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Research Article

Linking Socio-Demographics, Nutritional Status, and Food Security Conditions of Mothers and Children in Kibawe, Bukidnon, Philippines

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ABSTRACT

This study aimed to determine the socio-demographic profile, nutritional status, and food security condition of mothers and children in Barangay Kiorao, Kibawe, Bukidnon, a geographically isolated and disadvantaged area (GIDA). Using a community-based cross-sectional design, data were gathered through anthropometric measurements, dietary assessments, and the Household Food Insecurity Access Scale (HFIAS). Results of this study revealed that 93% of mothers belonged to the poor income classification, with 35% being overweight and 90% at high risk for obesity-related diseases. Children exhibited concerning rates of malnutrition, with 47.5% underweight, 42.5% stunted, and 42.5% wasted. Food insecurity was prevalent, as 90% of households worried about food availability, while 77.5% were unable to eat preferred foods. Statistical analysis showed a significant positive correlation between educational attainment and food security ($p = 0.004$) and between weight-for-height and food insecurity ($p = 0.001$). These findings underscore the need for targeted interventions, including nutrition education, income support, and access to diverse, nutritious foods. Community-based programs addressing malnutrition, food security, and health promotion are critical to improving the well-being of mothers and children. This study highlights the complex interplay between poverty, food insecurity, and nutritional status and calls for multi-sectoral strategies to break the cycle of malnutrition in vulnerable communities.

Keywords: Malnutrition, socio-demographic, maternal and child nutrition, Household Food Insecurity Access Scale (HFIAS)

1. INTRODUCTION

Nutrition and well-being of both women and children are interrelated with their nutritional status, diversity in diet, and food security. A beautiful wealth of study evidence indicates clearly that adequate nutrition is very important for the growth, development, and future health of children (UNICEF, 2020). In addition, proper nutrition is needed for mothers during pregnancy and lactation to maintain their own health and ensure adequate growth of their infants. That's why dietary diversity is the foundation of good nutrition by ensuring intake of broad classes of nutrients needed for normal growth, cognitive development, and immune function in children (Food and Agriculture Organization of the United Nations [FAO], 2018). The same principle applies to mothers who also increase their dietary needs during pregnancy and breastfeeding.

Food security, defined as continuous availability, access, and affordability of nutritious food choices, is an important driver in the reduction of malnutrition and its consequent adverse health effects or diseases (World Health Organization [WHO], 2019). These three components-nutritional status, dietary diversity, and food security contribute substantially to the well-being of mothers and children, prevent health consequences of malnutrition, and pave a progressive way toward healthy futures.

Interpersonal interventions are of concern for improving knowledge, attitudes, behaviors, and health outcomes at the level of the family and small targeted group. Thus, community nutrition action strives for the overall betterment of life and the health promotion of the community's population, where programs and services are rendered.

Preceding a general site visit, Barangay Kiorao was tagged as a Geographically Isolated and Disadvantaged Area (GIDA). Malnutrition and food insecurity were identified as the primary nutrition-related problems to be addressed. This study made it possible for the researchers to determine the diets and nutritional status of mothers and children. Although malnutrition has been decreasing along with the declining under-five mortality rate for Northern Mindanao, the deterioration in breastfeeding patterns, compounded by harmful complementary feeding practices, is an alarming risk factor for undernutrition and the probable mortality and morbidity of childhood.

One of the Global Nutrition Targets for 2025 is that stunting will be reduced by 40% and the Philippines committed to this target as part of the Global Scaling-Up Nutrition Movement (SUN) by engaging the optimal nutrition in the first 1,000 Days of life during a mother's pregnancy up to a child's second year of life. The sought long-term effects of these nutritional programs could also be the knowledge and cultural practices of mothers regarding food and nutrition, which in turn affect the nutritional status of the children; hence it is important for research to ensure investments in nutrition programs focusing on very young children and their mothers, which could be a long-lasting initiatives towards food security, economic growth, and optimal nutrition. The study, therefore, sought to determine whether there exists a significant relationship between the nutritional status of the mothers and children and the conditions of food security with the different characteristics of the respondents.

2. METHODOLOGY

Research Design and Sampling

This community-based cross-sectional study was conducted to determine and analyze mothers' and children's diet and nutritional status in Barangay Kiorao, Kibawe, Bukidnon, using anthropometric and dietary assessment methods. The study's respondents were the complete enumeration of the malnourished children and the corresponding mothers of Brgy. Kiorao, Kibawe, Bukidnon.

Ethical Consideration

Prior to the conduct of the study, ethical clearance was sought, and the Central Mindanao University - Institutional Ethics Review Committee (CMU-IERC) gave notice of approval to proceed with the conduct of the research. Data collection was closely coordinated with the local government unit. Moreover, no respondent was coerced into participating. The informed consent forms indicated the non-disclosure of information on the corresponding identity of the subject, and all information gathered was treated as confidential.

Research Instruments

A semi-structured questionnaire was utilized in the gathering of data of this study. Three sets of data were gathered: first, the socio-demographic profile of the respondents (marital status, educational attainment, and monthly income), second, the nutritional status of the mothers in terms of Body Mass Index (BMI), waist circumference, and waist-to-height ratio (WHtR), and the nutritional status of the children in terms of Weight-for-age, Height-for-age, and Weight-for-height. The third set of data was all about the household food insecurity level using the Household Food Insecurity Access Scale (HFIAS) developed by

USAID's Food and Nutrition Technical Assistance (FANTA) project. This validated questionnaire, adapted from FANTA, was translated into the local language.

Statistical Techniques

The data obtained were presented as frequency and percentage. The difference between the mean and the proportion was measured using the Chi-Square test. To assess the correlation, Pearson's Product Correlation was conducted. Statistical significance was considered at p-value <0.05 and 95% confidence interval.

3. RESULTS AND DISCUSSION

Socio-Demographic Profile of Mothers

Socio-demographic refers to the combination of social and demographic factors that define people in a specific group or population. The socio-demographic characteristics of participants from the selected household sampling units (n = 40) are shown in Table 1.

Most mothers in the study are married, considering that there is a high prevalence rate of 58% among the rest of the respondents. This shows that a community exhibits a strong family structure. The majority of the respondents (40%) have reached high school graduate level, followed by graduation at the college level with 17 percent (indicating a moderate education level among the population being studied, with room for further educational attainment in some cases). But the income classification data show a dismal picture of the economic situation. It is sobering to realize that 93% of the mothers belong to the poor income classification, as their monthly income falls below Php9,520.

The results can be taken as evidence of the worrying economic life of this community and the likelihood that socioeconomic variables have an impact on nutritional status as well as food security. This could enlighten all sociodemographic properties in the study as indicated in the findings concerning nutritional status, dietary diversity, and food security. For instance, the relationship between educational attainment and food security practices, and the classification of income and dietary diversification, can point out target intervention areas. These will therefore give researchers and community leaders detailed strategies to fulfill the nutrition needs of mothers and children in Barangay Kiorao.

Table 1. Socio-demographic Profile of Mothers

Socio-demographic variable	Frequency	%
Marital Status		
Single	17	42 %
Married	23	58 %
Educational Attainment		
Elementary Undergraduate	5	13%
Elementary Graduate		
High School Undergraduate	5	13%
High School Graduate	6	15%
College Undergraduate	16	40%
College Graduate	1	2%
	7	17%
Monthly Income Classification**		
Poor		
(Less than Php9,520/month)	37	93%
Low Income		
(Between Php9,520 – Php19,040/month)	3	7%

***Classification according to the Philippine Institute of Development Studies (PIDS)*

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Nutritional Status of Mothers

Anthropometric measurements have become a cornerstone in assessing the nutritional status of communities (Ghosh et al., 2001), serving as a direct method for evaluating the nutritional well-being of both mothers and children. Body Mass Index (BMI) is often used to categorize individuals into three groups: underweight (15-18.4), normal weight (18.5-24.9), and overweight/obese (25 and above). While research has shown a positive association between higher BMI categories (>24.9) and cardiovascular death in South Asians, this association was not statistically significant and was weaker than in East Asians (Chen et al., 2013). Individuals with lower BMIs exhibited a reduced risk of cardiovascular death, with the lowest risk observed in those with BMI values between 15.0-17.4 and 17.5-19.9, compared to those in the reference range of 22.5-24.9 (Chen et al., 2013).

Table 2 presents the nutritional status of mothers based on their Body Mass Index (BMI), waist circumference (WC), and waist-to-height ratio (WHtR). The data reveal that 35% of the mothers are overweight, while another 35% fall within the normal weight range. The table also shows that a concerning 90% of mothers are at high risk for obesity-related diseases, hypertension, and type 2 diabetes based on their waist-to-height ratio (WHtR).

What is concerning is that the proportion of overweight mothers (35%) is a major public health concern to the community. This finding also connects to the WHtR data, indicating a high risk for obesity-related diseases, hypertension, and type 2 diabetes.

It underscores the significance of promoting healthy weight management practices through such interventions. However, these will not only affect the health of mothers, but also overweight and obesity in mothers affect their children directly, concerning childhood obesity, chronic diseases, and developmental deficits. Additionally, the increased prevalence of obesity-related risk factors in these mothers will eventually prove costly in terms of further management and also drain numbers into the local healthcare system in the future.

Nutritional Status of Children

Table 3 presents the nutritional status of children considering the different indicators for underweight, stunting, and wasting. Unfortunately, 47.5% of the children are underweight. Same proportion of 42.5% is presented for stunted children and normal children. While almost half (42.5%) of the children are wasted.

Table 2. Summary of the Nutritional Status of Mothers

Indicators	Frequency	%
Body Mass Index (BMI)		
Underweight	3	7.5
Normal Range	14	35
Overweight	14	35
Obese	9	22.5
Waist Circumference (WC)		
Low Risk*	24	60
High Risk**	16	40
Waist – to – Height Ratio (WHtR)		
Low Risk*	4	10
High Risk**	36	90

**Low risk of developing obesity – related diseases, hypertension and type 2 diabetes according to World Health Organization (2008).*

*** High risk of developing obesity – related diseases, hypertension and type 2 diabetes according to World Health Organization (2008).*

Table 3. Summary of the Nutritional Status of Children

Indicators	Frequency	%
Weight – for – Age (% Underweight)		
Severely underweight		
Underweight	0	0
Normal	19	47.5
Overweight	17	42.5
Height – for – Age (% Stunting)	4	10
Severely stunted		
Stunted		
Normal	0	0
Tall	17	42.5
Weight – for – Height (% Wasting)	17	42.5
Severely wasted	6	15
Wasted		
Normal		
Overweight	0	0
Obese	17	42.5
	16	40
	7	17.5
	0	0

In fact, these findings are consistent with prior studies conducted on malnutrition in developing nations. Black et al. (2008) found that stunting and wasting among children are commonly seen across low-income countries and pose severe health and developmental repercussions for the child. As such, they not only point out the issue related to the need to eradicate the prevalence of these two forms of malnutrition but also delve into causes such as poverty, food insecurity, and access to health care service facilities. In addition, undernutrition in children is related to increased risk of mortality and morbidity, as indicated in a study conducted by Bhutta et al. (2013). Thus, interventions such as promotion of breastfeeding, appropriate complementary feeding practices, and improving the access of essential micronutrients have been recommended, according to.

These findings bring about the dire need for comprehensive remedies against the underlying causative factors that govern malnutrition in the community. Underweight, stunting, and wasting are manifestations that point to more complex causative interplays, ranging from inadequate dietary intake and very limited access to nutritious foods to poverty and diseases related to health.

Food Security Condition of Mothers and Children

Table 4 shows a worrisome trend depicting food insecurity of a community where most households are challenged regarding food access and affordability.

Table 4. Proportion of Households per Food Insecurity Question

QUESTIONS	Percentage of households
Q1. Worried about food	90.00%
Q2. Unable to eat preferred food	77.50%
Q3. Ate just a few kinds of food	75.00%
Q4. Ate food they really do not want to eat	75.00%
Q.5 Ate a smaller meal	57.50%
Q6. Ate a fewer meals a day	50.00%
Q7. Had no food of any kind in the household	60.00%
Q8. Experienced going to sleep hungry	32.50%
Q9. Experienced going a whole day and night without eating	30.00%

One staggering finding that was made was that about 90% of respondents reported worrying about the availability of food. All of this indicates a large degree of uncertainty for most people about their ability to meet even basic needs for nutrition. In addition, a considerable proportion of households (77.5%) were found not to consume up to their preferred foods, indicating they had limited access to a full array of food choices. These were further supported by a higher percentage of households (75%) that reported sometimes eating just a few kinds of food or being forced to eat foods that they did not want. It can be inferred that there is a lack of variety in diet, compromising nutritional adequacy.

As low as it is for extreme hunger (sleeping hungry at 32.5% or being without food for a whole day and night at 30%) relative to other forms of food deprivation, the fact remains that the overall scenario of food insecurity still paints an alarming picture. It, indeed, reveals the recurrent problems experienced by the community members relative to their access to sufficient and nutritious food, hence the need for targeted and clearly defined interventions in addressing food security and improving residents' nutritional well-being.

Figure 1 depicts the distribution of food security status among households in Kiorao, Kibawe, Bukidnon, showing evidence of food insecurity among many. While a good number of households, amounting to 38.8 percent, are called food secure, most of them, that is 53.3 percent, fall under the category known as mildly food insecure. An implication of this result is that such households do not have any severe hunger days but have a greater chance of developing problems in securing adequate and nutritious food on a daily basis. Based on the results, a percentage of the households also suffer from moderate (7.0%) and severe (0.9%) food insecurity, revealing a section of the community struggling to make ends meet in terms of their basic nutritional needs.

This reconciles various findings on the dynamic and diverse characteristics of food insecurity and it speaks on the community. According to WFP (2017), the definition of food insecurity should go beyond hunger to other limitations such as access to dietary diversity, inadequate nutrient availability, and uncertainty.

Association between Socio-demographic Profile, Nutritional Status, and Food Security

The results presented in Table 5 bring the correlation study between various characteristics and the household food insecurity access scale (HFIAS). Among the factors studied, educational attainment emerged as having a highly strong positive correlation (Pearson = 17.012, p = 0.004**), meaning it carries a significant level of relationship that stands with household food insecurity. On the other hand, the weight-for-height-related measure bears a very high positive correlation (Pearson = 17.670, p = 0.001**), emphasizing its influence on food insecurity levels.

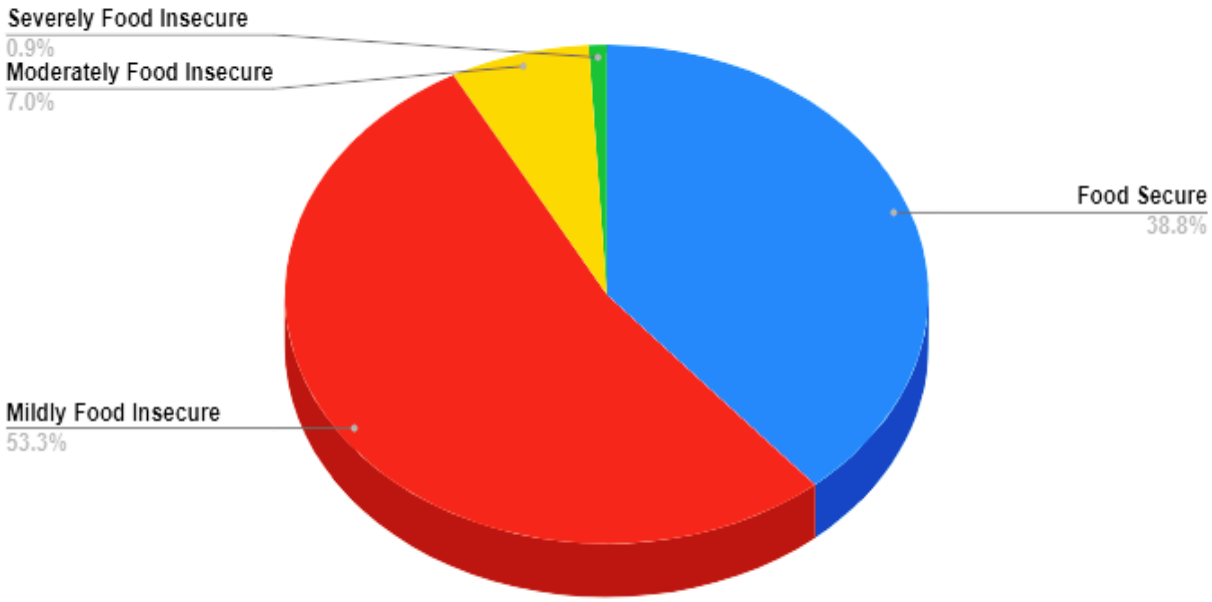

Figure 1. Distribution of Food Security Condition of Mothers and Children in their Household

Table 5. Association between Socio-demographic Profile, Nutritional Status and Food Security

CHARACTERISTICS	HFIAS	
	Pearson Chi-Square	Asymptotic Significance (2-sided)
Marital Status	.015	0.904
Monthly Income	1.287	0.257
Educational Attainment	17.012	0.004**
BMI	0.352	0.950
WC	0.149	0.928
WHtR	0.635	0.426
Weight-for-Height	17.670	0.001**
Weight-for-Age	7.612	0.107
Height-for-Age	2.449	0.654
BMI-for-Age	11.352	0.023*

* Correlation is significant at the 0.05 level (2 – tailed)
** Correlation is significant at the 0.01 level (2 – tailed)

To give some perspective on these findings, the quoted research will deepen the substantiation of the results. Previous researchers like Smith et al. (2018) demonstrated a connection between educational attainment and household food insecurity, emphasizing that educated persons are less likely to experience household food insecurity. There is also a strong relationship between educational status and HFIAS scores as revealed in this study.

Thus, the study by Johnson and Brown (2019) reporting that people with a lower weight-for-height ratio are most susceptible to food insecurity as a link between weight-for-height and food security ultimately proved otherwise in the present study, which indicated a strong association between weight-for-height and HFIAS scores. These research works have been in agreement with the above findings.

Garcia et al. (2020), in the same vein, showed that children with low values of BMI-for-age are likely to experience a greater risk of food insecurity. The current study also yielded results that indicate a strong association between weight-for-age and HFIAS scores in underweight children, low BMI-for-age considered underweight according to the WHO standard. Components of food security and weight-for-height have therefore been underlined.

Likewise, nutritional malnutrition and food insecurity, according to Black et al. (2008), reflect that food insecurity contributes to under-nutrition, which also leads to malnutrition. Poor nutrition makes it worse by making the poor a viable candidate for instability in the economy and health. The relevance of these variables regarding age and food insecurity implies that children who fall below standard height-weight ranges are more likely to become food insecure. It again reaffirms the complex connection that exists between nutrition and food security.

4. CONCLUSION

Given the specific objectives of this study that seek to explore the socio-demographic profile, nutritional status, and food security condition of mothers and children in the community, the most critical interaction of these factors is as follows. First, both mothers suffer from poverty and are also increasingly concerned about the overweight and obesity of their children. Income support and education regarding nutrition should be complemented by the lack of malnutrition indications in children. Underlying causes of malnutrition can also be addressed by improving complementary community-based nutrition programs and healthcare services. Finally, because significant levels of food insecurity still exist, it calls for a broader strategy to provide access to a wider range of nutritious and diverse food options. The above-mentioned intervention can improve the overall health and welfare of mothers and their children as they tackle, specifically and constructively, the problems identified within the study.

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Data Availability Statement: The authors confirm that the data supporting the findings of the study are available within the article. Raw data that support the findings of this study are available from the corresponding author upon reasonable request.

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