

**INFLUENCE OF GENDERED ROLES ON LEGUME UTILIZATION AND
IMPROVED CHILD DIETARY INTAKE IN MALAWI****Mulenga H¹, Mwangwela AM^{2*}, Kampanje-Phiri J³ and B Mtimuni¹****Haswel Mulenga**

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ABSTRACT

The relationship between gender roles, legume production, utilization and child feeding practices in rural smallholder households of Dedza and Ntcheu districts in Malawi was investigated and analyzed. A cross-sectional research study was conducted with legume farming households with children aged 6-23 months who were part of the Africa RISING 'mother trial' or 'baby trials' for two farming seasons (2014/2015 to 2015/2016). Africa RISING project encourages smallholder farmers to grow legumes namely, groundnut (*Arachis hypogaea*), cowpea (*Vigna unguiculata*), pigeon pea (*Cajanus cajan*) and soya bean (*Glycin max*) as one way of improving the wellbeing of smallholder farmers. The key objective of the research was to assess the influence of gender roles, legume production, utilization and infant and young child dietary intake. In total, 291 households with children 6-23 months were targeted. Eight focus group discussions (FDGs) for in-depth qualitative data were conducted. Two 24-hour dietary recalls and food frequency questionnaires were used to collect data on infant and young child feeding (IYCF) practices. Data collected were extracted, arranged, recorded and analyzed by using SPSS version 21. About 18% of children aged 6-23 months received a minimum dietary diversity (the consumption of four or more food groups from the seven food groups), 2.5% received a minimum acceptable diet (indicator measures both the minimum feeding frequency and minimum dietary diversity, as appropriate for various age groups) and 37.5% of children received a minimum meal frequency (frequency of receiving solid, semi-solid, or soft foods at the minimum numbers of two and three times for children aged 6–8 months, and 9–23 months, respectively). Control on use of income by women had a positive and significant association with minimum dietary diversity ($P<0.05$), minimum meal frequency ($P<0.05$) and minimum acceptable diets ($P<0.05$) among children of both sexes. Children aged 6-23 months from households where women were actively involved in partial processing and budgeting of legumes met minimum dietary diversity than children from non-participating households. Women farmers were more knowledgeable about legumes; played an important role in seed selection, storage and processing; however, the findings signal an opportunity to increase women's income by involving them in market information. Increasing legume production at household level does not mean increasing the nutritional status among children (6-23 months). Several factors related to gender roles, markets accessibility and legume utilization have an effect on infant and young child feeding practices.

Key words: Gender, IYCF, diversity, legumes, acceptable diet, Dedza, Ntcheu



BACKGROUND

Men tend to dominate cereal and cash crop production in many societies in Africa and women are more likely to take a major role in legume production [1]. Men in Malawi participate in growing of legumes whenever the legumes fetch high market prices and more profits [2]. However, poor farmers in Malawi prefer to avoid having to purchase part of their maize requirement in the market and so they allocate more land to maize production than legumes. Malawian farmers define the boundaries within which legumes can expand on their farm by food security and income [3].

Although men have more control of land than women, it is the responsibility of women to take care of agricultural activities [4]. In sub-Saharan Africa, including Malawi, 80% of women produce basic foodstuff both for household consumption and sales [4]. Failure to recognize women's contribution in agriculture is costly as it results in misguided policies and programs, poor agricultural output and associated income flows, higher levels of poverty, and food and nutrition insecurity [5].

Decision making for legume production and utilization at household level has been dominated by women, with men benefiting from the sales of legume produce [5]. On the other hand, when men take full responsibility of legume production, women have little or no input in decisions on legume utilization. Because of the gender inequality, there may be little or no legume consumption at household level which puts children at greater risk of malnutrition. Child undernutrition continues to be a major public health challenge in Malawi, as evidenced by the high prevalence of stunting (37.2%), underweight (11.75%), and wasting (2.75%) [6,7]. Similarly, micronutrient deficiencies of zinc (60%), iron (22%) and vitamin A (4%) are rampant among pre-school going children in Malawi [8].

According to the National Statistical office [7], the percentage of breastfeeding and non-breastfed children 6-23 months old who received minimum acceptable diets (which is a measure of the minimum feeding frequency and minimum dietary diversity, as appropriate for various age groups) and minimum dietary diversity (the consumption of four or more food groups from the seven food groups) in Malawi was 8.1% and 25.1%, respectively. Similarly, the National Statistics Office reported that only 29.2% of children in Malawi were being fed according to the recommended minimum meal frequency (frequency of receiving solid, semi-solid, or soft foods two times per day for children aged 6–8 months, and three times per day for children aged 9–23 months). Poor infant and young child feeding practices, usually using thin, watery maize flour porridge made up of 7% maize flour and providing about 105 kJ/100g is common in Malawi [9]. Enriching cereal-based complementary foods with legume-based products increases dietary diversity score and nutrient density hence, helping children to meet their daily recommended food and nutrient intakes [9].

Gender inequality is a major driver of vulnerability to malnutrition and food insecurity [7]. Gender is a key factor in explaining the variation in access to and control of resources at household level for complementary feeding as well as social services in rural low-income communities in Malawi [5]. Women and men have different and



complementary roles in securing nutritional well-being for all members of the household. Women often play a greater role in ensuring nutrition, food safety and quality, and are also often responsible for processing and preparing food for their households. Women tend to spend a considerable part of their cash income on household food requirements. The fact that women are often involved in household chores gives them little time to properly take care of the children [3]. Recognizing women's and men's distinct roles in family nutrition is key to improving food security and children's nutrition at household level in Malawi. The lack of such information is, therefore, an obstacle to reducing gender inequality in access to and control over resources, which consequently hinders efforts to improve infant and young child feeding in Malawi [3]. Therefore, this study was carried out to assess the influence of gender roles, legume production and utilization on infant and young child feeding practices.

METHODS AND MATERIALS

The study was conducted in the rural areas of Linthipe and Golomoti Extension Planning Areas (EPAS) in Dedza district and Kandeu and Nsipe EPAs in Ntcheu district of Malawi. The participants were farmers under Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) with children 6-23 months old. Thus, Africa RISING project in Malawi is promoting the growing of four legumes namely: groundnut (*Arachis hypogaea*), cowpea (*Vigna unguiculata*), pigeon pea (*Cajanus cajan*) and soya bean (*Glycin max*) for soil enrichment, food security and research. This study was a cross-sectional study. Cross-sectional studies are strong because of their large sample sizes and repeated cross-sectional surveys within the same population, essential for monitoring trends in reference distributions and prevalence.

Sampling

The sample size (n) was calculated using the formula: $n = (z \times \frac{c}{d})^2$ where n was the sample size, z = standard normal deviation depending on the degree of confidence (80 %, 90 %, 95 %, 99 %), c = coefficient of variation (%) as a measure of variation and d = acceptable difference of the sample mean from the population mean (% of the mean), also called error of the sample mean.

$$n = (z \times \frac{c}{d})^2 \text{ where: } Z = 1.96 \text{ (with 95\% degree of confidence), } c = 43\% \text{ (prevalence of stunting for 6-23 months old children), } D = 5\% \text{ (acceptable difference)}$$

$$= (1.96 \times 0.43 / 0.05)^2 = \mathbf{284}$$

However, 291 Africa RISING farmers with children 6-23 months were found and interviewed during the data collection exercise. The extra farmers were interviewed because they were invited by the government extension officer to participate in the study and they consented. A list of legume farmers with children 6-23 months in the target areas was purposively obtained from the extension worker and a simple random sampling was used to select the research participants to collect data on gender roles on household utilization of legumes and child feeding practices. About 222 Male- and 69



female-headed households who had been with Africa RISING for at least two farming seasons (2014/2015 and 2015/2016) were selected for the study.

Data collection and management

Since the research was focusing on how gender disparities in resources or assets within and across households' influence legume utilization and child feeding practices, questions on "who owns and controls" what resources (income, knowledge/skills and capital) that were relevant for healthy nutrition and legume utilization were administered. In this case, access to and control over household resources for complementary feeding and legume utilization were examined. Decisions on legume production, utilization and control of income generated from sales of legumes were investigated. In addition, questions on who participated in selling legumes, processing of legumes, budgeting legumes, storing legumes for consumption as porridge were also included. A grounded theory approach was used to analyze focus group discussion themes.

This research was novel in the sense that previous research studies conducted in rural areas of Malawi have not concentrated on generating new insights pertaining to the relation between gender dimension of legume production, distribution and consumption with infant feeding and nutrition. This means that the tools used in this study provided a holistic approach on gender roles, legume production and utilization and infant and young child feeding practices in Dedza and Ntcheu districts of Malawi.

Two 24-hour dietary recall sessions and a Food Frequency questionnaire (FFQ) [10] were used to collect data on minimum dietary diversity, minimum meal frequency and minimum acceptable diets. The FFQ includes questions regarding the usual frequency of consumption of 53 food items during a six-month period from the day data collection commenced. The possible answers in six categories ranged from "never" to "twice a day". The FFQ was administered in the form of a personal interview together with the first 24 – hour dietary recall session. The second 24- hour dietary recall session was conducted in the following seven-day period. The 24-hour dietary recall data were used to come up with minimum acceptable diets, minimum dietary diversity and meal frequency for children 6-23 months old.

Minimum dietary diversity (MDD): The sample universe for this indicator is youngest child 6–23 months of age living with their mothers. The 7 food groups used for calculation of this indicator are: 1) Grains, roots and tubers, 2) legumes and nuts, 3) dairy products (milk, yogurt, cheese), 4) flesh foods (meat, fish, poultry and liver/organ meats), 5) eggs, 6) vitamin-A rich fruits and vegetables, and 7) other fruits and vegetables. MDD was, therefore, calculated as follows:

$$\frac{\text{Number of children 6 – 23 months who received foods from } \geq 4 \text{ food groups during the previous day}}{\text{Total number of children 6 – 23 months of age}}$$

Minimum meal frequency: Proportion of breastfed and non-breastfed children 6–23 months of age, who receive solid, semi-solid, or soft foods (but also including milk



feeds for non-breastfed children) the minimum number of times or more. According to the WHO [11], the meal frequency is as presented in Table 1.

Table 1 shows that as children are growing, the number of feeds increases because energy and nutrient needs of the child also increase. The increase in energy and nutrient needs cannot only be met by breastfeeding. Meal frequency indicator was calculated from the following two fractions based on WHO (2008) standards:

$$\frac{\text{Breastfed children 6 – 23 months of age who received solid, semi – solid or soft foods the minimum number of times or more during the previous day}}{\text{Breastfed children 6 – 23 months of age}}$$

OR

$$\frac{\text{Non – Breastfed children 6 – 23 months of age who received solid, semi – solid or soft foods the minimum number of times or more during the previous day}}{\text{Non – Breastfed children 6 – 23 months of age}}$$

Minimum acceptable diet (MAD): Since appropriate feeding of children 6–23 months is multi-dimensional, it is important to have a composite indicator that tracks the extent to which multiple dimensions of adequate child feeding are being met. The minimum acceptable diet indicator combines standards of dietary diversity and feeding frequency by breastfeeding status. The numerator includes only those children who have received both the minimum dietary diversity and the minimum meal frequency for the child’s breastfeeding status. The indicator, thus, provides a useful way to track progress at simultaneously improving the key quality and quantity dimensions of children’s diets. The indicator was calculated from the following two fractions:

$$\frac{\text{Breastfed children 6 – 23 months of age who rhad at least the minimum dietary diversity and the minimum meal frequency during the previous day}}{\text{Breastfed children 6 – 23 months of age}}$$

And

$$\frac{\text{Non – Breastfed children 6 – 23 months of age who rhad at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day}}{\text{Non – Breastfed children 6 – 23 months of age}}$$

Separate focus group discussions were conducted for men and women. The separation was to ensure that women’s voices and decisions on what transpires at household level were not influenced by the presence of men during the discussion.



Data on child feeding practices and gender roles was entered and analyzed in Statistical Package for Social Sciences (SPSS) version 21. Qualitative data analysis was guided by the grounded theory approach to identify emerging themes and scrutinize the data for discrete ideas from both FGDs and KII. By identifying emerging themes and discrete ideas, the researcher reduced the material and began to analyze, interpret and make meaning of the data.

RESULTS AND DISCUSSION

Child feeding practices in Dedza and Ntcheu districts in Malawi

The diets provided to children (6-23 months old) in Dedza and Ntcheu districts were inadequate to meet the children's nutritional requirements (Table 2). Mostly legumes, animal products and fruits were missing in the diets of the children. In Malawi, poor feeding practices of children normally continue to school going age [12]. Current reports in Malawi [8], show high zinc deficiencies (60%) and anemia (28%) among pre-school children. The general, national recommended dietary diversity ratio of at least 35% for legumes or at least 35% for oils, animal foods, fruits and vegetables together [12] was not met. Similar trends of poor dietary diversity score among children (6-23 months) were also reported in Ethiopia [12]. Among other things, poor economic status could be a reason for inadequate dietary diversity among Malawian children [13]. On the other hand, 29.9% of breastfed children in Dedza and Ntcheu districts of Malawi received slightly lower frequency of meals than non-breastfed children. Whereas 16.3% of the children received less diversified diets and 1.3% of breastfed children received minimum acceptable diets than non – breastfed children although the differences were not significantly different (Figure 1). Breastfed children aged 6-23 months in Dedza and Ntcheu received slightly more water, tea, juice and fruit mash than non-breastfed children of the same age group. Thus, breastfed children were subjected to poor quality foods than children who were not breastfed. This could be attributed to women's perception that breastmilk provides adequate nutrients to children even above six months.



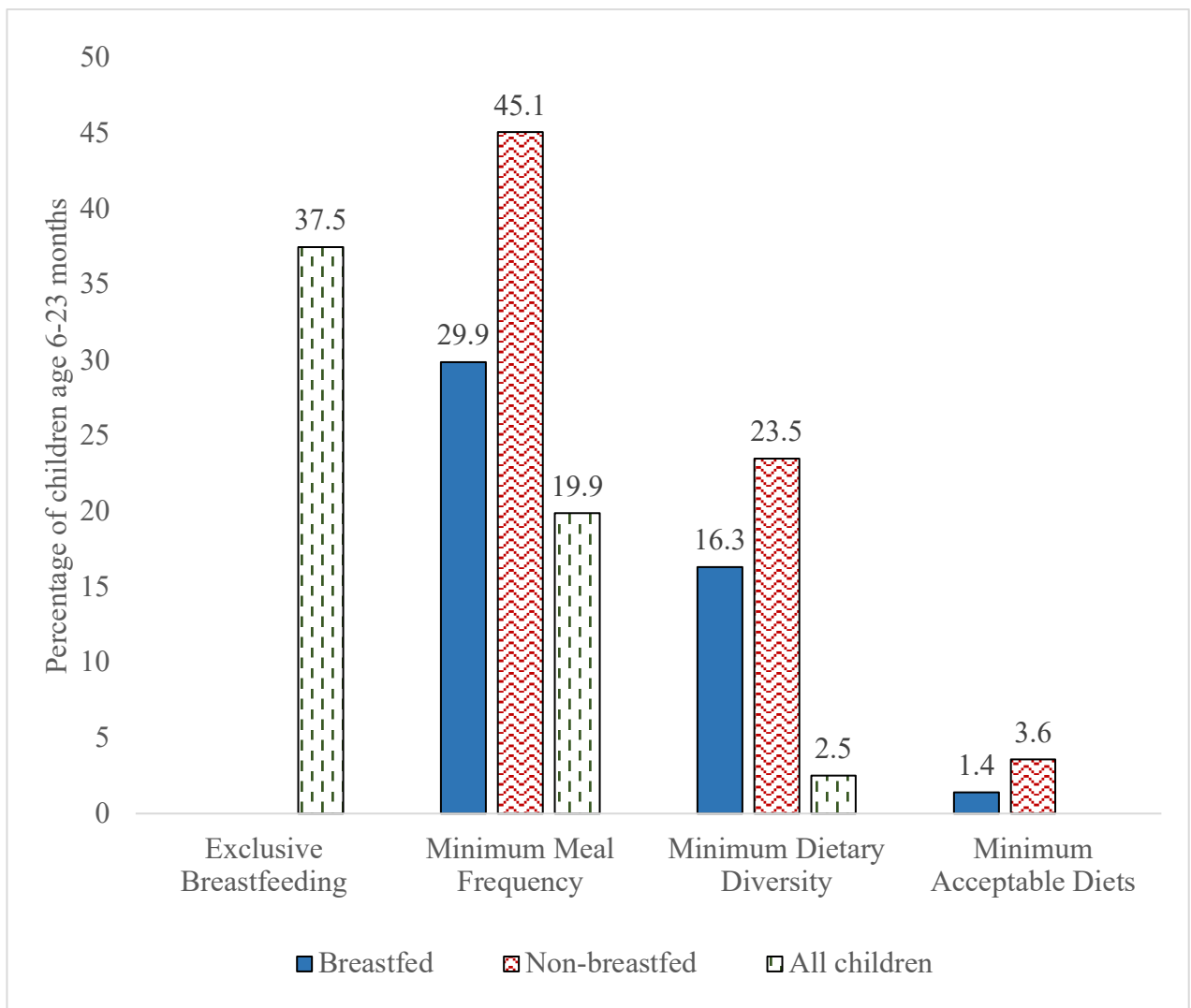


Figure 1: IYCF indicators among farm households in Dedza and Ntcheu districts of Malawi

Effect of legume processing on child feeding practices in Dedza and Ntcheu

Pearson's coefficient correlation analysis was performed to identify factors that impact on child nutrition. Women who partially processed, sold and kept legumes at household level significantly ($p=0.038$) provided recommended infant and young child feeding practices as compared to women who did not (Table 3). Low input in decisions regarding legume processing and budgeting by women was negatively associated ($P \geq 0.05$) with improved child feeding practices (Table 3). More women had little or no input in decision-making regarding legume budgeting, partial processing and consumption of partially processed legumes (Figure 2).

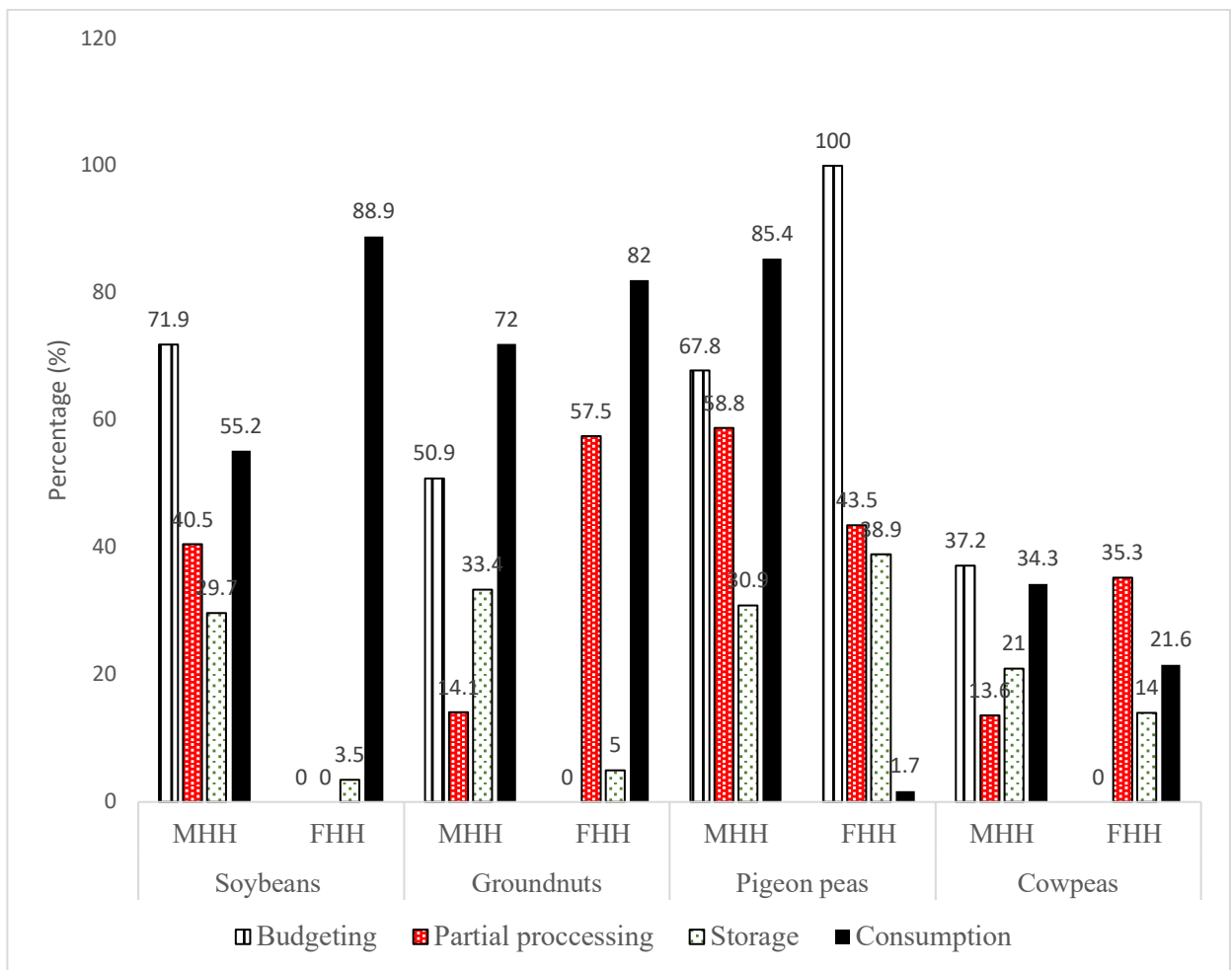


Figure 2: Proportion of women with little or no input in decision making on legume processing and utilization

Note: MHH- Male-Headed Household; FHH – Female-Headed Household

An important element that has an impact on infant and young child feeding practice is decision making regarding what and when to produce and control resources. Despite women's heavy involvement in legume production in the surveyed households, they had limited or no control over household resources and limited decision-making power over legume utilization as compared to men (Figure 2). This is a missed opportunity since substantial research shows that women's income is more likely to be spent on food, health and children's needs [14]. A cohort study (for 48 years) conducted in Guatemala revealed that adults who were provided with an improved nutrition during the first two years of life, were 46% wealthier than their counterparts [15]. Lessons from Guatemala study [15] show that improving the productivity of a country hinge on great investments in children less than 23 months. In this study, women in Dedza and Ntcheu had little autonomy in agricultural production reflecting low motivation for decision making regarding what to produce at household level. The ability of households' resource legacy influences the decision to expand legume production [2], which would in turn improve child nutrition outcomes. Similar results were also reported [3] that households who had little control over finances and credit were further

constrained in their ability to expand legume production due to lack of cash for seeds, and limited land and labor.

Importance of access to and control of resources on child feeding practices

Women with control of income and productive capital at household level provided optimal infant and young child feeding practices as compared to women without control on income. Figure 3 shows that 26.7% of married women had control over income and 14.7% autonomy in agricultural production. Women’s ability to control income, productive capital, finances and make decisions was positively and significantly associated with increased number of male and female children ($R=0.76$; P -value = 0.03) meeting the minimum meal frequency (Table 4). Women’s autonomy in credit decisions was positively associated with IYCF practices (Table 4).

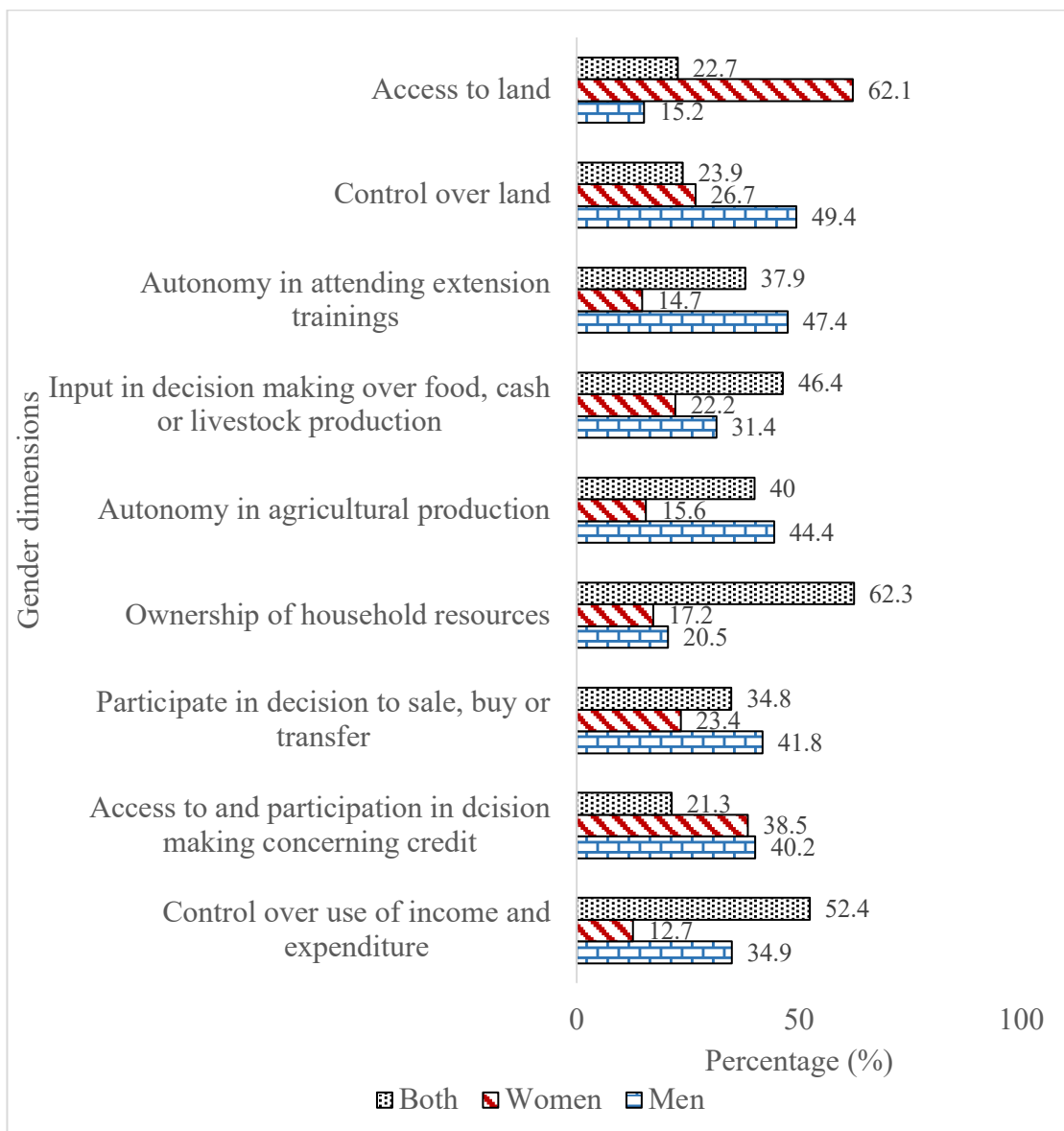


Figure 3: Gender dimension among male headed households with 6-23 months old children



In this study, productive capital referred to access and control to agricultural land, large and small livestock, house, cellphone and means of transport. Women's control of productive capital had a positive and significant effect (88.5%, P-value = 0.008) on child feeding practices in the surveyed households (Table 4). For the female child, decisions on credit by women was associated with a higher minimum dietary diversity explaining the reason why more male children (39.0%) were stunted than girls (35.4%) aged 6-23 months in Malawi [7].

Similarly, in Ghana, the association between girls' undernutrition and women's average number of credit decisions was positive and significant [16]. In households where women made credit decisions, there may be more scope for smoothing food consumption, which could minimize the incidence of acute food shortages or severe disease that results in substantial weight loss. Girl children are likely to respond better to discipline strategies than boys and it is considered easy to parent girl children than boys [17]. The results from the study bring to the attention that nutrition behavior change and communication education interventions should emphasize that children (regardless of sex) require equal care.

On the other hand, children who meet the minimum meal frequency had a high chance of meeting their energy requirement [18]. In another study conducted in Ethiopia, it was also found that minimum meal frequency was directly associated with children meeting their energy density [18]. Women in Dedza and Ntcheu who had more control of income generated from sales of legumes, had their children meeting recommended minimum dietary diversity and minimum acceptable diets than women who had no control. Control of income by women could also be an important factor of improving food security at household level. Household gender roles and gendered livelihood opportunities further shape the relationship between income and food security status [19]. Household food security in all types of households could be improved by facilitating women's ability to generate income through enhanced mobility within and beyond the city [20]. Findings from a qualitative study conducted in Blantyre district resonate with the broader literature on gender, livelihoods and mobility [21,22]. The positive effects would be heightened for many female-headed households, as they typically rely on fewer income earners.

Women, long economically marginalized in southern African cities, are most likely to be tasked with processing, preparing, allocating and producing food at home [23]. Legume utilization which was entirely performed by women in Dedza and Ntcheu districts also affected meal frequency, dietary diversity and minimum acceptable diets of children (6-23 months) according to Table 3. Increasing the proportion of children meeting minimum dietary diversity was influenced by input in decision making around legume utilization among legume growing farmers in Dedza and Ntcheu districts of Malawi. Women who were involved in partial processing of legumes (soybeans, groundnuts, pigeon peas and cowpeas) for storage, consumption and availability decisions at household level, ensured that children received a diversified diet. This was because storing and processing legumes ensured that, the household food basket remained high for a long period as compared to those who did not process and store



legumes. Although women in Dedza and Ntcheu in general experienced gendered inequalities, an autonomy in decisions regarding legume utilization had a profound effect (P -value < 0.05) on minimum dietary diversity among children aged 6-23 months old (Table 3). Partial processing of legumes reduced marketability of the product which ended up being consumed at household level.

Influence of market trends on male involvement in legume production

Involvement of men in legume production was high whenever the legumes were fetching high profits on the market. A focus group discussion (FDG) with men in Dedza and Ntcheu found that, level of decision-making regarding legume production, market and control of income from legume sales was high in response to high legume sales. On the contrary, a focus group discussion with women in Dedza and Ntcheu districts observed that control of income by men resulted in misuse as men resorted to drinking alcohol and buying worthless items like smartphones. During the focus group discussion with men, it was discussed that men tracked tonnes of legumes to bigger markets in search of better prices unlike women who sold legumes in small quantities and cheaply to itinerant traders. This also contributed to a lot of men having control over income generated from legumes.

CONCLUSION

Promotion of diversified grain legume (groundnuts, soybeans, cowpeas and pigeon pea) production on small farms that prioritizes complementary feeding can lead to positive child nutrition outcomes through household utilization and selling of these legumes. On the other hand, strengthening women's involvement in decision making and control with regards to production, processing and selling of legumes would augment child nutrition benefits from legumes. Communities and women could be empowered by increasing their involvement in decision making at household and community level and in decision making positions. Nutrition-sensitive agriculture programs must incorporate gender roles to improve the overall nutrition status of under-five children. Diagnosing and recommending appropriate areas of empowering men and women and examining how this correlates with indicators of child nutrition, may be an important first step toward evidence-based and culture-sensitive programs. Closing these gender gaps can then be an explicit target for food policy to empower women and improve child nutrition in Malawi. At the same time, using a holistic style in research on gender dynamics and nutrition studies prove to be of essence.

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Conflict of Interest

None declared.



Table 1: Meal frequency for age-specific children

Age (months)	Meal frequency
6 – 8	2 – 3 times/day
9 – 23	3 – 4 times/day
6 – 23 (non- breast feeding)	4 – 5 times/day

Source: [11]

Table 2: Foods given to children (6-23 months) in Dedza and Ntcheu

Variable	FFQ		Repeated 24-hour recall		
	n	%	Variable	n	%
Fruits	35	12	Fruits	91	31.4
Vegetables	169	58.1	Vegetables	120	41.3
Fats/oils	111	38.1	Fats/oils	60	20.7
Tinned or fresh milk	71	25.8	Animal products	57	19.6
Porridge	280	96.2	Staples	273	93.8
Other liquids	161	55.3			
Solid or mashed foods (e.g. nsima, cassava, sweet potatoes)	229	78.7			
Legumes	96	33	Legumes	28	13.1
Plain water	272	94.4			
Sweetened or flavoured water	172	59.1			
Tea	132	45.4			
Infant formula	38	13.1			

Table 3: Effect of household decisions on legumes by women on child feeding practices

Legume planning and utilization	Pearson Correlation	EBF*	MMF*	MDD*	MAD*
Budgeting for annual household legume requirement	Adjusted R value	0.233	0.683	0.543	0.818
	<i>P – value</i>	<i>0.080</i>	<i>0.03</i>	<i>0.05</i>	<i>0.047</i>
Partial processing of legume for storage (dehulling, drying)	Adjusted R value	0.662	0.634	0.536	0.582
	<i>P – value</i>	<i>0.19</i>	<i>0.37</i>	<i>0.008</i>	<i>0.038</i>
Storage of legume as seed	Adjusted R value	0.073	0.673	0.582	0.463
	<i>P – value</i>	<i>0.069</i>	<i>0.093</i>	<i>0.003</i>	<i>0.074</i>
Storage of partially processed legume for consumption as relish, porridge	Adjusted R value	0.547	0.552	0.827	0.773
	<i>P – value</i>	<i>0.053</i>	<i>0.054</i>	<i>0.022</i>	<i>0.000</i>
Ensuring availability and preparation of legume in the household.	Adjusted R value	0.438	0.353	0.686	0.866
	<i>P – value</i>	<i>0.038</i>	<i>0.002</i>	<i>0.05</i>	<i>0.000</i>

EBF = Exclusive Breastfeeding; MMF = Minimum Meal Frequency; MDD = Minimum Dietary Diversity; MAD = Minimum Acceptable Diets

Table 4: Effect of gender roles in male headed households on child feeding practices

Key variable	Pearson correlation	EBF		MDD		MMF		MAD	
		Boy	Girl	Boy	Girl	Boy	Girl	Boy	Girl
Control of productive capital by women	Adjusted R value	0.34	0.47	0.81	0.64	0.81	0.75	0.89	0.89
<i>Sig. level (95%)</i>	<i>P – value</i>	0.02	0.00	0.02	0.00	0.00	0.04	0.03	0.01
Credit decisions by women	Adjusted R value	0.63	0.45	0.76	0.60	0.83	0.61	0.89	0.87
<i>Sig. level (95%)</i>	<i>P – value</i>	0.09	0.11	0.03	0.05	0.00	0.00	0.01	0.01
Control on use of income by men	Adjusted R value	0.63	0.23	0.69	0.78	0.74	0.77	0.67	0.62
<i>Sig. level (95%)</i>	<i>P – value</i>	0.25	0.19	0.04	0.21	0.07	0.17	0.05	0.25
Control on use of income by women	Adjusted R value	0.25	0.15	0.92	0.70	0.81	0.76	0.95	0.74
<i>Sig. level (95%)</i>	<i>P – value</i>	0.07	0.14	0.01	0.01	0.01	0.03	0.01	0.00

EBF = Exclusive Breastfeeding; MDD=Minimum Dietary Diversity; MMF = Minimum Meal Frequency; MAD = Minimum Acceptable Diets

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