



Nutritional Innovation: Dumplings Packed with Iodine and Protein

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Abstract: The primary impetus for this research was the prevalence of stunting and other forms of malnutrition in public Philippine elementary and secondary schools. Finding out how effective a feeding regimen using dumplings with high protein and iodine content is was the primary goal of this research. Eusebio Lopez Memorial Integrated School in Sagay City, Negros Occidental, Philippines, was the site of thirty topic respondents who were eighth graders studying food trade. The goals of this research were to demonstrate the feasibility of making dumpling soup with foods high in iodine and protein, to compare the pre- and post-feeding BMI and academic performance of eighth-grade food trade students, and to identify any statistically significant differences between the variables. It employs a quasi-experimental design. Gathering data on the respondent's nutritional state and academic performance was one of the three elements of the instrument, which also included a survey on health and nutrition education and instructions on how to properly prepare a meal before receiving treatments. Following the implementation of the treatments, a statistically significant impact was seen. What this indicates is that there is a strong correlation between better nutrition education and better academic success. Consequently, iodine and protein dumplings must be manufactured and sold.

Keyword stopics covered include: academic achievement, nutrition education, food plates, feeding programs, Food dumplings with iodine and protein contents

1. Introduction

The Philippines is no exception to the rule that malnutrition is the world's most pressing nutritional crisis. According to a 2016 study conducted in the Philippines, around 31.8% of preschoolers, 3.2% of adolescents, and 13.2% of adults (including those over 65) were determined to be underweight for their age, according to UNICEF. The following statistics pertain to school-aged malnutrition cases in Sagay City, Negros Occidental: 459 were classified as underweight, 126 as severely underweight, 1,408 as stunted, 337 as severely stunted, 177 as wasted, and 80 as severely wasted (NNC, Negros Occ. Province). Research by Abayomi, O. of Ghana on the Educational Outcomes of School Feeding Intervention: Evidence from Rural Northern Ghana and Dr. Gregorio Reyes of the Polytechnic University of the Philippines titled the Impact of School-Based Feeding Program on the Physical Growth, Academic Performance and Social Development of Students in Holy Spirit Elementary School found that students' intellectual development is impacted by malnutrition, which in turn hinders their academic performance in school.

Problems with the school feeding program have persisted in Philippine public schools. The local administration of Sagay City, Negros Occidental, Philippines, allocates a Bottoms Up Budgeting (BUB) for public elementary and high schools every year as part of its policy, yet undernourishment remains the country's top concern. So, just eating veggies and a few high-energy items won't cut it. Seeing kids eat their packed lunches—which often consist of just enough rice, a few pieces of dried salmon, or a cube of chorizo—with

Gulayansa Paaralan Program (GPP) schools provide vegetable soup support. The protein, iodine, and iron found in meat, fowl, shellfish, and, most importantly, eggs and milk are essential macronutrients that may help with brain growth and stunting.

To address this issue, the Home Economics instructor at Northern Negros State College of Science and Technology collaborates with the Sagay City local government and the Department of Health of Sagay City to disseminate and implement ideas for menu production, which in turn helps alleviate the malnutrition situation in the community. The development of many dumpling recipes using components usually available in the Sagay City area. A typical school breakfast "food plate" includes dumplings filled with seafood like as brown mussels, tilapia, freshwater shrimp, clams, river swimming crabs, liver, sprouting mung beans, milk, and boiled eggs, along with tiny amounts of pork or chicken. Flour, blended squash



pulp, squash flowers, malunggay flowers, swamp cabbage flowers, and maize powder are the ingredients that make up the dumpling sheets. Dumpling soup is made using the following ingredients: There are 50% dumplings made of various seafood, including tilapia, brown mussels, scallops, freshwater clams, shrimp, and river swimming crabs; 10% dumpling sheets made of various squash varieties, malunggay flowers, and maize 5 percent water, 10 percent cooked eggs, 5 percent pig or fowl liver, 10 percent squash pulp mixture, 8 percent milk Using 1% salt and 1% monosodium glutamate.

Eusebio Lopez Memorial Integrated School's eighth graders in the food trade will serve as the survey's respondents. The reason they are being targeted is because the learning competence is closely related to the treatments that will be implemented. Additionally, in the next feeding program, this group will be responsible for assisting with the feeding of their fellow students, particularly those who are at risk of dropping out.

The Serdo. It has been shown that there is a lot of wasted and seriously wasted food when looking at the nutritional condition of the responders. There is a concerning trend of underweight and stunted individuals in this category. While the researchers mapped out the dwellings of the thirty students, they found that 29 of them had vegetable gardens, 15 had indoor toilets, 13 used empty lots, and 2 shared facilities with family. Living far from the ocean, yet close to rivers, all of the responders used to subsist on tilapia, freshwater shrimp, river swimming crabs, and clams. Due to their parents' limited financial resources, milk and eggs are not staples in their diet. Out of the thirty-three, twenty-three skip breakfast altogether, seven bring their own lunches, and twenty-three depend on the canteen for their meals. Spreads and dairy are also missing from their bread, which is a major health risk. Eleven out of thirty have lunch budgets and nineteen are on the hook for whatever their parents can afford. Vegetables alone do not provide enough nutrients to fulfill the recommended daily requirement for adolescents, thus the researchers will need to do further analysis. In order to meet their nutritional demands, the researcher must manufacture food. The group has settled on a breakfast dish of dumpling soup, and they should be able to get dumplings locally.

Making dumpling soup with foods high in iodine and protein is the goal of this study, which seeks to answer the following questions:

1. Before the program starts, what is the average body mass index among eighth graders who are interested in food trade?

Before the feeding program begins, how well do eighth graders in the food trade do in school?

3. How many calories do eighth graders who are studying food trade weigh after participating in a feeding program?

4. How does the feeding program affect the academic achievement of eighth graders studying food trades?

5. Does the feeding program have a noticeable effect on the Body Mass Index of eighth graders who are studying food trade?

6. Has the feeding program had a noticeable impact on the academic achievement of eighth graders studying food trades?

As a result, the researcher formulates a null hypothesis that claims that

Ho1. Grade 8 students in the food trade showed no statistically significant change in their body mass index (BMI) between the pre- and post-feeding programs.

Ho2. The eighth grade food trade students' pre- and post-feeding academic performance was not significantly different.

Here are the main points that will highlight the importance of this study: In the first place, there has to be a policy in place to ensure that all public schools' lunch programs are uniform in terms of ingredients, including the macronutrient protein and the micronutrients iodine and iron, which are present in foods like boiled eggs, beef, and liver.

Use items from the Gulayansa Paaralan Program, such as fresh or fortified milk, sprouted mung beans, and mushrooms. for GPP The second aspect is the policy of the food system pertaining to the secure production, transit, and handling of food, as well as the production of farmers and organizations involved in meal preparation. As a third point, we should push for ongoing study into the causes and effects of malnutrition in the home, with an emphasis on family education and values.



2. Methodology

A quasi experimental research design was used in the study. Thirty (30) students in Grade VIII Food Trade class served as the respondents as the survey was administered before and after the intervention changes related to the experiment. The following research instrument as a tool for gathering data were used. It has three (3) parts which are; Part 1 was the survey in awareness on health and nutrition education, before the intervention was provided. There were 30 items to be answered by yes or no to determine the gaps. Part 2 aimed to gather data in the respondent's nutritional status concerning the variable treated in this study which is the Body Mass Index (BMI) of the respondents scaling from severely wasted, wasted, normal, overweight and obese and the mean is calculated. Part 3 aimed to gather data in the respondent's academic performance which was the pre and post test using the 2017 "Healthy Diet, Gawing Habit For Life" module for teenagers of the National Nutrition Council of the Philippines scaling from very low, low, high and very high and the mean was calculated. The total enumeration was used in choosing the respondents because this group would help in the food preparation for the Students' At Risks Of Dropping Out (SARDO) feeding activities.

3. Intervention Used in the Study

Nutrition Education Self Check Guide

"Healthy Diet, Gawing, Habit for Life" Module of NNC (National Nutrition Council)

The menu for one week cycle created by the NONESCOST (Northern Negros State College of Science and technology) was used as feeding guide. The food plate produced were dumplings soup enriched with iodine, and protein dumplings, which were used as breakfast snacks.

Morning breakfast menu was used since basing on the survey most of the respondents were not having breakfast from their home so instead of lunch, the researcher used breakfasts menu. When checking the recommended dietary allowance for teenagers of the NNC (National Nutrition Council), it was suggested that the " Filipino Plate" suggested is 13-15 years for male is 2700 energy in kilo calorie, for female is 2170 energy in kilo calorie. Here is the suggested Filipino plate for morning breakfast: 1 medium bowl of dumplings soup, 1 boiled egg, 1 slice of cake, 1 glass of vitamin c juice and a small glass of fresh milk

4. Data Gathering Procedure

In order to study the effect of Pre and Post Feeding Program in the Body Mass Index and the Academic Performance of Grade-VIII Food Trade students, the researcher conducted the following procedure:

1. The researcher asked permission from the DepEd District 9 supervisor and ELMIS school principal about the research study and proposed an action plan for approval.
2. The researcher visited and discussed to the section advisers and obtained records of their BMI after the first examination, and the pre test,. Started conducting the Pre-survey on Knowledge, Attitude and Practices (KAP) in Health and Nutrition Education.
3. The researcher used bilingual (Hiligaynon and Filipino) as a medium of instruction and read slowly the questions and the students responded each question directly.
4. The researcher requested the parents and the respondents to attend an orientation on the feeding activity. The parents and students undergo skills training on how to prepare the menu such as the composition and process of the different variations of dumplings' soup which to be used as feeding snacks.
5. The researcher conducted pre-survey to the respondents after establishing the validity and reliability of the research instrument by the help of three Social Science Teachers and Teachers with specialization in biotechnology, nurse of the Division of Sagay, dietician of St. Anne Hospital in Cadiz City and Sagay City Health doctor. Sufficient copies of questionnaire were reproduced for the survey. The respondents answered the questionnaire during their TVE (Technical-Vocational Education subject) time. The answered questionnaires were retrieved; the data were tallied, tabulated, analyzed and interpreted as to be the basis of the study.
6. The researcher gathered the Body Mass Index (BMI) of the respondents in the 1st quarter period by their respected teacher-adviser.
7. The intervention utilized by the researcher was the Feeding Program utilizing dumplings soup sponsored by the local government of Sagay City, Negros Occidental, Northern, Negros State College of Science and Technology together with the Nutrition Education Council-Sagay City Chapter, and DepEd ELMIS, STVEP Food Trade from 2nd quarter to 3rd quarter period. Then the lecture on the module of NNC 2017, Healthy Diet Gawing Habit For Life.
8. The post survey was administered after the intervention was utilized for a period of time.
9. The researcher gathered the 3rd quarter Body Mass Index (BMI) and conducted post test regarding the "Healthy Diet, Gawing Habit For Life" module by the National Nutrition Council of the Philippines to the respondents after the Feeding



Program together with the teaching the Nutrition Education as included in the learning competency of STVEP especially in Food Trade. The lecture discussion on the nutrition education was done everyday by allocating ten- minute discussion, then followed by the skills training of the respondents producing a food plate which is the dumpling soup with iodine and protein content.

10. The symposium on malnutrition by the Department of Health-Sagay City and attended by all Grade-VIII students of ELMIS last July 2017 with their parents.
11. The researcher then conducted a one hundred twenty days Feeding Program with Grade-VIII Food Trade students preparing the food starting from July 10, 2017 up January 10, 2018. Orientation and deworming through City Health Department of Sagay City was conducted to Grade-VIII Food Trade students before the feeding activities started. The composition of dumplings' soup was previously stated in the introduction.
12. January 10, 2018 was the end of 120 days feeding program activities. Then, the researcher determined their body mass index and post test from their respective teacher advisers. The researcher made a comparison and obtained the difference on the increase of BMI (Body Mass Index), Post test on Nutrition Education using the "Healthy Diet, Gawing Habit for Life of the National Nutrition Council of the Philippines. Then researcher made a closing program.

5. Statistical Treatment of Data

For problem numbers 1, 2, 3, and 4 the frequency and percentage was used and the mean was calculated. The Body Mass Index was categorized into obese, overweight, normal, wasted and severely wasted. The level of academic performance was categorized into very high, high, low, and very low. A percentage frequency distribution displayed data that specified the percentage of observations which existed for each data point or grouping of data points.

For problems no.5 and 6 a T-test was utilized to test these hypotheses, gathering the mean of the Pre and Post Body Mass Index as well as the mean of the Pre and Post test using the module of the National Nutrition Council. The T-test was tested at 0.05 significant levels.

6. Results of the Study

Table 1:

First Quarter Summary of the Body Mass Index (BMI) Grade - VIII Food Trade Students
Eusebio Lopez Memorial Integrated School SY 2017-2018

Body Mass Index	No. of Students	Percentage %
Severely Wasted	7	12.69
Wasted	14	26.67
Normal	9	16.54
Overweight	0	0.00
Obese	0	0.00

Mean = 2.07

Table 1 shows that 7 respondents or 12.69% are severely wasted and 14 or 26.67% are considered wasted and only 9 or 16.54% are considered to have normal body mass index (BMI).

This implies that majority of the respondents are undernourished. This proves to the survey conducted by the NNC (National Nutritional Council), Province of Negros Occidental 2015-2016, that in Sagay City public school, there are 459 underweight, 126 severely underweight, 1,408 are stunted, 337 are severely stunted, 177 are wasted, and 80 are severely wasted. And also proves to the survey report of the UNICEF, that in the Philippines, there are about 4 million or (31.8%) of the preschool population were found to be underweight for age, 3 million or (19.8%) adolescents are underweight and five million or (13.2%) adults including older persons were found to be underweight and chronically energy deficient. Lastly, it proves to the report survey of the United Nations Children Fund that Philippine loses over P220 billion pesos every year because of Under nutrition

Table 2:

First Quarter Level of Academic Performance Grade - VIII Food Trade Students
Eusebio Lopez Memorial Integrated School SY 2017-2018

	Academic Performance	No. Of Students	Percentage %
90.00 – above	Very High	0	0.00 %
86.00 – 89.00	High	4	13.33 %



81.00 – 85.00	Low	10	33.33 %
75.00 – 80.00	Very Low	16	53.33 %

Mean = 3.4

Table 2 shows that 53.33% (16) of the respondents have a very low academic performance between the bracket (75.00 - 80.00), followed by 33.33% (10) for low academic performance with in the bracket of (81.00 - 85.00) and only 13.33% (4) is in the bracket of (86.00 - 89.00) in high academic performance. These indicate that majority of the respondents do not perform well academically in school during the 1st Quarter. This is supported by the study of Chiyuka K of Zimbabwe, Doncillo H. of the Philippines and Oppola et al of Nigeria on the Impact of Poor Nutrition on the Academic Performance in public school children. In addition, this results proves to the publication of the of the “Save the Children” group entitles “Cost of hunger: Philippines”, that childhood stunting - one of the most common forms of malnutrition - has permanent effects on a person’s growth which makes them drop out of school earlier and less productive than other workers when they start working. It also proves the Maslow’s motivational theory that food is the first physiological need of a person to be answered before the other needs. Whereby needs lower down in the hierarchy must be satisfied before individuals can attend to needs higher up..Where food is considered number one physiological need of a person. Table 3:

Summary of Body Mass Index (BMI) in the Third Quarter after the Treatment
Grade - VIII Food Trade Students
Eusebio Lopez Memorial Integrated School SY 2017 -2018

Body Mass Index	No. of Students	Percentage %
Severely Wasted	0	0.00
Wasted	4	13.33
Normal	26	86.67
Overweight	0	0.00
Obese	0	0.00

Mean = 2.87

Table 3 shows that after the 120 days feeding program there are 0% or none is severely wasted and only 4 or 13.33% remain to be wasted, and majority of the respondents whom 26 or 86.67% are now in the normal Body Mass Index. This implies that after the 120 days feeding program, the undernourished respondents gain weight and none of them is severely wasted. This supported by the study of Nervaart F. et al of Kenya, Lawson T. of Michigan University and Xavier University- Philippines on the Impact of school feeding program on Nutritional Status of Public School Children. It also proved to the study of Zenebe M et al of Ethiopia that SFP or School Feeding Program increases children’s nutrition and school academic performance.

Table 4:
Third Quarter Level of Academic Performance Grade - VIII Food Trade Students
Eusebio Lopez Memorial Integrated School SY 2017 -2018

SY 2017- 2018	Academic Performance	No. of Students	Percentage %
90.00 – above	Very High	9	30.00 %
86.00 – 89.00	High	14	46.66 %
81.00 – 85.00	Low	5	16.67 %
75.00 – 80.00	Very Low	2	6.67 %

Mean = 2.1

Table 4 shows that after 120 days feeding program, 9 respondents or 30% are having a very high academic performance, and 14 or 46.66% respondents have high academic performance. This implies that after the feeding program the respondents’ academic performance increases. This is supported by the study of Abayumi and Reyes stated in the literature above that students with proper nutrition perform well in school and also proves the Maslow’s motivational theory that physiological needs such as food should be given priority before the other needs. He states that people are motivated to achieve certain needs and that some needs take precedence over others. Our most basic need is for physical survival, and this will be the first thing that motivates behavior. Once that level is fulfilled the next level up is what motivates, and so on. He adds that if these needs are not satisfied, the human body cannot function optimally. Maslow considered physiological needs the most important as all the other needs become secondary until these needs are met. So, it proves also to the created principle that malnutrition hinders academic performance and feeding program plays a critical role in public school.



Table 5:

Significant Difference between the Body Mass Index of the Grade Eight Food Trade Students before and After the Feeding Program

Body Mass Index	N	Mean	SD	Sig. (2-tailed)
1 ST Quarter	30	2.07	0.739	0.000
3 rd Quarter	30	2.87	0.346	

Table 5 shows that there is a significant difference in the Body Mass Index of Grade-VIII Food Trade Students of ELMIS SY 2017 - 2018 in the Pre and Post Feeding Program. The results reveal that the t-value was 0.000, which is less than 0.05 ($t=0.000 < 0.05$). This implies that statistically there is a significant effect after the intervention was utilized. The null hypothesis is therefore rejected. This result proves to the study of Kidane of Ethiopia that feeding program is impacted nutritional status of students in public school and thus students are more interested to enroll because they know they are being cared for. It also proves that feeding program when conducted and monitored seriously the nutritional increase can prove to the "No Children Left Behind" principle.

Table 6:

Significant Difference between the Academic Performance of the Grade Eight Food Trade Students before and after the Feeding Program

Test	N	Mean	SD	Sig. (2-tailed)
Pre – Test	30	10.23	1.89	0.000
Post – Test	30	24.83	2.01	

Table 6 shows that there is a significant difference in the Academic Performance of Grade-VIII Food Trade Students of ELMIS SY 2017 - 2018 in the Pre and Post Feeding Program.

The result reveals that the t-value was 0.000, which is less than 0.05 ($t=0.000 < 0.05$). This implies that statistically, there is a significant effect after the intervention was utilized. It also means that an improvement of nutrition has significantly affected to an improvement of academic performance. The null hypothesis is therefore rejected. This result proves that Abraham Maslow Hierarchy of Needs is true. He says to distinguish physiological needs from other needs, it is important to note that they are commonly isolable and localizable somatically. The most common physiological needs are breathe, hunger, thirst and others. He adds that when physiological needs are addressed, the other stages of needs follow, therefore feeding program utilizing proper substances plays an important role to the nutritional status of students in public school and thereby improving the academic performance.

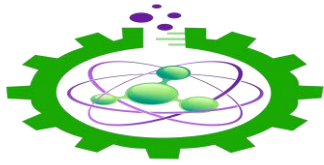
Summary of Findings

The findings show that the majority of the respondents' Body Mass Index before the feeding program are within the severely wasted and wasted and their academic performance is between very low and low. It also shows that after 120 days of intervention with feeding program utilizing dumpling soup, the respondents have significantly improved their Body Mass Index and even their academic performance which means that there is a significant difference in their Body Mass Index as well as academic performance before and after the conduct of interventions.

7. Conclusion

The study concludes that Feeding Program utilizing dumplings soup affects the Body Mass Index and the Academic Performance of respondents. Therefore, this research recommends the authorities concerned to:

1. Commercialize and standardize the food plate of dumplings' soup.
2. Come up with ideas on how to expand the Feeding Program with nutrition education, the promotion of safe production and innovation of high quality substances food which will contribute to health development of the students to become active in school academic performance;
3. That the government will encourage research and development on the closely and seriously monitoring on the survey of SBFP (School –Based Feeding Program) of the Department of Education on the strict implementation of feeding the right kinds of food ;
4. Conduct nutrition education to the group preparing the food;
5. Allocate one - hour time feeding activities to every class adviser as a regular subject included in the eight-hour civil service allocated time for government employees;
6. Include in Values Education subject competency the safe production, handling and preparation of food for the students' awareness of the right kinds of food to eat for physical and moral self improvement thereby preparing the students to future



active participation in nation building;

7. That the government shall create a policy in the utilization of local and indigenous produce of land, rivers and sea in the public schools feeding program, thereby innovating such product in the suited taste of children;
8. Create a policy on food system in the safe production, delivery and preparation of food products;
9. Rehabilitate local land, rivers, and sea as sanctuary of the source of the indigenous local food such as the fresh water shrimps, fresh water clams, river swimming crabs and others;
10. That the local government will educate the parents on the proper production, handling, and preparations of food in their homes;
11. Create a policy on the strict implementation of the consumption of root crops in every home especially the members of 4P's;

If all of these stated above will be implemented seriously, the issue on under nutrition and stunting in public school and community stated on the loses of Philippine government on malnutrition according to the report entitles "Cost of Hunger: Philippines," which has the lose on educational costs of P1.23 billion due to grade-level repetition by hungry primary and secondary students, P166.5 billion in potential income loss due to lower educational achievement of the undernourished, and another P160 billion in potential income loss due to premature child mortality which is resulted to 328 billion equivalent to 2.84 percent of the 2013 Philippine Gross Domestic Product will gradually be solved.

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- [5] This sentence seems to be a hyperlink rather than a whole sentence, so I'll paraphrase it: "Search: national nutrition council, oq: national nutrition council, aqs: chrome, e..69i57j0l5.11926j0j7, sourceid: chrome."
- [6] SmartSchool PH website
- [7] Rampler website
- [8] digitalcommons.kennesaw.edu/ca/w is the URL for this image.