



Nutritional Knowledge and Roles of Women Farmers in Resolving Hidden Hunger in Claveria, Misamis Oriental, Philippines

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Abstract: Hidden hunger or micronutrient malnutrition is becoming prevalent in farming households especially in the Philippines. Hence in a country where women in agriculture provides for the major micronutrients in the body, they have a highlighted role in this solution. This paper seeks to underline this role through a quantitative hidden hunger study involving 60 households of women vegetable and fruit producers in Claveria, Misamis Oriental. Findings showed that better educated women with older children have greater knowledge about micronutrients. Women who obtained knowledge from health workers had scored the highest level, whereas those who sourced knowledge from institutions like LGUs or school scored the lowest. Most of them decide singly or jointly with spouses on the choice of vegetables for production but have lesser influence on which fruits to grow. Women also predominantly control decisions regarding vegetable and fruit purchase and consumption. Vegetables consumed are largely sourced from own production containing Vitamins C, A and Manganese; whereas, fruits consumed are mainly purchased containing Vitamins C, A, Potassium and Calcium. Quantitative analysis revealed, that the higher the nutritional knowledge, the higher: (a) their budget allocation for vegetables, (b) the household fruit consumption in terms of kilograms, and (c) farm proportion for fruit production. Study reveals that because most of the women's households consumed the vegetables they produce, then it is important to pay attention to what they produce. In order to increase the availability of certain micronutrients, it is necessary to consider either the higher production and/or the increased consumption of these vegetables and fruits. Findings also indicate the necessity of increasing women's and men's level of nutritional knowledge from moderate to high because the former are sole decision-makers for food purchase and consumption, and the latter are dominant decision-makers of which vegetables and fruits to produce in the farm.

Key Words: hidden hunger; micronutrient deficiency; women in agriculture



1. INTRODUCTION

Hunger continues to persist as a pressing global phenomenon. This is especially true to a distinctive category of hunger called “hidden hunger” which inflicts both developed and developing countries (Darnton-Hill, et. al., 2005). Unlike the usual forms of hunger like Protein Energy Malnutrition (PEM) with victims almost in skin and bones, people suffering from hidden hunger may appear healthy. Furthermore, the classical presentation of hunger seen through the naked eyes in a starving individual is absent in someone with hidden hunger (DSM, n.d.; Uchendu & Atinmo, 2010). While it is a form of malnutrition, unlike others, hidden hunger is a disorder because of the lack of essential vitamins and minerals in the diet that are absorbed by the body (Uchendu & Atinmo, 2010). It is considered “hidden” due to the absence of the classic symptoms of hunger (i.e. starvation, “skin and bones” look, protruding abdomen) and to the “invisible” quality of vitamins and minerals in the food people eat (Burchi, et al., 2011; Uchendu & Atinmo, 2010).

Statistics show that hidden hunger is a critical problem in the Philippines. Nine out of 10 households lack iron in their diet (FNRI, 2008). Hence, anemia remains a moderate to severe public health problem affecting 40% of vulnerable populations (WHO, 2008). Eight in every 10 households have inadequate vitamin A intake (FNRI, 2008). Thus, vitamin A deficiency prevalence is as high as 40% among pre-schoolers categorizing it a severe public health problem (WHO, 2009). Eight out of 10 households have insufficient iodine intake (FNRI, 2008; WHO, 2004). Moreover, the Philippine Nutrition Security Atlas reveals that incidence is highest among rural poor households (Fernandez-San Valentin & Berja, 2012; See for example Philippine maps in FAO, 2001). With a high PEM incidence among these households, the effects of hidden hunger are compounded in children (Fernandez-San Valentin & Berja, 2012; Uchendo & Atinmo, 2010).

While the answer to hunger is clear – food, the solution of hidden hunger is linked to an even bigger picture transcending just that of food security (WFP, 2013; UNDG, 2011). Alone, food security is not an adequate solution to hidden hunger. The solution

also involves nutrition security (Keatinge, et. al., 2011; UNDG, 2011; WFP, 2013). Hence in a country where agriculture aids food security and provides for the major micronutrients in the body, the agricultural sector has a highlighted role in this solution. Ninety percent of this agricultural supply is produced by the 13.5 million women farmers in the country (BAS, 2010; Chiong-Javier, 2009). Recognizing the critical roles of women, the Philippine government, through the Department of Health in the 1993 Summit on Ending Hidden Hunger, called upon women in the agricultural arena to take part in the national advocacy to fight the permeating disorder (dela Cuadra, 2000).

Yet in spite of the intricate links found among the identified solutions such as food or food security, women in agriculture and nutrition security, researchers trying to understand the context of hidden hunger frequently remain separate and foreign from these connections. (Balatibat, 2004; Bernabe & Penunia, 2009; Fernandez-San Valentin, C. & Berja, J. G. Jr., 2012; FNRI, 2008; Karl, 2009). However, these campaigns tend to ignore the holistic nature of hidden hunger particularly its link to women’s roles in agriculture and nutrition security. As of today, there exists a lack of social science perspective in this current health issue. Relevant social aspects such as women’s nutritional knowledge including technical and folk, their decision-making capacities, their involvement and their choices in food production, food purchase and food consumption remain unexplored in this growing research interest.

Hence, this study seeks to address the remaining research gap in providing an indicative assessment of hidden hunger recognizing that these relevant social aspects are critical in understanding the prevention or development of potential hidden hunger among farm women’s households. The study sought to understand the level of nutritional knowledge and its influence on women’s decisions, involvement and choices concerning which vegetables and fruits to produce, purchase and consume or prepare in order to address potential hidden hunger.

2. METHODOLOGY

This paper presents major findings derived from a hidden hunger study involving 60 households of women vegetable and fruit producers in five

different barangays in Claveria, Misamis Oriental (Figure 1). The study was quantitative in nature and utilized the survey method. Quantitative data was collected through semi-structured interviews using an interview schedule.

The participants of the study were subjected through a non-probability sampling method. Sixty farm women in five barangays as classified by three elevations in Claveria, Misamis Oriental were selected through a purposive sampling technique and was grouped into two samples. The criteria used for purposive sampling included women who were actively farming for at least a year, growing vegetables and fruits in the farm; mainly responsible for food purchase and food preparation at home, and either mothers of preschool children or of non-preschool children. The study utilized a semi-structured interview schedule for the survey. The interview schedule contained three major parts: sociodemographic profile; women's decisions, involvement and choices; and nutritional knowledge.

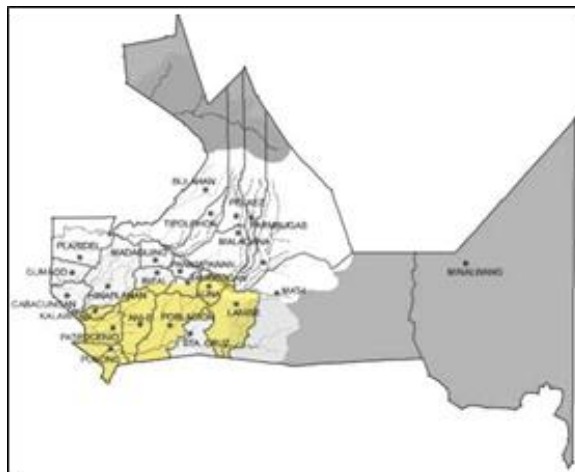


Figure 1. Map of Claveria and Study Sites

The data was encoded using the Statistical Package for Social Sciences (SPSS). SPSS was used to perform all descriptive and inferential statistical tests (i.e. spearman's correlation, one-way ANOVA, Mann-Whitney test) in the study.

3. RESULTS AND DISCUSSION

3.1 Women's Nutritional Knowledge

Age emerged as an insignificant factor while both educational attainment (One-way ANOVA, $F = 3.721$, $p = 0.031$) and children's ages (Mann-Whitney Test, $U = 278.500$, $W = 743.500$, $Z = -2.864$, $p = 0.004$) were significant. Study showed that the better educated women also happened to be mothers with non-pre-schoolers (or older children) and they possessed greater general knowledge (9.3 out of 10.0) about micronutrients (comprising of vitamins and minerals) than those with pre-schoolers (8.53 out of 10.0). They were able to name the more important micronutrients possibly because they have had a longer experience with caring for child nutrition and sourcing nutritional information.

Most women, whether with or without pre-schoolers, had a moderate level of nutritional knowledge, i.e., they can name the micronutrients as well as the vegetables and fruits from which the micronutrients are obtainable. However they were least able to identify the health value or function associated with the micronutrients they mentioned.

Table 1. Factors affecting Nutritional Knowledge

Factors	Statistical Test	Coefficient	Significance Level (p)
Mother's Age	Spearman's	rho=-0.90	1.770
Educational Attainment	One-way ANOVA	F=3.721	0.031*
Children's Ages	Mann-Whitney Test	U=278.50	0.004**

*Significant at 0.05 level

**Significant at 0.01 level

Four groups of sources had contributed to the women's nutritional knowledge, namely: (a) their family and relatives particularly parents, (b) the mass media especially television, (c) individual health service providers most notably their barangay or village health worker, and (d) local institutions



particularly their barangay government unit through its health seminars and trainings.

3.2 Women's Household and Farm Roles related to Nutrition

The choice of vegetables for production was made exclusive by the men or husbands in over a third (37%) of the farm women's households; while it was decided upon mainly by the wife or jointly by both husband and wife in less than a third each (32% and 30%, respectively). The same pattern was observed with regard to the selection of which fruits to produce, with men leading in 43% of the households, women in 22%, and both men and women in 17%. Because fruit trees were inherited in 18% of the households, it was the grandparents whose choice dominated fruit crop selection. For vegetable production, marketability was the overriding reason for choice of crop varieties regardless of who made the decision. In case of fruit production, desire to avoid spending on fruits governed their production decision.

On the other hand, the choice of vegetables and fruits to be purchased and consumed by the households rested predominantly in farm women as part of their roles of wife and mother. The main reasons given for buying vegetables and fruits were either that these were not produced in the farm, their farm supply was lacking, or the vegetable/fruit crops were not yet harvestable or in season.

3.3 Influence of Nutritional Knowledge on Women's Household and Farm Roles

Study found that there was no observable patterns linking the nutritional knowledge to women's roles because the data clustered around women's moderate level of knowledge. Further quantitative analysis (Table 2) revealed, however, that the higher the level of nutritional knowledge: (a) the higher their budget allocation for vegetables ($\rho=0.585$, $p=0.001$), (b) the higher the household fruit consumption in terms of weight in kilograms ($\rho=0.475$, $p=0.009$), (c) the more they tend to prepare meals with fruits ($\rho=0.468$, $p=0.001$) (d) the more vegetables and fruits prepared during

meals ($\rho=0.460$, $p=0.043$), (e) the more likely they are to devote a larger production area to fruits (Spearman's correlation, $\rho=0.392$, $p=0.032$).

Table 2. Influence of Nutritional Knowledge on Women's Farm and Household Roles

Women's Roles	Spearman's Correlation Coefficient (rho)
<u>Farm Roles: Decisions in</u>	
Proportion on vegetable production	-0.073
Proportion on fruit production	0.392*
Number of vegetable varieties grown	-0.251
Number of fruit varieties grown	-0.126
<u>Household Roles: Decisions in</u>	
Frequency of vegetable purchase	0.72
Frequency of fruit purchase	0.163
No. of vegetable varieties bought	0.318
No. of fruit varieties bought	0.264
Monthly budget on vegetable purchase	0.585**
Monthly budget on fruit purchase	0.287
Preparing vegetables in meals	-0.028
Preparing fruits in meals	0.468**
No. of vegetable varieties cooked	0.460*
No. of fruit varieties prepared	0.392*
Amount (weight) of fruits prepared	0.475**

*Significant at 0.05 level

**Significant at 0.01 level

The quantitative analysis also showed that women who obtained nutritional knowledge from village health workers had scored the highest level, whereas those who sourced knowledge from institutions like local government unit or school scored the lowest level.

3.4 Household Food Consumption Patterns

The farm women's households frequently produced a median of almost 9 varieties of vegetables in their farms, a median of 6 varieties of fruits. With regards to food purchases, they often bought a median of 5 vegetable and 3 fruit varieties. In terms of food consumption, they regularly ate a median of 6 vegetable and 3 fruit varieties. Estimated in terms of frequency per week, vegetable consumption averaged 7 and 6 days, respectively. Estimated in terms of

weight in kilograms per week, fruit consumption averaged 6 and 4 kilograms, respectively.

For the majority of households, their frequently consumed vegetables are own-produced. The top 10 consumed vegetables are malunggay (moringa), chayote, squash, eggplant, okra (lady's fingers), stringbeans, ampalaya (bitter gourd), beans, kangkong (water spinach) and alliums (like garlic and onions). However, their frequently consumed fruits are either self-produced or bought from the market. Among these fruits are banana, guava, avocado, orange, mango and apple (Table 3).

Table 3. Micronutrient availability of frequently consumed vegetables and fruits per household

Frequently Consumed Vegetables/ Fruits	f	Micronutrients available
Vegetables		
Malunggay	41	Vit A, C, Potassium, Zinc
Chayote	39	Vit C, A, B Complex
Squash	34	Vit C, B6, Manganese
Eggplant	28	Manganese
Lady's Fingers	26	Vit A, C, Folic Acid, Calcium
String beans	23	Vit C, A, Folic Acid
Bitter gourd	22	Vit C, Folic Acid, Potassium
Beans	20	Vit K, C, A, Manganese
Water Spinach	18	Vit K, C, B6, Manganese
Alliums	17	Manganese, Vit B6, C
Fruits		
Banana	38	Vit C, B Complex, Potassium
Mango	26	Vit C Calcium, Vit E, A
Orange	15	Vit C, A, Potassium, Calcium
Apple	15	Calcium, Potassium, Vit A, C
Guava	8	Vit C, A, E
Avocado	7	Vit B Complex, C, K

In the case of the top 10 consumed vegetables drawn from own-production, the generally available micronutrients are vitamins C (found in 9 of 10) as well as vitamin A and manganese (each found in 5 of 10). Among the fruits consumed that were mainly purchased, they mostly contain Vitamins C (found in 9 of 10), and also A (found in 6 of 10), Calcium (found in 5 of 10) and Potassium (found in 4 of 10).

3.5 Roles of Women Farmers in Resolving Hidden Hunger

Study reveals that because most of the farm women's households consumed the vegetables they produce, then it is important to pay attention to what they produce. Evidently, certain micronutrients are less available in the household diet because certain vegetables are less consumed although they are being produced.

Concomitantly, certain micronutrients are less available in the diet because their vegetable sources are less or not produced and also less consumed. Thus in order to increase the availability of certain micronutrients in the household diet, it is necessary to consider either the higher production and/or the increased consumption of those vegetable sources, e.g., vitamin B complex from umbok (Chinese cabbage), iron from saluyot (jute) and carrots, zinc from camote (sweet potato), vitamin K from radish, and potassium and phosphorus from coconuts.

Findings also indicate the necessity of increasing the farm women's level of nutritional knowledge from moderate to high because they are the sole decision-makers for food purchase and consumption which influence the nutritional security or insecurity. They need to be more knowledgeable about the health value associated with micronutrient functions and which types of micronutrients are found in their vegetable and fruit choices. They also need to know the micronutrient content in their household diets in order to ensure micronutrient adequacy.

Moreover, findings indicate the necessity to address and enhance the men's level of nutritional knowledge because they are influential decision-makers of which vegetables and fruits to produce in the farm household. Husbands should also be targeted by health service providers and institutions, nutritional messages delivered can be simplified, clarified or better explained for women and men's easier understanding

4. CONCLUSION



The study recognized that there exists a web causal relationships among agriculture, women and nutrition security. The study's major contribution to this research interest is towards supporting and strengthening claims as to how both agriculture and women play a significant and central role in nutrition which is important in the solution to hidden hunger.

The investigation also offered solutions and answers to hidden hunger not just limited to providing vitamins and minerals in the diet. It expanded the solutions of hidden hunger with increasing women's decision-making capacities, ensuring their involvement and informing their choices and improving their knowledge which can all contribute to available micronutrients found in the vegetables and fruits they produce, purchase and prepare/consume within their households. This can be done through information and educational campaigns (IEC's), women empowerment based on decisions and choices and continually encouraging women's involvement in activities ensuring nutrition security.

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