"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon" an inter-professional community nutrition program – a health outcome evaluation*

Jose Ronilo G. Juangco, MD, MPH[1]; Ramon Jason M. Javier, MD, MSTM[1]; Januario E. Sia-Cunco, MD, MHSE[1]; Clarita C. Penalba, RN, MAN, PhD[2]; John Lemuel A. Balatucan, PTRP[3]; Ingrid M. Paneda, MD[1] and Guillano C. Lacsamana, RMT, MOH[4]

Abstract

Introduction This study measured the impact and outcome of an inter-professional community nutrition program labeled as *"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon."* The program was a multi-disciplinary approach towards the attainment of proper nutrition for identified malnourished preschool age children in Barangay San Isidro, Rodriguez, Rizal.

Methods This was a mixed quantitative-qualitative program evaluation. The quantitative part consisted of a longitudinal observational study design, which reviewed the data of the children who received the nutritional intervention. The qualitative study was done with a phenomenological approach, using a thematic analysis for the process and impact evaluation by means of a focus group discussion and key informant interview processes.

Results There was a statistically significant increase in weight (2.32 kg) and height (3.04 cm) in terms of Z-scores. A total of 29 out of 30 malnourished children graduated with 1 to 3 degrees of improvement in their Z-scores. The program impact showed 1) overall improvement of the state of health of the children; 2) inculcation of family values, which emphasized the giving of more quality time of parents to their children, and teaching them to socialize and be courteous; and 3) better orientation of the children towards more nutritious food choices. The process evaluation focused on the positive disposition of the inter-professional collaboration and brought out transference of this attitude to the children and parents.

Conclusion *"NUTRI-CHIKA: Usapan Tungkol at Para sa Nutrisyon"* achieved its program objectives and impacted on the family and community, improving the overall state of health of the children and providing positive disposition and family values to the participants.

Keywords: program evaluation, nutrition, inter-professional health education

Correspondence:
Jose Ronilo G. Juangco, MD, MPH, Department of Preventive and Community Medicine, College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., 64 Aurora Boulevard, Barangay Doña Imelda, Quezon City, PH 1113;
e-mail: ronniejuangco@gmail.com

* Presented in the 21st Annual Research Forum, April 30, 2019, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City

[1] College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH
[2] College of Nursing, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH
[3] College of Allied Rehabilitation Sciences, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH
[4] College of Allied Health Professions, University of the East Ramon Magsaysay Memorial Medical Center Inc., Quezon City, PH

The global burden of malnutrition remains as a debilitating problem in the health status of children worldwide so that the goal to end hunger, achieve food security and improve nutrition is highlighted in the Sustainable Development Goals (SDG) of the United Nations as an aftermath of the failure to achieve the Millennium Development Goals across nations. The 8th and latest National Nutrition Survey conducted by the Food and Nutrition Research Institute (FNRI) shows that for children 5 to 10 years old, 29.1% are underweight, 29.9% are stunted, 8.6 % are wasted, and 9.1% are overweight.[1] Though there is a slight reduction in underweight among the 0-10 years old, the prevalence also remains to be medium to high and a public health concern.[1]

In line with the corporate and social responsibility (CSR) of the University of the East Ramon Magsaysay Memorial Medical Center, Inc., the Community Extension and Social Action Unit (UERMMMCI-CESAU) initiated an inter-professional community nutrition program to answer the nutritional deficiencies in a pediatric population in the adopted community in Southville 8B Homes, Phase IV, Barangay San Isidro, Rodriguez, Rizal.

The purpose of this study was to measure the impact and outcome of an inter-professional community nutrition program called as *"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon."* The health outcome evaluation consisted of a process, outcome and impact evaluation.

Program Description

The pilot project of *"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon"* was initiated by the UERMMMCI College of Medicine (COM) – Multi-Disciplinary Urban Community Health Services Extension Program (MUCHSEP) in 2009 under the leadership of the Department of Preventive and Community Medicine (DPCM).[2]

The processes followed in the *NUTRI-CHIKA* program were based on the principles in community-oriented primary care (COPC) by Kark.[3] Program development started with the examination of data gathered through community diagnosis. The prioritization process that followed confirmed that malnutrition was a "felt need" of the community stakeholders and ought to be addressed. Subsequent stages included planning the program's blueprint. Its implementation focused on the collaborative process of empowering mothers of the malnourished children. Subsequently, a review of the program was planned and conducted. Its heart was focused on capacity-building of mothers and primary caregivers of identified malnourished children through improvement of their basic nutrition knowledge and practices, by entrusting to them the responsibility of planning, preparing meals, and feeding their malnourished children. All these transpired in a setting of an underserved and resource-limited community.

The program was a quadripartite cooperation among UERMMMCI, the Southville 8B Phase IV Home Owners Association (HOA), Rotary International (Metro West Triangle), and the Sangguniang Bayan ng Rodriguez Rizal (i.e., local government unit / LGU). The HOA provided the social and community mobilization especially during the preliminary phase of the program. The Rotary International managed the finances of the program. The LGU allocated nutritional bars given to the malnourished children to supplement the daily meals. UERMMMCI was at the helm of the technical and manpower support for the actual implementation of the program.

For the multi-disciplinary and inter-professional component of the program, the following were accomplished. The UERM Memorial Hospital (UERMMH) Community Medicine post-graduate interns (PGI) and the faculty of the COM identified and enrolled malnourished children in the *NUTRI-CHIKA* program. The Dietary Section of UERMMH prepared a daily caloric build-up lunch meal plan for the children, given daily from Monday to Thursday. Volunteer community health workers (CHW) and mothers of the malnourished children were given novel and inter-active learning modules by the College of Nursing (CON) faculty and students on proper food handling and preparation, food equivalents-exchanges and awareness of prevalent food myths. The CHWs and the mothers were responsible for doing the market purchases, actual food preparation within the health facility, as well as feeding of the rationed food meals to the children. While the CHWs and mothers prepared the food, the children were also introduced to different learning-play sessions, conducted by the Community Medicine PGIs, which stimulated cognitive development. Congruent to this, regular physical activities by the College of Allied

Rehabilitation Sciences (CAReS) also helped enhance their physical development.

In the second quarter of 2017, an anthropometric survey was conducted throughout the whole community of Southville 8B Phase IV. This served as a screening process to identify the underweight children in the area. It was then followed by a more accurate means of assessing the children's anthropometric measurements, classifying them into the various categories of malnutrition. A community caucus was held, with the program organizers meeting the mothers of the identified malnourished children. Preliminary briefing and planning sessions were conducted, and the proposed program expectations, mechanics, and desired outcomes were discussed among all stakeholders. After interactive dialogues on their corresponding responsibilities, consent to participate was elicited. Thereafter, 40 children and their mothers were initially enrolled to the program. The mothers were organized, and their leaders were elected; nutrition teams were formed and given specific tasks. Among their responsibilities were the following: 1) participation in the nutrition education sessions; 2) preparation of the budget and meals; 3) doing the kitchen chores; and 4) feeding the children. The nutrition teams likewise managed the finances provided by Rotary International, purchased the ingredients and raw materials for the meals, and prepared the various viands based on the Dietary Section caloric build up meal plan. Concomitantly, six nutrition education sessions were conducted aimed at improving knowledge of the mothers and primary caregivers related to proper nutrition. The actual preparation of meals and feeding sessions served as the venue for the application of proper nutrition practices. In addition, regular meetings with the mothers and primary caregivers threshed out problems encountered in the implementation of the *NUTRI-CHIKA* program, and these opportunities allowed the detection of changes in their nutrition related practices.

The malnourished children were given supplementary lunch meals four times a week for a total duration of six months. One supplementary nutrition bar with each lunch meal was also served. Weight and height were measured at the start and every four weeks during the feeding months. The proportion of the food consumed by each child, illnesses present and absenteeism were noted every session.

Methods

Study Design

A mixed quantitative-qualitative health outcome evaluation was used. The quantitative part consisted of a longitudinal observational study design, which reviewed the data of the children who received the nutritional intervention. The qualitative study was done with a phenomenological approach, using a thematic analysis for the process and impact evaluation by means of a focus group discussion and key informant interviews.

Data Sources

For the outcome evaluation, the actual data collected during the implementation of the program were reviewed and analyzed. For the process and impact evaluation, focus group discussions (FGD) and key informant interviews (KII) were conducted.

Population and Setting

To determine the impact of the NUTRI-CHIKA program, the target population included the CHWs, parents and primary caregivers of those who participated in the nutrition program and the leaders in the community. For the outcome evaluation, a review of the records of the children who were given the nutrition program was undertaken.

Data Collection

The data of the malnourished children enrolled to the nutrition program were reviewed and analyzed. Since the data were already taken by the researchers during the implementation of the program and consent was already taken by CESAU prior to their inclusion of the program, there was no breach of data privacy of the children's data. The FGDs and KIIs were done for the process and impact evaluation. This was done after the participants signed an informed consent detailing the research process.

Data Analysis

Quantitative

Summary statistics for continuous variables included total frequency, mean and standard

deviation. Summary statistics for discrete variables were presented in terms of absolute and relative frequencies. Monthly change in weight and height were assessed using repeated measures analysis of variance (ANOVA). Frequency table was used to determine the proportion of children who had a one-degree change in nutritional status. McNemar's change test was used to determine improvement rate in nutritional status. Statistical analysis of all data was performed using Graph Pad Version 5.

Qualitative

Thematic analysis was done to process the data collected from the focus group discussion and key informant interview. Memoing was conducted while collecting the data. Once data had been saturated, coding was done to identify key words, concepts, images and reflections. From the coding, the researcher identified themes and sub-themes or patterns that emerged from the coded data. After this, the researchers finalized the name of each theme, wrote its description and illustrated it with a few quotations from the original text to help communicate its meaning to the reader.

Sample Size

Data collection proceeded until data saturation was observed.

Results

Outcome Evaluation

Initially, 49 children were included in the *"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon"* Feeding Program of the UERMMMCI-CESAU (Table 1). There were 25 girls and 24 boys. The average age at the start of the feeding program was 62 months. The average weight was 12.09 kg. Three children defaulted during the first month and another three children subsequently transferred residence.

Except for the first month, there was a significant improvement ($p < 0.001$) in weight every month for the participants (Table 2). There was an average of 2.32 kg statistically significant ($p < 0.001$) increase in weight from the initial baseline weight to the weight of the children at the fifth month of feeding, which clearly showed that the NUTRI-CHIKA program was successful in improving the weight of the children (Figure 1). Table 3 showed that there was a significant increase ($p < 0.001$) in the height of the children on each monthly measurement. There was a statistically significant increase in height ($p < 0.001$) from the baseline to the fifth month of feeding averaging 3.05 cm, which clearly showed that the feeding was effective in increasing the height of the children (Figure 2).

Table 1. Baseline demographic characteristics of the participants.

Demographic characteristics	N (%)
Sex	
Male	24 (49)
Female	25 (51)
Average age (mo)	62 ± 36
Degree of malnutrition	
Severe malnutrition	18 (37)
Moderate	14 (29)
Mild	12 (25)
Normal	4 (8)
Obese	1 (2)
Average weight (kg)	12.09 ± 4.02
Average height (cm)	95.60 ± 12.04

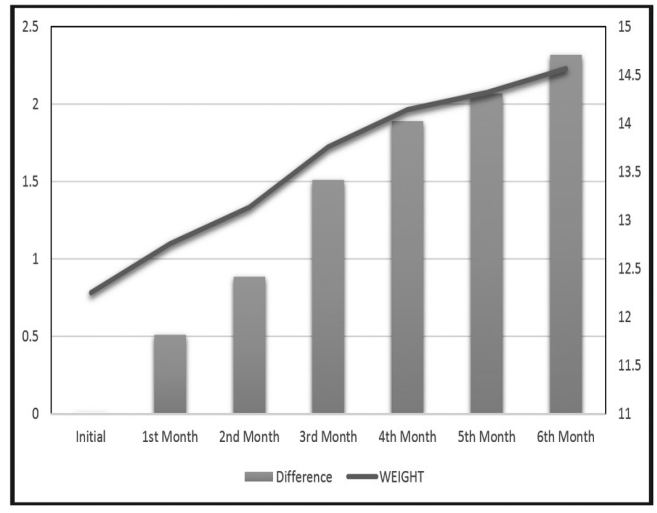

Figure 1. Weight improvement per month with the average weight per month.

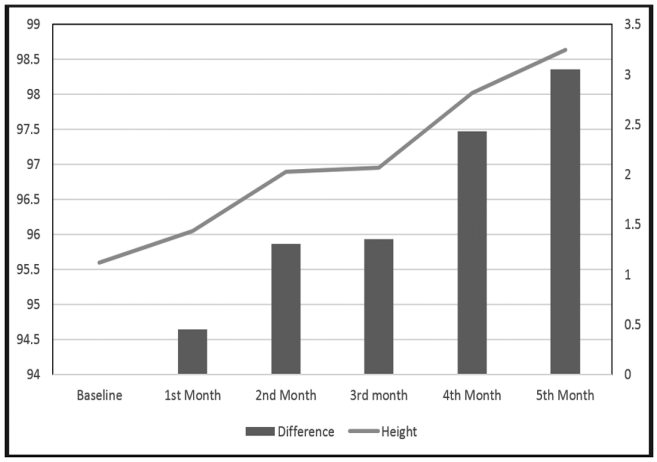

Figure 2. Improvement in height per month with the average height per month.

In terms of Z-scores, 32 children graduated with an increase in the Z-score ranging from one to three degrees improvement (Table 4). For those who had no change in the Z-score, four started as normal and ended up as normal. Only one participant's nutritional status deteriorated, where the Z-score worsened from mild to severe malnutrition. Overall, 76.19% of the participants showed significant improvement in the degree of malnutrition from the baseline, which was the prime objective of the feeding program.

Table 4. Change in the nutritional status of children from the baseline.

Change in Z-score value	Frequency (%)
No change	9 (21.43)
1-degree improvement	17 (40.48)
2-degree improvement	12 (28.57)
3-degree improvement	3 (7.14)
Worsened	1 (2.38)

There was a statistically significant odds ($p < 0.001$) that those who participated in the feeding program were 32 times more likely to have an improvement in their nutritional status (Table 5).

Process Evaluation

Regarding the participants' perceived best practices of the *NUTRI-CHIKA* program, most reported the good disposition the healthcare team (e.g., doctor, nurses, faculty, students, etc.) exhibited while implementing the program. Specifically, the participants noted their behavior to be: 1) attentive; 2) persevering, especially in teaching children about proper nutrition, and 3) kind.

Difficulties in the implementation of the program were encountered which focused mostly on the practices, daily habits and attitudes of the program participants and their families. Most of the participants

Table 2. Monthly change in weight of children using repeated measures analysis of variance.

SMonths	Average weight (kg)	Increase in weight (kg)	P-value
Baseline	12.25		
1st month	12.76	0.51	0.176
2nd month	13.14	0.88	< 0.001
3rd month	13.76	1.51	< 0.001
4th month	14.14	1.89	< 0.001
5th month	14.32	2.07	< 0.001
6th month	14.57	2.32	< 0.001

Table 3. Monthly change in height of children using repeated measures analysis of variance.

Months	Average height (cm)	Increase in height (cm) (95% CI)	P-value
Baseline	95.59		
1st month	96.05	0.45 (-8.71, 9.61)	0.021
2nd month	96.90	1.31 (-7.85, 10.47)	< 0.001
3rd month	96.95	1.36 (-7.80, 10.52)	< 0.001
4th month	98.02	2.43 (-6.73, 11.59)	< 0.001
5th month	98.64	3.05 (-6.11, 12.21)	< 0.001

Table 5. Improvement rate of the participant in terms of nutritional status.

	Improved	Unimproved	Odds ratio (95% CI)	P-value
Normal Z-scores at baseline	4	1	32.00 (5.34, 1302.93)	< 0.001
Abnormal Z-scores at baseline	32	5		

* McNemar's change test

noted that their tasks at home were the main hindrance as to why they were not able to participate in the *NUTRI-CHIKA* program arrangements, particularly on how cleanup was to be done after the feeding program. No problems were encountered on the part of the healthcare professionals. Side questions, which included the appropriateness and adequacy of the materials and equipment, were also asked in line with this question. To these questions, the participants mentioned that such materials and equipment were adequate and appropriate, though some kitchen materials went missing after the feeding program was implemented. The missing bowls were noted during the inventory of kitchen materials, which was done before and after the feeding program was implemented.

Impact Evaluation

The participants also reported that, due to the positive behaviors of the nurses and doctors, the children enrolled in the *NUTRI-CHIKA* program did not only become healthier in terms of their anthropometric measurements, but in their general disposition as well. The main lessons that were inculcated to the participants after the implementation of the program included genuine concern for the children's knowledge, attitudes, and practices on health and nutrition, as well as on good manners and right conduct. Specific responses elicited from the mothers and primary caregivers included:

1. There was better orientation of the children towards more nutritious food choices.
2. Mothers and primary caregivers realized the importance of properly preparing the right amount or serving of nutritious food for their children.

There was emphasis on family values, which focused on parents giving more quality time for their children and teaching them to socialize and be courteous.

As to the impact of the program to their daily lives, the participants stated that aside from the improvement in the health of their children, in terms of their weight and height, they also noted that the children did not get sick as often. The mothers also alleged that they now knew how to make better food choices for their children. They also added that it was much easier for their children to socialize and that the children exhibited well-mannered decorum and behavior. These values and lessons were also what the participants perceived to be the main impact of the *NUTRI-CHIKA* program to their community.

Overall, the participants highly lauded the NUTRI-CHIKA program and recommended the further implementation of this program, since it provided a holistic impact to children in the improvement of their physical and social well-being. A recommendation was raised to possibly include children with disabilities in the program by making the necessary amendments to the current *NUTRI-CHIKA* program plan to incorporate this group of vulnerable children.

Discussion

Numerous programs have been formulated by the government to address the nutritional situation of the country, foremost of which is the Philippine Plan of Action for Nutrition (PPAN) 2017-2022.[4] The PPAN consists of 12 programs and 46 projects, serving as a framework for actions that can be undertaken by member agencies of the National Nutrition Council (NNC), other national government agencies, local government units, non-

government organizations, academic institutions, and development partners.

Other pertinent nutrition programs being implemented by government and non-government organizations in the Philippines include the Lalakas ang Katawang Sapat sa Sustansiya (LAKASS program), Gulayan sa Paaralan, and Responsive Action for Integrated Nutrition (RAIN).[5,6] These programs have shown varying results as to their outcome and impact in the community, although one particular program evaluation showed a negative outcome.[7]

"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon" is a unique program in as much as it involves a quadripartite collaboration among an academic institution, the local government unit, the homeowners' association (HOA), a non-government organization, and the community itself. It also boasts of an inter-professional component, consisting of at least four different academic units and professions, cooperating toward the successful implementation of the program.

The program focused not only on feeding the children, but more importantly on behavior modification on the part of the mothers and primary caregivers to be able to catalyze change in their attitude and practice towards the nutrition of their children through an innovative and immersive health education program. The health component focused not only on the nutritional needs of the children, but also on their cognitive and physical development through regular interactive play learning sessions and physical exercise, respectively.

Outcome Evaluation

Numerous programs and studies have clearly shown that feeding projects, with or without the other facets of the *NUTRI-CHIKA* program, often resulted in improvement in the nutritional status of children.[8-10] This study demonstrated a statistically significant increase in weight and height of the participants. In terms of Z-scores, 32 out of 49 children graduated with at least 1 to 3 degrees improvement in their Z-scores. The significant change in weight surpassed most of the other program reports after six months of intervention and implementation. Pooled intervention, observed in selected third world countries in terms of complementary feeding and education programs, showed a mean difference in weight of only 0.25 kg.[11] The previous *NUTRI-CHIKA* program done in Quezon City in 2009 showed an absolute mean change in weight of 1.85 kg, compared to the observed mean change of 2.32 kg of this present *NUTRI-CHIKA* program. This could be attributed to the addition of the holistic multi-disciplinary and inter-professional approach of the intensified program, which also inculcated cognitive and physical development, as compared to the original 2009 *NUTRI-CHIKA* program, which was primarily an endeavor exclusively of the COM. The change in height also surpassed that of the aforementioned pooled intervention study, which showed only a 0.54 cm mean increase in height but was inferior to the original 2009 *NUTRI-CHIKA* program, which recorded a 4.0 cm mean increase in height of its participants.

The 2009 *NUTRI-CHIKA* program evaluation focused on the additional effect of nutrition education on the improvement of the height and weight of the children, as shown by the improvement in the post-test scores (i.e., via written and objective structured skills exams) of mothers when it comes to nutrition. However, in this particular program, there were no pre-test and post-test exams given to the mothers and primary caregivers to assess the gain in level of knowledge. However, the FGDs and KIIs showed that there was a change in the attitude not only of the mothers, but the children as well when it came to healthy food choices. Mothers were able to prepare healthy food choices with vegetables, and the children eventually learned to consume these healthy food choices, with minimal resistance. This could be attributed not only to the nutrition education given to the mothers and primary caregivers, but to the nutrition education given to the children as well, which was an added feature of the new *NUTRI-CHIKA* program.

The *NUTRI-CHIKA* program reported that 76.19% of the participants exhibited a significant decrease in the degree of malnutrition from the baseline. This was above the 70% improvement target objective of the School-Based Feeding Program (SBFP) of the Department of Education, which achieved 62% improvement.[12] This was also higher than the results of the LAKASS Program, which demonstrated significant improvements in the nutritional status of malnourished children (i.e., using weight-for-age parameters), by as much as 71.4% and 46.6% in severe and moderately underweight cases.[5]

Process Evaluation

The positive feedback and affirmative evaluation of *NUTRI-CHIKA* may be construed to be a good indicator that the program implementation went according to all the necessary planning arrangements. The achievement of the expected outcomes of the program was a benchmark for its further success. One setback in the *NUTRI-CHIKA* implementation was the general behavior of a few mothers, whose main dilemma was the inability to participate actively due to parental responsibilities to other children who were not part of the CESAU feeding program. Some mothers opined that it was impractical to join the *NUTRI-CHIKA* program, while a few even verbalized that the mere attendance to the series of learning modules was a difficult task to complete and comply with. These sentiments stemmed from the fact that the daily cooking and feeding process of the *NUTRI-CHIKA* program coincided with the actual preparation of lunch meals in the respective homes. Nonetheless, this was countered by other participant mothers and primary caregivers who volunteered to cook, serve and feed all children enrolled in the NUTRI-CHIKA, even for those whose mothers could not join the actual feeding session.

Implementation of the *NUTRI-CHIKA* program proved to be timely and relevant, as global and national reports underscored the problem of malnutrition. Though interventions had been implemented, some health experts expressed concern that such programs were not made in sweeping initiatives. According to the 2018 Global Nutrition Report, worldwide nutrition initiatives were characterized to be too slow and did not spread across all forms of malnutrition.[13] Thus, some completed and on-going public health programs, such as the community-oriented NUTRI-CHIKA project, had been facilitated in support of and aligned with PPAN 2017-2022, which called for the development of nutrition programs throughout the Philippine archipelago.

Impact Evaluation

An interesting and relevant finding demonstrated by the *NUTRI-CHIKA* program was how the malnourished children improved not only in their physical attributes, but also in their emotional and social well-being. Specifically, children enrolled in the *NUTRI-CHIKA* program presented with better disposition, higher regard for proper nutrition, and greater ability to socially engage with other children. A study conducted by Henningham found that undernourished children exhibited differences in terms of their temperament traits: these children tended to be: 1) less sociable, 2) less attentive, 3) more fearful, and 4) more emotionally negative, as compared to well-nourished children.[14] This could be a plausible explanation for the change in behavior of the *NUTRI-CHIKA* children.

Furthermore, a typical Filipino family, although shifting its context in modern civilization, has retained the old values it is known for. A Filipino family is viewed as an institution, the very basic social, unit, that adopts strategies variably in response to structural, cultural and ideological forces in society.[5] In this regard, if an intervention that changes health-seeking attitudes and practices is targeted toward the Filipino family, the family will most likely respond by changing its ideals and norms to adapt and employ the changes birthed by the program. This is evident in the findings that indicate that change has happened not only in the children, but in their families as well, because the parents saw the value of good nutrition in improving the lives of their children.

Conclusion

The *"NUTRI-CHIKA: Usapan Tungkol at para sa Nutrisyon"* program proved to be a success, based on the quantitative and qualitative evaluation done by the investigators. Positive change was evident, and this was not only exhibited in the physical dimension (i.e., weight and height), but also on the social well-being of the children. Family members likewise demonstrated behavioral change, and better perceptions on health and proper childhood nutrition had been elicited. Though there were minor setbacks in the implementation of the *NUTRI-CHIKA* program (i.e., conflict in schedule of the mothers), the program over-all was able to achieve its objectives in the time given. In the event the *NUTRI-CHIKA* program will be implemented in a different resource-limited community in the future, addressing these issues may further enhance the program.

References

1. Food and Nutrition Research Institute 8th National Nutrition Survey [Internet]. 2015. [Accessed 2019 Jan 4]. Available from: www.fnri.dost.gov.ph.

2. NUTRI-CHIKA: Usapan Tungkol at Para sa Nutrisyon - A program review. UERMMMCI Health Sci J 2012; 1(1): 40-8.
3. Kark SL. The practice of community-oriented primary care. New York: Appleton-Century-Crofts, 1981.
4. Philippine Plan of Action for Nutrition 2017-2022 [Internet]. [Accessed 2019 Jan 4]. Available from: http://www.nnc.gov.ph/downloads/technical-papers?download=870:philippine-plan.
5. Philippine Case Study: LAKASS Programme Annex 3(B) [Internet]. [Accessed 2019 Jan 4]. Available from: http://www.fao.org/docrep/006/Y5030E/y5030e16.htm.
6. Molijon AL, de la Rama JM. Baseline assessment of vegetable gardens (gulayan sa paaralan) in public elementary and secondary schools. JPAIR Institut Res [S.I.] [Internet]. 2014 [Accessed 2019 Jan 4]; 4(1): 64-75. Available from: http://philair.ph/publication/index.php/irj/article/view/307. doi: https://doi.org/10.7719/irj.v4i1.307
7. Akin JS, Guikey DK, Popkin BM. The school lunch program and nutrient intake: A switching regression analysis. Am J Agric Econ 1983; 65: 477-85.
8. Hamilton WL, Rossi PH. Effects of food assistance and nutrition programs on nutrition and health / FANRR. Economic Research Service, US Department of Agriculture.
9. Gartner A, Maire B, Kamlea Y, Traissac P, Delpeuch F. Process evaluation of the Senegal community nutrition program, data management and statistics analysis. Trop Med Int Health 2006 Jun; 11(6): 955-66.
10. Appoh LY, Krekling S. Maternal nutritional knowledge and child nutritional status in the Volta Region of Ghana. Matern Child Nutr 2005; 1: 100-10.
11. Imdad A, Yakoob MY, Bhutta ZA. Impact of maternal education about complementary feeding and provision of complementary foods on child growth in developing countries. BMC Public Health [Internet]. 2011; 11(Suppl 3): S25. Available from: http://www.biomedcentral.com/1471-2458/11/S3/S25.
12. Tabunda AL, Albert JR, Angeles-Agdeppa I. Results of an impact evaluation study of DepEd's school-based feeding program [Internet]. [Accessed 2019 Mar 15]. Available from: https://psa.gov.ph/sites/default/files/Session%2018%20Results%20of%20an%20Impact%20Evaluation%20Study%20of%20DepEd%27s%20Schhol-based%20Feeding%20Program.pdf.
13. 2018 Global Nutrition Report: Shining a light to spur action on nutrition (Executive Summary). Development Initiatives Poverty Research Ltd., 2018.
14. Baker-Henningham H, Hamadini JD, Huda SN, Grantham-McGregor S. Undernourished children have different temperaments than better-nourished children in rural Bangladesh [Internet]. 2009 [Accessed 2019 Feb 20]. Available from https://academic.oup.com/jn/article/139/9/1765/4670542.
15. Parrenas RS, cited in Zhou M, Ocampo AC. Contemporary Asian America, 3rd Edition: A multi-disciplinary reader [Internet]. 2006 [Accessed 2019 Feb 20]. Available from: https://books.google.com.ph/