers/caregivers and their children from 180 households selected from nine villages by means of systematic random sampling. Anthropometric measurements were used to determine caregivers and children's nutritional status. Statistical Package for Social Sciences (SPSS) version 20 was used to analyse the collected data. Descriptive and inferential (Chi-square ( $\chi^2$ ) test) statistics were used. The results indicated that the main food items consumed by most children were mealie/maize meal, sugar, tea, iodised salt, bread, and meat. The findings revealed that 44.4% of households were food insecure, whereas 33.9% were at risk of hunger, and only 21.7% were food secure. The main coping strategies used were borrowing food from neighbours, family or friends, and borrowing food from the local shops. Anthropometric indices were associated with food availability and the utilisation of coping strategies such as sending children to neighbours asking for food, credit from local shops, reducing food portions, or even sometimes sending children to bed hungry ( $p < 0.05$ ). About four to five out of ten children sometimes go to bed hungry. Households borrowing food from neighbours, family or friends, and credit from the local shop were the most common coping strategies. The need for nutrition education on low cost nutritious diets and sustainable food programmes intervention strategies are required in Sekhukhune District. In addition, positive response modes for coping with food deprivation, such as the use of wild foods and livestock should be encouraged.

**Key words:** Household Hunger, Coping Strategies, Nutritional status of children,  
Dietary pattern



## INTRODUCTION

Hunger is the uneasy and painful sensation caused by consumption of insufficient food to meet basic nutritional needs [1]. The prevalence of hunger in the world continues to rise in recent years after a long decline. Approximately 821 million people globally, are undernourished or do not get enough food to eat [2]. The Food and Agricultural Organization of United Nations (FAO) 2018 report revealed that undernourishment and severe food insecurity is stable in most regions of Asia while it seems to be on a rise in practically all regions of Africa and South America [2]. The situation is more persistent in the sub-Saharan region of Africa where an estimated 23.2% of the population might have undergone chronic food deprivation in 2014 [3]. Without increased efforts, the world will not achieve the Sustainable Development Goal (SDG) number 2 target of eradicating hunger by 2030.

According to the FAO (2017), Southern Africa Region showed a slight increase in the prevalence of undernourishment, perhaps because of droughts, rising food prices, and a decline of real per capita Gross Domestic Product (GDP) growth [1]. Although the current food crisis has touched all countries of the Southern Africa region, some countries have been affected differently [4]. South Africa has adequate food supplies to feed the entire population at national level. However, there is evidence of high prevalence of hunger in both urban and rural areas, and evidence of stunting, wasting, and micronutrient deficiencies among children under five due to the lack of access to food [5, 6]. This evidence clearly indicates the lack of purchasing power and not a shortage of food. Thus, hunger is a question of resource inequity and not a lack of food in the South African context.

The prevalence of food poverty in South Africa (SA) is alarmingly high, at 43% [7]. According to Statistics South Africa (8) food poverty refers to the amount of money that an individual will need to afford the minimum required daily energy intake. In 2006, Limpopo province had the highest rate (83%) of child poverty and only 28% of children live with an employed parent/s, while in 2011 a decline to 78.9% was reported [7]. This is a 4.1% reduction from 2006, but still higher than national level of 56.8%, and still the highest in the country. Furthermore, the Eastern Cape and Limpopo provinces were the only provinces with prevalence of hunger above 30% [8]. Although the national food consumption survey was conducted in South Africa, there is a need for representative district data on the prevalence and consequences of hunger. Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) also identified the area as being vulnerable, neglected and needed immediate attention [9]. Therefore, the current study aimed to report the dietary patterns, prevalence of household hunger, and show the relationship between household hunger and nutritional status of children aged 1-12 years in Limpopo Province. The study also aimed to determine the coping strategies that mothers used to adapt to periods of food deprivation in their households.

## MATERIALS AND METHODS

The study used an analytical cross-sectional survey involving households' mothers/caregivers and their children aged 1 to 12 years. The Makhuduthumaga



municipality was purposively selected from the five municipalities in Sekhukhune, is one of five districts in the Province and was identified as having high levels of poverty in the FIVIMS report [9]. Villages were used as a sampling frame. Nine villages were blindly selected from the map of Makhuduthamaga and systematic random sampling was used to select households from the selected villages. The first house from the point of entry to the village was selected and thereafter every fifth house on alternate sides was selected. If the chosen household did not have a target participant, then next household was selected using the systematic sampling procedure. Twenty households per village were chosen, giving a total of 180 households from nine villages with only one child selected per household. From each household, one child between 1-12 years was selected to be part of the study group. If the household had more than one child within the selected study age group, every child was then allocated a number and the one with the least number was selected. If the household has no children in that age group, the household was skipped.

The data was collected using structured interviewer-administered questionnaire with interviews conducted in the local language by the main researcher and a research assistant (nutrition undergraduate student). Three sets of data were collected:

- Demographic and household data
- The Food Frequency Questionnaire (FFQ) was used and complemented with the 24-hour recall to assess the availability of food, dietary pattern, and the consumption of available foods by children. In addition, a household food inventory was used to assess food availability at household level. Coping strategies were determined using predetermined close-ended questions and a set of open-ended in-depth questions. Food availability through household food production in the form of subsistence farming or vegetable gardens as well as caregivers' experiences and coping strategies were evaluated using both open- and close-ended questions. The mothers/caregivers were asked if they experienced food shortages. They were considered to have run out of food when they spent more than five days without starch, protein rich food, and vegetables or fruit. It excluded condiments such as salt and soups.
- The prevalence of hunger was measured using a hunger scale questionnaire adapted from a World Health Organization(WHO) standardised tool used on The South African National Food Consumption Survey (NFCS), 1999[10]. Caregivers were also asked to list food items always available in the household. A food item was considered to be usually available when a household spent less than five days in a week without purchasing that particular food
- Anthropometric measurement was done for weight, height, and head circumference.

All the statistical analysis was done using Statistical Package for Social Sciences (SPSS) Version 20.0 for Windows. Frequency counts and percentages were used for categorical variables and to determine the prevalence of hunger. Continuous variables such as dietary intake parameters were summarised using minimum and maximum values, means, and



standard deviations. The Chi-square ( $\chi^2$ ) test was used to examine associations between anthropometric indices and variables of food availability and coping strategies. A p-value of less than 0.05 was considered significant.

### **Ethical consideration**

The Higher Degrees Committee of the University of Venda and the Municipal Manager of Makhuduthamaga Municipality granted ethics approval. Permission to conduct the study was also obtained from the traditional authorities of the villages. The purpose of the study, the procedures, issues concerning confidentiality and their freedom to participate or withdraw from the study were explained to all participants during recruitment and written consent was obtained once they agreed.

## **RESULTS AND DISCUSSION**

### **Demographic characteristics**

A total number of 180 mothers and 180 children participated in the study. The sample distribution for children was 46.1% (n=83) male and 53.9% (n= 97) female. See Table 1.

Just above half (53.3%) of the caregivers had high school level of education, 92.2% were unemployed, and 53.9% were financially supported by grandparents. Majority (90.6%) of caregivers earned less than 500 ZAR monthly and, therefore, lived below the poverty line, which is estimated at 1 USD/day or 10.00 ZAR/day [11]. About half (50.6%) of the households were poor and had a total income of less than 1000.00 ZAR per month per household and spent 1000.00 ZAR or less on food on a monthly basis. The socio-demographic and economic characteristics have been reported in another article [12].

### **Dietary patterns of children**

Almost all the children consumed *mealie meal* (99.4%) and salt (99.4%), majority consume sugar (73.9%), tea (71.7%), while many consumed bread (40.6%), and meat (33.9%). Majority of households had mealie meal (99.4%), sugar (84.4%), flour (63.9%), potatoes (55%), and vegetables (44%), especially cabbage, on the day of the visit. Most consumed foods were vegetables (82.2%), potatoes (61.1%), milk (55.2%), eggs (47.2%), and chicken offal (46.7%); however, sweets, biscuits, and cordials were consumed occasionally. The results correlate with a study conducted by Oldewage-Theron and Egal [13], which showed that maize meal, sugar, tea, soup, bread, and full cream milk were the first food items consumed by children in QwaQwa, SA. In addition, the 1999 South African-National Food Consumption Survey (SA-NFCS) pointed out that maize meal, brown bread, *vetkoek* (fried fat cake), tea, and sugar were the most commonly consumed food items [10].

Protein-rich foods frequently consumed were milk, eggs, chicken offal, chicken, fish and soya, indicating adequate consumption of foods rich in iron and zinc. Although most households had oil, children did not frequently consume it. Furthermore, a limited variety of vegetables and fruits were consumed. Most households had potatoes and classified it as a vegetable rather than a starchy food as it is consumed together with a starchy food as a relish. The current findings are in line with the WHO [14], which recommends



consumption of milk, especially in non-breastfed children between 6 to 24 months of age.

The diet lacked a variety of vegetables and fruits. This is in agreement with a study by Kendal *et al.* [15] that showed a significant decrease in the frequency of consumption of fruits and vegetables, and the amount of food in the household. Consequently, poor consumption for fruits and vegetables could contribute to micronutrient deficiencies.

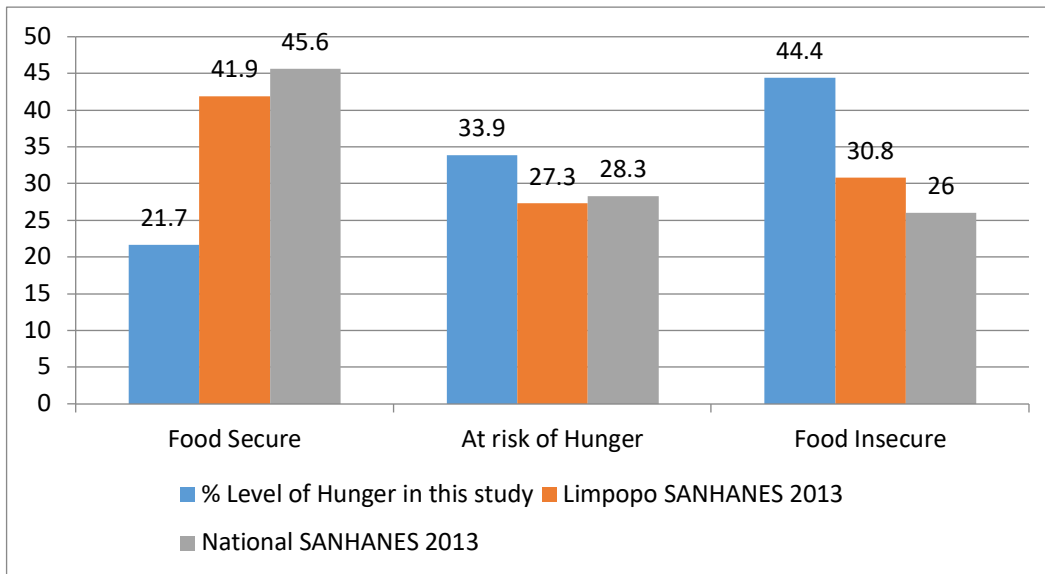
The meal pattern of children revealed that majority of children (66.1%) had three meals per day, whereas 26.6% had four meals, and only 0.55% had six meals per day. The study results concur with the recommendation by WHO [14] which spells out that a child should consume three meals and additional snacks per day.

### **Prevalence of hunger**

At household level, funds run out and they have to limit or cut food consumption. There were concerns of household food insecurity with the children sometimes going to bed hungry. The results revealed that 44.4% of the children experienced hunger sometimes, whereas 33.9% were at risk of hunger and only 21.7% were food secure. This implies that between four to five out of ten children sometimes go to bed hungry daily and are at risk of developing nutritional deficiencies, which might be irreversible later in life. The level of hunger in this study was higher than the provincial and national reported levels as shown in Figure 1 and similar findings were reported by South African National Health and Nutrition Examination Survey (SANHANES 2013) [8].

The results of this study show that the area still has a prevalence of households who are food insecure. See figure 1. The current findings indicate an increase (78.3%) in the prevalence of households who were food insecure or experienced hunger, when compared with the 54% and 62% of households in Limpopo Province and other rural areas of South Africa, respectively [11]. The high prevalence of food insecurity could be linked to poverty levels and the unemployment status of the mothers that was extremely high in this study. District or regional based data is highly recommended as it gives a true reflection of what is happening in that particular community, and will allow for targeting when interventions are implemented.





**Figure 1: Classification of the prevalence of hunger**

### Strategies for coping up with food deprivation

The results showed that 77.2% of the households reported experiencing food shortages whilst 22.7% never did. Maize meal (54.4%), sugar (53.3%), sunflower oil (21.7%), flour (20.0%), vegetables (18.3%), and tea (18.3%) were the most frequent food items that easily ran out in the surveyed households during the course of the month. There were limited dietary diversity and food varieties since most food items represented starches, vegetables, and fats and oils.

Mealie/maize meal, salt, and sugar were the food items that were most available in households, whilst margarine and meat were the least available foods. Other food items available in the households were sunflower oil, tea/coffee, flour and vegetables. Approximately 9.4% of households spent more than five days without food. It was noted that only 40% of households always had *mealie meal*, as this is their staple food. The presence of *mealie meal* and sugar in both lists of food available and unavailable means that these were mostly consumed and replaced soon after depletion.

Majority of households (78.9%) did not have a vegetable garden or field to plough during rainy seasons. Chickens were the most reared animals (49.4%) and were consumed by 45.6% of the household. Goats were reared by 32.8% of the households but only 21.7% consumed them as food. About a quarter (21%) of households had cattle but only 9% consumed them as food. Lastly, 3.3% of the households reared sheep which were consumed by only 2.2%.

Majority (64.4%) of caregivers responded that they borrowed food from neighbours, family or friends, 28.3% borrowed food from the local shop, 10.6% responded it never happens, and 3.3% slept without food. This implies that the caregivers were trusted by the local shops' Managers probably because most (76.9%) of the children received child support grants and were able to pay back [12]. Altman *et al.*[16] indicated that evidence has showed that social grants have played an important role in improving household food

security since 2001 in South Africa, but improvements in employment status are also important [17]. Sheriff and Khor [18] reported that borrowing money to buy food, receiving food from family members, relatives and neighbours, and reducing the number of meals seemed to cushion the household food insecurity.

A minority (2.8%) of households reduced portion sizes until end month. Similarly, findings by Kruger *et al.* [19] on farm workers showed that they consumed less preferred foods, bought on credit, or gathered food from their surroundings rather than limit food for 30 days. However, the findings of this study disagree with the results from the Vaal triangle study in S.A, which showed that 84.7% of households limited portion sizes over a 30-day period [20]. The difference could have been due to the location since the current study was in a rural village and the Kruger *et al.* [21] study on a farm where you find that families live as a closely-knit unit and assist one another when faced with food shortage. Alternatively, people living in the rural/farm areas can always gather food from their immediate surroundings (mountains, veld). Not all these coping strategies may apply in an informal settlement, due to overcrowding and lack of space/land. The result from the study in the Vaal Triangle showed that most households procured and cooked a limited variety of foods in trying to cope with the shortage of food [20].

Few (1.1%) of the households in this study sent their children to the neighbours or relatives for meals. Misselhorn [22] and Polsky and Senefeld [23] reported a migration strategy, which can also be used to reduce the number of people including adults, to have less people to feed. The explanation for the low number of people using the migrating strategy might be, as elucidated clearly by Snel and Starring [24], that poor people have their own pride; thus, they sometimes prefer to be poor and not depend on any third-party assistance or paternalistic support. This is further supported by the observation in this study that showed that around 15.0% of households reported getting assistance from their parents and friends. In addition, 55% also indicated that they would rather stay without food than ask for money and food from external sources. Since borrowing and asking was interpreted differently by the respondents as already explained, it seems that many preferred borrowing from neighbours and getting credit from the local shops. In the similar Malaysian study by Shariff and Khor [25] most of the food insecure households adopted a strategy of cooking whatever was available in the home.

Other coping strategies reported by caregivers were borrowing money to buy food from neighbours (2.2%), drinking tea only (1.1%), using mealie/samp (1.1%), selling traditional beer and buying food with the profit, and exchanging sorghum/green mealies for white mealie meal from local shops or mobile vendors (0.6%). Caregivers reported they received financial support from parents (15%), friends (13.5%), siblings (7.8%), in-laws (4.4%), and Non-Governmental Organisations (2.2%) in times of food deprivation. The least utilised food coping strategy for children was the use of traditional wild foods (0.6%) as summarised in Table 2. This strategy was more pronounced in households who stayed in mountainous villages. The use of locusts as a coping strategy to carry the household through a time of food deprivation due to death of the wage earner has been reported by rural children in South Africa [26]. Poor households mostly use this coping strategy as it does not require money to have locusts [25].





The use of a school support system should not be underestimated. This is because 0.6% households used school support to assist their children in coping with food deprivation. Although not established in this study, it is a known fact that SA has a school feeding programme that provides at least one balanced meal per school day. Additionally, teachers in schools can easily identify children affected by hunger and refer them to the relevant authorities.

Table 3 shows the association between anthropometric status of surveyed children and coping strategies to food insecurity per household; only significant variables ( $P < 0.05$ ) have been included. The anthropometric indices were associated with food availability and the utilisation of coping strategies such as sending children to neighbours, asking for food, credit, reducing food portion, or even children going to bed hungry.

These associations confirm the high rate of food insecurity (44.4%) observed in this study. An interesting phenomenon is the use of cattle as assets, which were available in some households but not consumed as food. This was reported earlier that, of those households that had cattle, they were not used for consumption or as a means to acquire funds.

This study corroborates the previous studies conducted in S.A that revealed that household food access correlated to anthropometric status, as children from households with poor food access were most likely to be stunted. Poor households are more likely to suffer from poor food access and poor dietary diversity, which in turn affects the nutritional status of young children, as these households may have wasted and/or stunted children as well as obese children; which in turn affects the majority of the population in S.A [27-29]. Studies by Steyn *et al.* [30] and Kimani-Murage [26] showed that poor households have a limited food variety and diversification, which are associated with poorer nutritional status.

The quality and quantity of food consumed by children can be considered as a measure of food poverty. However, this could not be done since it is unacceptable to analyse and draw conclusions without using dietary data [31]. Dietary intakes were not determined in this study. The researcher instead used the dietary data to assess only the availability of food consumed and dietary patterns. Dietary intake determination requires complex data collection techniques and availability of nutrient analyses for the food. In addition, not all the coping strategies reported in the current study can be applied in other settlements such as urban informal settlements, due to overcrowding and lack of space/land. In addition, the social desirability bias where some participants might have over-reported the extent of consumption of "healthy" foods such as fruits and vegetables to be viewed favourable by the others are possible limitations of the study.

## CONCLUSION

The current study results indicated that diet was monotonous and lacked diversification that might have resulted from high level of food insecurity, as about four to five out of ten children sometimes go to bed hungry. Thus, the need for nutrition education as an intervention strategy will assist in educating the population on nutrition security that includes dietary diversification and can subsequently improve the nutritional status. The



high prevalence of household hunger/food insecurity should be addressed through sustainable food programmes. Comprehensive multi-sectorial approach such poverty alleviation, cash transfers, and agricultural support can be employed. Positive response modes for improving food deprivation such as the use of wild foods and livestock should be encouraged through the promotion of community support groups.

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#### **AUTHOR CONTRIBUTION**

DA is the main researcher and student, she conceptualised and collected data. DA and BT did the data analysis, data development and finalisation of manuscript. CN and XG are co-supervisor and supervisor respectively. They provided guidance from conceptualisation, data collection and analysis, development and finalisation of the manuscript. None of the authors has conflict of interest related to this research.



**Table 1: Selected demographic characteristics of sample (n = 180 caregivers)**

<b>Age of the caretaker</b>	<b>Age</b>	<b>Frequency</b>	<b>%</b>
	13-19	3	1.7
	20-35	83	46.1
	36-59	74	41.1
	≥60	20	11.1
<b>Educational level of the caretaker</b>	<b>Level</b>	<b>Frequency</b>	<b>%</b>
	Never schooled	43	23.9
	Grade 1-7	37	20.6
	Grade 8-12	96	53.3
	Tertiary	3	1.7
	Post graduate degree	1	0.6
<b>Marital status of the caretaker</b>	<b>Status</b>	<b>Frequency</b>	<b>%</b>
	Single	96	53.4
	Married.	84	46.7
<b>Employment status</b>	<b>Status</b>	<b>Frequency (n = 180)</b>	<b>%</b>
	Unemployed Caregivers	166	92.2
	Employed caregivers	14	7.8
	Employed Fathers	34	21.1
	Unemployed Fathers.	44	24.4
	Households without fathers living with them.	102	54.5
<b>Financial Supporter of the children</b>	<b>Supporter</b>	<b>Frequency</b>	<b>%<sup>1</sup></b>
	Grandparents	97	53.9%
	Their fathers	29	16.4 %
	Their mothers,	17	9.4%
	Other members of the family	14	7.8%
	No financial supporter.	30	16.7%
<b>Monthly total household income</b>	<b>Total income</b>	<b>Frequency</b>	<b>%</b>
	R0-500	30	16.7
	R501-1000	61	33.9
	R1001-2000	48	26.7
	R2001-3000	16	8.9
	>R3000	25	13.9

<sup>1</sup>Some children had more than 1 financial supporter, thus the percentage total is not 100

**Table 2: Mothers' coping strategies acquiring food for children (n = 180 households)**

<b>Means of acquiring food for children</b>	<b>%<sup>1</sup></b>
Ask food for children from neighbours/relatives/friends	33.3
Use sorghum mealie meal	14.4
Send the children to play with neighbours' children and eat with them	12.2
Send the child to relatives to stay, especially during school holidays	9.4
Sleep without food	9.4
Share small amount with children	5.6
There is always food at home, especially mealie meal for children	6.1
Credit food from the local shop	4.4
They cry	2.2
They become angry	2.2
Buy bread for children	1.7
Reserve the small amount of food left for children	1.7
They drink water	1.7
Report to school and they arrange food for children	0.6
Use traditional wild foods	0.6

<sup>1</sup>The percentage represent households out of 180, who used the strategy. Some households used more than one strategy

**Table 3: The association between anthropometry and coping strategies, and dietary Pattern to household hunger<sup>1</sup>**

Variables	N	Chi-square	P value	
<b>Weight for Height Z-scores</b>	Uncle as the financial supporter <sup>2</sup>	85	13.75	0.001
	Food shortages during the month <sup>3</sup>	85	8.19	0.017
	Food items do not usually run out <sup>2</sup>	85	9.99	0.007
	Other food items do not usually run out <sup>2</sup>	85	6.20	0.045
	Do not have other means of acquiring food when it is not available at home <sup>3</sup>	85	7.64	0.022
	Obtain credit to buy food from the local shop <sup>3</sup>	85	10.7	0.005
	No food at home - Share small quantities of food with children <sup>3</sup>	85	8.81	0.012
	No food at home - Children becomes angry when there is no food at home <sup>3</sup>	84	7.81	0.020
<b>Height for Age Z-scores</b>	Food items usually run out <sup>3</sup>	179	7.00	0.008
	Have cattle as one of the domesticated animals <sup>3</sup>	179	5.02	0.025
	Have family support where we sometimes collect food <sup>2</sup>	180	5.04	0.025
	No food at home - Children becomes angry when there is no food at home <sup>3</sup>	179	4.19	0.041
<b>Weight for Age Z-scores</b>	Money spent purchasing food per month <sup>3</sup>	180	85.48	0.000
	Food items usually run <sup>3</sup>	170	9.65	0.008
	Other food items do not usually run out <sup>2</sup>	170	6.23	0.044
	Ask money from families/neighbours and friends to buy food <sup>3</sup>	170	12.05	0.002
	Share small quantities of food with children <sup>3</sup>	170	7.25	0.027
	Use traditional foods when there is no food at home <sup>3</sup>	169	12.07	0.002
<b>BAZ (body mass index for age Z-scores)</b>	Have cattle as one of the domesticated animals <sup>3</sup>	180	15.18	0.019
	Money spent purchasing food per month <sup>2</sup>	180	17.35	0.043
	When food runs out, they exchange sorghum or green mealie meal with white mealie meal in the local shop <sup>3</sup>	180	9.02	0.029
	When food runs out, they borrow money from neighbours <sup>3</sup>	180	16.52	0.001
	No food items usually run out <sup>2</sup>	180	10.28	0.016
	Siblings provide family support where we sometimes collect food <sup>3</sup>	180	14.23	0.027
	When food is not available at home, they eat <i>mabele</i> /bread/samp <sup>3</sup>	180	9.05	0.029
	We ask food from neighbours or families for children when there is no food at home <sup>3</sup>	180	11.52	0.009
We share the small quantities of food borrowed with children when there is no food at home <sup>3</sup>	180	11.76	0.008	

Note: n = 85 is for children under 60 months whereas n = 180 is for all children

<sup>1</sup>The coping strategies listed above were associated with low Z-scores. Meaning that in households where these were cited, the children were likely to be undernourished

<sup>2</sup> means the association was positive

<sup>3</sup> means the association was negative



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