Food Security and Nutritional Outcomes of Urban Poor Orphaned Children in Nairobi, Kenya

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Abstract

The study aims to inform policies and practices geared towards improving the welfare of orphaned children in urban poor areas with regard to food security and nutritional status. The study uses data from a World Bank funded project conducted by the African Population and Health Research Centre (APHRC) between July 2006 and June 2007 in two slums of Nairobi, Korogocho and Viwandani. The findings showed that orphans living in urban poor households are more vulnerable than their non-orphan counterparts to issues of food security, but not nutritional status as measured by height and weight for age. Paternal orphans were the most vulnerable group compared to other orphans. Other factors associated with vulnerability were age and gender of the child, household economic status and size, location of slum of residence, and, to a lesser extent education of the household head. The differential effects of these factors suggest possible points for intervention and support to improve nutritional status of urban poor children.

Key words: Orphans, vulnerability, food security, nutritional status, urban poor, sub-Saharan Africa, Kenya,

Introduction

Orphanhood is rising at a startling rate in sub-Saharan Africa (SSA) mainly due to AIDS (UNICEF, 2003, UNAIDS et al., 2004, Bicego et al., 2003). Every eighth child is an orphan and the orphan crisis is projected to worsen in the coming years (UNICEF, 2003). Our interest is in the specific vulnerability of the urban-orphaned population living in informal settlements. This interest stems from the higher prevalence of HIV in urban areas and the fact that the slums and shanty towns, home to 72% of Sub-Saharan Africa's urban residents, are characterized by poor health conditions and livelihood opportunities (Kimani-Murage and Ngindu, 2007, Amuyunzu-

Nyamongo and Taffa, 2004, APHRC 2002a, APHRC 2002b) that may impact negatively on the nutritional status of children living there. Indeed, a recent study by Fotso (2007) documented narrowing urban-rural differentials in child malnutrition in most SSA countries, mainly due to increasing urban malnutrition attributed to intra-urban disparity in social-economic status. Given that HIV prevalence is highest in urban areas in Kenya (10%); almost twice as high as in rural areas (6%), (CBS et al., 2004) and that a high proportion of the urban population in Kenya lives in the slums (UNHABITAT, 2003), there is a crucial need to understand the vulnerabilities of orphans living in poor urban areas.

Focusing on nutritional status and food security is a priority since nutritional deficiencies contribute to disability, illness and death. Furthermore, high rates of malnutrition jeopardize future economic growth by reducing the intellectual and physical potential of children (Mariara et al., 2006). The problem of malnutrition continues to be significant in SSA with the prevalence of stunting in the region reported at about 34% and being underweight at 24%, both manifestations of chronic malnutrition, and acute malnutrition manifested in wasting, reported at about 9% prevalence. Orphaned children are felt to be especially vulnerable and potentially at increased risk of compromised nutrition (Ayieko, 1997). Both anthropometry and food security have been used to monitor nutritional vulnerability. Definitions of food security include reference to food supply, access, adequacy and utilization.

The concept of food security is a key dimension in the prevention, care, treatment and mitigation of HIV/AIDS. Within HIV-affected households an increased risk of food insecurity and malnutrition may be incurred as a consequence of reduced resources (declining income when sick members are unable to work or if they die), and increased burdens (expenditure on health care, daily care for sick members) (UNICEF, 2007). There is widespread concern over the

vulnerability of children growing up in these households (Case et al. 2004, UNICEF, 2003), and a number of factors have been suggested that may affect both the level of food security experienced and children's nutritional status. These can broadly be classified into child characteristics including age and gender of the child, household characteristics, such as household assets and income (Fedorov and Sahn, 2005, Sahn and Stifel, 2003), parental characteristics, such as education level and community variables such as the availability of support services (Strauss and Thomas, 1995). Many of the characteristics associated with risk may be more prevalent in households in which orphans live, thus making them more vulnerable to food security issues. Orphans, for example, more frequently live in female-headed households, in larger households with a less favourable dependency ratio, and in households in which the head of the household is considerably older. Among orphans who have lost both parents, or who are not living with surviving parents, grandparents are commonly the caretakers (Monasch and Boerma, 2004), a household characteristic that has also been associated with poor nutritional outcomes (Kikafunda and Hanifa, 2006). At the child level some studies indicate that age is associated with nutritional status with, for example, younger orphans being more at risk (Lindblade et al., 2003). The relationship between nutritional outcomes and gender has been varied; some studies have found male children to be more vulnerable to malnutrition, (Sahn and Alderman, 1997) while others imply absence of gender effects on nutritional status (Ssewanyana, 2003, Strauss, 1990). At the parental level, previous research suggests that the mother's, but not the father's, educational level is an important determinant of a child's nutritional status (Mariara et al, 2006, Sahn and Stifel, 2002, Sahn and Alderman, 1997). Family size and number of orphans in a household have been found to have a negative relationship with children's nutritional status, with some indication of greater food insecurity among households with multiple orphans (Greenblott and Greenaway, 2007).

While studies have documented the vulnerability of orphans to adverse nutritional outcomes (Newell et al., 2003, Ainsworth and Semali, 2000), others have found no difference in nutritional outcomes between orphans and non-orphans (Sarker et al., 2005, Lindblade et al., 2003, Crampin et al., 2003). Variability in outcome may be explained by differences between study populations on the contextual dimensions described above, with the degree of vulnerability depending upon the characteristics of the exposure and a household's ability to respond to the risks.(Greenblott and Greenaway, 2007) Research in Malawi, Zambia and Zimbabwe revealed that HIV-related morbidity and mortality increased vulnerability to food insecurity, which in turn precipitated changes in children's activities, such as missing school. However, these changes were particularly experienced on the part of poor households (SADC, 2003). Not only are orphans more likely to be in households which experience food insecurity (49% vs 15% non-orphans), but food insecure households are also more likely to contain orphans (38% contain orphans vs 17% of food secure households) (Rivers et al., 2004). Other studies have found that orphans are also more likely to be short for their age, with the loss of a parent increasing the risk of stunting among the non-poor to levels found in poor children with living parents. The literature also highlights the experience of discrimination against children who are not biological descendants of the household head in the allocation of household resources particularly when those are scarce (Nhate et al., 2005). Levels of vulnerability are therefore likely to be defined by the interaction between household wealth, the number of risks faced and orphanhood (Gillespie et al., 2005). Vulnerability may also vary between different types of orphans; while it is generally accepted that maternal orphans are at greater risk than paternal orphans for health problems, other studies suggest that paternal orphans are more likely to show signs of acute malnutrition (wasting), than non-orphans (Chilima, 2006). Weight for height z-scores found in orphans are more pronounced among paternal orphans as well as among those who lost a parent more than 1 year ago (Lindblade et al., 2003).

This study seeks to explore the relative vulnerability with regard to food security and nutritional outcomes of orphaned children living in urban poor settlements in sub-Saharan Africa. It will examine differences in nutritional outcomes between orphan categories, and explore the determinants of vulnerability within a poor, urban population. The study is timely in the context of the spatial shifts in population in SSA and the high proportion of parents dying of HIV/AIDS in the region.

Data and Methods

Study Context and Data Source

The study was carried out in two informal settlements of Nairobi Kenya (Korogocho and Viwandani) where the African Population and Health Research Center (APHRC) runs a demographic surveillance system (DSS), the Nairobi Urban Health and Demographic Surveillance System (NUHDSS). The two slum areas are densely populated (63,318 and 52,583 inhabitants per square km, respectively), and are characterized by high congestion, poor housing, high unemployment rates, lack of a basic infrastructure and violence and insecurity. Viwandani has relatively higher education levels, higher levels of employment, while the population in Korogocho is more stable and shows more co-residence of spouses. Both informal settlements have been shown to exhibit worse health indicators than those found in the rest of Kenya (APHRC, 2002a, APHRC, 2002b).

The study uses data from a World Bank-funded project whose aim was to provide evidence on the welfare of orphans and vulnerable children (OVCs) aged 6-14 years in urban poor areas (APHRC and The World Bank, 2007). It also uses data from the NUHDSS. The project, which was conducted by APHRC between July 2006 and June 2007, collected data on various domains

of child welfare including education and schooling, health, food security, nutritional status, provision of support (care and shelter), neglect/abuse and exploitation, and social emotional and behavioural state. The DSS database identified 1,202 orphans aged 6-14 years who were matched on age, gender and location of residence to non-orphans randomly selected from the same database. For the purpose of the current study, data on nutritional status and food security are used. Only children whom we were able to interview as well as their caregivers (slightly over half of the sample) were considered in this analysis.

Study Variables

Dependent variables: Child Nutritional Status was represented by height for age (HAZ) and weight for age (WAZ) scores generated using the WHO/NCHS reference using the WHO Anthro 2007 program. *Food Security* was measured through interviews with both caregivers and children. Questions asked sought to assess perceived hunger, regularity of meals, food access and food shortage. Answers were initially recoded to be unidirectional, with 1 being the poorest/lowest and 4 or 5 the best/highest; or 0 being No and 1 being Yes. These variables were then standardized to cater for the variation in the scales. A composite measure was then derived by summing up standardized scores of all responses. Cases with missing information on any of the variables were not included in the generation of the summated score (a total of 63 cases). See Appendix 1 for questions contributing to food security score.

Independent variables: The orphan status of children - our key predictor- was defined using two specifications: 1) Non-orphan, orphan; and 2) Father orphan, mother orphan, double orphan. Child's age and sex, and household level explanatory variables were extracted from the DSS database. Other explanatory variables included in the analysis were: location of residence (Korogocho, Viwandani); level of education of the household head (none, primary, secondary) ;

number of children < 15 years in the household; and household wealth, (constructed from the following variables: 1) lighting (whether the household used electricity); and 2) possession of assets (bicycle, television, radio, house phone, sofa, table, flush light, kerosene lamp, kerosene stove, and wall clock)). Household wealth tertiles were generated from the wealth index using the Stata's xtile command and labelled as poorest (lowest 1/3), middle, and least poor (highest 1/3).

Methods

Analysis was carried out to test the following hypotheses:

- Orphans are more vulnerable than their non-orphan counterparts in relation to food security and have poorer nutritional status;
- Paternal orphans are worse of than maternal orphans in relation to food security and nutritional outcomes;
- Double orphans are worse of than single orphans in relation to food security and nutritional outcomes.

The analysis involved both descriptive and multivariate models. First, t-test was used to test the differences in child nutritional status and food security by orphan status (binary specification). One-way Anova test with the Bonferroni test option was also used to test the same for the three categories of orphans (father, mother, and double). Second, random intercepts regression models were used in the multivariate analysis using the Stata's xtmixed command to allow for clustering at the household level given the structure of the sample. The 1,235 children included in the study were nested within 1,034 households: One household had 4 children; 29 households had 3 children each; and 140 households had 2 children each; while the rest of the 864 households

hosted one child each. The mixed effect model was used to account for both fixed effects and random effects at the child level and at the household level.

Results

Children Background Characteristics

Table 1 describes the characteristics of the 1,235 children aged 6-14 years included in the analysis. Given that there were a higher number of orphans living in Korogocho, compared to Viwandani, our sampling strategy yielded about three-quarters of children from Korogocho. The sample was made up of 768 non-orphans (62.2%) and 467 orphans (37.8%), with a predominance of paternal orphans (about 66% of the orphans). This pattern was observed in both localities. There were a slightly higher number of girls (about 53%) in the total sample and in the two slum areas. The mean age of children was 10.6 years, with no difference by slum residence or by orphan status. The mean number of children aged less than 15 years in the households was 3.5, with no difference by orphan status of the index child. It is important to note that Korogocho households tended to host a higher number of children (3.8 on average), compared with Viwandani (2.8 on average). Viwandani had lower proportion of least poor households (25%) compared with Korogocho (36%). This result is contrary to expectation because as indicated above, Viwandani has relatively higher levels of employment, hence households in the area would be expected to be wealthier than those in Korogocho. This may therefore be an artifact of the sampling strategy. As expected, Viwandani has a higher proportion of household heads with secondary education (36%, compared with only 18% in Korogocho).

<<Table 1 about here>>

Bivariate analysis

Bivariate analysis of the three outcome variables by orphan status is shown in Table 2. Orphans exhibited higher height-for-age scores (mean of -1.16) than the non-orphans (mean of -1.25), but the difference did not reach statistical significance (p=0.242). Maternal orphans had the worst outcome (mean of -1.34) while double orphans displayed better outcome (mean of -0.88), but the differences were not significant at the level of 10% (p=0.119). With regard to weight-for-age scores, orphans were significantly better-off than the non-orphans (p=0.009). Among orphaned children, double orphans showed the worst outcome (p=0.029). The orphan group had significantly lower mean food security score compared to non-orphans (p=0.000). The means for paternal, maternal and double orphans were also significantly different (p=0.007), with paternal orphans being the most vulnerable (p=0.007).

<<Table 2 about here>>

Multivariate analysis

Table 3 shows the results of the multilevel regression models performed on the total sample of children, with orphan status coded as binary (non-orphan; orphan). In terms of height-for-age, orphan children are significantly better-off than the non-orphans ($p<0.10$); girls have better nutritional outcome than the boys ($p<0.01$); younger children are better-off than their older counterparts ($p<0.01$); and children in Korogocho have higher height-for-age, compared with those from Viwandani ($p<0.01$). Associations with other potential explanatory variables such as household wealth, education of the household head, and number of children in the household, though in the expected direction, did not reach statistical significance at the level of 10%. It should be noted that household-level random variation was strong ($p<0.01$), indicating strong intra-household heterogeneity in nutritional outcome.

Table 3 also shows that the estimates for orphan status, child's age, sex, household wealth and intra-household variance in the model for weight-for-age were of almost the same magnitude and level of significance, compared to those described above for height-for-age. Unlike the height-for-age model, the education of the household head and the number of children in the household have significant associations with weight-for-age ($p<0.05$ and $p<0.10$, respectively). Differentials in weight-for-age by place of residence are not apparent.

The pattern of association of the covariates with food security is different from that observed above for nutritional status in a number of respects. Non-orphans have significantly better food security ($p<0.01$); differentials in food security by household wealth are large, strong and in the expected direction ($p<0.01$); and Viwandani children display better outcomes than their counterparts from Korogocho ($p<0.01$). The number of children in the household is negatively associated with food security ($p<0.01$). In contrast, child's age is insignificant, and the sex of the child is weakly associated with food security ($p<0.10$).

<<Table 3 about here>>

Table 4 shows the analysis restricted to the sample of orphans, with orphan status defined as paternal (reference category), maternal, or double. Double orphans tended to have better nutritional and food security outcomes, compared with paternal orphans, but the difference was not significant. Maternal orphans are worse-off than paternal orphans in terms of height-for-age (difference not significant) and weight-for-age ($p<0.01$). By contrast, they are better-off than the paternal orphans in terms of food security ($p<0.05$).

<<Table 4 about here>>

Discussion

Our results indicate that orphans living in households in informal settlements in Nairobi are more vulnerable with regards to food security than non-orphaned children. The differences in responses to questions measuring food access, food shortage, perceived hunger and regularity of meals were particularly noted amongst households where the father had died. As has also been found in other studies this may reflect the effect of reduced income that is often linked to the death of the father (Monasch and Boerma, 2004). The association found between household wealth and food security across all households and the fact that the orphans were found to be living in poorer households than non-orphans, supports the influence of underlying economic differences between households contributing to food security.

In contrast to the vulnerability found in food security, and in line with some other studies that have found that orphans are not worse of than other children in terms of nutritional status (Sarker et al., 2005, Rivers et al., 2004, Lindblade et al., 2003, Crampin et al., 2003, Panpanich et al., 1999), orphans in this study were not worse off than non-orphans. In fact, orphans had both higher height and weight for age scores. The difference between orphans and non-orphans with regards to food security did not therefore translate into detrimental effects upon nutritional status. The discrepancy between food security scores and nutritional status was most marked for maternal orphans, who had significantly higher scores on food security while having the lowest mean scores for both height and weight for age. It is important at this point however, to note that while the nutritional status measures were objective, measurements for food security were subjective. We may be observing differences between households that are a reflection of perceived vulnerability rather than functional differences in food intake. Alternatively the discrepancies may be because the concerns recorded for food security were immediate in origin,

while children's weight and to a greater degree height, reflect past access and adequacy of intake. Early growth trajectories may pre-date the onset of the influence of parental illness and death, and thus height and weight may not be the most sensitive indicators of current influences on nutritional status. The lack of association between anthropometric measures and household wealth also suggests that current household characteristics do not influence anthropometric measures taken concurrently. Additionally, results not reported showed that correlation between food security score and nutritional status was very weak, indicating that current nutritional status may have been influenced by food security a while back. A longitudinal follow-up would enable a greater understanding of the effect of food security on physical growth and of the causal pathways between orphanhood and nutritional vulnerability, which our cross sectional study design does not allow.

The differential vulnerability between orphan groups found in our study, also a common feature of other investigations, suggests that both future investigations and interventions should no longer consider all orphans as one group, but consider the type of loss, a more sensitive indicator of need. Contrary to our expectations we did not find that double orphans were the most vulnerable. In our study paternal orphans had lower scores food security. It may be that adoption in to other households protects the double orphan from risks experienced by households where the father has died and the mother remains with the sole responsibility for feeding her children. It is also possible that the relative resilience that we saw in households where the mother has died is also as a consequence of support targeted to those in the care of their father's and not afforded to children with mothers. To answer the questions about differential vulnerability, more information is needed about support networks available to different households than is currently presented in the literature.

Other factors that we found that contributed to differences in outcome include; gender, age, family size educational level of the household head, and location of residence. We found that, as in other studies (Sahn and Alderman, 1997) males and not females are more vulnerable to poorer nutritional outcomes, but contrary to other studies (Lindblade et al., 2003), younger orphans were less vulnerable. This latter finding may reflect the fact that this study focused on school age children, and not the very young. That smaller family size was associated with higher food security is not unexpected, and does highlight the need to restrict the burden of numbers on households providing support for orphans. Education of the household head was significantly associated with a higher weight for age, suggesting a more consistent nutritional intake in this group of children over time. A more consistent nutritional input also seems to characterize children living in Korogocho, the more stable of the two neighborhoods, although better food security was experienced by children living in the slightly richer neighborhood of Viwandani. The significant household level random effects found imply that there are other influences upon variability in outcome between households that we have not captured in this study. Taken together the results indicate that the vulnerability of children living in poor households to the effects of orphanhood should be understood in terms of the constellation of risk and resilience factors that they are exposed to, and not to a single negative event, the death of a parent.

The most vulnerable children to poor nutritional outcome and food insecurity amongst those living in households in Nairobi slums appear to be those with some or all of the following characteristics: residence in the poorest households; with a single parent (the mother) as the main provider; and co-residence with a large number of children. The results suggest that support should be targeted to increase household income, reduce the burden of the number of children, and increase support through increasing the number of adults available to provide for the child. Subsequent studies need to address whether these findings are generalizable to children growing up in institutions, as these children were not included in this study. Further information is also

needed to understand the persistence or otherwise of the vulnerabilities observed. A longitudinal design would also be able to address the uncertainty over whether the poorer scores of orphans on our measure of food security was due to functional differences between households, or to differences in the perception of difficulties in food access that might be, for example, caused by the stress and anxiety of the illness/death of the child's parents.

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Table 1: Sample Characteristics

	Total sample		Korogocho		Viwandani	
	N/Mean	%	N/Mean	%	N/Mean	%
Total participants	1235	100	935	75.7	300	24.3
Orphan status						
Non-orphan	768	62.2	575	61.5	193	64.3
Orphans	467	37.8	360	38.5	107	35.7
Paternal	307	24.9	239	25.6	68	22.7
Maternal	95	7.7	68	7.3	27	9
Double	65	5.3	53	5.7	12	4
Sex						
Male	579	46.9	437	46.7	142	47.3
Female	656	53.1	498	53.3	158	52.7
Mean age						
Total sample	10.6		10.6		10.7	
Orphans	10.8		10.7		11.1	
Non-orphans	10.5		10.5		10.4	
Mean number of children <15 years in the HH						
Total sample	3.5		3.8		2.8	
Orphans	3.6		3.8		2.7	
Non-orphans	3.5		3.7		2.8	
Household wealth (tertiles)						
Poorest	412	33.4	312	33.4	109	33.3
Middle	412	33.4	287	30.7	125	41.7
Least poor	411	33.2	336	35.9	75	25.0
Education of the HHH						
None	251	20.3	214	22.9	37	12.3
Primary	707	57.3	553	59.1	154	51.3
Secondary+	277	22.4	168	18.0	109	36.3

Table 2: Mean height-for-age, weight-for-age and food security scores by orphan status

	Height-for-age z-score	Weight-for-age z-score	Food security score
By orphan status	P=0.242	P=0.009	P=0.000
Non-orphan	-1.25	-1.07	0.84
Orphans	-1.16	-0.93	-1.46
By orphan type	P=0.119	P=0.029	P=0.007
Paternal	-1.17	-0.90	-2.21
Maternal	-1.34	-1.13	0.61
Double	-0.88	-0.75	-0.96

Table 3: Multilevel regression analysis of nutritional status and food security (All children; n=1,172)

	Height-for-age z-score	Weight-for-age z-score	Food security score
1. Fixed effects			
Orphan status (Ref=non- orphan)			
Orphans	0.15*	0.19***	-1.84***
Sex of child (Ref=male)			
Female	0.31***	0.27***	0.57*
Child age (in years)	-0.16***	-0.09***	0.01
Number of children <15 years in HH	-0.01	-0.03*	-0.64***
Household wealth (Ref=low)			
Middle	-0.07	-0.07	1.68***
Least poor	0.10	0.05	2.65***
Education of the Household head(Ref=none)			
Primary	0.05	0.16**	-0.08
Secondary+	0.05	0.17**	0.73
Area of residence (Ref=Korogocho)			
Viwandani	-0.25***	-0.08	1.8***
2. Random effects			
Household level variance	0.53***	0.42***	6.10***
Child level variance	1.16	0.73	2.37

*P<0.10; **P<0.05; ***P<0.01

Table 4: Multilevel regression analysis of nutritional status and food security (Orphans; n=438)

	Height-for-age z-score	Weight-for-age z-score	Food security score
1. Fixed effects			
Orphan type (Ref=paternal)			
Maternal	-0.15	-0.23***	2.02**
Double	0.27	0.14	0.46
Sex of child(Ref=male)			
Female	0.33***	0.39***	0.98**
Child age (in years)	-0.15***	-0.07***	-0.07
Number of children <15 years in HH	-0.02	-0.04	-0.86***
Household wealth (Ref= low)			
Middle	-0.17	-0.11	2.25***
Least poor	-0.03	-0.09	3.47***
Education of the Household head(Ref=none)			
Primary	-0.15	-0.04	0.75
Secondary+	0.00	0.00	0.58
Area of residence (Ref =Korogocho)			
Viwandani	-0.18	-0.07	1.31
2. Random effects			
Household level variance	0.63***	0.51***	6.61***
Child level variance	1.13	0.71	2.14

*P<0.10; **P<0.05; ***P<0.01