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## Gender Bias in the Food Insecurity Experience of Ethiopian Adolescents

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### Abstract

Food insecurity is a pressing public health concern in many developing countries. Despite widespread interest in the sociocultural determinants of food insecurity, little is known about whether youths living in food insecure households experience food insecurity. The buffering hypothesis reviewed here assumes that, to the extent possible, adult members of households will buffer younger household members from the ill effects of food insecurity. A variant of the buffering hypothesis argues that only certain members of the households will enjoy the benefits of buffering. We hypothesize that within the context of Ethiopia, where girls have historically experienced discrimination, buffering is preferentially aimed at boys, especially as the household experiences greater levels of food stress. These hypotheses are tested using data from a population-based study of 2084 adolescents living in southwestern Ethiopia. Results indicate that boys and girls were equally likely to be living in severely food insecure households. Despite no differences in their households' food insecurity status, girls were more likely than boys to report being food insecure themselves. This gender difference was the largest in severely food insecure households. This same pattern was observed when comparing male-female sibling pairs living in the same household. These results are among the first to show that household level measures of food insecurity predict adolescent experiences of food insecurity, and that in the Ethiopian socio-cultural context, the relationship between household level food insecurity and adolescent food insecurity varies by gender. We also show that adolescent food insecurity is strongly associated with measures of general health and well-being.

### Keywords

Food security; nutrition; discrimination; Ethiopia; Africa; intra-household; adolescents; gender

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## Introduction

Insecure access to sufficient and culturally-appropriate foods at all times by all people is a persistent and, in some places, increasing public health threat (FAO, 2004). Although it is often assumed that the household food insecurity status represents the experience of individuals within the household, studies – primarily from Asia – show that this frequently is not true (Haddad, Pena, Nishida, Quisumbing, & Slack, 1996; Messer, 1997). Many studies focus on within-household discrimination against young children and women with some data suggesting that young children are buffered from food insecurity by adults (Leonard, 1991; Messer, 1997). There have been far fewer attempts to link food insecurity at the household level to adolescents' experience of food insecurity. This is especially true for individuals in sub-Saharan Africa (Haddad, et al., 1996). Adolescence is an energetically demanding period of the life course and one in which individuals are expected to make a series of key transitions into adulthood. Many of these key transitions are also affected by nutritional status. Insecure access to food may influence school attendance and achievement, reproductive decisions, migration strategies, employment options, and overall health and well-being (ACC/SCN, 2002; Gillespie, 2006). There is also a need to assess whether youths'<sup>1</sup> experience of food insecurity is gendered, as insecure access to adequate foods may generate health disparities. Issues linking gender, youth, and food insecurity are especially salient in the context of sub-Saharan African.

In this paper we examine the relationship between household and individual level reports of food insecurity and health status among adolescent boys and girls in southwestern Ethiopia. We address the following questions: (1) Does household level food insecurity predict individual level reports of food insecurity as experienced by adolescents? (2) Is the association between adolescent food insecurity and household level food insecurity the same for boys and girls? and (3) Does adolescents' experience of food insecurity predict self-reported health status?

## Background

There is a long history in public health nutrition and anthropology of examining differences in the food insecurity status of individuals within households. However, research on food insecurity has been beset by serious methodological shortcomings due to insufficient or poorly measured dietary data. For instance, studies of intrahousehold discrimination often rely on proxy reports, usually made by the mother, of the dietary intake and nutritional status of other household members. Although proxy reports for individuals, like other methods, can be powerful methods for detecting biases in food distribution (Ferro-Luzzi, 2002), they are only meaningful when presented along with an indicator of energy requirement for each household member for whom a report is given (Haddad, et al., 1996). Unequal consumption may reflect differential food insecurity but, alternatively, it could reflect differential activity patterns or nutrient requirements.

Measurement issues also plague dietary assessment studies of intrahousehold discrimination among populations that share meals from a common pot (Dop, Milan, Milan, & N'Diaye, 1994), which is widespread in many East African settings, including Ethiopia. While direct observation can be used as an alternative to proxy reports of those eating from a common pot (Gittelsohn, Shankar, Pokhrel, & West, 1994), direct observation, like proxy reports, may not provide an accurate assessment of dietary intake for adolescents who typically take more of their meals outside the household. Finally, the use of anthropometric measures to identify adolescent food insecurity resulting from intrahousehold discrimination is hampered by the

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<sup>1</sup>Throughout the paper we use the terms youths and adolescents interchangeably.

lack of an agreed upon reference population and the need for sensitive information on maturational stage (Woodruff & Duffield, 2002). Indeed, in a review of eleven studies of nutritional status of adolescence in developing countries, the authors concluded that “nutritional [anthropometric] measures alone should not be used as indicators of well-being” (Kurz & Johnson-Welch, 1994:25). Collectively these methodological issues make it difficult to assess the extent to which youths experience food insecurity, and in particular they make it difficult to identify biases in the allocation of resources within the household that adversely impact on adolescent members.

An alternative measurement strategy that overcomes some of these shortcomings is to measure the experience of food insecurity itself, rather than direct dietary intake or other proxy measures of intake that are time consuming, burdensome to the respondent, or prohibitively costly to collect (Kennedy, 2002). The experience of food insecurity is a proxy indicator of dietary intake, and it is more closely linked to the phenomenon of interest, not having sufficient food, than alternative methods. For example, measures of wealth and assets are often used as proxies for food insecurity but such proxies rely on a number of untested assumptions linking household measures to individual dietary intake (Webb, Coates, Frongillo, Rogers, Swindale, & Bilinsky, 2006). Recent studies have asked respondents directly about their experience with food insecurity. These studies use food insecurity scales which capture several dimensions of food insecurity including worry over the adequacy of the food supply, concern about the quality of the food supply, and changes in eating patterns in response to food shortages. Results from a number of developing country studies indicate that these qualitative self-assessments provide valid indicators of food insecurity (Frongillo & Nanama, 2006; Melgar-Quinonez, Zubieta, MkNelly, Nteziyaremye, Gerardo, & Dunford, 2006; Webb, et al., 2006).

### **The biosocial consequences of food insecurity**

Food insecurity has important biological and social consequences, although the evidence is strongest for maternal and young child health. Studies identify a range of poor outcomes associated with the experience of food insecurity, which influence both psychosocial and physical health outcomes (ADA, 2002). The negative health outcomes associated with food insecurity appear to be linked to both the poorer quality of the diet in food insecure households as well as the uncertain and unpredictable nature of the food environment. Studies find a higher risk of common mental health disorders (Hadley & Patil, 2006; Patel & Kleinman, 2003), seasonal weight loss, dietary change (Rose, 1999; van Liere, Ategbo, Den Hartog, & Hautvast, 1995) and overall poorer health among members of food insecure or food insufficient households (Casey, Szeto, Robbins, Stuff, Connell, Gossett et al., 2005; Cook, Frank, Berkowitz, Black, Casey, Cutts et al., 2004; Siefert, Heflin, Corcoran, & Williams, 2004). Anthropological studies of food insecurity also document a range of social responses to food insecurity including migration, borrowing from other households, and switching to less desirable foods (Dirks, 1980; Panter-Brick & Eggerman, 1997; Shipton, 1990). Although relatively few studies focus on youth, we can expect many of the underlying relationships between food insecurity and health status that have been observed for adults and children to be present for adolescents. A recent study of mental health and food insecurity among adolescents in the United States found that food insufficiency was associated with dysthymia and suicidality (Alaimo, Olson, & Frongillo, 2002). We are not aware of any comparable studies of adolescent health and well-being and food insecurity in a developing country setting (although see Kurz and Johnson-Welch, 1994).

### **Household level food insecurity and adult buffering of adolescents**

The food insecurity construct is typically measured at the household level under the assumption that household food insecurity or periods of insecure access to food negatively affect all household members. Yet, there are several reasons why we might expect that household level

food insecurity may not predict adolescent food insecurity. By the time children have reached adolescence, parents have invested substantial resources in their children (Kaplan, 1994) with the hope that as they themselves become too old to work their children will provide them with support. Given these incentives, it is reasonable to expect that parents will seek to mitigate the impact of food insecurity on children. Steps that parents can take to stretch limited food resources include reducing the frequency of meals or reducing the portions consumed at each meal. The expectation that parents will engage in this kind of buffering behavior and absorb some of the reductions in food supply is referred to as the buffering hypothesis. Evidence for the buffering of children by adults is mixed and suggests that buffering is highly context specific.

Two variants of the buffering hypothesis specify economic and cultural conditions under which buffering is expected to vary. The first of these variants assumes that at severe levels of household level food insecurity buffering is not a feasible strategy and food deprivation will be experienced by all household members, including children and adolescents. A second variant of the buffering hypothesis suggests that the relationship between household and youth food insecurity is attenuated in sociocultural contexts where there exists an asymmetry in perceptions of the relative value of male and female youth (Das Gupta, 1987), or where social privileges and movement are highly gendered. Gender often emerges as a key criterion used in intra-household food allocation decisions, and in some cases females receive an overall diet that is poorer in quality (Haddad, Hoddinott, & Alderman, 1997). For instance, Gittelsohn, Thapa, & Landman (1997), relying on observations of dietary intake, show that in Nepal women are systematically kept from consuming high status foods, which has consequences for indicators of micronutrient status. Das Gupta (1987) also provides some evidence from rural Punjab of discrimination towards girls in the household allocation of food. Some data from African settings suggest that adolescent girls' may receive preferential treatment prior to marriage and may be better prepared to face the demands of food insecurity because of their knowledge of coping strategies. Studies, primarily from developed countries, also hint that girls appear to experience household-level food insecurity in a different way than boys (Alaimo, et al., 2002; Jyoti, Frongillo, & Jones, 2005). Notably, many of these studies relied on a single measure of household level food insecurity and did not separately measure youths' experience of food insecurity. In fact, we are not aware of any studies that examine adult buffering behavior of adolescent children in the context of food insecurity in a developing country setting.

Because the negative consequences of food insecurity reverberate across many life domains (mental health, physical well-being, academic achievement, work performance, etc) and have long-term life course consequences, gender differences in access to food might create and amplify the disadvantaged status of women. Gendered food insecurity during adolescent years takes on particular significance from a public health perspective, because the early teen years are widely regarded as a last opportunity for economically-disadvantaged girls to experience physical growth that may compensate for some earlier nutritionally-related stunting. This type of catch-up growth is particularly critical for girls because nutritionally stunted mothers are at a higher risk of giving birth to low birth weight babies (ACC/SCN, 2000).

In this paper we examine how household food insecurity is differentially experienced by adolescent boys and girls. We take household food insecurity as exogenously determined and given: conditional on the household reporting food insecurity, we expect individual adolescents to differentially experience food insecurity based on the severity of their household's food insecurity situation and their gender.

### **Food insecurity, youth, and gender in the Ethiopian context**

Issues related to food insecurity, youths, and gendered-access to food are particularly relevant in the contemporary Ethiopian context. Ethiopia suffers under a high burden of food insecurity

and undernutrition. Estimates vary but suggest that approximately 45 percent of the total population is undernourished and that food insecurity is extremely common (FAO, 2004, p17) due to loss of crops and livestock because of famine, conflict, and poor governance (Kaluski, Ophir, & Amede, 2002). These factors are all compounded by unrelenting poverty: more than 45 percent of the rural population and 37 percent of the urban population falls below the poverty line, thereby preventing households from purchasing foods (FAO, 2003). Ethiopia also has a very young age structure. As of 2005, the population of Ethiopia hovered near 71 million individuals, nearly 45 percent of Ethiopians were under the age of 15 (UNDP, 2005) and the median age was 17 years.

Issues of gender are also paramount in the Ethiopian context. Although there is considerable variation within Ethiopia and signs of national improvements, the country scores low on many traditional measures of gender equality including an unbalanced ratio of male to female school attendance, differential progression to secondary school, and consequently unequal rates of completion. The Gender-related Development Index of Ethiopia is 134 out of a possible 140 – the lowest level of development (UNDP, 2005). These national level statistics are reflected in the everyday lives of young girls, who enjoy fewer rights and privileges than their male counterparts (Poluha & Nordiska Afrikainstitutet., 2004). It is with this background in mind that we examine the impact of household food insecurity on adolescent well-being.

The analysis in this paper proceeds in three parts. First, we examine the relationship between adolescent food insecurity and household food insecurity, with a particular focus on gender differences. Second, we use logistic regression to estimate the impact of household level food insecurity on the risk of individual-level food insecurity, net of other individual, household and community level factors, and we test for a differential effects of household food insecurity by gender. Third, we examine the consequences of youth food insecurity for health and well-being. All data analysis was carried out in SAS 9.1.

## Methods

Data for this study come from the ongoing Jimma Longitudinal Family Survey of Youth (JLFSY). The JLFSY began in 2005 and is a longitudinal study of adolescents designed to examine the social and economic determinants of adolescent health and well-being. The study population occupies three diverse agro-ecological zones and includes urban, semi-urban, and rural settings in and around the city of Jimma, Ethiopia. The city of Jimma, three nearby small towns, and the rural areas around each town were purposively selected to represent a range of ecological and development contexts. Stratified random sampling was used in each of the sites to select households for inclusion in the study. The study had a target sample of 2,100 adolescents and used a two-stage sampling plan. At the first stage, households were randomly sampled from within each study site with the sample size in each site determined by the relative proportion of the study population in the site and the overall target sample size. In the second stage, one adolescent boy and one adolescent girl were randomly selected from each household using a Kish table. This sampling plan produced representative samples of households and adolescent boys and girls age 13 to 17 in the city of Jimma Town, the three outlying towns, and nine rural peasant associations. The study selected 13 to 17 year olds in order to capture, during the subsequent five year follow-up period, the major transitions into adulthood experienced by youth (e.g., exit from school, start of work, initiation of sexual activity, entry into marriage, and start of child bearing). Approximately 3500 households were screened resulting in a sample of 2106 boys and girls aged 13 to 17 years. In 351 of the households visited there was an eligible male and an eligible female. In those households with both a male and a female adolescent, each of the two adolescents was interviewed separately. In the analysis presented here we use data for 2084 boys and girls for whom there was no missing information on the variables of interest.



The household questionnaire included a household registry which collected sociodemographic information on all current resident and non-resident household members and all adult children of the household head living in independent households. The questionnaire also collected information on household production, consumption, and food insecurity. The second stage adolescent interview was conducted by an interviewer of the same sex as the adolescent respondent and was conducted in private at a later date. The adolescent questionnaire focused on issues related to education, reproduction, employment, health, and future expectations regarding each of these domains. The first round household and adolescent interviews were completed in mid 2005–2006. All survey data were doubled-entered.

### **Measuring household food insecurity**

Household level food insecurity is measured with a six item scale that was adapted from published food insecurity scales used in developing countries (Coates, Frongillo, Rogers, Webb, Wilde, & Houser, 2006; Frongillo & Nanama, 2006; Melgar-Quinonez, et al., 2006; Webb, et al., 2006). The items were included after much discussion with the interviewing team and pilot testing and reflect what appear to be universal expressions of food insecurity (Swindale & Bilinsky, 2006). The household head was asked a series of six questions which addressed whether the household ran out of food or did not have enough money to buy food in the last three months. The questions covered whether: (1) the respondent worried about running out of food; (2) the household ran out of food; (3) the variety of food for children was reduced; (4) the children did not have enough to eat; (5) the respondent or another adult did not eat enough; and (6) the respondent ever felt hungry but did not eat. The “Yes” responses were coded one and the “No” responses were coded zero, and the responses were summed to produce an index of household food insecurity. An analysis of the index showed that it had high internal consistency (Cronbach’s Alpha 0.92). The distribution of the index of household food insecurity was then divided into terciles representing low, medium, and severe levels of household food insecurity. Subsequent analyses showed few differences between the low and medium groups. We therefore created a two-level variable that grouped together low and medium food secure households as a contrast category to severely food insecure households.

### **Measuring adolescent food insecurity**

Adolescent food insecurity is measured with a four item index. Respondents were instructed to think about their own experience and not that of their households and then were asked whether, in the last three months, they had: (1) ever worried about having enough food; (2) ever had to reduce food intake because of shortages of food or money to buy food; (3) ever had to go without eating because of shortages of food or money to buy food; and (4) ever had to ask outside the home for food because of shortages of food or money to buy food. Again, “Yes” responses were coded one and “No” responses were coded zero, and the responses were summed to produce an index of adolescent food insecurity. An analysis also showed that the index had high internal consistency (Cronbach’s Alpha= 0.81). Because the distribution was highly skewed to the right (many zeros), we dichotomized the score to represent food secure (summed score of zero) and food insecure (summed score greater than zero) adolescents. The youth food insecurity measure was constructed by modifying some of the questions that were used at the household level so that they could be used at the individual level. The individual level measures were also informed by discussions with the interviewing team, who were from the study area. Preliminary analyses of the data from the Jimma Longitudinal Family Survey of Youth also show a strong correlation between the measures of adolescent food insecurity and reports of depression, problems with school attendance, fatigue and poor health (Jimma University and Brown University 2006a, 2006b, 2006c, 2007). Even so, the lack of formal validation of the measures of adolescent food insecurity is a limitation of the study and will be explored further in future research.

## Assessment of adolescent well-being and health status

Adolescent health is assessed using three self-reported measures of health and well-being, and one measure of the timing of the last illness episode. For self-reported health and well-being adolescents were asked the following three questions: (1) “In general, how would you rate your health today?” (2) “In the last 30 days, how often has feeling tired or not having enough energy been a problem for you?” and (3) “Overall, in the past 30 days, how often have you had difficulties with school, work, or household activities because of poor health?” Possible responses to the first question were very good, good, moderate, and poor. Responses to the question on low energy and difficulties in daily activities were: very often, sometimes, rarely, and never. For this analysis we coded responses to the overall health question as very good/good and moderate/poor, and responses to the questions on energy and difficulties as very often/sometimes and rarely/never. Adolescent respondents were also asked: “When was the last time you were sick with any illness?” Responses to this question were re-coded into two categories: within the last month or more than one month ago. Numerous studies show that self-rated health is a good predictor of morbidity and mortality (reviewed in Idler and Benyamini, 1997).

## Household wealth

Because food insecure households also tend to be poor households, we include a measure of household socioeconomic status in our multivariate analysis of adolescent food insecurity to control for the effect of living in a poor household. We expect that the household food insecurity index will provide a more direct measure of the impact of household food insecurity and food deprivation on the risk of adolescent food insecurity if its effect is estimated net of the effect of household socioeconomic status. We constructed the index of household socioeconomic status based on household ownership of 18 items. The index includes items such as a functioning radio, television, cooking stove, various furniture items, and farming implements. The index ranges from 0 (not owning any of the items) to 18 (owning all of the items). The distribution of the index was then divided into approximate terciles representing low, medium, and high levels of socioeconomic status. Alternative methods of calculating the wealth index, including the use of factor analysis to differentially weigh each item, produced similar results in our multivariate models.

## Results

### Descriptive Analysis

Table 1 presents the distribution of adolescent food insecurity status by household food insecurity status and gender. Overall, approximately one-in-five youth are categorized as food insecure. Adolescent food insecurity varies significantly by household food insecurity. Among youth living in households that are not severely food insecure, 14 percent are food insecure, whereas 31 percent of youth in severely food insecure households are food insecure. The strength of the relationship between food insecurity at the household and the individual levels is substantially stronger among girls than boys. Forty-one percent of girls in severely food insecure households also experienced food insecurity compared to 20 percent of boys in severely food insecure households. The fact that there are no significant gender differences in the prevalence of food insecurity among youth living in households that are not severely food insecure, suggests that the large gender difference observed in severely food insecure households represents real differences in experienced food insecurity and not gender-specific differences in subjective evaluations of food insecurity.

To explore the gender differences in food insecurity further, Figure 1 presents intra-household sibling comparisons of adolescent food insecurity by household food insecurity status and gender for a total of 351 households in which both a boy and a girl were interviewed. The unit

of analysis in Figure 1 is the sibling pair. Within each of the two levels of household food insecurity, sibling pairs are classified as: both boy and girl have same individual level food insecurity status (i.e., concordant), the boy only is food insecure, and the girl only is food insecure. Because these comparisons are made within households, other household level factors that might influence food insecurity among individual adolescent household members are held constant. Consistent with what Table 1 showed, there is little difference in the level of food insecurity between boys and girls in households that are not severely food insecure. Seventy-seven percent of paired siblings in such households report the same level of individual food insecurity, and among the pairs who differ in their individual reports, girls are only slightly more likely than boys to report food insecurity. However, in households that are severely food insecure close to 40 percent of girls reported food insecurity and their brother did not.

### Multivariate Analysis

Figure 1 provides further evidence suggestive of the differential and unfavorable treatment of girls compared to boys in households that are severely food insecure. However, the differences in girls' and boys' risk of food insecurity may be due to differences in work status, student status or other background characteristics that influence access to food both inside and outside of the household, and not to intentional buffering behavior within households. To control for other correlates of food insecurity, we estimate a logistic regression model predicting individual food insecurity. We include in the model individual, household, and community-level control variables, and use the interaction between gender and household food insecurity to test for significant gender differences in the effect of household food insecurity on individual food insecurity. Individual-level variables include age, gender, student status, employment status, and religion. Household variables include household size, household socioeconomic status, and household food insecurity status. Community-level variables include a control for type of community (city, town, rural).

Table 2 presents sample characteristics for selected variables included in the logistic regression model. The mean age of the adolescents in the sample is 14.8 years, and the sample is evenly divided between females and males. Education among youth in the study area is nearly universal with 91 percent of the adolescents still in school at the time of the survey. Just over a quarter of the adolescents were employed at the time of the survey (28%). Nearly two-thirds of the adolescents self-identify as Muslim, one-third as Orthodox Christian, and six percent as Protestants. Mean household size in the study area is relatively large at 6.5 persons per household, and forty percent of youth live in households that are categorized as severely food insecure.

Table 3 presents the results from the logistic regression model predicting the probability that an adolescent experienced food insecurity. The table presents estimates of the coefficients and the associated odds ratios and significance levels. Adolescent age, gender, student status, employment status, religion, and place of residence are not significantly associated with adolescent food insecurity at the 0.05 level of significance. Household socioeconomic and food insecurity status, and the interaction between gender and household food insecurity status are all highly significant. As we would expect, youth living in low and medium socioeconomic status households are more likely to experience food insecurity than youth living in high socioeconomic status households, even after controlling for household food insecurity status. With the inclusion in the model of the gender and household food insecurity interaction term, the gender variable measures the gender difference in the risk of adolescent food insecurity among adolescents living in households that are not food insecure. The insignificant gender effect indicates that boys and girls living in households that are not food insecure are at an equal risk of food insecurity, which is consistent with Table 1. The significant household food insecurity effect and gender interaction term indicates that youth in food insecure households



are at a significantly higher risk of experiencing food insecurity themselves, but the risk is significantly higher for girls than for boys. In fact boys in such households are at half the risk of food insecurity than girls. This result is again consistent with Table 1.

### Consequences of Adolescent Food Insecurity

In the final part of our analysis we examine the relationship between adolescent reports of food insecurity and self-reported health and well-being (Table 4). Adolescent food insecurity is associated with all four measures of health and well-being. Adolescents who reported experiencing food insecurity are more likely than adolescents who were food secure to have been ill in the month prior to the interview (23 percent compared to 44 percent). They are also more likely to rate their overall health as moderate or poor (6 percent compared to 10 percent), and they are more likely to report that they very often or sometimes felt tired or had no energy (17 percent compared to 32 percent). Adolescents who experienced food insecurity are also more likely than food secure adolescents to report that poor health affected their daily activities (20 percent compared to 33 percent). These results indicate that food insecurity at the individual level has real consequences for youth in the Jimma study area, and they underscore the importance of focusing more attention in demographic and health studies on adolescent experiences of food insecurity.

### Discussion

Our study has four main findings. First, the prevalence of household and adolescent food insecurity in the Jimma study area is high, which is not surprising given the overwhelming poverty found throughout Ethiopia. Second, the level of food insecurity measured at the household level exceeded the level reported by adolescents at the individual level, suggesting some buffering by adults. Third, self-reported health status is strongly associated with adolescents' experience of food insecurity, underscoring the importance of food security for other adolescent outcomes. Finally, and most importantly, girls are more likely than boys to experience food insecurity in households that are food insecure. This relationship is consistent with discriminatory buffering of food insecurity by adults or differential access to outside food sources. These relationships match the larger sociocultural milieu within Ethiopia both in terms of high levels of food insecurity and discrimination against females.

The strength of the study is the focus on adolescents, a group that is often neglected in studies of international health (although see Kurz and Johnson-Welch, 1994). An additional strength of the study is the use of a two-stage survey interview that permit the comparison of household head and adolescent responses regarding food insecurity. Moreover, this survey design was carried out using a representative sample of youth in urban, semi-urban, and rural settings in Ethiopia. A final strength of the study is the ability to compare the responses of boys and girls living within the same households. These intra-household comparisons control for unobserved household characteristics that may influence access to food, and thus provide a measure of gender bias in food allocation that is not affected by unobserved household heterogeneity. Limitations, which hopefully will guide future research, are the need to validate the food insecurity instruments and to carry out unstructured interviews with youth regarding the intra-household dynamics of food allocation.

The results indicate that one out of every five youths in the study area experienced food insecurity and 40 percent of households are severely food insecure. Food insecure youth are most likely to be living in food insecure households. Household food insecurity is strongly associated with socioeconomic status: youth living in households with fewer material assets are more likely to be food insecure, even after controlling for food insecurity at the household level.

The discordance between household level estimates of food insecurity and adolescents' experience of food insecurity is in line with predictions of the buffering hypothesis. Households are far more likely to be food insecure than are individual adolescent members, which suggests that some of the ill effects of household level food insecurity are absorbed by adult members. Although this may protect youth, data from diverse settings show that adult buffering of younger household members can have adverse impacts on adult health and well-being. A study of low-income Canadian mothers showed that they consistently had poorer quality diets than their children, a finding the authors interpreted as evidence of buffering (McIntyre, Glanville, Raine, Dayle, Anderson, & Battaglia, 2003). A study from Benin suggested that mothers reduced their dietary intake in the 'hungry' season to buffer their young children. Consistent with this hypothesis, they showed that children's dietary adequacy increased in this food insecurity period, while their mothers' dietary adequacy declined (van Liere, et al., 1995).

We also find evidence consistent with differential buffering. Girls are more likely than boys to experience food insecurity even though they are distributed across households in a manner similar to boys. One possible explanation for this pattern is that male youth are more likely to be employed and thus can use those resources to purchase food outside the household. This explanation, however, is not supported by the data: while boys are somewhat more likely than girls to be employed, employment is not related to adolescent food insecurity. Girls may also have higher energetic needs that are not being met by their households. If this were true then we would expect to find a sex by age interaction, as older girls would have the highest energetic needs; we did not find evidence of this in the data or that pregnancy influences food insecurity (results not shown). Our findings do make sense within the socio-cultural context of Ethiopia, and indeed in many countries, where patriarchy is the dominant cultural model. There is little doubt that girls in Ethiopia experience a very different life than boys. Boys and young men are able to spend substantially more time outside of their homes and are therefore more likely to be able to seek food elsewhere (Mains, 2007; Poluha & Nordiska Afrikainstitutet., 2004). Along with this enhanced freedom they also enjoy the support of their families, and it is not uncommon for young men to receive a small amount of money from their parents during the day to help feed themselves whereas this is less likely to be the case among girls (Mains, 2007). Our results suggest that these differential opportunities have nutritional consequences and may not result solely from outright parental discrimination. This gendered pattern of time allocation and privilege in moving through social spaces may in part explain why many other studies examining intra household food distribution in sub-Saharan Africa have not identified a gendered difference in food intake. Future studies need to assess individual food insecurity by age and sex, as well as the interaction of these factors across the life course in different cultural ecologies; similar points have been made by Das Gupta (1995) and Worthman and Kohrt (2005) among others. Adolescence may represent a period of particular nutritional vulnerability for young Ethiopian women but not necessarily for female infants or adult women.

A final explanation for our findings regarding gender differences in food insecurity relies on a social constructivist perspective, which suggests that the gender differences in adolescents' reporting of food insecurity may reflect different perceptions about the world, and not reflect the actual food allocation situation. This perspective predicts that even in the face of exactly the same level of food insecurity we would observe a gendered-response, and is consistent with several other studies showing that girls experience some stressors more acutely than boys (Alaimo, et al., 2002; Jose & Ratcliffe, 2004; Jyoti, et al., 2005). It is possible that an embodied vulnerability manifests more acutely under generally stressful conditions, which would account for the gender interactions. It is also possible, given the ubiquitous gender divide, that boys experience insecurity and anxiety in other domains as the household's food insecurity increases and that we simply did not capture them here. We hope to explore these alternatives in the future using dietary, anthropometric, vignettes, and biomarkers. To test these competing explanations for the bias in youth food insecurity, future studies should also collect information

on where youth are taking their meals, and where they are getting the funds to pay for meals taken outside the household.

We also find that youths' experience of food insecurity is associated with self-reported health status. Food insecure youth are more likely to report being ill in the last month, more likely to report feeling tired or not having any energy, and more likely to report that their daily activities are limited because of poor health. Food insecure youth also disproportionately rate their overall health as moderate to poor. If the association is indeed causal, as many other studies suggest, then our results suggest that youths' experience of food insecurity is a strong predictor of health and well-being. This could be due to the influence of food insecurity on energy intake, and micronutrient deficiencies (e.g., iron), or because food insecurity influences other aspects of the household ecology which in turn affect health and well-being. More detailed analysis of dietary and activity patterns are planned in the future and should help clarify the pathway linking youth food insecurity to youth health and well-being.

This study provides some of the first evidence of the magnitude of the youth food insecurity problem in Ethiopia. In doing so, the work calls attention not only to the public health problem among youth, but also the gendered nature of this issue and the possible role that cultural ecologies play in producing and reproducing gendered health disparities. Our results also suggest that adolescent food insecurity is associated with important dimensions of health and well-being. Future research will aim to verify these results with additional sources of data and examine the mechanisms through which girls experience greater levels of food insecurity when living in food stressed households.

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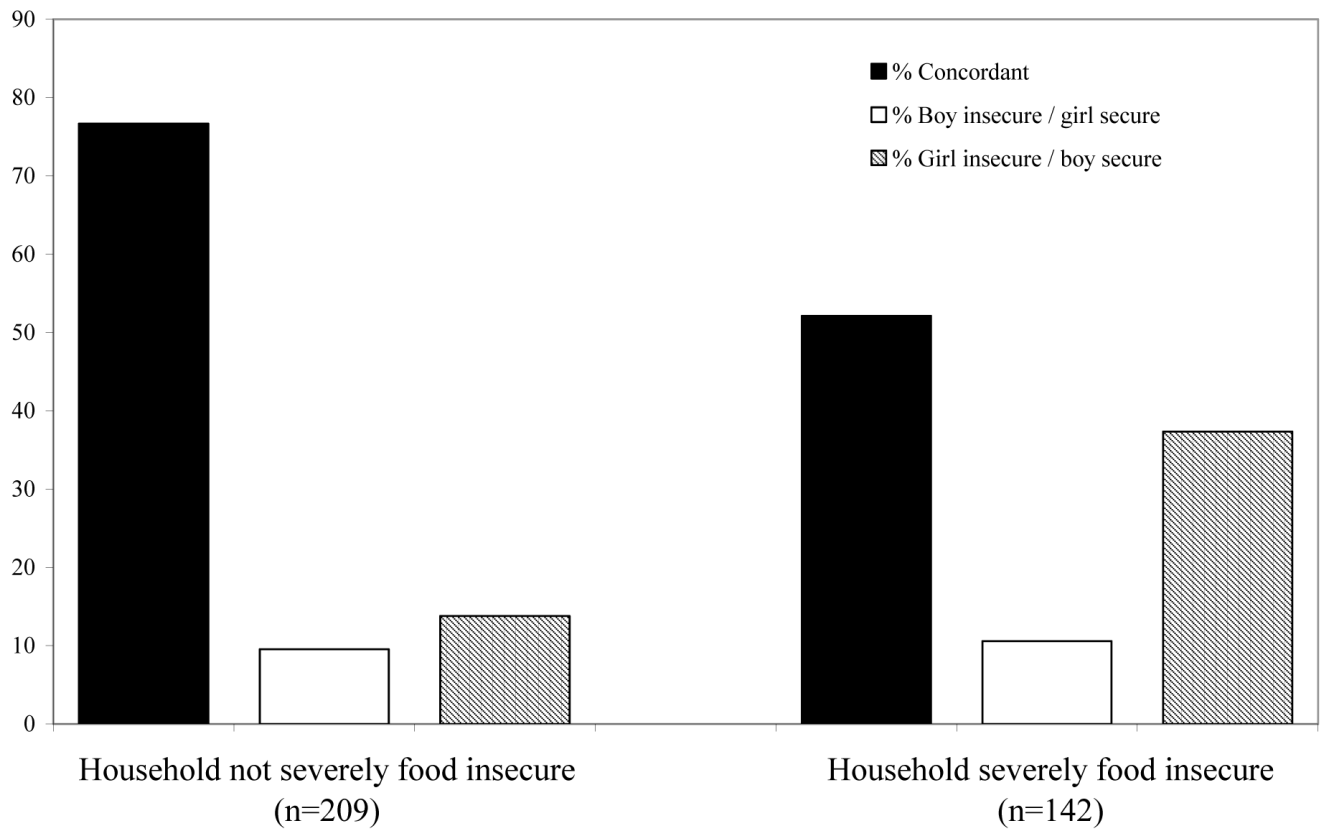
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**Figure 1.** Intra-household sibling comparisons of adolescent food insecurity by gender and household level food insecurity. Concordant households are those where the boy and girl are both food secure or both food insecure. Jimma Longitudinal Family Survey of Youth, 2005–06, Jimma, Ethiopia.

Household and Adolescent Food Insecurity Status by Gender, Adolescents Age 13–17, Jimma Longitudinal Family Survey of Youth, 2005–06, Jimma, Ethiopia. (n=2084)

Table 1

Adolescent food insecurity status	Not severely food insecure			Household food insecurity status			Severely food insecure			Total %
	All %	Boys %	Girls %	All %	Boys %	Girls %	All %	Boys %	Girls %	
Not food insecure	86.1	87.6	84.7	69.2	79.1	59.0	79.5	79.1	59.0	79.5
Food insecure	13.9	12.4	15.3	30.8	20.9	41.0	20.5	20.9	41.0	20.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of cases	(1263)	(643)	(620)	(821)	(416)	(405)	(2084)	(416)	(405)	(2084)

**Table 2**

Selected Sample Characteristics, Adolescents Age 13–17, Jimma Longitudinal Family Survey of Youth, 2005–06, Jimma, Ethiopia. (n=2084)

Variable	Mean (SD)
Age	14.8 (SD 1.4)
Male, %	50.8
In School, %	91.0
Employed, %	28.4
Religion	
Muslim, %	61.3
Orthodox Christian, %	33.1
Protestant, %	5.6
Household size	6.5 (SD 2.3)
Household food insecurity	
Not severely food insecure, %	60.2
Severely food insecure, %	39.8
Place of residence	
City	35.8
Small town	28.4
Rural	35.8

**Table 3**

Parameter Estimates from Logistic Regression Model Predicting the Probability that an Adolescent Experienced Food Insecurity. Jimma Longitudinal Family Survey of Youth, 2005–06, Jimma, Ethiopia. (n=2084)

	<i>B</i>	<i>OR</i>	<i>P</i>
Individual characteristics			
Age (years)	-0.041	0.96	0.35
Male	-0.277	0.76	0.10
In school	-0.184	0.83	0.36
Employed	0.121	1.13	0.35
Orthodox Christian	0.263	1.30	0.06
Protestant Christian	0.467	1.60	0.06
Muslim (reference)	--	--	--
Household characteristics			
Household size	0.006	1.01	0.83
Low socioeconomic status	1.268	3.55	<0.01
Medium socioeconomic status	0.926	2.52	<0.01
High socioeconomic status (reference)	--	--	--
Household severely food insecure	1.092	2.98	<0.01
Male × household severely food insecure	-0.736	0.48	<0.01
Community characteristics			
City	0.281	1.32	0.05
Small town (reference)	--	--	--
Rural	-0.312	0.73	0.06
Constant	-1.892		0.01
LR Chi-square = 183.9			

**Table 4**

Adolescent Food Insecurity and Self-reported Health and Well-being. Jimma Longitudinal Family Survey of Youth, 2005–06, Jimma, Ethiopia. (n=2084)

	Adolescent food insecure		<i>P</i>
	No	Yes	
Recent illnesses (%)			
Not ill in last month	77.0	23.0	<0.01
Ill in last month	55.7	44.3	
Current overall health (%)			
Very good/good	94.2	5.8	<0.01
Moderate/poor	90.0	10.0	
How often feel tired/no energy in last month? (%)			
Never/rarely	83.1	16.9	<0.01
Very often/sometimes	68.1	31.9	
Difficulties with every duties and activities in last month? (%)			
Never/rarely	80.2	19.8	<0.01
Very often/sometimes	67.3	32.7	