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Associations Between Orphan and Vulnerable Child Caregiving, Household Wealth Disparities, and Women's Overweight Status in Three Southern African Countries Participating in Demographic Health Surveys

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Abstract

Objectives—This study examines whether orphan and vulnerable children (OVC) primary caregivers are facing absolute household wealth (AWI) disparities, the association between AWI and women's overweight status, and the modifying role of OVC primary caregiving status on this relationship.

Methods—Demographic Health Surveys (DHS) data (2006–2007) from 20–49 year old women in Namibia (n=6,305), Swaziland (n=2,786), and Zambia (n=4,389) were analyzed using weighted marginal means and logistic regressions.

Results—OVC primary caregivers in Namibia and Swaziland had a lower mean AWI than other women in the same country. In Zambia, OVC primary caregivers had a lower mean AWI score than non-primary caregivers living with an OVC but a higher mean AWI score than non-OVC primary caregivers. In Swaziland and Zambia, even small increases in household wealth were associated with higher odds for being overweight regardless of women's caregiving status. Only in Namibia, OVC primary caregiving modified the effect of the previous association. Among Namibian OVC primary caregivers, women who had at least medium household wealth (4 or more AWI items) were more likely to be overweight than their poorest counterparts (0 or 1 AWI items).

Conclusions—OVC primary caregivers are facing household wealth disparities as compared to other women from their communities. Future studies/interventions should consider using population-based approaches to reach women from every household wealth level to curb

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POTENTIAL CONFLICT OF INTEREST

The author(s) declare that they have no competing interests.

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overweight in Swaziland and Zambia and to focus on specific household wealth characteristics that are associated with OVC primary caregivers' overweight status in Namibia.

Keywords

Caregivers; Africa south of the Sahara; Economic Factors; Overweight

INTRODUCTION

Because nearly 12 million orphan and vulnerable children (OVC) reside in Africa (more than four-fifths of all OVC worldwide), focusing on the health and nutritional status of primary caregivers of OVC younger than 18 years of age is important (1). The increasing size of the OVC population has been considered the most tragic and long-term legacy of the human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV/AIDS) pandemic on this continent (1). Southern African countries have high prevalence of OVC (e.g., 19.2% in Zambia, 28.0% in Namibia, and 31.1% in Swaziland) (2–4). Despite the large number of women who are OVC primary caregivers, current studies related to OVC have focused on the OVC's needs and ignored challenges OVC primary caregivers face on a daily basis.

The impact of the HIV/AIDS epidemic, custody arrangements for OVC, and socioeconomic background vary among Southern African countries. For example, HIV/AIDS prevalence for adults ages 15–49 in 2011 was higher in Swaziland (26.0%) than in Namibia (13.4%) or Zambia (12.5%) (5). In 2006–2007, few households with OVC received medical support at least once per month for a seriously ill household member (e.g., 29.1% in Zambia, 16.9% in Swaziland, and 9.9% in Namibia) (2–4). Even though the mean number of family members in a household was similar in the three countries (4.5 in Namibia; 4.9 in Zambia), a higher percentage of children under 18 years of age lived with both parents in Zambia (58.2%) than in Namibia (25.8%) and Swaziland (22.0%) (2–4). OVC with siblings were more likely to live with their siblings in the same household in Namibia (54.6%) and Zambia (53.3%) than in Swaziland (29.0%) (2–4). Income, assets, and access to food for OVC families also vary by country. For example, a higher percentage of OVC in rural areas have shoes, two sets of clothes, and at least one meal per day in Swaziland (59.0%) in comparison to Namibia (33.2%) and Zambia (34.6%) (2–4).

Sub-Saharan Africa is facing a nutritional transition where underweight or/and overweight coexist (6,7). The overall prevalence of overweight or obesity has increased from 20.9% (1992) to 29.3% (2006) in Namibia and from 14.1% (1992) to 18.8% (2007) in Zambia (8). Among OVC primary caregivers, the prevalence of overweight (Namibia: 33.2%; Swaziland: 61.3%; and Zambia: 26.9%) is higher than the prevalence of underweight (Namibia: 13.1%; Swaziland: 1.7%; and Zambia: 7.2%) (9). Child caregiving could serve as an additional stressor and lead to psychological distress that may increase cortisol and catecholamine, lead to unhealthy behaviors (e.g., eating fast-food or junk food), and result in increased body mass index (BMI) (10). While increased attention has been placed on the nutritional transition that African populations are experiencing as a whole, the association

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between household wealth and the overweight status of reproductive age OVC primary caregivers remains unclear.

Household wealth disparities in Africa continue (11). Some people cannot access basic services such as water and sanitation; other families are able to buy cheaper goods (e.g., a radio or a bicycle) and while wealthy families have access to all western commodities (12). The label "OVC family" is solely based on the presence of a biological and/or non-biological OVC in the household. As such, the label includes wealthy women who adopt an OVC. In some cases, OVC primary caregivers may lose wealth as a direct result of supporting the health needs of family members affected by HIV/AIDS. The stigma associated with HIV and AIDS could affect the social status of OVC primary caregivers and could lead to discrimination and further marginalization of the OVC and their families from the local community and other service providers (13,14). In Southern Africa, the myth "benign obesity" as a positive state of health is exposing women from specific racial/ethnic groups (e.g., Blacks) to health risks (15). Therefore, it is important to understand the specific household wealth conditions of OVC primary caregivers.

Household wealth is considered a more consistent proxy measure than either income or consumption (11). This study focuses on a specific aspect of household wealth: household integration into the modern economy. The rationale behind using the Absolute Wealth Index (AWI) is that as soon as a family becomes involved in the modern economy (e.g., non-agrarian activities), it can accumulate goods and equipment, benefit from a variety of modern services (e.g., health services, education services), and change its behavior, imitating the upper classes (e.g., marriage, contraception)

OVC primary caregivers were women categorized as primary caregivers who provided care to one or more OVC (biological or non-biological). ***Non-OVC primary caregivers*** were women categorized as primary caregivers who did not live with an OVC (biological or non-biological) but provided care to other children. ***Non-primary caregivers living with an OVC*** were non-primary caregivers who mentioned that one or more OVC lived in their house. ***Non-primary caregivers not living with an OVC*** were women categorized as non-primary caregivers who did not live with an OVC.

To the best of our knowledge, no previously published studies have investigated overweight problems associated with household wealth among OVC primary caregivers. For this article, we focused on 20–49 year old women. Women ages 15–19 were excluded from these analyses because their BMI may be influenced by adolescent growth spurt period and/or puberty. Four research aims guided this study: 1) Determine if the AWI mean vary significantly by women's OVC primary caregiving status within countries; 2) Assess if the mean AWI scores for OVC primary caregivers varied by country; 3) Investigate the presence of significant associations between AWI and women's overweight status, and; 4) Examine whether OVC primary caregiving status is an effect modifier (moderator) for the association between AWI and women's overweight status.

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METHODS

Data from Demographic Health Surveys (DHS) for Namibia (2006–2007), Swaziland (2006–2007), and Zambia (2007) were analyzed for this cross-sectional study. DHS household surveys are nationally representative and comparable across countries through the use of common sample selection procedures, model questionnaires, standard formats for data collection, interviewer training, and pre-testing of all data collection instruments. In order to have a representative sample of the population, DHS surveys involved two stages of sampling. The first stage was based on an up-to-date sampling frame, i.e., a list of small administrative units with defined boundaries and known population size, usually census enumeration areas (EAs). Around 300–500 of these EAs were selected from the sampling frame list with probability proportional to population size (16). After the EAs (i.e., clusters) were selected, a household listing operation was implemented. This involved sending a small team (usually 2 people) to each selected EA to locate the boundaries, sketch a map, and prepare a list with the name of the head and the address or location of each household. In the selected households, all women of reproductive age (15–49) were eligible for an individual interview (16). If an interview was not completed on the first visit, up to three further attempts were made before classifying the case as non-response. There was no replacement for a household or an individual that refused to be interviewed or was otherwise classified as non-response. Response rates for eligible women for the countries included in this study reached at least 94% (2–4).

Trained interviewers performed all data collection including health and weight measurements (16). The training consisted of classroom lectures, mock interviews, and practical interviews in the field (12). Further details on interviewers' training, sample selection, and data collection procedures have previously been published (17).

Countries selected for this article met the following inclusion criteria: located in Southern Africa (the region most heavily affected by the HIV epidemic and with the highest prevalence of overweight and number of wealthiest countries on the continent), HIV prevalence of at least 5% or orphan prevalence of at least 8% among 0–17 year old children (i.e., one or both biological parents have died), had less than 20% missing BMI data, belong to the *Southern African Development Community*, had economies linked to South Africa, and had available DHS data for primary caregiving status and women's anthropometry. This study included 20–49 year old women who gave oral consent to participate and reported household residency. Pregnant and three months or less postpartum women were excluded to avoid the impact of the fetus and lactation on BMI (18). Women with BMI less than 12.0 or BMI greater than 60.0 were excluded as these might be cases of extreme anthropometric measures or resulting from data errors (19). The Macro Institutional Review Board approved every DHS survey (20). The University of Maryland College Park Institutional Review Board (IRB) reviewed this study's protocol (secondary data analysis without personal identifiers) to determine whether the proposed research met the definition of human subject research and required IRB review, and concluded that this study did not meet the definition of human subject research under the purview of the IRB according to federal regulations and therefore did not require further IRB review.

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Measures

Dependent Variable—The dependent variable was **woman's BMI**, also known as the Quetelet index. BMI is defined as weight in kilograms divided by height squared in meters (kg/m^2). BMI was analyzed using two categories: normal weight (18.5 ≤BMI < 25.0) and overweight (BMI ≥ 25.0). BMI has been widely used as an anthropometric indicator of health, especially for nutrition-related disease among adult women from Sub-Saharan countries and other regions (14, 16). Weight was measured using a solar-powered scale (Uniscale) with an accuracy of ± 100g (14). Height was measured to the nearest 0.1 cm with an adjustable wooden measuring board (Shorr Height boards).

Independent Variable—Wealth was assessed with the **AWI**, a measure developed by Hohmann and Garenne (2011) that captures a wide range of household wealth distribution (11). AWI is a powerful tool for measuring poverty and inequalities and for assessing household wealth differences in various health and demographic outcomes (e.g., fertility, mortality, nuptiality, education, nutritional status) (21). AWI was used as: 1) a continuous variable that included a score from 0 to 14 with 0 indicating no modern goods and 12 or higher indicating all modern comforts (e.g., running water, flushing toilet, electricity, etc.); and, as used in other studies, 2) a categorical variable including poorest: 0–1 (reference group); poorer: 2–3; medium: 4–5; wealthier: 6–7; and wealthiest: 8 or higher (11,19).

Effect Modifier

The effect modifier, **OVC primary caregiving status**, included 4 mutually exclusive categories. Women who were **primary caregivers** cared for a biological and/or non-biological child under the age of 18 living in their household. The OVC primary caregiving status of a woman was based on the question: "How many orphans and vulnerable children live in your household?" For this study, we utilize Demographic Health Surveys' (DHS) definition of OVC: children with one or both parents deceased (orphans); and vulnerable children who (a) have a chronically ill parent (sick for more than 3 consecutive months during the past 12 months) or (b) live with an adult who was chronically ill or died during the past 12 months.

Socio-demographic and household characteristic variables

The following variables were considered as potential confounders: presence of a child 5 years old or younger living in the house, w*omen's marital status, women's age, region of residence, parity*, sex of the household head, number of household members, number of 18–49 year old women in the household, and number of 18–49 year old men in the household.

STATISTICAL ANALYSIS

Statistical analyses included data screening to check for outliers and errors as well as descriptive statistics for continuous and discrete variables. Research AIMS 1 and 2 were addressed by estimating weighted marginal means and their respective 95% confidence intervals. Analytic weights were used to correct for over-sampling and variations in survey response rates by region. Research AIMS 3 and 4 were addressed using adjusted logistic regression models including potential confounders and interaction terms. Significant

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associations were assessed using 95% confidence intervals and p-values ($\alpha \leq 0.05$). Analyses were performed using SPSS® 19. Unadjusted and adjusted logistic regression models were used to determine potential confounders. A variable was included as a confounder if the adjusted odds ratio was 10% different than the unadjusted odds ratio.

Collinearity between each pair of independent variables was tested by using Phi coefficients when both variables were dichotomous and Cramer's V for variables with three or more levels. A pair of independent variables with a Phi or a Cramer's V value of at least .60 was considered to have substantial collinearity and, thus, one of the two variables was removed from the analysis. Multicollinearity among the independent variable and all potential confounders entered in the model was tested using two collinearity statistics: the tolerance value and the *variance inflation factor (VIF). A tolerance value less than 0.1 was considered as an indication for a serious collinearity problem and a VIF greater than 10 was also considered as a cause for concern* (22,23).

RESULTS

Sample characteristics

This study included data on 20–49 year old women from three countries: Namibia (n=6,638), Swaziland (n=2,875), and Zambia (n=4,497). OVC primary caregiving prevalence ranged from 27.0% in Namibia and Swaziland to 28.6% in Zambia (Table 1). The majority of women in Swaziland were overweight but in Namibia and Zambia, the majority of women had normal weight. Over half of the women were living with a child younger than 6 in all three countries. In Namibia and Zambia, women were distributed evenly between rural and urban settings. Namibian and Swazi women were more educated than their counterparts in Zambia.

More than half of OVC primary caregivers in Namibia (58.6%) and Swaziland (53.5%) had secondary or higher education—much higher than in Zambia (36.9%). OVC primary caregivers were also more likely to have never been married in Namibia (41.1%) and Swaziland (28.5%) compared to Zambia (6.5%). OVC primary caregivers in Namibia (42.8%) and Swaziland (46.6%) were not working compared to 32% in Zambia. Among those OVC primary caregivers who were working, a higher percentage were working in agriculture in Zambia (37.2%) than in Namibia (25.9%) and Swaziland (10.7%) (Data not shown).

Mean AWI differences by women's primary caregiving status within countries

OVC primary caregivers in Namibia and Swaziland had lower mean AWI scores than women from the other three caregiving groups (Figure 1). In Zambia, OVC primary caregivers had a lower mean AWI score than non-primary caregivers living with an OVC but a higher mean AWI score than non-OVC primary caregivers.

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Mean AWI differences by country within OVC primary caregivers

OVC primary caregivers in the three countries had mean AWI scores that were categorized as medium wealth (4–5 items). Swazi OVC primary caregivers had a higher mean AWI score than their counterparts in Namibia and Zambia.

Differences in specific wealth items

While half of OVC primary caregivers in Namibia had adequate sources of drinking water and toilet facilities, only fifteen percent of Swazi OVC primary caregivers had an adequate source of drinking water and less than ten percent of them had adequate toilet facilities (Figure 2). A higher proportion of OVC primary caregivers had electricity in Namibia and Zambia (41.70% and 37.5% respectively) than their counterparts in Swaziland (17.3%). Regarding OVC primary caregivers' means for transportation, Zambia had the highest proportion owning a bicycle and Namibia had the highest proportion who owned a motorcycle, a car, or a truck. In the three countries, around one-third of OVC primary caregivers lived in a house that had adequate flooring (e.g., parquet or vinyl) and adequate roof materials (e.g., metal or wood). Regarding their access to mass media, a lower proportion of Swazi OVC primary caregivers had access to television and radio than their counterparts in Namibia and Zambia. However, a higher proportion of Namibian OVC primary caregivers had access to radio compared to their counterparts in Zambia. A considerably higher proportion of OVC primary caregivers had a telephone in Namibia than in Swaziland or Zambia (70.0%, 19.2%, and 10.7%).

Logistic regression models

Adjusted models showed that AWI was associated with women's overweight status in the three countries (Table 2). In Zambia, the poorest women were less likely to be overweight than women from the other four AWI categories. In Swaziland, the poorest women were less likely to be overweight than women who had medium wealth or more.

Effect modification analyses

OVC primary caregiving status modified the effect of the associations between AWI and women's overweight status only in Namibia (Table 3). Among OVC primary caregivers, only women who had medium wealth or more were more likely to be overweight than their counterparts who were poorest.

DISCUSSION

Our first research aim explored whether OVC primary caregivers were facing household wealth disparities. Previous studies have suggested that OVC primary caregivers may be at greater risk of poverty as a result of supporting the health needs of family members due to HIV/AIDS (13,14,24,25). Indeed, this study found that AWI means varied significantly by women's OVC primary caregiving status within countries. Our second research aim explored whether the mean AWI scores for OVC primary caregivers varied by country. Swazi OVC primary caregivers had a higher mean AWI score than their counterparts from Namibia and Zambia.

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Studies in developed countries have shown that lacking household wealth is associated with a higher prevalence of overweight and chronic disease (26,27). In contrast, results from our analysis for research AIM 3—and results from other studies in Africa—have demonstrated the opposite: positive associations between having more wealth (AWI) and being overweight (8,28,29). S. Lopez-Arana et al. (2013) found that the positive association between educational level and overweight in Sub-Saharan Africa was somewhat attenuated, but remained similar between models without wealth and models that incorporated wealth. Using data from 2004–2009, Lopez-Arana also found that 19.6% of OVC primary caregivers were overweight in Sub-Saharan African countries (30). Interestingly, for research AIM 4 we found that OVC primary caregiving modified the association between AWI and women's overweight status only in Namibia. We recommend further studies using other household wealth measurements and performing the analyses for each AWI item separately. These studies could also include additional approaches for creating a household wealth indicator using DHS data such as the multiple correspondence analysis, factor analysis, and/or principal components analysis (31,32). These analyses can test these domains/dimensions and determine if domains have different strengths of associations with overweight status, which was beyond the scope of this article.

Our study also found that a relatively high percentage of OVC primary caregivers were not working in Namibia (42.8%), Swaziland (46.6%) and Zambia (32.0%). In rural areas, at least half of OVC primary caregivers were living in households in the poorest or poor AWI categories (0–3 items), (Namibia: 64.5%, Swaziland: 49.4% and Zambia: 61.8%). This percentage was substantially lower in urban areas ranging from 4.8% in Swaziland to 0.6% in Zambia. Medical support at least once a month during illnesses was not widely available for very sick persons living in OVC households (Namibia: 9.9%, Swaziland: 16.9% and Zambia: 29.1%). Medical care, supplies or medicine in the past 12 months was even less accessible for OVC (Namibia: 2.2%, Swaziland: 5.3% and Zambia: 5.7%). Even though a high percentage of OVC attended school in these countries (Namibia: 94.6%, Swaziland: 92.2% and Zambia: 87.9%), a relatively low percentage of them received school related assistance (allowance, free admission, books or supplies), (Swaziland: 34.0%; Namibia (4.1%) and Zambia (8.1%). Further studies should investigate the mechanisms in which OVC primary caregivers could sustain and be able to take care of the OVC in the absence of income and available health and educational support.

Strengths and Limitations

This study features a representative, large sample of reproductive age women including OVC primary caregivers in communities located in Sub-Saharan Africa. We were able to assess mean AWI differences by women's primary caregiving status within countries, and by country within primary caregiver status. DHS surveys contain core questions that are identical across countries, and height and weight were measured rather than relying on self-reported information.

The AWI measures absolute poverty (or wealth) and produces gradients with respect to health indicators, which are more stable and more robust than those given by wealth quintiles (10). However, AWI means should be interpreted cautiously. Our results also

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suggest that the characteristics of OVC primary caregivers' wealth varied by country. Overall, Namibian OVC primary caregivers had greater access and Swazi OVC primary caregivers had less access to AWI items.

A weakness of this study is its cross-sectional study design, which does not allow it to: 1) determine whether underweight or overweight preceded household wealth indicators; 2) assess whether the child might have moved to live in a wealthier household to receive care; and, 3) assess the length of time the person provided primary caregiving. Previous studies have shown that caregiving is less likely to impact the caregivers' health during the early stages of caregiving (33,34). This study did not measure the intensity of primary caregiving by the type or quantity of assistance provided. Women's health status and dietary food intake were not assessed. The DHS only included one nutritional measurement (BMI) and polygamy was not addressed. The DHS only collected data from 15–49 year old men and women in the household. Future studies stratified by regions (urban/rural) should focus on obesity problems among OVC primary caregivers and household members 50 years old or older and compare weight status of OVC and OVC primary caregivers in addition to their AWI. The household composition of OVC families and the role of male household members as OVC primary caregivers should also be explored. Further studies should examine contributing factors to overweight including distant factors such as globalization and urbanization; intermediate factors such as occupation, social relationships, built environment, and cultural perceptions of weight; and proximate factors such as caloric intake, physical inactivity, and genetics (35).

Due to different contextual factors, this study should be replicated in other African countries to further assess generalizability. Findings may differ for other sub-Saharan countries with different macro economies translated in the dependence of rural labor and/or use of mechanized industry as well as for countries in which the impact of HIV/AIDS and access to retroviral treatments are different. Women working in agricultural occupations are less likely to be overweight compared to women working in higher occupational classes (36). The combination of reduced physical activity due to changes in mechanization and technology affecting women working in agriculture and production, together with changes in dietary habits, have been associated with an increase in the prevalence of overweight and obesity among women (36).

CONCLUSIONS

Future studies/interventions in Swaziland and Zambia should consider using population-based approaches to reach women from every household wealth level to curb overweight. Our findings also call for additional studies focusing on specific household wealth characteristics that are associated with Namibian OVC primary caregivers' overweight status. Such studies are important because even though Namibian OVC primary caregivers are experiencing household wealth disparities compared to other women in their communities, the overweight pandemic has affected all women in these areas—particularly OVC primary caregivers with medium wealth or more (5+ AWI items). As such, nutritional campaigns for OVC families should not only focus on underweight problems because the overweight pandemic has already reached them.

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LIST OF ABBREVIATIONS

AWI	Absolute Household Wealth
DHS	Demographic Health Surveys
OVC	Orphan and Vulnerable Children

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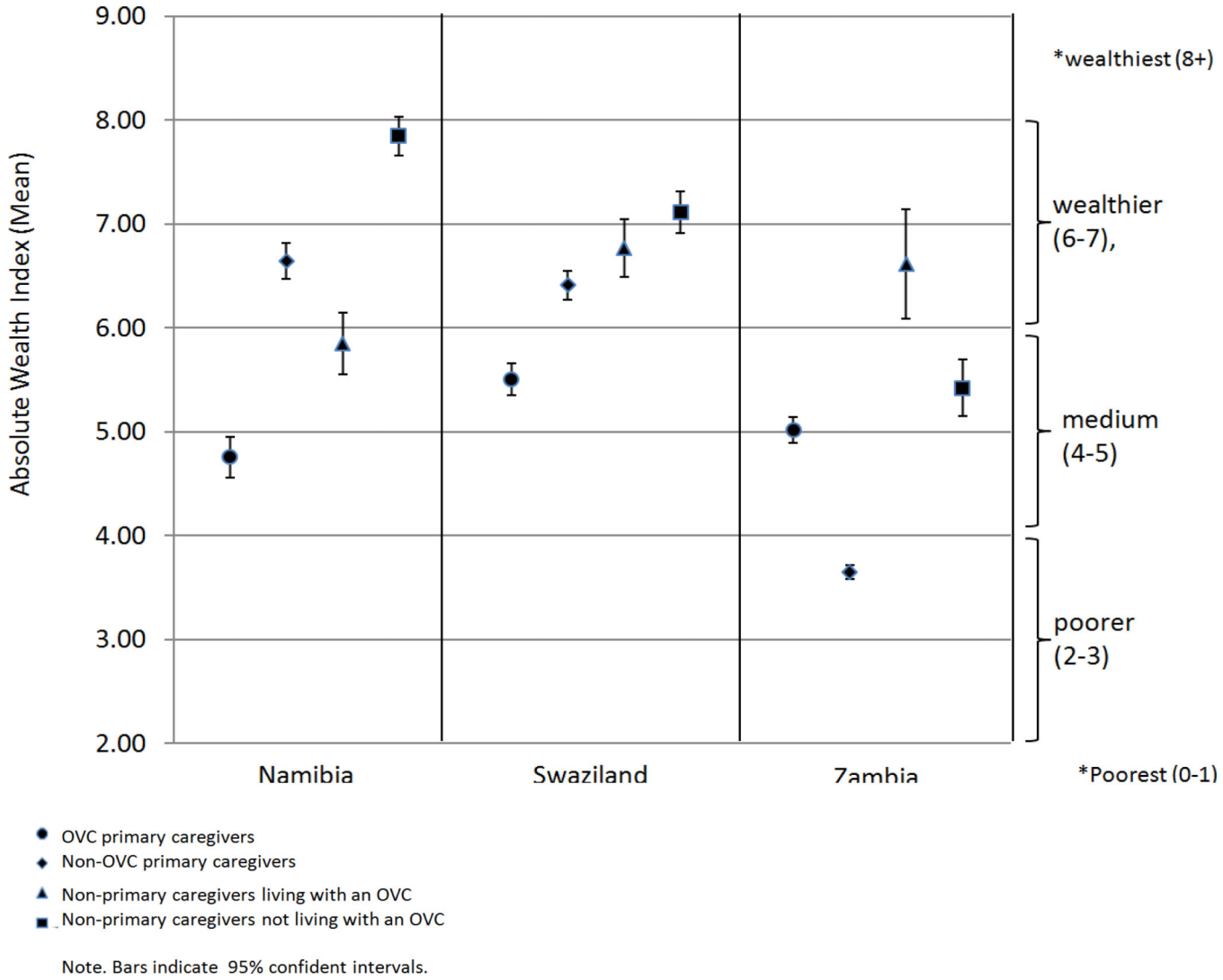

Figure 1.

Mean of the Absolute Wealth Index for women ages 20–49 years from Namibia, Swaziland, and Zambia participating in the Demographic Health Survey (2006–2007) by orphan and vulnerable child (OVC) primary caregiving status and country.

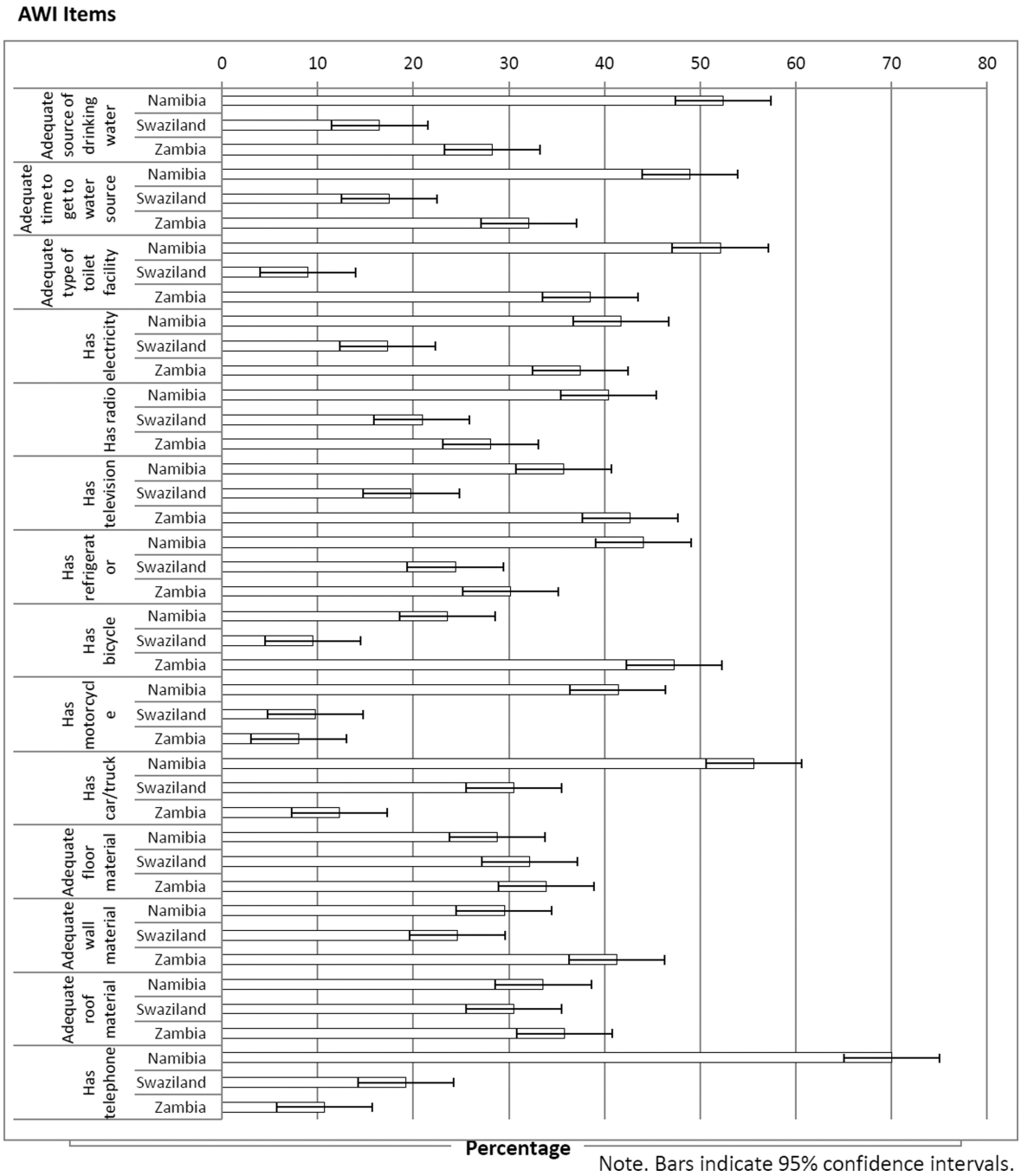

Figure 2.

Prevalence of the possession of individual Absolute Wealth Index items for women ages 20–49 years from Namibia, Swaziland, and Zambia participating in the Demographic Health Survey (2006–2007) by country.

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Table 1

Socio-demographic characteristics by country.

	Namibia (n=6,305) n (%)		Swaziland (n=2,786) n (%)		Zambia (n=4,389) n (%)	
Nutritional status[a]						
-Underweight	756	(12.0%)	51	(1.8%)	373	(8.5%)
-Normal Weight	3,372	(53.5%)	1,077	(38.7%)	3,049	(69.5%)
-Overweight	2177	(34.5%)	1,658	(59.5%)	967	(22.0%)
OVC primary caregiving status						
-OVC caregiver	1,709	(27.1%)	760	(27.3%)	1,255	(28.6%)
-Non-OVC caregiver	2,737	(43.4%)	1,574	(56.5%)	2,500	(57.0%)
-Non-caregiver living with OVC	655	(10.4%)	118	(4.2%)	239	(5.4%)
-Non-caregiver not living with OVC	1,204	(19.1%)	334	(12.0%)	395	(9.0%)
Women's Education						
-No Education	586	(9.3%)	291	(10.4%)	539	(12.3%)
-Primary Education	1,744	(27.7%)	854	(30.7%)	2,343	(53.4%)
-Secondary Education	3,537	(56.1%)	1,328	(47.7%)	1,207	(27.5%)
-Higher Education	438	(6.9%)	313	(11.2%)	300	(6.8%)
Women's Age in Years						
Mean Age in Years (standard deviation)	32.37	(8.38)	32.13	(8.60)	31.75	(8.29)
Women's marital						
-Never Married	2,897	(46.0%)	976	(35.0%)	570	(13.0%)
-Married/living together	2,820	(44.7%)	1,453	(52.2%)	3,054	(69.6%)
-Widowed	241	(3.8%)	233	(8.4%)	286	(6.5%)
-Divorced	83	(1.3%)	17	(0.6%)	357	(8.1%)
-Not living together	261	(4.1%)	107	(3.8%)	122	(2.8%)
Women's work status [b]						
-Not working	2,434	(38.9%)	1,186	(42.6%)	1,543	(35.2%)
-Working in agriculture	653	(10.4%)	164	(5.9%)	1,294	(29.5%)
-Working other than agriculture	3,168	(50.6%)	1,433	(51.5%)	1,544	(35.2%)
Region of Residence						

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	Namibia (n=6,305) n (%)		Swaziland (n=2,786) n (%)		Zambia (n=4,389) n (%)	
-Urban	2,934	(46.5%)	1,019	(36.6%)	1,959	(44.6%)
-Rural	3,371	(53.5%)	1,767	(63.4%)	2,430	(55.4%)
Religious affiliation						
-Protestant	4,804	(76.4%)	499	(17.9%)	3,466	(79.1%)
-Roman Catholic	1,390	(22.1%)	14	(0.5%)	839	(19.1%)
-Other/no religion	98	(1.6%)	2,272	(81.6%)	78	(1.8%)

[a] Underweight (BMI < 18.5), normal weight (18.5 ≤ BMI < 25.0), and overweight (BMI ≥ 25.0).

[b] Non-agricultural jobs include the following: professional, technical, management, clerical, sales, household and domestic services, skilled or unskilled manual jobs. Agricultural jobs include self-employed as well as employed people.

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Table 2

Association between AWI and women's overweight status.

	Namibia[¥] (n=6,638) n (%)			Swaziland[//] (n=2,875) n (%)			Zambia[Γ] (n=4,497) n (%)		
	Odds Ratio	**95% C.I.**	**P-Value**	**Odds Ratio**	**95% C.I.**	**P-Value**	**Odds Ratio**	**95% C.I.**	**P-Value**
				Overweight vs. Normal Weight					
Unadjusted Models									
Poorest (0–1 AWI items)	1.00			1.00			1.00		
Poorer (2–3 AWI items)	1.93	(1.51, 2.48)	***	1.32	(0.90, 1.94)		1.45	(1.10, 1.90)	**
Medium wealth (4–5 AWI items)	3.44	(2.66, 4.44)	***	1.56	(1.09, 2.23)	*	3.40	(2.57, 4.49)	***
Wealthier (6–7 AWI items)	4.29	(3.31, 5.55)	***	2.17	(1.48, 3.17)	***	4.85	(3.63, 6.47)	***
Wealthiest (8+ AWI Items)	6.39	(5.09, 8.02)	***	2.56	(1.80, 3.64)	***	6.85	(5.32, 8.81)	***
Adjusted Models									
Poorest (0–1 AWI items)	1.00			1.00			1.00		
Poorer (2–3 AWI items)	1.40	(0.95, 2.07)		1.45	(0.97, 2.17)		1.37	(1.04, 1.80)	*
Medium wealth (4–5 AWI items)	2.91	(1.92, 4.43)	***	1.77	(1.21, 2.58)	**	2.74	(2.02, 3.71)	***
Wealthier (6–7 AWI items)	4.07	(2.62, 6.33)	***	2.77	(1.86, 4.14)	***	3.67	(2.63, 5.11)	***
Wealthiest (8+ AWI Items)	8.32	(5.70, 12.16)	***	3.56	(2.44, 5.19)	***	5.10	(3.68, 7.06)	***

[*] p value <0.05,

[**] p value <0.01,

[***] p value < 0.001

[¥] Controlled for OVC primary caregiving status, parity, and the interaction between OVC primary caregiving status and AWI.

[//] Controlled for OVC primary caregiving status, women's parity and age.

[Γ] Controlled for women's education, parity, region, and marital status.

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Table 3

Association between AWI and women's overweight status stratified by OVC primary caregiving status in Namibia.

	OVC primary caregivers			Non-OVC primary caregivers			Non-primary caregivers living with an OVC			Non-primary caregivers not living with an OVC		
	Odds Ratio	**95% C.I.**	**P-Value**	**Odds Ratio**	**95% C.I.**	**P-Value**	**Odds Ratio**	**95% C.**	**P-Value**	**Odds Ratio**	**95% C.I.**	**P-Value**
Namibia												
Adjusted Models[//]												
Poorest (0–1 AWI items)	1.00			1.00			1.00			1.00		
Poorer (2–3 AWI items)	1.41	(0.95, 2.08)		2.52	(1.71, 3.72)	***	5.00	(1.45, 17.22)	*	2.50	(1.11, 5.62)	*
Medium wealth (4–5 AWI items)	2.94	(1.94, 4.48)	***	4.32	(2.91, 6.42)	***	7.52	(2.05, 27.66)	**	3.13	(1.40, 6.98)	**
Wealthier (6–7 AWI items)	4.14	(2.66, 6.45)	***	5.97	(4.02, 8.89)	***	12.64	(3.56, 44.91)	***	3.10	(1.39, 6.92)	***
Wealthiest (8+ AWI Items)	8.63	(5.86, 12.72)	***	9.81	(6.89, 13.96)	***	13.05	(3.84, 44.30)	***	5.45	(2.60, 11.43)	***

[*] p value <0.05,

[**] p value <0.01,

[***] p value < 0.001

[//] Adjusted for parity.