WOMEN'S AUTONOMY, STATUS, AND NUTRITION IN ZIMBABWE, ZAMBIA, AND MALAWI

Michelle J. Hindin

1 INTRODUCTION

There are several countries in southern Africa that have been experiencing both a food crisis and an HIV epidemic. According to UNAIDS (UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance, 2001), in 2002 an estimated 14.4 million people were at risk of starvation in Lesotho, Malawi, Mozambique, Swaziland, Zambia, and Zimbabwe. This food crisis, which has been evolving since the 1992 southern African drought, has also been associated with "alarmingly high prevalence rates" of HIV. In the past, households in these nations were able to cope with food crises through producing food, earning cash from food produced, and relying on trading and bartering; however, HIV/AIDS, according to UNAIDS, has led to an erosion of coping mechanisms with food shortages. I hypothesize that in these highly constrained settings, women with low autonomy and status will be less likely to obtain adequate food resources and will then be more likely to experience undernutrition or chronic energy deficiency (CED).

1.1 Defining a "Resource-Constrained" Context

As of 2003, there are six countries suffering from both periodic food shortages and the effects of high prevalence of HIV. These countries include Malawi, Zambia, and Zimbabwe. According to a mission report to the United Nations in 2003 (Morris and Lewis, 2003), there are three unique factors in the current food shortage in southern Africa. In this most recent food emergency, the shortage was worsened by HIV/AIDS through the loss of productive working adults who can bring food to households and, in particular, the loss of women who have been the main providers of food security in many of these households. In addition, many households have lost breadwinners and caregivers, leaving households even poorer and more vulnerable to starvation, and therefore more vulnerable to HIV. This report also suggests that populations highly affected by HIV are likely to experience continued food crises (Morris and Lewis, 2003).

In addition to the current food crisis, there has been a series of food shortages since the drought of 1992 (Southern African Development Community [SADC], Food, Agriculture and Natural Resources [FANR] Vulnerability Assessment Committee, 2003). A report from the SADC on Malawi, Zambia, and Zimbabwe finds that households affected by HIV (either through morbidity, mortality, or high demographic load characterized by a high dependency ratio or the presence of orphans) have reduced agricultural production and nonfarm income, which has led to lower levels of food security (SADC FANR Vulnerability Assessment Committee, 2003). A recent report on African food security suggests that the food price index has soared, and Zambia, Malawi, and Zimbabwe are among countries most adversely affected (Rukuni, 2002). By the end of 2001, an estimated 33.7 percent of adults in Zimbabwe, 21.5 percent of adults in Zambia, and 15 percent of adults in Malawi were living with HIV/AIDS (SADC FANR Vulnerability Assessment Committee, 2003).

1.2 HIV and Nutritional Status

Since the onset of the HIV epidemic, numerous studies have documented that one of the clinical problems associated with the disease is muscle wasting. Recent evidence, drawn from developed nations with access to antiretroviral therapies, demonstrates a continued strong link between HIV and nutritional status. Several recent reviews have documented that malnutrition is a major complication of HIV and that malnutrition is associated with increased mortality, faster disease progression and decreased functional status (Grinspoon and Mulligan, 2003; Wanke et al., 2003; Salomon et al., 2002). These studies, in developed nations, note that although antiretroviral therapies are commonly administered, nutritional complications with HIV persist.

In the developing world, HIV and nutrition continue to be linked in the same way as that seen in the early phases of the HIV epidemic in the developed world. In Malawi, a recent study of individuals admitted for tuberculosis showed that 80 percent of them had HIV. Among these patients, malnutrition, as measured by body mass index (BMI) was associated with mortality (Zachariah et al., 2002). Malnutrition was also prevalent among inpatients in a Burundi hospital, with food availability being the leading cause of malnutrition among HIV-seronegative patients and tuberculosis being a leading cause of malnutrition among HIV-seropositive patients (Niyongabo et al., 1999). In a context where HIV worsens nutritional status and food shortages increase vulnerability to HIV, women's roles as food providers have become increasingly complex and difficult. According to the United Nations Administrative Committee on Coordination/Sub-committee on Nutrition (ACC/SCN, 2001:7), "at the social level, food insecurity is a major cause of vulnerability to HIV." This operates through reduced agricultural production, leading to increased difficulties for households. For example, women can be forced to trade sex for food or money, increasing their vulnerability to HIV.

1.3 Women's Autonomy and Anthropometry

Although women have tended to be producers for the family in many agricultural settings, their lack of access to the income from this labor leaves them resource-poor (Abbas, 1997). There has been some evidence to suggest that women who have lower levels of autonomy and status within in the household are more likely to experience undernutrition (Hindin, 2000) or have a lower BMI (Bindon and Vitzthum, 2002; Baqui et al., 1994). The theoretical rationale for why this may be the case is outlined in a paper on Zimbabwe by Hindin (2000), who suggests that women's health can be adversely affected if they are unable to negotiate for themselves, particularly in resource-constrained settings.

A combination of factors suggests that women with less autonomy and status will have poorer health, based on having a higher prevalence of CED. These factors include the fact that many households in these settings have been affected by the HIV/AIDS epidemic either directly, through loss of a family member, or indirectly, through the poor economic prospects in communities that have experienced substantial losses in the economically independent population. In addition, Malawi, Zambia, and Zimbabwe have undergone a series of droughts that have led to poor food security throughout these nations. At the same time, gender norms in these countries often arise out of patrilineal and patrilocal practices that put women at a disadvantage when it comes to intrahousehold bargaining and resource allocation. In these highly resource-constrained settings, women with low autonomy will be less likely to obtain adequate food resources and may, in the long run, be at greater risk for contracting HIV/AIDS or having a more rapid progression of the disease if they have already contracted the virus. In addition, since women are the primary producers of food

in these nations, the HIV/AIDS epidemic can compromise women's ability to devote as much time to food production because of additional care-giving responsibilities, adding indirectly to food insecurity in all constrained households.

2 METHODOLOGY

2.1 Sample

Three Demographic and Health Surveys were obtained from MEASURE DHS for these analyses: the 1999 Zimbabwe Demographic and Health Survey (DHS), the 2000 Malawi DHS, and the 2001-2002 Zambia DHS. Each of these surveys collected nationally representative data on reproductive health issues from women age 15-49. For the purposes of this paper, in each of the three countries, the sample was limited to nonpregnant married or cohabiting women who had not given birth in the past three months. Since many of the key issues in this paper are focused on relationships, the sample needed to be limited to those women in partnerships. All women who reported being in a partnership at the time of the survey were included; however, a variable was created to determine whether or not the partner was co-residing at the time of the survey. Because there are different sets of nutritional guidelines and weight expectations for pregnant and lactating women, the sample was limited to women who were not currently pregnant or had recently given birth. These constraints led to a sample of 2,667 women in Zimbabwe, 3,485 women in Zambia, and 6,854 women in Malawi.

2.2 Dependent Variable

CED is based on an internationally derived standard. It is a dichotomous measure based on the standard BMI cutoff of <18.5 (James et al., 1988).

2.3 Independent Variables

Measures of sociodemographic characteristics and women's and partners' characteristics. The sociodemographic characteristics of the sample are divided into two groups: household characteristics and women's characteristics. Urban residence is a dichotomous variable based on the woman's place of usual residence. Household wealth was calculated as a weighted sum of whether or not the household had the following items: electricity, radio, television, scooter, bicycle, cement floor, and flush toilet. The weights were calculated as the inverse of the proportion of households in the sample that had these items. The number of births the woman had was used as a dichotomous variable, with women having no births compared with other women. Household size was left as a continuous measure of the number of individuals per household. Two additional sociodemographic measures were included to better describe the partnership: the first was whether or not the woman and her partner were currently in the same household at the time of the survey, and the second measure was whether or not the partner was polygynous. Whether or not the woman was literate (excluded in the Zimbabwe analysis because of collinearity with education) and her current employment status at the time of the survey were included as dichotomous variables; however, the woman's occupation was used instead of current employment status. Occupation was divided into six categories: unemployed, working in agriculture, unskilled manual, skilled manual, nonmanual, and professional. Since few women were in skilled manual jobs, for modeling, the skilled and unskilled manual laborers were combined. Women's ages were used as continuous measures. Education (for both the respondent and her partner) was coded in four levels: no schooling, some primary school, completed primary school, and began secondary school or more. Partners'

characteristics include their age, education, and occupation. In Zambia, women were asked whether they were ever physically abused by their spouses, and this variable was included in the Zambian analyses.

2.4 Measures of Women's Relative Status, Women's Status in Society, and Decisionmaking Autonomy

Women's relative status. Women's relative status is conceptualized as their status relative to their partner's status in terms of age, education and occupation. For age, three categories were used on the basis of the continuous measures of age: 1) respondents who were four or more years older than their partners, 2) respondents who were six or more years younger than their partners, or 3) everyone else who was near the same age as their partners. For education, four levels were used for both respondents and their partners: no schooling, some primary school, completed primary school, or attended some secondary school or more. Relative educational status was calculated as a difference between the partners' schooling levels with three categories: respondent has more, the couple has same level, or the partner has more. For occupation, six levels were used for the respondents and their partners: not working, agricultural, unskilled manual, skilled manual, nonmanual, and professional. A relative occupational difference was calculated using five categories: both unemployed, both in agriculture, respondent at a higher level, couple at equal levels, and partner at a higher level. In Malawi, no women reported that their partners were unemployed, so there is no category for "both unemployed." Few women in all three countries were in unskilled manual labor, so unskilled manual and skilled manual levels were combined for the multivariate analyses.

Women's status in society. In each of the surveys, women were asked about their attitude toward wife beating.

> *Sometimes a husband is annoyed or angered by things which his wife does. In your opinion, is a husband justified in beating his wife in the following situations:*
>
> *If she goes out without telling him?*
> *If she neglects the children?*
> *If she argues with him?*
> *If she refuses sex with him?*
> *If she burns the food?*

From these dichotomous variables (yes/no), an index was created on the basis of whether women think it is justified for a husband to beat his wife, under any of the circumstances. This variable is used as a proxy to measure women's status or lack thereof (self-perceived) within each of the three countries.

Measures of decisionmaking. Depending on the survey, a different set of domains were included in terms of decisionmaking. The domains included for the Zimbabwean women are based on a series of four questions about who makes the decisions. In Zimbabwe and Malawi, women were asked—

> *Who in your family usually has the final say on the following decisions?*
>
> *Your own health*
> *Large household purchases*

Daily household purchases
Visits to family, friends, or relatives
Food to be cooked each day

In Malawi, an additional domain was included:

Number of children and when

In Zambia, the domains included the following:

Your own health care
Large household purchases
Visits to family, friends, or relatives
Number of children and when

For each of these questions, the women were given the following response options: 1) themselves (respondent), 2) husband/partner, 3) respondent and husband/partner jointly, 4) someone else, and 5) respondent and someone else jointly. A set of dichotomous variables was created for each of the decisionmaking domains to reflect patterns of decisionmaking. For each domain, the variable was coded as 1 if the woman had final say over that decision alone and "0" if the woman did not have final say alone. A similar set of dichotomous variables was created for each domain on the basis of whether or not the partner had final say in the decision or whether the final decision was made jointly. From the sets of dichotomous variables, indices were created to show the number of domains in which women or their partners had final say or whether the final decision was made jointly. Because the goal of these indices is to represent a range of domains, it was anticipated that alpha coefficients, showing the inter-item correlations, would be moderate—around 0.70. In Zimbabwe, the decisionmaking indices had alpha coefficients as follows: for respondent having the final decision (Cronbach's alpha=0.58), partner having the final say (Cronbach's alpha=0.65), and joint final decision (Cronbach's alpha=0.67). In Zambia, the decisionmaking indices had alpha coefficients as follows: for respondent having the final decision (Cronbach's alpha=0.50), partner having the final say (Cronbach's alpha=0.74), and joint final decision (Cronbach's alpha=0.73). In Malawi, the decisionmaking indices had alpha coefficients as follows: for respondent having the final decision (Cronbach's alpha=0.70), partner having the final say (Cronbach's alpha=0.76), and joint final decision (Cronbach's alpha=0.71).

2.5 Statistical Analyses

The analyses were completed in four parts. First, descriptions of the study population and its sociodemographic measures, women's status, and decisionmaking autonomy were provided for each country. With ordered logistic regression, possible confounders of the relationship between CED and decisionmaking autonomy were tested by modeling the associations between decisionmaking and the sociodemographics, woman's characteristics, women's relative status, and women's status in society. Bivariate associations with CED were explored with cross-tabulations, and multivariate logistic regression was used to explore associations with adjustment for confounders.

3 RESULTS

3.1 Background Characteristics

Table 1 shows the percent distribution of women by sociodemographic characteristics, women's characteristics, husband's or partner's characteristics, couple's characteristics, women's relative status, and women's autonomy in household decisionmaking. In Zimbabwe, the percentage of women with CED is 4.6, in Zambia, the percentage of women with CED is 13.9, and in Malawi, it is 6.8. Some characteristics are quite similar across the three countries, with all residences being predominately rural (70 to 80 percent), most women having had at least one birth (94 to 96 percent), and polygyny being confined to a minority of households (approximately 16 to 17 percent). More than 50 percent of the women report currently working at the time of the survey, with most employed in agricultural jobs on their own land. The mean age of the samples ranges between 31 and 32 years old. Zambia has the largest number of people per household with 6.3; Zimbabwe has 5.6, and Malawi has 5.3 people in the average household. Malawi has some of the lowest indicators for women, with the lowest literacy rate and the highest percentage of women and men who did not attend any formal schooling. In Zimbabwe, 29 percent of women reported that their partner was not living with them, in contrast to 13 percent in Malawi and 6 percent in Zambia. Whether or not the partner lives in the household can have an important relationship with both the availability of food resources and women's autonomy in decisionmaking.

Table 1 Percent distribution of women in Zimbabwe, Zambia, and Malawi, by selected background variables, DHS surveys in Zimbabwe (1999), Zambia (2000-01), and Malawi (2000)

Variable	Zimbabwe	Zambia	Malawi
Chronic energy deficiency			
No	95.4	86.1	93.2
Yes	4.6	13.9	6.8
SOCIODEMOGRAPHIC CHARACTERISTICS			
Residence			
Rural	72.0	69.7	79.9
Urban	28.0	30.3	20.1
Household wealth			
Range	0-128.0	0-174.1	0-130.0
Mean (SD)	7.7 (12.6)	6.9 (14.3)	7.1 (13.8)
Number of births			
None	6.2	5.5	6.3
One or more	93.8	95.5	93.7
Household size			
Range	1-20	1-26	1-21
Mean (SD)	5.6 (2.7)	6.3 (2.9)	5.3 (2.4)
Husband/partner living in household			
No	28.7	6.2	12.9
Yes	71.3	93.8	87.1
Husband/partner is polygynous			
No	84.3	82.9	82.6
Yes	15.7	17.1	17.4
WOMEN'S CHARACTERISTICS			
Literate			
No	26.0	43.5	48.6
Yes	74.0	56.5	51.4
Currently working			
No	45.6	35.4	38.8
Yes	54.4	64.6	61.2
Age			
Range	15-49	15-49	15-49
Mean (SD)	31.6 (8.7)	30.9 (8.8)	30.7 (8.9)
Education level			
None	10.7	15.9	34.2
Some primary	25.3	42.2	43.5
Completed primary	24.3	20.6	7.5
Secondary or more	39.6	21.4	16.5
Occupation			
Not working	41.5	35.4	41.2
In agriculture	27.1	41.3	51.3
Unskilled/skilled manual	8.7	3.5	3.6
Nonmanual	17.9	17.5	1.4
Professional	4.8	2.3	2.5
HUSBAND'S/PARTNER'S CHARACTERISTICS			
Age			
Range	17-88	17-87	16-85
Mean (SD)	36.4 (11.7)	38.0 (11.4)	37.0 (10.6)
Education level			
None	6.3	8.5	15.3
Some primary	19.7	25.3	36.5
Finished primary	23.4	25.2	9.2
Secondary or more	50.6	41.0	38.9
Occupation			
Not working	3.6	2.5	0.0
In agriculture	19.8	55.4	59.2
Unskilled manual	13.2	0.7	0.7
Skilled manual	19.2	15.9	21.6
Nonmanual	24.3	18.9	26.0
Professional	36.5	6.6	6.9

Continued …

Table 1 *(continued)*

Variable	Zimbabwe	Zambia	Malawi
COUPLE'S CHARACTERISTICS/ WOMEN'S RELATIVE STATUS			
Age difference between partners			
Woman older by 4 years or more	1.3	0.9	1.2
Same age (woman<4 years older, partner<6 years older)	45.3	44.8	52.4
Partner older by 6 years or more	53.4	54.4	46.4
Education level difference between partners			
Woman more	15.3	11.4	10.1
Same level	51.4	41.9	47.0
Partner more	33.3	46.7	42.9
Occupational type difference between partners			
Both unemployed	7.5	1.3	u
Both in agriculture	12.0	48.5	40.9
Woman higher	16.7	11.5	3.6
Same level	11.3	9.0	2.8
Partner higher	52.2	42.5	52.7
Woman ever beaten by partner			
No	u	58.1	u
Yes		41.9	
AUTONOMY IN DECISIONMAKING			
Final say over health care			
Partner	31.1	52.0	69.7
Joint	13.2	13.0	7.5
Woman	55.7	35.0	22.8
Final say over large purchases			
Partner	35.7	61.7	80.7
Joint	46.4	26.9	12.5
Woman	17.9	11.3	6.7
Final say over what to cook			
Partner	3.0	u	64.4
Joint	5.8		13.3
Woman	91.2		22.3
Final say over household purchases			
Partner	15.7	u	40.3
Joint	21.7		10.8
Woman	62.6		48.9
Final say over visiting relatives			
Partner	20.4	55.3	36.0
Joint	46.1	28.0	45.0
Woman	33.5	16.7	19.0
Final say over number of children and when			
Partner	u	51.1	43.7
Joint		39.1	47.1
Woman		9.8	9.2
Respondent decisionmaking index			
Range	0-5	0-4	0-6
Mean (SD)	2.6 (1.3)	0.7 (0.9)	1.3 (1.5)
Joint decisionmaking index			
Range	0-5	0-4	0-6
Median (SD)	1.4 (1.3)	1.1 (1.3)	3.4 (1.9)
Partner decisionmaking index			
Range	0-5	0-4	0-6
Median (SD)	1.0 (1.3)	2.2 (1.5)	2.9 (1.6)

Continued …

Table 1 *(continued)*

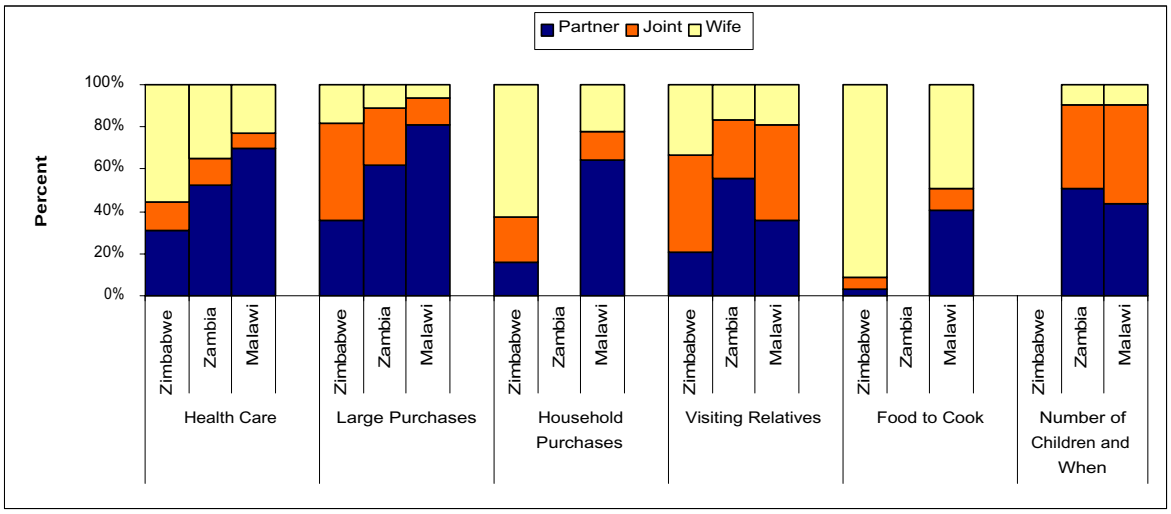
Variable	Zimbabwe	Zambia	Malawi
WOMEN'S STATUS IN SOCIETY			
Okay to beat wife if she goes out without permission			
No	70.6	17.6	82.4
Yes	29.4	82.4	17.6
Okay to beat wife if she neglects the children			
No	67.0	36.2	77.7
Yes	33.0	63.8	22.3
Okay to beat wife if she argues with her spouse			
No	64.2	43.5	80.6
Yes	35.8	56.5	19.4
Okay to beat wife if she refuses to have sex			
No	73.6	47.5	81.1
Yes	26.4	52.5	18.1
Okay to beat wife if she burns the food			
No	87.2	52.2	83.2
Yes	12.8	47.8	16.6
Wife beating index, 0-5, mean (SD)	1.4 (1.6)	3.0 (1.8)	0.9 (1.5)
Number	2,667	3,485	6,854

u = Unknown (not available)

In terms of women's relative status, in all three countries only a few women (approximately 1 percent) are older than their partners by more than four years; in Zimbabwe and Zambia, most partners are more than six years older than their wives; in Malawi, most couples are the same age. In all three countries, women and men attain about the same level of education, or men have more education than their partners. In Zimbabwe, 17 percent of women have a higher status job than their partner, compared with 12 percent in Zambia and 4 percent in Malawi.

The patterns of household decisionmaking are shown in Figure 1. In Zimbabwe, women have substantially more autonomy than women do in either of the other two countries. Although the decisionmaking domains vary by country, a general pattern emerges. In Malawi, men are more likely to have the sole final say over large household purchases and women's own health care. In Zimbabwe, women are more likely to have the sole final say than their partners over their own health care, household purchases, and what food to cook; the decisions concerning large purchases and visiting relatives are primarily made jointly. In Zambia, men are more likely to have the sole final say in all four domains queried. Three of the four decisions are more often made jointly than by the respondent alone, but more women have the final say over their health care. In terms of women's status in society, 88 percent of women in Zambia, 54 percent of women in Zimbabwe, and 36 percent of women in Malawi believe that wife beating is justified in at least one of the five domains posed in the questionnaire (data not shown).

Figure 1 Percent distribution of persons who contribute to the final decision by country, according to household decisionmaking domain



3.2 Factors Associated with Decisionmaking Autonomy

Tables 2 through 4 show the results of ordered multivariate logistic regressions with each of the three decisionmaking autonomy indices as outcomes and with sociodemographics, women's characteristics, women's relative status, and women's status in society as independent variables for each country. For each country, three separate models were run. Net of the other factors in the models, many of the same factors are associated with decisionmaking autonomy across the three countries. Among the sociodemographic characteristics, having an urban residence, a partner living at home, and a polygynous partner are all associated with decisionmaking autonomy. In all three countries, urban women report that their partners have the final say in fewer decisions, and in Zambia and Malawi, urban residence is associated with more decisions where the woman has final say. In all three countries, having the partner living in the same household as the woman is associated with fewer decisions being made by the women and more decisions being made by the partner. In both Zimbabwe and Malawi, the presence of a male partner is associated with more joint final say. Polygynous men have more final say than women in Zimbabwe and Malawi, and in all three countries, polygynous households have the fewest number of decisions made jointly. Higher levels of household wealth are associated with more joint decisionmaking and less decisionmaking by the women alone, and in Zambia, women in larger households make fewer final household decisions alone.

In terms of women's characteristics, age is a consistent factor associated with decisionmaking in all three countries. Older women report having the final say alone in more decisions, and younger women report more decisions being made by their partners alone. In Malawi, older women also report more jointly made decisions. In Zimbabwe, more educated women report having the final say in fewer decisions, but have more joint decisions. In Zambia and Malawi, more educated women report having more final say in decisions and report that their partners have the final say in fewer of the decisions. In Zimbabwe, women employed in nonmanual and professional occupations have the final say in more domains, compared with unemployed women, and professional women report that their partners have the final say in fewer domains. In Zambia, compared with unemployed women,

women in nearly all occupations have the final say in more decisions and report that their partners have the final say in fewer decisions. In Malawi, there is a general trend toward employed women having the final say in more domains, and it is clear that women's employment is inversely related to partners having the final say in more domains. Employed women in Malawi also report more decisions being made jointly.

Few of the relative status variables are statistically significant in these models, after controlling for the sociodemographic characteristics, women's characteristics, and women's status in society. In Zimbabwe, the only significant result is that when both women and their partners work in agriculture, they make more joint decisions. In Zambia and Malawi, women who have more education than their partners make more decisions, and in Malawi, women with more education than their partners have partners who make fewer decisions. In Zambia, women who are more than four years older than their partners make more decisions jointly, and fewer decisions are made by their partners. In terms of relative occupational status, women who report having a higher level of education than their partners also make fewer decisions on their own or jointly, and they have partners who make more decisions. When the partners have a higher level of education, women make fewer of the decisions, and more decisions are made solely by the partner. In Malawi, couples who both work in agriculture made fewer decisions jointly than couples at the same occupational level who do not work in agriculture. In all three countries, women's attitudes toward wife beating are related to household decisionmaking. In Zimbabwe and Zambia, women who find wife beating justifiable are more likely to report that their husbands have the final say in more household decisions. In Malawi, women who find wife beating justifiable have the final say themselves in more household decisions.

Table 2 Multivariate ordered logistic regression of variables associated with decisionmaking autonomy in Zimbabwe (odds ratios), DHS survey in Zimbabwe (1999)

Variable	Number of decisions where respondent has final say	Number of decisions where partner has final say	Number of decisions where final say is made jointly
SOCIODEMOGRAPHIC CHARACTERISTICS			
Urban residence	1.22+	0.71**	1.22+
Household wealth	1.00	1.00	1.00
Had at least one birth	1.23	0.90	1.01
Household size	0.94	1.01	1.03+
Partner is at home	0.32***	1.76***	1.71***
Partner is polygynous	1.14	1.54***	0.50***
WOMEN'S CHARACTERISTICS			
Women's age (years)	1.02***	0.98***	1.00
Women's education level			
None (comparison)	1.00	1.00	1.00
Some primary	0.85	0.97	1.29
Completed primary	0.69*	1.07	1.52*
Secondary or more	0.78	0.96	1.52*
Women's employment			
Not working (comparison)	1.00	1.00	1.00
In agriculture	1.13	1.00	0.94
Unskilled	1.46	0.67	1.11
Skilled manual	1.08	0.82	1.07
Nonmanual	1.56*	0.84	0.87
Professional	1.69*	0.40***	1.24
WOMAN'S RELATIVE STATUS			
Age difference			
Woman older	1.08	1.01	1.04
Same age (comparison)	1.00	1.00	1.00
Partner older	0.98	1.12	0.87
Education level difference			
Woman more	1.10	0.82	1.04
Same level (comparison)	1.00	1.00	1.00
Partner more	1.03	0.96	1.04
Occupational level			
Both unemployed	0.76	1.21	0.90
Both in agriculture	0.81	0.74+	1.65***
Woman higher	0.73+	1.25	1.02
Same level (comparison)	1.00	1.00	1.00
Partner higher	0.71+	1.09	1.09
WOMEN'S STATUS IN SOCIETY			
Number of domains where wife beating is justified	1.03	1.11***	0.89***
Number	1,872	1,872	1,872

***P < 0.001; **P < 0.01; *P < 0.05; +P < 0.10

Table 3 Multivariate ordered logistic regression of factors associated with decisionmaking autonomy in Zambia (odds ratios), DHS survey in Zambia (2000-01)

Variable	Number of decisions where respondent has final say	Number of decisions where partner has final say	Number of decisions where final say is made jointly
SOCIODEMOGRAPHIC CHARACTERISTICS			
Urban residence	1.03***	0.69***	1.06
Household wealth	1.00	1.00	1.00
Had at least one birth	1.12	1.02	1.09
Household size	0.96***	1.00	1.01
Partner is at home	0.38***	1.89***	1.26
Partner is polygynous	1.00	1.39***	0.66***
WOMEN'S CHARACTERISTICS			
Women's age (years)	1.02***	0.99**	1.00
Literate	0.87	1.02	1.13
Women's education level			
None (comparison)	1.00	1.00	1.00
Some primary	0.83	1.17	0.94
Completed primary	0.81	1.38*	0.84
Secondary or more	0.96	0.86	1.36+
Women's employment			
Not working (comparison)	1.00	1.00	1.00
In agriculture	2.45***	0.61**	1.03
Unskilled manual	0.52	0.48	2.05
Skilled manual	2.67***	0.48**	1.19
Nonmanual	3.28***	0.34***	1.27
Professional	4.55***	0.14***	2.89***
WOMEN'S RELATIVE STATUS			
Age difference			
Woman older	1.22	0.84*	1.23**
Same age (comparison)	1.00	1.00	1.00
Partner older	1.03	0.69	1.39
Education level difference			
Woman more	1.48**	0.95	0.78+
Same level (comparison)	1.00	1.00	1.00
Partner more	1.00	0.98	1.01
Occupational level			
Both unemployed	1.10	1.39	0.48+
Both in agriculture	0.75+	1.05	1.19
Woman higher	0.52**	1.26***	0.59*
Same level (comparison)	1.00	1.00	1.00
Partner higher	0.50**	2.45***	0.76
WOMEN'S STATUS IN SOCIETY			
Number of domains where wife beating is justified	0.97	1.10***	0.91***
Number	2,663	2,663	2,663

***P < 0.001; **P < 0.01; *P < 0.05; +P < .10

Table 4 Multivariate ordered regression of factors associated with decisionmaking autonomy in Malawi (odds ratios), DHS survey in Malawi (2000)

Variable	Number of decisions where respondent has final say	Number of decisions where partner has final say	Number of decisions where final say is made jointly
SOCIODEMOGRAPHIC CHARACTERISTICS			
Urban residence	1.20*	0.66***	1.66***
Household wealth	0.99***	1.00	1.01*
Had at least one birth	1.00	1.07	0.96
Household size	1.00	1.01	0.97+
Partner is at home	0.29***	2.03***	1.72***
Partner is polygynous	1.44***	0.89+	0.75***
WOMAN'S CHARACTERISTICS			
Women's age (years)	1.01***	0.98***	1.01*
Literate	0.81*	0.96	1.29**
Women's education level			
None	1.00	1.00	1.00
Some primary	1.65***	0.73***	0.99
Completed primary	2.58***	0.55***	0.96
Secondary or more (comparison)	3.42***	0.21***	1.08
Women's employment			
Not working (comparison)	1.00	1.00	1.00
In agriculture	1.40***	0.72***	1.19*
Unskilled/skilled manual	1.29	0.59*	1.62+
Nonmanual	1.98*	0.21***	2.71**
Professional	1.21	0.15***	5.77***
WOMAN'S RELATIVE STATUS			
Age difference			
Woman older	1.25	1.06	0.74
Same age (comparison)	1.00	1.00	1.00
Partner older	1.13*	1.00	0.92
Education level difference			
Woman more	1.33***	0.83**	1.01
Same level (comparison)	1.00	1.00	1.00
Partner more	0.92	1.22*	0.84*
Occupational level			
Both in agriculture	1.01	1.15+	0.76**
Woman higher	1.32	1.09	0.68
Same level (comparison)	1.00	1.00	1.00
Partner higher	1.00	0.86	1.06
WOMEN'S STATUS IN SOCIETY			
Number of domains where wife beating is justified	1.04*	1.01	0.95*
Number	4,333	4,333	4,333

***P < 0.001; **P < 0.01; *P < 0.05; +P < 0.10

4 FACTORS ASSOCIATED WITH CHRONIC ENERGY DEFICIENCY

4.1 Sociodemographic Characteristics and Women's and Partner's Characteristics

In Table 5, the unadjusted associations with CED are explored with cross-tabulations and chi-square tests. In all three countries, more rural women have CED than urban women. In Zambia, fewer nulliparous women have CED than women who have at least one birth. In both Zambia and Malawi, fewer literate women have CED than nonliterate women, and fewer women with more education have CED. In Zambia, more women in agricultural work have CED than women in other occupations or unemployed women. More women with partners who have more education have CED in Zambia and Malawi, and in Zambia, fewer women with partners employed in occupations other than agriculture have CED.

Table 5 Percent distribution of variables and associations with chronic energy deficiency, DHS surveys in Zimbabwe (1999), Zambia (2000-01), and Malawi (2000)

Variable	Zimbabwe	Zambia	Malawi
SOCIODEMOGRAPHIC CHARACTERISTICS			
Residence			
Rural	5.2	15.7***	7.3***
Urban	3.2	9.9	4.6
Number of births			
None	5.1+	12.1*	7.4
One or more	3.8	14.0	6.7
Partner/partner living in household			
No	4.7	16.7	7.3
Yes	4.6	13.7	6.7
Partner/partner is polygynous			
No	4.7	13.5	6.5
Yes	4.1	16.0	7.8
WOMEN'S CHARACTERISTICS			
Literate			
No	6.1	16.1***	7.5*
Yes	5.0	12.2	6.0
Currently working			
No	4.8	6.5	7.0
Yes	4.4	6.5	6.6
Education level			
None	5.2	20.5***	7.4**
Some primary	4.6	16.7	7.0
Completed primary	5.9	14.4	7.6
Secondary or more	3.7	10.3	4.3
Occupation			
Not working	4.8	13.7***	7.1
In agriculture	4.2	17.3	7.2
Unskilled manual/skilled manual	4.2	13.7	7.7
Nonmanual	4.0	8.1	2.5
Professional	8.6	3.8	5.4
PARTNER'S CHARACTERISTICS			
Education level			
None	4.8	20.5***	7.7*
Some primary	3.7	16.8	8.0
Completed primary	5.5	14.4	6.7
Secondary or more	4.5	10.3	5.3
Occupation			
Not working	4.0	11.7***	u
In agriculture	4.6	17.4	7.8
Unskilled manual	5.6	4.3	5.4
Skilled manual	4.5	8.9	6.1
Nonmanual	4.5	10.7	6.6
Professional	4.6	7.9	5.1

Continued…

Table 5 *(continued)*

Variable	Zimbabwe	Zambia	Malawi
COUPLE'S CHARACTERISTICS/WOMEN'S RELATIVE STATUS			
Age difference between partners			
Woman older	5.9	12.1**	5.0*
Same age (+/- 2 years)	5.0	18.9	7.5
Partner older	4.1	13.3	5.9
Education level difference between partners			
Woman more	2.7	17.0	7.0
Same level	5.2	13.4	7.0
Partner more	4.6	13.6	7.0
Occupational type difference between partners			
Both unemployed	6.7	9.3***	u
Both in agriculture	4.0	18.1	7.7
Woman higher	4.8	8.4	6.3
Same level	5.2	9.6	6.6
Partner higher	3.7	13.2	7.2
Woman ever beaten by partner			
No	u	15.3+	u
Yes		13.1	
AUTONOMY IN DECISIONMAKING			
Final say over health care			
Partner	5.3	14.1	7.1+
Joint	5.0	13.9	5.5
Woman	4.6	13.0	5.8
Final say over household purchases			
Partner	3.5	u	7.2*
Joint	5.0		6.1
Woman	5.3		5.5
Final say over large purchases			
Partner	4.4	15.4*	7.0
Joint	5.1	11.7	5.3
Woman	5.2	12.1	6.2
Final say over what to cook			
Partner	2.6	u	8.1***
Joint	4.7		7.0
Woman	4.6		5.6
Final say over visiting relatives			
Partner	4.9	14.5	7.2
Joint	4.7	12.3	6.2
Woman	5.7	13.9	7.1
Final say over number of children and when			
Partner	u	14.5	7.5+
Joint		12.9	6.1
Woman		13.0	5.1
WOMEN'S STATUS IN SOCIETY			
Okay to beat wife if she goes out without permission			
No	4.7	13.2	6.6
Yes	4.3	14.1	7.2
Okay to beat wife if she neglects the children			
No	4.4	13.7	6.7
Yes	5.4	13.9	6.9
Okay to beat wife if she argues with her spouse			
No	4.7	12.5*	6.6
Yes	4.3	14.9	7.1
Okay to beat wife if she refuses to have sex			
No	5.3+	13.0	6.7
Yes	3.7	14.2	6.8
Okay to beat wife if she burns the food			
No	4.6	12.5*	6.4**
Yes	4.7	15.3	8.1

***P < 0.001; **P < 0.01; *P < 0.05; +P < .0.10
u = Unknown (not available)

4.2 Women's Relative Status, Women's Status in Society, and Decisionmaking Autonomy

In Zambia and Malawi, women in couples where both partners are the same age are more likely to have CED than are women in couples where one partner is older. On the basis of findings concerning the association between CED and agricultural work in Zambia, it is not surprising to note that when both members of the couple are employed in agriculture, more women have CED. Decisionmaking is most associated with CED in Malawi, where the trend suggests that more women with partners who make more decisions have CED. Some individual measures of women's attitudes toward wife beating are associated with CED in Zambia and Malawi, and fewer women who report ever being beaten by their partners have CED in Zambia. Since Zambia has the only survey that includes this question, it was eliminated from the final set of models in order to make the analyses more similar.

5 MULTIVARIATE REGRESSION OF CHRONIC ENERGY DEFICIENCY

For each country, four models were run for CED with logistic regression. Modeling was done in a block fashion, where the first model includes only sociodemographic and women's characteristics, the second model adds couple characteristics and women's relative status, the third model adds women's status in society and woman's joint final say in decisionmaking, and the fourth model adds partner's final say in decisionmaking and removes woman's and joint final say. Since the variables did not substantially change in the presence of other blocks, the final models, with all variable blocks included, are presented for each country (Table 6). The association of variables in isolation can be seen in Table 5, while the multivariate models adjust for other factors, recognizing that some constructs are measured by several factors. For example, the construct of women's educational status can be measured by both schooling completion and literacy. These models have a smaller sample size than described earlier because of missing values in several variables.

In terms of sociodemographics, none of the factors are significantly associated with CED in Zimbabwe. In Zambia, fewer women from large households have CED, and the trend is the same in Malawi. In Malawi, fewer urban women have CED than rural women. In terms of the women's characteristics, there are no significant associations in Malawi. Age is associated with CED in both Zimbabwe and Zambia. In Zimbabwe, more younger women have CED, and in Zambia, more older women have CED. Higher levels of education are associated with lower rates of CED in both Zimbabwe and Zambia, after controlling for the other variables presented in the models. In Zimbabwe, more women in a professional occupation have CED, which is a trend seen in Table 5. This counterintuitive result may be a product of small sample sizes or other factors, possibly body image, that determine why women are in a professional occupation.

Some of the women's relative status variables are associated with CED. In both Zambia and Malawi, women who are with a partner who is at least six years older are less likely to have CED, as compared with women who have partners who are the same age. In Zimbabwe, as compared with women in couples whose members have the same level of education, fewer women have CED when either member of the couple has more education. In contrast, in Zambia, more women who have higher levels of education than their partners have CED. This trend is also seen in the bivariate associations shown in Table 5. In terms of women's status in society, or lack thereof, more women who feel that wife beating is justified in more domains are less likely to have CED, though this result does not attain significance at the $P<0.05$ level. Bivariate associations show the same trend (odds

Table 6 Multivariate logistic regression of variables associated with chronic energy deficiency (body mass index <18.5) (odds ratios), DHS surveys in Zimbabwe (1999), Zambia (2000-01), and Malawi (2000)

Variable	Zimbabwe	Zambia	Malawi
SOCIODEMOGRAPHIC CHARACTERISTICS			
Urban residence	0.72	1.11	0.67+
Household wealth	1.00	0.99	0.99
Had at least one birth	0.91	1.48	0.79
Household size	0.98	0.94**	0.95+
Partner is at home	0.89	0.68	0.56
Partner is polygynous	0.76	1.22	1.27
WOMEN'S CHARACTERISTICS			
Women's age (years)	0.94***	1.02**	1.00
Literate	–	0.97	0.97
Women's education level			
None (comparison)	1.00	1.00	1.00
Some primary	0.58	0.78	0.99
Completed primary	0.62	0.61+	1.04
Secondary or more	0.21**	0.58+	0.72
Women's employment			
Not working (comparison)	1.00	1.00	1.00
In agriculture	1.01	0.82	0.78
Unskilled/skilled manual	1.67	0.51	2.02
Nonmanual	1.04	0.44	1.35
Professional	3.88*	0.11+	3.71
WOMAN'S RELATIVE STATUS			
Age difference			
Woman older	1.38	0.42	0.87
Same age	1.00	1.00	1.00
Partner older	0.96	0.71**	0.78*
Education level difference			
Woman more	0.37*	1.57*	0.96
Same level	1.00	1.00	1.00
Partner more	0.50*	0.85	0.93
Occupational level			
Both unemployed	0.60	0.34	u
Both in agriculture	0.89	1.09	1.18
Woman higher	1.01	1.00	0.38
Same level	1.00	0.75	1.00
Partner higher	0.66	0.86	0.45
WOMEN'S STATUS IN SOCIETY			
Number of domains where wife beating is justified	0.84+	1.02	0.95
AUTONOMY IN DECISIONMAKING			
Woman has final say (no. of decisions)	1.02	0.90	0.94
Partner has final say (no. of decisions)[1]	0.99	1.08+	1.07*
Joint final say (no. of decisions)	1.01	0.95	0.94+
Number	1,788	2,627	4,281

***P < 0.001; **P < 0.01; *P < 0.05; +P < 0.10; – dash indicates variable dropped due to colinearity

u = Unknown (not available)

[1]Modeled separately using all variables shown except woman's and joint decisionmaking.

ration [OR]=0.89, P=0.15). This surprising result may be due to how widely accepted wife beating is in Zimbabwe and how it reflects gender norms that tolerate violence towards women (Hindin, 2003).

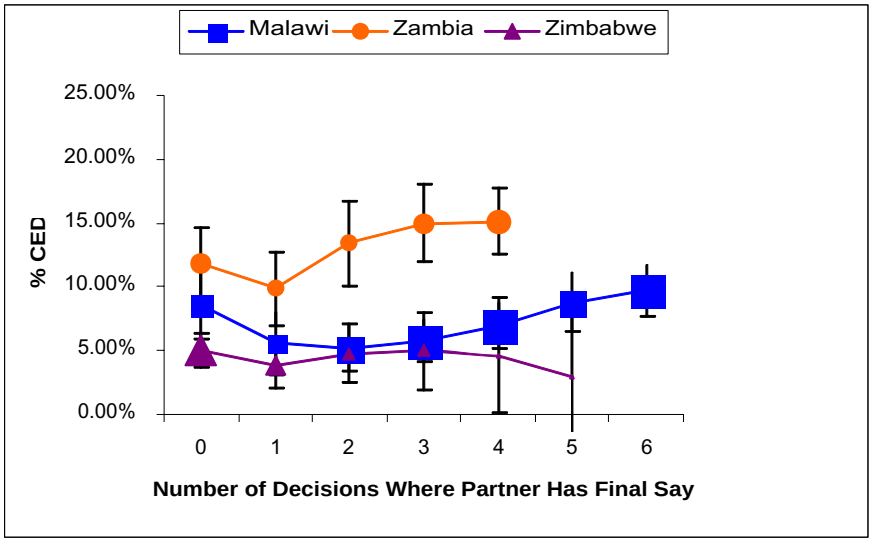
Patterns of decisionmaking autonomy are similar in Zambia and Malawi. In both Zambia and Malawi, the more domains in which partners have the final say, the more likely the woman is to

have CED. In Zambia, this result is statistically significant before multivariate adjustment (OR=1.12, P=0.01 [data not shown]), but it becomes attenuated (OR=1.08, P=0.054) with the presence of the factors in the model. In Malawi, the trend is that the more joint decisions made by the couple, the less likely the woman is to have CED.

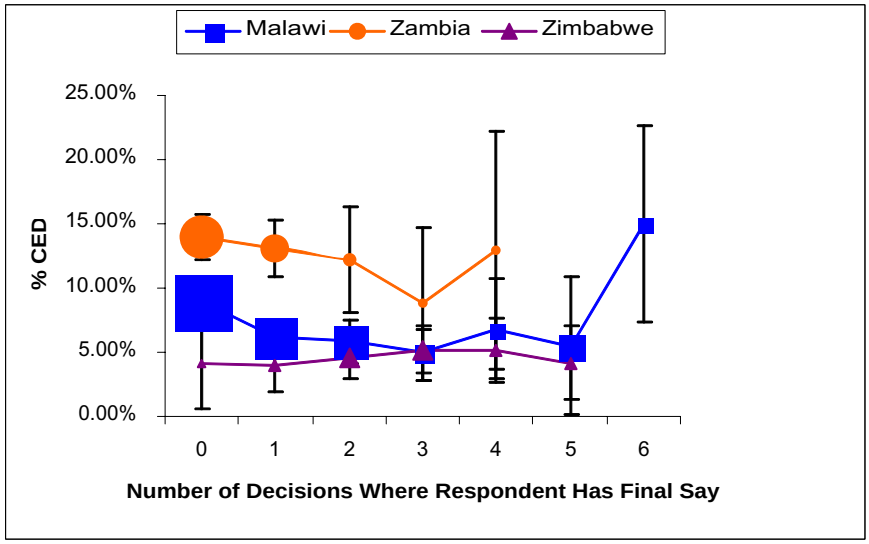
Figure 2 is designed to further explore the relationship between decisionmaking autonomy and CED. In figures 2A and 2B, there is a small but interesting group where partners make no final decisions and women make all the final decisions. Each panel in the figure presents the percentage of women who have CED, by their reported decisionmaking pattern, with a separate panel for the number of decisions made by either member of the couple (Figures 2A and 2B) and decisions made jointly (Figure 2). The markers for the lines (squares in Malawi, circles in Zambia, and triangles in Zimbabwe) vary in size depending on how many people report making a certain number of the decisions. For example, if 1,000 women in Malawi reported that they made one decision jointly with their partner, the square is bigger than that shown if only 100 women reported making the decisions jointly. In addition, 95 percent confidence intervals are used to show the errors around the estimates of CED. Although the percentages reported are not adjusted for confounders, the findings displayed, when run in logistic regression, do not vary substantially with and without multivariate adjustment.

In Figure 2 (Panel A), the percentage of women with CED is shown by reported decisionmaking by the partner. In all three countries, starting with the first decision made by the partner, women are at higher risk of CED. However, when women report that their partners have the final say in none of the decisions, women are more likely to have CED. This pattern needs to be interpreted with caution, since the proportion of women who report that their partners have no final say is relatively small, except in Zimbabwe (and the percent difference is small). Despite the small sample of women who report that their partners do not have the final say in any of the decisions, when this point is modeled separately from the linear trend in Malawi, the odds ratio of having CED if the husband makes none of the decisions is 2.23 (P<0.01), while the significance and magnitude of the linear trend without the point increase the adjusted odds ratio of having CED from 1.07 (P<0.05) (Table 6) to an adjusted odds ratio of 1.16 (P<0.001). These differences in the significance and magnitude suggest that this group, where partners have none of the final say, in Malawi is a different group than the others. Figure 2 (Panel B) shows a similar pattern whereby when women report having the final say in all decisions, they are at an increased risk of having CED. (This group of women, who have all of the final say in decisions, is the same group of women who report that their partners have none of the final say.) If this point is modeled separately from the linear trend, women who have the final say in all six decisions in Malawi are 1.76 (P<0.001) times more likely to have CED, and the linear trend without these women increases the adjusted odds ratio of having CED from 0.94 (P>0.10) (Table 6) to 0.86 (P<0.01). These results suggest that women who have the highest level of autonomy are the worst off—even compared with women who have no final say in any of the decisions. Figure 2 (Panel C) shows the relationship between joint decisionmaking and CED in all three countries. While there is some evidence of a U-shaped pattern to the relationship between joint decisionmaking and CED in Zambia and Malawi, the upward trend in CED with more joint decisions is not statistically significant.

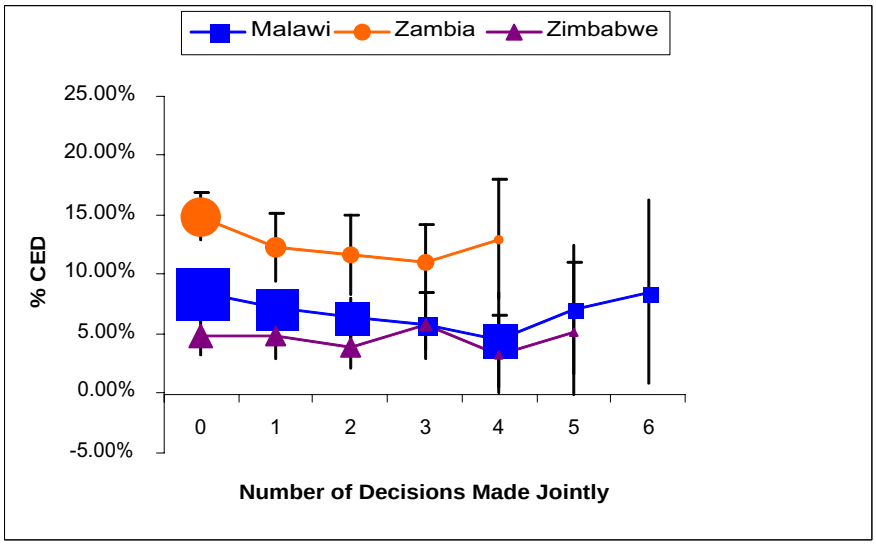
Figure 2 Percentage of women with chronic energy deficiency (CED) according to the number of decisions made (A) by the partner, (B) by the respondent, and (C) jointly



Panel A



Panel B



Panel C

6 DISCUSSION

The three countries studied have experienced not only the devastation of the HIV epidemic, but also the difficulties associated with chronic droughts and food shortages. This paper has shown that some of these difficulties may be affecting households and women's health. Although levels of CED are not as high as one might expect, some women are experiencing undernutrition that could be caused by either food shortages or illness related to HIV. For women in Zambia and Malawi, there is a relationship between patterns of household decisionmaking and their nutritional well-being. In both of these countries, women who live with partners who have more decisionmaking autonomy are also more likely to have CED. However, a different pattern emerges when women either have all of the final say or partners have none of the final say—a situation that may indicate households where partners contribute little to the household. More women who have the final say in all decisions (or who have partners who make none of the decisions) have CED than would be expected, and this group is statistically significantly different from what would be expected in Malawi. Further exploration is needed to see whether this trend is true in other countries outside those in this region, as this group may have important implications for women's empowerment. It is possible that women who have so much control are in a situation where they are forced to make all of the decisions because their partner is no longer a functioning part of the household. Several other studies document that women's autonomy is associated with poorer outcomes for women; in particular, more autonomous women may experience more interpersonal violence (Jewkes, 2002; Koenig et al., 2003; Hindin and Adair, 2002). These studies point out that the context for women's status and autonomy makes a difference and that when women behave in a manner opposite that of traditional gender roles, their well-being may be at greater risk. In the three countries in this study, women may be at risk for greater conflict and less negotiation power if they are more autonomous, given the historical levels of patriarchy in these countries. In addition, women may not be able to fulfill their traditional roles as food producers, because of both droughts and HIV, which, in turn, leads to greater food insecurity for themselves and their households.

The results, or lack thereof, in Zimbabwe generally support the hypothesis that women will be at greatest risk for CED in resource-constrained settings where they have little status and autonomy. Zimbabwean women have substantially more decisionmaking autonomy than do the women in Zambia and Malawi. In addition, the women surveyed in Zimbabwe appear to be the least resource constrained of the three countries (as would be expected from many markers of economic development). For example, Zimbabwe includes the most educated women of the three samples. Although the results of a similar analysis in Zimbabwe by Hindin (2000) showed a small but significant association between women's decisionmaking autonomy and CED, the present study did not find these results. On one hand, this is surprising since Zimbabwe has some of the highest prevalence rates of HIV, a political situation that has become increasingly difficult, and the same drought as the other two nations in this study. However, just 4.8 percent of the women surveyed could be defined as having CED, and in fact, a larger proportion of women were obese in Zimbabwe in 1999 (9 percent) than were experiencing CED. The gradient of stronger associations in poorer countries supports the central hypothesis of this paper. Women who live in the most constrained settings, and who have lower levels of autonomy than their partners, are most likely to have CED.

Several other important results emerged in this three-country comparison. One of the most striking results is that women in Zimbabwe have substantially more final say in household decisions than do women in Zambia or Malawi. Among the most significantly associated factors with

decisionmaking autonomy are age and occupation. In all three countries, older women and women with higher status jobs have more decisionmaking autonomy. Older women are less likely to make joint decisions. In all three countries, women with high-status jobs are less likely to have their partners having the final say in decisions by themselves, and in Malawi and Zambia, professional women are more likely to make decisions jointly. While a recent paper has noted alarmingly high levels of women who report that they find wife beating acceptable in Zimbabwe (Hindin, 2003), the levels of acceptance of wife beating are just as high in Zambia. In all three countries, making joint decisions is inversely associated with attitudes towards wife beating whereby women who report more joint decisions also report that they think wife beating is justified in fewer domains.

While there is support for the central hypothesis of this paper, there are some important limitations to these results. The data are cross-sectional, so the direction of the relationship between women's autonomy and CED is unclear. While most would argue that women with limited bargaining power in the household would not be able to negotiate for themselves well enough, it is also possible that women who began their marriages or relationships with a higher BMI were also better negotiators in household decisions. Conversely, women who had lower BMIs at the start of the marriage or partnership may also have been poorer bargainers. In addition, while the observed relationship between CED and decisionmaking has been found in two of the countries, the relationship observed could be due to a third factor that was unmeasured. Although a design comparing the 1994 and 1999 Zimbabwe DHS surveys was considered, the measures of women's decisionmaking autonomy were different—both in terms of domains and in terms of the way the questions were asked (in 1994, joint final say was not an option, and low autonomy was measured as the number of domains in which women had no say). Although Hindin (2000) found that more women with no say in household decisions had CED, the data available were different. In fact, in an attempt to create a similar measure of decisionmaking as the one used in the 1999 Zimbabwe DHS survey with the 1994 data, it was found that only the decision about whether the woman can work outside the home was significantly associated with a lower BMI but not CED. This domain was not included in the 1999 Zimbabwe DHS survey, making a direct comparison impossible. The other two measures, reconceptualized to match the 1999 Zimbabwe DHS survey, were not significant anymore.

Despite the limitations of this study, there are some important results worthy of policymaker and public health attention. If the women in this study with CED are not already infected with HIV, they are more likely to be susceptible because of their need to provide food security through any means possible, including such avenues as sex work. In addition, with the recent food shortages and droughts, women in rural households could be even more essential, as they are the primary providers of food for the household. HIV/AIDS in these settings will prevent women from carrying out this primary role under two scenarios. First, if the women are infected themselves, they may experience muscle wasting and loss of physical strength, rendering them less able to tend to the crops, leading to food insecurity for themselves and their families. Second, if women need to care for family and household members who are ill because of HIV/AIDS, they will have less of an opportunity to adequately farm and produce food for themselves and their households. These factors taken together put women and their families at substantial risk of food insecurity, with women who are unable to contribute to household decisions with their partners least able to minimize this risk.

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