

Hunger for knowledge: Food insecurity among students at the University of KwaZulu-Natal

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The experience of food insecurity in the South African university student population is not well documented or researched. Data to assess vulnerability to food insecurity in a sample of 1.083 students from the University of KwaZulu-Natal (Pietermaritzburg Campus) was collected between 2007 and 2010 via a questionnaire developed specifically for this purpose. The results indicate that 20.8% of the sample experienced some level of vulnerability to food insecurity, with 16.1% reporting serious levels of vulnerability, and 4.7% experiencing severe to critical levels of vulnerability to food insecurity. Students on financial aid were found to be significantly more vulnerable to food insecurity when compared to those who were not on financial aid. A similar relationship was found between students in a bridging programme when their level of vulnerability to food insecurity was compared to those in mainstream programmes. The potential impact on university students' educational outcomes and social and psychological well-being are discussed. The results are also contextualised within the retention and throughput efforts of South African higher education institutions, and recommendations for institutional responses are made.

Keywords: Food insecurity; South African university students

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Introduction

This study reports on food insecurity (FI) among students in the South African higher education (HE) context, and specifically focuses on the dimensions of “access to food”, the nutritional value of food, and the stability of these over time (FAO, 2008: 1). As an international norm, it is now accepted that all people in a society should have a right to access enough food to enable active participation in social life (Labadarios, Mchiza, Steyn, Gericke, Maunder, Davids & Parker, 2011). Beyond this human right, it is pragmatic to ensure that all students at higher education institutions (HEIs) have their basic needs met so that they have a fair chance of academic success.

Although issues in respect of FI have probably always been central to human existence, Sen’s (1981) work in this field is probably most influential in bringing to the fore a focus on human rights, poverty, and the FI dimension of access to food. In particular, Sen (1981) highlighted a decline in food entitlement, characterised by the persistent, chronic and irregular ability to access food by people from poorer, rural and working-class backgrounds. In South Africa, food entitlement is inextricably linked with “extreme inequalities in the distribution of endowments and entitlements” (Bernstein, 1994: 5). Despite positive advances in South African human rights legislation since 1994, and accompanying socio-economic shifts, inequalities persist in how South Africans are able to routinely access nutritious food. The Household Food Insecurity Access Scale (HFIAS), administered as part of the General Household Survey (GHS) in 2011, suggests that 21.2% of South African households experienced limited access to food in 2011, while 24.6% of South African individuals experienced food access limitations (Stats SA, 2012), this being more prevalent in poorer and rural communities (Labadarios *et al.*, 2011). As South African HEIs have become more successful in admitting students from diverse backgrounds, particularly those from “working class and rural backgrounds” (CHE, 2010: 3), it thus becomes more likely that FI will increasingly impact on HE experiences and outcomes.

The majority of programmes aimed at addressing FI in southern Africa appear to be aimed at rural and poor communities, and within school feeding schemes (Ebersöhn & Ferreira, 2012). While these communities are undoubtedly in need of intervention in relation to FI, the experience and extent of FI in the South African HE sector is under-researched and poorly understood. Indeed, much more attention is paid to the issue in better resourced countries such as Canada, Australia and the USA (for example, Rondeau, 2007; Chaparro, Zaghoul, Holck & Dobbs, 2009; Hughes, Serebryanikova, Donaldson & Leveritt, 2011). Willows and Au (2006) note that Canadian HE students are increasingly vulnerable to FI because of the impact of university fee increases on the growing numbers of students on financial aid. They also highlight that the first Canadian university campus food bank was opened in 1991, and that, by 2004, one in five university campuses in Canada had established food banks.

Most FI research in education, however, is carried out in pre-tertiary contexts. For example, Taras (2005) summarises ten multinational studies that focus on

food insufficiency and cognitive functioning in school-aged children. Nine of the studies suggest a correlation between food insufficiency and diminished academic achievement in school-aged learners, while it is also evident that the quality and variety of diet also impact on academic performance (Florence, Asbridge & Veugelers, 2008). Although these studies were conducted on school-aged children, there is no reason to believe that similar relationships between quality, quantity and variety of nutritious food and academic performance would not exist for HE students.

Context

The University of KwaZulu-Natal (UKZN) is a South African public HEI with a mission to be meaningfully engaged with society and demographically representative. Black students (including Black African, Coloured and Indian students) constitute 88% of the student population (Department of Basic Education, 2010), thus signalling the institution as demographically representative of the general population of South Africa. UKZN offers several on-campus residences and all offer facilities for self-catering. As with other South African HEIs, UKZN is concerned with reducing student academic failure, and enhancing retention and throughput. Internal UKZN reports have highlighted financial causes of failure as being especially relevant for students from poor backgrounds, with these students finding it difficult to fund study-related expenses such as accommodation, textbooks and meals. A study of five other South African HEIs reported similar causes underlying student failure (Jones, Coetzee, Bailey & Wickham, 2008). The exploratory study reported on in this article aims to document the scope of vulnerability to FI among UKZN students, the experience of FI in the university student population, and the likely impact of FI on the well-being and academic experiences of students at university.

Method

The first phase of the study involved administering the University Student's Food Insecurity Questionnaire (USFIQ), as a pilot project, to 310 students (Fourie, 2005). We then embarked on consolidating the items in the USFIQ (second phase), these being refined and selected for inclusion in relation to three sources. The first source included reflections and findings from the first phase of the study, while registered dietitians employed as lecturers at UKZN provided a second source of expert input on the questions. Thirdly, we ensured that the three domains from the HFIAS were reflected in the USFIQ, these domains pertaining to "anxiety or uncertainty about ... food supply", "insufficient quality" of food, and "insufficient food intake [quantity] and its physical consequences" (Coates, Swindale & Bilinsky, 2007: 6). Unlike the HFIAS, however, questions on the USFIQ were designed to apply to the individual HE student and not a household. Additional items were included to explore the self-reported physiological, affective, and study-related impact of FI in the local student population. The questionnaire takes approximately 20 minutes to complete, respondents reporting on biographical and demographic data, eating habits,

spending habits, and questions exploring their responses to possible university strategies to address FI in students. Most items are formatted on a 5-point Likert scale with options ranging from “never” to “almost always”. A subset of these items was intended to specifically measure vulnerability to FI in HE students, although some items were dropped during item-analysis procedures discussed below. A copy of the full USFIQ is available from the primary author, while the items included in the scale for measuring vulnerability to FI appear in the following questionnaire.

Scale items embedded in the University Students Food Insecurity Questionnaire

1. How often do you eat a smaller meal than you felt you needed because there was not enough food?
2. How often do you eat fewer meals in a day because there is not enough food?
3. How often do you eat cheaper foods or eat the same foods for several days in a row because there is not enough money for food?
4. How often do you have no food at all because there is not enough money to get more?
5. How often do you struggle to concentrate in class and/or while you are studying because you are hungry?
6. How often do you feel weak (tired) because you are hungry?
7. How often does hunger negatively affect your moods?
8. How often do you miss lectures/tutorials because you are hungry?
9. Do you feel that your health suffers because you don't get enough food or because you don't eat good enough food?
10. How often do you worry where your next meal will come from?
11. How often do you go for 24hrs without eating because you did not have enough money for food?
12. How often do you go hungry at the beginning of the semester?
13. How often do you go hungry at the end of the semester or during examinations?

The third phase of the study (2007, 2008 and 2009) involved the administration of the consolidated USFIQ to a sample of 792 UKZN (Pietermaritzburg Campus) students recruited from mainstream degree programmes, and 291 students recruited from UKZN's Centre for Science Access (CSA) programme. The CSA offers foundational and extended

curriculum programmes to students from disadvantaged schools who do not meet entrance requirements for mainstream science degrees. CSA students were particularly targeted for this study, given their socio-economic and educational backgrounds. Of the 792 mainstream student volunteers, 367 were purposively recruited from second-year courses (across three faculties). Since we were aware that highly vulnerable students may have been under-represented in lectures, a further 425 volunteers were recruited from various student residences (which house both under- and postgraduate students). Overall, our sampling was purposive, with a view towards maximising exposure to the USFIQ for students across a range of residential, socio-economic and faculty arrangements. This article reports on the results of the third phase of the study with a sample of 1.083 UKZN students. Each participant completed the questionnaire anonymously and only once.

Ethics

Ethical consent for this study was obtained from the relevant research ethics committee at UKZN. Before completing the questionnaires, research participants were informed of the nature and scope of the research and that their participation was voluntary. Researchers also advised potential participants that their completion/non-completion of the questionnaire would have no bearing on the allocation of food parcels/vouchers or money to participants. It was recommended that participants seek assistance from relevant student service departments at UKZN for assistance with accessing support for FI.

Results

Table 1 summarises the demographics of our sample.

Table 1: Demographics of sample

<i>Demographics</i>		<i>% of sample</i>
Gender	Female	52.4%
	Male	47.6%
Nationality	South African	88.6%
	Non-South African	11.4%
Residence	On-campus	63.5%
	Off-campus	36.5%
Funding	Financial aid	34.5%
	Non-financial aid	65.5%

Overall vulnerability to food insecurity

As mentioned earlier, a scale (within the USFIQ) representing vulnerability to FI was developed using item-analysis procedures. Specifically, a factor analysis was used to confirm that the items pertaining to FI were unidimensional. The procedure yielded

a single dominant factor (eigenvalue 7.506, accounting for 37.5% of the variance) on which all items loaded positively, except for items 5-9 which loaded negatively. These items also loaded strongly and positively on a marginal second factor (eigenvalue 1.494, accounting for 7.5% of the variance), suggesting that they were not assessing the same core construct as the other items in the scale. A reliability analysis using Cronbach's alpha confirmed these results. When the least reliable items were successively dropped until Cronbach's alpha exceeded .9, items 5-9 were the first and only items removed. On reflection, item 9 (How often do you buy take-away food (for example, pizza, KFC, burgers)?) did not relate directly to FI, and items 5 (Do you eat at least one meal a day?), 6 (Do you eat when you wake up (for example, breakfast)?), 7 (Do you eat during the day (for example, lunch)?), and 8 (Do you eat at night (for example, supper)?) conflate personal (and possibly religious) habits with FI. Item 21 (What is the longest period that you have had to go without food during the semester?) was dropped, because we realised that it conflated religious-based fasting (for example, Ramadan) with genuine FI and was also on a different numerical scale than the other items (ranging between 0 and 3 instead of 0 to 4). Factor analysis confirmed that the variables remaining after the item-analysis procedure comprised a single factor solution. The dominant factor had an eigenvalue of 6.505 (accounting for 46.5% of the variation), while the next largest factor had an eigenvalue of only 1.107 (accounting for 7.9% of the variation, with all items loading strongly and positively on the dominant factor. The final scale yielded a Cronbach's alpha of .916 for the full sample, suggesting a high degree of scale reliability. A vulnerability to FI score was calculated for each participant by averaging their scores on the 13 scale items.

When interpreting the FI scale, it should be noted that it is anchored at 0 and, since many students have no problems with FI, it is positively skewed and has a strong floor effect. For example, middle-class students living with their parents would probably score very close to nil on the scale. By contrast, to achieve a score of four, a student would have to answer each of the 13 scale items as "almost always", indicating an untenable level of hunger that would make it impossible for them to continue with their studies. Since the scale averages 13 items, for a student to near the midpoint of the scale, s/he generally needs to score higher on at least some of the items. Since our basis for understanding food security includes all people being able to access enough food all the time so that they can actively participate in society (Labadarios *et al.*, 2011), it follows that no student should be hungry, because they do not have the resources to access food. As a result, it was reasoned that the midpoint of the scale would already indicate serious problems with FI, with the upper extreme of the scale indicating extreme vulnerability. As expected, the mean for the vulnerability scale was low ($M = 1$; $SD = 0.8$), indicating that the majority of students (79.2%) in the sample reported low levels of vulnerability to FI. However, this metric also classifies 16.1% of the sample population as reporting serious levels of vulnerability to FI, and a further 4.7% of the sample as reporting severe or critical vulnerability to FI. All students with FI coded as "serious" or above (that is, with FI scores from the

midpoint of the scale and above) reported experiencing at least one of the conditions referred to in the scale “often” or “almost always”, and 65% reported experiencing at least one aspect “almost always. Table 2 displays the thresholds for describing the levels of vulnerability to FI, along with a summary of the results from our sample.

Table 2: Average scaled scores and levels of vulnerability to food insecurity

<i>Average scaled score</i>	<i>Average experience of FI across items</i>	<i>Level of vulnerability to FI</i>	<i>% of sample</i>
0	Never	None	38.8%
1	Seldom	Low	40.4%
2	Sometimes	Serious	16.1%
3	Often	Severe	4.3%
4	Almost always	Critical	0.4%

Concentration, fatigue, and worry in relation to food insecurity

When asked how often deficits in concentration as a result of hunger were experienced, 11.3% of the sample reported that this occurred “often” or “almost always”, while 21.5% indicated that this happened “sometimes”. Respondents were also asked to report on the effects of hunger on their fatigue. Trends similar to those in relation to concentration were observed, with 12.2% of the sample reporting effects of “often” or “almost always” being fatigued in relation to hunger. When responding to the experience of worry in relation to an individual student’s capacity to access food/meals, 10.7% of the sample indicated experiencing this worry “often” or “almost always”.

Consistency of food insecurity across the semester

We were interested to find out if students were more likely to go hungry at the beginning of a semester, or at the end of a semester (near examinations). A repeated measures (paired samples) t-test using Bonferroni adjusted alpha levels of .0169 revealed that students are significantly more likely ($t = -6.817$; $df = 1059$; $p < .001$) to report going hungry at the end of a semester ($M = 1.12$; $SD = 1.3$) than at the beginning of a semester ($M = 0.9$; $SD = 1.2$). Specifically, 17.3% of students reported going hungry “often” or “almost always” at the end of a semester compared to 11.4% who reported going hungry “often” or “almost always” at the beginning of a semester.

We were also interested to find out if students on financial aid¹ were more vulnerable to FI when compared with those who were not on financial aid; and likewise, whether students in the CSA were more vulnerable to FI when compared with those in mainstream programmes. An independent samples t-test using Bonferroni adjusted *alpha* levels of .0169 revealed a significant difference in vulnerability to FI ($t = 7.955$; $df = 1027$; $p < .001$) between students on financial aid ($M = 1.3$; $SD = 0.8$)

and those not on financial aid ($M = 0.9$; $SD = 0.8$). When comparing mainstream and CSA students, an independent samples t-test with the same Bonferroni adjustment revealed that the difference in vulnerability to FI between students in the CSA ($M = 1.4$; $SD = 0.8$) and those in mainstream programmes ($M = 0.9$; $SD = 0.8$) is also significant ($t = 9.708$; $df = 1034$; $p < .001$).

Discussion

In principle, we believe that all students accepted into HEI should be provided with access to the resources that may give them a fair chance of succeeding. This includes access to food, and is resonant with internationally accepted norms of what constitutes food security. It is suggested that students from financially and/or educationally compromised backgrounds face significant challenges in adapting to HE, especially in relation to peers from well-resourced backgrounds. This research confirms our suspicions that a proportion of our students are confronting the challenges of knowledge acquisition while hungry.

Analysis of individual items from the USFIQ revealed high levels of worry in relation to sourcing food, as well as adverse concentration and fatigue in relation to self-reported levels of hunger. In particular, between 11% and 18% of the sample reported “often” or “almost always” experiencing hunger-related difficulties with concentration and fatigue. This is a concerning percentage of students. Since a quota sample was used, it is not possible to directly extrapolate the results to the UKZN population. However, the fact that vulnerable students were less likely to be recruited in lectures (since this subgroup reported less frequent lecture attendance) is likely to be offset by possible over-representation of vulnerable students in the smaller access programme subgroup. On balance, these results suggest that thousands of students at UKZN are likely to experience adverse hunger-related effects.

Although effects pertaining to FI at any point in a student’s life are concerning, they are potentially even more deleterious at the end of a semester near examinations. Variations in the timing of learning and assessment protocols differ for UKZN courses; however, the authors have observed that the academic demands at UKZN are generally highest towards the end of a semester. The consequences of poor concentration and fatigue on academic performance are probably most serious at a time when students are preparing for examinations. The results from this study suggest that 17.3% of the sample report “often” or “almost always” going hungry at the end of a semester/near examinations. This is significantly higher than the same frequency levels of hunger at the beginning of the semester (11.4%), and could provide important explanatory information regarding performance in examinations.

Prior research has suggested that effective study and examination-preparation behaviours are dependent on the foundation of sound nutrition (Taras, 2005; Florence *et al.*, 2008). Given the influence of FI on self-reported concentration, motivation, energy levels, and overall cognitive functioning (such as thinking, memorising, goal-setting and self-regulation), it is probable that the food security of individual students

influences examination performance and subsequent graduation and throughput rates.

Vulnerability to food insecurity

Of central importance for this study is the finding that 4.7% of the sample reported being severely or critically vulnerable to FI. A further 16.1% of the sample reported a serious level of vulnerability to FI. In summary, this translates into an experience for 20.8% of the sample of “sometimes”, “often” or “almost always” worrying about where they will obtain food, eating food that is substandard in quality and/or variety, reducing the quantity of food consumed, and experiencing adverse nutrition-related effects. It is interesting to note that our results are comparable with the most recent estimates of vulnerability to FI in South Africa, as indicated in the GHS of 2011 (Stats SA, 2012).

Beyond the descriptive findings pertaining to vulnerability to FI, the results also indicate that UKZN students on financial aid are significantly more vulnerable to FI. These results are consistent with the positive correlation between FI and reliance on financial aid reported by Willows and Au (2006) in a Canadian study. Although some of the students in our dataset are not on financial aid, but are also vulnerable to FI, there is nonetheless a significant increase in vulnerability levels for those on financial aid. Given that students qualify for financial aid on the basis of their family’s financial circumstances, this pattern is not surprising. Students on financial aid come from disadvantaged financial backgrounds, and as such it is probable that their family and other social networks of support are less likely to have the means to supplement expenses often associated with HE study (for example, textbooks, stationery, travel, accommodation, and food). However, these findings demonstrate that the current funding strategy for these students is not offering sufficient support for HE study. The current funding system results in that students from poorer backgrounds are academically undermined by their nutritional deficit, and that students from wealthier backgrounds experience a relative academic advantage endowed by their superior food security.

During 2011, UKZN students on financial aid received meal allowances to the value of R5.026.00 annually paid in eight instalments of R628.25 (four per semester) (<http://studentfunding.ukzn.ac.za/Policy.aspx>). This is equivalent to R20.85 per day (R6 per meal) during the lecture and examination periods; however this assumes that these students have individual and family resources to support them during the mid-year and end-of-year vacations. We raise the question of whether R6 per meal is really enough to provide optimum nutrition for academic success. In addition, these calculations assume that students on financial aid will only need to spend this money on food. For many students, their meal allowance will also be needed to supplement textbook allowances (as the financial aid textbook allowance is likely to be inadequate), pay for stationery, photocopying and other student expenses (as their families may not have the resources to fund these), cover travel costs, fund

food for family members (in the case of the university student being the head of a household), and supplement other living expenses for family members (if no member of the family is working).

In addition, the results indicate that students in the CSA are significantly more vulnerable to FI when compared to UKZN students in mainstream programmes. As mentioned earlier, CSA students are drawn from disadvantaged schools and socio-economic backgrounds with the intention of “boosting the academic and developmental potential of learners from disadvantaged schools and preparing them for entry into mainstream study” (<http://csa.ukzn.ac.za/Homepage.aspx>). It seems likely that FI is an important factor undermining these pedagogic aims.

The extent of vulnerability to FI in the university student sample is concerning from a humanitarian perspective, and in relation to the adverse impact this could be having on positive educational outcomes and eventual graduation rates at UKZN. These results demonstrate that many students’ persistence and success at UKZN (and possibly other South African HEIs) is potentially undermined by their vulnerability to FI. Despite reasonable success in widening access to HE, the results suggest that UKZN students from previously disadvantaged backgrounds may continue to be vulnerable to FI, and lack the nutritional resources to effectively meet the academic demands required of them.

Conclusion and recommendations

Apart from the ideal that no individual should go hungry, it is evident that FI poses a threat to a substantial proportion of UKZN students’ academic performance, degree completion, entry into the labour market, as well as social and economic advancement. A series of management and intervention strategies are proposed to lie in the formation of partnerships both within and beyond HE structures. This is likely to require involvement by individual HEIs, as well as government, non-government and private organisations. We would like to make six specific recommendations for addressing the problems associated with FI in the South African university student population:

- Creating awareness across HEIs and relevant government departments about the serious problem of FI, and the threat that it poses to individual students and national transformation aims.
- Provision of ethically and responsibly managed food vouchers funded by HEIs and/or via funds from external organisations.
- Investigating the viability of on-campus food banks or reduced fee meals by on-campus vendors.
- Bolstering on-campus student employment opportunities (student assistants, mentors, demonstrators, research assistants, and entrepreneurial endeavours).
- Provision of life-skills training in money management and budgeting.
- Reassessment of financial aid meal allowances, taking into consideration individual students’ personal circumstances.

Limitations and recommendations for future research

Assessing nutritional habits and FI by means of self-report questionnaires may hinder reliability, especially if respondents are not able to clearly remember their diet or spending habits. In addition, our purposive sampling technique limited the generalisability of our findings to the larger UKZN and HEI student population. Future research in this field would benefit from addressing the abovementioned limitations. In addition, we could improve the USFIQ by adding replacement items for those dropped in the item-analysis procedures, balancing the number of items assessing each domain of FI, and including behavioural or longitudinal measures to validate the cross-sectional self-report data. Moreover, participants in this study were asked to respond to the questionnaire anonymously in an attempt to protect their identity, encourage honest response behaviours, and discourage attempts to over-emphasise vulnerability to FI. Unfortunately, this compromised the opportunity to correlate academic performance with reported levels of vulnerability to FI. The impact of future research in this field could be enhanced by exploring the actual (not implied) relationship between FI and academic performance. Finally, further research is recommended on the qualitative experience of FI in the student population, which would potentially provide insight into the coping strategies associated with this phenomenon.

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Endnotes

Financial aid refers to the need-based loan awarded by the National Student Financial Aid Scheme of South Africa (NSFAS). Typically, recipients come from a family with a gross income of less than R130.000 per annum (<http://studentfunding.ukzn.ac.za/Policy.aspx>).