ORIGINAL ARTICLE

Nutritional Status of Children 0-59 Months Old and Household Enrollment in the *Pantawid Pamilyang Pilipino Program* (4Ps) in a Rural Municipality in Leyte: A Cross-sectional Study

Angelita C. Jaya, RN, MD, MPM, Hannah Grace D. Pugong, RM, RN, MD, Daryne Aya H. Bolla, RM, RN, MD, Edelmer B. Azcueta, RM, RN, MD and Charlie C. Falguera, RN, RM, MAN

School of Health Sciences, University of the Philippines Manila, Palo, Leyte, Philippines

ABSTRACT

Background. Child malnutrition is a prevailing global public health concern especially in low- and middle-income countries. Conditional cash transfer (CCT) programs were implemented to help address this problem.

Objective. To determine the relationship between the nutritional status among 0-59 months old children and household enrollment in a Philippine CCT program, *Pantawid Pamilyang Pilipino Program* (4Ps).

Methods. A cross-sectional study was employed to 392 children and mothers/primary caregivers in a rural municipality in Leyte. Stratified random sampling technique was used in selecting the participants. Anthropometric characteristics were measured for these 392 children and were classified as 4Ps and non-4Ps members. Chi-square test was used to determine the relationship between the variables of interest.

Results. 4Ps household beneficiaries had mothers/primary caregivers who were older and had fewer years of education. The 4Ps beneficiary households had more household members and had lower average monthly income compared to the non-beneficiaries. No significant differences were found between the 4Ps beneficiary and non-beneficiary households in terms of the household hunger scale, the mean age of the children, and the sex distribution of the children included in the study. Specific profile components were found to be correlated to the children's nutritional status. The age of the children was significantly associated to their length/height-for-age (L/HFA) wherein stunting was noted to occur among children older than 12 months of age. Maternal education was significantly associated to the weight-for-age (WFA) of the children. Children who were underweight had mothers/primary caregivers with fewer years of education. No significant correlation was found between the child's sex, age of the mother/primary caregiver, household size, average monthly household income, and household hunger scale and the children's nutritional status Lastly, there was no significant correlation between 4Ps household enrollment and the WFA and L/HFA status of the children. 4Ps household enrollment was, however, significantly correlated to the weight-for-length/height (WFL/H) or wasting status of the children.

Conclusion. The 4Ps program has the potential to enhance the nutritional outcomes of children hence the need to maximize its gains. In addition, the relationship of different sociodemographic variables with the children's nutritional status reflects the complexity and multidimensionality of childhood malnutrition, implying the need for a holistic and multistakeholder approach in addressing the problem.

Keywords: child nutrition, conditional cash transfers, rural municipality, Philippines

Corresponding author: Angelita C. Jaya, RN, MD, MPM
School of Health Sciences
University of the Philippines Manila
Palo, Leyte, Philippines
Email: acjaya@up.edu.ph

INTRODUCTION

Child malnutrition is a prevailing public health concern across the globe especially in low- and middle-income countries. Available data showed an insufficient progress to meet the world nutrition targets of the 2025 World Health Assembly (WHA) and the 2030 Sustainable Development Goals (SDG).[1] In the Philippines, 28.8% and 5.8% of children under 5 years of age remain stunted and wasted, respectively.[2] A recent data from the 2023 National Nutrition Survey showed that majority of the underweight, stunting, and wasting children aging 0-59 months old were living in the rural areas and in the poorest income quintiles.[3] Malnutrition is a multifaceted condition with various determinants including poverty and exclusion.[4]

In response to the need for poverty alleviation in the Philippines, the 4Ps was started in 2007.[5] This is a conditional cash transfer (CCT) program that covers low-income households and one of its aims is to improve both the children's health and nutrition outcomes. The program provides cash transfers, food subsidies, and health and educational assistance to identified poor families upon their compliance with program requirements which include compliance with maternal and child health care and education, and attendance in monthly Family Development Sessions that cover topics on health, and general well-being of the family.[5,6]

Conditional Cash Transfer (CCT) are cash transfer programs, generally to impoverished households, on the condition that those beneficiary households meet specific requirements that overall increase the human capital of children.[7] These specific requirements or conditionalities are usually related to health, nutrition, and education. CCT programs in developing countries used integrated approaches to reduce poverty, while balancing between social assistance and formation of human capital among beneficiaries. These programs are acknowledged as means to reducing inequality and assisting families to break out of the vicious cycle whereby poverty is passed from generation to generation. The program benefits children from conception through late childhood.[8]

Different countries have been adopting CCT programs in the hope of meeting the Sustainable Development Goals especially in ensuring healthy lives and promoting good of the people across the lifespan.[9] Evidence from Colombia showed that their CCT program increased the probability of utilizing preventive care services among families as well as on children's dietary diversity and food consumption.[10] A study on South Africa's largest cash transfer program, the Child Support Grant (CSG), showed that the duration of the grant had no effect on stunting, but maternal education had a protective effect on stunting. Furthermore, the study argued that inflation and poor developments of other social services might have significant influence on children's nutritional status.[11] Some rural areas in China demonstrated that CCT program showed improvements in the uptake of maternal and child health services but made no noticeable effects to children's health outcomes.[12] Several other studies have been conducted focusing on the impacts of CCT to children's growth and weight gain such as in Tanzania, Latin America, Niger, Somalia, Indonesia, Brazil, and India.[13-19]

This study was conducted as an empirical evidence and additional literature on the influence of a CCT program (4Ps) to the nutritional status among children aging 0-59 years old who were living in a rural municipality. Several studies have been conducted examining the impact of 4Ps towards students' academic performance, health expenditure and utilization, social welfare and development, and agricultural protection.[20-24] A more recent studies explored the association between 4Ps household enrollment and the nutritional status of their children but focused on wider age range from zero to 12 years and 19 years of age.[6,25] The study's results may have significant implications in the local government unit, the agency in social welfare and development, local health units, and policymakers in strengthening the program towards better health outcomes to mothers/primary caregivers and their children.

This study aims to determine the association between household enrollment in the 4Ps and the nutritional status of 0-59 months old children in Alangalang, a rural municipality in the province of Leyte.

METHODS

Study Design

This study employed a descriptive cross-sectional design.

Participants and Settings of the Study

The participants were 0-59 months old children who were residents in the Municipality of Alangalang, Province of Leyte. This is a second-class landlocked municipality comprising of 54 *barangays*. Alangalang, Leyte is one of the biggest municipalities and population as well as one of the biggest number of 4Ps beneficiaries in the Province of Leyte. Two of the 54 *barangays* belong to the geographically isolated and disadvantaged areas (GIDA). Data from the local population commission revealed a total of 4,297 children aging 0-59 months old as of December 2023. The target participants included those 0-59 months old, either 4Ps or non-4Ps beneficiary, and registered residents in the said municipality for at least six months. In addition, for those 4Ps beneficiaries, they must be enrolled in that program for at least one year. Children with active co-morbidities such as cancer, diabetes, growth and developmental delays, were excluded.

Sample Size and Sampling Technique

Using the Raosoft online sample size calculator, at least 353 participants will be needed from 4,297 population. A 5% margin of error, 95% confidence level, and 50% response distribution were set in the actual computation. A stratified random sampling was done to determine the participants

of the study. All qualified 0-59 months old children of the municipality were considered in the study. Each stratum was identified according to the *barangay* of the municipality. The proportion of the target participants were obtained according to the population of the barangay in reference to the total population of the municipality. The list of 0-59 months old children from the Barangay Nutrition Scholar (BNS) of each barangay was utilized. The list from the BNSs was divided according to 4Ps enrollment status then numbers were assigned to each child on the list which were the same numbers written on individual papers and placed into a fishbowl. Finally, the total number of participants per barangay was drawn from a fishbowl and the names of the corresponding children to be included in the study were noted by the researchers. If the selected child did not meet the inclusion criteria, a replacement was determined using the same method. For consistency of data, one mother/primary caregiver with one child aging 0-59 months old, even with multiple children but with only one child within the identified age range, were included in the actual selection of the participants.

Data Collection Tool

Data were collected from April 17, 2024 to June 28, 2024. A structured questionnaire adopted from a previous study was used to gather data.[25] The initial part of the research instrument collected the demographic profile of the participants, such as the children's age and sex, age of the mothers/ primary caregivers, number of years in school of the mothers/primary caregivers, household size, average monthly household income, and the household hunger scale (HHS). The HHS was developed by the United States Agency International Development (USAID), Food and Nutrition Technical Assistance (FANTA).[26] This was designed primarily for cross-cultural application and has been validated for assessing household hunger in areas with food scarcity. The HHS comprises of three occurrence and three frequency-of-occurrence questions. The HHS occurrence questions were developed to ask if a specific condition was associated with the household's experience of hunger or food insecurity ever occurred during the previous month (yes or no). If the answer is "yes," HHS frequency-of-occurrence questions determine the frequency of occurrence during the same time frame. This can be reported as rarely (once or twice), sometimes (three to ten times), or often (more than ten times). The six questions are each scored 0 to 2, with 2 being the highest frequency of occurrence. The sum of the scores for the three questions is derived with the total score ranging from 0 to 6. The score indicated the level of hunger/food insecurity in the household. The final scores can be interpreted as follows: 0 to 1 means "little to no hunger in the household," 2 to 3 means "moderate hunger in the household," and 4 to 6 means "severe hunger in the household."

The second part of the research instrument collected data on the children's weight and length/height and their nutritional status across the three indicators. The nutritional status of the children across the three indicators were based on the WHO Child Growth Standards.[27] Nutritional status is the children's health condition as affected by nutritional intake and utilization.[28] The three indicators of nutritional status involved in this study were weight-for-age, length/height-for-age, and weight-for-length/height. Weight-for-age refers to the body weight of the child relative to his/her age on the day's measurement, while length/height-for-age shows the child's growth in height or length relative to his/her age during the visit. Weight-for-length/height refers to the child's body weight in proportion to his/her growth in length or height.[27] The WHO Child Growth Standards were developed using data collected in the WHO Multicenter Growth Reference Study conducted between 1997 and 2003 involving children from widely different ethnic backgrounds. The questions were translated to Waray, the local language, by three native Waray speakers to facilitate ease of interview of the participants. These native Waray speakers were healthcare workers in the rural health unit of the municipality.

Data Collection Procedure

Administrative clearance to conduct the study was secured from the Office of the Mayor of Alangalang, Leyte through the Municipal Health Office. Upon approval, coordination was made with the rural health midwives (RHMs) and Municipal Nutrition Office for the determination of the target population and selection of target participants. Determination of the 4Ps and non-4Ps participants was made from the rural health midwives (RHMs) and the *Barangay* Nutrition Scholars (BNS) of the respective *barangays*. Written informed consent was obtained for every participant, the mother/primary caregiver of the child. This signifies that enough information about the purpose of the study, possible benefits, harm, and risks was provided prior to participation. Likewise, they were given time to ask questions and clarifications before the survey. The survey was conducted by the researchers at the place of residence of the participants. The anthropometric measurements of the children included in the study were taken by the researchers immediately after each survey of the mothers/primary caregivers. A calibrated weighing scale and a height/length measuring board from the Municipal Nutrition Action Office was used to measure the anthropometric data of the children. Three researchers who were involved in the actual anthropometric data of the children had extensive experience in collecting such data. The survey of the primary caregiver and the taking of measurements of the child lasted for 15-20 minutes. The data were rechecked and validated for its completeness and accuracy.

Data Analysis

Collected data were summarized, coded, and tabulated using Microsoft Excel. Data were then entered into Statistical Package for the Social Sciences (SPSS) ver. 20.0 for statistical analysis. Descriptive statistics such as frequency count, percentage, mean, and standard deviation

were used to show differences in demographic characteristics of the 4Ps beneficiary and non-beneficiary households, and the nutritional status of their children. To understand patterns in the participants' profile which may potentially be associated with the nutritional status of the children, inferential statistical tools were used. Chi-square was used to determine the relationship between the profile components and the nutritional status of the children in terms of the three indicators of nutritional status: weight-for-age (WFA), length/height-for-age (L/HFA), and weight-for-length/height (WFL/H). Chi-square test was also used to assess the relationship of the 4Ps household enrollment and the nutritional status of the children. A post-hoc analysis using the Bonferroni method was used to identify which specific groups contribute to the significant result. The significance level was set at <0.05.

Ethical Considerations

Ethical clearance to conduct the study was secured from a registered local ethics review board in Eastern Visayas (EVHRDC-ERB-2024-003). Likewise, approval letter to conduct the study was secured from the Municipal Mayor through the Municipal Health Office. Written informed consent was obtained from each participant prior to their participation. They were informed that they can withdraw at any part of the study even if they previously agreed. Possible risk and harm in participating include breach of confidentiality and the consequences of such a breach. To prevent this, confidentiality, anonymity, and privacy of the participants were maintained throughout the study. Participants were anonymized in the actual data gathering. Likewise, the survey and measurement were taken in their respective houses with privacy. They were not paid nor given a token in their participation. The researchers declared no conflict of interest over the participants. All raw data were kept secured. Only the researchers have the access to raw data. After analysis and publication, raw data will be deleted. The findings of the study were intended to disseminate to the public through publication in a reputable journal and presentation in reputable research conference.

RESULTS

A total of 392 children were included in this study and were almost equally divided between male (n=193; 49.23%) and female (n=199; 50.77%) with an average age of 29 months. There were 392 mothers/primary caregivers in the households participated in the study with mean age of 31 years old (SD=7.70 years old) and mean 9 years (SD=2.60 years) of education. Household size across the sample was on average of five members. A great proportion (n=336; 85.71%) of the households included in the study had monthly income below PhP 10,000.00. Little to no hunger was experienced in 304 (77.55%) of the households as reported by the mothers/primary caregivers while 88 (22%) households experienced moderate hunger. Differences were observed between 4Ps and non-4Ps household beneficiaries. Results showed that the mean age of the mothers/primary caregivers of 4Ps household beneficiaries (35 years; SD=7.50) was significantly higher than that of the non-4Ps household beneficiaries (28 years; SD=6.39). In addition, the mean number of years spent in school of the mothers/primary caregivers belonging to 4Ps household beneficiaries (8 years; SD=2.63) was significantly lower than that of the non-4Ps beneficiaries (10 years; SD=2.45). Household size of 4Ps household beneficiaries (6 members; SD=1.78) was significantly higher than that of the non-beneficiary households (5 members; SD=1.59). There are more 4Ps household beneficiaries whose average monthly income is below PhP 10,000.00 (n=177; 91.71%) compared to non-beneficiaries (n=159; 79.90%). When the income is above PhP 20,000.00, the household is more likely a non-4Ps beneficiary. There were no significant differences between the 4Ps beneficiary and non-beneficiary households in terms of the household hunger scale, the mean age of the children, and the sex distribution of the children included in the study. Table 1 presents the summary of the demographic profiles of the participants.

Figure 1 shows the nutritional status of the children across the three indicators. Overall, the number of severely underweight and underweight children in the sample were 15 (3.86%) and 43 (10.97%), respectively. The number of severe stunting and stunting is 42 (10.71%) and 103 (26.28%), respectively. Severe wasting and wasting and children were four (1.02%) and 14 (3.57%), respectively. Overweight and obese children were 5 (1.28%) and 7 (1.79%) of the sample, respectively.

Of the 193 children from 4Ps household beneficiaries, two (1.04%) children were overweight for their age, 26 (13.47%) were underweight, and nine (4.66%) were severely underweight. The remaining greater proportion of children, 156 (80.83%) were of normal weight-for-age. Low length/height-for-age (stunting) was observed in 70 (36.27%) children: 51 (26.42%) were stunted while 19 (9.84%) were severely stunted. More than half of the children (n=117 or 60.62%) from 4Ps household beneficiaries were of normal length/height-for-age. There were six (3.11%) tall-for-age children from this group. The proportion of wasting (low weight-for-length/height) was observed in 13 (6.74%) children: 11 (5.70%) were moderately wasted while two (1.04%) were severely wasted. Overweight and obese children were three (1.55%) and one (0.52%), respectively and the remaining greater proportion (n=176 or 91.19%) were of normal weight-for-length/height.

On the other hand, from 199 children belonging to non-4Ps beneficiary households, 17 (8.54%) were underweight for their age, six (3.01%) were severely underweight, and three (1.51%) were overweight. The greater proportion of the children had normal weight-for-age (n=173 or 86.93%). The number of stunted (low length/height-for-age) children in this group was 75 (37.69%). Specifically, 52 (26.13%)

Table 1. Socio-Demographic Profile of the 4P's and Non-4Ps Children and Mothers/Primary Caregivers (n=392)

Sociodemographic Characteristics		4Ps, n=193 f (%)	Non-4Ps, n=199 f (%)	Total, n=392 f (%)	*P*-value
Sex of child	Male	86 (44.56)	107 (53.77)	193 (49.23)	0.068
	Female	107 (55.54)	92 (46.23)	199 (50.77)	
Age of child (months)	0-12	45 (23.32)	46 (23.12)	91 (23.22)	0.483
	13-24	30 (15.55)	42 (21.10)	72 (18.37)	
	25-36	46 (23.83)	43 (21.61)	89 (22.70)	
	37-48	36 (18.65)	37 (18.59)	73 (18.62)	
	49-59	36 (18.65)	31 (15.58)	67 (17.09)	
Age of mother/primary caregiver (years)	10-19	4 (2.07)	7 (3.52)	11 (2.81)	0.000
	20-29	38 (19.67)	137 (68.84)	175 (44.64)	
	30-39	118 (61.15)	46 (23.12)	164 (41.84)	
	40-49	25 (12.95)	5 (2.51)	30 (7.65)	
	≥50	8 (4.16)	4 (2.01)	12 (3.06)	
Years spent in school by mother/ primary caregiver (years)	≤6	57 (29.54)	21 (10.55)	78 (19.90)	0.000
	7-12	127 (65.80)	146 (73.37)	273 (69.64)	
	≥13	9 (4.66)	32 (16.08)	41 (10.46)	
Household size (members)	2	0 (0.00)	3 (1.51)	3 (0.77)	0.000
	3-4	37 (19.17)	110 (55.28)	147 (37.50)	
	5-6	97 (50.26)	59 (29.65)	156 (39.80)	
	7-8	45 (23.32)	21 (10.55)	66 (16.83)	
	9 and above	14 (7.25)	6 (3.01)	20 (5.10)	
Monthly household income (PhP)	≤10,000.00	177 (91.71)	159 (79.90)	336 (85.71)	0.001
	10,001.00 to 20,000.00	13 (6.74)	24 (12.06)	37 (9.44)	
	20,000.00	3 (1.55)	16 (8.04)	19 (4.85)	
Household Hunger Scale Category	Little to No Hunger	150 (77.72)	154 (77.39)	304 (77.55)	0.937
	Moderate Hunger	43 (22.28)	45 (22.61)	88 (22.45)	

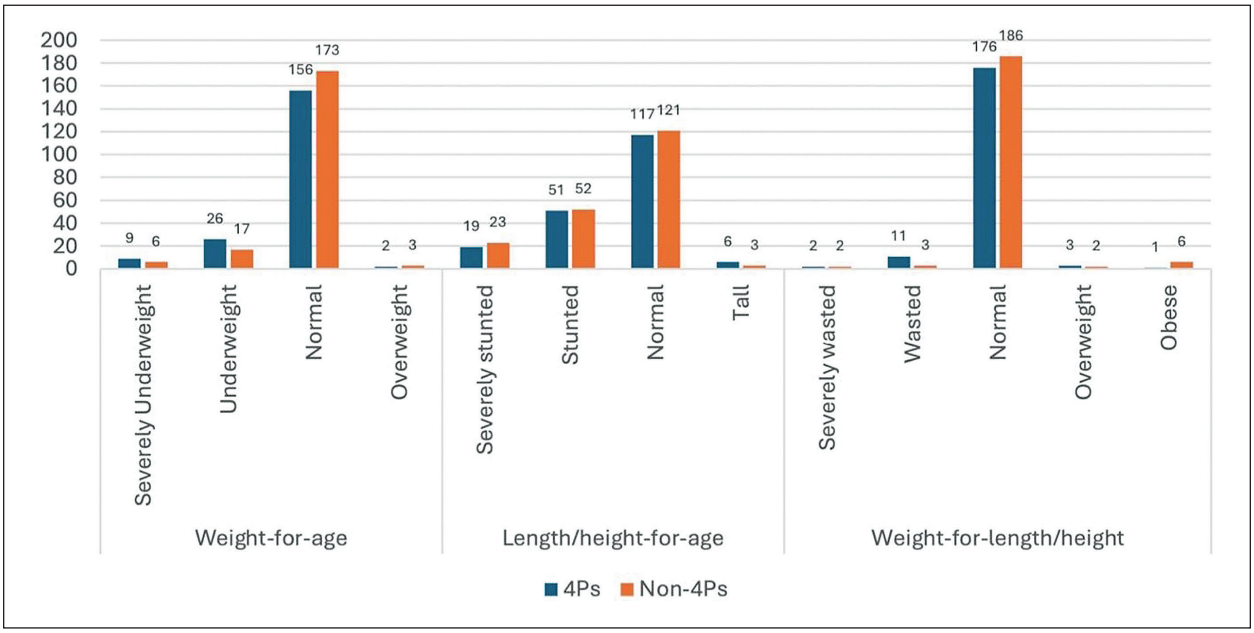

Figure 1. Nutritional status of 4Ps and Non-4Ps children aging 0-59 months old.

Table 2. Correlations Test Results between Socio-Demographic Profile and Children's Nutritional Status

Characteristic	Weight-for-age		Length/Height-for-age		Weight-for-length/height	
	X^2	*P*- value	X^2	*P*- value	X^2	*P*- value
Sex of child	1.976	0.372	2.126	0.345	0.475	0.789
Age of child	6.312	0.177	**14.875**	**0.005****	6.602	0.580
Age of mother/ primary caregiver	3.565	0.312	4.606	0.203	7.887	0.247
Years spent in school of mother/ primary caregiver	**6.396**	**0.041***	0.466	0.792	5.388	0.250
Household size	4.500	0.212	3.539	0.316	6.599	0.360
Average monthly household income	3.720	0.156	0.876	0.645	1.213	0.545
Household Hunger Scale Category	4.765	0.092	3.591	0.166	5.158	0.076

**P<0.05; **P<0.01*

Table 3. Correlations Test Results between 4Ps Household Enrollment Status and the Nutritional Status of Children 0-59 Months Old

Variable	Weight-for-age		Length/Height-for-age		Weight-for- length/height	
	X^2	*P*-value	X^2	*P*-value	X^2	*P*- value
4Ps household enrollment status	3.362	0.067	0.025	0.771	**3.989**	**0.046***

**P<0.05*

were stunted while 23 (11.56%) were severely stunted. Three (1.51%) children were tall for their age in this subgroup while the remaining 121 (60.80%) children had normal length/height-for-age. Wasting was observed in five (2.51%) children, with three (1.51%) wasted and two severely wasted children. The number of overweight and obese children among this group were two (1.01%) and six (3.01%), respectively while the remaining proportion (n=186) were of normal weight-for- length/height.

Table 2 shows the results of chi-square test to determine the relationship between components of household profile included in the study and the three indicators of the nutritional status of the children. The sex of the child, age of the mother/primary caregiver, monthly household income, household size, and household hunger scale category were not significantly correlated to the nutritional status of the children.

The age of the child is significantly correlated to the L/HFA of the children (X^2=14.875, P=0.005) but was not significantly correlated to the WFA and WFL/H of the children. Post hoc testing utilizing adjusted p-values of Bonferroni method showed that a lesser proportion of children aged 0-12 months were stunted. On the other hand, the years spent in school of the mother/primary caregiver was significantly associated to the WFA (X^2=6.396, P=0.041) of the children but was not significantly associated to the L/HFA and WFL/H of the children. Post hoc analysis utilizing adjusted p-values of Bonferroni method further showed that a greater proportion of underweight children have mothers with six years and below of schooling.

Table 3 presents the chi square test results to determine the relationship between 4Ps household enrollment status and the children's nutritional status. There was no significant relationship between household enrollment in the 4Ps and the nutritional status of the children in terms of WFA and L/HFA. However, there was a significant relationship between 4Ps household enrollment status and the weight-for-length/height nutritional status of the children (X^2=3.989, P=0.046). Thus, the hypothesis is partially supported.

DISCUSSION

This study was conducted to determine the correlation between household enrollment in the 4Ps and the nutritional status of 0-59 months old children in Alangalang, a rural municipality in the province of Leyte.

The findings from the descriptive statistics showed that there were no significant differences in the age and sex of the children from the beneficiary and non-beneficiary households. Further analysis showed that the sex of the children in this study was not associated to their nutritional status across the three indicators contrary to the findings of a meta-analysis and systematic review showing how males under five years of age are more affected by undernutrition than their female counterparts.[29] Findings may imply that childhood malnutrition equally affected both sexes in the study.

In terms of the age of the children, this study found that the age of the children was significantly associated to their L/HFA but not to their WFA and WFL/H. Post hoc testing revealed that stunting least likely occurred in children who were 0-12 months old. This implies that cases of stunting occurred later than 12 months of age. This study reflects the findings in the 2021 Expanded National Nutrition Survey (ENNS) conducted in the Philippines by the Food and Nutrition Research Institute (FNRI) showing that stunting

was significantly higher among the 12-23-month-old children compared to those who were in the 6-11-month-old age group.[30] Karlsson et al. studied patterns in child stunting by age across 94 low- and middle-income countries and found similar results – stunting being of highest prevalence among older children (around 28 months).[31] Presumably, this can be due to longer exposure times. Stunting is attributed to the accumulation of the deleterious effects of malnutrition and illnesses since fetal development.[32] Moreover, the first 1000 days of a child which encompasses the time from conception to a child's second birthday is considered as the crucial time when the foundations for lifetime development and optimal health are set.[33] These findings suggest that programs targeting the prevention of stunting should start as early as the time of conception of a child. Black et al. found that maternal undernutrition during pregnancy contributed to fetal growth restriction and resulted in stunting by two years of age.[34] Bhutta et al. studied countries that successfully reduced the stunting prevalence among under-five-year-old children and found commonalities in the strategies employed.[35] These include improvement of maternal nutrition and newborn outcomes, promotion of early and exclusive breastfeeding, improvement of complementary feeding practices, conduct of parental education, advancement of water, sanitation and hygiene, promotion of reproductive health practices specifically increased contraceptive use, delayed first pregnancy, and increased birth spacing. Bhutta et al. also highlighted the pivotal role of high-level political support and sustained financing for nutrition programs.[35] In this study, mothers/primary caregivers from the beneficiary households were found to be older and had lesser years of education compared to those from non-beneficiary households.

However, there was no significant correlation in the age of the mother/primary caregiver to the nutritional status of the children across all three indicators. On one hand, the years spent in school of the mothers/primary caregivers was significantly associated to the WFA of the children but was not associated to the stunting and wasting status of the children. Rezaeizadeh et al. found that low maternal education is correlated with lower WFA and HFA among children belonging in the middle-income countries.[36] Anwar et al. explored various pathways through which a high maternal education led to better child nutritional status and found that socio-economic status and attitudes towards professional health care services were the most important pathways linking the two variables.[37] A higher maternal education meant better paying jobs for women and also translated to improved health knowledge and nutritional caretaking practices, reproductive behavior (birth spacing), and better health-seeking behavior.[37]

In terms of household size, this study found that household size among beneficiary households was significantly larger compared to the non-beneficiary households. Findings showed that household size was on average six members in 4Ps beneficiary households which is also higher than the Philippine average household size of 4.1 members in the 2020 Census by the Philippine Statistics Authority.[38] Orbeta Jr. discussed how an increased family size is linked to reduced wage income of parents, reduced enrollment to school of children, decreased expenditure per child who remain in school, and reduced household savings, all of which were also associated to poverty incidence, gap, and severity; the problem that is purposely targeted by CCTs such as the 4Ps.[39] Additionally, having more household members would mean redistributing resources, which might mean less money allocated for the children.[40,41] This study, however, did not show a significant relationship between household size and the nutritional status of the children.

A greater proportion of the beneficiary households in this study had an average monthly income below PhP 10,000.00. An average monthly income below PhP 10,000.00 is markedly below the poverty threshold in the province of Leyte, equivalent to PhP 16,113.00.[42] Household food insecurity is significantly linked to the occurrence of hunger and undernutrition among children.[43] The Food and Agriculture Organization of the United Nations defines food insecurity as the inadequate access to sufficient and wholesome food on a regular basis for healthy and active living and appropriate growth and development.[44] The Household Hunger Scale (HHS) was created and was validated for use across different cultures by the USAID FANTA to serve as a simple measure of household hunger in food-insecure areas.[26] The findings in this study showed that little to moderate hunger was experienced by the participant households and that there was no significant difference in the HHS category between the 4Ps beneficiaries and non-beneficiaries. Explaining this result in terms of the cross-sectional design of the study may provide two possible reasons. First, if the beneficiaries and non- beneficiaries had similar characteristics according to their experience of food insecurity, the results of the study might mean that the transfers through the 4Ps did not result in a significant difference between the two groups. Alternatively, and assuming the beneficiary households had more severe experiences of food insecurity and hunger at baseline, it could be hypothesized that the transfers through 4Ps contributed to some improvement in the food security of the beneficiary households. This is similar to the findings in the third wave of the 4Ps impact evaluation conducted by the Philippine Institute for Development Studies from 2017 to 2019 wherein a 12% increase in food expenditure was attributed to the 4Ps and that there was a major reduction in the total incidence of reported hunger.[45] It is important to note that the HHS is a simple indicator of food insecurity and household hunger but does not provide information regarding diet diversity and quality which are also important factors in nutrition.

According to the WHO, WFA reflects body mass relative to the chronological age of the child.[1,27] It is affected by both the weight and the height of the child and

reflects both chronic and acute malnutrition. As such, an underweight child may be stunted, or wasted, or both. The L/HFA or stunting status, on one hand, reflects the cumulative effects of malnutrition and illnesses since and even before the birth of a child. Hence, stunting can be interpreted as a chronic limitation of a child's growth potential. Moreover, WFL/H or wasting status reflects body weight in relation to height and serves as an indicator for acute malnutrition. The current study showed that household enrollment in the 4Ps was not significantly correlated to the WFA and the L/HFA (stunting status) of the children but was significantly correlated to the WFL/H (wasting status) of the children. The findings of this study are in in contrast to the study of Kandpal et al. which found a relationship between 4Ps household enrollment and severe stunting of children but found no relationship between 4Ps household enrollment and the WFA and wasting status of children.[46] In Mexico and Peru, the implementation of the CCT programs *Progresa Oportunidades Prospera* and *Juntos*, respectively, were correlated with a higher height-for-age and lower prevalence of stunting among children in participating households.[47,48] A possible explanation for the correlation of 4Ps enrollment and lower incidence of childhood stunting in the previous studies is the concurrent increase in health-seeking behavior among the beneficiaries which may further be explained by the beneficiaries' adherence to the conditionalities to retain their entitlements.[45] However, the extent through which the beneficiaries complied to the 4Ps conditionalities and their receipt of entitlements was beyond the scope of this study. The findings of this study somehow reflect the results of the third wave of the impact evaluation of the 4Ps which showed no significant difference in the stunting and underweight status of children between beneficiaries and non-beneficiaries.[44] As previously mentioned, stunting results from the accumulation of the deleterious effects of malnutrition and illnesses since fetal development. The cross-sectional study design, however, limits the consideration of past events and other factors apart from enrollment in the 4Ps that may be associated to stunting. It is also necessary to take into account other social determinants of childhood undernutrition.

On one hand, a low WFL/H or wasting among under-five year old children is a sign of acute malnutrition and is usually a result of inadequate food intake or the occurrence of illnesses.[49] This study found a correlation between household enrollment in the 4Ps and the wasting status of children. 4Ps aims to alleviate the problem of wasting among children through the provision of cash transfers that can assist beneficiary households in coping with acute problems that negatively affect food security and exacerbate illness. In a recent meta-analysis done by Manley et al. assessing the impact of CCT programs on child nutrition outcomes, CCTs modestly reduced wasting among children albeit no significant effect on the children's overall WFH/L was noted.[50] In the same study, CCTs had more pronounced effects on dietary diversity and increased consumption of animal-sourced foods of the children, factors that were not included in the present study.

Study Limitations

The study has several limitations. First, the study utilized a descriptive cross- sectional approach so trends and changes in the past were not considered. Also, causality among variables cannot be determined. It is also worth noting that the limited variables included in this study excluded an assessment of specific mechanisms by which 4Ps household enrollment may affect various health outcomes that may contribute to the nutritional status of children. Furthermore, this study excludes to determine the degree to which the beneficiary households met specific conditionalities of 4Ps and the extent of their entitlements in receiving the financial assistance. Caution is therefore advised in the over-interpretation of the statistical significance of the findings because contributions of other confounding factors cannot be totally ruled out.

Information regarding 4Ps household enrollment status was self-reported by the mother/primary caregiver and this may contribute to misclassification bias. Likewise, the correlations observed between variables were not controlled for potential confounders. In addition, the data were collected in almost three months period, seasonal factors (i.e., harvest cycles, disaster risk) may have influenced food security outcomes. Finally, data on household profiles relied on the veracity of participants, hence, may lead to response bias. Nevertheless, the researchers ensure completeness and accuracy of the data collected both from the survey and the anthropometric measurements.

CONCLUSION

The 4Ps has the potential to improve nutritional outcomes among children, hence the need to maximize its gains. Age of child was significantly correlated with length/height-for-age while years spent in school of mother/ primary caregiver was significantly correlated with weight-for-age. 4Ps household enrollment status was significantly correlated with weight-for-length/height. The correlation of different variables with the nutritional status of the children reflects the complexity and multidimensionality of the problem of childhood malnutrition implying the need for a holistic and multi-stakeholder approach in addressing the problem of childhood undernutrition. Strategies to strengthen monitoring of compliance on 4Ps program conditionalities are recommended. Likewise, monitoring and evaluation activities of the nutritional status of the children in the communities, as well as in addressing those with nutritional problems must be conducted on a regular basis.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

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