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RESEARCH, EXTENSION AND PRODUCTION

TERMINAL REPORT

A. BASIC INFORMATION

- TITLE : Malnutrition Reduction Initiatives in Panabo City through the Complementary Foods (DOST-PINOY Products)
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- IMPLEMENTING AGENCY:
 - a. Lead Agency: Davao del Norte State College
 - Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI)
 - Department of Science and Technology (DOST) – Region XI
 - Local Government Unit – Panabo City
 - Barangay Local Government Unit – Cagangohan
 - City Nutrition Action Office – Panabo City
 - b. Project Site: Cagangohan, Panabo City
- FUNDING AGENCY: Davao del Norte State College
 - Barangay Local Government Unit – Cagangohan
- DURATION
 - c. Date Started: October 2016
 - d. Date Completion: September 2017
- PROJECT COST: P 40,000.00

B. TECHNICAL REPORT

ABSTRACT

Malnutrition is the most common nutritional disorder in developing countries. To alleviate this condition, DNSC in partnership with DOST-FNRI and DOST XI implemented the project: Production of Cereal-Legume Complementary Food Products for the Reduction of Malnourished Children in Davao Regions, a pilot test for the malnutrition reduction program in Panabo City.

The barangay with the highest incidence of malnourished children was chosen as first recipient. There were 16 children identified, with ages 10-42 months. The feeding program used the DOST PINOY product, Rice-Mongo crunches, which was feed for 120 days and the FNRI protocol and procedures were followed.



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There is an increase in the weight during the first and second months of feeding but there was a significant increase in weight gained starting from the third month onwards. Using the t-test, a p-value of 0.052 was obtained during the third month while a p-value of 0.0227 for the 4th month of implementation. An average weight increase ranges from 0.200-0.475 kg per child. Furthermore, 81.25% of the children are now under normal weight. The DOST PINOY food formulation is effective in increasing the weight of children 6-48 months and is therefore recommended to malnourished children.

I. INTRODUCTION

The World Health Organization identifies malnutrition as the most common nutritional disorder in developing countries and it remains one of the most common causes of morbidity and mortality among children worldwide. The latest UNICEF report (2017) states that almost half of all deaths in children under 5 are attributable to undernutrition. This translates to loss of about 3 million young lives a year. Undernutrition puts children at greater risk of dying from common infections, increases the frequency and severity of such infections, and contributes to delayed recovery. Furthermore, the interaction between undernutrition and infection can create a potentially lethal cycle of worsening illness and deteriorating nutritional status. Poor nutrition in the first 1,000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance.

Malnutrition and diet are by far the biggest risk factors for the global burden of disease: every country is facing a serious public health challenge from malnutrition. The economic consequences represent losses of 11 percent of gross domestic product (GDP) every year in Africa and Asia, whereas preventing malnutrition delivers \$16 in returns on investment for every \$1 spent. The world's countries have agreed on targets for nutrition, but despite some progress in recent years the world is off track to reach those targets (Global Nutrition Report, 2016).

According to Ertharin Cousin, Executive Director of the World Food Programme, the *Global Nutrition Report* confirms the urgency of collective action to combat malnutrition's cascading impact on people, communities, and whole societies. "The simple truth is we cannot secure sustainable development until we address the persistent food and nutrition challenges undermining opportunities for our planet's poorest and most vulnerable people. Moving from theory to action requires giving specific attention to those people left furthest behind, enduring persistent crisis and the effects of climate change." Thus, the UN General Assembly declared on April 1, 2016, the UN Decade of Action on Nutrition for the period 2016–2025. The Decade of Action reaffirms the call to end all forms of malnutrition as anchored in the ICN2 Rome Declaration and in the 2030 Agenda for Sustainable Development.

Even before this latest reports, the United Nations System in the Philippines in 2011, said that the Philippines is one of the countries in the world that account for most of the global burden of malnutrition (as cited by www.savethechildren.org.ph, 2014). The country ranked 9th in terms of countries with the highest burden of stunting (an indicator of malnutrition). The World Bank report in 2006 points to malnutrition in developing countries as one of the biggest obstacles in attaining the Millennium Development Goals (MDGs). The Philippine Millennium Development Goals (MDGs) includes those related to nutrition that targets to halve the 1990 levels of underweight among under-fives and or households with inadequate energy intake. The Philippine Plan of Action for Nutrition (PPAN), 2011-2016 is the country's response to malnutrition. An integral component and as a companion plan of the Philippine Development Plan (PDP), 2011-2016, PPAN provides the framework for improving the nutritional status of Filipinos. The NNC believes that nutrition should and would have influence and would be influenced by other concerns in the PDP -- from pursuit of inclusive growth to macroeconomic policy, industry, agriculture and fisheries, infrastructure, governance, peace and security, and environment and natural resources.

Sadly, based on the Updated 2015 Nutritional Status of Filipino Children by the Food and Nutrition Research Institute (FNRI), during the last ten years (2005-2015), there is an increase in the number of underweight of children under the age of five years old. The same survey also show the same trend for the stunting rate. The increase maybe small but it still alarming. Furthermore, the prevalence of malnutrition among children less than 5 years old, particularly, for underweight and stunting are both high. So, in general, the Philippines failed to achieve its MGD of halving the number of malnourished children in the country by 2015.

In response to this need, the DOST-FNRI had launch the "Malnutrition Reduction Program". In the early part of 2016, DNSC in partnership with DOST-FNRI and DOST XI implemented the project: *Production of Cereal-Legume Complementary Food Products for the Reduction of Malnourished Children In Davao Regions*. This extension project is a pilot test for the malnutrition reduction program in Panabo City, particularly in barangays that have been assessed to have the highest incidence of malnourished children. As of the April 2015 DOST report, there is no Feeding Intervention Model beneficiaries in the Davao Region. In the Philippines, only seven areas had a similar feeding intervention using the DOST PINOY package.

Among the barangays with frequent number of malnourished children in the City, Barangay Cagangohan was chosen as the first recipient because it had the highest incidence of malnourished children; likewise availability of personnel to conduct the project was considered.

OBJECTIVES

The main objective of the project was to reduce the malnutrition among children in Barangay Cagangohan, Panabo City. Specifically it aimed to:

1. Develop continued partnership with LGU's and BLGU's;
2. Increase the capacity of barangay health workers and mothers with malnourished children on the feeding protocols of DOST-FNRI
3. Introduce the complementary food to malnourished children aged 6-48 months who are not yet of school age or are not attending in daycares who have their own feeding programs.

II. METHODOLOGY

The implementation of the extension project started with consultative meeting with key agencies, stakeholders and beneficiaries. This also included the signing of a memorandum of agreement. The Barangay Cagangohan through its Council approved the purchase of Rice-Mongo Crunchies from DNSC for the feeding project.

A pre-weighing of beneficiaries (children) was done to obtain baseline weight. There were actually 16 children beneficiaries identified in Barangay Cagangohan, whose ages ranged from 10-42 months. Among these children, three were 10-month old, while thirteen were from 18-42 months. All these children were fed with rice-mongo crunches, a nutritious deep-fried snack made from a blend of rice flour and mongo flour. It contains 580 Cal and 8g protein per 100g; this provide 31.8% of recommended energy and nutrient intake (RENI) for energy and 14.3% for protein of 1 to 3 year-old children. The Rice-Mongo Crunchies (RMC) in the extension project had several flavors, namely: cheese, barbecue and chocolate flavor.

The RMC is made from a combination of 70 parts rice flour and 30 parts mongo flour. This means, for example, that for every 7 cups of rice flour, 3 cups mongo flour is added. Water is added to make a thick dough, the dough is steamed, flattened into thin sheets, cut into desired size, oven dried and then deep-fried and packed for storage.



Figure 1. Rice-Mongo Crunchies main ingredients and its final product.

The initial part of the implementation was the conduct of a capacity building training to Barangay Nutrition Health (BNH) workers, especially on how to use the forms for monitoring and for the mothers of malnourished children to further educate them in the feeding process as shown in Figure 2. The feeding started on Nov. 7, 2016 and ended on March 7, 2017.



Figure 2. Capacity building training prior to the feeding program

Following the DOST-FNRI protocol, the feeding program was a continuous feeding for 120 days or four months of the RMCs, one pack per day. This one pack can be consumed one time or divided into small servings as snacks for the child, provided it should be consumed within that day. The estimated price per pack was P8.00 based on production cost.

This also included the use of a standardized form of monitoring the weight per child every month and weekly assessment of problems encountered during the feeding period. A general monthly feedback assessment was also undertaken through meetings and using of feedback monitoring forms.

The data obtained was statistically analyzed using t-test to determine significant difference between initial weights and weights per month. It was then tabulated showing the nutritional status of the children after the feeding program.

III. RESULTS and DISCUSSION

There was an increase in weight during the first and second months of feeding but there was a significant increase in weight starting from the third month onwards as shown in Figures 3 and 4.

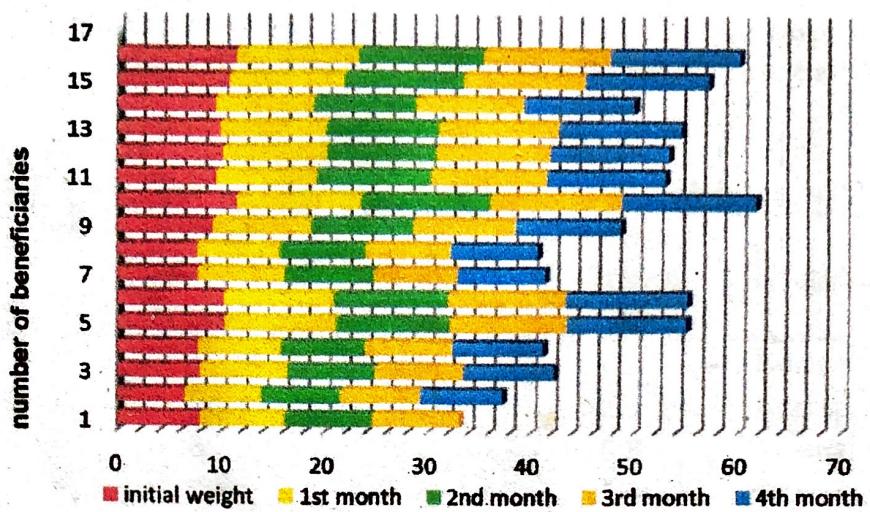


Figure 3. Changes in weight gained per month per child

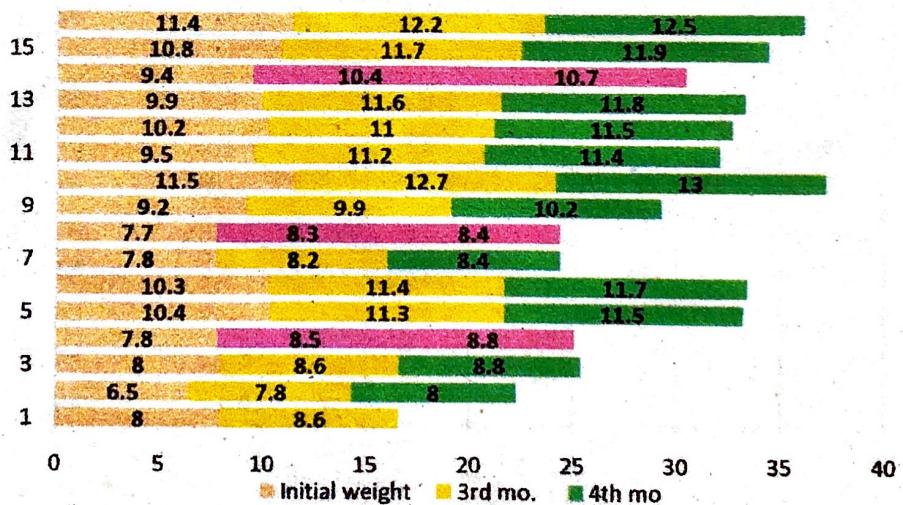


Figure 4. Changes in weight highlighting the 3rd and 4th month of feeding

Using the t-test, a p-value of 0.052 ($\alpha=0.05$) was obtained during the third month while a p-value of 0.0227 ($\alpha=0.05$) for the fourth month of implementation. The normal growth rate is in the range of 0.15-0.20 kg weight gained per month per child according to the WHO Child Growth standards. The result of this study has shown that an average increase of 0.20-0.475 kg was observed per child per month. At the end of the 4th month of feeding, a range of 0.6-1.9 kg was gained per child.

Out of the 16 children, 13 were now considered as having a normal weight, an 81.25% success rate as shown in Table 1. Furthermore, the remaining three (pink colored brick in Figure 4) have gained significant increase in their weights, however they have not obtained the normal weight for their respective ages. This may be attributed to the fact that one child had been sick and the others were teething during the feeding period, and all three had really small weights classified as severely underweight from their initial weighing. However, as accessed by their mothers and health workers in the barangay, these children have since then gained more appetite in eating and seems to be healthier than before the feeding program was commenced.

Table 1. Summary of findings for the changes in weight of each individual child

Age of child	Sex	Initial Weight kg	Final Weight kg	Weight Gained kg	Remarks on status of growth
10	F	8	8.6	0.6	Normal
10	F	6.5	8	1.5	Normal
18	F	8	8.8	0.8	Normal
26	F	7.8	8.8	1.0	Severe underweight
32	F	10.4	11.5	1.1	Normal
33	F	10.3	11.7	1.4	Normal
10	M	7.8	8.4	0.6	Normal
21	M	7.7	8.4	0.7	Severe underweight
21	M	9.2	10.2	1.0	Normal
22	M	11.5	13	1.5	Normal
24	M	9.5	11.4	1.9	Normal
26	M	10.2	11.5	1.3	Normal
28	M	9.9	11.8	1.9	Normal
30	M	9.4	10.7	1.3	UNDERWEIGHT
35	M	10.8	11.9	1.1	Normal
42	M	11.4	12.5	1.1	Normal



Figure 5. During the conduct of the feeding program

Moreover, the results of this study are consistent with the previously conducted feeding programs in selected areas in Luzon and the Visayas by the DOST-FNRI. This also proves that nutrition-specific and nutrition-sensitive intervention approaches to curving if not eradicating malnutrition are effective.

IV. CONCLUSIONS AND RECOMMENDATIONS

The data gathered has shown that the DOST PINOY food formulation increased the weight of malnourished children which at the end of the feeding period have obtained the ideal normal weight. This further implied that continuously feeding those children who have not gained normal weights will in time obtain ideal weights. It is also recommended that the same intervention be done to other barangays in the province who have malnourished children, and thus increase the data gathered to further prove its effectivity. It is further recommended that the Rice-Mongo crunchies be promoted in different LGUs to be included in their feeding programs as alternative snack products. Mass productions for commercial selling of these nutritious products be encourage as well.

V. REFERENCES

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C. PROBLEMS ENCOUNTERED DURING THE CONDUCT OF EXTENSION

I. PROBLEMS

- Some children have experienced sickness (fever), growing of teeth which some way affected weight gain.
- Some kids were also bored of eating the same flavor of crunchies. However, we address this with new flavors. Some though don't like chocolate or barbecue flavor.
- Some are not able to consume the whole pack for the day.
- Mothers opt to stay at home rather than getting their share in feeding their children and attending seminars.
- Technical problems especially on the machines were encountered hampering the production.
- Lack of personnel for the weekly monitoring of the feeding program.
- Lack of access to transportation during delivery of products.

II. RECOMMENDATIONS

- Introduce different flavors of crunchies to the children.
- Instruct other methods of introducing the products to the children such as mixing them in other foods.
- Give incentives to encourage mothers to attend various activities.
- Conduct preventive maintenance, repair or even replace machines that always delay the production.
- Hire additional personnel to perform needed activities during project implementation.
- Look for a vehicle that could be used to deliver the products.