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Differences in the nutritional status among beneficiaries of a civil society organization according to sociodemographic and economic covariates

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Abstract:

BACKGROUND: High-risk areas in the Philippines still experience a high prevalence of undernutrition. The efforts of the governments are not enough to reach those who are in need; hence, the presence of Civil Society Organizations (CSOs) is crucial. One CSO has implemented health and nutrition technical programs to increase the number of well-fed children in four selected areas in the Philippines.

OBJECTIVES: This study aims to shed light on the differences in the nutritional status of the children when they are characterized according to their sociodemographic and economic covariates.

METHODOLOGY: An analytical cross-sectional design was used to survey 692 households, including 764 children aged 0–5 years old. Descriptive analysis and the Chi-Square test of difference were used to answer the objectives.

RESULTS: The study results show that no significant differences were observed when the nutritional status of the children was characterized according to the sociodemographic of the caregiver, food consumption score (FCS) and food security status, water, hygiene and sanitation (WASH) practices, and economic indicators, except weight-for-height and marital status of caregivers, and weight-for-age and livelihood and economic support received by their caregivers ($P = 0.02$).

CONCLUSION: The majority of children, regardless of their nutritional status, share the same experience and resources in terms of sociodemographics of caregivers, FCS and food security status, WASH practices, and economic indicators. CSO can boost the impact of their health and nutrition interventions by harmonizing their efforts with government programs, leading to better-targeted and more efficient outcomes.

Keywords:

Economic covariates, food security, malnutrition, WASH practices

Introduction

The Philippines still experiences a high prevalence rate of undernutrition, especially in high-risk areas. These high-risk areas are prone to malnutrition due to various factors such as weak governance, the presence of conflict, and prone to natural disasters such as drought and floods.[1] One example is North Cotabato, wherein 15.8% of children under the age of five are underweight, 25.2% are stunting, and 4.4% are wasting.[2] Another example is Aurora Province, wherein 21.3% of children under the age of five are underweight, 17.6% are stunting, and 10.9% are wasting.[3] The weak

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governance and presence of conflict in some areas affect the implementation of health and nutrition programs, which eventually affects the nutritional status of the vulnerable population.[4]

There are sociocultural determinants that also affect the nutritional status of children under the age of five. Studies have revealed that income, nutrition knowledge, feeding practices, water, hygiene and sanitation (WASH) practices, food variety, and use of health facilities were some of the sociocultural covariates that affect the nutritional status of children under the age of five.[5,6] Furthermore, it was shown that superstitions and cultural beliefs, and practices are still practiced.[7] Maternal education is significantly associated with the nutritional status of their children, as educated parents can make more informed choices in terms of child-rearing.[8,9] Food security is needed to maintain optimum nutritional status, and it was shown that food-insecure households are more likely to have chronic energy-deficient mothers and at least one stunted child.[10] WASH practices are also significant as good WASH practices, such as proper handwashing, clean sanitation facilities, and clean and potable drinking water lower the household members' susceptibility to illnesses due to pathogenic bacteria.[11] Livelihood and savings of the parents also affect nutritional status as the former enables the parents to afford nutritious food and health care, while the latter enables them to have a safety net for emergencies.[12,13] Prolonged undernutrition in children aged 0–5 years old not only affects the children themselves but also impacts the community as undernutrition children grow into unhealthy adults, which in turn impacts their productivity and income.[14]

The Philippine government has multiple programs to help alleviate the growing problem of undernutrition in the country. The National Nutrition Council (NNC) is the council in the Philippines who spearheads nutrition programs in the Philippines. The NNC produces the Philippine Plan of Action for Nutrition, which details their plans, programs, and collaboration with government agencies such as the Department of Health and Department of Social Welfare and Development to fight against malnutrition.[15] However, the government efforts are not enough as their services do not reach secluded areas; thus, civil society organizations (CSOs) offer their assistance in this matter.

CSO were shown to play an important role in health and nutrition outcomes. They help the government by engaging communities, organizing nutrition programs, and building the capacity of community leaders and volunteers.[16] A CSO is currently implementing health and nutrition technical programs across selected provinces in the Philippines. The goal of the programs is to increase the number of well-fed children under the age of five. The CSO focuses on early childhood development and nutritional status of children through mother's classes and feeding programs, integrating WASH practices in their programs, spearheading savings groups, and providing livelihood and livelihood support to their beneficiaries.[17,18]

Hence, this study aims to characterize the current nutritional situation of children 0–5 years old across the study sites. Furthermore, the study would like to shed light on the differences of the nutritional status of the children when they were characterized according to their sociodemographic and economic covariates across the study sites.

Methodology

Research design and study sites

An analytical cross-sectional study design was conducted in four major sites in the Philippines. In Luzon, Municipality of Jose Panganiban, Camarines Norte, and Municipality of Bugallon, Pangasinan were selected. Jose Panganiban is a second municipality in Camarines Norte, and 4.6% of children aged 0–5 years old from Jose Panganiban were underweight, 9.6% were stunted, and 0.9% were wasted.[19,20] Bugallon is a second-class municipality in Pangasinan, and 1.6% of children aged 0–5 years old from Bugallon are underweight, 1.4% are stunting, and 0.2% are wasting.[20,21]

In Mindanao, the Municipality of Quezon, Bukidnon, and the Municipalities of Esperanza and Bagumbayan, Sultan Kudarat were included. Quezon, Bukidnon is a first-class municipality wherein 2.1% of children aged 0–5 years old are wasting, 5.3% are stunting, and 0.9 are wasting.[20,22] Esperanza and Bagumbayan are first-class municipalities found in Sultan Kudarat.[23,24] The former has prevalence of wasting of 3.4%, 13.6% in stunting, and 1.1% in wasting for children aged 0–5 years old, while the latter has a prevalence of 4.5% in terms of underweight, 7.8% for stunting, and 1.4% for wasting for children aged 0–5 years old.[20]

Study participants

Household beneficiaries with children 0–5 years old of any health and nutrition programs of the CSO were selected, and must complete at least one project model. Beneficiaries who have children affected by chronic diseases (e.g. asthma, congenital heart disease, and diabetes) were excluded. Beneficiaries who are also recipients of other nongovernment organizations will be excluded. Furthermore, beneficiaries who experienced force majeure (e.g. extreme weather, supply shortage, war, and terrorism) in the past 3 months were also excluded.

Sampling size and sampling technique

This study used the data set of a study entitled "Evaluation of the Project Models in Health and Nutrition in the Provinces of Bukidnon, Camarines Norte, Pangasinan, and Sultan Kudarat, Philippines" selecting children aged 0–5 who satisfied the minimum criteria set above. A stratified random sampling design with proportional allocation in terms of their location and the program was utilized to select the respondents to ensure representativeness across locations and area programs, thus reducing sampling bias. The sample size was computed based on a two-tailed 95% level of confidence with a power of 80% and a hypothesized small effect size based on previous institutional reports which indicated weak-to-moderate associations between socioeconomic/WASH factors and nutritional outcomes. There was an estimated need for 906 participants in this study, accounting for an oversampling of 15% to account for data attrition.

A total of 905 households and 806 children aged 0–5 years old were chosen to participate in the study. Approximately 213 households and 42 children were excluded from this study due to incomplete data. Overall, the study used the data of 692 households and 764 children.

Research instrument

This study used six main research instruments: anthropometric measurements, household dietary diversity, food consumption survey, food consumption survey, WASH assessment, and economic assessment. To guarantee the validity of the extracted questionnaires, the research instrument went through face and construct validation with 3 project managers and evaluation experts.

Anthropometric measurements

Height, weight, and recumbent length were measured by a data collector according to the standard protocols:

Weight of the children was measured using a double digital scale, which has a capacity of 150–200 kg. The measurement was done two times and recorded to the nearest 0.01 kg. A third reading was done if the difference between the first two measurements was >0.3 kg.

The height of the children was measured using a height board for children aged 2 years old and above, while a medical plastic infantometer was used for the recumbent length for those below 2 years old and unable to stand on their own. The measurement was done twice and logged to the nearest 0.1 cm. A third reading was done if the difference between the first measurements was > 0.5 cm. The anthropometric measurements of children 0–5 years old were interpreted using the Child Growth Standard developed by WHO to assess the nutritional status of children aged 0–5 years old.[25]

Household dietary diversity score

Extracted from guidelines for measuring household and individual dietary diversity from FAO (2010). It was defined as the number of different food groups eaten by the household for the previous 7 days, not regarding the frequency of consumption. There are two categories: unacceptable (≤8 groups consumed) and acceptable (9–12 groups consumed).

Food consumption score

Extracted from Food Consumption Score (FCS) of the World Food Programme (2008). It is a composite score calculated, which includes frequency of consumption and nutritional importance of different food groups consumed by the household for the past 7 days. If a household has an FCS of 42 and below, it means they have unacceptable food consumption, while a score of 43 and above means they have acceptable food consumption.

Household food insecurity access scale

Extracted from Household Food Insecurity Access Scale for Measurement of Food Access: Indicator Guide from Food and Nutrition Technical Assistance (2007). This questionnaire is used to assess the physical and economic access to sufficient, safe, and nutritious food of the beneficiaries that meets their dietary needs and food preferences for an active and healthy life (FNRI, 2016). It has two categories: food secure and food insecure.

WASH assessment

Extracted from Core questions on water, sanitation, and hygiene for household surveys of WHO and UNICEF. This assesses the following WASH practices of the participants:

Improved drinking water: The household drinking water is from an improved water source.

Safely managed drinking water services: The household drinking water is from an improved water source that is located on the premises and is available when needed.

Basic sanitation services: The household uses improved facilities that are not shared with other households.

Basic hygiene services: Availability of a handwashing facility on premises with soap and water.

Economic assessment

The economic assessment is divided into two: CoMSCA membership, and livelihood and economic support received.

Savings group membership

The caregiver had self-reported their membership in the savings group from the last 12 months.

Table 1: Demographics of caregivers in the four selected sites in the Philippines, 2024

Demographics of caregivers	*n*=692 *n* (%)
Sex	
Male	149 (21.5)
Female	543 (78.5)
Age	
20 and below	40 (5.8)
21 - 30	283 (40.9)
31 - 40	238 (34.4)
41 - 50	91 (13.2)
51 - 60	23 (3.3)
60 and above	17 (2.5)
Marital Status	
Married	357 (51.6)
Widowed	16 (2.3)
Never married	15 (2.2)
Seperated	10 (1.4)
Cohabiting/Living-in	294 (42.5)
Highest educational attainment	
Never attended	1 (0.1)
Preschool	1 (0.1)
Elementary	164 (23.7)
Secondary	375 (54.2)
Vocational/College	138 (19.9)
ALS	13 (1.9)

Table 2: Demographics of children aged 0-5 years old in the four selected sites in the Philippines, 2024

Demographics of children aged 0-5 years old	*n*=764 *n* (%)
Sex	
Male	367 (48.0)
Female	397 (52.0)
Age	
0-2 years old	302 (39.5)
3-5 years old	462 (60.5)

Livelihood and economic support received

The caregiver self-reported that they received livelihood and/or economic support from the CSO.

Training of data collectors

The data collectors and data managers went through rigorous training to ensure the quality of the data collected, especially the anthropometric measurements. They were taught how to conduct the survey while minimizing social desirability and recall bias. Furthermore, they were also taught how to calibrate the measuring tools properly, and to repeat the procedure of gathering anthropometric measurement thrice.

Data collection procedure

A letter of request was sent to the local chief executive of the four major study sites. The researchers then visited the household of the beneficiaries for the survey. The data collectors went through a series of capacity training to ensure the quality of data. An informed consent form was administered through explaining the rights of the participants. Once the participant agreed to participate, a signature or thumb mark was secured. The survey was done in a secured place, and the answers were input via KoBo Toolbox. The survey proper was conducted from May 2024 to July 2024. The data were temporarily stored in a password-protected folder and will be deleted after the final report has been published. After the data collection, the data went through cleaning to address errors. The clean data were then processed and collated.

Data analysis

Descriptive statistics, specifically frequencies and percentages, were used to summarize the sociodemographic characteristics of caregivers and children using the software, Jamovi version 1.2. Such an approach was appropriate given the current focus on characterizing nutritional status and examining socio-economic, WASH, and food security indicators; thus, complex analysis was unnecessary for this paper.

Ethical consideration

The study went through ethics reviews at the National Center for Mental Health and was approved with REC Protocol No. NCMH-REC-2024-27 and Sponsor Protocol No. SP-2024-04. Before the survey proper, the participants were reminded about their rights and ensured confidentiality by removal of identifying information; if the caregivers understood their rights, they then signed the informed consent form on their behalf and their children.

Results

Sociodemographics of the participants

The majority of the caregivers were female (78.5%), between the ages of 21 and 30 (40.9%), married (51.6%), and finished secondary education (54.2%). The majority of the children, on the other hand, were female (52.0), and between the ages of 0–2 years old. The details are shown in Tables 1 and 2.

Differences in the nutritional status of children when aggregated according to the demographic profile of the caregivers

Most of the underweight (78.6%), stunted (79.3%), and wasted (78.6%) children had female caregivers. The majority of the underweight (42.2%), stunted (41.0%), and wasted (48.4%) children were having caregivers aged between 21 and 30. In addition, most of the underweight (47.1%), and stunted (51.1%) children were having caregivers who were married, while most of the wasted (49.5%) children were having caregivers who were not married. On the other hand, most of the underweight (54.9%), stunted (57.9%), and wasted (53.8%)

Table 3: Differences in the nutritional status of children when aggregated according to demographic profile of the caregiver in the four selected sites in the Philippines, 2024

Demographics of the caregivers	Weight-for-age			Height-for-age			Weight-for-height		
	Not underweight *n*=577 *n* (%)	Underweight *n*=187 *n* (%)	Pearson Chi-Square (*P*)	Not stunted *n*=498 *n* (%)	Stunted *n*=266 *n* (%)	Pearson Chi-Square (*P*)	Not wasted *n*=673 *n* (%)	Wasted *n*=91 *n* (%)	Pearson Chi-Square (*P*)
Sex									
Male	123 (21.3)	40 (21.4)	0.00 (0.98)	108 (21.7)	55 (20.7)	0.11 (0.75)	144 (21.4)	19 (20.9)	0.01 (0.91)
Female	454 (78.7)	147 (78.6)		390 (78.3)	211 (79.3)		529 (78.6)	72 (79.1)	
Age									
20 and below	36 (6.2)	9 (4.8)	1.10 (0.95)	30 (6.0)	15 (5.6)	1.81 (0.87)	38 (5.6)	7 (7.7)	7.13 (0.21)
21 - 30	240 (41.6)	79 (42.2)		210 (42.2)	109 (41.0)		275 (40.9)	44 (48.4)	
31 - 40	197 (34.1)	67 (35.8)		171 (34.3)	93 (35.0)		236 (35.1)	28 (30.8)	
41 - 50	73 (12.7)	22 (11.8)		58 (11.6)	37 (13.9)		90 (13.4)	5 (5.5)	
51 - 60	19 (3.3)	5 (2.7)		16 (3.2)	8 (3.0)		20 (3.0)	4 (4.4)	
60 and above	12 (2.1)	5 (2.7)		13 (2.6)	4 (1.5)		14 (2.1)	3 (3.3)	
Marital Status									
Married	304 (52.7)	88 (47.1)	6.48 (0.17)	256 (51.4)	136 (51.1)	0.81 (0.94)	355 (52.7)	37 (40.7)	16.88 (0.02)
Widowed	10 (1.7)	6 (3.2)		11 (2.2)	5 (1.9)		13 (1.9)	3 (3.3)	
Never Married	9 (1.6)	6 (3.2)		9 (1.8)	6 (2.3)		9 (1.3)	6 (6.6)	
Seperated	11 (1.9)	1 (0.5)		9 (1.8)	3 (1.1)		12 (1.8)	–	
Cohabiting/Living-in	243 (42.1)	86 (46.0)		213 (42.8)	116 (43.6)		284 (42.2)	45 (49.5)	
Highest educational attainment									
Never attended	1 (0.2)	–	6.83 (0.23)	1 (0.2)	–	4.79 (0.44)	1 (0.1)	–	4.74 (0.45)
Pre-school	1 (0.2)	–		–	1 (0.4)		1 (0.1)	–	
Elementary	123 (21.3)	52 (27.8)		114 (22.9)	61 (22.9)		155 (23.0)	20 (22.0)	
Secondary	317 (54.9)	103 (55.1)		266 (53.4)	154 (57.9)		371 (55.1)	49 (53.8)	
Vocational/College	126 (21.8)	28 (15.0)		108 (21.7)	46 (17.3)		136 (20.2)	18 (19.8)	
ALS	9 (1.6)	4 (2.1)		9 (1.8)	4 (1.5)		9 (1.3)	4 (4.4)	

Table 4: Differences in the nutritional status of children when aggregated according to food consumption score and food security status in the four selected sites in the Philippines, 2024

Food consumption score and food security status	Weight-for-age			Height-for-age			Weight-for-height		
	Not underweight *n*=577 *n* (%)	Underweight *n*=187 *n* (%)	Pearson Chi-Square (*P*)	Not stunted *n*=498 *n* (%)	Stunted *n*=266 *n* (%)	Pearson Chi-Square (*P*)	Not wasted *n*=673 *n* (%)	Wasted *n*=91 *n* (%)	Pearson Chi-square (*P*)
Food Consumption Score									
Acceptable	527 (91.3)	174 (93.0)	0.55 (0.46)	452 (90.8)	249 (93.6)	1.86 (0.17)	617 (91.7)	84 (92.3)	0.42 (0.84)
Unacceptable	50 (8.7)	13 (7.0)		46 (9.2)	17 (6.4)		56 (8.3)	7 (7.7)	
Household Dietary Diversity Score									
Acceptable	550 (98.3)	178 (95.2)	0.01 (0.94)	473 (95.0)	255 (95.9)	0.30 (0.58)	641 (95.2)	87 (95.6)	0.23 (0.88)
Unacceptable	27 (4.7)	9 (4.8)		25 (5.0)	11 (4.1)		32 (4.8)	4 (4.4)	
Food Security									
Food Secure	36 (6.2)	13 (7.0)	0.12 (0.73)	32 (6.4)	17 (6.4)	0.00 (0.99)	47 (7.0)	2 (2.2)	3.06 (0.80)
Food Insecure	541 (93.8)	174 (93.0)		466 (93.6)	249 (93.6)		626 (93.0)	89 (97.8)	

children were having caregivers that achieved secondary education. No differences were observed in the nutritional status of children when they were characterized according to sex, age, marital status, and highest educational attainment of their caregivers. The difference was only observed in terms of weight-for-height status when children were grouped according to the civil status of their caregivers ($P = 0.02$). Details are shown in Table 3.

Differences in the nutritional status of children when aggregated according to food consumption score and food security status

Most underweight (93.0%), stunted (93.6%), and wasted (92.3%) children had acceptable FCS. The majority of underweight (95.2%), stunted (95.9%), and wasted (95.6%) children had an acceptable

Table 5: Differences in the nutritional status of children when aggregated according to WASH practices in the four selected sites in the Philippines, 2024

WASH Practices	Weight-for-age			Height-for-age			Weight-for-height		
	Not underweight *n*=577 *n* (%)	Underweight *n*=187 *n* (%)	Pearson Chi-Square (*P*)	Not stunted *n*=498 *n* (%)	Stunted *n*=266 *n* (%)	Pearson Chi-Square (*P*)	Not wasted *n*=673 *n* (%)	Wasted *n*=91 *n* (%)	Pearson Chi-Square (*P*)
Safely Managed Drinking Water									
Unimproved	23 (11.7)	5 (10.0)	0.11 (0.74)	16 (9.6)	12 (14.8)	1.45 (0.23)	27 (12.5)	1 (3.2)	2.32 (0.13)
Improved	174 (88.3)	45 (90.0)		150 (90.4)	69 (85.2)		189 (87.5)	30 (96.8)	
Drinking Water Source									
Unimproved	6 (1.0)	2 (1.1)	0.00 (0.97)	5 (1.0)	3 (1.1)	0.03 (0.87)	8 (1.2)	–	1.09 (0.3)
Improved	571 (99.0)	185 (98.9)		493 (99.0)	263 (98.9)		665 (98.8)	91 (100.0)	
Basic Sanitation Facility									
Unimproved	10 (1.7)	7 (3.7)	2.62 (0.11)	13 (2.6)	4 (1.5)	0.98 (0.32)	13 (1.9)	4 (4.4)	2.24 (0.14)
Improved	567 (98.3)	180 (96.3)		485 (97.4)	262 (98.5)		660 (98.1)	87 (95.6)	
Basic Hygiene Services									
Unimproved	64 (11.1)	19 (10.2)	0.13 (0.72)	55 (11.0)	28 (10.5)	0.05 (0.83)	72 (10.7)	11 (12.1)	0.16 (0.69)
Improved	513 (88.9)	168 (89.8)		443 (89.0)	238 (89.5)		601 (89.3)	80 (87.9)	

Table 6: Differences in the nutritional status of children when aggregated according to support provided by the CSO and other economic indicators in the four selected sites in the Philippines, 2024

Economic Indicators	Weight-for-age			Height-for-age			Weight-for-height		
	Not underweight *n*=577 *n* (%)	Underweight *n*=187 *n* (%)	Pearson Chi-Square (*P*)	Not stunted *n*=498 *n* (%)	Stunted *n*=266 *n* (%)	Pearson Chi-Square (*P*)	Not wasted *n*=673 *n* (%)	Wasted *n*=91 *n* (%)	Pearson Chi-Square (*P*)
Savings group membership									
Yes	246 (42.6)	88 (47.1)	1.12 (0.29)	213 (42.8)	121 (45.5)	0.52 (0.47)	298 (44.3)	36 (39.6)	0.73 (0.39)
No	331 (57.7)	99 (52.9)		285 (57.2)	145 (54.5)		375 (55.7)	55 (60.4)	
Livelihood and economic support recipient									
Yes	333 (57.7)	126 (67.4)	5.50 (0.02)	297 (59.6)	162 (60.9)	0.12 (0.73)	402 (59.7)	57 (62.6)	0.28 (0.60)
No	244 (42.3)	61 (32.6)		201 (40.4)	104 (39.1)		271 (40.3)	34 (37.4)	

household dietary diversity score (HDDS). Finally, most underweight (93.0), stunted (93.6%), and wasted (97.8%) children were food insecure. No differences were found in the nutritional status of the children when they were characterized according to FCS, HDDS, and food security [Table 4].

Differences in the nutritional status of children when aggregated according to WASH practices

Table 5 shows the differences in the nutritional status of children when aggregated according to WASH practices. The majority of underweight (90.0%), stunted (85.2%), and wasted (96.8%) children had already safely managed drinking water. Furthermore, almost all of the underweight (98.9%), stunted (98.9%), and wasted (100.0%) children had improved drinking water. Most of the underweight (96.3%), stunted (98.5%), and wasted (95.6%) children had basic sanitation facilities. Finally, the majority of underweight (89.8%), stunted (89.5%), and wasted (87.9%) children had basic hygiene services. No differences were found in the nutritional status of the children when they were characterized according to safely managed drinking water, drinking water source, basic sanitation facility, and basic hygiene services.

Differences in the nutritional status of children when aggregated according to support provided by the Civil Society Organization and other economic indicators

For economic indicators, the majority of underweight (52.9%), stunted (54.5%), and wasted (60.4%) children had caregivers who were a member of a savings group. On the other hand, most underweight (67.4%), stunted (60.9%), and wasted (62.6%) had caregivers who were recipients of livelihood and/or economic support from the CSO. No differences were found in

the nutritional status when they were characterized according to their savings group membership and livelihood and economic support received. However, the difference was observed in terms of weight-for-age status when the children were grouped according to the livelihood and economic support received by their caregivers ($P = 0.02$). The details are shown in Table 6.

Discussion

Differences in the nutritional status of children when aggregated according to the demographic profile of the caregivers

According to the results of the study, only body mass index and civil status of the caregiver had significant differences in distribution, despite studies suggesting that educational attainment and age of caregivers affect the nutritional status of the children.[26,27] It was shown that an educated caregiver can make more informed decisions regarding child-rearing, thus, can affect the nutritional status of the children.[28] A scoping review has found that older mothers are more experienced when it comes to child-rearing compared to young mothers.[29] The lack of difference in the distribution suggests that regardless of the nutritional status of the children, the majority of their caregivers had the same sociodemographics.

Differences in the nutritional status of children when aggregated according to food consumption score and food security status

The study shows there was no significant difference in distribution between the nutritional status of the children and the food insecurity indicators, which means that all of the children experience the same situation in terms of FCS, HDDS, and food security status. However, it is in contrast to the different studies that show that food security directly affects the nutritional status of children, and a more diverse a diet is, the more nutrients that they get.[30,31] A study done in Laguna shows that undernutrition was correlated to household food insecurity and poor diet diversity.[32] High household food insecurity in the study areas can be explained by many factors, including food inaccessibility and poverty.

Food insecurity is associated with limited access to healthy food, low wages, and adverse social and economic conditions.[33] Inflation also plays a role in food security, whereas the food inflation in the Philippines during the conduct of the study reached 6.7%.[34] It is also important to note that HDDS and FCS do not provide any information reading the consumption of different food groups by individuals in the households.[35]

Differences in the nutritional status of children when aggregated according to WASH practices

WASH are key factors to ensure the health and nutrition of each family member. They are essential for the maintenance of health, for prevention of water-borne, soil-transmitted helminthiasis and neglected tropical diseases and alleviating the existing forms of undernutrition. According to WHO (2023), drinking water should be safe, sufficient, reliable, acceptable (i.e. taste and color), and accessible (i.e. cost and distance).[36]

Proper sanitation is crucial to combat certain diarrheal and/or parasitic diseases and to prevent worsening of the nutritional status of children.[37] Furthermore, studies have shown that WASH practices greatly affect the nutritional status of the children.[38,39] Based on the findings of Raminez and Ducay (2021), households with water-sealed toilets give protection against undernutrition of children.[40] However, the current study found that there is no significant difference in the distribution between the nutritional status of the children and their WASH practice, which can mean that the children experience the same WASH practices regardless of their nutritional status. While WASH practices contribute greatly to the nutritional status of the children, other factors such as the diet of the child, food security status of the family, and healthcare also affect it.[41] This is related to the result of a cluster-randomized controlled trial done in Metro Manila, indicating that none of the WASH interventions reduced or improved stunting and wasting, but low-intensity health education reduced stunting.[42] This is an indication that while the participants may have access to water, there is a question in terms of quality as underground water continuously deteriorates that might result in poor water quality even if there is good hygiene.[43]

Differences in the nutritional status of children when aggregated according to support provided by the civil society organization and other economic indicators

In the health and nutrition context, the financial situation of the households affects the nutritional status of the members as multiple studies have shown that low-income households have poor diet quality, as it affects their access to nutritious foods and health care.[44,45] Karlan *et al.* explained that expanding savings access tends to have a promising impact on increasing resistance to health shocks, promoting entrepreneurial activity, and impacting decision-making and empowerment.[46]

Livelihood is also an important aspect, as this is where the income of the household came from. The livelihood affects what food they can afford, and according to Bennett's

Law, as income increases, people eat more nutrient-dense food as compared to calorie-dense staple foods.[47] A study conducted by Capanzana *et al*. reveals that there is a high prevalence of undernutrition among the children of fishermen.[48] Furthermore, Malabana and Miguel found that low household income can strongly predict the underweight status of the children.[49] In contrast, the findings of this study revealed there was no significant difference in distribution between the nutritional status of the children and the economic indicators, with the exception of weight-for-age and livelihood and/or economic support received. This can mean that the children experience the same circumstances in terms of economic indicators regardless of their nutrition status.

Limitations of the study

The study acknowledges the limitations in sample size, study design, and more complex analytic procedures. Future research activities could apply weighting techniques to address possible issues in representativeness, particularly in cases of geographic or demographic disparities. Multiple biases, such as recall bias and social desirability bias, may also affect the study as the participants may over-and underestimate their experiences; hence, the field enumerators went through a series of training to ensure the quality of data.

Conclusion

This present study proved the high prevalewnce of undernutrition in the study areas, and no significant differences in the distribution of undernutrition indicators were observed when participants were characterized according to their sociodemographic variables, except in the weight-for-height of children. There was an observed difference in the weight-for-height of children when they were grouped according to the civil status of their parents. Furthermore, there were no significant differences in the distribution found between the food security indicators and WASH indicators with the nutritional status of the children. However, only weight-for-age and livelihood and economic support received were found to have a significant difference in distribution between economic indicators and nutritional status of the children.

The result implied that the respondents almost shared the same experiences and resources, resulting in poor nutritional status of the children in the study areas. The results of this study suggest that there is a need to review the targeting of beneficiaries in terms of nutrition-sensitive interventions delivery considering that even WASH indicators, undernutrition remains to be a concern in the area. Furthermore, there is a need to review the focus of programs targeting financial literacy, suggesting that it directly impacts activities that can improve food and nutrition security. Hence, harmonization of CSO programs and activities with government initiatives in nutrition and health should be done to improve its programming and targeting that can result in better efficiency.

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Conflicts of interest

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