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A Report on

THE EFFECT OF THE NUTRITION EDUCATION COMPONENT OF A VILLAGE NUTRITION PROGRAM ON THE KNOWLEDGE, ATTITUDE AND PRACTICE OF TARGETED COMMUNITY MEMBERS

by

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TABLE OF CONTENTS

Title	Page
LIST OF TABLES	ii
LIST OF FIGURES	iv
EXECUTIVE SUMMARY	v
ACKNOWLEDGEMENTS	viii
1. INTRODUCTION	1
1.1 Background	1
1.2 Program Description	1
1.2.1 Intervention	2
1.2.2 Organization	3
2. PROGRAM EVALUATION	5
2.1 Objectives	5
2.2 Design	5
2.3 Subjects	5
2.4 Study Sites	5
2.5 Sampling	6
2.6 Variables and Method of Data Collection	7
2.7 Intervention	9
2.8 Data Analysis	10
3. PROGRAM IMPACT	11
3.1 Mothers	11
3.1.1 Non-pregnant Non-lactating	11
3.1.2 Lactating	18
3.1.3 Pregnant	25
3.2 Storeowners	32
3.3 Schoolchildren and Teachers	36
3.4 Community Health Workers	39
3.5 Community	42
4. DISCUSSION AND CONCLUSIONS	44
5. IMPLICATIONS AND RECOMMENDATIONS	46
REFERENCES	48

LIST OF TABLES

		Page
Table 1	List of experimental and control areas	6
Table 2	Variables collected in the study	8
Table 3	Profile of NPNL mothers according to selected socio-demographic and community environment characteristics, survey period and treatment group	13
Table 4	Health and nutrition-related knowledge and attitude scores of NPNL mothers by treatment group and survey period	14
Table 5	Health and nutrition-related practice of NPNL mothers by treatment group and survey period	15
Table 6	Source of nutrition information for NPNL mothers by treatment group and survey period	16
Table 7	Type of nutrition education sessions attended by NPNL mothers by treatment group and survey period	16
Table 8	Frequency and percent distribution of NPNL mothers by brand of food product with SPS bought by treatment group and survey period	17
Table 9	Profile of LACTATING mothers according to selected socio-demographic and community environment characteristics, survey period and treatment group	20
Table 10	Health and nutrition-related knowledge and attitude scores of LACTATING mothers by treatment group and survey period	21
Table 11	Health and nutrition-related practice of LACTATING mothers by treatment group and survey period	22
Table 12	Source of nutrition information for LACTATING mothers by treatment group and survey period	23
Table 13	Type of nutrition education sessions attended by LACTATING mothers by treatment group and survey period	23
Table 14	Frequency and percent distribution of LACTATING mothers by brand of food product with SPS bought by treatment group and survey period	24
Table 15	Profile of PREGNANT mothers according to selected socio-demographic and community environment characteristics, survey period and treatment group	27

Table 16	Health and nutrition-related knowledge and attitude scores of PREGNANT mothers by treatment group and survey period	28
Table 17	Health and nutrition-related practice of PREGNANT mothers by treatment group and survey period	29
Table 18	Source of nutrition information for PREGNANT mothers by treatment group and survey period	30
Table 19	Type of nutrition education sessions attended by PREGNANT mothers by treatment group and survey period	30
Table 20	Frequency and percent distribution of PREGNANT mothers by brand of food product with SPS bought by treatment group and survey period	31
Table 21	Profile of STOREOWNERS according to selected socio-demographic and community environment characteristics, survey period and treatment group	33
Table 22	Health and nutrition-related knowledge, attitude and practice of STOREOWNERS by treatment group and survey period	34
Table 23	Frequency and percent distribution of STOREOWNERS by brand of food Product with SPS available in the store, treatment group and survey period	35
Table 24	Profile of SCHOOLCHILDREN according to selected socio-demographic characteristics, treatment group and survey period	37
Table 25	Knowledge, attitude and practice scores of SCHOOLCHILDREN by treatment group and survey period	38
Table 26	Health and nutrition-related knowledge and attitude scores of TEACHERS by treatment group and survey period	38
Table 27	Percent distribution of health workers according to correct responses on the knowledge test, by treatment group and survey period	41
Table 28	Weighing practices of health workers by treatment group and survey period	42
Table 29	Community environment characteristics by treatment group and survey period	43
Table 30	Effect of Project BIDA on the knowledge of mothers	44
Table 31	Effect of Project BIDA on the attitude of mothers	45
Table 32	Effect of Project BIDA on the practice of mothers	45

LIST OF FIGURES

		Page
Figure 1	BPAN organizational structure	4
Figure 2	Knowledge test administered to the BHW/BNS	40

EXECUTIVE SUMMARY

Micronutrient malnutrition remains a public health problem in the Philippines affecting the development and productivity of the population. To address this problem, the Barangay Program of Action for Nutrition (BPAN) was developed. It is a community-based action program, which aimed to eliminate micronutrient malnutrition through nutrition education in the school and the household. The program had the following components: nutrition, information and education (Project BIDA); home food security through food production; food fortification; micronutrient supplementation; and, growth monitoring. Project BIDA (*Bayang Mayaman sa Iron, Iodine at Bitamina A*) was the centerpiece component of the BPAN. It was implemented through a package of information, education and communication materials (consisting of the *Nutri*-guide, school guide, community guide, flip chart and poster) disseminated in the school and the community. The information in the *Nutri*-guide was disseminated primarily through the conduct of nutrition-reading sessions called *Pabasa sa Nutrisyon.* The Pabasa was a participative, circular gathering of 10-12 mothers per cluster discussing informally the health and nutrition information contained in the print materials.

An impact evaluation was conducted on the comprehensive nutrition education component of the BPAN from 1999-2000. The evaluation aimed to assess the impact of the nutrition education intervention on the health and nutrition-related knowledge, attitude and practices of mothers, schoolchildren, teachers, storeowners and community health workers. The study was carried out in selected areas of Southern Tagalog, Northern Mindanao, Eastern Visayas and Central Visayas. Knowledge, attitude and practice of targeted community members were determined at baseline and after one year of program implementation using interview schedules, self-administered tests, and ocular observations in the experimental and control areas. The BIDA intervention was implemented in the experimental areas only. No intervention was given in the control areas.

Program Impact

Data for the evaluation were obtained from 1,216 non-pregnant non-lactating mothers (NPNL), 586 lactating mothers, 259 pregnant mothers, 152 storeowners, 3,313 schoolchildren, 553 teachers and 136 health workers (BHW/BNS) by trained research assistants. The results of the study revealed significant increases in the level of knowledge among BPAN mothers compared to the control mothers in the area of micronutrient-rich foods. Significant knowledge differences were also noted among lactating mothers in the area of protein-energy and micronutrient malnutrition for the lactating mothers; among non-pregnant non-lactating mothers in the areas of food preparation and breastfeeding and mother's health; and among pregnant mothers in the areas of prevention of malnutrition and breastfeeding and mother's health. The differences, though not generalized, were all in favor of the BPAN group. The knowledge areas cited were covered in the BIDA materials.

Significant results in attitude and practice were limited. Significant differences in attitude were noted only among NPNL mothers and specifically in the area of what their children should eat. In terms of practice, significant differences in favor of the BPAN group were noted such as giving of iron supplements to young children among lactating mothers; participation in the ASAP, attendance to nutrition education sessions and having a fruit/vegetable garden in the

home among NPNL mothers; and having a fruit/vegetable garden in the home and attendance to nutrition education sessions among pregnant mothers.

Storeowner, teacher and schoolchildren respondents from the BPAN areas had higher knowledge scores than their control counterparts after one year of program implementation. The high knowledge scores did not, however, translate to change in attitudes and practices.

Among health workers, the trend in results seemed to reflect better knowledge for the BPAN group. This result, however, has to be interpreted with caution due to certain limitations identified.

Practices or behaviors change all the time and are influenced by several factors. An increase in knowledge may not necessarily result to an immediate change in practice or attitude. Practices and behavior may not even change at all as observed in most of the evaluation findings. In interpreting the results it would be important to take into account that there are four factors which are known to affect how we behave: a) our thoughts and feelings; b) people who are important to us; c) resources; and d) culture. It seemed easier to increase the level of awareness on micronutrients and other nutrition-related issues rather than effect a change in food eating habits. This was observed in our results. Although a change may still be possible, the timing of the evaluation may not be that appropriate to measure the desired changes due to the "sleeper effect".

Implications and Recommendations

On the basis of the results of the study, implementation of the BIDA intervention is encouraged due to its potential to effectively communicate practical nutrition knowledge and practice with the target mothers and their families, schoolchildren, teachers, storeowners and community health workers (BHW/BNS). There is a need, however, for program implementers to review their program targets. It is possible that some targets set are not achievable within a given timeframe. The program implementers may have to decide as to when a certain variable is expected to change and time the impact or outcome evaluation during that period.

It may be prudent to just evaluate the effect of BIDA and not the whole BPAN.

To effect change in behavior or practices, a program should be able to address all the other factors that influence behavior. The program was able to achieve significant improvement in the knowledge level of target groups in the intervention areas. Visible change noted in practice however, is minimal. Sleeper effect was cited to account for this observation. It is also possible that other factors might be involved but these are not being recognized and therefore not being addressed. A fault tree analysis may be useful in identifying factors that may have influenced the maintenance of status quo.

In future evaluation efforts, qualitative evaluation methods should be included to understand better why the effects (both intended and not intended) occurred.

It is very obvious from this evaluation that increasing the knowledge level is not enough to change attitudes and practices. Further, attitudes and practices do not change overnight.

Strong and sustained components on community organization and capability building in the delivery of nutrition messages are a must in the program.

The program has achieved a lot in providing the very basic ingredients needed for people to change toward healthier lives. Additional inputs will have to be provided and sustained so that all the effort, time and money, will not be put to waste.

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1. INTRODUCTION

1.1. Background

Micronutrient malnutrition remains a public health problem in the Philippines affecting the development and productivity of the population. Results from the recent national nutrition survey carried out by the Food and Nutrition Institute revealed a prevalence rate of 30.6% for iron deficiency anemia (1). The most severely affected age groups were the 6 months to 1-year-old children (56.6%), pregnant women (50.7%), male elderly (49.1%), and lactating women (45.7%). Vitamin A deficiency remained prevalent likewise with rates of 8.2%, 7.1% and 3.9% among 6 months to 5-year-old children, pregnant women and lactating women, respectively (2). Based on the urinary iodine levels, the prevalence of moderate and severe iodine deficiency among schoolchildren was 23.5% and 12.3%, respectively (3).

The Philippine Plan of Action for Nutrition (PPAN) was formulated to address these nutrition problems (4). PPAN's 5 impact programs include food production, micronutrient supplementation, food fortification, food assistance and nutrition education. While all these programs are in place, that on nutrition education has not been fully established and implemented. The implementation of nutrition education programs is often hampered by the lack of readily available educational materials at the grassroots. At present, there is no comprehensive nutrition education program that provides materials and support to community health workers and the households. The proper knowledge, skills and attitudes of health workers and the community are crucial in ensuring the success of any nutrition program.

To address this problem, a community-based action program named the Barangay Program of Action for Nutrition (BPAN) was developed by the Nutrition Center of the Philippines (NCP) in partnership with the National Nutrition Council (NNC). The BPAN simply translates the PPAN into impact action programs at the village level and targets vulnerable members in the households such as women and children. Specifically, BPAN aims to aid in the elimination of micronutrient malnutrition through nutrition education in the school and the household.

1.2. Program Description

The BPAN was a pilot project implemented in 38 villages in the provinces of Batangas, Negros Occidental, Cebu and Bukidnon from 1999-2000. It was designed to contribute to the improvement of the nutritional status of women and children through the prevention and control of energy and micronutrient malnutrition in the selected areas through intensified nutrition activities. The objectives of the program were to: a) promote adequate household consumption of energy and micronutrient-rich foods; b) improve the availability of nutritious foods, fortified foods, iodized salt and micronutrient supplements at the village level; and, c) increase the proportion of mothers breastfeeding, giving complementary food and monitoring the growth of children. The program had the following components: a) nutrition information and education (Project BIDA); b) home food security through food

production; c) food fortification; d) micronutrient supplementation; and, e) growth monitoring.

1.2.1. Intervention

Project BIDA (*Bayang Mayaman sa Iron, Iodine at Bitamina A*) was the centerpiece component of the BPAN. It aimed to increase the knowledge, attitudes and skills of mothers, schoolchildren, teachers and community health workers to enable them to practice desired health and nutrition behavior in the home, school or community. Project BIDA was implemented through a package of information, education and communication materials as follows:

- *Nutri-Guide*
  This material presents itself as a simple, relevant and action-oriented household reference. It provides guidelines on how to identify protein-energy and micronutrient malnutrition and practical solutions on how to address these nutrition problems.

- *School Guide*
  This instructional material for teachers contains information on how to integrate concepts presented in the Nutri-Guide in the school curriculum (Grades 1-6).

- *Community Guide*
  This instructional guide is intended for barangay captains and councilors, members of the barangay nutrition committee, agriculture technicians, day care workers, health and nutrition workers, and members of Sangguniang kabataan. It identifies the roles and functions of other health, nutrition and government personnel involved in providing support for activities in the program.

- *Flip Chart*
  This illustrative material is helpful for teachers and community health workers in communicating basic information from the Nutri-Guide to the target mothers and children.

- *Poster*
  This illustrative material is used for promoting the BPAN in the community. A major focus of the material is the promotion of the consumption of fortified foods.

The information in the Nutri-Guide was disseminated primarily through the conduct of nutrition-reading sessions called *Pabasa sa Nutrisyon.* The *Pabasa* was a participative, circular gathering of 10-12 mothers per cluster discussing informally the health and nutrition information contained in the Nutri-Guide. This activity sought to empower the women in reducing the families' vulnerability to malnutrition. Mothers were required to attend 10 sessions to cover all the topics in the Nutri-Guide. The priority targets of the *Pabasa* were the mothers of preschool children, pregnant and lactating mothers and mothers with underweight children.

Houses were clustered to facilitate the mobility of the mothers in going to and from the identified *Pabasa* site. Mothers were given copies of the Nutri-Guide as a permanent household reference on nutrition. They were encouraged to participate by reading aloud portions of the Nutri-Guide and by sharing personal experiences on the topics discussed. The interactive approach was coupled with fun-learning activities such as games, exercises and demonstrations held at the end of the sessions to increase participation in the sessions and to increase learning retention among mothers. The conduct of games such as nutri-domino, market game, nutri-puzzle, "bring me" and *padamihan* made the sessions more interesting and enjoyable. The simple demonstrations on the detection of common signs and symptoms of malnutrition helped the mothers to be aware of their family's nutritional status. Hands on demonstrations on vegetable planting encouraged the mothers to establish their own home garden while sessions on micronutrient supplementation and growth monitoring encouraged the mothers to participate in Garantisadong Pambata and Operation Timbang. The rapid test for the presence of iodine in salt encouraged the usage of iodized salt. Cooking demonstrations using the recipes in the Nutri-Guide provided an opportunity to practice how to plan and prepare a balanced diet.

The *Pabasa* sessions were held in the school, day care center, chapel, barangay hall, along the street or in a mother's house. The sessions were held once to 3 times a week and lasted for 2-8 hours per session, depending on the topic under discussion. Barangay and school officials helped encourage mothers to participate in the *Pabasa* sessions.

Through the implementation of Project BIDA, the other components of the BPAN such as micronutrient supplementation, breastfeeding and diet counseling, growth monitoring and food production were enhanced. Further, village stores were encouraged to sell fortified foods, including iodized salt.

1.2.2. Organization

The organizational structure for BPAN is presented in Figure 1. A steering/working committee at the national level provided the overall directions for the implementation of the program. It consisted of representatives from the Department of Health (DOH), Department of Education, Culture and Sports (DECS), Department of Agriculture (DA), Department of Social Welfare and Development (DSWD), NNC, NCP and Procter and Gamble, Philippines.

Representatives from the DECS at the provincial and district levels facilitated the implementation of Project BIDA. Nutrition committees at the regional, provincial, municipal and village levels (composed of representatives from the DOH, DA, DSWD and NNC) implemented the other components of the BPAN. The Area Program Officers (APOs) of the NCP monitored the progress of implementation and provided technical assistance to the program implementers. They also coordinated the implementation activities of the DECS and the different nutrition committees.

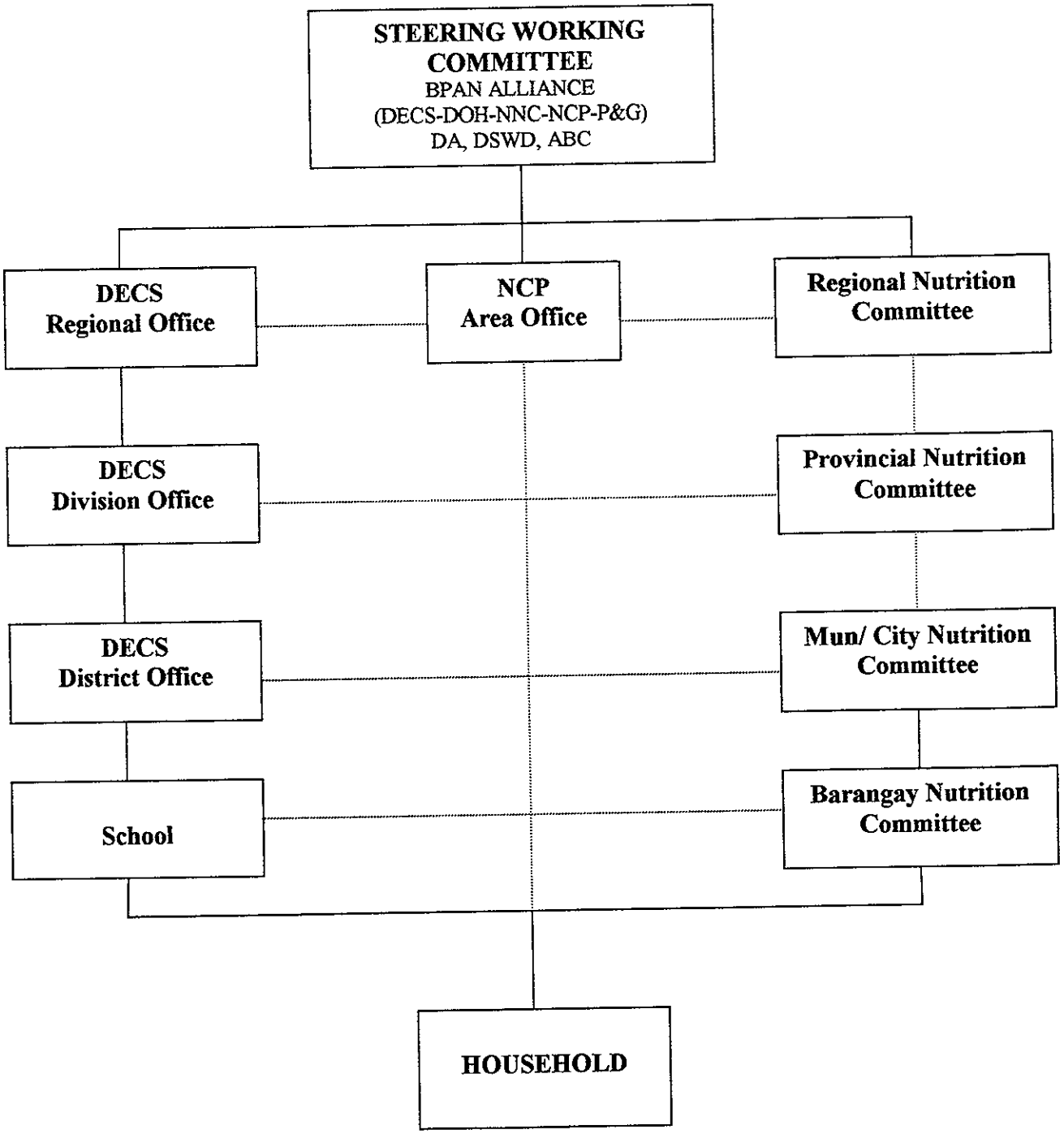


Figure 1. BPAN Organizational Structure

2. PROGRAM EVALUATION

The Social Science Research Division of the NCP carried out an evaluation of the nutrition education component of the program in July 1999 and July 2000, one year after its implementation. This document presents the results of the evaluation conducted. Details regarding program implementation are presented in a separate report. Procter and Gamble, Philippines and USAID sponsored this program evaluation.

2.1. Objective

The major objective of this evaluation was to assess the impact of the nutrition education component of the program on the health and nutrition-related knowledge, attitudes and practices (KAP) of mothers, schoolchildren, teachers, community health workers and storeowners.

2.2. Design

The impact evaluation was based on pre-post comparisons of health- and nutrition-related KAP of target participants between two treatment groups: experimental and control.

2.3. Subjects

Participants for the evaluation consisted of mothers (pregnant, lactating and non-pregnant, non-lactating), schoolchildren, teachers, community health workers (specifically BHW and BNS) and retail storeowners in the communities selected.

2.4. Study Sites

Table 1 shows the list of areas surveyed according to municipality, village and treatment group. The 8 provinces covered came from Southern Tagalog, Eastern and Central Visayas and Northern Mindanao regions.

Table 1. List of experimental and control areas

AREAS	EXPERIMENTAL	CONTROL
Luzon	**Sto. Tomas, Batangas**	**Teresa, Rizal**
	Brgy. San Francisco	Sitio Abuyod, Brgy. Looc
	Brgy. San Luis	Brgy. Prinza
	Brgy. San Joaquin	**Morong, Rizal**
	San Nicolas, Batangas	Brgy. Caniogan
	Brgy. Bancoro	**Cardona, Rizal**
	Brgy. Balete	Sitio Korokan, Brgy. Looc
		Binangonan, Rizal
		Brgy. Ithan
Visayas	**Lapu-Lapu, Cebu**	**Dauis, Bohol**
	Brgy. Subabasbas	Brgy. Songculan
	Cordova, Cebu City	Brgy. Tinago
	Brgy. Day-as	**Tagbilaran, Bohol**
	Brgy. Gabi	Brgy. Dao
	Cebu City	Brgy. Cabawan
	Brgy. Agsungot	**Guiholngan, Negros Oriental**
	Escalante, Negros Occidental	Brgy. Basak
	Brgy. Washington	Brgy. Calamba
	Brgy. Rizal	Brgy. Mc Kinley
	Brgy. Buenavista	**Vallehermoso, Negros Oriental**
	Brgy. Alimango	Brgy. Ulay
	Toboso, Negros Occidental	Brgy. Tabon
	Brgy. Magticol	
Mindanao	**Lantapan, Bukidnon**	**Balingasag, Misamis Oriental**
	Brgy. Bantuanon	Brgy. Napaliran
	Brgy. Bugcaon	Brgy. Baliwagan
	Brgy. Balila	**El Salvador, Misamis Oriental**
	Sumilao, Bukidnon	Brgy. Taytay
	Brgy. Kisolon	Brgy. Himaya
	Brgy. San Vicente	Brgy. Molugan

2.5. Sampling

A one-stage sampling design for schools and a two-stage sampling design for the other units of observation were employed in each treatment group. The selection of schools, students, households, pregnant and lactating women, preschoolers, infants and stores for each treatment group is described below.

There were four regions selected: Southern Tagalog, Northern Mindanao, Eastern Visayas and Central Visayas. For each region, five pairs of schools matched according to size of school, socio-economic status of students, and level of urbanization in the village where the pilot school is located was chosen. Schools were grouped according to the municipality they belonged to. The unit of sampling was the municipality. Municipalities were randomly chosen to be part of the

Experimental Group (with BPAN). Another list of schools with similar characteristics was generated. Five schools from this list were selected to form the control group (without BPAN).

Only households with elementary schoolchildren were considered for inclusion in the study. A list of households with elementary schoolchildren was generated through house-to-house interviews. A list of these households with pregnant or lactating mothers was likewise generated.

From the list of households without pregnant or lactating mothers, 16 households were randomly selected. From the list households with pregnant or lactating mothers, the required number of households was randomly selected (4 households with pregnant, 8 households with lactating women).

All households randomly chosen above were included in the study. All schoolchildren and preschoolers who belonged to these households were included. All BNS/BHW in the villages selected were included. This sampling design was utilized for both the baseline and post-intervention surveys.

2.6. Variables and Method of Data Collection

The different categories of variables collected in this evaluation study were the following:

- KAP of mothers
- KAP of schoolchildren
- KAP of storeowners
- KA of teachers
- KP of community health workers
- Household socioeconomic-demographic characteristics
- Health and nutrition education sessions in the community
- Integration of nutrition in school curriculum
- Village-initiated nutrition programs
- School programs on nutrition

The detailed list of variables under each category is presented in Table 2.

Table 2. Variables collected in the study

VARIABLE	SOURCE	METHODOLOGY/TOOL
Dependent Variables 1. Mothers Knowledge scores - Micronutrient-rich foods - Micronutrient and protein-energy malnutrition - Prevention of malnutrition - Food preparation - Breastfeeding/mother's health - Government programs on nutrition Attitude scores - Breastfeeding - Food preparation - *Sangkap Pinoy Seal* (SPS) - What children should eat Practices - Purchase of fortified foods with SPS - Breastfeeding - Introducing appropriate complementary foods to infants - Growth monitoring - VA supplementation to preschoolers - Fe supplementation to preschoolers - Fe supplementation for pregnant women - Participation in nutrition education sessions - Presence of fruit/vegetable garden in the home - Use of iodized salt	Mothers - non-pregnant - pregnant - lactating	Interview schedule
2. KAP scores of schoolchildren 3. KA scores of teachers 4. Storeowners Knowledge scores - Micronutrient-rich foods - Micronutrient and protein-energy malnutrition - Prevention of malnutrition - Food preparation - Breastfeeding/mother's health - Government programs on nutrition Attitude scores - Role in improving health and nutrition in the community - What to sell	Schoolchildren Teachers Storeowners	Achievement test Self-administered test Interview schedule

VARIABLE	SOURCE	METHODOLOGY/TOOL
Practices - Volume of fortified foods with SPS sold - Selling of iodized salt 5. Health workers - knowledge - growth monitoring - practice - weighing 6. School - no.of school nutrition programs - integration of nutrition in school curriculum	Health workers Teachers	Self-administered test Observation Records review Interview schedule
7. Community - no. of health education sessions conducted in the health center for the past 6 months - no. of nutrition education sessions conducted in the health center for the past 6 months - no. of village-initiated nutrition programs - no.of school nutrition programs - integration of nutrition in school curriculum	Health workers Teachers	Records review Interview schedule Records review
Independent Variables 1. Home environment - Age, education, occupation - Household monthly income - Household size - Home ownership - Land ownership	Mother Storeowner	Interview schedule

Various tools were utilized to assess the different parameters of the evaluation. Mothers were interviewed in the local dialect using pre-tested structured interview schedules. Tests were administered to schoolchildren and teachers. Health center records were reviewed and observations were made during the actual weighing sessions conducted by the health workers. Trained field research assistants performed these data activities.

2.7. Intervention

The program was implemented in the experimental areas only. No intervention was given in the control areas. Regular health and nutrition activities were continuously done in the control areas.

2.8. Data Analysis

Analysis of the data was done at the NCP using the Statistical Analysis Software (SAS). Chi-square tests were used in comparing differences in the profile characteristics between groups. The effect of the program was determined based on the differences in the changes of the outcome indicators between the two treatment groups. However, these expected outcomes were also affected by other variables, which may not be related to the treatment variables. Thus, the analysis of the effect of the program on the continuous and binary outcome indicators was done adjusting for the effect of the confounding variables using linear and logistic regression analyses, respectively.

3. PROGRAM IMPACT

Although efforts were made to make the treatment groups comparable in terms of factors that may affect the outcome indicators, there were still differences noted in some socioeconomic, demographic and other variables studied, or in knowledge, attitude and practice as assessed by the baseline questionnaires administered to the respondents. These differences were taken into account when comparing changes in the outcome measures between groups.

In interpreting the results, it is important to note that the data were obtained from 2 cross-sectional surveys. It is thus, inappropriate to compare the values between groups at post-intervention as a means to determine the program impact. Baseline values, obtained from a group of respondents different from those at post, need to be considered when evaluating impact. So the more appropriate measure of impact is the change between post and baseline values within groups.

3.1 Mothers

3.1.1 Non-pregnant, Non-lactating (NPNL)

A profile of the 1,216 NPNL mothers included in this evaluation study is shown in Table 3. The mean ages of the mothers were slightly different between the two groups at baseline ($p<0.0476$). In general, and on the average, the mothers were in their late thirties. Only a small proportion (less than 10%) of mothers in both groups was able to reach or finish a college. More mothers in the intervention group were unemployed at baseline ($p<0.0001$). The two groups were different in terms of household size at post ($p<0.0237$). About 86-89% of the respondents in both groups owns the houses they live in and only 35-43% of them owns the lot where their house is built. The median monthly income for both groups was P3000.

The groups were comparable at baseline in terms of mean knowledge scores. Significant differences between groups were seen at baseline in mean attitude scores for items relating to breastfeeding ($p<0.0016$) and what the child should eat ($p<0.0015$). In terms of health and nutrition-related practices at baseline, the groups differed in attendance to nutrition education sessions ($p<0.0026$), use of iodized salt in the homes ($p<0.0493$) and, giving of iron supplements to young children ($p<0.0000$).

Differences found between groups in the profile characteristics and other baseline outcome measures were taken into account in the data analysis.

3.1.1.1 Knowledge and Attitude

Significant changes in knowledge scores from pre to post (between groups) were noted in topics relating to micronutrient-rich foods ($p<0.0029$), food preparation ($p<0.0243$) and breastfeeding and mother's health ($p<0.0014$) (Table 4). The changes observed were higher in the BPAN group. No

significant differences in the scores from pre to post were noted between groups for knowledge relating to protein-energy and micronutrient malnutrition, prevention of malnutrition and government nutrition programs.

Mothers in the BPAN group showed a greater degree of positive attitude change than the control mothers for attitude relating to what the child should eat ($p<0.0161$). There were no significant differences observed in attitude change between groups for items relating to food preparation, SPS and breastfeeding after one year of intervention.

3.1.1.2 Practice

Table 5 shows the percent distribution of health and nutrition-related practices of NPNL mothers by treatment group and survey period. After the program implementation, more mothers in the intervention group tended to participate in the *Araw ng Sangkap Pinoy* (ASAP) ($p<0.0081$), join nutrition education sessions in the community ($p<0.0120$), and have a fruit/vegetable garden in the home ($p<0.0001$) as compared to their counterparts. There were no significant differences from the start and after one year of program implementation between groups for practices such as monitoring of children's growth; giving of vitamin A and iron supplements to the children; use of iodized salt in the home; and, amount of fortified foods with SPS bought.

Increased proportions of mothers reporting sources of nutrition information from the *Nutri-Guide*, BHW/BNS and teacher/schoolchildren were noted in the BPAN group (Table 6). In the control group, an increase in the proportion of mothers claiming they obtain their nutrition information from BHW/BNS was also noted although much lower than that observed in the BPAN group. Both groups had a reduced proportion of mothers at post that reported getting nutrition information from radio/TV/print media, RHM/RHN/MHO, private doctors and other sources.

An increase in the proportion of mothers reporting attendance to mother's class was observed in both the BPAN and control groups. However, a higher change in proportion of NPNL mothers who attended mother's class from pre to post was noted in the BPAN group (Table 7).

The ten most popular fortified foods with SPS bought by the NPNL mothers are presented in Table 8. The choices were similar in both groups. A higher proportion of NPNL mothers in the BPAN group buying the food products was noted at the end of one year of intervention. The change in the proportion of control mothers buying the products was very minimal. In some instances, a reduction in the proportion of mothers in the control group consuming the product was observed.

Table 3. Profile of NPNL mothers according to selected socio-demographic and community environment characteristics, survey period and treatment group

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
	n=304	*n=304*		*n=304*	*n=304*	
Age (y), mean	38.66	37.53	0.0476 [a]	38.94	38.67	0.6531
Education, %						
Elementary level	26.6	21.7	0.5061	22.4	22.7	0.7929
Completed elementary	25.7	23.0		29.6	25.0	
High school level	16.8	20.7		16.4	19.1	
Completed high school	17.1	17.4		16.4	16.4	
College level/vocational	7.5	9.2		9.2	9.2	
Completed college	6.3	7.9		5.9	7.6	
Occupation, %						
None	90.5	76.3	0.0001 [a]	61.8	65.1	0.8287
Professional	0.7	2.6		3.9	3.6	
Blue collar	2.3	5.9		12.5	10.5	
Self-employed	6.6	15.1		21.7	20.7	
Household size, %						
≤ 6	58.6	64.8	0.1133	58.2	67.1	0.0237 [a]
Home ownership, %	85.8	88.5	0.2739	87.8	87.5	0.8995
Land ownership, %	42.8	36.2	0.0966	42.4	35.2	0.0668
	n=300	*n=299*		*n=300*	*n=296*	
Monthly income, (P) median	3000	3000		3000	3000	

[a] significantly different between groups ($p<0.05$)

Table 4. Health and nutrition-related knowledge and attitude scores of NPNL mothers by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	mean±sd	mean±sd	mean±sd	mean±sd	
KNOWLEDGE	*n=304*	*n=304*	*n=304*	*n=304*	
Micronutrient-rich foods	16.37±5.28	15.85±5.11	16.34±5.02	13.68±4.93	0.0029 [b]
Protein-energy and micronutrient malnutrition	13.13±3.98	12.41±3.64	12.88±3.60	11.62±3.60	0.2302
Prevention of malnutrition	3.85±1.11	3.95±1.08	3.89±1.09	3.80±1.11	0.2263
Food preparation	3.22±0.94	3.36±1.15	3.22±0.93	3.07±1.20	0.0243 [b]
Breastfeeding and mother's health	5.43±1.32	5.77±1.38	5.55±1.35	5.37±1.32	0.0014 [b]
Government	1.94±1.32	1.83±1.19	1.95±1.25	1.67±1.28	0.2308
ATTITUDE	*n=304*	*n=304*	*n=304*	*n=304*	
Food preparation	2.86±0.86	2.80±0.92	2.94±0.89	2.85±0.74	0.7299
Sangkap Pinoy Seal	2.82±1.03	2.68±1.05	2.92±1.14	2.94±1.16	0.2686
Breastfeeding	3.17±0.69	3.19±0.69	3.32±0.59	3.23±0.56	0.1397
What child should eat	2.92±0.50	3.01±0.64	3.05±0.47	3.00±0.44	0.0161 [b]

[a] p-values reported above were based on the results of linear regression analysis after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 5. Health and nutrition-related practices of NPNL mothers by treatment group and survey period

PRACTICE	BPAN				CONTROL				p-value [a]
	PRE		POST		PRE		POST		
	N	%	N	%	N	%	N	%	
Monitors growth of preschoolers	304	87.0	304	84.4	304	80.6	304	75.5	0.8521
Participates in ASAP	169	45.6	141	69.5	165	49.7	151	53.6	0.0081 [b]
Children given vitamin A supplements	169	85.8	141	83.7	165	84.2	151	83.4	0.9252
Children given iron supplements	169	57.4	141	29.8	165	33.9	151	19.9	0.2133
Has fruit/vegetable garden in the home	304	56.3	304	60.5	304	58.2	304	34.5	0.0001 [b]
Uses iodized salt in the home	304	46.7	304	65.1	304	38.8	304	51.3	0.3057
Attends nutrition education sessions	304	38.8	304	56.9	304	27.3	304	29.3	0.0120 [b]
		(mean±sd)		(mean±sd)		(mean±sd)		(mean±sd)	
No. of fortified foods with (SPS) bought	304	2.34±2.36	304	2.89±3.04	304	1.71±2.34	304	1.75±2.38	0.1301

[a] p-values reported above were based on the results of the logistic and linear regression analyses after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 6. Source of nutrition information for NPNL mothers by treatment group and survey period

SOURCE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=304)		(n=304)		(n=304)		(n=304)	
	n	%	n	%	n	%	n	%
Radio/TV/print media, food labels	202	66.4	146	48.0	203	66.8	153	50.3
Nutriguide	0	0.0	114	37.5	0	0.0	0	0.0
BHW/BNS	154	50.7	193	63.5	142	46.7	165	54.3
RHM/ PHN/ MHO	156	51.3	129	42.4	188	61.8	148	48.7
Private Doctors	13	4.3	10	3.3	23	7.6	11	3.6
Teachers/ Schoolchildren	31	10.2	72	23.7	19	6.3	12	3.9
Religious leaders, neighbors, hilot, etc.	56	18.4	41	13.5	20	6.6	24	7.9

[a] multiple response

Table 7. Type of nutrition education session attended by NPNL mothers by treatment group and survey period

TYPE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=118)		(n=173)		(n=83)		(n=89)	
	No.	%	No.	%	No.	%	No.	%
Mothers' class	83	70.3	162	93.6	57	68.7	72	80.9
Counselling	7	5.9	0	0.0	7	8.4	3	3.4
Mass activities	31	26.3	7	4.0	19	22.9	12	13.5
Seminars	1	0.8	1	0.6	0	0.0	3	3.4
Don't know	2	1.7	4	2.3	4	4.8	1	1.1

[a] multiple response

3.1.2 Lactating

A total of 586 lactating mothers were interviewed for the evaluation. The respondents for this group were in their early thirties (Table 9). Less than 10% of the respondents in each group were able to reach or finish college. Majority (74-86%) of the lactating respondents were plain housewives. Less than half (36-44%) of the respondents in both groups have household sizes of less than six. The proportion of those who have their own homes was significantly lower in the BPAN group compared to the control group at baseline ($p<0.0169$). Lot ownership between groups was similar at baseline however, at post, less proportion of the respondents was noted in the control group. The median monthly income for this group of respondents ranged from P2400-P3000.

Both groups were comparable at baseline in mean knowledge scores. Mean attitude scores for *Sangkap Pinoy Seal* was noted to be significantly different between groups at baseline ($p<0.0214$). The two groups were comparable for practically all of the health and nutrition-related practices cited except for attendance to nutrition education sessions ($p<0.0012$).

Differences found between groups in the profile characteristics and other baseline outcome values were considered in the data analysis.

3.1.2.1 Knowledge and Attitude

Comparison of scores from pre and post between groups revealed significant changes in knowledge relating to micronutrient-rich foods ($p<0.0448$) and protein-energy and micronutrient malnutrition ($p<0.0617$). These changes were found to be significantly higher in the BPAN group. Change in knowledge on prevention of malnutrition was also higher in the BPAN group although it was of borderline significance ($p<0.1087$) (Table 10). For knowledge relating to food preparation, breastfeeding and mother's health and government nutrition programs, no significant changes in scores from the start and after one year of program implementation were noticed between groups.

There was no significant difference noted in attitude changes between the two groups.

3.1.2.2 Practice

Lactating mothers in the BPAN group had significantly increased participation in nutrition education sessions ($p<0.0010$) compared to those in the control group after one year of program implementation (Table 11). The change in the proportion of lactating mothers with children given iron supplements was also noted to be significantly higher in the BPAN group ($p<0.0445$).

For practices like exclusive breastfeeding for at least 6 months, introduction of complimentary foods to infants at 6 months while breastfeeding, monitoring

Table 8. Frequency and percent distribution of NPNL mothers by brand of food product with the *Sangkap Pinoy Seal* (SPS) bought, treatment group and survey period

RANK	BPAN						CONTROL					
	FOOD PRODUCT WITH SPS [a]	PRE (n=304)		FOOD PRODUCT WITH SPS [a]	POST (n=304)		FOOD PRODUCT WITH SPS [a]	PRE (n=304)		FOOD PRODUCT WITH SPS [a]	POST (n=304)	
		n	%		n	%		n	%		n	%
1	Lucky Me Noodles	88	28.9	Lucky Me Noodles	121	39.8	Lucky Me Noodles	89	29.3	Lucky Me Noodles	95	31.3
2	Maggi Rich Mami Noodles	87	28.6	Maggi Rich Mami Noodles	103	33.9	Eight O'clock Orange Juice	59	19.4	Maggi Rich Mami Noodles	64	21.1
3	Eight O'clock Orange Juice	76	25.0	Eight O'clock Orange Juice	97	31.9	Maggi Rich Mami Noodles	55	18.1	Tang Orange Juice	45	14.8
4	Ovaltine	67	22.0	Tang Orange Juice	72	23.7	Ovaltine	38	12.5	Eight O'clock Orange Juice	43	14.1
							Magic Flakes Cream Sandwich	38	12.5			
5	Tang Orange Juice	66	21.7	Ovaltine	64	21.1	Tang Orange Juice	36	11.8	555 Sardines	37	12.2
6	Minola Cooking Oil	39	12.8	555 Sardines	60	19.7	Star Margarine	33	10.9	Magic Flakes Cream Sandwich	27	8.9
				Papa Ketchup	60	19.7						
7	Payless Noodles	38	12.5	Payless Noodles	51	16.8	555 Sardines	28	9.2	Ovaltine	26	8.6
8	555 Sardines	37	12.2	Magic Flakes Cream Sandwich	47	15.5	Papa Ketchup	20	6.6	Star Margarine	24	7.9
	Magic Flakes Cream Sandwich	37	12.2				Minola Cooking Oil	20	6.6			
9	Pipo	32	10.5	Minola Cooking Oil	35	11.5	Nico	18	5.9	Payless Noodles	21	6.9
	Nico	32	10.5							Papa Ketchup	21	6.9
										Minola Cooking Oil	21	6.9
10	Papa Ketchup	28	9.2	Star Margarine	33	10.9	Payless Noodles	17	5.6	Swift Mighty Hotdog	15	4.9
							Pipo	17	5.6			

[a] multiple response

of children's growth and participation in the ASAP; control mothers had a higher change in proportion from pre to post but this was not statistically significant when compared with that of the BPAN group. More mothers in the BPAN group seemed to use iodized salt and have a fruit/vegetable garden in their homes compared to the control mothers, however, this was not found to be statistically significant after controlling for the effect of confounders. No significant differences between groups were also noted for other practices such as children given vitamin A supplements and average number of fortified foods with SPS bought.

Table 12 shows the sources of nutrition information between groups before and after one year of program implementation. The trend in the change in proportions from pre to post was almost similar for each of the sources in both groups however, higher changes were noted for sources such as *Nutri-Guide*, BHW/BNS and teachers/schoolchildren in the BPAN group. The proportion of respondents obtaining nutrition information from radio/print/TV media, RHM/RHN/MHO, private doctors and others sources was reduced after one year of program implementation.

Mother's class was the most common type of nutrition education session attended by lactating mothers in both groups (Table 13). A higher proportion of mothers attending this session was noted to be higher in the BPAN group at post compared to the control group; although a higher change in proportion was seen in the control group from pre to post.

Table 14 presents the ten most commonly purchased food products with the SPS by lactating mothers in the two groups at pre and post surveys. An almost similar choice of items was observed in both groups; however, a higher proportion in the BPAN group reported buying such products after one year of intervention.

Table 9. Profile of sample LACTATING mothers according to selected socio-demographic characteristics, survey period and treatment group

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
	n=151	*n=149*		*n=141*	*n=144*	
Age (y), mean	33.99	33.98	0.9904	34.62	34.48	0.8224
Education, %	*n=152*	*n=141*		*n=149*	*n=144*	
Elementary level	26.3	27.5	0.0799	25.5	29.9	0.2019
Completed elementary	23.0	25.5		24.8	27.8	
High school level	21.7	16.1		19.1	13.2	
Completed high school	23.7	16.1		23.4	16.0	
College level/vocational	4.6	9.4		5.0	7.6	
Completed college	1.3	5.4		2.1	5.6	
Occupation, %	*n=152*	*n=141*		*n=149*	*n=144*	
None	84.9	85.9	0.5239	78.0	73.6	0.2038
Professional	1.3	2.7		0.8	2.1	
Blue collar	4.6	2.0		7.8	4.2	
Self-employed	9.2	9.4		13.5	20.1	
Household size, %	*n=152*	*n=141*		*n=149*	*n=144*	
≤ 6	36.8	41.6	0.3976	36.2	43.8	0.1923
	n=152	*n=149*		*n=139*	*n=144*	
Home ownership, %	79.6	87.2	0.0169 [a]	85.6	88.2	0.5201
	n=152	*n=146*		*n=139*	*n=143*	
Land ownership, %	32.2	25.3	0.1899	38.4	21.0	0.0014 [a]
	n=151	*n=147*		*n=136*	*n=137*	
Monthly income, (P) median	2500	3000		2400	2400	

[a] significantly different between groups ($p<0.05$)

Table 10. Health and nutrition-related knowledge and attitude scores of LACTATING mothers by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	mean±sd	mean±sd	mean±sd	mean±sd	
KNOWLEDGE	*n=152*	*n=140*	*n=149*	*n=144*	
Micronutrient-rich foods	16.31±5.12	16.24±4.95	15.85±5.39	13.99±4.99	0.0448 [b]
Protein-energy and micronutrient malnutrition	12.63±4.25	12.70±3.92	12.97±3.66	11.62±3.68	0.0617 [b]
Prevention of malnutrition	3.68±1.2	3.99±1.00	3.97±1.05	3.99±1.02	0.1087
Food preparation	3.26±0.87	3.03±1.07	3.41±0.93	2.93±1.14	0.1950
Breastfeeding and mother's health	5.45±1.47	5.48±1.31	5.53±1.42	5.38±1.29	0.3735
Government nutrition programs	1.78±1.19	1.84±1.23	1.90±1.21	1.77±1.19	0.3155
ATTITUDE	*n=152*	*n=141*	*n=149*	*n=144*	
Food preparation	3.01±0.86	2.81±0.88	2.98±0.87	2.95±0.84	0.2256
Sangkap Pinoy Seal	2.75±0.77	2.69±0.71	3.05±1.38	2.92±1.18	0.7271
Breastfeeding	3.28±0.68	3.15±0.69	3.25±0.61	3.21±0.54	0.3821
What the child should eat	2.98±0.42	2.97±0.49	3.03±0.56	3.06±0.47	0.6113

[a] p-values reported above were based on the results of linear regression analysis after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 11. Health and nutrition-related practice of LACTATING mothers by treatment group and survey period

PRACTICE	BPAN				CONTROL				p-value [a]
	PRE		POST		PRE		POST		
	N	%	N	%	N	%	N	%	
Breastfeeds exclusively for at least 6 months	152	33.6	141	30.5	149	26.2	144	31.9	0.3097
Introduces complementary food to infant at 6 months	152	24.3	141	27.0	149	22.1	144	28.5	0.7244
Monitors growth of preschoolers	150	86.0	141	77.3	147	78.9	143	74.1	0.5419
Participates in ASAP	150	49.3	141	62.4	147	42.9	143	67.1	0.1318
Children given vitamin A supplements	150	78.0	141	78.7	147	80.3	143	74.8	0.5197
Children given iron supplements	150	44.0	141	35.5	147	34.0	143	15.4	0.0445 [b]
Has fruit/vegetable garden in the home	152	55.9	141	53.9	149	51.0	144	35.4	0.1586
Uses iodized salt in the home	152	39.5	141	69.5	149	34.2	144	50.7	0.1709
Attends nutrition education sessions	152	36.2	141	68.1	149	22.8	144	26.4	0.0010 [b]
		(mean±sd)		(mean±sd)		(mean±sd)		(mean±sd)	
No. of fortified foods with (SPS) bought	152	2.07±2.59	141	2.52±3.18	149	1.40±1.87	144	1.51±2.12	0.5043

[a] p-values reported above were based on the results of logistics and linear regression analyses after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 12. Source of nutrition information for LACTATING mothers by treatment group and survey period

SOURCE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=152)		(n=141)		(n=149)		(n=144)	
	n	%	n	%	n	%	n	%
Radio/TV/print media, food labels	85	55.9	61	43.3	99	66.4	51	35.4
Nutriguide	0	0.0	59	41.8	0	0.0	0	0.0
BHW/BNS	89	58.6	110	78.0	68	45.6	88	61.1
RHM/ PHN/ MHO	94	61.8	76	53.9	118	79.2	77	53.5
Private Doctors	7	4.6	1	0.7	11	7.4	1	0.7
Teachers/ Schoolchildren	8	5.3	25	17.7	5	3.4	8	5.6
religious leaders, neighbors, hilot, etc.	23	15.1	10	7.1	9	6.0	5	3.5

[a] multiple response

Table 13. Type of nutrition education session attended by LACTATING mothers by treatment group and survey period

TYPE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=55)		(n=96)		(n=34)		(n=38)	
	No.	%	No.	%	No.	%	No.	%
Mothers' class	44	80.0	89	92.7	23	67.6	32	84.2
Counselling	6	10.9	1	1.0	13	38.2	1	2.6
Mass activities	11	20.0	6	6.3	8	23.5	5	13.2
Don't know	1	1.8	1	1.0	0	0.0	0	0.0

[a] multiple response

Table 14. Frequency and percent distribution of LACTATING mothers by brand of food product with the *Sangkap Pinoy Seal* (SPS) bought, treatment group and survey period

RANK	BPAN						CONTROL					
	FOOD PRODUCTS WITH SPS [a]	PRE (n=152)		FOOD PRODUCTS WITH SPS [a]	POST (n=141)		FOOD PRODUCTS WITH SPS [a]	PRE (n=149)		FOOD PRODUCTS WITH SPS [a]	POST (n=144)	
		n	%		n	%		n	%		n	%
1	Lucky Me Noodles	49	32.2	Lucky Me Noodles	50	35.5	Lucky Me Noodles	41	27.5	Lucky Me Noodles	42	29.2
2	Maggi Rich Mami Noodles	43	28.3	Maggi Rich Mami Noodles	44	31.2	Maggi Rich Mami Noodles	31	20.8	Maggi Rich Mami Noodles	32	22.2
3	Tang Orange Juice	27	17.8	555 Sardines	30	21.3	Eight O'clock Orange juice	19	12.8	Eight O'clock Orange juice	16	11.1
	Payless Noodles	27	17.8									
4	Eight O'clock Orange Juice	26	17.1	Eight O'clock Orange Juice	25	17.7	Star Margarine	16	10.7	555 Sardines	15	10.4
5	Ovaltine	21	13.8	Tang Orange Juice	22	15.6	Tang Orange Juice	13	8.7	Magic Flakes Cream Sandwich	13	9.0
6	555 Sardines	19	12.5	Ovaltine	20	14.2	Papa Ketchup	12	8.1	Star Margarine	12	8.3
							Magic Flakes Cream Sandwich	12	8.1			
7	Minola Cooking Oil	17	11.2	Magic Flakes Cream sandwich	17	12.1	555 Sardines	11	7.4	Tang Orange Juice	11	7.6
8	Magic Flakes Cream sandwich	12	7.9	Papa Ketchup	16	11.3	Ovaltine	10	6.7	Papa Ketchup	10	6.9
										Ovaltine	10	6.9
9	Pipo	11	7.2	Minola Cooking Oil	15	10.6	Pipo	7	4.7	Swift Mighty Hotdog	7	4.9
	Papa Ketchup	11	7.2				Payless Noodles	7	4.7	Payless Noodles	7	4.9
	Nico	11	7.2				Nico	7	4.7	Minola Cooking Oil	7	4.9
	Mr. Chips	11	7.2									
10	Star Margarine	9	5.9	Payless Noodles	14	9.9	Minola Cooking Oil	5	3.4	Pipo	4	2.8
										Nico	4	2.8

[a] multiple response

3.1.3 Pregnant

Table 15 shows the profile of 259 pregnant mothers for this evaluation. Respondents for this group were mostly in the 2nd or 3rd trimester of pregnancy. Their ages ranged from 33-34 years. Compared with the lactating and NPNL respondents, a higher proportion of the pregnant respondents (16-27%) reached college level although only a few were able to get a degree. Majority of the respondents in the BPAN and control groups have no major occupation. The proportion of respondents with household sizes of 6 or less ranged from 62-73%. Seventy-five to ninety-one percent have ownership of their homes while about 31-38% own the lot where their house was built. Median monthly income for both groups ranged from P2100-P2600.

Pregnant mothers in both groups have similar knowledge scores at baseline. Attitude scores, however, were different in both groups at baseline for attitude towards food preparation ($p<0.0278$). Pregnant mothers in the two groups were significantly different at baseline for practice relating to attendance in nutrition education sessions ($p<0.0367$).

The two groups were comparable in terms of the profile characteristics mentioned. However, differences found between groups in the baseline outcome values were considered in the analysis.

3.1.3.1 Knowledge and Attitude

Pregnant mothers in the BPAN group showed significantly higher changes in knowledge scores from pre to post compared to their control counterparts in items relating to micronutrient-rich foods ($p<0.0088$), prevention of malnutrition ($p<0.0219$) and breastfeeding and mother's health ($p<0.0006$) (Table 16). No significant changes in scores from pre to post between groups were observed for knowledge relating to protein-energy and micronutrient malnutrition, food preparation and government nutrition programs.

Significant changes in attitude scores (from pre to post) between groups were not seen.

3.1.3.2 Practice

The change in the proportion of pregnant mothers between the two groups was significantly different in terms of having a fruit/vegetable garden in the home (Table 17). A higher increase in proportion from pre to post was noted in the BPAN than the control group ($p<0.0030$). Attendance to nutrition education sessions was also found to be higher in the BPAN group ($p<0.0537$). Participation in the ASAP and use of iodized salt in the home were also noted to be increased in the BPAN group, however, after adjusting for the effect of confounders the changes observed were not found to be statistically significant.

No significant changes were observed in the other practices such as intake of iron supplements during pregnancy, growth monitoring of young children, children given iron supplements and number of fortified foods with SPS bought.

Table 18 presents the sources of nutrition information for the pregnant respondents. Higher increases in proportion were seen for *Nutri-Guide*, BHW/BNS and teachers/schoolchildren in the BPAN group compared to the control group. Mother's class was the most popular type of nutrition education session attended for both groups (Table 19). The change in proportion among those who reported attending mother's class from pre to post was higher in the BPAN group as compared to the control group.

The ten most popular fortified foods with SPS bought by the pregnant mothers in the two groups is shown in Table 20. The choices were similar in both groups but a higher proportion of BPAN mothers at post reported buying the products compared to the controls.

Table 15. Profile of sample PREGNANT mothers according to selected socio-demographic characteristics, treatment group and survey period

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
	n=67	*n=60*		*n=72*	*n=60*	
Age (y), mean	33.48	33.53	0.9498	34.57	33.07	0.0772
Education, %	*n=68*	*n=60*		*n=71*	*n=60*	
Elementary level	25.4	23.3	0.2449	15.3	30.0	0.2584
Completed elementary	34.3	21.7		31.9	20.0	
High school level	16.4	20.0		27.8	28.3	
Completed high school	0.00	0.0		0.00	1.7	
College level/vocational	22.4	26.7		20.8	16.7	
Completed college	1.5	8.3		4.2	5.0	
Occupation, %	*n=68*	*n=60*		*n=71*	*n=60*	
None	83.6	95.0	0.1057	80.6	81.7	0.8928
Blue collar	9.0	1.7		6.9	5.0	
Self-employed	7.5	3.3		12.5	13.3	
Household size, %	*n=68*	*n=60*		*n=72*	*n=60*	
≤ 6	61.2	73.3	0.1482	62.5	63.3	0.9217
	n=66	*n=60*		*n=72*	*n=60*	
Home ownership, %	91.0	90.0	0.5552	87.5	75.0	0.6535
	n=62	*n=60*		*n=71*	*n=60*	
Land ownership, %	31.3	28.3	0.7126	38.0	30.0	0.3369
	n=62	*n=57*		*n=68*	*n=60*	
Monthly income (P) median	2500	2600		2100	2300	
No. of months pregnant, %	*n=68*	*n=60*		*n=71*	*n=60*	
1 – 3	5.9	6.7	0.9020	9.7	5.0	0.5723
4 – 6	45.6	41.7		36.6	40.0	
7 - 9	48.5	51.7		53.5	55.0	

[a] significantly different between groups ($p<0.05$)

Table 16. Health and nutrition-related knowledge and attitude scores of PREGNANT mothers by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	mean±sd	mean±sd	mean±sd	mean±sd	
KNOWLEDGE	*n=68*	*n=71*	*n=60*	*n=60*	
Micronutrient-rich foods	16.017±4.75	15.92±5.16	17.15±4.95	13.72±4.30	0.0088 [b]
Protein-energy and micronutrient malnutrition	12.87±3.81	11.73±4.14	14.00±3.74	11.88±3.42	0.4672
Prevention of malnutrition	4.03±0.75	4.01±0.87	4.10±0.82	3.52±1.21	0.0219 [b]
Food preparation	3.23±1.01	2.90±1.07	3.42±0.85	2.82±1.14	0.3588
Breastfeeding and mother's health	5.46±1.40	5.86±1.17	5.92±1.45	5.20±1.31	0.0006 [b]
Government nutrition programs	1.82±1.23	1.58±1.16	1.68±1.14	1.43±1.11	0.9706
ATTITUDE	*n=68*	*n=71*	*n=60*	*n=60*	
Food preparation	3.09±0.79	2.94±0.98	2.75±0.93	2.95±0.60	0.1156
Sangkap Pinoy Seal	2.94±0.79	2.70±0.85	2.85±1.25	2.86±0.82	0.2509
Breastfeeding	3.38±0.73	3.21±0.61	3.18±0.54	3.17±0.56	0.3972
What the child should eat	2.96±0.68	2.92±0.69	2.90±0.54	2.93±0.67	0.6920

[a] p-values reported above were based on the results of linear regression analysis after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 17. Health and nutrition-related practices of PREGNANT mothers by treatment group and survey period

PRACTICE	BPAN				CONTROL				p-value [a]
	PRE		POST		PRE		POST		
	N	%	N	%	N	%	N	%	
Takes iron supplements	68	48.5	71	57.7	60	46.7	60	58.3	0.8402
Monitors growth of preschoolers	52	84.6	54	89.0	47	80.9	46	76.1	0.5636
Participates in ASAP	52	51.9	54	64.8	47	55.3	46	58.7	0.5540
Children given vitamin A supplements	52	90.4	54	92.6	47	83.0	46	84.8	0.2041
Children given iron supplements	52	55.8	54	24.1	47	42.6	46	26.1	0.3523
Has fruit/vegetable garden in the home	68	58.8	71	63.4	60	55.0	60	26.7	0.0030 [b]
Uses iodized salt in the home	68	48.5	71	70.4	60	38.3	60	41.7	0.1347
Attends nutrition education sessions	68	42.6	71	63.4	60	25.0	60	21.7	0.0537 [b]
		(mean±sd)		(mean±sd)		(mean±sd)		(mean±sd)	
No. of fortified foods with (SPS) bought	68	1.97±2.06	71	2.65±3.35	60	1.73±1.95	60	1.73±2.26	0.2821

[a] p-values reported above were based on the results of logistics and linear regression analyses after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 18. Source of nutrition information for PREGNANT mothers by treatment group and survey period

SOURCE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=68)		(n=71)		(n=60)		(n=60)	
	n	%	n	%	n	%	n	%
Radio/TV/print media, food labels labels	42	61.8	37	52.1	36	60.0	29	48.3
Nutriguide	0	0.0	23	32.4	0	0.0	0	0.0
BHW/BNS	36	52.9	56	78.9	31	51.7	30	50.0
RHM/ PHN/ MHO	46	67.6	46	64.8	47	78.3	47	78.3
Private Doctors	5	7.4	2	2.8	3	5.0	0	0.0
Teachers/ Schoolchildren	4	5.9	11	15.5	2	3.3	1	1.7
Religious leaders, neighbors, hilot, etc.	8	11.8	7	9.9	5	8.3	6	10.0

[a] multiple response

Table 19. Type of nutrition education session attended by PREGNANT mothers by treatment group and survey period

TYPE [a]	BPAN				CONTROL			
	PRE		POST		PRE		POST	
	(n=29)		(n=45)		(n=15)		(n=13)	
	No.	%	No.	%	No.	%	No.	%
Mothers' class	20	69.0	37	82.2	11	73.3	9	69.2
Counselling	1	3.4	2	4.4	2	13.3	0	0.0
Mass activities	0	0.0	6	13.3	1	6.7	4	30.8
Seminars	6	20.7	0	0.0	0	0.0	0	0.0
Don't know	2	6.9	0	0.0	1	6.7	0	0.0

[a] multiple response

Table 20. Frequency and percent distribution of PREGNANT mothers by brand of food product with the *Sangkap Pinoy Seal* (SPS) bought, treatment group and survey period

RANK	BPAN						CONTROL					
	FOOD PRODUCTS WITH SPS [a]	PRE (n=68)		FOOD PRODUCTS WITH SPS [a]	POST (n=71)		FOOD PRODUCTS WITH SPS [a]	PRE (n=60)		FOOD PRODUCTS WITH SPS [a]	POST (n=60)	
		n	%		n	%		n	%		n	%
1	Eight O'clock Orange Juice	23	33.8	Lucky Me Noodles	24	33.8	Lucky Me Noodles	17	28.3	Lucky Me Noodles	17	28.3
2	Lucky Me Noodles	20	29.4	Eight O'clock Orange Juice	20	28.2	Eight O'clock Orange Juice	13	21.7	Eight O'clock Orange Juice	10	16.7
				Maggi Rich Mami Noodles	20	28.2				Magic Flakes Cream Sandwich	10	16.7
				Tang Orange Juice	20	28.2						
3	Maggi Rich Mami Noodles	19	27.9	Ovaltine	13	18.3	Maggi Rich Mami Noodles	11	18.3	Maggi Rich Mami Noodles	8	13.3
4	Ovaltine	10	14.7	Magic Flakes Cream Sandwich	11	15.5	Magic Flakes Cream Sandwich	10	16.7	Tang Orange Juice	7	11.7
				Payless Noodles	11	15.5						
5	Tang Orange Juice	9	13.2	Papa Ketchup	10	14.1	Tang Orange Juice	8	13.3	Ovaltine	6	10.0
	Magic Flakes Cream Sandwich	9	13.2	Mr. Chips	10	14.1				Payless Noodles	6	10.0
										555 Sardines	6	10.0
										Star Margarine	6	10.0
										Papa Ketchup	6	10.0
6	Payless Noodles	8	11.8	555 Sardines	9	12.7	Ovaltine	7	11.7	Mr. Chips	3	5.0
	Minola Cooking Oil	8	11.8				Payless Noodles	7	11.7			
							555 Sardines	7	11.7			
7	555 Sardines	5	7.4	Minola Cooking Oil	8	11.3	Star Margarine	5	8.3	Minola Cooking Oil	2	3.3
	Star Margarine	5	7.4				Papa Ketchup	5	8.3	Pipo	2	3.3
	Papa Ketchup	5	7.4							Nico	2	3.3
										Swift Mighty Hotdog	2	3.3
										Eden Filled Cheese	2	3.3
8	Pipo	4	5.9	Pipo	7	9.9	Pipo	4	6.7	Minola Margarine	1	1.7
	Nico	4	5.9				Nico	4	6.7	Chezee Pasteurized Filled Cheese	1	1.7
										Gerber Infant Cereal	1	1.7
9	Mr. Chips	3	4.4	Star Margarine	6	8.5	Minola Cooking Oil	2	3.3			
				Nico	6	8.5	Swift Mighty Hotdog	2	3.3			
10				Swift Migthy Hotdog	5	7.0	Chezee Pasteurized Filled Cheese	1	1.7			

[a] multiple response

3.1.4 Storeowners

A total of 152 storeowners were interviewed at pre and post from the two groups. The groups were comparable in terms of age, education, number of years in the business and monthly income at pre and post survey periods (Table 21). The average ages ranged from 44-48 years. The respondents in both groups had varied educational backgrounds. Most of the storeowners have been operating for 1-6 years and 10 or more years. Median monthly income for both groups ranged from P3500 to P5000.

3.1.4.1 Knowledge, Attitude and Practice

Results of the linear regression analysis indicated that storeowners in the BPAN group obtained better changes in knowledge scores than the control group after one year of program implementation ($p<0.0255$) (Table 22).

Changes in attitude scores for items relating to what kind of products to sell and role in improving health and nutrition in the community seemed to be better in the control group compared to the BPAN group however, this difference was not found to be statistically significant.

In terms of practice, there was a significantly higher change in the proportion of storeowners selling iodized salt in the BPAN than the control group ($p<0.0445$) after one year of intervention. Storeowners in the control group had more food products with SPS available in their stores compared to the BPAN storeowners. This difference however, was not found to be statistically significant.

Table 23 shows the ten most common fortified products with SPS available in the stores. Food items sold in both groups at pre and post tended to be similar. It would be noticed that the items with SPS available in the stores were similar to the items commonly bought by the mothers.

Table 21. Profile of storeowners according to selected socio-demographic characteristics, treatment group and survey period

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
Age (y), mean	*n=38* 45.58	*n=38* 47.90	0.2454	*n=38* 43.60	*n=38* 47.42	0.1048
Education, %	*n=38*	*n=38*	0.6821	*n=38*	*n=38*	0.1602
Elementary level	28.9	28.9		13.2	23.7	
Completed elementary	21.1	13.2		13.2	26.3	
High school level	10.5	18.4		21.1	13.2	
Completed high school	18.4	10.5		21.1	18.4	
College level/vocational	15.8	23.7		13.2	10.5	
Completed college	7.9	5.3		18.4	7.9	
No. of years in business, %			0.8195			0.3902
< 1 year	13.2	10.5		18.4	18.4	
1 – 3 years	36.8	44.7		31.6	18.4	
4 - 6 years	13.2	15.8		13.2	28.9	
7 – 9 years	7.9	2.6		13.2	7.9	
≥ 10 years	28.9	26.3		23.7	26.3	
Monthly income (P) median	*n=38* 3800	*n=37* 5000		*n=37* 4000	*n=37* 3500	

Table 22. Health and nutrition-related knowledge, attitude and practice of STOREOWNERS by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	n=38	*n=38*	*n=38*	*n=38*	
KNOWLEDGE, *mean±sd*	42.58±8.37	44.58±11.62	42.45±11.58	36.90±9.26	0.0255 [b]
ATTITUDE, *mean±sd*					
What to sell	3.07±0.68	2.78±0.94	3.14±0.77	3.16±0.70	0.2136
Role in improving health and nutrition in the community	3.04±0.70	2.71±0.92	3.24±0.76	2.93±0.51	0.9475
PRACTICE					
Selling of iodized salt, %	13.2	31.6	13.2	5.3	0.0445 [b]
Number of fortified foods with SPS available in the store, *mean±sd*	7.26±3.39	6.66±3.68	5.40±3.47	5.63±3.04	0.4471

[a] p-values reported were based on the results of the linear and logistic regression analyses after adjusting for the effect of confounders

[b] change from pre to post significantly different between groups ($p<0.10$)

Table 23. Frequency and percent distribution of STOREOWNERS by brand of food product with *Sangkap Pinoy Seal* (SPS) available in the store, treatment group and survey period

RANK	EXPERIMENTAL						CONTROL					
	FOOD PRODUCTS WITH SPS [a]	PRE (n=38)		FOOD PRODUCTS WITH SPS [a]	POST (n=38)		FOOD PRODUCTS WITH SPS [a]	PRE (n=38)		FOOD PRODUCTS WITH SPS [a]	POST (n=38)	
		n	%		n	%		n	%		n	%
1	Maggi Rich Mami Noodles	36	94.7	Maggi Rich Mami Noodles	34	89.5	Maggi Rich Mami Noodles	30	78.9	555 Sardines	30	78.9
2	Ovaltine	31	81.6	555 Sardines	26	68.4	555 Sardines	27	71.1	Maggi Rich Mami Noodles	29	76.3
3	Eight O'clock Orange Juice	30	78.9	Eight O'clock Orange Juice	25	65.8	Lucky Me Noodles	24	63.2	Eight O'clock Orange Juice Magic Flakes Cream Sandwich	20 20	52.6 52.6
4	Lucky Me Noodles 555 Sardines	27 27	71.1 71.1	Lucky Me Noodles Ovaltine	24 22	63.1 57.9	Eight O'clock Orange Juice	22	57.9	Lucky Me Noodles	19	50.0
5	Tang Orange Juice	21	55.3	Tang Orange Juice Magic Flakes Cream Sandwich	17 17	44.7 44.7	Ovaltine	15	39.5	Ovaltine	17	44.7
6	Star Margarine	19	50.0	Star Margarine Papa Ketchup	14 14	36.8 36.8	Tang Orange Juice Papa Ketchup	14 14	36.8 36.8	Tang Orange Juice	15	39.5
7	Payless Noodles	18	47.4	Payless Noodles	13	34.2	Payless Noodles	13	34.2	Star Margarine	12 12 12	31.6 31.6 31.6
8	Magic Flakes Cream Sandwich	16	42.1	Eden Filled Cheese	11	28.9	Star Margarine Mr. Chips	11 11	28.9 28.9	Minola Cooking Oil	6	15.8
9	Papa Ketchup	13	34.2	Mr. Chips	9	23.7	Magic Flakes Cream Sandwich	10	26.3	Payless Noodles	5	13.2
10	Mr. Chips	11	28.9	Nico Minola Margarine	7 7	18.4 18.4	Pipo Nico	6 6	15.8 15.8	Pipo Nico	4 4	10.5 10.5

[a] multiple response

3.1.5 Schoolchildren and Teachers

A total of 3,313 schoolchildren and 553 teachers were included in this evaluation. A profile of the schoolchildren is presented in Table 24. The groups were not comparable in terms of education of mothers and occupation of mothers at pre and post. These differences, however, were taken into account in the data analysis.

Only age information was available to describe the profile of the schoolteachers in this evaluation. Both groups were comparable in terms of age.

3.1.5.1 Knowledge and Attitude

Table 25 shows the mean KAP scores of the schoolchildren at pre and post. Significantly higher changes in KAP scores were noted among schoolchildren in the BPAN than in the control group ($p<0.0180$).

The change in the knowledge scores of schoolteachers was noted to be better in the BPAN than the control group ($p<0.0004$) (Table 26). However, no differences in attitude change between groups were observed after one year of intervention.

Table 24. Profile of SCHOOLCHILDREN according to selected socio-demographic characteristics, treatment group and survey period

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
	n = 841	*n = 904*		*n = 838*	*n = 730*	
Grade, %						
One	22.4	20.8	0.0997	17.4	16.0	0.7169
Two	14.7	17.7		18.4	19.2	
Three	18.7	14.3		16.0	15.4	
Four	16.6	16.9		16.6	14.7	
Five	15.5	16.5		16.3	17.3	
Six	12.1	13.8		15.3	17.4	
Education of mothers, %	22.7	21.6	0.0363 [a]	21.2	21.2	0.0022 [a]
Elementary level	27.0	24.7		29.4	23.8	
Completed elementary	17.2	20.0		18.1	22.6	
High school level	19.3	15.5		17.8	16.0	
Completed high school	7.6	8.8		8.0	8.5	
College level/vocational	4.0	7.1		4.1	6.6	
Completed college						
Occupation of mothers, %	90.5	80.6	0.0009 [a]	69.1	71.8	0.0562 [a]
None	0.5	1.9		1.4	1.4	
Professional	2.7	4.5		7.0	9.3	
Blue collar	6.3	12.9		22.4	17.5	
Self-employed						
Household size (≤ 6), %	28.4	30.6	0.3094	25.8	33.0	0.0017 [a]
Monthly income (P), median	3000	3000		3000	3000	

[a] significantly different between groups ($p<0.05$)

Table 25. Knowledge, attitude and practice scores of SCHOOLCHILDREN by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	Mean ± sd	Mean ± sd	Mean ± sd	Mean ± sd	
	n = 841	*n = 838*	*n = 904*	*n = 730*	
SCORE	14.46 ± 4.29	15.34 ± 4.42	15.03 ± 4.11	14.90 ± 4.04	0.0180 [b]

[a] p-values reported were based on the results of the linear regression analysis after adjusting for the effect of confounders
[b] change from pre to post significantly different between groups ($p<0.10$)

Table 26. Health and nutrition-related knowledge and attitude scores of TEACHERS by treatment group and survey period

TOPIC	BPAN		CONTROL		p-value [a]
	PRE	POST	PRE	POST	
	Mean ± sd	Mean ± sd	Mean ± sd	Mean ± sd	
	n = 143	*n = 144*	*n = 133*	*n = 133*	
KNOWLEDGE	49.73 ± 7.45	54.20 ± 7.04	49.85 ± 7.16	50.10 ± 6.21	0.0004 [b]
ATTITUDE					
Beliefs	1.56 ± 0.54	1.52 ± 0.60	1.66 ± 0.61	1.69 ± 0.67	0.4837
Responsibilities	3.55 ± 0.54	3.57 ± 0.63	3.43 ± 0.71	3.60 ± 0.37	0.1469
Nutrition program	2.31 ± 0.44	2.28 ± 0.54	2.26 ± 0.59	2.37 ± 0.40	0.1143

[a] p-values reported were based on the results of the linear regression analysis after adjusting for the effect of confounders
[b] change from pre to post significantly different between groups ($p<0.10$)

3.4 Community Health Workers (BHS/BNS)

Two major limitations affect the comparison of the two groups when it comes to determining the effect of the program on the KAP of the health workers. First, data on the profile of this group of respondents was not available so the possible effect of their personal characteristics and other variables on the results obtained could not be determined. Second, there was a very large difference in sample size in both groups from pre to post for the determination of weighing practices. This was due to the reason that only a few health workers were able to conduct weighing sessions during the post survey.

3.4.1 Knowledge

Figure 2 shows an illustration of the test administered to the health workers to measure their knowledge on growth monitoring. Table 27 shows the percent distribution of health workers' responses according to test item, treatment group and survey period.

Figure 2. Knowledge test administered to the BHW/BNS

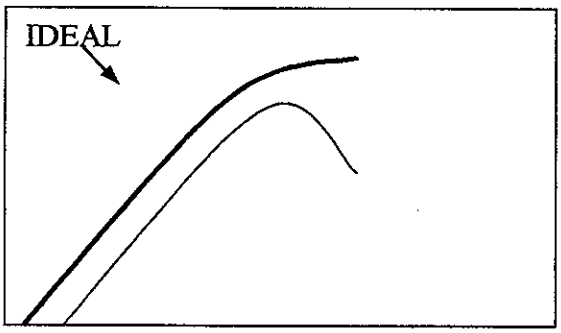
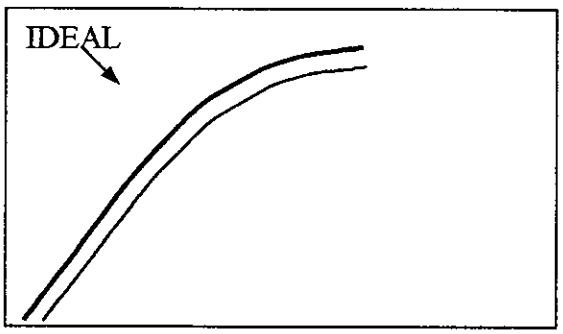
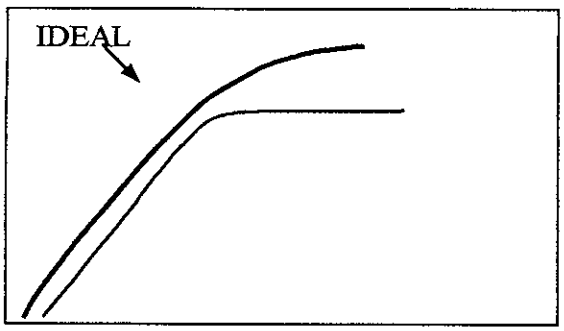
CHART PATTERN	INTERPRETATIONS	
Figure 1 	**A** The child is growing properly.	**I** Needs urgent nutritional support.
Figure 2 	**B** The child is not gaining weight.	**II** Nutritional support not needed.
Figure 3 	**C** The child is losing weight.	**III** Needs minimal nutritional support.

Table 27. Percent distribution of health workers according to correct responses on the knowledge test, by treatment group and survey period

ITEM	BPAN		CONTROL	
	PRE (n=104)	POST (n=103)	PRE (n=117)	POST (n=82)
Figure 1				
Correct interpretation	81.7	85.4	80.3	76.8
Correct management	78.8	84.5	74.4	76.8
Correct interpretation and management	71.1	79.6	64.10	70.7
Figure 2				
Correct interpretation	88.5	87.4	91.4	78.1
Correct management	79.8	84.5	78.6	75.6
Correct interpretation and management	78.9	80.6	76.1	73.2
Figure 3				
Correct interpretation	78.8	83.5	78.6	76.2
Correct management	74.4	85.4	70.9	74.4
Correct interpretation and management	66.3	75.7	58.1	64.6

3.4.2 Practice

It seemed that the BPAN group was better off in practically all weighing practices compared with the control group before program implementation as shown in Table 28. However, a meaningful interpretation of the change in practice for both groups could not be made due to very small sample sizes at post.

Table 28. Weighing practices of health workers by treatment group and survey period

PRACTICE	BPAN		CONTROL	
	PRE (n=67)	POST (n=12)	PRE (n=53)	POST (n=4)
Introduce self properly	61.2	0.0	11.3	0.0
Informed purpose of the visit	52.2	0.0	18.9	0.0
Filled-up info about the child	58.2	83.3	37.7	25.0
Wrote year and month of birth	61.2	75.0	37.7	50.0
Moved scale to zero	97.0	83.3	81.1	100.0
Child wearing no/minimal clothing	52.2	33.3	45.3	25.0
Placed child with care, strap secured	91.0	66.7	81.1	100.0
Balanced the scale properly	95.5	100.0	86.8	100.0
Unstrapped the child with care	77.6	50.0	73.6	75.0
Recorded weight of the child by dot	46.3	91.7	37.7	50.0
Plot weight of the child by dot connection	50.7	83.3	37.7	75.0
Explained results of weighing	49.2	33.3	30.2	75.0
Thanked parents for cooperating	55.2	84.3	41.5	0.0
Advised mothers on the next weighing schedule	52.2	58.3	30.2	25.0

3.5 Community

Table 29 shows a comparison of the characteristics between the BPAN and control areas in terms of implementation of village and school nutrition programs, health and nutrition education sessions, and integration of nutrition-related topics in the school curriculum.

Both groups were comparable at baseline in terms of the characteristics mentioned. However, after one year of intervention, the BPAN areas had more village- and school-initiated nutrition programs implemented ($p<0.0041$ and $p<0.0157$, respectively). Likewise the BPAN areas seemed to have more health and nutrition education sessions conducted although these were of borderline significance ($p<0.0824$ and $p<0.0825$, respectively).

Table 29. Community environment characteristics in the study areas by treatment group and survey period

CHARACTERISTIC	PRE			POST		
	BPAN	CONTROL	p-value	BPAN	CONTROL	p-value
	n = 19	*n = 19*		*n = 19*	*n = 19*	
No. of nutrition-related village programs, %						
None	52.6	63.2	0.8775	21.0	7.37	0.0041 [a]
1	15.8	15.8		15.8	15.8	
2	26.3	15.8		10.5	5.3	
> 2	5.3	5.3		52.6	5.3	
No. of health education sessions conducted for the past 6 months, %						
None	47.4	21.1	0.1471	42.1	68.4	0.0824
1 - 5	15.8	42.1		36.8	5.3	
6 - 10	15.8	26.3		26.3	21.1	
> 10	21.1	10.5		10.5	5.3	
No. of nutrition-related health education sessions conducted for the past 6 months, %						
None	42.1	21.1	0.2276	10.5	47.4	0.0825
1 - 5	31.6	63.2		47.4	21.1	
6 - 10	10.5	10.5		26.3	21.1	
> 10	15.8	5.3		15.8	10.5	
No. of nutrition-related school programs, %						
None	15.8	31.6	0.3786	5.3	42.1	0.0157 [a]
1	31.6	42.1		15.8	26.3	
2	36.8	15.8		36.8	21.1	
> 2	15.8	10.5		42.1	10.5	
Nutrition-related topics integrated in school curriculum, %	79.0	73.4	0.7065	89.5	79.0	0.3799

[a] significantly different between groups ($p<0.05$)

4. DISCUSSION and CONCLUSIONS

Impact evaluation is concerned with the assessment of the immediate effects of the program and usually corresponds with the measurement of program objectives (5). As such, this evaluation is limited to the effect of BIDA as a nutrition education component of BPAN and not the whole BPAN program.

4.1 Effect on Knowledge, Attitude and Practice of Mothers

4.1.1 Knowledge

Project BIDA used several health and nutrition instructional materials, delivered in multiple formats to help achieve its goal. These materials focused basically on micronutrients and fortified food products. Results have shown that it is in this area where a significant increase in the level of knowledge among BPAN mothers was noted (Table 29). The reverse is true, however for the control group (see Tables 4, 10 and 16). Significant knowledge differences were also noted among lactating mothers in the area of protein-energy and micronutrient malnutrition; among non-pregnant non-lactating mothers in the areas of food preparation and breastfeeding and mother's health; and among pregnant mothers in the areas of prevention of malnutrition and breastfeeding and mother's health. The differences, although not generalized, are all in favor of the BPAN mothers. The BIDA health and nutrition materials also covered all these topics.

Table 30. Effect of Project BIDA on the knowledge of mothers

KNOWLEDGE TOPIC	P-value		
	NPNL	LACTATING	PREGNANT
Micronutrient-rich foods	0.0029	0.0448	0.0088
Protein-energy and micronutrient malnutrition	NS	0.0617	NS
Prevention of malnutrition	NS	NS	0.0219
Food preparation	0.0243	NS	NS
Breastfeeding and mother's health	0.0014	NS	0.0006
Government nutrition programs	NS	NS	NS

4.1.2 Attitude

Attitudes reflect our likes and dislikes. Significant differences in attitude were noted only among NPNL mothers and specifically in the area of what their children should eat as shown in Table 30. It is very early at this point to say, that the BIDA intervention did not result to any significant change in attitude. While theoretically the impact of a health program should be an immediate improvement in the health factor of interest and sustained over time, in real settings, health promotion rarely has instantaneous and everlasting effects (6). Lawrence Green categorized these effects into five and what we are experiencing may be attributed to what he calls as

"sleeper effect". This means we are probably measuring effect that will only be apparent after sometime, and this evaluation may not be that time.

Table 31. Effect of Project BIDA on the attitude of mothers

ATTITUDE TOPIC	P-value		
	NPNL	LACTATING	PREGNANT
Food preparation	NS	NS	NS
Sangkap Pinoy Seal	NS	NS	NS
Breastfeeding	NS	NS	NS
What child should eat	0.0161	NS	NS

4.1.3 Practice

The significant difference in the results obtained from lactating mothers is observed up to the level of practice. While practices are supposed to have been influenced by the level of knowledge and attitudes, the reverse may also be true. In Table 31, NPNL mothers attended more ASAP activities and nutrition education sessions. These two activities were actually directed to knowledge acquisition and it is in these areas were significant differences were observed. Some practices may be directly related to changes in knowledge and attitudes and are obvious in our evaluation like having fruit/vegetable gardens and giving of micronutrient supplements.

Table 32. Effect of Project BIDA on the practice of mothers

PRACTICE	P-value		
	NPNL	LACTATING	PREGNANT
Monitors growth of preschoolers	NS	NS	NS
Participates in ASAP	0.0081	NS	NS
Children given vitamin A supplements	NS	NS	NS
Children given iron supplements	NS	0.0445	NS
Has fruit/vegetable garden in the home	0.0001	NS	0.0030
Uses iodized salt in the home	NS	NS	NS
Attends nutrition education sessions	0.0120	0.0010	0.0537
No. of fortified foods with SPS bought	NS	NS	NS

4.2 Effect on Knowledge, Attitudes and Practices of Storeowners, Students and Teachers

Respondents from the BPAN areas were able to get higher knowledge scores than their counterparts in the control areas. The high knowledge scores did not, however, translate to change in attitudes and practices.

4.3 Effect on Knowledge of Health Workers

Conclusive findings could not be derived from the data obtained in this evaluation due to certain limitations. However, the trend of the results seemed to reflect higher knowledge for health workers in the BPAN group.

4.4 Interrelationship of Knowledge, Attitudes and Practices

Practices or behaviors change all the time and are influenced by several factors. It is not exactly correct to say that an increase in knowledge will result to an immediate change in practice or attitude (like or dislike). Practices and behavior may not even change at all. In this evaluation, significant differences in knowledge level change have been noted with most of the changes observed among BPAN mothers, storeowners, students and teachers.

Results in attitude and practices however, were not significant (except in limited areas). There are four factors which are known to affect how we behave: a) our thoughts and feelings; b) people who are important to us; c) resources; and d) culture (7). BIDA increases the level of awareness of community members on micronutrients and other nutrition-related issues and promotes the use of micronutrients and change in food eating habits. The first objective is not difficult to achieve but the second one is. This we have observed in our results. Although it may still be possible, as mentioned earlier that this may not be the appropriate time to measure attitudes and practices because of the "sleeper effect".

5. IMPLICATIONS AND RECOMMENDATIONS

- On the basis of the results of the study, implementation of the intervention is encouraged due to its potential to effectively communicate practical nutrition knowledge and practice with the target mothers and their families, schoolchildren, teachers and storeowners.
- There is a need, however, for program implementers to review their program targets. It is possible that some targets set are not achievable within a given timeframe. The program implementers may have to decide as to when a certain variable is expected to change and time the impact or outcome evaluation during that period.
- It may be prudent to just evaluate the effect of BIDA and not the whole BPAN.
- To effect change in behavior or practices, a program should be able to address all the other factors that influence behavior. The program was able to achieve significant improvement in the knowledge level of target groups in the intervention areas. Visible change noted in practice however, is minimal. Sleeper effect was discussed earlier to account for this observation. It is also possible that other factors might be involved but these are not being recognized and therefore not being addressed. A fault tree analysis may be useful in identifying factors that may have influenced the maintenance of status quo.

- In future evaluation efforts, qualitative evaluation methods should be included to understand better why the effects (both intended and not intended) occurred.
- It is very obvious from this evaluation that increasing the knowledge level is not enough to change attitudes and practices. Further, attitudes and practices do not change overnight. Strong and sustained components on community organization and capability building in the delivery of nutrition messages are a must.
- The program has achieved a lot in providing the very basic ingredients needed for people to change toward healthier lives. Additional inputs will have to be provided and sustained so that all the effort, time and money, will not be put to waste.

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