Literature Review

Review of intrahousehold allocation of food/energy in various situations and varying degrees of food insecurity

Submitted by:
Joanne Arsenault, PhD
October 17, 2015

Submitted to:
Christine McDonald
FEWS NET Nutrition Advisor
Chemonics International Inc.
1. Introduction

This paper reviews the published literature summarizing key issues and findings related to intrahousehold allocation of food and energy in various situations and degrees of food insecurity. Food allocation within a household is either distributed equally or unequally to favor one or more members of the household. The unequal distribution can be explained generally by two patterns, a Needs rule in which a higher proportion of the household’s food is allocated to those with greater need, or a Contribution rule in which a greater amount (and/or quality) of food is allocated to those with higher economic value (1). According to the Needs rule, children would be allocated more or better quality food to support their higher needs (in proportion to their body weight) for growth than adults and pregnant or lactating women would be allocated more food to support their increased needs. According to the Contribution rule, the adult male or other working member of the household would receive more and/or greater quality food because of their economic value to the household. While these patterns have been observed in many developing country settings with known high levels of food insecurity, it is unclear if or how these rules of food allocation may be impacted by a severe food crisis.

A recent review of literature on intrahousehold food allocation concluded that “it is reasonable to assume equitable intrahousehold distribution of food when designing food fortification programs” (2). However, the author acknowledged the marked variation in findings, which appeared to indicate no systematic bias towards one age or sex group within the household but trends varying in different cultural situations or geographical locations. This review paper will examine many of these studies as well as other studies found through Pubmed searches, gray literature searches via Google, and articles that were referenced in other articles. In studies that report quantitative data on energy intakes, the primary method to assess whether there is bias towards one individual or another within the household is to calculate an energy adequacy ratio defined as the energy intake divided by the energy requirement of the individual which depend on body size and assumed physical activity level. Studies which only report differences in absolute energy intake between household members were not included in this review because the absolute intakes are expected to be different due to different needs and do not necessarily reflect differential partitioning of food. The discussion of findings is divided into five sections by the following topics: age bias, gender bias among children, gender bias among adults, intrahousehold food allocation during seasonal food scarcity, and intrahousehold food allocation during other food stress situations. Findings from an individual study may be reported under more than one section.

2. Age bias in intrahousehold food allocation

According to the Needs rule, children should have higher food or energy intakes than adults, but adults (predominately men) should have higher intakes according to the Contribution rule. Several studies have reported findings that support each of these rules.

Four studies from Latin American countries have reported greater energy intake adequacy for children than adults (3-6), although two of the studies only assessed the intake of the mother and child (3, 4). In 51 food insecure households in Brazil, children’s (ages 4-16 years) energy intake averaged 77% of their energy needs, which was 15% higher than their mothers who consumed 62% of their energy needs (3). The difference in protein adequacy was even greater, with children meeting 183% of needs and mothers 94%. In Mexico, children (2-6 y) had similar energy intake adequacy (91%) as their
mothers (90%), but consumed greater percentages of their requirements for protein (101%) than their mothers (72%), as well as other nutrients such as riboflavin, vitamin C, and vitamin A (4). Children consumed milk more frequently than their mothers, which likely contributed to the greater intakes of protein, riboflavin, and vitamin A. Qualitative data from focus groups revealed that mothers stated that milk was saved for the youngest children in times of scarcity and they often gave their children eggs in blended milk drinks. In 15 households in Peru, pre-school aged children (4-6 y) had a mean energy adequacy of 111%, while the energy adequacy was 95% for adult males and 91% for adult females (5). Younger children (1-3y) had a mean energy adequacy of 93%, which was similar to adults, but the authors note that intakes may have been underestimated due to not accounting for between-meal snacks. In another study from Peru, children 1-12 y had mean energy adequacy of 106% compared to 75% for adults during the pre-harvest period needs (6).

Most studies from Asia have reported favoring of adults, particularly males, in food allocation (7-10). Two studies conducted in Bangladesh reported lower energy adequacy for children than adults (7, 8). Among 53 households, the young children’s (1-4 y) energy intakes per kg body weight were lower than their requirements, while adult intakes were within the expected ranges (7). A larger study of 297 households also reported low energy intake adequacies among children (48% for 1-3 y, 68% for 4-6 y, 72% for 7-9 y) while adult energy adequacies were 101% for males and 95% for females (8). However, in both studies the intakes of the youngest children appear to be underestimated due to lack of accounting for breastmilk intake. A study of 78 households in India also found lower energy intake adequacy among children (73% for 1-3 y, 81% for 4-6 y, 83% for 7-12 y) compared to the male head of households (90%) (9). Among 140 households in the Philippines, energy intake adequacy was lower among children 1-17 y (64%) than adults (78%) (10). The mother’s wage had a positive effect on children energy allocation but the father’s wage had a negative impact.

Three studies from Asia did find evidence of favoring of children (11-13). A study of 115 households in Nepal reported generally higher mean energy adequacies for all age and sex categories of children than for adult males and especially in comparison to adult females who had the lowest adequacy (11). Young children <3 years had the highest priority in serving order based on observations of meals in the households. Another study in China based on secondary analysis of national health and nutrition survey data reported that young children (0-4 y) received more fruit, meats, and dairy than adults, as indicated by higher ratios of food share (individual intake of food/household intake of food) to energy share (individual energy intake/household energy intake) (12). A study in 480 Bangladeshi households reported higher levels of many micronutrient adequacies among children (2-4 y) than women (13).

From the available literature reviewed, it appears that children are favored in Latin America. In Asia, it seems there is a tendency for favoritism of adult male, but that was not found in all studies.

3. Gender bias in intrahousehold food allocation among children

The concept that boys may be valued over girls because of their future potential for working and providing for the family aligns with the Contribution rule. Culture is likely to play a role in this ideology. Studies from Asia tend to support this concept, although 3 of 4 studies were from Bangladesh. Brown et al. (14) measured food and breastmilk intake of 70 children and found that that boys 18-30 months of age consumed about 30% more energy per kg of body weight than girls during the post-harvest period,
indicating a preferential feeding of boys when food became more available. Chen et al (15) reported the ratio of energy intake of boys to girls adjusted for body weight was greater than 1 among children 0-4 years but not for older children. A third study from Bangladesh reported energy and protein intakes on a per kg body weight basis that were about 20% higher for boys than girls among 1-4 year olds (7). A study from China reported no gender bias in the youngest children (0-4 y), but among older children energy and other nutrient adequacy was higher in boys than girls (12). A study in Nepal found no gender differences in energy adequacy until age 10, thereafter girls fared worse than boys with mean energy adequacies of adolescent girls approximately 12-14 percentage points lower than boys (11).

On the other hand, two studies conducted in Peru found no evidence of any gender bias in food allocation among young boys and girls (5, 6). This conclusion was based on no differences in energy adequacy among boys and girls 1-12 y in one study (6), and in total energy intake between boys and girls 1-3 y and 4-6 y in the one study (5). In the latter study, data were pooled for boys and girls to determine energy adequacy so it is unclear how boys and girls compared in terms of their requirements.

Overall, there appears to be favoring of boys in Asia, while in Latin America energy allocation did not differ by gender.

4. Gender bias in intrahousehold food allocation among adults

Women are undervalued across various cultures and dimensions, including nutrition and health. According to the Contributions rule, men would receive a larger share of household food given their economic value to the household, which is recognized over women’s contributions to agricultural work, household domestic work, and child care. The majority of studies identified that describe food or energy allocation among adult men and women report that women consume less of their requirements than men (8, 9, 12, 15-17). In particular, pregnant and lactating women consume the lowest share of their requirements (8, 9, 15). Energy requirements can be up to 300-500 kcal per day higher than normal (18).

In a study of 152 households in Bangladesh, energy intake was assessed by 24-hour direct observation and weighing and basal metabolic rate was estimated for adults using age and sex specific equations based on body weight (16). The ratios of energy intakes to basal metabolic rate of adult males were about 25-38% higher than females across two regions and seasons. The higher ratio in males could be attributed to higher physical activity, although the authors concluded that the mean EI:BMR values corresponded to physical activity associated with heavy occupational work for both men and women. Another study from Bangladesh reported only slightly lower energy intake adequacy in women (95%) than men (101%), but women who were pregnant or lactating had energy inadequacies of 90%, indicating they were not fully compensating for their greater energy needs (8). Similarly, Chen (15) reported that discrepancies between men and women’s energy intake equalized after adjusting for body size, but when adjusting for pregnancy or lactation status the women fared worse than men. In India, pregnant women received on average 84% of their RDA and lactating women received 68% of their RDA compared to the male head of household who received 90% of his RDA (9). Energy adequacy was not reported for women who were not pregnant or lactating.

In China, adult men received a greater allocation of energy, protein, iron, and vitamin A than women (12). Men were given more meat than females as indicated by a higher ratio of food share to energy share. In Nepal, women had lower energy adequacy than men and the discrepancies between
adequacies of micronutrients were even greater (17). Men were more likely to consume vegetables and milk than women, particularly lactating women.

Only a few studies outside of Asia that addressed adult gender bias in food allocation were identified. In Peru, no gender differences were seen in energy adequacy of adults (6). In Kenya, energy adequacy was not significantly different between adult men and women (19).

The lower adequacies of pregnant and lactating women could be due to lack of awareness of increased needs during these states rather than deliberate discrimination in food allocation. Nevertheless, it does appear that women receive less food in relation to their needs than men.

5. Intrahousehold allocation of food or energy during seasonal food scarcity

The previously discussed studies were predominately conducted in resource-poor settings where seasonal food shortages exist, but only a few of the studies included details about seasonal differences in food or energy allocation (6, 7, 14, 16) and most were from Bangladesh.

Brown et al. (14) measured food and breastmilk intakes by direct observation/weighing among children over several rice-harvest seasons in Bangladesh. Seasonal intakes increased from the pre-harvest to post-harvest season, but the increase was much greater in boys than in girls. The increase in energy intakes of boys during post-harvest appeared to be about 20% over pre-harvest intakes, which were attributed predominately to rice and breastmilk. Tetans et al. (16) also measured food intakes of household members in Bangladesh by direct weighing, including breastmilk for children. The mean energy intakes of young girls (0-3 y) increased by 24% from the lean to peak season but only increased by 4% in young boys. Increases in energy intakes were also seen in other age groups except 30-60 years where seasonal increases were similar (24-25%). There was also no seasonal difference in the energy intake to BMR ratio of adults. The third study in Bangladesh reported that adults had lower energy intakes per kg of body weight during the pre-harvest season when food stocks are typically lowest, but young children (1-4 y) did not (7). Young girls had even higher intakes during the lean season than more plentiful seasons, but the number of girls ranged from 6-15 and so this conclusion is questionable.

A study in Peru with 26 households that used direct weighing to assess energy intakes found that during the pre-harvest season children were meeting their energy needs but adults were only consuming about 75% of energy needs (6). After harvest, both adults and children consumed energy exceeding their needs. Qualitative data revealed that the women were conscious of the fact that seasonal hunger presents an acute problem for children, and mothers often sent their children to relative’s homes for meals during periods of most limited food availability.

The results of these studies vary and the limited number of studies makes it difficult to make any broad conclusions regarding whether children are buffered during seasonal food shortages. Most of the studies were also somewhat limited by their small sample sizes. While the effect of seasonal food scarcity on food and energy intakes in general is clearly documented in the broader literature, studies measuring the intakes of entire households with large enough sample sizes to examine differences in age and sex categories are scarce.
6. Intrahousehold allocation of food or energy during other food stress situations

The literature regarding how food is allocated within households during times of emergency or crisis is fairly limited. Some questions related to behaviors during times when food was scarce are posed in food security assessments such as the Coping Strategy Index created by Care and the World Food Program (20). However, the behaviors are reported rather than observed, and so it is unclear how accurately they reflect the actual behavior or impact energy consumption. Some studies have examined household sharing of emergency food aid or supplementary foods targeted for a specific member of the family.

Early research on development of a coping strategies index identified the concept of ‘maternal buffering’ whereby a mother limits her own intake to ensure that children get enough to eat (21). A cumulative index score including this and five other concepts which were identified from focus groups conducted in Uganda correlated positively to a dietary adequacy indicator of diversity of food groups. Another study comparing a coping strategies index and household energy availability was conducted with data from a food consumption survey in Ghana (22). One of the 9 coping questions posed to the primary homemaker was related to intrahousehold food allocation: ‘In the past month, how often have you had to limit your own intake to ensure child gets enough.’ The mean score of 1.16 indicated this behavior was practiced on average between less than per week to 1-2 times per week, and was the third highest score among the 9 questions. In the creation of the index, this question clustered with 4 other questions that related to reducing food, and the index score for the 5 food rationing indicators was significantly inversely correlated with household energy availability. The food rationing index score also correlated inversely with child nutritional status as indicated by height-for-age z-score, but the association was fairly weak and there was no association between household energy availability and child nutritional status. The results of these studies do not clearly validate the particular question of limiting adult food intake in favor of the child because individual consumption was not measured.

Some research on the impacts of floods in Bangladesh has shown that child malnutrition intensifies during flooding, as indicated by decreased anthropometric indices (23, 24), but this could also be partly attributed to increased morbidity during flooding. A qualitative study conducted with 18 mothers in slums in Dhaka, Bangladesh revealed that mothers used the coping strategy of reducing their own food intake to protect their children (25). Among food-insecure households (82% of households), it was reported that fathers did not reduce their consumption while mothers and children did, but in food secure households this was not the case. This was believed to be due to the increased needs of men in food insecure households due to their higher rates of involvement in physical labor such as rickshaw pulling compared to men from food secure households. Food secure households reported being able to continue cooking special complementary foods for children during flooding, but food insecure households had to feed their children the same diet as the rest of the household.

A nutrition study that coincided with a severe drought and temporary food shortage in Kenya in 1984 permitted the examination of the impact of the drought on food intakes (26). Energy intakes were measured in a sample of 247 households by daytime observation and weighing of foods supplemented by recall of nighttime consumption and foods consumed outside the home. The mean energy intakes of mothers and schoolchildren decreased by about 400 kcal and 250 kcal per day, respectively, but the energy intakes of toddlers remained stable indicating some buffering of the younger children.
A study in South Sudan conducted a mixed-methods case study to understand how diets within households are influenced by the cultural and political context in post-conflict South Sudan (27). The study included interviews, meal observations of young children, and focus groups among beneficiaries of a food ration program targeting women and young children. In focus groups, the women described that food is allocated to young children first, then older children, then adult men, and lastly adult women. The year of the study was described as time of particular scarcity due to draught and resulted in frequent need to prioritize children and reduce their own portion sizes. The mother reported that in times of scarcity, they would try to leave the portion for children unchanged and will reduce the portion for the women of the household, then if necessary will reduce the portions for men. The meal observations agreed with the statements of the women in the focus groups.

In a study of household decision-making regarding resource allocation in the aftermath of a food crisis in Niger, mothers reported no favoritism towards a particular child even if the child was sick (28, 29). The intra-household variation in children’s growth and health status appeared to be partly due to the cultural belief of treating all children the same and not allocating extra care to the most vulnerable child. One woman explained that she might buy gari (powdered cassava) and peanut butter for a sick child, but everyone will eat some because all food is shared (29). The feeding style of children was labeled as ‘laissez-faire’, with little parental supervision of children’s eating and lack of awareness of hunger cues. For example, boule, the main staple made from millet and often diluted with water during times of food shortage, is kept in a dish and left for the family to consume at will. Boule rarely runs out and mothers conclude that the children have enough to eat. However, the young children who have small stomachs are likely unable to meet their nutritional needs from the low-nutrient dense boule.

Sharing of supplementary food that is targeted toward a specific malnourished child with other children or family members has also been documented in African countries. In Niger, a nut-based supplementary food distributed to children was reportedly shared in 25% of households (30). The women commented in focus groups that you cannot refuse to give the product to other children and that hunger causes everybody to want to share any food received. In Malawi, although less than 1% of households reported diverting the food supplement to someone other than the intended beneficiary (31), direct observations revealed that sharing occurred in 15% of feeding episodes with a corn-soy blend supplement and 5% of episodes with a lipid-based supplement (32). Another study in Malawi reported high rates of reported sharing (27-35%) of targeted lipid-based nutrient supplements, usually with siblings or other children (33). This highlights the importance of education and monitoring in targeted food assistance.

7. Conclusions

This research indicates that patterns of intrahousehold food allocation do exist and that the cultural context needs to be considered when making broad conclusions. In general, it does appear that children are allocated more (and more nutritious) food in relation to their requirements than adults, although that evidence seems the strongest in Latin America. In Asia, adult males seem to be favored over other household members, but in some cases children appear to receive more food than adult women in relation to requirements. Very few studies from Africa were found, but it appears there is no favoring a particular child over another even if there is a certain child who may be more vulnerable.
Women are clearly the lowest priority in terms of food allocation, and those who have additional requirements due to pregnancy or lactation do not often receive extra food to meet their needs.

Some limitations to the available evidence should be considered. The premise for the conclusions from most of the studies that quantitate energy allocation within households is that food should be allocated according to energy requirements and that the requirements are in fact appropriate for all age and sex groups. However, estimating an individual’s energy requirements is dependent on accurate information on body size and physical activity, which is almost never obtained in these investigations. Energy requirements have also changed over time as new scientific bodies review available literature and publish recommendations (18). Many of the studies reviewed here used different sets of requirements and so may contribute to variability across studies. Secondly, it is assumed that individuals are aware of the increased requirements for specific population groups, such as young children and pregnant or lactating women, so that they can allocate more food and nutrient-dense foods to these groups.

There appears to be a fairly large gap in the knowledge about how households allocate food during periods of critical food shortages. Many studies have examined the impacts of seasonal food shortages on intakes and nutritional status of particular populations, but are often limited by the relatively small number of households included, a problem that can be compounded when disaggregating into age and sex categories. Studies could also be strengthened by including both qualitative and quantitative components, although obtaining quantitative information during a crisis situation and before or after the crisis is clearly challenging.
References


