

The Multifaceted Nature of Food and Nutrition Insecurity in South Africa: Lessons Learnt from Conducting a Case Study of Malnourished Children on Nutrition Security Programme (NSP)

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ABSTRACT A composite measurement to harmoniously capture all the pillars of food security has not yet been discovered. Food availability in sufficient quantities at all times does not necessarily mean nutrition security as compromised food quality may lead to malnutrition. This paper shows the multifaceted and complex nature of measuring food and nutrition insecurity of 136 caregivers and their children attending nutrition rehabilitation programme. A multi-measurement was used to assess food and nutrition security status. Although the children were part of a rehabilitation programme, only 63 percent of these children were successfully rehabilitated, 29 percent were wasted and 6 percent obese. Sustainable Developmental Goals (1: No poverty; 2: No hunger and 3: Good health and Well-being) are associated with the concern about obesity that is virtually an epidemic beyond achievement of the Millennium Developmental Goals. This study confirmed the complexity of food and nutrition insecurity as it extends to contextual social and behavioural issues. A proactive-holistic approach is required when planning future interventions, developing assessments and measuring systems.

INTRODUCTION

The international definition of food security is “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (Barrett 2010). Thus to determine food security status, all the four parameters (*availability, access, utilization and stability*) should be measured. In South Africa, the food security concept has been integrated with nutrition as a single component. According to Weingartner (2010), nutritional security exists when individuals have a satisfactory utilisation of their diet that is adequate in quantity, of quality, safe and is socially acceptable in order for them to live a healthy life. Although there are synergies in these concepts, their complexities and in-depth understanding could introduce paradoxes and more inconsistencies to their assessment and measurements.

Both food and nutrition insecurity deals with the issue of hunger, which is usually equated to access to insufficient food quantity and com-

promised food quality to meet the minimum daily intake. The food security concept in the past has been the issue of food availability and its accessibility, more recently the utilisation component has been recognised as important. On the other hand nutrition focus has been on consuming diversified sufficient meals and nutrient absorption that could lead to other types of malnutrition such as hidden hunger and obesity (Hurley et al. 2016). Latest research findings suggest that both food and nutrition should be integrated, especially when dealing with complexities such as the dual economy, in a country that is food secure at national level, but food insecure at grassroots levels. The multifaceted factors that aggravate the food and nutrition insecurity status go beyond just food production as South Africans are more food purchasers rather than food growers. Therefore, the issues of food access and utilisation become more of fundamental priority as food availability is not really the problem but rather the quality of food accessed, its utilisation and the behavioural factors which seem to aggravate the food and nutrition insecurity status. As stated by FAO, IFAD

and WFP 2013 (2013), food and nutrition security professionals and decision-makers need to be observant, conversant and insightful about the changing situational contexts.

Currently, using the multiple measures to concurrently assess all the four parameters is still the only valuable way to obtain a true perspective of food and nutrition status (Mock et al. 2013). Even though the use of the multiple measurements is informative, it also bears its flaws as at times the parameter measurements contradict and this fails to provide an all-inclusive result (Calerto et al. 2013). This paper shows the researchers' views through a case study to showcase the complexities and multifaceted nature of measuring food and nutrition security in South Africa.

Relationship between Food and Nutrition Insecurity at Household Level

Food insecurity at the household level is one of the three main underlying causes of malnutrition. The complexity attached to food insecurity as explained by Jones et al. (2013) is linked to the evolution of the concept over the years. Webb et al. (2006) highlighted four conceptual developments in measuring food insecurity (FI). Firstly, work completed by Webb et al. (2006) citing Sen (1981) was reviewed in which the concept of food security focused on the availability of food. However, the focus soon shifted to the physical and economic access to food. This change was due to a study that found no correlation between food availability and household food security. A second change occurred when FI was seen as a condition of poverty. This concept was said to be too theoretical as it did not consider the life experiences of those individuals living in poverty. Thirdly, there was greater emphasis on focussing on important measurements of FI rather than depending on proxy measures, such as children's nutritional status and agricultural productivity. The fourth concept that Webb et al. (2006) highlighted was the recognition of households' exposure to external risks such as climate change, global economic crises and unemployment. As argued by Jones et al. (2013), food security does not directly translate into nutrition security as it can be improved or compromised through certain decisions and behaviour.

The complexity of this relationship has been reported in various studies which observed a positive association between household food

security and childhood growth indicators such as weight gain; others have found negative associations with weight and height gains amongst children (Calerto et al. 2013; Mock et al. 2013; Saaka and Osman 2013). In other studies, the level of household food insecurity was not significantly associated with the child's nutritional status. Another study showed that higher food security was associated with better growth outcomes. On the contrary, other studies reported stunting and underweight to be negatively associated with household food security. A study conducted in eight countries, including South Africa, assessed food insecurity and the nutritional status of children aged 24 and 60 months. The South African findings showed that over 50 percent of the children were stunted although none suffered from wasting, which indicated that food security was significantly associated with stunting, but not with wasting (Psaki et al. 2009). Baretto (2010) remarked that the discourse observed through the lack of consensus when using the tools to measure food and nutrition insecurity results in questionable reliability and validity of the measurements. Consequently, decisions and actions towards adjusting or developing policies and programmes becomes affected.

The Conundrum of Measuring Food Insecurity (FI) in South Africa (SA)

Measurement of food insecurity is complex, identifying and choosing relevant indicators is a challenge (Hanie et al. 2013). There has been an extensive research but limited progress in identifying relevant food insecurity tools; sometimes leading to uncoordinated and overlapping information systems (Weingartner 2010). In other countries, tools such as the Household Food Insecurity Access Scale (HFIAS), Child Food Insecurity Access Scale (CFIAS), Household Dietary Diversity Score (HDDS) and Months of Adequate Household Food Provisioning (MAHFP) were integrated to assess food security. The HFIAS assessed different aspects of the access component (not only sufficient food but also food preferences); the HDDS measures dietary quality (more food groups reflects a better access to food); while the MAHFP only asks if households have adequate food provisioning.

South African researchers also have used different methods of survey design and vari-

ables to measure food and nutrition insecurity (Jacobs 2010). The Food insecurity and vulnerability information and mapping system (FIVIMS), an internationally developed tool failed to directly determine the food security status of South Africa as it only provided information about geographic areas and sectors of populations that suffer from hunger or malnutrition (Chitiga-Mabugu et al. 2013). The General Household Survey (GHS) also focuses on hunger over time and not on FI while the Income and Expenditure Survey (IES) only collects information about sources of income and patterns of household expenditure and does not directly measure FI. According to Chitiga-Mabugu et al. (2013), using the GHS and the National Food Consumption Survey (NFCS) to determine hunger in the population raised conflicting evidence as these tools showed different percentages, and thus it was unclear which percentage should be used to classify hunger in South Africa.

Nathalie (2012) also confirmed the discourse that usually emanates from the multiple use of tools. She adopted the use of multiple tools when conducting a study in Limpopo, South Africa to measure the food security status of households by means of six different food security indicators and five classifications. The indicators used included HFIAS, HDDS, MAHFP, Food Over Household Expenditure (FOHE), Food Poverty (FP) and Low Energy Availability (LEA). These tools showed different results that together formed a picture of the overall status of FS in Limpopo, even though they also had their downfalls. For example, the results of the HFIAS differed from those of the LEA. The HFIAS showed that few households in Limpopo were food insecure whereas, the LEA showed a higher percentage of food insecurity. This made it difficult for the researcher to choose which tool to trust and so the report included results from both. It was explained in the study that the LEA uses recommendations and estimations, whereas the HFIAS is based on people's perceptions (Nathalie 2012). According to Nathalie's study, using MIFI had a positive outcome as the tools were designed differently and captured different dimensions of FI.

A key weakness in using these instruments is that there were inconsistencies in the phrasing of questions which made comparisons over time difficult. The instruments focussed on different categories, for example, those that con-

centrate on availability indicators ignore individual nutritional status and focus on the national food supply. Food expenditure and access indicators measure monetary values of food as a proxy for food consumption and exclude individual nutritional status (Chitiga-Mabugu et al. 2013). Using all of these instruments raises the question as to whether there is a clear picture of the FS status at all levels in the country. This shows the difficulties of using more than one tool to measure a single parameter of FI. South Africa lacks a national survey which assesses all the four food insecurity parameters simultaneously. There is an urgent need for South Africa to develop or improve FI and NI measurement and assessment.

METHODOLOGY

A MIFIP were adapted to measure food and nutrition security of malnourished children on NSP. Table 1 presents the tools used to determine the food security and nutritional status of children registered on the NSP, as well as that of the households in which they reside.

Table 1: Food and nutritional security indicators

<i>Food security tools</i>	<i>Nutrition security tools</i>
- HFIAS	- Anthropometrics
- CFIAS	- 24 hour
- HDDS	- Recall

As shown in Table 1, the HFIAS was adjusted to accommodate children, resulting in the CFIAS. It assessed food poverty and the inability to obtain healthy and affordable food. This tool retained the three domains of food insecurity: (1) Anxiety and uncertainty about the household food supply; (2) Alteration of the diet quality; (3) Food quantity reduction as coping strategy. The CFIAS was also used to verify the 24-hour recall as both of these tools seek to determine the food intake and access to food of children in a 24-hour period. The 24-hour recall was used in this study to capture information about the children's food intake. The recall was given by the caregivers of the children because the children were too young to be able to recall their dietary intake. Both the HFIAS and the HDDS are appropriate for the monitoring of populations to assess changes in food access and dietary consumption, to plan interventions for de-

velopment or following shocks, and for the monitoring and evaluation of food security and nutrition policies and programmes (Selvester et al. 2008).

The anthropometric indicators were based on physical body measurements, such as height and weight. Anthropometric measurements were used to determine the prevalence of Protein-Energy-Malnutrition (PEM) (Amosu et al. 2011). They provided the most valid indicator and reliable indices of children's nutritional status. This technique is usually preferred because it is "non-invasive, relatively simple, cost-effective, and applicable and can be easily carried out and interpreted without requiring professional expertise" (Oyewole and Amosu 2012). Anthropometric measurements of weight-for-age have great potential for capturing short-term changes in food security (Fan 2012) and has an important advantage over other nutritional indicators, such as biochemical and clinical indicators, which are useful only at the extremes of malnutrition cases.

RESULTS

Table 2 shows a summary of all the indicators used in this study and provides a brief preview of the findings as discussion.

As confirmed by the focus group discussions, the respondents received nutrition counselling from the clinics, food parcels, and were encouraged to plant vegetable gardens. However, this intervention was not successful be-

cause most of the respondents resided in informal settlements thus land and other agricultural related resources were a challenge to these caregivers. It should also be noted that although to a certain extent the household food diet was diverse as reported on the 24hr recall, the poor quality of the diet was a major challenge. In particular, the children were indirectly deprived of their right to proper foods necessary for their development because monotonous diets (dominated by energy giving foods) were being served to them.

The focus group discussions also revealed that insufficient small salaries and unsteady income affected the budgeting and the economic resource distributions of households. Consequently, the households immediately feel the impact when limited economic power limits their ability to purchase food. Children and women become the victims as their diets and food intakes are usually compromised.

In reference to the tools used in this study, there was a close association observed between the dietary diversity and the ability of the household to access food. In this study the limited economic power of the household had an effect on the food basket and how the household's food was diversified. Jones et al. (2013) noted that measuring diet diversity is a complex phenomenon as factors such as culture, preferences and socio-economic settings need to be of consideration. The limitation found in this study was that the diet diversification using the 24 hr

Table 2: Summary of indicators measuring food and nutrition insecurity

<i>Category</i>	<i>Indicator</i>	<i>Example</i>	<i>Key finding</i>
<i>Food Security</i>	Food production	Home vegetable gardens	Only 49 percent of households participated in active vegetable gardens to improve their dietary diversity and food intake.
	Dietary diversity	Number of meals eaten per day	44 percent of the children ate about four times per day, however the diet was monotonous and less diverse. The food group that dominated or that was consumed the most included energy giving foods (starch, fat and oil).The protective foods (fruits and vegetables) were consumed least often.
	Income	Income from all possible sources (salaries, social grants, production sales)	Sixty one percent of the households had combined income just over R1000 per month. The household sizes were between 5-16 members. Mainly the income came from children grants and informal jobs.
	Household expenditure	Food expenditure	Sixty two percent of the households spent about R1000 per month on food.
<i>Nutrition Security</i>	Nutritional status	Anthropometrics (Weight-for-height)	Only 32 percent of the children were exclusively breast feeding. Twenty nine percent of the children were wasted and 8 percent obese.

recall scale was not easy to obtain because the caregivers wanted to impress. Only the focus group discussion provided the truth on the monotonous diets that were given to children and the reasons why that was done. Table 3 illustrates the association discussed showing the p-value was highly significant.

It should also be noted that the findings of this study were not clear about the association between food security and malnutrition. Other studies have reported similarly insignificant findings on the relationship between household access to food, diet diversification and the nutritional status of children. The obesity malnutrition is one of the complexities because the household socio-economic status does not directly translate to nutrition intelligence.

The findings of the study also showed that households and children had sufficient access to food, but that the quality of food was not satisfactory. Various factors could have influenced the selection of food types for both household and children's food basket. Consequently, only 63 percent of children were healthy, compared to 29 percent who were wasted and 6 percent obese (refer to Table 4).

The 37 percent failure to rehabilitate was caused by various factors which could not be clearly measured through the use of other mea-

surements. Some of the answers were received only through probing. As mentioned by Hurley et al. (2016) nutrition is a broad concept thus nutrition risks, well-being and behaviour should be given serious attention when planning assessment and measuring activities.

DISCUSSION

One of the challenges in using HFIAS was the need to be sure that the responses given were indubitably representative of the food constraints experienced by all members of the household. Using the HFIAS and the CFIAS in conjunction with the focus group discussions helped to clarify matters as the focus groups provided the reasons for children's eating patterns and the frequency of meals as well as the way in which food was distributed in the households. Therefore, using both tools simultaneously helped to provide solid findings that showed different angles to food access in households and for individual children. More so, the anthropometric measurements prove to be a valuable tool, but it should be used in conjunction with other tools. The findings can thus be compared with the findings of other studies on children's food access, whereas if only one tool (HFIAS) had been used, the children's food access would

Table 3: Analysis of household incomes - CFIAS, HDDS, MAFHP and HFIAS

		<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>ANOVA p-value</i>
<i>CFIAS</i>	Between groups	637.752	3	212.584	10.429	.000
	Within groups	2690.593	132	20.383		
	Total	3328.346	135			
<i>HDDS</i>	Between groups	47.876	3	15.959	5.575	.001
	Within groups	377.888	132	2.863		
	Total	425.765	135			
<i>MAFHP</i>	Between groups	69.384	3	23.128	14.742	.000
	Within groups	207.087	132	1.569		
	Total	276.471	135			
<i>HFIAS</i>	Between groups	1018.490	3	339.497	8.547	.000
	Within groups	5243.326	132	39.722		
	Total	6261.816	135			

Table 4: Anthropometric status of children on the NSP

<i>Status</i>	<i>Age</i>				<i>Total</i>	
	<i>6 months</i>	<i>7-24 months</i>	<i>25-48 months</i>	<i>49-72 months</i>	<i>n</i>	<i>%</i>
Wasted/malnourished	5	22	8	5	40	29
Normal/healthy	2	46	23	15	86	63
Overweight/Obese	1	5	2	2	10	8
Total	8	73	33	22	136	100

only have been assumed from the households' results. It is recommended that these tools be used together in food security and nutrition assessments, thus enriching the breadth of information available to identify food insecure groups and understand the consequences of poor food access on food consumption.

As reported in various studies, the HDDS has its shortfalls, which were also noted in this study. Calerito et al. (2013) stated that the household's food basket composed of calories is usually not a problem; rather it is the minimal inclusion of other food groups that determine the quality of the diet which affect the nutritional status of most children. Although this tool provides insight to a certain extent, the findings are still not yet transparent and conclusive. Perhaps, better understanding of the complexity of food security should be recognised and its consequent influence to nutrition status. Food security is related to socio-economic factors and the livelihoods of households. However, there are other factors that can have either a negative or a positive impact on the household food security status at the macro or the micro levels. Food insecurity is one of the underlying causes of malnutrition. Thus, addressing food insecurity will not directly translate into correcting malnutrition as there are still other factors that cause malnutrition that need to be considered, as stated by the UNICEF Conceptual Framework of Malnutrition.

More so, this study showed that food security does not directly translate to nutrition security; there are other underlying factors that need to be investigated that could affect the situation. In this study, the quality of food available at households and consumed by children affected the nutrition status of the children. Subsequently, nutritional status can be improved even if food insecurity continues to exist, through improved 'nutrition supportive' decisions and behaviour change interventions. Hence, one of the limitations of the scales is that they do not probe the household's behaviours and determinants of food access, hence qualitative tools should be part of the measuring systems.

There is no single perfect tool to measure FI, either in South Africa or any other country. Using the multiples measures seems to be the best option until a composite tool is developed. However, caution has to be taken when selecting indicators - they should match with the objec-

tives of the assessment to minimise biases and contradictory findings. The multiple measures in this study provided a better understanding of food and nutrition insecurity. The development of a common food security target across the globe for future research would be advantageous but the target should take into consideration household structure, time, geographical location, risks and the livelihoods of the population. Rigorous research is required to develop a composite tool as food and nutrition security is a global challenge, however it is not important to remember that FI tends to manifest differently in different contexts; causes and implications of FI in developing countries compared to developed countries should be taken into consideration.

CONCLUSION

The discourse in measurement and assessment of food and nutrition security situations bears high risk of misleading the policy development, programs and interventions designed to combat this situation. As learnt in this study children's right to food is being compromised due to various complex factors. Unfortunately the cost of compromised child care is too high, subsequently the impact is not immediate. Therefore accurate and meaningful measures and assessment systems require urgent attention. As noticed, underweight has been historically the challenge, however, there is a noticed emergent challenge of obesity that seems to be an epidemic going forward to 2050. Therefore, the future brings forth new challenges, and there is thus a need for cautious and rigorous research to develop proper and accurate harmonised measurement.

RECOMMENDATIONS

Food and nutrition security is an evolving concept, from the 1970s definition and the changing perspectives and its analysis. Earlier food security was a concept on its own but lately there is a noticeable shift in thinking as some countries have decided to integrate the concepts of food and nutrition security. Thus, it should be noted that both food and nutrition security concepts are complex in scope, therefore an integrated system should be achieved if harmonised measurements and assessments are to be attained. Food security is a concept that is closely related to poverty and socio-economic fac-

tors, whilst these determinants in the nutrition status do not necessarily and or directly affect the status. Therefore, in-depth research with regards to the issues of societal behaviour, care (households/child), support systems and access to conducive environment are other factors of consideration. A proactive and holistic approach is required when planning future interventions, developing assessments and measuring systems.

REFERENCES

- Amosu AM, Degun AM, Atulomah NOS, Olanrewju MF 2011. A study of the nutritional status of under-5 children of low-income earners in a South-Western Nigerian community. *Current Research Journal of Biological Sciences*, 3(6): 578-585.
- Bilinsky P, Swindale A 2005. Months of inadequate household food provisioning (MIHFP) for measurement of household food access: Indicator guide. *FANTA Project*, 1-8.
- Chitiga-Mabugu M, Nhemachena C, Karuaihe S, Motala S, Tsoanamatsie N, Mashile L, Ngwenya T 2013. *Measurement of Food Security in South Africa Policy Paper*. South Africa: National Development Agency.
- Fan S 2012. Improving food and nutrition security information for better measurement and effective decision-making. *IFPRI Research Brief*, 1-4.
- FAO, IFAD, WFP 2013. *The State of Food Insecurity in the World 2013: The Multiple Dimensions of Food Security*. Rome: FAO.
- Hanie E, Gerber N, Torero M 2013. Food and nutrition security indicators: A review. *Center for Development Research Working Paper*, 1(108): 1-63.
- Hurley TM, Pardey PG, Rao X, Andrade RS 2016. Agricultural R and D policy and long-run food security. *International Journal of Food and Agricultural Economics*, 4(2): 101-124.
- Jacobs P 2010. The status of household food security targets in South Africa. *Agrekon*, 48(4): 410-433.
- Jones AD, Ngure FM, Pelto G, Young SL 2013. What are we assessing when we measure food security? A compendium and review of current metrics. *Adv Nut*, 4: 481-505.
- Mock N, Morrow N, Papendieck A 2013. Global food security. *Science Direct Journal*, 2(1): 1-64.
- Nathalie C 2012. *A Comparative Overview of Commonly Used Food Security Indicators, Case Study in the Limpopo Province, South Africa*. Thesis, Unpublished. Ghent: Faculty of Bioscience Engineering, University of Ghent.
- Oyewole OE, Amosu AM 2012. Appraisal of public health nutrition education in child health and development in Nigeria. *International Journal of Basic and Applied Medical Sciences*, 2(1): 14-21.
- Psaki S, Bhutta Z, Ahmed T, Ahmed S, Islam M, John S, Kosek M, Svensen E, Miller M, Richard S, McGrath M, Seidman J, Caulfield L, Checkley W 2009. Household food insecurity and nutritional status in children: Results from eight-country MAL-ED study. *Population Health Metrics*, 10(24): 1-11.
- Saaka M, Osman SM 2013. Does household food insecurity affect the nutritional status of preschool children aged 6–36 months? *International Journal of Population Research*, 1-12.
- Selvester K, Fidalgo L, Ballard T, Kennedy G, Dop M, Mistura L, Deitchler M 2008. Report on use of the household food insecurity access scale and household dietary diversity score in two survey rounds in Manica and Sofala Provinces, Mozambique. *FAO Project*, 1-23.
- Weingartner L 2010. The Concept of Food and Nutrition Security. In: K Klennert (Eds.): *Achieving Food and Nutrition Security: Actions to Meet the Global Challenge. A Training Course Reader*. 3rd Edition. Bonn: Inwent.
- Webb P, Coates J, Frongillo EA, Rogers BL, Swindale A, Bilinsky P 2006. Measuring household food insecurity: Why it's so important and yet so difficult to do. *J Nutr* 136(5): 1404S-1408S.

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