FORTIFIED FOODS WITH *SANGKAP PINOY* SEAL and the MICRONUTRIENT INTAKE AMONG SELECTED HOUSEHOLDS IN PUNTA, STA. ANA, MANILA, PHILIPPINES

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ABSTRACT

This study evaluated the food fortification program (*Sangkap Pinoy* Seal Program-SPS) in the Philippines in terms of determining the rate of awareness, attitude and considerations and the factors associated with purchase of fortified foods with SPS among women in a poor urban area in Manila. This study also determined the contribution of SPS foods to total iron and vitamin A intake of their preschool children. A survey was conducted through personal interviews among 134 mothers who were randomly selected from all villages of Punta, Sta. Ana, Manila.

Descriptive data showed that around 60% of the participants were aware of SPS foods. In general, a positive perception on SPS foods was demonstrated by the women as reflected in their comments. Majority of these comments associated SPS foods as foods accepted/recommended by the Department of Health, foods with added nutrients and nutritious and safe food to eat. Around 89% of those who were aware exhibited a positive attitude towards fortified foods. Awareness of fortified foods and foods with SPS were significant predictors of purchase of SPS foods. However, even if income was the stronger determinant of purchase than awareness, awareness still had some effect. Around 3% and 6% of the variation in purchase of SPS foods could be attributed to the effects of attitude to fortified foods and total opinion to food and health, respectively.

The results of this study also showed that preference of the family and taste were major considerations in purchasing SPS foods among more than half of the sample. These findings suggest that the participants purchased SPS foods not mainly because of added nutrients.

Intakes of energy and vitamin A among the respondents' preschooler children were considered adequate. However, their iron intake was found to be

less adequate. A remarkable finding of this research study was the significant contributions of SPS foods to iron and vitamin A intakes of the children in achieving the RDA. There was 53% increase on the number of children whose vitamin A intake was less than 50% of the RDA if SPS foods were taken out from the diet. SPS foods contributed around 27.6% to total vitamin A intake of the children. Without, the contribution of iron from SPS foods, there was 44% decrease on the number of children whose iron intake was greater than 75% of the RDA and 100% increase on the number of children whose iron intake was less than 50% of the RDA. Hence, iron and vitamin A from SPS foods did have an impact in the nutritional status of the children.

The findings of the study may provide vital information to the food fortification program and pose a challenge to nutrition educators. The results are discussed in relation to the previous literature and recommendations are presented with particular emphasis on the implications for future research. In conclusion, SPS foods may have a good potential to improve the nutritional status of the children.

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Micronutrient malnutrition is a potential threat to the health and productivity of more than 2 billion people around the world but it can be largely prevented (Darnton-Hill, et al., 1999). The Philippines, just like any Third World country suffers from primary malnutrition problems. The 1998 National Nutrition Survey shows the continued existence of vitamin A deficiency, anemia and goiter among vulnerable groups particularly among pre-school (Madriaga, et al., 1998). These deficiencies have serious consequences for both mental and physical health.

1.1.1 Statement of the Problems

Malnutrition is a significant public health problem in the Philippines. The most affected groups are preschoolers, pregnant and lactating women. According to Florencio (1989), malnutrition affects growth and development, productivity, reproductive ability, resistance to disease and learning ability. The prevalence of night blindness and Bitot's spots among children 6 months to 6 years was 0.4% and 0.1% respectively. Translating these figures, approximately 3.5% of the estimated 11 million Filipino pre-school children have xeropthalmia, 10% of which are corneal related cases. Even worse, 50% of those with corneal damage become blind, 70% of them may die a few months after becoming blind (De Guzman, et al., 1996). Around 6.9% of the population 7 years and older have goiter, a manifestation of iodine deficiency. About 28.9% of the population was found to be affected by iron deficiency anemia. The most affected groups were infants aged 6 months to 1 year old with a prevalence rate of 49.2%, followed by

the elderly (45.6%), then by the pregnant women (43.6%) and lactating women (43%) (FNRI, 1993). Recently, the 1998 National Nutrition Survey showed 8.2% and 29.6% prevalence rates for vitamin A deficiency and anemia, respectively among children 6 months to 5 years old (Madriaga, et al., 1999).

Micronutrient supplementation, nutrition education and food fortification are major interventions being implemented to reduce micronutrient malnutrition in the Philippines. Food fortification is the addition of a micronutrient deficient in the diet to commonly consumed food or seasoning. To be successful, the quality must be maintained or improved without the quantity of food eaten being increased (De Guzman, et al., 1996).

Fortification of widely consumed foods, particularly staples, such as rice, sugar and flour-based products is a major intervention program under the Philippine Plan of Action for Nutrition (Joven, et al., 1996). Generally, it is recognized as the most effective, sustainable and long-term intervention to eliminate micronutrient deficiencies (NNC, 1995). Since the nutrients are added to commonly consumed foods, food fortification does not require changes in food habits and it can reach much of the target population at low cost (NNC, 1995).

Food fortification in the Philippines dates back to 1948 when the use of enriched rice significantly reduced mortality due to beriberi by 67% (Claudio, et al., 1982). The early 1950's saw the passage of Rice Enrichment Law, which required the addition of thiamin, niacin and iron to ordinary rice during the milling process (Corpuz, 1986). During its initial implementation, it was reported that prior to cooking, several housewives removed and discarded fortified artificial rice grains due to its yellowish color from added thiamin and riboflavin (Latham, 1997). Unfortunately, operational and political problems hampered its full implementation and thus rice enrichment died a natural death (Florentino and Pedro, 1998).

The 1980's saw renewed interest in the fortification of rice. The Food and Nutrition Research Institute (FNRI) modified and adapted the technology using ferrous sulphate as the fortificant. In 1994, efforts were exerted to establish the technical, organizational, and legal foundation to operationalize a food fortification program in the country (NNC, 1995). A pilot program to test the feasibility of marketing and distributing rice fortified with iron was run in Nueva Ecija. It was called Fortified Vitamin Rice (FVR) Program. The Nutrition Service-Department of Health along with other national agencies initiated this project. The FNRI carried out the fortification and a local cooperative in the area was responsible for marketing and distributing the iron-fortified rice to households in pilot municipalities. Despite government support, this program has not proceeded as expected, perhaps due to technical problems with discoloration, the multitude of rice mills and a lack of illustrated success in a pilot trial (Darnton-Hill, 1998). Along with rice fortification, iodization of salt has been a major effort in eliminating iodine deficiency disorders in this country since the early 90's. Still, iodine deficiency is prevalent. At present, efforts in fortification of bread resulted in the introduction of fortified bread in selected bakeries in Manila. Since fortification of staple foods has not been widely implemented nationwide, fortification of processed foods has been introduced as another measure of the food fortification program to eliminate micronutrient malnutrition in the Philippines.

An initial attempt at fortification of processed food product in the Philippines was the fortification of the flavor enhancer monosodium glutamate (MSG) with vitamin A in 1973 (Solon, et al., 1985). MSG was widely consumed with an average intake of 2.4 grams per day. Problems with the quality of the product and the fortificant during packaging and distribution were encountered. Nevertheless, MSG fortification resulted in the improvement of vitamin A status among the sample population within a short period of time. However, nationwide implementation of MSG fortification did not proceed due to a variety of technical, political and food industry reservations (Bloem, et al., 1998).

The *Sangkap Pinoy* Seal Program (SPSP) has been developed to encourage food manufacturers to market high quality fortified food products with essential micronutrients. It was first implemented in 1994. Its thrust is public and private sector collaboration. The program encourages the food manufacturers to fortify their food products with only vitamin A, iron and iodine-the nutrients commonly inadequate in the Filipino diet. *Sangkap Pinoy* (SP) is the DOH adopted term for the micronutrients needed by the body for mental, physical and emotional development. These nutrients are Vitamin A, iron and iodine. The *Sangkap Pinoy* Seal (SPS) is envisioned to be a prestigious sign to be awarded to food manufacturers after meeting the standards for fortifying products with vitamin A, iron, or iodine. With this seal, it is hoped that the general public will be more aware of the availability and benefits of fortified foods and thus be encouraged to consume such products (NNC, 1995). Marketing of fortified foods with the seal has been the responsibility of food manufacturers themselves. However, the Department of Health is responsible for a promotional campaign to generate public awareness of the availability and the nutritional benefits of SPS foods.

At present, products from 18 food manufacturers fortified with vitamin A, iron or iodine carry the SPS. Among approximately a hundred fortified foods, which have proliferated in the Philippine market, only 25 them have been granted the *Sangkap Pinoy* Seal (NS-DOH, 1999). These foods are referred to as SPS foods or foods with SPS. Manufacturers of the other food products claiming to be fortified foods have applied for SPS but were not able to meet the standards; or have been waiting for the evaluation of their application; still, others have not applied for the seal at all. The fortified foods with the seal of acceptance include basic commodities such as noodles, sardines, cooking oil, and less commonly consumed foods such as infant cereals, orange juice, margarine, cheese, hotdog, chips chocolate drink, mixed flour, catsup, crackers, milk, sandwich spread and other snack foods.

In order for the SPS program to be effective, the segment of the population lacking or in need of these micronutrients must consume the fortified foods.

Only a few studies have looked at the characteristics of consumers in relation to purchase and consumption of fortified foods. In the Philippines, results of a qualitative study conducted among mothers showed that good nutrition was recognized as important and respondents were willing to buy fortified foods (Joven, et al., 1996). However, the term fortification was not well understood and there were concerns about the possible change in color, texture, taste and odor of fortified bread. It was shown that fortified foods were generally perceived as more expensive than non-fortified foods and mothers who were willing to buy these foods were perceived as only those who could afford more expensive foods. A similar study on perceptions of fortified foods in the Philippines demonstrated the limited knowledge and exposure to fortified foods among respondents (NS-DOH and Moran, 1996).

1.2 SIGNIFICANCE OF THE STUDY

The *Sangkap Pinoy* Seal Program has now been running for six years and only in the past three years have a good variety of foods been available in the market.

Now is a good time to evaluate the present Sangkap Pinoy Seal Program by examining the rate of awareness of SPS foods after several years of continued promotion. This study will also examine the considerations that affect the purchase and use of SPS foods and the contribution of SPS foods to the micronutrient intake in the diet.

This proposed research will be carried out in all barangays (villages) in Punta, Sta. Ana, Manila through personal interviews among women with preschool children. These women and their children are most likely to have deficient nutrient intakes, and hence use of foods with SPS will be beneficial. The findings of this study will provide valuable information to assist nutrition educators in encouraging the use of SPS foods. It may also suggest changes to SPS foods to increase acceptance. Knowing the characteristics of people who are

aware and not aware of fortified foods may help the program implementor to identify people who are likely or unlikely to consume fortified foods. In addition, the results of this study might serve as basis for legislation for fortification of staple foods since there is a pending bill for fortification of processed foods in Congress. Alternatively, if a high rate of awareness and interest to foods with SPS among the respondents is found, it may stimulate the food manufacturers to apply for the seal and ensure good quality fortification. Improved products could lead to increased use and hence, decrease micronutrient deficiencies. It is expected that the barriers to purchasing fortified foods could be unfavorable attitude, unawareness, and perception of high price. It is believed that all this information may be useful and relevant to nutrition educators not only in the advocacy of SPS foods but also for a more successful implementation of *Sangkap Pinoy* Seal Program.

As far as the researcher knows, this study is the first local research to determine the micronutrient contribution of SPS foods among the consumers. This information is expected to be useful in the fortification program since this will measure the effect of fortified foods with SPS on iron and vitamin A intakes of the Filipino preschool children.

The review of literature shows that the relationship of socio-economic factors to food choice and nutrient intakes is significant. It is important to determine their effects on the purchase and intake of SPS foods. It is postulated that socio-economic factors as well as attitude towards food selection and awareness of SPS foods will exert a significant effect on the consumption of SPS. The proposed study aims to identify the socio-demographic factors that are associated with purchase and intake of SPS foods. Knowing these factors may assist nutrition educators in their advocacy of SPS foods.

Food choice is a complex process and is influenced by a number of factors. It is assumed that the factors that influence purchase of SPS foods will be similar to the factors that affect food choice. People do not necessarily make a conscious

decision to purchase fortified foods or foods with SPS. If a particular food (fortified or not) meets their choice criteria it is likely that they will purchase it.

It is hoped that advocacy campaign on SPS foods will increase awareness and lead to purchase of these foods. Purchase of SPS foods may be influenced by a number of factors. The attributes of foods such as quality and nutritional content could affect purchase of SPS foods. It is postulated that attitude might influence purchase of these foods. Attitude is influenced by perceptions of attributes e.g. price, taste, quality, nutrient (cognitive), general attitude and feelings towards fortified foods (affective), and expected action e.g. purchase or reject fortified foods, as a result of these perceptions (conative). An individual's purchase of SPS foods will also depend on social and economic aspects such as income, size of the family, preference of the family and advertising. Beliefs and opinions on foods and health might also exert an influence on purchase of these foods. It is assumed that purchase of SPS foods would be different from purchase of other foods.

1.3 OBJECTIVES

1.3.1 General Objective:

To determine awareness and how it is related to purchase of SPS foods and relate the level of SPS fortified food consumption to the micronutrient intake of preschool children in a selected area in Manila.

1.3.2 Specific Objectives:

1. To determine the rate of awareness and attitudes towards fortified foods and foods with SPS among mothers with preschool children and describe their relationship with demographic characteristics.
2. To determine the relationship of awareness, attitude, use of label and describe demographic information with purchase of foods with SPS.
3. To determine considerations in purchasing foods with SPS for mothers with preschool children.

4. To determine the nutrient intake of iron and vitamin A of preschool children through the use of three 24-hour recall and calculate the contribution of foods with SPS consumed to micronutrient intake.

1.4 RESEARCH QUESTIONS

In the light of these objectives, the proposed research aims to answer the following research questions:

Are people aware of fortified foods or SPS foods and what are the characteristics of people who are aware or not aware? Knowing the rate of awareness of fortified foods in general and SPS foods in particular, will enable nutrition educators to evaluate their efforts in disseminating information on SPS foods. Determining the characteristics of people associated with awareness of fortified foods with SPS will help the nutrition educators in their advocacy.

Does attitude relate to demographic characteristics? Identifying the characteristics of people with positive or negative attitude to fortified foods might be useful for a more effective implementation of the food fortification program.

What is the relationship of awareness, use of label, attitude, general opinion on food and health and demographic factors with purchase of SPS fortified foods? Nutrition educators need this information for more effective advocacy of SPS foods and to ensure a more efficient implementation of the program.

How much is the contribution of SPS foods to total nutrient intakes? Will this contribution be significant enough to affect the level of adequacy for these nutrients? This information will be relevant to evaluate the SPS program.

What are the considerations that influence the purchase of SPS foods? Determining the factors that influence consumers' purchase of SPS foods will help in improving the quality and acceptance of these foods to the public.

This chapter provides the background information on the situation and introduces the need for a local research study on SPS foods and highlights the significance of the research.

Chapter two will explore in detail the relevant literature on food choice, micronutrient intake and use of fortified foods from both Philippine and international sources. Since an integral part of this study is determination of micronutrient intake of preschoolers, a brief background on the energy and nutrient intake of the local population, particularly the preschoolers, will be covered. Previous local and international studies on fortified foods are included in relation to the present study.

Chapter three describes the methods used and chapter four presents the results and analysis of the data collected including presentation of tables and illustration of figures.

Chapter five discusses the results in detail in relation to the objectives of this study and the previous literature. It also includes the limitations of the study.

The last chapter presents the conclusions, implications and recommendations of the research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

In this chapter, background literature is introduced relating to food choice, micronutrient intake and use of fortified foods. The review has been selective and limited to these areas. Each section explains the criteria for selection and its relevance to the present study. The chapter begins with an overview of food choice and consumption among Filipino housewives, then outlines the factors that affect their food selection and presents the demographic information associated with their choice and buying behavior on foods. Patterns of adequacy of energy and micronutrient intakes of Filipino preschoolers are also included. Particular emphasis is given to the literature on Filipino and international studies conducted on nutrient contribution from fortified foods. Background information on the *Sangkap Pinoy* Seal Program is also provided. This chapter ends with research questions that the present study will undertake. The studies presented in this chapter were conducted in the Philippines unless otherwise stated.

2.1 ENERGY, IRON and VITAMIN A INTAKES of FILIPINO PRESCHOOLERS

The aim of this section is to present an account of the energy, iron and vitamin A intakes of the Filipino population in general and those of the preschoolers in particular. A review of surveys on Filipino diet shows inadequacy in energy and nutrient intakes of the average diet. This section will point out these inadequacies, which justify the adoption of food fortification as a preventive measure for their control.

Geographically, adequacy of energy intake varies among families in an analysis of previous national food consumption surveys (del Rosario, et al., 1984). The intakes for calories were adequate in Cagayan region (northern part of the country). Studies from various parts of the Philippines suggested that the preschoolers' nutrient intakes of calories vary between studies. Cabotaje's study (1983) among 141 urban households revealed that the food intake of preschoolers was adequate for energy. On the other hand, data derived from 1993 National Nutrition Survey revealed that mean one day per capita energy was only 1649 kcal, the lowest recorded since 1978 (Florentino, et al, 1996b). As a matter of fact, Solon (1997) pointed out that only 64% of the required energy intake was consumed by vulnerable preschool children as supported by previous national nutrition surveys.

Adequacy of vitamin A intake also varies in different studies. Although vitamin A was moderately provided at 88.1% RDA, urban children had higher vitamin A intake than rural children as shown in the 1993 FNRI survey (Florentino, et al., 1996a). However, more studies reported inadequate intakes of vitamin A. A study conducted in Laguna, Batangas, Iloilo and Manila by Florencio (1990) showed that vitamin A intake of preschoolers was only 73% of the RDA. Younger preschoolers (1-3 years) had a higher mean intake than older ones (Aligaen and Florencio, 1980; Florencio, 1990). Inadequate vitamin A intake was also noted by Cabotaje's study (1983).

Florentino and co-workers (1996a) found that per capita iron had only 64.7% adequacy in the 1993 national nutrition survey. Cabotaje (1983) also reported the inadequate iron intake among the children. Iron intake varied depending on geographical location as found out by del Rosario, et al. (1984). The intake for iron was adequate in Cagayan region (northern part of the country) and in Southern Tagalog (lower middle part). These surveys used one–day individual food weighing.

It is important to present the nutrient inadequacies of Filipino preschoolers in order to understand their food intakes. This section pointed out that in general, there is inadequacy in energy and micronutrient intakes among Filipino preschoolers. Inadequacies in intakes of iron and vitamin A are the basis of the implementation of the food fortification program in the Philippines. The relevance of the present study is that it will investigate if intake of SPS foods will affect the micronutrient intakes. If so, will this effect be substantial enough to meet the recommended level? To improve nutritional adequacy, these foods need to be consumed by those with previously inadequate intakes.

The next section discusses the changing consumption patterns and the transition of traditional foods to processed and convenience foods. This has led eventually to access of people to fortified foods.

2.2 OVERVIEW of CHANGING PATTERNS of FOOD CHOICE and CONSUMPTION AMONG FILIPINOS

The objective of this section is to point out the changing food pattern of urban residents from traditional foods to a gradual shift to consumption of processed foods. The transition of the diet and the popularity of processed foods provided the opportunity for fortified foods to be available in the Philippine market.

Limited income and the high cost of food items were the main problems which deter low income homemakers from buying adequate foods for the needs of the whole family (Ortega, 1979). A typical Filipino diet consists of rice, vegetables and fish (FNRI, 1993). The same survey noted that dried beans, nuts and seeds, eggs, fats and oil starchy roots and tubers were consumed in less significant amounts.

The report of FNRI (1990) predicted that rapid urbanization would alter the food consumption pattern in Metro Manila from traditional to more popular,

western-type convenience diets. As a whole, urban households particularly in Metro Manila consumed more fats and oils, meat and poultry, eggs, milk and milk products, dried beans, nuts and seeds, and vitamin C-rich fruits than their rural counterparts (Florentino, et al., 1996b). Rural households in turn, consumed more cereals, starchy roots and tubers, and vegetables than their urban counterparts. The 1993 national survey revealed that urban households had more than adequate intake for retinol equivalent whereas the rural households had only 73.8% of the recommended level. Food preferences have changed with trends shifting to increased consumption of processed foods from traditionally prepared foods (Parce, 1995). The sharp increase of the food processing industry reflects the rapidly increasing demand for processed foods (Florentino, 1994).

This change in eating patterns has had a mixed influence on nutritional status/intake. The increasing popularity of processed foods in the urban areas was also noted in the 1993 FNRI survey. The varied diet and higher amounts of foods consumed meant that the urban households also had an advantage in nutrient intakes over rural counterparts.

As a result of the transition from traditionally prepared foods to processed foods, fortified foods found its way in the Filipino diets. The opportunity for promotion of fortified foods evolved through proliferation of convenience foods in the market with nutrient addition as its selling advantage. The Philippine government adopted the strategy of adding nutrients to food products as a preventive measure to eradicate micronutrient malnutrition through the *Sangkap Pinoy* Seal Program. The program is also meant to protect the public from unscrupulous nutrition claims.

The next section provides the background information and details of this food fortification program.

2.3 *SANGKAP PINOY* SEAL (SPS) PROGRAM: BACKGROUND

INFORMATION

The background information about the *Sangkap Pinoy* Seal Program is presented in this section to explain how it could alleviate the existing micronutrient deficiencies.

Food fortification has been an effective public health measure to eliminate micronutrient deficiencies in the US (Sloan and Stiedmann, 1996). In the Philippines, the *Sangkap Pinoy* Seal Program is a strategy to encourage food manufacturers to fortify food products with one or more of the following micronutrients: vitamin A, iron, and iodine supplying at least 1/3 of the recommended level per serving. This level of percent recommended dietary allowance (RDA) is determined for whom expected consumption of the particular SPS food is intended. For example, fortified chips with iron intended for children should serve at least 1/3 of the RDA for children. Foods for general consumption should contain at least 1/3 of the RDA for adults. These nutrients are generally deficient in Filipino diets. A seal of acceptance is issued to food manufacturers who meet the qualification requirements (NS-DOH, 1998). The product bearing the seal may, however, lose the privilege of carrying it on its label if found to be lacking in nutritional quality. The Bureau of Food and Drug Administration performs regular quality assurance tests to determine whether a product is still qualified to carry the seal. The *Sangkap Pinoy* Seal is guaranteed to protect the consumers from false claims and misbranding/mislabeling of the food products sold in the market. The SP seal is granted to the food manufacturers after qualifying with the standards set by the Department of Health. An administrative cost of five hundred pesos is charged to each food manufacturer applying for the seal. Once the seal has been granted, the food company will pay P 8,000.00 for a one-year contract of using the seal. After a year, the food manufacturer which maintained the terms stipulated in the contract has the option to renew the contract of using the seal by paying a renewal fee of P 5,000.00 annually (NS-DOH, 1998).

The SPS Program is promoted through a social marketing network utilizing interpersonal communications and the mass media to reach the widest scope of the population. This is funded by the government through the food fortification program. Public and private sector meetings have been continuous since the launching of the program in 1995. Advocacy to encourage production, distribution and marketing of fortified foods have been conducted since the launch. These include one-on-one or group meetings, workshops, and symposia involving lawmakers, national agencies and NGO's at sub national levels, chiefs of local government, food manufacturers and other institutions (NNC, 1995). Marketing and promotion of fortified foods with the seal in the media has been the main responsibility of food manufacturers themselves. However, the Department of Health and member agencies of the National Nutrition Council are responsible for a promotional campaign to generate public awareness of the availability and the nutritional benefits of SPS foods.

Hand in hand with this advocacy, promotion of food products with the seal on print, radio and television have been extensive recently. Whatever medium of advertising is used, the focus of promotion is on the addition of micronutrients as well as the beneficial effects to prevent nutrient deficiencies. At present, continued advocacy on the part of the government agencies and aggressive promotion and advertisements on the part of food manufacturers has created a conducive environment for other food manufacturers to apply for the seal and for consumers to purchase these food products. A survey with food manufacturers revealed that majority of the respondents considered the marketing advantage of the SPS to their food product as its most valuable factor. In fact, some food manufacturers reported sales increase with the use of the seal (Bagriansky, 1998).

There has never been a detailed study on awareness and use of fortified foods with SPS and whether these foods have a significant impact in the Filipino diets. Clearly, there is a need to examine if the food fortification program has been

succeeding in its aim to improve the nutritional adequacy of the food intake particularly those who are most in need.

The next section reviews Philippine and international studies, which show the efficiency of fortified foods in increasing nutrient intakes and preventing deficiencies.

2.4 FILIPINO AND INTERNATIONAL STUDIES ON EFFICACY OF FORTIFIED FOODS

This section discusses both Philippine and international studies on efficacy of fortified foods. This section is relevant to highlight how effective fortified foods are in improving nutrient intakes and preventing nutrient deficiencies in the population.

2.4.1 Efficacy of Fortified Foods in the Philippines

As early as mid 70's, studies on fortified/enriched foods have been conducted in the Philippines. These studies however are limited to the measurement of physiologic response to consumption of fortified foods added to the diet using an experimental design. Results of an early study on routine intake of fortified mono-sodium glutamate with vitamin A demonstrated a 7.5 μg/dl increase in serum retinol and a 35% reduction in the prevalence of xeropthalmia compared to other interventions (Solon, 1985). Clinical trials on fortified rice with iron in 1994 demonstrated a significantly greater increase in hemoglobin among the school children in the experimental group compared with the control group (Florentino and Pedro, 1998). In addition, a greater increase in the proportion of children with low to deficient serum ferritin was shown in the control group. More recently, a research project is being undertaken by NS-DOH to determine the effect of fortified rice on the iron status of preschoolers. Note that these investigations measured the impact of fortified food by comparing the difference between the experimental and control groups through direct

intervention i.e. by giving fortified foods to the respondents. The contribution of fortified foods consumed freely by individuals has not yet been examined.

To date, the only local study on the physiological effect of fortified foods on diets of free-living preschool Filipino children was conducted by Solon, et al. (1996). This study assessed the effect of vitamin A-fortified margarine on vitamin A status of young children using a double-masked randomized community trial design. The children's vitamin A status and dietary intake were assessed at baseline and follow up. Results of consumption of fortified margarine with vitamin A among the experimental group and non-fortified margarine among the control group showed that intake of vitamin A fortified margarine made a significant improvement in the vitamin A status of the preschoolers. There has never been a study looking at the effectiveness of fortified foods among free-living populations.

The next section shows the percentage contribution of fortified foods to total nutrient intakes of the population. Highlighting the nutritional contribution of fortified foods emphasizes the importance of the food fortification programs especially if nutrient deficiencies exist.

2.4.2 Contribution of Fortified Foods in Nutrient Intakes

The following studies show the amount of nutrients contributed by fortified foods to total nutrient intake.

Most US studies demonstrated the significant contribution of fortified foods to total nutrient intakes. Cook and Welsh (1987) determined the effect of enriched and fortified grain products to nutrient intake using the 1977-1978 US Nationwide Food Consumption Survey. They found that around 64-67% of total thiamin intake was provided by these products. About 20% of iron intakes were contributed by fortified breakfast cereals. According to Hurrel (1997), about 20% of the total iron intake as determined in NHANES II were due to the fortified iron

in white bread, rolls, crackers, corn flour, corn grits, pasta and breakfast cereals. Another US study showed that fortified cereals contribute around 32%, 18%, 20% and 19% of thiamin, riboflavin, niacin and iron to the total intake respectively (Walter, 1997).

An analysis by Block, et al. (1994) using data taken from the 2nd National Health and Nutrition Examination Survey from 1976-1980 showed that fortified foods contribute 8.9% and 16% of the vitamin C intakes of white and black populations in the US, respectively. Vitamin E contributed by fortified foods was 10% and 1%, respectively among white and black peoples.

A study on dietary sources of nutrients among US children concluded that fortified foods have strong influence in contributing to several vitamins and minerals in the US (Subar, et al., 1998). Data from 1989-1991 Continuing Surveys of Food Intakes by Individuals were utilized in this study to create one large dataset. The results of the study showed that fortified foods were dominant contributors in the micronutrient intakes of the respondents. Fortified ready-to-eat cereals were the top contributors for folate and vitamin A intakes and the third or fourth contributor for vitamin C. Fortified fruit drinks were the second highest source of vitamin C for all age-gender groups. No toxicity issue on the use of fortified foods was encountered. The 24-hour recall and 2-day diet records were used in this study and the main meal planner/preparer was asked to report intake of children younger than 12 years. However, the investigators advised caution in using these data to rank food sources of nutrients among American children since most of the frequently eaten fruits and vegetables were treated as separate groups. Otherwise, if all citrus fruits or all vegetables were combined together, the contributions of many nutrients from these sources would be considerably higher than what were shown.

Studies from other western countries have shown the significant contribution of fortified foods to nutrient intakes. Using a different data set, iron from fortified wheat flour and bakery products provides approximately 20% of

the total iron intake in North America and almost 40% of that in Sweden (El Guindi, et al., 1988).

In the United Kingdom, the contribution of iron from fortified foods to iron intake was substantially lower at around 6%. However, fortified breakfast cereals could provide up to 15% of total iron intake in 11-12 year olds in the UK (Hurrel, 1997). The contribution of flour fortification to total calcium intake was determined by Moynihan et al. (1996) in the diets of adolescents in the UK. The calcium content of each food consumed was subdivided into naturally occurring calcium, and calcium from fortification and data were analyzed to provide the daily intake of each nutrient. Fortification of flour contributed 13% of the total calcium intakes of the subjects. The study also suggested that if flour fortification was removed, the proportion of adolescents with intakes of calcium below the lower reference nutrient intake increased more than fourfold to as great as 16%.

In a recent survey, over half of the total vitamin A intake from non-breast milk sources was derived from fortified sugar, incaparina (a local food) and margarine indicating that fortified foods make significant contributions towards vitamin A intake among poor Guatemalan toddlers (Krause, et al., 1998). Fortified sugar alone contributed to 25% of the children's total vitamin A intake from non-breast milk sources and the total vitamin A intake was almost the same level recommended by FAO/WHO (400 RE/d). It showed the important contribution of fortified foods to vitamin A intake of the sample. Although a detailed intake of vitamin A from food sources was determined through 7 consecutive 24-hour recalls, this study recruited only 55 children as respondents. More conclusive results could have been obtained if the sample size was increased.

The above studies provide evidence on the actual contribution of fortified foods to the nutrient intakes of the populations studied in terms of percentage.

The next section shows how international studies have provided literature indicating the effectiveness of fortified foods.

2.4.3 International Studies on Efficacy of Fortified Foods

This section presents a review of literature on fortified foods from international sources providing evidence on the significant effect of fortified foods in improving nutrient intakes and in preventing nutrient deficiencies.

Numerous international studies on fortified foods clearly showed the efficacy of food fortification. The following studies showed the physiologic response to consumption of fortified foods when these foods are added to the diet using the experimental design. A double-blind controlled iron fortification trial using iron-EDTA in curry powder was conducted in an iron-deficient Indian population for two years (Ballot, et al., 1989). The improvement in iron status was significant for females in hemoglobin, ferritin, and body iron stores but for males, it was only for ferritin. There was a decrease from 22 to 5% in the prevalence of iron deficiency anemia in females in the experimental group.

In Chile, bovine-hemoglobin-fortified cookies improved the iron status of school children who participated in a nationwide program for 2 years (Walter, et al., 1993b). The benefit was more evident among the children with greater needs for iron, such as post-menarchial girls and pubertal boys. The results of the study conducted by Walter et al. (1993a) showed that intakes of fortified cereals among infants were quite effective in preventing iron deficiency anemia. It concluded that iron-fortified cereals could contribute substantially to prevent iron deficiency anemia.

Adding vitamin C to iron fortified foods may help in the absorption of iron. Nilson and Piza (1998) found that adding 100 mg of vitamin C to milk containing 15 mg/L iron significantly reduced anemia from 36% in the control group to 13% in the fortified group of children. Another study reported by these authors noted

a reduced prevalence of anemia from 28% in the control group to 2% in the fortified group after consumption of milk fortified with the same amount of iron.

Another double-blind field study was undertaken to test the effectiveness of sugar fortification in controlling iron deficiency in one highland control community receiving vitamin A-fortified sugar and three communities receiving sugar fortified with vitamin A and iron NaEDTA (two lowland and one highland) (Viteri, et al., 1995). There was a significant increase in iron stores in the fortified communities except for women 18-48 years of age in one lowland community and women of more than 49 years in the highland community.

The response to iron fortification of yellow and white maize and wheat flour was studied in Venezuela among children aged 7, 11 and 15 years (Layrisse, et al., 1996). The corn flour was also fortified with vitamin A, thiamine, riboflavin and niacin. The wheat flour was also enriched with the same vitamins except vitamin A. After a year of fortification, a preliminary survey was carried out among 307 children and showed a reduction of 37% in the prevalence of iron deficiency and 19% in the prevalence of anemia in 1992. In 1994, the reduction was 15% and 10% respectively.

Ortega and associates' (1996) work in Spain showed that the group of children who consumed fortified breakfast cereals had higher intakes of thiamin, pyridoxine, folates and beta-carotene and had higher levels of retinol, serum folate and riboflavin compared to children who did not. This study used hematological, biochemical, anthropometric and dietary data.

Iron fortification of soup (providing 18.4 mg elemental iron or 0.9 absorbable iron) was associated with positive increase in hemoglobin, mean corpuscular volume and serum ferritin among children with low iron stores compared to children who did not receive fortified soup. This was shown by the intervention study conducted in South Africa by Kruger and co-workers (1996) on the effects of iron fortified soup on iron status and growth among school children.

This is a carefully designed study, which used three experimental groups (1st group-fortified soup and anthelmintic therapy; 2nd group-fortified soup and placebo; 3rd group- unfortified soup and anthelmintic therapy) and two control groups (1st group-unfortified soup and 2nd group-placebo). Although anthelmintic therapy also demonstrated positive changes in hemoglobin, the significant effect of fortified soup was also evident. Again, the effect of fortified soup with iron was more significant among participants with low iron stores.

As viewed from these experimental studies, fortified foods made a significant contribution to the nutritional status of some consumers. The results of these studies justify a food fortification program on a national scale to prevent and control micronutrient malnutrition. A study to measure the effect of fortified foods in the micronutrient intake of Filipino population needs to be conducted at this time.

The following section will provide data on significant improvements on the micronutrient status of free-living population consuming fortified foods.

2.4.4 International Studies on Fortified Foods in Free Living Individuals

This section presents the positive effect of fortified foods in free-living populations.

To be effective, people formerly lacking in nutrients must consume fortified foods in adequate amounts. Several international studies have demonstrated an increase in nutrient intakes and physiological response in free living/free eating populations. In Guatemala, a significant decrease in the prevalence of vitamin A deficient plasma values among the population was reported in the first period (1975-1977) of sugar fortification (Pineda, 1993). The first six months after the second period (1988 onwards) also showed similar results with a reduction in the prevalence of plasma retinol levels below 20 and

30 μg/dl. Similar success was demonstrated in reducing the level of anemia through food fortification efforts particularly in infant foods and cereal-based products in Sweden and the United States (Darnton-Hill, et al., 1999). Similarly, Hurrell (1997) reported that iron from the consumption of fortified infant formulas in the US and Sweden accounted for the constant drop in the prevalence of iron deficiency in infants and preschool children over the last 30 years. Moreover, the present low incidence of iron deficiency among fertile US women could be due in part to the high intakes of fortified foods with iron.

The benefit of fortified food was also evident in another study (Kloeblen, 1999). Kloeblen showed that almost 80% of the respondents would probably achieve the goal of 400 μg folate per day with intake of folate fortified grains alone. The samples consisted of low-income pregnant women. Although the author enumerated several limitations of her study including incomplete assessment of respondents' total folate intake, the results of the study confirmed the significant contribution of fortified grains to folate intake of the samples.

The effect of biscuits fortified with iron, iodine and beta-carotene on the micronutrient status was examined in school children (Van Stuijvenberg, et al., 1999). A significant improvement in the micronutrient status among the children was demonstrated after consumption of fortified biscuits for 43 weeks over a 12-month period. Biochemical analysis was sufficient to measure the effect of the micronutrients.

Cuskelly, et al. (1999) reported that habitual intakes of foods fortified with low amounts of folic acid is associated with a mean dietary intake of this vitamin that was 35% higher than that of nonconsumers. This in turn, was reflected in significantly higher red blood cell concentrations in consumers than in nonconsumers. Even more, when fortified foods were excluded from the diet, a reduction of 78 μg folic acid was observed from those who consumed fortified foods compared to those who did not. The individual intakes of folate in 21

women of child-bearing age increased by 550 ±279 micrograms from fortified foods (Firth, et al., 1999). It was found that when folic acid fortification was added to dietary intake, there was no need for routine supplementation to achieve folate intakes of 400 micrograms in most of the respondents.

The studies presented previously were success stories on the effects of fortified foods. Nevertheless, not all studies were able to establish the positive contribution of fortified foods to nutrient intake. An example was the study by Subar and Bowering (1988) in New York. This investigation found that people with low risk for deficiency might not need fortification of foods. The contribution of enrichment and fortification of foods to nutrient intake was studied in a survey among 162 women shoppers. Except for vitamin C, vitamin D and calcium, high and moderate users of fortified foods had significantly greater nutrient intake from fortification. However, no significant differences between the study groups were detected for total mean nutrient intake from all food sources (fortified and non-fortified foods). The respondents did not appear to need enrichment or fortification to meet their RDA for niacin, riboflavin and vitamin C probably because they represented a homogenous affluent group of women who were at low risk for deficiency. The results could have been different if the investigators included subjects with marked differences in socio-economic status.

Generally, fortified foods have been shown to improve nutrient intakes of the population under study. Moreover, intakes of fortified foods significantly reduced levels of nutrient deficiencies in specific populations. However, this still needs to be investigated in the Philippines. It is possible that those at low risk of deficiency could consume SPS foods predominantly.

The actual nutrient contribution of fortified foods to total nutrient intakes of Filipinos merits a critical study to determine its impact in the adequacy of the diet.

The following section discusses the negative effect or risk of fortified foods.

2.4.5 The Effects of Nutrient Interaction/Risks of Fortified Foods

This section presents possible negative effects or risks of consumption of fortified foods.

Nutrients present in food interact to influence absorption. High iron intake has been hypothesized to interfere with zinc absorption (Solomons, et al., 1983; Crofton, et al., 1989). Davidsson and co-workers investigated this in 1995. The methods used were radioisotopic labeling of single meals followed by measurements of whole-body retention of zinc at 14 days after intake. They evaluated the current iron fortification levels of 200 or 500 mg Fe/kg (weaning cereals), 65 mg Fe/kg (white wheat flour) and 12 mg Fe/l (infant formula). It was found that fortification of iron in these foods was not associated with impaired absorption of zinc. However, the long-term effect of iron-fortified foods on zinc absorption remains to be seen even though most studies have not demonstrated any negative effect. Other potential negative effects of over consumption of fortified foods are very high nutrient intakes and iron overload.

The effect of withdrawal of fortified foods on certain at- risk populations was also presented to give a balanced picture of food fortification. Although most of the previously discussed studies clearly emphasize the benefits of food fortification, there is a certain point in time when a decision to stop fortifying food may occur. Osler, et al.'s longitudinal study (1999) examined the effect of iron fortification on iron status by comparing the intake of iron with serum ferritin over time and in relation to elimination of fortified flour in Denmark. The remarkable finding was that even after removal of flour fortification after 5-6 years, serum ferritin increased in both men and postmenopausal women. Considering that mandatory fortification affects the whole population including those at risk with chronic diseases due to high iron stores, the authors were

prompted to conclude that stopping the mandatory flour fortification after 33 years of implementation in that country appear to have been well-founded.

The effect of withdrawal of food iron fortification was studied in Sweden (Olsson, et al., 1997). Findings of this study provided assumptions that people with hemochromatosis will accumulate excess iron at a slower rate and the prevalence of iron deficiency will increase among menstruating females as a result of withdrawal of iron fortification. Similarly, a longitudinal study among Danish adults measured their calcium and vitamin D intakes in 1987/88 and again six years later in relation to food patterns, recommendation and legislation (Osler and Heitmann, 1998). It demonstrated that fortification of flour supplied up to 30% of the total calcium intake. With the absence of mandatory flour fortification, there was a significant increase in the percentage of adults whose calcium intakes were below the recommended amount. The results of this study suggest that stopping mandatory flour fortification with calcium may have been premature.

To ensure that no toxicity issue arises with consumption of SPS foods, the SPS program requires a specific level of nutrients to be added to the foods. For processed foods to be fortified with nutrient(s) with known toxicity (e.g. vitamins A, D, E, K, zinc, selenium), the level of such nutrient in the food shall not exceed 150% of the RDA for the target consumers per prescribed serving(s) likely to be consumed per day. Processed foods that maybe fortified are those that can supply at least 40 kcal per serving (Parce, 1995).

It is still premature to establish whether fortified foods pose any risk to the population. Assumptions used to set allowable levels of fortification can be examined by looking at actual intake levels.

The next section discusses the available literature showing the considerations in purchase and intake of fortified foods.

2.5 CONSIDERATION in PURCHASE and INTAKE of FORTIFIED FOODS

This section discusses the factors that consumers consider in their purchase and intake of fortified foods. The purpose of this section is to give background information on how people choose fortified foods.

There is limited literature on purchase and intake of fortified foods. A study conducted among 162 shoppers in New York City showed that only 18% of highly fortified foods were actually consumed for reason of acquiring added nutrients (Subar and Bowering, 1989). Taste was shown to be the most important consideration in purchasing fortified foods as opposed to factors related to nutrient content. In addition, the results of this research study indicated that many consumers appeared not to be aware of nutrient addition to the foods.

The qualitative research on fortified foods in the Philippines (Joven, et al., 1996; NS-DOH and Moran, 1996) found that respondents were willing to buy fortified staple foods if there was no increase in price and deterioration of physical attributes (taste, color, odor, texture and appearance). Participants who agreed with the need for fortification of bread with vitamin A indicated that everyone regardless of price would buy fortified bread. However, other respondents believed that price would determine consumers' access to fortified bakery products. They were amenable to a price increase of 5 to 10 centavos (US$ 0.0125) for small bread and 2 pesos (US$ 0.05) for loaf bread.

The limited literature on the factors that affect purchase and intake of fortified foods indicates the need to study this aspect. It is believed that this information could be vital for more acceptance of these foods to the public.

The next section explores awareness of fortified foods.

2.5.1 Do People Know About Fortified Foods?

The US study on fortified foods by Subar and Bowering (1988) showed that even with the advertising for fortified foods, many participants were not aware which foods were enriched or fortified and appeared to have limited knowledge of the nutrient content of these foods as well. Similarly, the findings of the qualitative study on fortified foods in the Philippines (Joven, et al., 1996; NS-DOH and Moran, 1996) reported that Filipino mothers were not familiar with the term "fortified foods".

From this limited literature, it seems that people need to be informed about fortified foods to maximize its benefits. There is a need to study if people are aware of fortified foods. Provided that people are aware of fortified foods, will awareness affect their selection of fortified foods?

The section that follows discusses attitude to fortified foods among Filipinos.

2.5.2 Attitudes Towards Fortified Foods in the Philippines

This section presents the results of previous studies on attitude of Filipino mothers towards fortified foods to give an idea on how they perceive these foods.

Although it appeared that Filipino mothers were not familiar with the term "fortified foods", they showed positive attitude towards addition of nutrients to foods. Florencio's study in 1990 determined the perceptions of pregnant and lactating mothers on fortification of foodstuffs. Around 90% of the women agreed to fortification of foods, such as rice, salt, sugar and bread, while 80-89% agreed for all other foodstuffs. An increase of 50 centavos for fortified foods was acceptable to most of the participants but 5 to 19% did not favor fortification if there was price increase.

In 1996, a national qualitative study on the knowledge, attitudes and awareness of mothers of fortified staple foods was conducted among full time and working mothers (Joven, et al., 1996 and NS-DOH and Moran, 1996). In general, almost all of the respondents had positive attitudes towards fortified foods or foods with added nutrients. Good nutrition was recognized as important. Fortified foods were perceived as "easy to prepare", "nutritious", "worthy of trial", "keeps you healthier", but "contains preservative". Mothers who purchase fortified foods were seen as "practical", "concerned", "wise", "health conscious" and "can afford these products". However, some respondents also perceived that people who did not eat enough fruits and vegetables would most likely purchase fortified foods.

Filipino mothers have shown a positive attitude to the idea of fortified foods. It remains to be seen how they perceive fortified foods with SPS. Hence, there is a need to investigate their attitude and determine if it can influence their choice of these foods.

The next section shows the characteristics of people consuming fortified foods.

2.5.3 Who Uses Fortified Foods?

This section is presented to identify the people who consume fortified foods. Describing the demographic characteristics of the population using fortified foods will provide comparison of results from previous studies to the present study.

The literature is scant on the demographic characteristics of populations consuming fortified foods. A search on the databases in nutrition and food intake studies and nutritional surveys provided little information in this subject. This might be because previous studies on fortified foods focused on the consumption and nutrient intakes from fortified foods. In addition, evaluation studies on food

fortification programs have not attempted to associate demographic variables with intake of fortified foods.

In the Philippine study, qualitative research on fortified foods showed that respondents buy food products with familiar brands and base their food purchase on the preference of their children and the husband. It was also found that the most commonly purchased processed brands were sardines, noodles, corned beef, hotdog, meat loaf, sausages and fruit juice (NS-DOH and Moran, 1996).

Sloan and Stiedmann (1996) reported that the demographic profiles of consumers of fortified foods resemble the 101.2 million nutrient supplement users in the US. However, these people only had similarities on demographic characteristics but the conscious decision to buy these supplements could not be comparable to an intention to buy fortified foods.

With limited information, it will be more useful to discuss the relationship of demographic characteristics and the priorities of people in food selection. Glanz, et al. (1998) showed that demographic factors were significant predictors of the priorities in food choice. The importance of nutrition was most important to the elderly, women and certain ethnic groups but it had no significant relationship with income. Younger respondents, women, non-whites and people with lower incomes placed the highest importance to cost. Weight control concerns were most important to older respondents and among women.

It is clear that data on the demographic characteristics of population consuming fortified foods are lacking. Therefore, a study about it is needed to fill in this research gap.

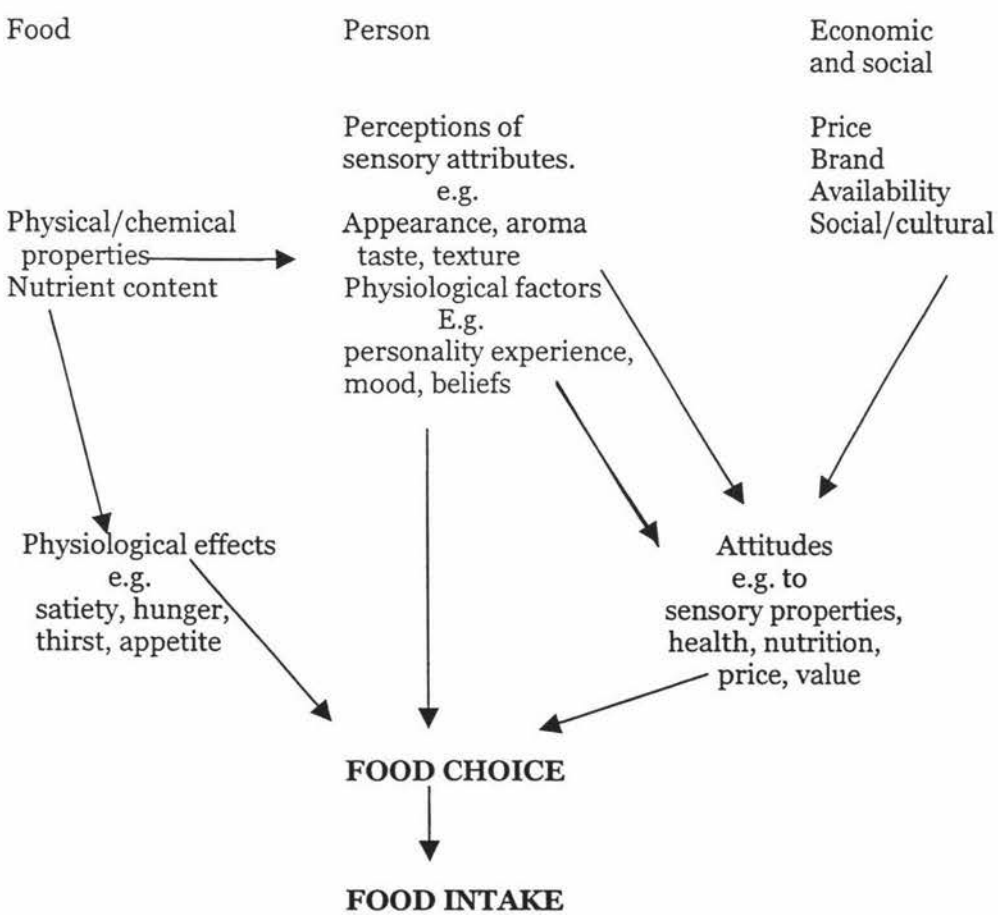
The preceding section discusses the use of fortified foods as a food choice decision.

2.5.4 Fortified Foods as a Food Choice Decision

If people are aware that foods are fortified they can then make a conscious decision regarding purchase.

It remains to be established if purchase of fortified foods is made in the same way as one makes a food choice decision. A review of studies on factors that affect food choice is presented in this section to provide an overview of the most common factors that influence food selection. The model on Figure 2-1 illustrates the factors that affect food choice (adapted from Shepherd, 1990, p 3).

Figure 2-1. **Some Factors Affecting Food Choice and Intake (Adapted from Shepherd, 1990,p 3)**



2.5.4.1 Studies on Factors that Affect Food Choice

Section 2.2 gave an idea on how food choices are shaped by the changing cultural and socio-economic patterns. This section will attempt to enumerate the factors that affect food choice and food buying pattern/behavior among mothers particularly in urban areas.

A range of factors affects food choice. Kurt Lewin's theory indicated that food choice is a complex process which involves cultural, sociological, and psychological factors varying between individuals and exerting different degrees among various groups of people and for different foods (Winter Falk, et al., 1996). As Cardello (1995) puts it, "*of equal importance as food's sensory attributes for determining food choice are such factors as 1) social and cultural influences operating on the consumer; 2) product expectations as generated by product information and packaging; 3) situational and market factors; 4) learning and/or previous experience; and 5) bodily states, such as hunger, level of hydration, and sensory specific deprivation*".

Food purchasing can have consequences for the nutritional status of an entire household since the food consumption of a family may be determined by the primary food purchaser- mother (Ballew and Sugerman, 1996).

In a study on self-reported food buying practices of housewives in a subdivision in Metro Manila, the needs of the family ranked first in the factors that respondents consider in buying foods (Martinez, 1979). Purchase of foods depended on income, size of the family, food preferences, prices of foodstuff, season, age and occupation of the family members. This study used personal interview and utilized numerical ranking of the factors according to their importance.

A number of US studies determining the factors considered in food selection reported taste as the most important factor influencing their choice

(Glanz, et al., 1998; Colavito, et al., 1996; Sloan and Steidmann, 1996; Sloan, 1994). Nutritional concerns were less relevant to most respondents than taste and cost (Sloan and Stiedmann, 1996). Other important factors considered in food selection were nutrition (75%), price (74%), and product safety (72%) among others (Sloan, 1994). In another study, the data using the 1989-91 Continuing Survey of Food Intake by Individuals and Diet Health Knowledge found that price, ease of preparation and perishability were important food purchasing considerations for majority of respondents (Colavito, et al., 1996).

A wide range of factors was relevant in food choice of the family (Kirk and Gillespie, 1990). An analysis of working mothers' perspective on food choices for their families in the US was conducted gathering a qualitative data. The results showed that health, nutrition, socialization (interaction of family members), catering to individual family member's desires (preferences, variety), budget, time (convenience and ease of preparation), management and organization (planning and allocation of resources in relation to foods), and season and weather are given top priorities when it comes to family mealtime food choices.

It appears likely that for each particular food item, the respondents might weigh these factors differently. Some studies reported other factors influencing food selection. The relationships between food shopping behavior and food patterns in two-parent families were examined through a mailed questionnaire (Bassler and Newell, 1982). The respondents were asked to select the first, second and third most important factors from a list influencing their food purchases. More than half of the respondents reported that cost and nutritive value were the first influencing factors on food purchases. However, family preferences seemed to dominate and have control over several purchases.

All in all, all these studies show that the most important considerations in food choice and food purchase are taste (sensory), price, nutrition, family preferences, and quality of food. These are then influenced by personal, social, cultural and food attributes. The results of these studies can give an idea on how

individuals select foods. Figure 2-1 illustrates the complex process of how people choose foods. In so doing, it is postulated that these considerations will be similar when it comes to selection and purchase of fortified foods. Presumably if people are not aware that a food is fortified, their choice will be similar to any other food. While if they are aware, this may influence their choice. Awareness and use of food label can influence each other in selection of fortified foods. The influence of awareness to choice of fortified food is stronger if "nutrition" is an important factor for them if they believe that fortified foods will improve their nutrient intake. This is where attitude may exert certain influence in selection of fortified foods. People's priorities also affect food selection. However, these factors may vary depending on demographic characteristics and on the food under consideration. Consumption of fortified foods determines the nutritional status (See Figure 2-2).

Although there is a vast of literature on factors that affect food choice. How people choose fortified foods is another research gap. A study of these factors could be beneficial to improve acceptance of fortified foods by the consuming public.

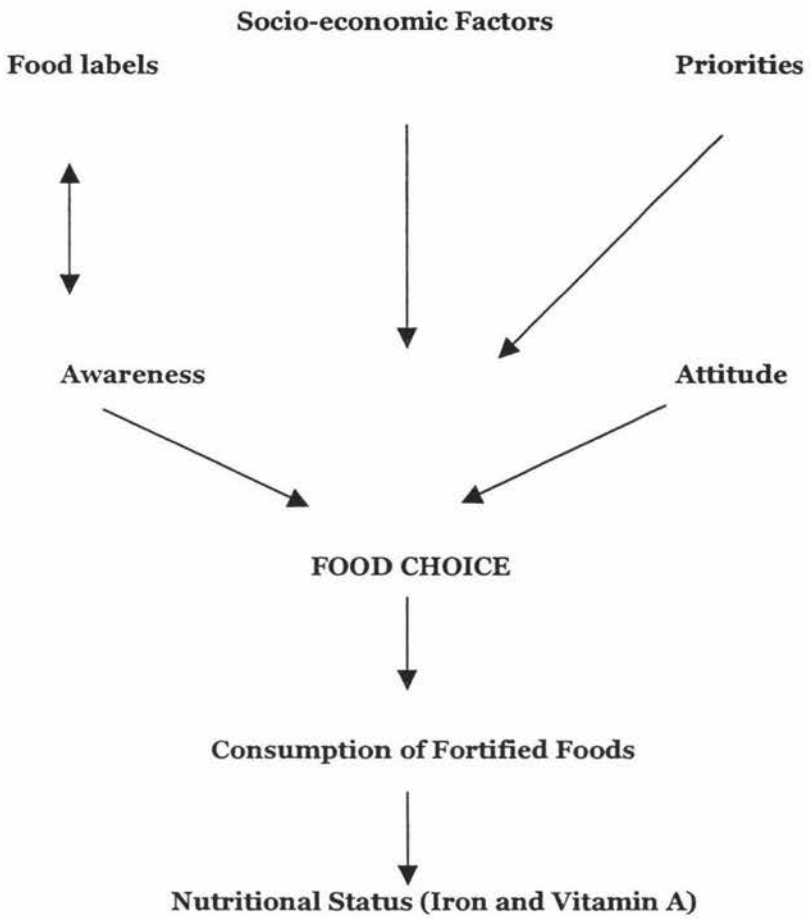
Figure 2-2 presents the conceptual framework of the present study, which is an adaptation of Shepherds' model on food choice.

The next section presents the relationship of each socio-economic factor with food choice and food intake.

2.6 RELATIONSHIP of SOCIO-ECONOMIC FACTORS to FOOD CHOICE and INTAKES

It is important to describe each factor that affects food choice and intake and the extent of its influence. In this way, it will permit assessment of whether such factors are likely to exert influence in selection of fortified foods.

***Figure 2-2* Conceptual Framework**



A number of studies in the Philippines have consistently demonstrated the effects of income, education of meal planner, occupation of household heads, and household size, choice, and nutrient intake of the family. The differences in food and nutrient intakes of 155 preschool children were accounted for by family income and food budget, family size, age and sex of the children, employment of mothers, food preparation and distribution practices (Lim and Florencio, 1975). In a study in Quezon City (a key city in Metro Manila), education of housewife, monthly household income, food expense per day and storage facilities were significantly related to some food purchasing patterns (Cabotaje, 1983). Healthy well nourished preschoolers came from households with better employment, higher family income and food budget, smaller families, more education,

increased mother's personal care, better food preparation practices, and greater variety of foods. Moreover, food expenditure, food preparation time and mother's education exerted positive effects on nutrient intake of the 197 families under study (Florencio, 1983).

2.6.1 Income

No other demographic characteristic studied has exerted stronger effect on food purchasing and food and nutrient intakes of consumers than income. Combined 1978 and 1987 national nutrition surveys in the Philippines found that income had a stronger relationship with food and nutrient intake than other factors under consideration (Florentino, 1996a; Villavieja, et al, 1989). Furthermore, income and food peso value were found out to be strong determinants of food intake among the factors analyzed in relation to dietary intake in the 1987 FNRI survey (Villavieja, et al, 1989). In the 1993 national nutrition survey, it was found that households who were nutritionally at risk with alarming low nutrient intakes for several nutrients were those having an annual per capita income of less than P 6,000 and with per capita per day food expenditure of less than P 10.00 (FNRI, 1993). Based on 1993 national nutrition survey, changes on food choices were also evident as incomes increased through reduction of some traditional calorie sources and preference for more convenience foods (Florentino, et al. (1996a). It is postulated that an increase in income could also cause an increased intake of fortified foods since these foods are classified as "processed"/convenience foods.

International studies also reported the effect of income on food intake. Data from the Health Education Authority's 1993 Health and Lifestyles Survey in the UK examined the barriers to accessing healthy diet. It revealed that access to food was primarily determined by income, which was closely associated with available physical resources to avail of healthy foods (Caraher, et al., 1998). In the US, Variyam and Blaylock, 1998 examined the relationship between income and diet quality. Their finding produced surprising results. If two people with

the same characteristics, except one had a higher income, the one with higher income had a lower quality of diet as measured by healthy eating index. This suggested that income alone did not necessarily equate with healthy eating.

Nevertheless, even with added income, engagement of mothers in income-generating activities did not increase nutrient intake of urban families unlike rural families (Florencio, 1983). This difference could have been due to the fact that these rural mothers worked near their homes, thus easing their combined work and wife-mother roles.

The literature showed how income affects food choice. Does income have positive influence in the selection of fortified foods? This needs to be assessed in the future.

2.6.2 Food budget

According to Solon (1997), *"it is a known fact that a large part of the budget of an average Filipino family goes to food"*. This was supported by Florencio (1989), Cabotaje (1983) and Ramos-Jimenez, et al., (1986) where most of the household monthly income was spent on foods among households. Food expenditure had consistent positive effects on both total (weighed) intake and consumption of energy and protein (Florencio, 1983).

This trend could be explained by Engel's Law, which states that the share of food in total household expenditure decreases with increasing income (Ritson and Hutchins, 1995).

An early study in the Philippines (Popkin, 1975) found that around 10-16% of the household income was contributed by the mother's income and that maternal income had an independent positive effect on food expenditure. However, additional income was not associated with additional vitamin A intake when the mother was employed except for top two-income quartile. Moreover,

Popkin's (1975) study reported that even with the increased food expenditure, the nutritional status of the child had been found to be poorer among working mothers with the greatest difference occurring in vitamin A consumption.

Since food budget has the largest share in the family's expenses, it is considered a major factor that influences the purchase and consumption of fortified foods. This is because with increased income, more foods (e.g. fortified foods) are purchased. However, this still needs to be established.

2.6.3 Household Size/Composition

Household composition also plays a significant role in food expenditure and consumption patterns among rural Filipino households (Villavieja, et al., 1989). Households of four members or less and with fewer members aged 13 years and over attained better diets (Valerio, et al., 1982). This data was taken from low-income households in the 1978 national food consumption survey. In a more recent survey, households with few members consumed large amounts of food groups (Florentino, et al., 1996a). This was supported by Florencio's study (1983) wherein family size had a negative effect on nutrient intakes of families. Moreover, household size related negatively with income (Florentino, et al., 1996b).

From the results of these studies, it appears that there is an inverse relationship between household size and the food and nutrient intakes of the family members. However, these studies did not control for income.

If family size can influence food consumption, it remains to be seen if it affects the quality and quantity of fortified foods.

2.6.4 Occupation

Occupation is one measure of socio-economic status of an individual and is perceived to exert its effect in purchasing patterns of consumers through a number of mechanisms. Occupation is directly associated with income and hence, food budget. Ortega's study (1979) in Manila also showed that the incomes of unemployed, daily wage laborers and casual workers were inadequate to meet the needs of the family, thus limiting the choice of homemakers in buying foods. In a small-scale survey, the majority of households in rural areas with better diets had family heads who were farm owners and managers (Valerio, et al., 1982). However, occupation can be a marker for education. In the 1993 national survey, meal planners with high educational attainment had better food choices on the quantity and quality of foods for their households given the same financial difficulties faced by all households (FNRI, 1993).

In 1993, the occupational groups shown to have more diverse and better food intake were the professionals, particularly the professional overseas contract workers, professional technical and related occupation, executives and managers and large entrepreneurs. On the other hand, those occupational groups such as kaingeros, small fishermen, hired fishermen, service, sports and related workers and those without jobs had very limited choices and provisions for food (FNRI, 1993). The households with the least amount of peso value had limited intake of foods. Hence, these groups could only purchase cheap foods like corn and products, green leafy vegetables and starchy roots and tubers.

Difference in income or occupation is not the only predictor of nutrient intakes but also access to resources. A comparative study on food consumption patterns focused on four occupational groups (Florentino, et al., 1991). It was found that the proportion of income spent for food was larger among the urban poor and fishing households and less among the small farmers and farm laborers. Energy-giving foods accounted for the largest share of food expenditures. However, the urban poor households had the lowest energy, protein and iron

intake. Vitamin A was low for all the four occupational groups. All the households from the four occupational groups had incomes below the poverty thresholds. Moreover, preschoolers from the urban poor had the biggest proportion of moderately and severely underweight children. This might be due to the fact that urban households had no access to land and production resources thus were not able to produce for their own food needs. For these urban households, foods consumed were a function of income or purchasing power that was very low.

Based on these studies, occupation is associated with meeting the food and nutrient needs of the family. This effect may be due to income and access to resources. Occupation is very much related with income, and this in turn, can be moderated by the effect of education in terms of meeting the nutrient needs. There is a need to study if socio-economic factors like occupation could influence consumption of fortified foods.

2.6.5 Educational Attainment

Most studies in the Philippines found a positive relationship between mother's education and household diet. It was found by a survey that meal planners with high educational attainment made better choices on the quantity and quality of foods for family members (Florentino et al., 1996a). Likewise, Orlina (1982) reported that mother's education had a significant relationship with the child's nutritional status. Villavieja, et al (1989) demonstrated that the contributions of some aspects of education particularly the level of mother's education, their nutrition knowledge and the nutrition messages they received have indirect but substantial effect on the child's diet and nutritional status. This meant that the more educated parents were, (particularly mothers who had better knowledge of nutrition and child care), the better their decision on food and on allocation of resources than less educated parents (Villavieja, et al., 1989). Valerio, et al. (1983) found that household composition and meal planner's

education were the strongest variables affecting food cost and energy intake of the household in 1975.

In contrast, Ortega's (1979) study found that educational attainment of the homemakers did not influence their buying practices although income of the family and occupation of housewife had a significant relationship with food buying practices in Manila.

Most studies in the Philippines showed the positive effect of maternal education to food and nutrient intake. Studies that determine if education has a similar influence on consumption of fortified foods are recommended.

2.6.6. Advertising

A number of studies in the Philippines suggest that advertising influences the purchasing behavior of households. In a survey of buying behavior among 300 urban low-income households, a greater tendency was observed among households highly exposed to advertising to patronize highly advertised foods compared to those with low exposure regardless of socio-economic status (Lasquety, et al., 1990). Thus, advertising may shape the buying behavior of households towards highly advertised foods despite limited purchasing power. In contrast, according to Florentino, et al. (1991) susceptibility to food advertisements was clearly associated with purchasing power. The households who had higher income (small farmers and fishermen) than the other groups appeared to purchase advertised products. In contrast, urban and landless households with limited incomes, tended not to buy advertised food products.

In another descriptive study conducted among 100 semi-urban housewives, television was found to be the most effective form of media in creating product awareness and also the most convincing media in selling food products (Natividad, 1981). In this self-report study, quality and nutritional

value of the food and the preference to buy such product were the factors considered in trying a new product.

Advertising has been shown to have a positive effect on food choice. There is a need to study if the information campaign on fortified foods through the mass media could influence selection of these foods by the consumers. It is particularly interesting to see if the effect of advertising on fortified foods is affected by socio-economic status.

The following section gives a brief background on the relationship of nutrition knowledge and demographic information.

2.6.7 Knowledge and Demographic Information

The survey by Turrel (1997) in Australia showed that education was significantly related to both knowledge and food and nutrition practice. Similarly, the demographic characteristics of participants less knowledgeable about fiber content of foods were those with lower income and lower education along with being male, Black, smoker and Hispanic (Variyam, et al., 1996). Furthermore, consumers with low nutrition knowledge were likely to have lower education, lower income and with less prestigious occupations (Fusillo and Beloian, 1977).

Healthy Eating Index (HEI) scores were used by USDA to measure the overall quality of individual's diets using the data in the Continuing Survey of Food Intakes by Individuals (Variyam and Blaylock, 1998). It was found that higher level of education was correlated with more nutrition knowledge of the foods' nutrient contents inducing them to improve the quality of their diets.

In the Philippines, nutrition knowledge was significantly associated with higher income, more years of formal schooling and attendance to nutrition classes (Celestino, et al., 1982) and exposure to nutrition information materials

(Valdecañas, et al., 1986). However, there has never been a study conducted to determine if awareness of fortified foods is significantly related with any of the demographic information. Thus, this needs to be assessed in order to identify the demographic characteristics of people who are likely to be aware and not aware of fortified foods for information dissemination purposes particularly if awareness is associated with purchase.

It is believed that aside from demographic information, the use of label has the tendency to affect food purchasing.

2.6.8 Use of Label in Purchasing Foods

The label on food products provides valuable information about the product's quality and quantity including its nutritional content. In the Philippines, the usual format of the label of food products indicates the ingredients, food additives, vitamins and minerals, nutrition information (percentage of protein, carbohydrates, fat, energy value and vitamins and minerals per 100 gms of the product and open-date markings (The Filipino Consumer, 1997). The label of the product also indicates if a product is fortified with vitamins or minerals.

A study on the buying behavior of housewives in Metro Manila revealed that housewives with higher educational level always read labels of canned/packed food items before buying (Cabotaje, 1983). In contrast, a qualitative study on fortified foods revealed that most of the respondents did not pay attention to the details of the label on the food products (Joven, et al., 1996). This study was conducted among professional and educated mothers (working) and full time mothers (non-working). Further research is needed to clarify the findings of these self-report studies. Only limited literature on the use of label among meal planners in the Philippines is available thus, justifying a need to examine international literature.

It appeared that respondents with higher income and higher education were more likely to use label on foods in other countries. A 1991 survey of 302 supermarket shoppers in New Zealand found that majority (79.8%) claimed to read some information on food packets and tins (Wiseman, 1991). Thirty seven percent (37%) looked for additives on labels. It was apparent that the subjects usually seek nutritional information. This survey also found that 73% of respondents would try new food items if that food was described as "low fat", "additive free", "low sugar", "low calorie", "natural", "energy-packed", "nutritious", "vitamin-enriched". Furthermore, heavy users of labels considered nutrition information labels as a very important factor to make better food choice decisions. They tended to have higher income, higher education and belonged in the age group 35 to 54.

Similar results have been found in the US. An analysis by Bender and Derby (1992) compared the prevalence of reading nutrition and ingredient information on food labels among adult American using FDA surveys from 1982-1988. Those who used nutrition and ingredient information in the labels were more likely to be better educated. Similarly, the results of a survey on consumers' use of nutritional labels conducted in supermarkets and at home showed that education was a significant factor in using labels. Moreover, individuals who have an annual income of $ 30,000 are less likely to use labels to compare brands while shopping compared to those earning at least $ 50,000 (Nayga, et al., 1998). Guthrie and co-investigators (1995) reported that the characteristics found to be positively related with the use of nutrition label were having at least some college education, being more knowledgeable about nutrition and being more concerned about nutrition and product safety, among others.

In contrast, education could negatively influenced nutrition information utilization (Moorman, 1990). This study explained that educated consumers were less motivated to search for more information since they had adequate knowledge. Moorman's study used experimental conditions at point of purchase

were participants were actually asked to shop in a simulated shopping area. This suggests that self-reported use of label as shown by earlier studies is different from actual label use when this behavior was measured at point of purchase. Hence, the latter study could be more credible in reporting the use of label among their respondents. It is likely that self-reported "use of label" from the above studies could not be as reliable in determining use of label as compared with studies where respondents were asked to shop and be given opportunities to actually use label. An exploratory study conducted in the US by Klopp and McDonald (1981) revealed the reasons for non-usage of nutrient labels among 40% of respondents. These consumers believed that they did not need the labels as source of information and they viewed labels as containing too much information. These respondents had less formal education, lower self-rated nutrition knowledge and were not likely to prepare meals in advance. Age, gender and responsibility for meal preparation did not predict use of label.

There is evidence of a strong association of label usage with health beliefs suggesting that individuals interested in health look at the information on food labels to decide their food purchase. Neuhouser, et al. (1999) conducted a telephone survey among Washington residents in the US to describe the demographic and diet-related psychosocial correlates of nutrition label use and examine the relationship between nutrition label use and diet. They found that 80% of the respondents read nutrition labels on packaged foods. The results also showed that women, residents younger than 35 years old and those with more than high school education were significant users of nutrition label. However, when these demographic characteristics were controlled, belief on the importance of eating a low-fat diet was the strongest predictor of label use.

Glanz and associates (1992) examined the research from a database of 278 citations on a variety of consumer behavior-nutrition education topics conducted for the past four years. One of the conclusions reached in their review was that many consumers preferred credible information about nutrition, but they tended to get and use it only if it was "*readily available, clear, perceived as useful and*

new, and simple to use". Hence, it appears that consumers read and use labels if they perceive it as simple, easy to understand and useful in their food purchase.

Based on these studies, it can be viewed that reading/usage of label generally indicates an individual's inclination to seek information on health and nutrition in foods. This is common among people with higher education and income. However, this needs to be assessed in purchase of fortified foods. If people read labels and see information on fortified foods, then they can make a decision to purchase/not purchase these foods. The effect of label usage on purchase of fortified foods is another research gap to fill.

The following section presents attitude to healthy diet in lieu of studies on attitude to fortified foods.

2.7 INFLUENCE of ATTITUDE to HEALTHY DIETS

Due to very limited literature showing the influence of attitude towards fortified foods, this section discusses attitude to healthy diets. As Shepherds' model on food choice indicates, attitude can influence food selection. This section presents attitude to healthy diet and how it influences the intake of healthy diet. Due to unavailability of Philippine studies on the influence of attitude to healthy diets, international literature was examined.

The perceived benefits of healthy eating were examined among a nationally representative sample of adults in Europe (Zunft, et al., 1997a). More women than men expected benefits from healthy eating. With increasing age, people were more likely to believe in the gains of staying healthy and prevent disease. Moreover, people with higher education related more benefits from healthy eating. Using the same data, Margetts and co-workers (1997) found that educational level seemed to have the strongest influence on perceptions of a healthy diet.

It is likely that attitude to healthy diet can be linked to personal beliefs or health-seeking behaviors of individuals. Margetts, et al. (1998) interviewed 5533 men and women to determine the factors, which influence healthy eating patterns in England. The investigators found that the group of men and women who were more likely to posses negative attitude about healthy eating were those most likely to smoke; believed that healthy foods were just another fashion or expensive and they were less likely to care about what they eat.

Kearney and co-workers (1998) conducted a study determining the attitudes and beliefs about nutrition and health among 1401 Irish adults. The results showed that 57% of the respondents believed that eating a healthy diet was a health priority. Around 39% described their attitude about eating by selecting the statement " I don't worry too much as long as I have enough healthy things such as fruit and vegetables". However, the limitation of this study was that it did not determine the food and nutrient intakes of the subjects. It would have been interesting to determine whether the nutrient intakes of the group concerned with healthy eating differed from those who were not.

In the US, data from Continuing Survey of Food Intake by Individuals and Diet Health Knowledge Survey was used to determine the relationship of diet-health attitudes and nutrition knowledge of household meal planners to fat and fiber intakes (Colavito, et al., 1996). They found that parents-diet health attitudes were more influential on their own diets than on the diets of preschoolers.

It appears that attitude can influence food selection to a certain extent. A study to determine if attitude exerts an influence in selection of fortified foods is needed to determine if intake of these foods is as complex as food choice.

2.8 DEMOGRAPHICS ASSOCIATED with ATTITUDES/REASONS for FOOD SELECTION

This section discusses the demographic factors that are related with food choice. It aims to present the characteristics of people who place greater importance to factors such as taste, nutrition, cost, and others in their perception of healthy eating.

Demographic factors have been shown to be significantly associated with the reported importance of various factors influencing food choices i.e. taste, nutrition, cost, convenience and weight control (Glanz, et al., 1998). Nutrition and weight control were more important to older persons. Younger persons put greater importance to cost and convenience. Women rated higher importance to taste, nutrition, cost and weight control compared to men. Those with low incomes placed more importance to cost and convenience.

Influences on food choice are mediated by an individual's beliefs and attitudes. Perceptions about the nutritional quality and health effects of a food maybe more influential in a person's food selection than its actual nutritional quality and health effects (Shepherd, 1995). Attitude can influence food choice through positive or negative perceptions on the importance of a particular food or its attributes and then the likely action (accept or reject food) based on these perceptions. Attitude appears to be associated with socio-economic factors. Presumably, this would be the case in the Philippines.

It appears that the level of one's education is closely associated with his/her perception of a healthy diet in developed countries. It remains to be established whether this is the case in the Philippines. Increased priority in nutrition is related with more positive attitude to healthy eating. It is believed that this is where attitude could influence consumption of fortified foods.

2.9 CONCLUSION

Energy, and micronutrient intakes of Filipino preschoolers are generally below the recommended level.

Fortified food found its way in the Filipino diets as a result of a changing pattern of food consumption from traditionally prepared foods to processed foods. In addition, food fortification was initiated in line with the government's policy to decrease micronutrient deficiencies. It remains to be seen whether SPS foods will make a significant impact in meeting the adequacy level of micronutrients commonly inadequate in the Filipino diet. For this to be case, effectiveness of fortified foods requires the use of those who are in need.

Socio-economic factors exert significant influence on food choice. To improve acceptance of fortified foods among the consuming public, it is worth investigating the considerations on purchase and intake of fortified foods. Also important are the demographic characteristics of the segment of the population consuming fortified foods. It is assumed that identifying the characteristics of people who are unlikely to consume these foods will enable nutrition educators to focus their efforts in nutrition information campaigns on fortified foods. Since food choice is a complex process, the influence of attitude to purchase and intake of fortified foods needs to be assessed.

Other points to consider are:

- For those who are aware of fortified foods, there is a need to determine if their use is a positive choice or if they choose fortified foods for non-nutrition reasons.
- Awareness is probably associated with other factors i.e. reading food labels.
- If people are aware of fortified foods, there is a need to:
  1. look if nutrition is a priority in selecting foods
  2. determine if they think fortified foods will improve nutrient intakes
  3. have resources to follow their choice

A review of literature from Philippine and international studies have demonstrated the positive effects of fortified foods in controlled and free living

populations. However, the effectiveness of the current SPS program has not been examined.

2.10 RESEARCH QUESTIONS

The purpose of this section is to establish clearly the research questions that need to be addressed by the present study.

It was illustrated in this chapter that Filipino consumers in general have a positive attitude to idea of fortified foods (Joven, et al., 1996). Awareness and attitude to SPS foods are perceived as vital influencing factors that affect purchase and eventual intake of these foods. With continuous advocacy from nutrition educators and aggressive promotion from food manufacturers, a 1999 survey on awareness of SPS foods showed that 51% of respondents were aware of these foods (FETP-DOH, 1999). The question of **who are aware of SPS foods and their demographic characteristics** may help nutrition educators to focus their efforts and target the segment of the population who are likely not to be aware of fortified foods in the promotion of these foods.

What is the attitude of the mothers towards fortified foods and what are their characteristics? Determining their attitude and demographic information will provide useful assessment of how people perceive SPS foods. Nutrition educators and the program implementors need these perceptions to improve consumption of SPS foods.

What are the relationships of awareness, attitude, use of label and demographic characteristics to purchase and intake of SPS foods? This is another relevant question to be investigated in the present study. Awareness of fortified foods will be investigated but only the use of foods with SPS will be considered in carrying out the research. This is because the food fortification program in the Philippines focuses on the advocacy of SPS products to achieve its goals of eliminating micronutrient malnutrition. The issue of

whether awareness, attitude, use of label and demographic characteristics relate with purchase and intake of SPS foods will be addressed in this research.

What are the other factors that influence purchase of SPS foods? Are the factors that exert significant influence in food selection as reviewed in this chapter similar to the factors that will affect purchase of SPS foods? For the SPS program to be sustainable, most if not all of the populations must consume SPS foods. This assumption is not only from a commercial point of view but also from the view of the nutrition program implementor in the elimination of micronutrient deficiencies. Consumption is determined by purchase of these foods. Food choice is very complex and it is expected that awareness of SPS foods alone does not determine purchase. This study attempts to determine the most important considerations influencing purchase of SPS foods.

How much is the contribution of fortified foods to total nutrient intake? Will it affect the level of adequacy for these nutrients? These questions will provide answers that will indicate the impact of the food fortification program on the nutritional status of the population.

If people with higher income and higher education consume fortified foods and the literature review indicates that they are likely to have the best nutrient intakes, then fortified foods may not make significant nutritional impact. The answer to this question will be assessed by examining the diets of preschoolers in the present study to determine if the nutritional contribution of fortified food helps to meet the recommended level.

This chapter reviewed related literature pertaining to nutrient intakes of Filipino preschoolers, background information on food fortification program and how fortified foods became available in the market with the changing dietary patterns of Filipinos. A detailed review was given to show the positive effects of fortified foods including possible risks associated with it using studies from the Philippines and international sources. The demographic characteristics and

attitude associated with fortified foods and healthy eating were also provided. The relationship of socio-economic factors to food choice was outlined to relate their possible influence to selection of fortified foods. The next chapter will present in detail the methods that are used to carry out this research study. The limitations of the study are discussed in the next chapter.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The objectives of this study are determination of 1) awareness and attitude towards fortified foods and foods with *Sangkap Pinoy* Seal; 2) consumer's considerations in purchasing foods with SPS; 3) nutrient intakes of iron and vitamin A of preschool children consuming foods with the seal and the percentage of these children meeting the RDA; 4) the amount of iron and vitamin A contributed by intake of SPS foods and 5) the relationship between purchase of SPS foods, awareness, attitude, use of label and demographic information.

This chapter describes the methodology used. The rationale for the use of a quantitative method is explained in Section 3.2. In this section, selection and justification of the research methods is described. Sections 3.3, 3.4, 3.5, 3.6 3.7 3.8 and 3.9 describe the location of the study, sampling method, recruitment of participants, ethical considerations, questionnaire design/administration, pre-testing of questionnaires and data collection procedure. The data collection analysis is presented in Section 3.10. Also discussed in this chapter are the limitations of the study in Section 3.11.

3.2. RATIONALE for the USE of METHODS

3.2.1 Quantitative Study

The nature of the present study calls for a quantitative method. This approach is specific and directed towards "proof". This method typically "*aims to show cause and effect relationships on specific variables that leads to*

predictions and generalization of findings to appropriate populations" (Webster, 1998, p 25.). Quantitative research also relates to the concept of representation which is assured through related methods of sampling, testing and inference to the population from which samples will be drawn (Webster, 1998). In short, quantitative research relies on numerical records, which result from a process of measurement (Kent, 1999). In the present study, the measurements of attitude and considerations in purchase and consumption of fortified foods, its contribution to micronutrient intake and determination of the relationship among attitude, awareness, use of label and the use of fortified foods all require the quantitative approaches. As Anderson and Poole (1998) point out, these variables need to be defined operationally in terms of how they are measured in quantifiable form.

3.2.2 Selection of Research Methods

The survey methodology was deemed the most appropriate method to carry out this research. A survey is the collection of data based on addressing questions to participants in a formal manner and keeping a systematic record of their responses (Kent, 1999). According to Thomas as cited by Greenfield (1996, p. 115), "*quantitative surveys use explicit, standardized and objective methods of sampling data collection and data analysis*". A survey requires a collection of data in systematic way and forming inferences from the results (Allison, et al., 1996). From these various definitions and descriptions, the need to use survey in this study seems reasonable.

The use of a qualitative research could have produced a deeper analysis of awareness and attitude but would not produce data that are needed to meet all the objectives of this study. Hence, a quantitative approach using survey methodology was chosen as the method to achieve the objectives of this research.

There are three main methods of questionnaire administration: interview surveys, telephone surveys and postal surveys. In the target population, a

telephone survey was not possible due to unavailability of telephone in most households. Moreover, a postal survey is not popular in the Filipino population due to very low turnout of respondents. Thus, the present study employed interview survey. The advantages of using personal interviews (as adapted from Kent, 1999, p. 94) specific to the present study are outlined in Table 3-1. Moreover, accessibility of the study site made it possible to conduct face-to-face interviews with each respondent.

***Table 3-1* Advantages of interview surveys specific to the present study**

Advantages of Interview Surveys
1. The interviewer can check and ensure respondent's eligibility before the interview started.
2. Personally administered questionnaires ensure that all questions are queried in the required order and that all applicable questions are asked.
3. The interviewer can encourage participants to answer as fully as possible.
4. Materials that need to be shown to the respondents can be properly presented in an interview.
5. Response rates are consistently higher than for other methods of questionnaire administration.
6. The use of three 24-hour recall can be appropriately employed using personal interviews.
7. The interviewer can encourage respondents to complete the interview.

According to Holbert and Speece (1993), personal interviews allow for the most complete interaction and better data quality. The negative aspects of face-to-face interviews are high cost, interviewer-induced bias, (Neuman, 1997) and respondents' reluctance to cooperate (Rea and Parker, 1997). These concerns however were minimized in the conduct of the survey. Transportation cost was reduced due to proximity of the study site. Interviewer-induced bias was minimized since the researcher and two assistant researchers were professional researchers in their fields trained to conduct interviews objectively. Reluctance on the part of respondents to cooperate was not a problem in this study due to researcher's strict compliance with the requirements of the Ethics Committee in informing respondents about their rights in participating in the study.

A summary of the advantages and disadvantages of closed-ended and open-ended questions adapted from Neuman (1997) is presented in Table 3-2. This research used both types of questions where appropriate. Mixing open-ended and closed-ended questions can reduce the disadvantages of each question type. It can also offer a change of pace that can be helpful to the respondents (Neuman, 1997).

Table 3-2 **Advantages and disadvantages of open-ended and closed-ended questions** (Neuman, 1997)

Advantages of closed-ended questions	**Disadvantages of closed-ended questions**
• It is easier and quicker for respondents to answer. • The answers of different respondents are easier to compare. • Answers are easier to code and statistically analyzed. • The response choices can clarify meaning of questions for respondents. • Respondents are more likely to answer about sensitive topics. • There is less irrelevant or confused answer to questions. • Less articulate or less literate respondents are not at a disadvantage. • Replication is easier.	• They can suggest ideas that the respondent would not otherwise have. • Respondents with no opinion or no knowledge can answer in anyway. • Respondents can be frustrated because their desired answer is not a choice. • It is confusing if many (e.g. 20) responses are offered. • Misinterpretation of a question can go unnoticed. • Distinction between respondent answers may be blurred. • Clerical mistakes or marking the wrong response is possible. • They force respondents to give simplistic responses to complex issues. • They force people to make choices they would not make in the real world.
Advantages of open-ended questions	**Disadvantages of open-ended questions**
• They permit an unlimited number of possible answers. • Respondents can answer in detail and can qualify and clarify responses. • Unanticipated findings can be discovered. • They permit adequate answers to complex issues. • They permit creativity,	• Different respondents give different degrees of detail in answers. • Responses may be irrelevant or buried in useless detail. • Comparisons and statistical analysis become very difficult. • Coding responses is difficult. • Articulate and highly literate respondents have an advantage.

self-expression, and richness of details. • They reveal a respondent's logic, thinking process and frame of reference.	• Questions maybe too general for respondents who lose direction. • Responses were written verbatim which is difficult for interviewers. • A greater amount of respondent time, thought and effort is necessary. • Respondents can be intimidated by questions. • Answers take up a lot of space in the questionnaire.

3.2.3. Diet Methodology

Research Objective 4 of the study focused on the assessment of nutrient intake to determine the contribution of foods with SPS. The nutrient intake of preschool children was determined through the use of three 24-hour recalls administered to the mothers. According to Rasanen (1979), when the 24-hour method was used in child populations, it had been reported to give an acceptable agreement with the actual consumption. Eck and co-workers (1989) found strong correlations (r=.86) between the recall of parents of the child and the observed intakes. The correlation between recall and observed intakes ranged from .58 to .74 in the study on the validity of 24-hour recall by Karvetti and Knuts (1985). Women achieved more accurate results than men. Lastly, Basch and co-workers (1990) found that the mothers' recall of dietary intake by their children appeared to be useful for classification of children's intake of calorie, macronutrients and micronutrients.

The present dietary survey was carried out to compute the average daily intakes of iron and vitamin A and determine the percentage contribution of foods with SPS to these nutrients. The percent adequacy of iron and vitamin A intakes of children who consumed foods with SPS was determined based on the Philippine recommended dietary allowance (RDA).

In order to obtain information about each child's diet, this study used three 24-hour recall instead of a single recall. There were large coefficient of variations associated with one day recall and a 20-30% coefficient of variation on dietary data collected for one day from both weighed and estimated records (Bingham, 1985). Although Pao and associates (1985) found little difference for most nutrients using 3-day mean intakes and 1-day mean intakes for individuals, generally, the individual variability was greater for 1-day intakes than for 2-3 day intakes. If it is important to determine the individual's usual food intake, repeated measures of intakes are essential (Todd, et al., 1983; Freudenheim, et al., 1987) for most nutrients including vitamin A. This is because the level of vitamin A in individual food varies extremely, hence there is wide intraindividual variation from day-to-day and many replications are required to obtain a reliable estimate of the usual intake (Beaton, et al., 1983). However, the groups needing the fewest days of diet recall data are the preschool children aged 1 to 4 years (Nelson, et, al., 1989). In the Philippines, Barrozo-Vargas (1999) showed that the three day food recall could give accurate estimates for individual or group mean energy, protein, iron and vitamin A intakes which could be comparable to one day food weighing and food frequency questionnaires among preschoolers.

In the present study, participants with breast milk intakes were excluded from the analysis of intakes since total energy and micronutrient intakes could not be estimated. Although test-weighing technique was used to measure breast milk intake (Brown, et al., 1982a; Brown, et al., 1982b; De Kanashiro, et al., 1990), this technique was not considered practical for 24-hour studies in field settings (Brown, et al., 1982b). Similarly, Martinez, et al (1985) excluded intakes of infants receiving human milk from their study since the amount of breast milk was not determined. Intakes of two children were not included in the present study due to the mothers' gross overestimation and underestimation of their food intakes. However, these respondents were included in all other analyses. It is recognized that researchers have always excluded extreme records (Carter, 1998).

3.3 LOCATION of the STUDY

The location of the study was in Manila. As it is the premier urban area, it is likely to have a higher rate of awareness, availability and use of SPS foods compared to rural areas. A bigger sample would be required if the study were conducted in a rural area where the rate of awareness and purchase of SPS foods would be low. Accessibility was another advantage of conducting the survey in Manila.

The study was conducted in all 14 barangays (villages) in Punta, Sta. Ana, Manila, a composite geographical area of Manila consisting of depressed and upper income barangays. The area covering the present study has more or less 6,300 households. It was not feasible to sample from all of Manila so an area was chosen that belongs to city health district of Manila area, has the presence of supportive local officials and health personnel, exposure to promotion and advertisements, accessibility, has variation in socio-economic status (presence of depressed and upper-income barangays), and strategic location at the heart of Manila (See map of the Philippines and map of Manila in the following pages). These were the general criteria that were applied to Punta, Sta. Ana.

3.3.1 Punta, Sta. Ana, Manila: A Brief Historical and Geographical Description (Giron, 1969)

Punta is one of the principal streets of old Sta. Ana, Manila. The Pasig River separates this place from the Sta. Ana "mainland". It was called *Punta* by the Spaniards, which meant, "loop" since it was a pointed loop of land created by the Pasig and San Juan Rivers (Ira, et al., 1977). It has an estimated population of 38,215. It composes of 14 barangays (villages) five of which are depressed (low socio-economic status with a high a population).

In 1865, Santa Ana was confined to the north by the town of San Felipe de Neri (now Mandaluyong), six leagues to the East by the Pasig River, to the south

by San Pedro Makati, the west by Dilao (Paco), and one league to the north by Pandacan and Sampaloc (see map of Manila). During the Spanish regime, Santa Ana was subdivided into 10 districts. Later these districts broke off from Santa Ana.

According to the legend, Santa Ana used to be tiny kingdom called *Namayan* (a word that means "established residence there"). During the Spanish occupation *Namayan* was called Santa Ana after the saint whose image was donated by a Spanish governor to the parish. Two villages known as *Itaas* (above) and *Ibaba* (below) were established at the place now called Punta.

Moros were the first settlers of Punta. Later, Christians settled at Ibaba while Itaas became a sugar plantation. From the ricefields, people discovered gold nuggets, which attracted people from other areas to flock in the place. The English who occupied Manila in 1572, bought the place and sent the Filipinos to Itaas. Years later, the English sold the property to the Swedes who put up the Philippine Match Company. Until today, there are still factories in Punta where Japanese plants were located before World War II. At present, the occupations of residents are mostly factory workers, office employees, vendors, part-time or contractual workers. Some are professionals and overseas workers. Similar to other areas of Manila, no productive land for agricultural crops is available in this area.


Luzon Strait
Laoag
Aparri
Tuguegarao
Roxas
Cagayan
Baguio
Dagupan
San Carlos
Tarlac
PHILIPPINES
Angeles
Quezon City
Manila Bay
MANILA
South China Sea
Lake Taal
Batangas
Lucena
Naga
Legaspi
Philippine Sea
Calbayog
Iloilo
Bacolod
Tacloban
Palawan Passage
Cebu
Puerto Princesa
Butuan
Cagayan de Oro
Iligan
Sulu Sea
Zamboanga
Cotabato
Davao
Isabela
General Santos
BRUNEI
MALAYSIA
INDONESIA
Celebes Sea
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MANILA
DOT OFFICIAL MAP
POINTS OF INTEREST
① CHINATOWN (D-3)
② MALACANANG PALACE (E-4)
③ INTRAMUROS (E-2)
④ RIZAL PARK (F-3)
⑤ DEPARTMENT OF TOURISM (F-3)
⑥ MANILA ZOO (G-3)
⑦ CULTURAL CENTER OF THE PHILIPPINES (H-3)
⑧ PHILIPPINE CENTER OF THE PHILIPPINE TRADE AND EXHIBITIONS (H-3)
⑨ PHILIPPINE CONVENTION CENTER (H-3)
N
W
E
S
NAVOTAS
CALOOCAN CITY
QUEZON CITY
SAN JUAN
MANDALUYONG
PASAY CITY
MANILA BAY
NORTH PORT DISTRICT
SOUTH PORT DISTRICT
TONDO
SAN NICOLAS
BINONDO
STA. CRUZ
QUIAPO
SAN MIGUEL
SAMPALOC
INTRAMUROS
ERMITA
MALATE
PACO
PANDACAN
STA. ANA
LA LOMA CEMETERY
CHINESE CEMETERY
NORTH CEMETERY
SAN LAZARO RACE CIRCUIT
RIZAL MEMORIAL STADIUM
MANILA NORTH HARBOR
MANILA BAY
MANILA YATCH BASIN
RIZAL AVENUE
QUEZON BLVD.
RAMON MAGSAYSAY BLVD.
QUIRINO AVE.
PRES. QUIRINO AVENUE
SOUTH SUPER HIGHWAY
M. ROXAS BOULEVARD
BONIFACIO DR.
LEGEND
CITY BOUNDARY
MAJOR ROAD
SECONDARY ROAD
RIVER OR CREEK
SHORELINE
RAILWAYS
BUILDING, CO., ETC.
Project of
in cooperation with
PHILIPPINE CONVENTION & VISITORS CORPORATION
Produced by:
UTP
Unlimited Tourist Promotions

3.4 SAMPLING METHOD

Since it was not possible to study the whole population of Punta, Sta. Ana, Manila to meet the objectives of the study, it was more practical to draw a sample that could represent the villages in this area without significant variability from the true population.

A sample of 120 was determined in consultation with a statistician after statistical treatments to be used in the study were decided. The sample size of 120 was increased to 140 to allow for non-response.

Proportional stratified random sampling was used in this study for more accurate representation of all households in villages since the population of the villages varied from one village to another. Generally, stratified sampling produces samples that are more representative of the population than simple random sampling if the stratum information is accurate (Zikmund, 1994; Neuman, 1997). To illustrate, the sample drawn using stratified sampling in the present study represented each *barangay* proportionately since the number of respondents from each *barangay* depended on the size of its population.

In stratified sampling, all 14 *barangays* were sampled and the number of respondents for each barangay ranged from 3-25. The number of respondents selected was in proportion with the total number of households with 2-4 years old children in each *barangay*. These 3-25 households represent the strata. The respondents from each of the 14 *barangays* were also randomly selected by using the random sampling method generated by a computer software (Microsoft Excel, 1997). The numbers chosen by the computer were matched to the names of the mothers in the master list provided by the health center.

3.5 RECRUITMENT of RESEARCH PARTICIPANTS

The participants in this study were mothers with at least one preschool child (aged 2 to 4 years old) from 14 barangays in Punta, Sta. Ana, Manila.

The information sheets (see Appendix 3.1) were given to 140 prospective respondents by the researcher/interviewer. At this time, a short verbal description of the study was given and the health workers introduced the interviewer to the prospective respondent.

During the initial meeting of the researcher and would be participant, screening of eligibility of respondents was done based on the presence of a pre-school child aged 2 to 4 years old. If the household selected had more than one family, the family with preschool children aged 2 to 4 years old was recruited as respondent. If the household selected has more than one family with preschoolers, random sampling of the families was done through drawing lots. If the household had no preschool children aged 2 to 4 years old, then the respondent was disqualified.

Two days after the initial meeting, the interviewer visited the respondents and asked if they were willing to participate. Those who were willing to participate were asked to sign the informed consent (see Appendix 3.2).

3.6 ETHICAL CONSIDERATIONS

Appropriate approval for the conduct of the study was obtained by conducting courtesy calls to the main health center and from chief local executives in each barangay. Ethical approval was obtained from Massey University Ethics Committee on Human Subjects by formal application.

Respondents were assured of their right to withdraw from the study anytime and confidentiality of their identity and the information collected.

3.7 QUESTIONNAIRE DESIGN/ADMINISTRATION of the QUESTIONNAIRE

A questionnaire was prepared consisting of a mix of closed and open-ended questions (See Appendix 3-3).

The questionnaires consisted of five sections: awareness, considerations, attitude, and demographic information.

3.7.1 Section A. Awareness of fortified foods

The first question related to the utilization of label in purchasing a food product and what particular information participants read in the label. A set of 10 questions to determine awareness of fortified foods and foods with SPS were then asked. The respondents were asked to define the meaning of fortified foods and SPS in their own words. If a participant said that she was aware, identification of examples was required. Probing questions were asked to measure the degree of understanding on foods with SPS. This was done in order to identify respondents who can distinguish these foods from fortified foods in general.

3.7.2 Section B. Considerations for Purchase of Fortified Foods

The second part of the questionnaire dealt with purchase of foods with SPS and the factors that influenced their purchase. The questions were presented as a table for clarity and brevity. The first question (column 1) on the table related to regular purchase of foods. This list of foods comprised the food products where one or more brand of these products carry the *Sangkap Pinoy* seal.

The second question (column 2) asked the brand usually bought and was intended to classify respondents who were purchasers of foods with SPS. The interviewer coded the response from one of these three codes (yes, yes-partially

and no), which corresponded to purchase of only brands with SPS, purchase of both brands with and without SPS and purchase of no brands with SPS, respectively.

The third question (column 3) asked the respondents to rank their reasons for buying food products with SPS. They were shown a card with the list of factors: preferences of family members, brand name[1], added nutrient, taste and price. The respondents were asked to rank the three most important reasons they consider when buying this food with 1 as the most important reason for purchase. The list of factors used for this part of the questionnaire included key factors identified by respondents in the pre-testing of questionnaires and factors identified by several authors in local and international studies presented in the literature review.

The fourth question (column 4) asked the respondents if they were aware of nutrient addition in the following brand(s), here the interviewer listed those brands with the seal. If the response was positive, the participant was asked to identify the nutrient added. The last question (column 5) on the table pertained to the amount of the particular SPS food purchased in a week.

Administration of the questions was designed in a way that the respondents were not aware that the particular food product being asked had SPS. This was because theoretically, most if not all respondents were actually buying foods with SPS without being aware of it.

The table was intentionally arranged and situated in the second page of the questionnaires so as not to create bias in the response of the subjects to the first set of questions regarding fortified foods.

3.7.3 Section C. Attitude

[1] The interviewer wrote out the brand of each food in the questionnaire. A brand was classified later as SPS food using the list of all SPS foods and its brand names.

The third part of the questionnaire consisted of attitude statements on fortified foods. These were only asked from participants who said that they were aware of fortified foods or foods with added nutrients. These statements included the three aspects of attitude: cognitive, affective and conative. Ajzen (1988) described each of these aspects. Cognitive statements are expressions or perceptions of beliefs on characteristics or attributes of an object. In this case, the object is fortified foods. The second aspect from which attitude can be inferred is the affective component. These affective statements are evaluations of and expressions of feelings toward the object. Lastly, the conative aspect is the behavioral inclination, intention, commitment and action with respect to object. Simplified statements were carefully worded in the questionnaire to represent all aspects of attitude. The statements on attitude were based on the previous local qualitative research on fortified foods conducted in a nationally representative sample of mothers (Joven, et al., 1996 and NS-DOH and Moran, 1996).

Table 3-3 **Statements on Three Aspects of Attitude**

Aspect of Attitude	**Cognitive**	**Affective**	**Conative**
Statements	1.The price of fortified food is comparable to the price of other foods.	1. My attitude towards purchasing fortified foods is...	1. I buy fortified foods because I want more nutrients to our diet.
	2.Compared with other foods, fortified foods are.... (safe)	2. I would say that my feelings about purchasing fortified foods is...	2. I will buy fortified foods only if there is no increase price.
	3. Fortified foods taste the same as other foods.		
	4. Fortified foods have the same color as other foods.		
	5. Fortified foods are less nutritious		
	6. My family would not like me to buy fortified foods.		

Each statement (cognitive, affective and conative) was followed by a 5 point Likert scale ranging from strongly agree to strongly disagree. The five-

point Likert scale was used to provide a consistent quantitative measure of attitude on the concepts implied in each statement. Suskie (1996) stated that people in general are more likely to agree than disagree with a statement, which may lead to Likert scale items to yield biased results. Hence, a combination of both positive and negative statements was designed to measure the attitude of respondents with the least possible bias.

Another set of questions measuring opinions about foods and health in general was asked for all respondents. These statements also used a five-point Likert scale.

3.7.4 Section D. Demographics

The demographic information was asked at the last part of the questionnaire. This was placed intentionally at the end to establish rapport on the respondents before asking this personal and rather sensitive information. Personal details such as age, educational attainment, size of the family, occupation of both the respondent and her husband, food budget and income were asked from the participants.

Income was the last question asked from the respondents. Each participant was presented with a card showing the ranges of income and she was asked to specify the range to which the family income belonged. The researcher/interviewer observed the presence of amenities in the house and type of abode. These were included to verify income. These two questions and a question on home ownership were not meant to be analyzed but if the responses to these questions were not consistent with the self-reported income of the respondents, then, income was reported as missing.

3.7.5 24 Hour Recall

In administering the 24-hour recall, the interviewer had a separate form (see Appendix 3.4) to record the foods and drinks consumed by the pre-school child of the respondent. If a respondent had several preschool children, the oldest preschooler nearing 4 years old was considered. Respondents were asked the hours and types of meals taken by the preschoolers. Afterwards, they were probed to describe all the foods and drinks consumed from the previous 24 hours, the kind of foods taken including the brand, the preparation entailed and the approximated amount in household measures. Food models using molded clays resembling the size of pre-weighed cooked meats were provided and measuring cups and spoons were used to aid the respondents in estimating the amount of foods the children consumed.

Respondents were visited twice within the week after the first interview for two additional 24-hour recalls (2 weekdays and 1 weekend). If a woman was not at home on the first visit, at least 2 more visits were conducted to cover respondents until she completed the interview and recall. Only respondents who were able to complete the three 24-hour recall were considered for the computation of the nutrient contribution of SPS foods.

In the computation of iron and vitamin A intakes, only foods with SPS were considered as fortified because these foods passed the quality test for nutrient addition and the researcher had access to the amount of nutrient(s) added to these foods. Fortified foods without SPS were considered as ordinary foods in this study since there was no way to validate the amount of nutrient(s) claimed in the food labels.

3.8 PRE-TESTING of the QUESTIONNAIRES

Ten mothers in Sta. Cruz, Manila were asked their opinion of the survey questions when the researcher was able to go home to the Philippines in December 1999. This area was similar in the setting of the study and the profile of these 10 mothers was almost the same as the profile of the research

participants in the present study. After asking the mothers' opinions, relatively minor revisions were done to the questionnaires. These included deletion of some unimportant questions, shortening some lengthy questions and rephrasing some questions. The revised questionnaires were again pre-tested prior to the data collection. These pre-testing enabled the researcher to come up with a user-friendly questionnaire that was clear, concise and comprehensive for the participants, thus ensuring the maximum elicitation of their responses.

3.9 DATA COLLECTION PROCEDURE

The principal researcher and two assistants who are technical staff of a research section in a nutrition agency in the Philippines carried out the data collection. They have post-graduate degrees in nutrition and posses wide experience in conducting nutrition surveys. Although the Food and Nutrition Research Institute trained them in the conduct of 24-hour recall, the researcher briefed them on the administration of the questionnaires and in the conduct of 24-hour recall for uniformity of data collection on food intake.

Selection of days for administration of 24 hour recall depended on the day the participant was interviewed. For example, if she was interviewed on Monday, the next 2 interviews for the recall were on Thursday and Sunday. The interviewers made sure that administration of the 24-hour recall was done after one to three days so that the recalls were not done for two consecutive days.

3.10 DATA ANALYSIS

Completed questionnaires were checked for errors and responses to closed-ended questions were coded. Responses to open-ended questions were summarized and similar responses were collapsed to give major responses.

Nutrient analysis was computed manually using the Philippine Food Composition Table (FNRI, 1997). The amount of iron or vitamin A in each SPS

food was provided by the Nutrition Service-Department of Health and was determined through independent nutrient analysis conducted by accredited laboratories of the Department of Health. The sums of the computed amount of energy, iron and vitamin A from all the food items for three days were added and divided into three to get the average amount of these nutrients for each child. The researcher and an assistant did the nutrient computations. These computations were double-checked for errors.

In computing the amount of energy, iron and vitamin A of each food item, the amount of this food (gathered from each 24 hour recall) was translated in grams. Translation of household measures to amount in grams was done using the standard reference in the FNRI Food Exchange List. The number of grams was divided by 100 (the amount of each food in the Food Composition Table (FCT) was measured per 100 grams) and the quotient was multiplied by the amount of energy, iron and vitamin A of this particular food as indicated in the FCT. In the case of SPS food, the amount of iron or vitamin A was determined by dividing the amount of SPS food in grams by the amount of this food per serving and the quotient was multiplied by the actual amount of iron or vitamin A or both of this particular SPS food. The amount of iron and vitamin A of preschool children from SPS foods was considered as the intake of SPS foods.

The percentage contribution of SPS foods to iron and vitamin A intakes of preschool children was calculated using the Philippine FCT. The amount of iron and vitamin A in foods with SPS was taken from the *Sangkap Pinoy* Seal Program files[2]. Although there was confidentiality treatment specified in the contract between SPS food manufacturer and DOH, the information on the amount of iron and vitamin A added in the food product was provided to the researcher on condition that this information would be used solely for the purpose of this research. This amount was the actual amount of iron and vitamin A present in a particular SPS food as shown in chemical analysis. The percentage

[2] An independent chemical analysis on the nutrient composition of these foods was conducted by accredited laboratories of the Bureau of Foods and Drugs under the Department of Health in Manila.

of these nutrients from foods with SPS was then calculated. The adequacy of the intake of the preschoolers was calculated based on recommended dietary allowance of Filipino preschoolers (FNRI, 1989). The percentage RDA was then computed.

The data were analyzed using the Statistical Package for Social Science (SPSS) for Windows, Release 9.0 (1998). All variables were labeled for identification. An exploratory data analysis using descriptive statistics was completed to check frequency distributions, outliers and missing values. Responses to questions were cross-tabulated to determine the frequencies and corresponding percentages for each response. Discussion of data analysis was subdivided into four sub problems (specific objectives).

Awareness was measured by yes or no responses. Descriptive statistics (percentage and frequency distributions) were used to determine the rate of awareness of fortified foods in general and food with SPS. Responses to some open ended-question probing the respondents' understanding on the meaning of the seal were also summarized and quotes were presented in discussing the results.

The purchase variable was defined based on average weekly purchase of SPS foods reported by each participant. Respondents were asked about their purchase of a total of twelve foods each of which included at least one brand with SPS. The purchase variable was computed by categorizing the amount purchased for each SPS food into one (small), two (medium) and three (large) and summing over all SPS foods purchased. This categorization depended on the frequency of purchase and the amount in grams of each SPS food purchased. This categorization was necessary in order to combine purchase of dry foods like noodles with liquid foods such as cooking oil and catsup. The number of SPS foods purchased ranged from one to twelve food products, thus the total score of purchase ranged from 1 to 36. To make the purchase variable more normally

distributed (as required with the use of general linear model analysis), log transformation of this variable was performed.

A variable "attitude towards fortified foods" was obtained as the sum of scores from the attitude statements. The sum of the scores for each participant was tallied. This study used the 5-point Likert scale to measure the agreement or disagreement for each statement. For each positive statement, 5 was the perfect score. Scoring for the responses to negative statements was recoded so that the least disagreement had 5 as the score. The total perfect score for all attitude statements was 50. A high total score indicated a more positive attitude to fortified foods while a low total score indicated a negative attitude. The scores in between high and low represented the mixed attitude group.

The scores of five statements on opinions about food and health were tallied and represented the respondents' general opinion about food and health. Scoring of positive and negative statements was similar to scoring of attitude to fortified foods. The total score was 25.

The use of label variable had three categories: frequent users, occasional users and non-users.

To determine the most important factors that the respondents consider in purchasing SPS foods, the proportion of foods with each reason as one of the top three reasons was computed by counting the number of times each reason was mentioned in any order and dividing the sum by the total number of SPS foods purchased. From this proportion, the percentages of respondent who considered each reason in purchasing all or none of the SPS foods were computed. A proportion of 1.0 means that a reason was mentioned by the participants among the top three reasons in all SPS foods they purchased. Thus, the proportion of respondents who mentioned each reason for purchasing all SPS foods were determined based on this proportion of foods. Moreover, the percent of

respondents who never mentioned a particular reason for purchasing SPS foods was also determined.

The proportion of respondents who considered added nutrients as one the first three reasons for their purchase was determined in noodles, orange juice and chocolate drink-the three most commonly purchased SPS foods.

The demographic variables included income, family size, respondents' occupation, husband occupation, education, mother's age and age of preschool child. These variables were classified as categorical variables. The five categories of income were collapsed into only three categories due to a small number of participants in the upper income bracket. Respondents' occupation variable was also collapsed into two categories due to a small number of participants with paid employment. Hence, the respondents were classified as working (employed) and non-working (unemployed) and this variable was referred to as respondents' employment status.

3.10.1 Statistical Methods

The statistical treatments used in this study were determined in consultation with a statistician.

Relationships between variables were determined using the univariate general linear model (GLM) analysis in SPSS. The GLM Univariate analysis provides regression analysis and analysis of variance for one dependent variable and one or more independent variables (as factors) (SPSS, 1998). The factor variables divide the population. GLM permits interaction between independent variables. It also uses analysis of covariance to control the effect of an extraneous variable (e.g. effect of family size to purchase).

The F-test was used to compare full and reduced models predicting purchase of SPS foods. The F ratio was computed by dividing the difference of

error sum of squares of both models by the degrees of freedom of the particular variable added into the full model. The quotient was then divided by the error mean square of the full model. This was the F ratio. For a particular model to be significant, the value of the F ratio must be greater than the tabulated value in the F-statistic table.

Correlation tests (bivariate and partial) were used to determine the relationship of continuous variables (purchase, attitude, and total opinion). Correlation test used 99% confidence interval for "statistical significance" unless otherwise stated. To determine if the difference of one group is significant from other groups, comparison of the standard error of mean and least square difference was done. This analysis was done in comparing the means of purchase of respondents in the interactions between employment status and SPS awareness and between use of label and SPS awareness.

Binary logistic regression was used to determine the demographic variables that were significantly related with awareness of fortified foods or SPS foods.

All analyses except correlation tests used 95% confidence interval for "statistical significance".

3.10.1.1 Subproblem 1. To determine the rate of awareness of fortified foods and foods with SPS and attitude towards fortified foods among the respondents and describe their demographic characteristics

The frequencies of responses to questions related to awareness of fortified foods and foods with SPS were tabulated.

The relationship between awareness of fortified foods or SPS foods and demographic variables was determined using binary logistic regression.

Attitude scores were used to classify the attitude of respondents. GLM was employed to determine the association between attitude and demographic variables.

3.10.1.2 Subproblem 2. To determine the relationship of awareness, attitude, use label and demographic information with the purchase and intake of fortified foods with SP seal

The statistical methods used to analyze the relationships of awareness, attitude, use of label and demographic information and purchase and intake of foods with SPS are tabulated and presented in Table 3-4.

In all analyses of the purchase variable, GLM analysis was used and the effect of family size was controlled.

Table 3-4 **Statistical Methods Used to Measure Variables**

Relationship/Association Being Measured Between Variables	Statistical Test Used
Awareness of fortified foods and SPS foods and demographic information	Binary Logistic Regression
How awareness of respondents vary among demographic characteristics	General Linear Model Univariate Analysis
Purchase and all other variables	General Linear Model Univariate Analysis (analysis of covariance)
Purchase and attitude	Partial Correlation
Attitude and total opinion	Correlation
Iron or vitamin A intake/ iron or vitamin A from SPS foods and demographic characteristics	General Linear Model Univariate Analysis

3.10.1.3 Subproblem 3. To determine considerations in purchasing foods with SPS among women

Only the computation of the proportion of foods where each reason was mentioned in the top three reasons for purchasing SPS foods was done. The percentage of participants based on these proportions was tallied. The reasons

with top three highest percentages of respondents who mentioned the corresponding reasons were then considered the three most important considerations in purchase of SPS foods.

3.10.1.4 Subproblem 4. To determine the percentage contribution of fortified foods with SP seal on iron and vitamin A intakes of preschool children and determine the percentage of children meeting the RDA from the consumption of these foods through the use of three 24-hour recall

To determine if the contribution of SPS foods to iron and vitamin A was significant in meeting the RDA for these nutrients, chi-square analysis was used in the cross tabulation between the presence of SPS foods and the categories of nutrient adequacy.

A correlation test was used to determine the relationship of iron or vitamin A from SPS foods and the percent RDA of the children for these nutrients.

3.11 LIMITATIONS of the STUDY

This section discussed the limitations of the present study in terms of the limitations of analyses of the main variables. This research was limited to measuring attitude towards fortified foods in general and not towards foods with SPS. The statements on attitude were based only from perceptions gathered from a previous local qualitative study on fortified foods. Focus group discussions intended for the present study were not conducted. The variables "awareness of fortified foods" or " awareness of SPS foods " were only limited to yes or no responses although understanding of the meaning of this term and a detailed probing of the extent of awareness was conducted through a series of follow-up questions.

Actual purchase of foods with SPS was measured only through a self-report of regular purchase in a week and was not measured through a cupboard survey or through a list of actual weekly purchase by the respondents. The researcher acknowledges the limitation of the respondents' ability to accurately estimate the amount of SPS foods regularly purchased in a week. The categorization of combined solid and liquid SPS foods based on the amount in grams may be prone to underestimation or overestimation due to variability in the amount in grams for each package of SPS foods.

Iron and vitamin A intakes of preschoolers were determined through the use of three 24-hour recall. Validation of these 24-hour recall by another dietary method or biochemical analysis was not conducted due to budget and time constraints. In addition to time and financial limitations, a heavy respondents' burden prevented the use of 7-day food records. Longer periods may have resulted in a truer average intake for vitamin A and perhaps a better indication of usual SPS food consumption.

Punta, Sta. Ana, Manila may not be representative of greater Manila area. The sample size may have been too small to show some relationships (i.e. not enough power). Due to time and cost constraints to have access to all major areas of Manila, the survey area was limited to a pre-selected area of Manila.

This chapter discussed in detail the methodology applied in carrying out this research study and provided the rationale for the methods used. It also identified and described all the variables used in this study. Moreover, this chapter explained the techniques used in the analysis of all variables to meet the objectives of this study. The results chapter that follows presents the results of all data analyses.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

This chapter is divided into six sections. In the first section (4.2), the profile of the participants is presented. In the second section (4.3), awareness, purchase and use of label are described and the relationships of demographic variables, attitude and use of label to purchase are examined. The relationship of awareness of fortified food and of SPS foods with purchase of these foods is also outlined. The third section (4.4) presents what respondents considered the most important reasons in buying SPS foods. The nutrient intakes of the participants' preschool children are reported in the fourth section (4.5). The percentage contribution of SPS foods to iron and vitamin A intakes of the children is included in the fifth section (4.6). This section also summarizes the relationship of demographic variables and awareness of SPS foods with the amount of iron and vitamin A obtained from SPS foods and the effect of subtracting the amount of SPS foods in meeting the RDA for iron and vitamin A. The last section presents a summary of this chapter.

4.2. PARTICIPANTS

One hundred and thirty four mothers from Punta. Sta. Ana, Manila participated in the survey using the questionnaires in Appendix 3-3. This was 95.7% of the originally selected sample of 140. One participant was not included since the age of her youngest preschooler was five years old. Another one participant declined to participate. Three respondents had migrated to other places and the families now occupying their residences did not include children

younger than 5 years. Finally, one participant was not available even after several visits.

4.2.1 PROFILE OF PARTICIPANTS

Age. The average age of the participants was 31 years (range 17 to 47 years). The majority of the respondents (49%) belong to less than 30-age range as shown in Table 4.1.

Educational Attainment. The participants came from mixed educational backgrounds with more than half of them (51.5%) being high school graduate/high school undergraduate. Only small portions of the sample population were elementary graduates/elem. undergraduates and college graduates/post-graduates (See Table 4.1).

Respondent Employment Status. Only 31.3% of the respondents were employed. With a small number of respondents having paid employment, respondents' occupation was not used in the analysis. Only respondents' employment status (employed or not employed) was used for further analysis.

Socio-economic Status. Predominantly, the sample population belonged to lower income brackets as illustrated by Table 4.1. Over half (54.5%) of them had a household income between P 3000.00-8000.00 while 15.7% had a monthly income of P2999.00 and below. Only 26.8% of the sample population had household income ranges that fell within the range of the national average income of Filipino families, which was P10, 264.00 in 1997 (NSO, 1997).[1]

Employees/sales or skilled workers were the occupations of 37.3% of respondents' husbands. About 31.3% of the respondents' husbands belonged to production/manufacturing/labor workforce.

[1] All incomes reported by participants were verified in the observation of abode (e.g. ownership, type of abode, presence of major appliances).

Family Size. Over half of the participants (53%) had a family size of 5-7 members, which is the average family size in the Philippines.

Age of preschool child. The age of the preschool children was almost evenly distributed into 2, 3 and 4 years old. The mean age is 3 ±.81 years.

***Table 4.1.* Characteristics of the participants**

Characteristics	Frequency	Percentage (%)
Age		
15-22	5	3.7
	61	45.6
	42	31.3
38 and above	26	19.4
Educational Attainment		
Elementary/elem. undergraduate	11	8.2
High school/H.S. undergraduate	69	51.5
Vocational/college undergraduate	36	26.9
College graduate/post graduate	18	13.4
Income		
P 2999.00 and below	21	15.7
P 3000.00-8000.00	73	54.5
P 8001.00 & above	36	26.8
Missing (not given)	4	3.0
Husband's Occupation		
Unemployed	11	8.2
Professional, administrative & related workers, OCW	15	11.2
Employees,/sales/skilled workers	50	37.3
Production/manufacturing/ labor workers	42	31.3
Part-time/irregular workers	11	8.2
Not given	5	3.7
Respondents' Employment Status		

Employed	89	66.4
Not Employed	42	31.3
Missing	3	2.2
Family Size		
2-4	31	23.1
5-7	71	53.0
8-10	19	14.2
11 and above	13	9.7
Age of Preschool Child		
2	40	29.8
3	45	33.6
4	49	36.6

4.3 RELATIONSHIP OF AWARENESS, ATTITUDE, USE OF LABEL AND DEMOGRAPHIC INFORMATION WITH PURCHASE OF FOODS WITH SPS[2]

4.3.1 Awareness

The respondents were asked first about their awareness of the terms "fortified foods" and "foods with added nutrients" [2] before eliciting their awareness of *Sangkap Pinoy Seal* (SPS). Only 31.3% of the participants said that they were aware of "fortified foods", but an additional 35.1% of respondents were aware of "foods with added nutrients". Thus, 66% were aware of either the term or the concept. These respondents were termed "aware" in the analysis.

The proportion of respondents who were aware of fortified foods (or foods with added nutrients) varied significantly among respondents grouped by education (P=0.014), income (P=0.002) and respondents employment status (P=0.007) using binary logistic regression. With the use of GLM univariate analysis, significantly more employed respondents (81%) were aware of fortified

[2] All 134 respondents were included in these analyses. Analyses using only 134 respondents for whom the 24-hour recall were available showed that the results were basically similar.

foods compared with unemployed respondents (P<0.05) (See Table 4.3). More younger respondents (71%) were marginally more aware than older ones (P=0.09). Those with the lowest education and with the lowest income groups were significantly more likely not to be aware than those with higher education and higher income. Husband's occupation and family size were not associated with awareness.

Most respondents who were aware of fortified foods (89.89%) were also aware of SPS foods. This translates to 59.7% of the sample population being aware of *SPS* foods. SPS foods are fortified foods with *Sangkap Pinoy Seal* (SPS)- the seal of acceptance by the Department of Health that ensures nutrient addition in the foods carrying it. These respondents were considered "aware of SPS foods".

The proportion of respondents who were aware of SPS varied significantly among age (P=0.020) and income groups (P=0.003) as investigated by binary logistic regression. SPS awareness was also marginally significantly related with education (P=0.068) of participants. With the use of univariate GLM, participants with lowest income were significantly more likely not to be aware of SPS compared with those with higher income (P<0.05). More of the youngest age group of participants (72%) was marginally more aware than older participants (P=0.069) (53%). Respondents' employment status, husband occupation and family size were not associated with SPS awareness.

Participants were probed further on their understanding of the terms "fortified foods" and "SPS foods" by asking them to give an example of the food or a brief description of what it meant. This is further discussed in the next section.

4.3.1.1. Understanding of fortified foods and foods with SPS

The mothers were asked to explain the meaning of "fortified foods" and "SPS foods" in their own words. Most of the participants (68.6%) were not familiar

with the term "fortified foods". However, 51.1% of those who were not aware of the term "fortified foods" were aware of foods with added nutrients once they were asked and could even give examples of such foods.

Among respondents who claimed awareness (n=42), 64.2% of them did not understand its meaning (Table 4.2). Less than one fifth (18.7%) of the respondents defined fortified foods as healthy foods. Other perceptions (5.2%) were mostly positive as reflected in comments such as "approved by DOH" and, "daily recommended". Other concepts that were associated with fortified foods were "without much chemicals" and "safe". However, one participant added a concept "assured of vitamins even though not tasty". Only 9.7% of the mothers had an accurate understanding of fortified foods. However, the rest of the respondents' comments reflected general descriptions of fortified foods.

Table 4.2 **Understanding of the term "fortified foods" (n=134)**

Perception	Frequency	Percentage (%)
Don't know	86	64.2
Foods with added nutrient	13	9.7
Healthy foods	25	18.7
Complete foods	3	2.2
Others	7	5.2
Total	134	100

The responses elicited from the interviewees showed a more common understanding of the meaning of foods with SPS. Among those who were aware of SPS foods, 31% viewed it as food approved/accepted or recommended by the Department of Health (DOH) in the Philippines (see Table 4.3). Around 22.5% of the respondents identified these foods as foods with added nutrient. Other positive remarks were "safe foods to eat" (7.5%) and "nutritious foods" (20.0%). Other comments reflected three concepts; one was "not junk foods", and "good for the health of the children". Other similar concepts associated with SPS foods were "passed the test for nutrient content" and "complete in vitamins and minerals". The third concept was "with Filipino taste". In general, 53% of those

who were aware (or 32% of the total sample) had a correct idea of the meaning of SPS foods, as either those approved by DOH or those with added nutrients.

Table 4.3 **Understanding on the meaning of foods with SPS by those who were aware of the term (n=80)**

Perception	Frequency	Percentage (%)
Don't know	6	7.5
Approved/accepted/recommended by DOH	25	31.3
With added nutrient	18	22.5
Nutritious food	16	20.0
Safe food to eat	6	7.5
Others	9	11.2
Total	80	100

Of the participants who said that they were aware of SPS foods, 3.8% was not able to name any food with SPS. About three fourths of those aware (71.3%) could only give one to two examples of foods with SPS while one fourth (25.0%) could enumerate three to four examples of these foods.

4.3.1.2 Perception of difference between SPS foods and other foods

Among the respondents who were aware of SPS foods, 87.4% thought that there was a difference between SPS foods with other foods. Only 11.2% believed that there was no difference between these foods while 1.3% was not sure if there was difference at all. When probed about the difference of SPS foods from other foods (see Table 4.4), about 28.8% of respondents said that 'assured of nutrient addition' was the distinction of SPS foods from other foods. Approved by DOH was mentioned by 13.8% of the mothers as the difference of SPS foods. The comments "*SPS foods have more vitamins, thus more nutritious and there is no doubt that it is safe to be eaten by children*" summed up the positive perceptions of the majority of participants towards foods with SPS. However, there were two respondents' comments that reflected a skeptical view on SPS foods. According

to them, *"SPS foods were not fresh and that the seal itself was just an endorsement and an additional propaganda".*

Table 4.4 **Perception of the difference between SPS foods and other foods by those who were aware of SPS foods (n=80)**

Perception	Frequency	Percentage (%)
No difference/not sure	10	12.5
Approved by DOH	11	13.8
Assured of nutrient addition	23	28.8
Guaranteed to pass quality test	5	6.2
Others		
Positive comments	29	36.2
Negative comments	2	2.5
Total	80	100

Among the sample population who believed that there was difference between SPS foods from other foods, 71.2% claimed that this knowledge influenced them in their purchase of fortified foods with SPS. Only 28.8% of the mothers who knew about this difference said that it did not influence them in their purchase.

4.3.1.3 Source of Information on *Sangkap Pinoy* Seal (SPS) Foods

Most respondents (66.3%) said that they learned of SPS foods from advertisements. Health workers and supermarkets were the source of information among 6.2% and 5.0%, respectively, of the mothers. Less than one fourth (22.5%) of the sample population found about SPS foods from other sources. These other sources were friends and family and from the food product itself.

Among the mothers who were aware of SPS foods, almost all of them (93.7%) had seen, heard or read advertisements for foods with SPS. Most of these participants (92%) had seen SPS foods from advertisements on TV. Only

1.3% and 2.7% of the respondents had read or heard SPS advertisements on newspapers and promotion by health workers, respectively. A few (4.0%) read about it from magazines and promotional leaflets.

4.3.2 Use of Food Labels

Less than half of the respondents (42.5%) claimed that they "always" read food labels while only 20.1% use labels "occasionally". More than one third (37.3%) of the mothers reported that they did not read labels at all when purchasing foods.

Among the frequent and occasional users of labels, almost one-third (32.1%) looked at the ingredients and instruction on how to prepare the food product (see Table 4.5). Information on nutrient alone (21.4%) was the next most frequent label content sought by those reading food labels. This was followed by information on nutrient plus other information (13.1%). All in all, 34.5% of label users looked for nutrition information in combination with other information.

The relationship of each demographic variable with the use of food labels was also examined. The results showed that education of the respondent had a positive significant linear relationship with the use of label by respondents ($P<0.05$) ($r^2=.043$). The use of labels by respondents who were college graduates or undergraduates was significantly higher than those who attained only high school and elementary education (See Table 4.6). However, there was no significant difference on the use of label by respondents between college and vocational graduates.

Table 4.5 **Information sought on food labels by frequent and occasional users**

Information read on food labels	Frequency	%

Nutrient present	18	21.4
Ingredients/instruction on how to prepare food product	27	32.1
Expiration date	11	13.1
Nutrient + other information	11	13.1
Others	17	20.2
Total	84	100

***Table 4.6* Percent of respondents using food labels by educational status**

Educational level	Non-user n= 50 (%)	Occasional users n=27 (%)	Frequent users n=57 (%)	Total
Elementary grad./elem. undergrad.	14	7	4	11
High school grad./high school undergrad.	58	44	49	69
Vocational grad/college undergrad.	24	30	28	36
College grad./college undergrad.	4	19	19	18
Total	100	100	100	134

Husband's occupation also had a significant association with the use of label by respondents ($P<0.05$) ($r^2=.071$). It appeared that husband's occupation was a better predictor of the use of label than education of respondents. Surprisingly, respondents whose husbands were unemployed used labels more frequently than other husband occupation categories. The next most frequent users of labels were respondents whose husbands' were employed as professional/administrative workers/overseas workers followed by employees/sales/skilled workers.

However, both education and husband's occupation explained only 1.2% more of the variability in purchase ($r^2=.083$).

The respondents' employment status, age, household income and family size ($P>0.05$) were not statistically related to the use of label by the respondents.

The relationship between use of label and SPS awareness was also examined. The use of label was significantly associated with awareness of SPS foods ($P<0.05$) ($r^2=.057$). The use of label by participants who were aware of foods with SPS was significantly higher compared to those who were not aware of these foods.

The ability of each demographic variable and SPS awareness to predict use of label was also determined. Only the addition of husband's occupation to the model with SPS awareness significantly improved the model predicting use of label ($r^2=.118$) ($P<0.05$). [3]

4.3.3. Purchase of SPS Foods and Association with Demographic Information

4.3.3.1 Purchase

In a usual weekly purchase, the number of fortified foods with SPS bought by the respondents ranged from one to seven items. The average number of purchases was 2.8 SPS foods per week. The three most commonly purchased SPS foods were noodles, orange juice and chocolate drink.

The amount of purchase of SPS foods was classified from 0 to 36 (See Section 3.10 for a description of purchase variable). In the sample, the range of purchase variable was from 0 to 14. The mean purchase level was 4.2 $\pm$2.6. To make it more normally distributed as required by general linear model analysis, log transformation was performed on purchase variable.

4.3.3.2 Relationship of Purchase with Demographic Information

The amount of SPS foods purchased in a household could be expected to vary depending on the household size. For example, if a household with 3 members purchased 3 packets of noodles in a week, this would be similar in

[3] This analysis used the F-test.

nutritional terms, to a household with 7 members purchasing 7 packets. Univariate general linear model (GLM) showed that family size was significantly related to the amount of SPS foods purchased (P=.006) (model r^2=.049). Family size explained 5% of the variation in purchase of SPS foods. Therefore, to take into account this linear relationship, family size was included in all analyses as a covariate.

In the analysis, univariate GLM was used in predicting purchase of SPS foods when the effect of each demographic variable and use of label was included one at a time, controlling for the effect of family size (See Table 4.7). Addition of income significantly improved the model predicting purchase of SPS foods (P<0.05) (model r^2=.126) using F-test. Mean purchase varied significantly with income categories (P<0.05) (See Table 4.8). This relationship was linear. Respondents whose household income were P8001.00 and above had the highest purchase of SPS foods. As expected, the lowest income group had the lowest mean purchase of SPS foods. Statistically, the mean purchase of the lowest income group (P2999.00 and below) was significantly lower from the rest of the income groups.

The respondents' employment status was also significantly related with purchase of SPS foods (P<0.05) (model r^2=.078) (See Table 4.9). Mothers in paid employment purchased significantly more of these foods compared with unemployed mothers. When both income and respondents' employment status were included in the model, income was still significantly related to purchase (P=0.007) but the effect of employment status was no longer significant (P=.105).

The reported use of label had a significant relationship with SPS foods purchased (P<0.05) (model r^2=.081). The frequent users of label purchased significantly more SPS foods than those respondents not reading food labels at all (See table 4.10).

The results indicated that among the three significant predictors of purchase, income was the best predictor of purchase. When the three variables with significant association with purchase (use of label, respondents' occupation status and income) were included in the model at the same time, the results showed that this model was not a significant improvement when compared with the model using income alone.

Table 4.7 **Predictors of the reported SPS foods purchased in a week controlling for the effect of family size**

Independent Variables	P Value	Model Adjusted r^2
Age	P=.600	.040
Income	Sig.* P=0.025	.126
Husband occupation	P=.331	.049
Respondent employment status	Sig.* P=0.030	.078
Food Budget	P=.938	.031
Education	P=.836	.033
Use of label	Sig.* P=0.040	.081
Income, use of label, respondents' occupation status	Income-Sig.*P=.009 Use of label-P=.160 Res. Occup. Status-P=.175	.156

Sig.*-Significant

Table 4.8 **Mean Purchase of respondents by income categories**

Income Categories	Mean Purchase	(95%) Confidence Interval
P 2,999.00 & below	2.737[a]	1.654 - 3.819
P 3,000.-8,000.00	4.311	3.735 – 4.888
P 8,001.00 & above	5.133[a]	4.315 – 5.951

a-Significantly different at P<0.05

Table 4.9 **Mean Purchase of SPS foods by respondents' employment status**

Respondent Employment Status	Mean Purchase	(95%)Confidence Interval

Not employed	3.8453[a]	3.320 – 4.386
Employed	4.954[a]	4.178 – 5.730

a-Significantly different at P<0.05

Table 4.10 **Mean purchase of respondents based on frequency of use of label**

Use of label	Mean Purchase	(95%) Confidence Interval
No	3.620[a]	2.912 – 4.328
Sometimes	3.852	2.886 – 4.818
Yes	4.929[a]	4.264 – 5.595

a-Significantly different at P<0.05

When the effect of all demographic variables was analyzed at the same time using GLM, there was no significant increase in the model predicting purchase (r^2=.132) as compared with the model having income, respondents' employment status and use of label.

4.3.4 Relationship of Awareness and Purchase

4.3.4.1 Awareness of Fortified Foods

Using GLM analysis for predicting the amount of purchase, it was found that awareness of fortified foods had a significant relationship to purchase of SPS foods if the effect of family size was controlled (P<0.05) (r^2=.084). Respondents who were aware of fortified foods had significantly higher purchase compared to those who were not aware of these foods.

Because awareness was related to demographics, it was possible that they may confound the relationship of awareness and purchase so they were included in the model and the relationship was observed.

Adding income significantly improved the model predicting purchase (r^2=.138). Income was still significant (P=0.026) while fortified food awareness was less significant (P=.088).

There was a significant interaction between awareness and age groups. There was no significant difference in the amount of purchase among mothers with younger age groups (15-22, 23-30 and 31-37 years old) between those who were aware and not aware of fortified foods. On the other hand, mothers who were aware had significantly higher amount of SPS foods purchased compared to those who were not aware among the oldest age range (38 years old and above).

Adding education, husband occupation and food budget categories did not significantly improve the model predicting purchase of SPS foods.

4.3.4.2 Relationship of SPS Awareness and Purchase

It was found that the effect of SPS awareness on purchase of SPS foods was significant if family size was taken into account (P<0.05)(r^2=.084). Respondents who were aware of SPS foods had significantly higher purchase than those respondents who were not aware of SPS foods.

The predictive strength of the model containing fortified food awareness or SPS awareness to purchase was the same (r^2=.084).

Adding income significantly improved the model predicting purchase (r^2=.141). Contribution of income was significant (P=.005) but SPS awareness was just marginally significant (P=.081).

There was a statistically significant interaction between the effect of SPS awareness among employed and unemployed respondents and among age groups. The difference of the amount of purchase between those who were aware or not aware was more or less the same among the younger age groups (15-22,

23-30 and 31-37 years old). However, respondents who were aware of SPS purchased significantly more SPS foods than those who were not aware among the oldest group (38 years and above) (See Table 4.11). Among participants who were not aware of SPS, there was no significant difference in the amount of purchase between those who were employed and not employed. On the other hand, among mothers who were aware of SPS, those who were employed had significantly higher amount of purchase than those who were unemployed (See Table 4.12). The interaction between awareness and age did not improve the model predicting purchase (r^2 of model=.098). However, the interaction between awareness and employment status improved this model (r^2 of model=.129). These significant interactions remained even when income was included in the model.

Adding age (r^2=.070), education (r^2=.068), food budget (r^2=.062), husband occupation (r^2=.081) or respondents' employment status (r^2=.101) one at a time did not significantly improve the model predicting purchase of SPS foods nor did they change the significant association between SPS awareness and purchase of SPS foods.

Table 4.11. **Interaction between SPS awareness and age**

SPS Awareness and Age			
Age	**n**	**Aware of SPS?**	**Mean Purchase**
15-22	0	No	-
	5	Yes	4.6000
23-30	22	No	3.9091
	39	Yes	4.3333
31-37	17	No	4.2941
	25	Yes	4.0400
38 & above	15	No	2.9333}
	11	Yes	6.3636}*

*Significantly different at P<0.05

Table 4.12 **Interaction between SPS awareness and respondents' employment status**

SPS Awareness and Respondents' Employment Status			
Employment Status	**Aware of SPS?**	**n**	**Mean Purchase**
Not employed	No	40	3.7000
	Yes	14	3.9286
Employed	No	49	3.5992}
	Yes	28	5.5000}*

*Significantly different (P<0.05)

In the model predicting purchase of SPS foods including family size and SPS awareness,(r^2=.084), additional information on the respondents' use of label did not result in a significant improvement of this model (r^2=.101). However, there was a significant interaction between SPS awareness and the different degrees of the use of food labels (See Table 4.13). The significant interaction between label use and awareness did improve this model (r^2=.135). The frequent users of labels who were aware had significantly higher amount of SPS foods purchased compared to those who were not aware. Among the occasional users, there was no significant difference on the amount of purchase between those who were aware and those who were unaware. For mothers who were not using label at all, purchase of those who were aware was close to being significantly higher than purchase of those who were not aware.

Table 4.13 **Interaction between use of label and SPS awareness**

Use of Label	n	SPS Awareness	Mean Log Purchase
Frequent users	57	Yes	1.541}
		No	1.082}*
Occasional users	27	Yes	1.041
		No	1.398
Non-users	50	Yes	1.268
		No	.939

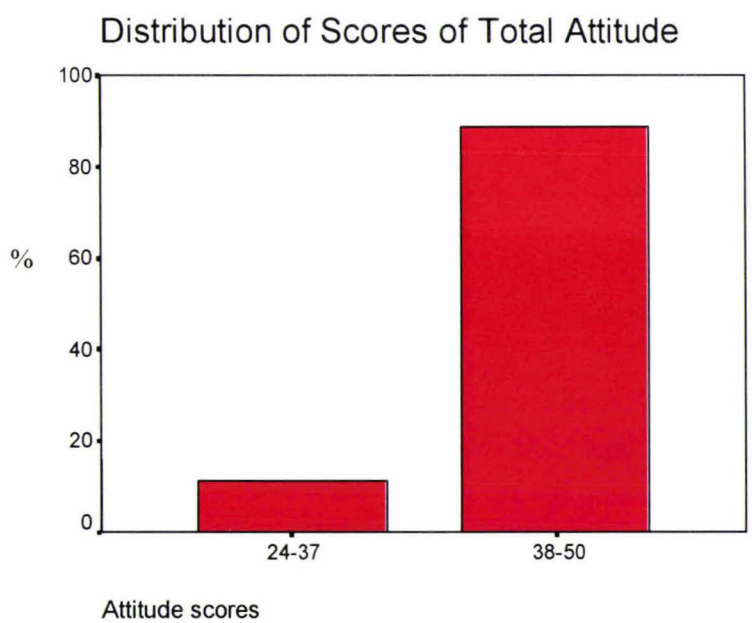
*Significantly different (P<0.05)

Addition of education, husband occupation or food budget categories one at a time together with SPS awareness did not significantly improve the models predicting purchase of SPS foods. There was no significant interaction between the effect of SPS awareness and these demographic variables.

4.3.5 Attitude to Fortified Foods

Only respondents who said they were aware of "fortified foods" or "foods with added nutrients" were asked about their attitude to these foods. The attitude of respondents was solicited through ten statements on cognitive, affective and conative aspects of attitude towards fortified foods. The relationships of attitude of these respondents (n=89) with purchase and other demographic variables were analyzed using GLM. The range of attitude scores of the respondents was 28-50 with a mean score of 43 ±4.81. It was found that majority of the mothers (88.8%) had a positive attitude (with scores of 37-50) towards fortified foods and only 11.2% of the sample population had mixed attitude (with scores of 24-36) towards fortified foods. There was not a single respondent who were classified as having low attitude based on their scores (with scores of 11-23). (See Figure 4.1)

Figure 4.1 Distribution of Respondents' Scores on Attitude to Fortified Foods



The majority (92%) of the participants (who were asked the attitude questions) were favorable towards purchasing fortified foods. Around 40% of respondents agreed that the price of fortified foods was the same as the price of other foods. Only 11% perceived fortified foods as more expensive than other foods. The rest of the respondents actually thought that fortified foods were cheaper. About 39.3% of the mothers strongly agreed that they would purchase fortified food if there were no price increase. About 19.1% of the total participants were amenable to price increase but another 19.1% were not in favor.

4.3.5.1 Relationship of Demographic Variables to Attitude to Fortified Foods

Attitude to fortified foods was assessed only for those who were aware of fortified foods or foods with added nutrients (n=89). Attitude towards fortified foods varied significantly among respondents with different education backgrounds (see Figure 4.2) ($P<0.05$). However, the relationship was not linear as expected. High school graduates/undergraduates had more positive attitude followed by the vocational and college undergraduates. Respondents who were graduates or undergraduates of elementary education had the least positive attitude. However, the attitude of respondents with elementary and college graduates was more or less the same.

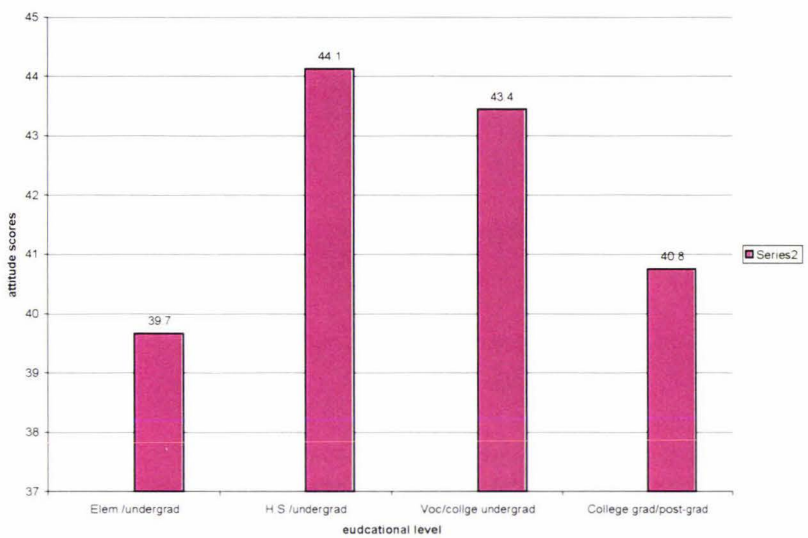
Age, income, food budget, respondents' occupation status, husband occupation or use of label categories was not significantly associated with attitude towards fortified foods.

4.3.5.2 Attitude and Purchase

A correlation test showed that a weak positive linear relationship ($r=.1754$ at 0.05 significance level) existed between attitude of respondents towards fortified foods and purchase of SPS foods when the effect of family size was

controlled. This means that only 3% of the variation in purchase could be attributed to attitude.

Figure 4.2 **Graph showing the attitude scores of respondents in different educational backgrounds**



4.3.5.3 Effect of Demographic Variables on the Relationship Between Purchase and Attitude to Fortified Foods

Attitude to fortified foods was asked only in the subgroup of respondents (n=89) who were aware of fortified foods or foods with added nutrient. The effect of demographic variables on the relationship between purchase and attitude to fortified foods was examined. The association between purchase of SPS foods and attitude was significant ($P<0.05$). It was found that the statistical significance of attitude towards fortified foods to purchase of SPS foods varied depending on the demographic variables (See Table 4.14).

Attitude did not change the significant relationship between mothers' employment status and purchase of SPS foods but it was less significantly related with purchase ($P=0.07$).

Attitude was more significantly related with purchase when food budget was taken into account (P=0.051).

When age, education, or husband occupation was added singly to the model (with attitude alone), the relationship between purchase and attitude was still marginally significant (See Table 4.14). These demographic variables were not significantly related with purchase of SPS foods even when attitude was taken into account. When the effect of income was taken into account, the relationship between attitude and purchase of SPS foods was not evident (P=0.092). This analysis also showed that in the sub-group of respondents who were aware, income and attitude were not significantly related to purchase.

4.3.6 Purchase and General Opinion on Food and Health.

General opinion on food and health was assessed with five (5) attitude statements on foods and health, with 25 as perfect score. The scores of the participants ranged from 9-25 with a mean score of 17.4 ± 2.5.

Table 4.14. **Effect of demographic variables on the relationship between purchase and attitude towards fortified foods**

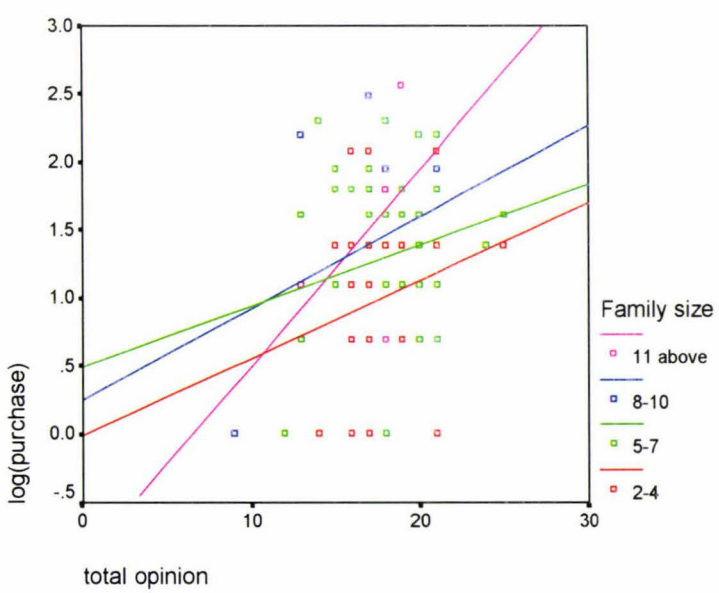
Variables	P-Values	Model Adj. r^2
Income	Income (0.492) Attitude (.092)	.075
Husband Occupation	Husband Occupatic (.716) Attitude (.068)	.043
Education	Education (.698) Attitude (.088)	.047
Food Budget	Food Budget (.840) Attitude (.051)	.050
Respondent Employment Status	Employment Status (.021) Attitude (.071)	.119
Age	Age (.721) Attitude (.091)	.046
Attitude	Attitude (0.051)	.064

Attitude to Fortified Foods and General Opinion on Food and Health. A weak positive linear relationship existed between attitude and general opinion. The correlation was significant with r=.281 (P=<0.05)). It was interesting to note that the general opinion of participants who were not aware of fortified foods was marginally significantly lower than those who were aware (P=0.057). The mean score of those who were aware was 17.7 while the mean score of those who were not aware was 16.8.

Controlling for family size, the level of purchase of SPS foods and the general opinion to food and health were significantly correlated at 0.05 level of significance (r=.24). This means that 6% of the variation in purchase of SPS foods can be attributed to the variance in general opinion on food and health. However, this correlation was even higher than the correlation between the amount of SPS foods purchased and attitude towards fortified foods.

Figure 4.3 shows that households with 11 and more family members had the strongest linear correlation of general opinion and purchase but the correlation among the rest of the family size categories was more or less similar.

***Figure 4.3* Graph showing the correlation between purchase and total opinion controlling for the effect of family size**



4.3.6.1 Relationship of Purchase to Awareness Controlling for Family Size and General Opinion

In the general linear model predicting the amount of purchase, the relationship of SPS awareness was examined controlling for family size and general opinion. The findings revealed that purchase of SPS foods by respondents was still significantly related to awareness of fortified food ($P<0.05$) ($r^2=.125$) and SPS awareness ($P<0.05$) ($r^2=.122$) when general opinion was taken into account. The predictive strength of the model (with awareness alone) to predict purchase significantly increased with the addition of general opinion.

Only income was significantly confounding the relationship between purchase and general opinion. Adding income significantly improved the model (with awareness, general opinion and purchase) predicting purchase of SPS foods ($r^2=.159$). The relationship between general opinion and purchase was less significant ($P=0.065$).

Age, education, food budget, husband occupation and respondents' employment status categories did not significantly confound the relationship of fortified food awareness and general opinion with purchase.

4.4 CONSIDERATIONS IN PURCHASING FOODS with SPS

One specific objective of this study was to determine if the presence of added nutrient was considered by participants when purchasing SPS food. In order to determine this, respondents were asked to rank their reasons for choosing their most commonly purchased brands with SPS. The respondents were also asked to identify the nutrients added to foods carrying SPS.

The top reasons chosen were not the same for each food. Added nutrient was most commonly cited as one of the top three reasons for purchase of

noodles-with 61% of the mothers (70 out of 115) considered added nutrient as one of the first three reasons they buy a brand of noodles with SPS. However, only 24.6% of the participants correctly identified vitamin A as the nutrient added to noodles. Added nutrient was among the first three reasons given by about 60% of the participants (57 out of 95) as their reason for purchasing their particular brand of orange juice. Still, only 6.7% of the respondents were able to identify vitamin A as the nutrient added to orange juice with SPS. Half (28 out of 56) of the participants included added nutrient as one of their reasons why they buy their brand of chocolate drink. However, a very minor portion (2.2 %) of the participants was accurate in identifying vitamin A as the nutrient added to chocolate drink. In general, the participants were able to name other nutrients either present or not present in the food products. Only 4.4% of the respondents were able to name the correct nutrient in all SPS foods they purchased.

The proportion of foods purchased with added nutrient as one of the top three reasons was computed by counting the number of times this reason was mentioned in any order (first, second, third) and dividing the sum by the total number of SPS foods purchased (See section 3.10 of the Methodology chapter for details). The results showed that 29.3% of the mothers considered added nutrient as one of the top three reasons in purchasing all SPS foods. Preference (54.1 %) and taste (52.6%) were cited more often among the top three reasons that participants mentioned in purchasing all SPS foods (See table 4.15).

Table 4.15 **Percentage of respondents who mentioned the top three reasons for purchasing all SPS food.**

Reasons cited as one of the top 3 in purchasing all SPS food by respondents	**Percentage of respondents (%)**
Preference	54.1
Taste	52.6
Added nutrient	29.3
Price	21.0
Brand	4.5

Note: Respondents were asked to give 3 answers, thus percentages do not sum to 100%

Around one-fifth (21.1%) of the mothers never included added nutrients as one of the top three reasons for choosing SPS foods they purchased weekly (See Table 4.16). The results also indicated that a high percentage of the sample population (62.4%) never regarded brand as one of the top three reasons for their purchase of SPS foods. In addition, more than one third (38.3%) of the respondents did not mention price as a reason for choosing any of the SPS foods they regularly purchased.

Table 4.16 **Percentage of respondents who did not mention each reason for purchasing any SPS food.**

Reasons not included as one of the top three in purchasing any SPS food by respondents	Percentage (%)
Preference	9.0
Taste	6.0
Added nutrient	21.1
Price	38.3
Brand	62.4

Note: Respondents were asked to give 3 answers, thus percentages do not sum to 100%

4.5 NUTRIENT INTAKES OF PRESCHOOLERS

The 24-hour recall was administered to all respondents for three days (2 weekdays and one weekend day). The intake of one preschool child was reported by each respondent.

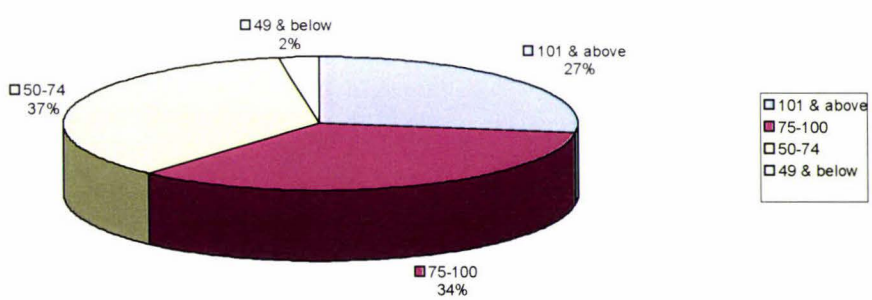
In analyzing the nutrient intakes, only 124 children of the participants were included. Ten children were excluded. This was because 7 of the children had breast milk intakes; hence, total energy and micronutrient intakes could not be estimated. One respondent appeared to have a gross underestimation of the food energy intake (462 kcal) while another had a huge overestimation of her child's average intake (3,802 kcal). Intake of another respondent was not included in all food intake analyses since she was not able to complete the food recall for three days.

4.5.1 Energy Intake

The children's average daily energy intake was 1247 kilocalories ± 336 and ranged from 605-1993 kilocalories. The mean percentage RDA on their energy intake[4] was 86.7% ± 24.7, ranging from 44%-147%. The distribution of the energy intake is shown in Figure 4.4.

Based on the Philippine Recommended Dietary Allowance (FNRI, 1989) (see Appendix 4-1) for Filipino children (see Figure 4.4), less than one third of the children (27.4%) met more than 100% of the RDA for energy. About 33.9% of the preschoolers met 75-100% of the RDA while only 36.3% of the respondents' children had intakes within 50-74% of the RDA. Only a small percentage (2.4%) of the children had 49% and below of the recommended level.

***Figure 4.4* % of children's energy intake in different adequacy levels based on % RDA**



4.5.2 Vitamin A Intake

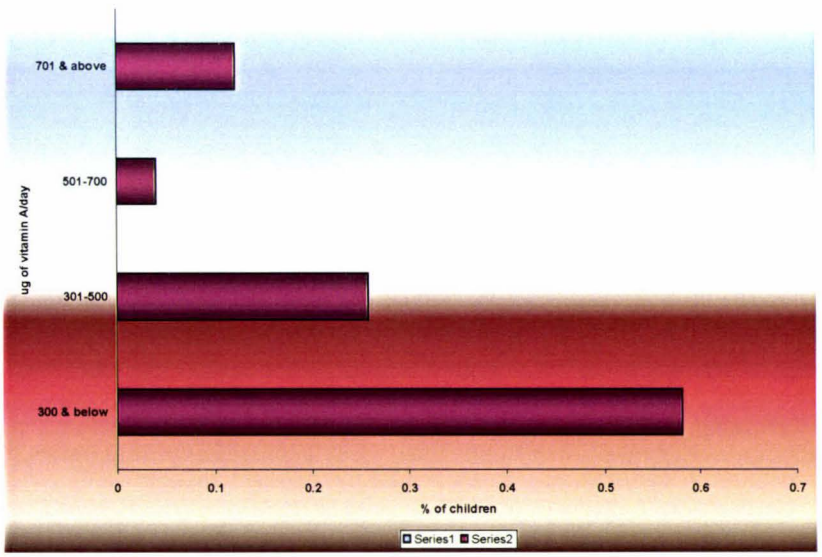
[4] Since the RDA for the age ranges (2-3 years and 4 years old) was different, RDA was computed based on age range.

The average daily vitamin A intake of the children was 362 μg ±277 and ranged from 70.7 to 1473.6 μg. The mean % RDA of vitamin A was 100% ±77 with a range of 18.8%-392.9%.

The bar graph on Figure 4.5 shows the average intake of vitamin A by preschoolers. More than half of the children (58.1%) had vitamin A intakes of 300 μg (RE) and below. Very high intakes of 701 and above μg were consumed by 12.1% of the preschoolers.

In comparison to the Philippine RDA (350 μg/day for 2-3 years old and 375 μg/day for 4-6 years old), 51.6% had an intake of at least 75% of the RDA for vitamin A. About one fourth (25.8%) of the respondents' children had intakes within 50-74% of RDA. Those meeting only 49% or below of the RDA comprised around 22.6% of the sample population.

Figure 4.5 **3-day average vitamin A intakes (μg/day) of respondents' preschool children**



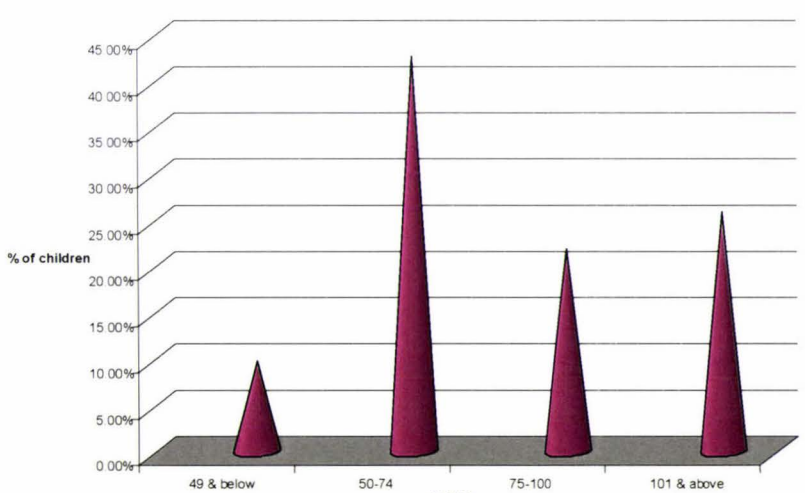
4.5.3 Iron Intakes

The average daily iron intake of the children was 7.58 mg ± 3.0 and ranged from 2.04-21.76 mg with a median of 6.69 mg. The mean percentage RDA for iron intake was 80.9% ±33 with a range of 20%-241%.

The majority of the respondents' children did not meet the recommended iron intakes. Only 39.5% had intakes of 8 mg or above. More than one fourth had intakes of 6-7 mg. A low intake of 3-5 mg was consumed by about one third (33.1%) of the preschool children.

Based on the RDA (8 mg for 2-3 years old and 10 mg for 4-6 years old), around one fourth (25.8%) of the respondents' children were able to meet more than adequate (101% and above) intake for iron (see Figure 4.6). Majority of the children (42.7%) met only 50-74% of their recommended intakes for iron.

Figure 4.6 **Adequacy of iron intakes of the respondents' children based on % RDA**



4.5.4 Relationship of Energy and Nutrient Intake with Demographic Variables

4.5.4.1 Average Energy Intake

The relationship of demographic variables to energy intake was examined one at a time. Only income was marginally significantly related with energy intake (P=0.083). The effect of income on energy intake of the children was not linear. Respondent's use of label had a significant positive relationship to energy intake of preschool children (P<0.05). However, energy intake of the children did not vary significantly with child's age (2-3 years and 4 years old), food budget, maternal education, respondents' employment status, husband occupation and family size. Awareness of fortified foods and SPS was not associated with the energy intake of the children.

4.5.4.2 Average Vitamin A Intake

The relationship of the demographic variables to average vitamin A intake was also examined one at a time.

There was a weak negative relationship that existed between vitamin A intake and family size (P<0.05) using a correlation test. The children's vitamin A intake in families with 2-4 members and 5-7 members was significantly higher than intake in families with 8-10 members (P<0.05). However, intake of vitamin A by the children did not vary among respondents grouped according to age, education, income, food budget, employment status, and husband occupation. On the other hand, significantly higher vitamin A intakes were recorded among preschool children whose mothers were frequent users of food labels compared to children whose mothers were non-users of labels (P<0.05). However, respondents' awareness of fortified foods or SPS foods was not associated with the children's vitamin A intake.

A correlation test did not yield a significant relationship between energy and vitamin A intakes of the children.

4.5.4.3 Average Iron Intake

Since iron intake and energy intake were significantly related (P=.000 with .477 correlation) as shown by correlation test, the effect of energy was controlled. The association between iron intake and each demographic variable was examined singly using GLM.

The amount of iron varied significantly in different income categories (P<0.05). The relationship of income and iron intake of the children was linear (see Table 4.17). There was also a positive marginally significant relationship between food budget and iron intake of the preschoolers controlling for the effect of energy (P=0.086). The employment status of the respondents was also significantly associated with the iron intake of their children (P<0.05). Children of employed mothers had significantly higher intake of iron compared with children of unemployed mothers. In addition, iron intake varied significantly with the use of label by the respondents (P<0.05). The results showed that the more frequent respondents use label, the higher was the average iron intake of their children. When the relationship of income, food budget, respondents' employment status and use of label to iron intake was examined, only mothers' employment status and use of label were significantly related with iron intake of the children. However, the rest of the demographic variables (age, education, husband occupation and family size) had no significant relationship to the children's iron intake.

Iron intake was not associated with respondents' awareness of fortified foods or SPS foods.

Table 4.17 **Average iron intake of the children belonging to different income levels***

Income	n	Mean Iron Intake	Standard Error
P 2,999.00 & Below	21	6.864	.658
P 300-8,000.0	73	7.367	.374

P 8,001.00 & above	36	8.522	.517

* Significant at P<0.05.

4.5.5 Purchase and Intake

Correlation tests showed that the reported purchase of SPS foods and energy intake had a weak positive relationship (P<0.05, r=.2563) indicating that the higher the purchase of SPS foods, the higher was the energy intake. This significant relationship remained even when the effect of income was controlled though there was a significant decrease in the correlation (r=.1827).

The average vitamin A intake had an even weaker positive relationship (P<0.05, r=.1790) with purchase of SPS foods.

However, iron intake had no significant association with purchase of SPS foods.

4.6 PERCENTAGE CONTRIBUTION OF SPS FOODS ON VITAMIN A AND IRON INTAKES

The food intake of the children was reported by the respondents through the use of three (3) 24-hour recall. The three-day recall was able to record the intake of SPS foods only among 78 children or 62.9% of the sample population. Hence, in this section the amount of vitamin A and iron supplied by SPS foods was analyzed among 63% of the children since this was the proportion of children who consumed SPS foods. Only 59 children or 76% of children who consumed SPS foods had iron from these foods. In general, 52% of all children did not obtain iron from SPS foods. The rest of the participants had 0% of iron and vitamin A supplied by SPS foods. Respondents' children who consumed SPS foods during the three day 24-hour recall had marginally significantly higher amount of purchase of SPS foods compared to those children without intake of SPS foods.

4.6.1 Vitamin A Intake from SPS Foods

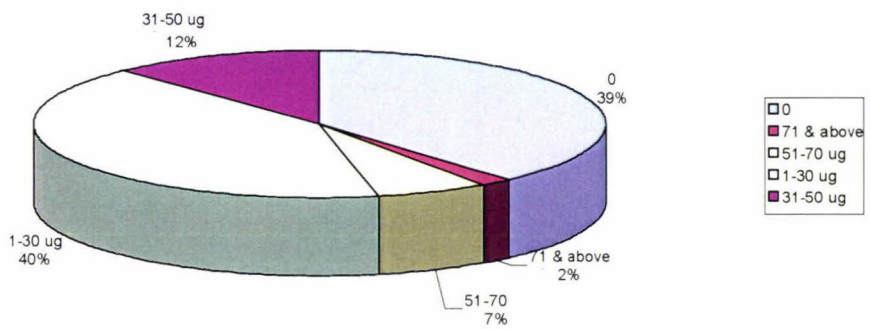
The average amount of vitamin A contributed by SPS foods in the children's diet was 326 µg (RE) ±467 with a range of 47-3503 µg and a median of 285 µg. The mean percentage contribution of SPS to vitamin A intake was 27% ±18 with a range of 1%-90%. All children (63% of the sample) who consumed SPS foods had vitamin A from these foods. Only 6 children or about 5% of all children had intake of more than 1,000 µg.

It should be noted that only 62.9% of the respondents' children had intakes of vitamin A from SPS foods in three days of the 24-hour recall[5]. Hence, among 39% of the children, there was no contribution of vitamin A (0%) from SPS foods (See Figure 4.7). SPS foods contributed 1-30 µg of total vitamin A for 41.1% of the children. About 12% of the children obtained 31-50 µg of vitamin A from SPS foods. SPS foods contributed 51-70 µg and 71 µg & above of vitamin A to only 2% and 7% of the children, respectively.

Correlation test showed that there was a significant positive linear relationship between vitamin A (in µg) from SPS foods and percent RDA of vitamin A intakes ($P<0.05$) ($r=.462$). It was observed that the higher the amount of vitamin A from SPS foods, the higher the percentage adequacy of vitamin A based on the RDA.

[5] Children without intake of SPS foods were not included in analysis of iron and vitamin A from SPS foods.

***Figure 4.7.* % of children having vitamin A (in μg) from SPS foods.**



4.6.2 Iron Intake from SPS Foods

The average amount of iron contributed by SPS foods was 3.99 mg ±6.0, which ranged from 0-38.9 mg. The mean percentage contribution of SPS foods to iron intake of the children was 15.03% +15.34 ranging from 0-74.42%.

Not all respondents' children who consumed foods with SPS had iron from these foods because not all SPS foods are fortified with iron. Only 61.3% of the total sample had iron intakes from SPS foods. No amount of iron was contributed by SPS foods among 16.1% of the children who consumed SPS foods. About 8.9% of the children obtained 1-10% of their iron intake from SPS foods. Nineteen percent of the children had 11-20% of iron contributed by SPS foods. SPS foods contributed 21-30% of iron intakes of 9.7% of the sample population. Only a small percentage of the children (4.0%) had 31-40% of iron intakes owing to SPS foods. Still, a minor portion (3.2%) of the preschoolers obtained over 41% of their iron intake from SPS foods. The rest of the children (38.7%) had no

intake of iron from SPS foods. Hence, overall SPS foods had only small contribution to iron intakes of the children.

4.6.3 Effect of Removing SPS Foods from the Diet

4.6.3.1 Relationship of SPS Foods to Meeting RDA of Vitamin A with and without SPS Foods

As shown on Table 4.18, children with >75% RDA for vitamin A were more likely to consume SPS foods than those who had <75% RDA. A pattern indicated that as the vitamin A intake increased, the proportion of children with vitamin A from SPS foods also increased (χ^2 P=0.054).

Table 4.18 **Cross tabulation of % RDA on vitamin A intake with or without Vitamin A from SPS foods**

% RDA of vitamin. intake	Witl Vitamin A from SPS foods				
	No	%	Yes	%	Total
49% and below	15	32.6	13	16.7	28
50-74	14	30.4	18	23.1	32
75-100%	8	17.4	16	20.5	24
101% and above	9	19.6	31	39.7	40
Total	46	100	56	100	124

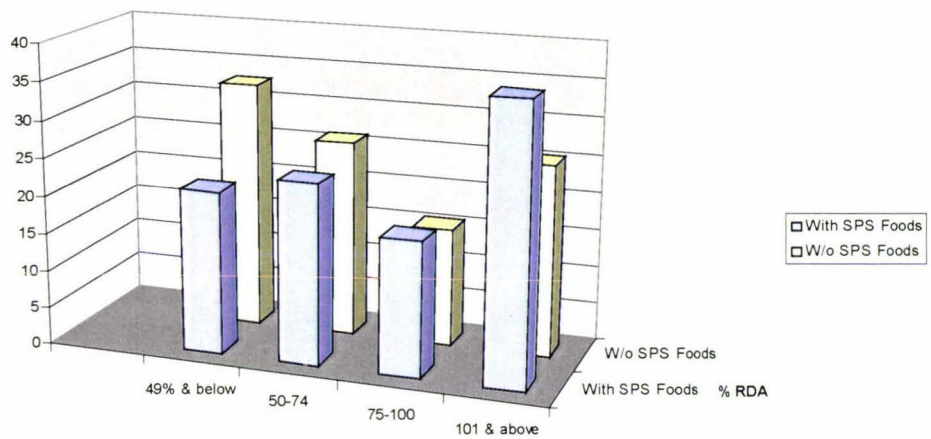
χ^2 P=0.054

4.6.3.2 Cross tabulation of Percentage Adequacy of Iron A with and without SPS Foods

The pattern similar to vitamin A from SPS foods also emerged in the case of iron from SPS foods as shown in Table 4.19. As iron intake increased, the number of children with iron from SPS foods also increased. This relationship was not statistically significant. However, a correlation test showed a significant positive relationship between iron contributed by SPS foods and % RDA of the children's total iron intake (r=. 519).

49% and below	22.6	34.7	53.54 (increase)
50-74%	25.8	28.2	9.3 (increase)
75-100	19.4	16.9	12.89 (decrease)
101 and above	32.3	20.2	37.46 (decrease)

Figure 4.8 **Comparison of % RDA of vitamin A intakes with and without SPS foods**



When the amount of iron contributed by foods with SPS was subtracted from daily intakes, there was a 100% increase in the number of children whose percentage RDA was <50% (see Table 4.21 and Figure 4.9). There was little change in the percent of children whose iron intake was 50-100% of RDA. But the number of the children with more than adequate (101% and above) vitamin A intakes decreased by 40.7%.

Note that there were children who consumed SPS foods but did not receive iron from these foods. This was because most SPS foods are fortified only with vitamin A alone. However, some SPS foods are fortified both with iron and vitamin A and one SPS food is fortified with iron only (See Appendix 4-2).

Table 4.19 **Cross tabulation of % adequacy on iron intake with and without iron from SPS foods**

% RDA of iron intake	Witl Iron from SPS Foods				
	No	%	Yes	%	Total
49% and below	9	13.2	3	5.4	12
50-74	30	44.2	23	41	53
75-100%	13	19.1	14	25	27
101% and above	16	23.5	16	28.6	32
Total	68	100	56	100	124

χ^2P=.149

4.6.4 Effeet of Removing the Contribution of SPS Foods on Percentage RDA

The amount of vitamin A and iron contributed by SPS foods was deducted from the daily average intakes of these nutrients in order to see its effects in the percent of children meeting the RDA. Table 4.20 shows the comparison of RDA of vitamin A intakes with and without the amount of vitamin A from SPS foods. The percent of children meeting only 49% and below of the RDA increased by 53.5%. The percent of children with more than 100% RDA on vitamin A decreased by 37.5%. Figure 4.8 shows the comparison of % RDA of the children with and without SPS foods in their diet.

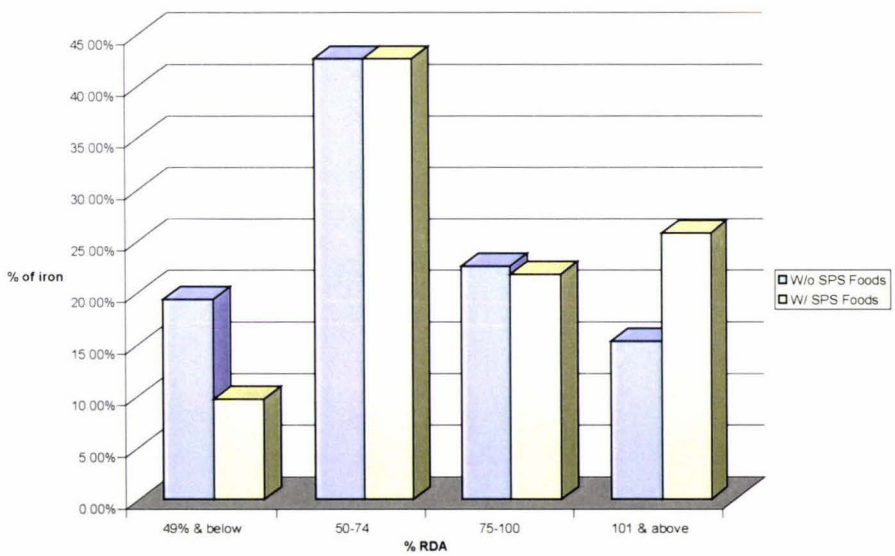
Table 4.20 **Comparison of % RDA for vitamin A among children with and without the vitamin A contribution from SPS foods.**

% RDA on Vitamin A Intake	% of Children with SPS foods included	% of children without vitamin A from SPS foods	% increase or decrease

Table 4.21 **Comparison of percentage adequacy with and without the amount of iron contributed by SPS foods.**

Level of % RDA On Iron Intakes	% of children with SPS foods	% of children without iron from SPS foods	% increase or decrease
49% and below	9.7	19.4	100 (increase)
50-74%	42.7	42.7	- (same)
75-100	21.8	22.6	3.67 (decrease)
101 and above	25.8	15.3	40.7 (decrease)

Figure 4.9 **Comparison of % RDA of the children with or without iron from of SPS foods**



4.6.5 Intake of Foods with SPS

4.6.5.1 Relationship of Vitamin A from SPS Foods with Demographic Variables

The amount of vitamin A the children obtained from SPS foods had a marginally significant relationship with income of the households (P<0.06). The

respondents with household income of P 8,001-12,000.00 had the highest mean intake of vitamin A from SPS foods. Not surprisingly, those with the lowest income bracket of P 2,999.00 and below had the lowest mean intake of vitamin A contributed by SPS foods. Family size had a significant association with the amount of vitamin A contributed by SPS foods ($P<0.05$). The amount of vitamin A from SPS foods among families with 2-4 members and 5-7 members was significantly higher ($P=<0.05$) than families with 8-10 members. However, the amount of vitamin A from foods with SPS did not vary significantly with respondents' age, education, food budget, respondents' employment status, husband occupation and use of label.

Awareness of SPS foods and fortified foods among respondents was not related to the amount of vitamin A from SPS foods consumed by the children. Purchase was marginally significantly associated with the amount of vitamin A from SPS.

4.6.5.2 Iron from SPS Foods

Income had a marginally significant relationship to the amount of iron obtained from SPS foods ($P=0.07$). Similar to vitamin A, children belonging to households with income bracket of P8001.00-P 12,000.00 had the highest mean intake of iron contributed by SPS foods. As expected, the children with the lowest mean intake of iron from SPS foods came from lowest income (P 2,999.99 and below) category. The rest of the demographic variables (age, education, food budget, respondents' occupation status, husband occupation and use of label) had no relationship with the amount of iron from foods with SPS.

In much the same way as vitamin A, SPS awareness and fortified foods awareness of respondents was not related to iron from SPS foods. Similarly, reported weekly purchase of SPS foods was not significantly associated with the amount of iron from SPS foods.

4.7 SUMMARY

This chapter presented the results of the data analyses performed to meet the objectives of the study. The first section summarized the profile of participants. A brief description of major variables was given. The relationships of awareness, attitude, use of label, general opinion to food and health and demographic variables with purchase of SPS foods were discussed with figures and tables. The next section provided the major factors that respondents considered in their purchase of SPS foods. The last section gave a detailed account of the energy, iron and vitamin A intake of preschoolers, the contribution of SPS foods to iron and vitamin A intakes to total intakes of the children, its relation to demographic variables and purchase of SPS foods and the effect of subtracting the amount of iron and vitamin A to the level of adequacy.

The next chapter discusses and explains the results and implications in relation to limitations of the study.

Chapter Five

DISCUSSION

5.1 INTRODUCTION

The review of literature has demonstrated that consumption of fortified foods can be beneficial for improving the nutriture of the target population. In the Philippines, the number of fortified foods available in the market is now increasing. Many of these foods are regulated and monitored through the *Sangkap Pinoy* Seal (food fortification) Program of the government. After five years of implementation, the present study evaluated this program in terms of consumers' rate of awareness, considerations in purchasing SPS foods, characteristics of those who purchase and the contribution of SPS food consumption in iron and vitamin A intakes of preschool children. This research study was carried out through stratified random sampling among 134 women from all villages (barangays) of the study site (Punta, Sta. Ana, Manila). Personal interviews using structured questionnaires were conducted among the research participants.

This chapter will discuss the findings of the study as they relate to the research objectives and the previous literature on the subject. The discussion will be presented based on the research questions outlined in the first two chapters of this thesis. Limitations of the study will be discussed and implications for further research will be outlined.

5.2 RATE OF AWARENESS OF FORTIFIED FOODS OR SPS FOODS AND DEMOGRAPHIC CHARACTERISTICS

5.2.1 Rate of Awareness

The first aim in the present study was to determine the rate of awareness of fortified foods and SPS foods and attitude towards fortified foods and describe the demographic characteristics. Awareness of fortified foods refers to awareness of the participants of the general term "fortified foods" or "foods with added nutrient". Awareness of SPS foods pertains to awareness of respondents of foods with *Sangkap Pinoy* Seal. About 66% of the sample population were aware of fortified foods. All but two respondents who were aware of fortified foods were also aware of SPS foods.

The rate of awareness of SPS foods in the present study is even higher than the recent national average rate of 51% (FETP-DOH, 1999). This is quite expected considering that Manila is the premiere urban area in the Philippines and that the present survey was conducted after another year of advertising. It is reasonable to say that urban residents have more exposure to SPS foods compared to rural counterparts because of their wider access to mass media and easier access of promoters of SPS foods to urban shoppers in supermarkets and groceries.

The findings revealed that awareness of fortified food varied significantly among respondents grouped by income, education and respondents' employment status. These results were not surprising since it was expected that income, education and employment status of the mothers would afford more access and exposure to information (i.e. mass media and food labels) on foods with added nutrients. Those with higher income tend to have more food purchases and thus more exposed to food labels. Those with higher education tend to process and retain nutritional information seen on TV easily. These results support the findings of Celestino, et al (1982) and Valdecañas, et al (1986) in which respondents who were more knowledgeable on nutrition were observed among those with higher income (Mancebo and Oñate, 1979), more years of formal schooling and increased attendance of nutrition classes in the Philippines.

Studies carried out in other parts of the world have also shown positive relationships between nutrition knowledge and education (Turrel, 1997); knowledge and income and education (Variyam, et al., 1996; Fusillo and Beloian, 1977).

Similarly, SPS awareness was significantly higher among younger participants, those with higher income and those with higher education. Younger participants are more likely to look for novel foods compared with older ones. This result has been found in another setting (Watson and Watson, 2000). The result of the present study suggests that efforts of nutrition educators should focus on the middle aged and older consumers, those with lower education and in the lower income segment of the population, thus ensuring a maximum exposure to SPS awareness.

5.2.1.1 Understanding of Fortified Foods and Foods with SPS

Most respondents were not familiar with the term "fortified foods". About 64.7% of those who said they were aware of fortified foods did not understand its meaning. However, around 35% of the participants who were not aware of the term "fortified foods" were aware of foods with added nutrients. These results are supported by the finding of a formative research on fortified foods in the Philippines where the terms "fortification or fortified foods" were generally not well understood (Joven, et al., 1996). In the present study, the perceptions of fortified foods were mostly positive as reflected in comments such as " nutritious foods", "more benefits", "better foods", "clean, nutritious foods", "foods that make you strong", "without much chemicals". However, one comment "assured of vitamins even though not tasty" deviated from the general understanding of the term. More than 50% who knew the term "fortified foods" did not know what it meant while most of those who had heard of SPS had a fair idea what it meant.

The responses elicited from the interviewees reflected mostly positive comments but three different views were associated with the meaning of foods with SPS. The positive perceptions were not surprising since these were also reflected in the qualitative study conducted by Joven, et al (1996) in which there was a generally positive attitude towards fortified foods endorsed by DOH. The views of one third of the sample population in the present study reflected a collective agreement that products, which passed the DOH standards and were accepted by DOH, were generally quality products, recommended for good health. However, it appears that they do not really understand the purpose of fortification, as very few respondents knew about the nutrients added to SPS foods.

The finding that only 53% of those who were aware had a generally correct idea of the meaning of SPS foods suggests that more information on SPS foods and its benefits is needed. However, a skeptical view on SPS foods, *"SPS foods were not fresh and that the seal itself was just an endorsement and an additional propaganda"* was likewise encountered from two respondents. Ironically, the respondent who considered the seal as propaganda regarded SPS foods as foods approved by DOH when asked about the meaning of SPS. It appeared that even if she knew that SPS foods were foods approved by DOH, this did not prevent her from having skeptical view on these foods. It is possible that aggressive commercial advertisements on TV by some SPS food manufacturers highlighting the expression "accepted by DOH" were regarded by these mothers as just another marketing strategy. The views of these mothers are similar to skeptical views of some US consumers about advertising claims (Mazis and Raymond, 1997). Studies in the UK and US have found the credibility of nutritional information from media to be low (Buttriss, 1997; Porter, et al., 1998).

Most respondents (66.3%) learned of SPS foods from advertisements. Only a small percent of the sample population relied on the promotion of health workers and supermarkets for their source of information on SPS foods. Promotion of SPS foods in print, radio and TV is largely undertaken by food

manufacturers (See Appendix 5-1 for samples of commercial advertisements on SPS foods in print). Health workers are underutilized source of information on SPS foods. In fact, it was only in the month long celebration of Nutrition Month in 1998 that a nationally coordinated effort in the promotion of SPS foods and its benefits was initiated by health and nutrition workers. Generally, the low-income segment of the population avail of health services in the health center. The doctor, midwife and volunteer health workers have regular contact with these people. This interaction could provide a window of opportunity to promote SPS foods.

It would be interesting to see if information from health workers could predict purchase of SPS foods more than information from TV in future studies.

The findings on awareness suggest that consumers still have to realize the importance of SPS foods and the benefits of food fortification. Advertisements of SPS foods should aim to educate consumers about SPS foods and its benefits.

Analysis using yes/no responses was not a sensitive measure of awareness. The term "fortified foods" was not a good indicator of awareness. Although this study found awareness of participants, understanding of the term was limited.

The impact of awareness and demographics on SPS foods and how it influenced the amount of purchase of these foods is discussed later.

5.2.1.2 Use of Label and Demographic Information

Less than half of participants were younger than 30. More than half of the respondents were high school graduates or high school undergraduates. The sample population mostly belonged to lower socio-economic status. In fact, less than one third of the respondents had household incomes, which fell within the national average income of Filipino families. Only 31% of the mothers were in paid employment.

Among the demographic variables, only education and husband occupation were significantly related with the use of label.

At least 63% of respondents reported using food labels either frequently or occasionally. It was observed that the higher the education category, the more frequent was the use of labels. This result is similar to studies in the US wherein label use was significantly and positively associated with higher education along with other factors (Bender and Derby, 1992; Guthrie, et al., 1995; Wang, et al., 1995).

Husband's occupation was also significantly associated with the use of label by respondents. Respondents whose husbands were unemployed used labels more frequently than other husband occupation categories. This could be because with the limited financial resources available to the family, housewives tend to be more concerned with food purchases ensuring that they get their money's worth by careful food selection through the use of label. The next most frequent users of labels were in the top earning groups. In these husband occupation groups, it is likely that the effect of education has influence in their concern for food purchases through the use of food labels when shopping.

5.3 THE RELATIONSHIPS OF AWARENESS, USE OF LABEL, ATTITUDE, GENERAL OPINION AND DEMOGRAPHIC INFORMATION WITH PURCHASE OF SPS FOODS

5.3.1 Predictors of Purchase: Demographic Information and Use of Label

The effect of each demographic variable with purchase controlling for the effect of family size was determined. Mean purchase of SPS foods was positively related to income. The low-income group was shown to have the least amount of SPS foods purchased. It is likely that the low-income group consumes fewer amounts of processed foods or "convenience foods" such as SPS foods. Since SPS foods are considered nutritious foods, the result of the present study could be comparable to the result of international studies where income played a

significant role in the nutritional quality of the diet. International studies showed that a decrease in income was related with poor nutritional quality of food purchases (Walberg, et al., 1998) and in the variety and quantity of food consumption (Anderson and Morris', 2000). Moreover, Gupta (1981) reported that higher income was significantly associated with improved food consumption and nutrient intakes in a comparative study in three Caribbean countries.

The respondents' employment status had a significant relationship with purchase of SPS foods. Employed mothers had significantly higher purchase of these foods compared with unemployed mothers. Better control of income among employed respondents could possibly explain this difference. This is reiterated by another study on women's employment status and control of income (Jayachandran, et al., 1998).

However, purchase of fortified foods did not vary significantly among respondents grouped according to husband's occupation or maternal education, food budget or age.

The use of label had a significant positive relationship with purchase of SPS foods controlling for the effect of family size. The relationship between the use of label and purchase is logical since information about SPS foods or the perceived benefit of the SPS food explicit in the label could have positive effects on purchasing behavior of the mothers. Alternatively, respondents who learned about SPS foods may read labels to see if the *Sangkap Pinoy* seal is present. The result of the present study supports the findings from international sources which found that labeled foods exerted a positive influence in purchase behavior (Glanz, et al., 1989; Hunt, et al., 1990; Shucker, et al 1992; Lang, et al., 2000). In general, this finding supports the view that nutrition information at the point of purchase could potentially improve food choices and promote health among the public.

In summary, income, respondents' employment status and use of label were found to be the significant predictors of purchase of SPS foods. Among these three significant predictors of purchase, income turned out to be the best predictor and inclusion of other variables did not significantly improve the model predicting purchase.

These findings suggest that those with low income, unemployed and not using food labels are unlikely to purchase SPS foods. It appears that purchase of SPS foods varies with socio-economic status. This result is a challenge to future nutrition education efforts. Use of label may reflect a higher concern for quality food selection among the participants. In the promotion of SPS foods, it will be beneficial to encourage the use of label to make sure that the food product has the seal which ensures nutrient addition in the food.

5.3.2 Relationship of Awareness with Purchase and the Effect of Demographic Variables

Respondents who were aware of fortified foods or SPS foods had significantly higher purchase of SPS foods compared to those who were not aware. This finding is similar to that observed by Solon, et al (1992) where promotion of specific leafy vegetables in a community in the Philippines resulted to a significant increase in vegetable consumption. International studies have found that knowledge is associated with food choice (Smith, et al., 1995; Larsson, et al.,1999).

Awareness was significantly associated with income. Both awareness and income were significantly related with purchase. However, when both income and awareness were considered, SPS awareness had only a marginally significant effect on the amount of purchase. It appeared that the effect of income was confounding the effect of awareness. Although income was the stronger determinant of purchase, awareness still had some predictive value.

There was a significant interaction between awareness and employment status. Among those who were aware, employed respondents had significantly higher purchase than unemployed ones. There was no significant difference between purchase of employed and unemployed mothers among those who were not aware.

Interestingly, the relationship of awareness to purchase was not the same for women of different ages. Mothers in the oldest age range (38 years and above) who were aware had significantly higher purchase than the same age group who were unaware. The effect of awareness on fortified foods was not significant in other age groups. It could be because these mature participants were more health and nutrition conscious and they would be more likely to act having been aware of a food's nutritional advantage. It is also possible that older consumers are more conservative which could explain the low amount of purchase for those who are not aware of SPS. This suggests that there is a need to understand the cause of the difference of awareness on purchase among age groups and then plan the promotion of SPS foods accordingly.

There was a significant interaction between awareness of SPS foods and users of labels. Among those who use labels frequently, significantly higher amount of purchase of SPS foods was observed among those who were aware than those who were not aware. Majority (72%) of frequent users of labels were aware of SPS. It is more likely that the use of food labels on the part of the mothers could influence their intent to purchase based on what they read in the food product. However, among those not using labels at all, it was interesting to note that purchase of participants who were aware of SPS was marginally significantly higher than those who were unaware. This could be explained by the fact that the effect of SPS awareness was more significantly associated with purchase than the effect of use of label. These results imply that those who are aware of SPS foods do not necessarily use label and not all who used labels are aware of SPS. This finding suggests the possibility that not all consumers who look at the food labels may notice the SP seal. Promotion of SPS foods should

encourage the consumers to look for the seal to be sure that the food product is ensured of nutrient addition. This result also suggests that it would be beneficial for SPS food manufacturers to consider the layout of SP seal in their food labels.

These results suggest that the effect of awareness on purchase of SPS foods vary with socio-economic factors. Income was a stronger predictor than awareness although to a small extent, awareness overcame the effect of low income. The nutrition educators should consider that awareness of SPS foods alone does not determine purchase. Perhaps promotion of SPS foods should be directed towards the nutritional benefits of SPS foods and changing the view of consumers on the affordability of these foods.

It is possible that "awareness" may not be the best measure of this concept since only yes/no responses were used in the analysis. This variable only measured that respondents knew and had heard of these foods but it did not measure understanding of the term. If the supporting questions on awareness are used to validate "awareness", then its rate could be much lower but it could be a more reliable measure of this concept. If a more complicated indicator of awareness is used, it might have shown a stronger link with purchase.

5.3.3 Attitude to Fortified Foods, Demographic Variables and Purchase

5.3.3.1 Attitude to Fortified Foods and the Effect of Demographic Variables

Attitude to fortified foods was measured through ten statements consisting of cognitive, affective and conative aspects. Respondents were asked to show the degree of their agreement or disagreement with each statement.

The finding implies that those who are aware of fortified foods have positive perception of these foods.

About 86% of the mothers claimed that they purchased fortified foods because they want to increase the nutritional content of their diets.

Only 11% perceived fortified foods as more expensive than other foods. In contrast, the findings of Joven and co-workers study in 1996 revealed that most of the mothers perceived fortified foods as more expensive. This improvement in the perception of the price of fortified foods could be attributed to the advocacy of SPS foods in the past 4 years.

Attitude towards fortified foods varied significantly among respondents in different education backgrounds. In the present study, the high school graduates/undergraduates had the highest mean attitude score followed by the vocational and college undergraduates. A possible explanation why the attitude score of high school graduates/undergraduates was even higher than the score of college graduates could be because these participants with higher education may be more cynical. It could also be similar to what Worsley and Scott (2000) described that highly educated respondents in Australia and New Zealand were less concerned about most issues on food and health. They further explained that higher education was associated with having more material resources that may protect them from difficulties faced by less well off. In the present study, those with college education may have a less positive attitude towards fortified foods because it is possible that they do not feel that fortification of food is needed in their diet. In contrast, however, Zunft, et al (1997b) observed that people with higher education associated more benefits from healthy eating in a nationally representative sample of adults in the European Union. In India, educational level of mothers was also positively associated with their attitudes towards correct nutrition practices (Mukta and Kumar, 1998). Unlike these studies, the present study assessed the attitude of respondent to fortified food by using a combination of perceived benefits and perception of respondents on these foods. The finding suggests that individuals with higher education do not necessarily posses positive attitude to fortified foods. Social marketing of SPS foods should consider this finding in influencing attitude of all segments of the population.

5.3.3.2 Relationship between Attitude and Purchase and the Effect of Demographic Information

Attitude to fortified foods had only a marginally significant influence on the amount of purchase. The 3% variation on purchase explained by attitude implies that there are more important factors that influence purchase of SPS foods aside from it. But the marginally significant association of attitude to purchase of fortified foods was still evident when each demographic variable was taken into account. The relationship of attitude to purchase was stronger when food budget was considered. The effect of attitude to purchase was less significant (P=0.092) only when the effect of income was taken into account. This finding also showed that in the sub-group of respondents who are aware, income and attitude of respondents to fortified foods have no effect on purchase of SPS foods. Only respondents' employment status was significantly related with purchase even when attitude was considered. Employment status of participants was still significantly associated with purchase of SPS foods regardless of attitude. It appears that the effect of attitude to purchase of SPS foods varies with socio-economic status. These findings suggest that it would be worthwhile to address attitude in social marketing campaigns of SPS foods.

The finding of the present study is also consistent with a number of studies, which had found similar association between attitude and food purchase/intake (Axelson, et al., 1985; Kristal, et al., 1990; Williams, et al., 1993; Witte, et al., 1991). Interestingly, a study in the perception of a food' healthiness had only a marginal influence on consumption of all foods except meat, spreads and snack (Williams, et al., 1993). It would have been interesting if the present study were able to show the perception in specific SPS food products (i.e. fortified noodles, orange juice, sardines, etc) and its effect on the amount of purchase of these foods. This analysis is therefore, recommended in future similar studies.

The marginal association of attitude towards fortified foods with the amount of purchase was explained by the views of Holbrook and Hirschman cited

by Allen, et al (1992) that attitude "represents only a tiny subset of the emotions and feelings of interest to the experiential view". Therefore, attitude alone could not be expected to be strongly predictive of purchase that could be influenced by a host of factors other than attitude.

Perhaps, assessment of attitude using questions on attitude specifically pre-tested for this study could have produced a more sensitive measurement of attitude. The use of factorial analysis to determine the aspect of attitude that could indicate a stronger predictor of purchase of SPS foods would have been beneficial. The present study assessed attitude of only 80 respondents who were aware of fortified foods and foods with added nutrients. It is therefore, recommended that future studies should determine the influence of attitude on purchase of SPS foods using a larger number of respondents to look at attitude of sub-groups. Furthermore, it is recommended that attitude to SPS foods be assessed in future studies to measure its effect on purchase of these foods. The present study only assessed attitude to fortified foods but not attitude to SPS foods since during the conceptualization of this research, the extent of awareness of SPS foods was not known. It would be useful for similar studies in the future to consider some other ways of assessing attitude for better understanding of how people perceive SPS foods.

5.3.4 Relationship of General Opinion, Attitude and Demographic Variables to Purchase

General opinion to food and health was measured through five statements on food and health. Respondents were asked to show their agreement or disagreement on each statement. The sum of their scores was tallied and total opinion was treated as a continuous variable.

5.3.4.1 Attitude to Fortified Foods and General Opinion to Food and Health

Although attitude to fortified foods and general opinion on food and health were correlated, only a weak positive relationship also existed between them. It appeared that the two scores measured somewhat different things. Awareness of fortified food was marginally related to general opinion on food and health. This suggests that the message on awareness is getting through more clearly to consumers who are interested since presumably they are receptive to information on food and health. It is likely that these interested mothers are just as exposed to TV advertisements as those with lower scores on general opinion. It makes sense that people who rate foods in promoting good health also rate fortified foods just as highly. It would be useful to undertake advocacy of SPS foods and at the same time emphasize the importance of nutrition to health to improve attitude to fortified foods. This will enable the consumers to appreciate the value of such foods.

Attitude to fortified foods and general opinion to food and health were measured through statements that included all aspects of attitude and generalization on food and health using Likert scale. However, people were generally more inclined to agree than disagree with a statement, hence the results could be prone to bias (Suskie, 1996). Hence, the attitude of respondents in the present study may be more positive than the actual level of attitude.

5.3.4.2 Relationship of Purchase with General Opinion, Demographic Information and Awareness

There was a weak positive relationship between purchase and total opinion to food and health. This implies that the more positive the attitude to food and health among the mothers, the higher will be the amount of their purchase on SPS foods. However, when income was considered the relationship between general opinion and purchase of SPS foods was less significant.

General opinion on food and health added predictive value to purchase even after taking into account fortified food awareness. Although general opinion

was related with purchase of SPS foods, it did not alter the significant effect of awareness to purchase. Participants who were aware of fortified foods purchased more SPS foods compared to those who were not aware if the effects of family size and general opinion on food and health were controlled. It also reiterates the significant effect of fortified food awareness on purchase of SPS foods.

This result is also a challenge to nutrition educators to consider improving the general attitude of the consumers to food and health as a way of increasing purchase of SPS foods.

The statements used to measure total opinion on food and health were lifted from the results of a previous qualitative research. Although these statements reflected a general perception on food and health, statements that were developed specifically for the purpose of this research could have provided a more objective and more appropriate measure of the participants ' opinion on food and health. Moreover, most aspects of opinion were related to the role of foods and added nutrients to health. Although the five statements may not be enough, the decision to use them was based on pragmatism due to additional length these questions might add to the questionnaires.

In the light of this finding, it would be useful to undertake social marketing addressing all aspects of attitude as a component of dietary behavior that can potentially influence consumption of SPS foods rather than concentrating on information transfer alone. However, there is a need to explore/identify the relevant attitude that influences purchase and intake of SPS foods in the future. In so doing, promotion of SPS foods could be planned accordingly with the established effect of attitude to SPS foods. Improvement of the diet through social marketing of SPS foods could be achieved.

In summary, awareness, income, respondents' employment status, use of label and attitude were significantly related to purchase of SPS foods in varying degrees. Even if income was the stronger determinant of purchase, awareness

still had some effect. The predictive effect of awareness to purchase was stronger than the effect of respondents' employment status. Awareness had different effects to purchase among the users of food labels. Even among those not using labels, those who were aware purchased slightly more than unaware respondents did. Most of those who were aware of fortified foods had positive attitude towards these foods. The effects of attitude to fortified foods and general opinion on food and health to purchase of SPS foods were only small. Income was confounding the significant relationships of attitude and purchase and general opinion and purchase. When attitude was considered, only respondents' employment status added predictive value to purchase of SPS foods among the demographic variables. The predictive value of awareness to purchase was still evident even when general opinion on food and health was taken into account. Among these variables, income was the best predictor of purchase of SPS foods.

That income was the strongest predictor of purchase suggests the need to emphasize the affordability of SPS foods and its importance to one's health and nutrition in promoting these foods to the general public. Nutrition educators need to consider the socio-economic factors, consumers' attitude and general opinion to food and health in their advocacy of SPS foods.

In this study, purchase was measured based on the number and the size of the package of each SPS food regularly purchased in a week as reported by the respondent. Thus, this self-report estimate could be subjective and prone to either underestimation or overestimation. There was no validation of the self-reported amount of purchase. Purchase variable was a rough estimation of the amount of purchase due to the combination of dry and liquid foods. The results could have been different when each SPS food is measured separately. This is because the relationship of the actual amount of purchase for each SPS foods could be analyzed with the variables of interest and the link between them could have been stronger. It is recommended that future studies should consider measuring the amount of purchase based on cupboard survey or actual weekly purchase through provision of weekly shopping lists.

5.4 CONSIDERATIONS IN PURCHASING FOODS with SPS

Added nutrient was mentioned by around 60% of participants as one of the top three reasons (either first, second or third) in purchasing SPS noodles, orange juice and chocolate drink. These foods represent the three most commonly purchased SPS foods by the sample population. Choice due to added nutrient was the third most frequently mentioned attribute in the top three reasons for buying all SPS foods. It was chosen by less than one third (29.3%) of the mothers. This figure was similar to more than one third (35.5%) of the sample having a conscious effort to consider nutrition when shopping for foods with the use of food labels. This finding implies that the conscious decision on added nutrient varies between foods. These results were similar to the findings of international studies by Subar and Bowering (1988); Reid, et al., 1996 and Lennernas, et al., (1997). These could be due to thrust of advertising and product quality. The choice of added nutrient as one of the first three reasons suggests a conscious effort on the part of more than half of the mothers to consider added nutrient to improve the nutritional content of the families' diets through SPS foods. Of concern is Shucker's (1985) view that survey respondents generally show more concern, possess more favorable attitude and express more intention to improve the nutrient quality of their food purchases than is supported by their reported buying behavior.

More than half of the respondents (54.14 %) chose preference and taste (52.6%) as one of the top three (3) reasons in purchasing all foods with SPS. The finding on preference is supported by a number of studies which found that food and family preferences were significant predictors of food intakes and/or purchase followed by taste and nutrition (Bassler and Newell, 1982; Drewnowski, et al., 1999; Drewnowski and Hann, 1999). The design of the present study does not permit verification of factors considered by the participants in buying SPS foods. It is very difficult to verify these factors. Moreover, even among the participants who considered added nutrient as one of their top reasons for buying the three most commonly purchased SPS, a very small proportion (4%) was able

to correctly identify the nutrient added to such foods. It will be more interesting to validate if respondents choosing added nutrient as one of their reasons for buying SPS foods purchase more of these foods and if they purchase SPS foods intentionally to increase the nutritional content of their family's diets. This could be further analyzed in the future. It is recommended, therefore, that future studies consider validating measures to ensure more objective results. The reported major influence of non-nutritional factors in purchasing SPS foods suggests that the majority of respondents are not considering any changes to their diet for health reason as shown by De Graaf and associates, (1997).

Only 21.0% of the sample population mentioned price as one of the top three reasons for their purchase of all SPS foods and around 31.38% of the sample did not mention price at all. This result appeared to confirm the perception of the majority of participants that the price of fortified foods was the same or even cheaper than other foods. The least cited attribute was brand that was mentioned by a very small portion of the mothers in buying all SPS foods but it was not mentioned by 65.61% of the total respondents in relation to their purchase. From this figure, it appears that the sample population is not brand-conscious or they may purchase particular brands just because of taste. This also suggests that choice of brand within the food category has no influence on purchase of SPS foods. However, it is not known how these respondents actually view the term "brand". In the qualitative study on fortified foods, brand stood out as a major influence on how mothers purchase foods. The difference in these results could be attributed to how the information was collected. This qualitative research asked the women what factors they considered important in food selection through focus group discussions. The present study asked the respondents to rank the first three important reasons among five factors enumerated in a list. Perhaps asking a question on the factors a respondent consider important in food selection using personal interview could be a better method to produce more unbiased results.

In general, these findings imply that participants are purchasing SPS foods not mainly because of nutrition but according to taste and preference of the family. It suggests that their reason for purchase of SPS foods is not any different than their purchase of ordinary foods. This result is another challenge to nutrition educators to redirect their efforts to change consumers' priorities guiding purchases and improve their perceptions/beliefs regarding their family's nutritional/health needs and the importance of SPS foods to help meet these needs.

5.5 THE CONTRIBUTION OF SPS FOODS TO TOTAL NUTRIENT INTAKE

5.5.1 Intake of SPS Foods Among Preschoolers

The food intake of the children was reported by the respondents through the use of three- (3) 24-hour recall. That the intake of SPS foods was observed only among 62.9% of the sample population suggests that consumption of SPS foods among the children was not as much as nor as frequent as expected. All respondents but one had a weekly purchase of SPS foods though in varying amounts for each food. Hence, it was expected that at least 80% of the children would be consuming SPS foods.

5.5.1.1 Energy Intake

The daily average energy intake of respondents' preschool children is 1247 kcal. with a mean % RDA of 86.7%. However, the mean percentage RDA in the present study is higher than the 64% RDA consumed by the vulnerable pre-school children in the country in general (Solon, 1997) and percent RDA of the preschoolers in low-income families in an urban area in the Philippines (Azares, 1982). The range of energy intake was 44 to 147% of the recommended level for energy. The sample population was not the most deprived group and more than half had adequate energy intake.

Generally speaking, most of the respondents' children in the present study appeared to have relatively adequate food energy intake as shown by the figures above. This could be expected since urban households had more varied diet and higher amount of foods consumed compared to rural households as found in 1993 and previous food consumption surveys (FNRI, 1993).

The relationship of the energy intake of the respondents' children and the demographic variables and use of label was explored in the present study. Energy intake of the children had a positive significant relationship with household income. This finding is similar to the results of the study conducted by Valerio, et al., 1983 wherein income was significantly related with the energy intake of the subjects in the urban sector in the central part of Philippines (Visayas) from 1975 to 1978 and in the 1987 FNRI survey (Villavieja, et al., 1989).

Respondent's use of label appeared to have a significant association ($P<0.05$) with energy intake of preschool children. The significant relationship between income and energy intake was only marginal ($P=0.083$). It is possible that the respondents' use of label could be seen as a general concern for food and nutrition on their part that could explain the significant relationship on energy intake of their children.

However, energy intake of the children did not vary significantly with age, food budget, education, respondents' occupation status, husband occupation and family size. In addition, awareness of respondents on fortified foods and SPS was not related with the energy intake of the children.

The result of this study was contradicted by Florencio's finding (1983) in the Philippines that noted the positive correlation between mother's occupation status and energy adequacy of the children. Unlike the present study, Florencio's (1983) study found that food budget had a consistent positive effect on their total energy and protein intakes. The latter study did not relate the effect of income to energy intake.

These finding suggests that only income and use of label affect the quantity of food intake as reflected in the food energy intake of the children.

5.5.2 Vitamin A Intake and Contribution of SPS Foods

5.5.2.1 Vitamin A Intake

The result of the present study on the average vitamin A intakes of preschoolers was high (362.13 μg). The average vitamin A intake was 103.5% of the RDA for 2-3 years old and 96.6% of RDA for 4 years old. This high average intake is partly due to very high intake among a few children (4 x RDA). The mean vitamin A intakes of the children in the present study ranged from as low as 70.7 μg to as high as 1473 μg. On average, the children's intakes were 112% of their RDA. Metro Manila had the distinction of having the highest intake for retinol equivalent among all regions. In the 1993 FNRI nationwide survey, the advantage of the urban populace over vitamin A intake was attributed mainly to higher quantities of animal foods particularly meat and poultry (FNRI, 1993). Findings of other local studies showed that the mean vitamin A intake of the children was lower than the result of the present study (Florencio, 1990; Florentino, et al., 1993).

Very high intakes of vitamin A were noted among some children whose intakes were two to four times the recommended level. Although these levels do not approach toxicity levels, possible over consumption of SPS foods with vitamin A merits further analysis in future studies. SPS food manufacturers used retinol acetate, retinol palmitate or pro-vitamin A as fortificants for processed foods.

The relationship of vitamin A intake among the demographic variables and use of label were also examined in this study. Significantly higher vitamin A intakes were recorded among preschool children whose mothers were frequent users of food labels compared to children whose mothers were non-users of

labels. It is possible that mothers who use labels are choosing other foods with high content of vitamin A. However, the amount of vitamin A by the children did not vary among respondents grouped according to age, education, income, employment status and husband occupation. This result is unusual compared with most literature on this subject. A study in the Philippines found a significant positive correlation between percentage vitamin A intake with education of housewives and husband, and income but not family size (Celestino, et al., 1985) and in Central Java, Indonesia (Kjolhede, et al., 1995). International studies also found significant associations between vitamin A of the children and maternal education and socio-economic status (Ramakrishnan, et al., 1999); vitamin A and income (Nayga, 1994); vitamin A and mothers' occupational status (Carloni, 1984). It is possible that the contribution of SPS foods cushioned the effects of these demographic characteristics on vitamin A intakes by leveling the amount of vitamin A. It would be interesting to look into these relationships in future analysis.

The present study also found a negative correlation between vitamin A intake and family size. This was supported in part by the epidemiological, clinical and biochemical study of Austin and co-workers (1981) and Celestino and associates (1984) in the Philippines, which showed a negative correlation between vitamin A intakes of the children and size of the family. This result also suggests a possible difference on the types of foods purchased by smaller families.

Awareness of the respondents on fortified foods and SPS foods was not associated with children's intake of vitamin A. This finding is similar to the result of the study on nutrition knowledge and dietary behavior of housewives in the Philippines (Celestino, et al., 1984). This study found an almost negligible effect of the homemakers' nutrition knowledge in predicting the households' adequacy for vitamin A, along with energy, protein and iron. Although nutrition knowledge does not equate with awareness, awareness is one aspect of knowledge. This result reiterates that awareness alone does not determine purchase. Hence, awareness may not increase the vitamin A intake of the children.

The use of label being significantly related with vitamin A intake could be explained in part by the general concern of respondents in food and nutrition through this information seeking behavior.

With the high variability of vitamin A, it is possible that the 3-day 24 hour recall employed in this study may not be the most appropriate method to measure the true daily average intake of the children.

5.5.2.2 Contribution of SPS Foods to Total Vitamin A Intake

The mean vitamin A contributed by SPS foods was 27.65%. This result suggests a moderate contribution of SPS foods to the daily average vitamin A intake of the preschool children. The significant contribution of SPS foods on vitamin A is similar to the findings on the effect of fortified food on vitamin A status of Filipino preschoolers (Solon, et al., 1996) and the effect of fortified breakfast cereals among American children (Morgan, et al., 1981). The results of the present study are also in parallel with the 20-50% increase in vitamin and mineral intake from fortified foods among German children and adolescents (Sichert-Hellert, et al., 2000). Findings of this study were also similar to those in other countries where fortified foods contributed significant amounts of micronutrients in the diet of the population under study (Mcnulty, et al., 1997; Clement, et al, 1998). The present study showed that there were more children with more than adequate (101% RDA) vitamin A intake among those consuming SPS foods (See Figure 4.10 in Chapter 4).

The results of the present study clearly demonstrated a substantial percentage contribution of SPS foods on vitamin A intake of the preschoolers.

5.5.2.3 Vitamin A Intake and Purchase

The average vitamin A intake had a weak positive relationship with purchase of SPS foods. The result of the present study suggests how purchase of

SPS foods can slightly improve the vitamin A intake of the preschool children. There are several reasons that could explain the marginal association between purchase of SPS foods and the average vitamin A intake of the children. First, there are several SPS foods that are fortified with vitamin A than SPS foods fortified with iron. The amount of SPS foods purchased by respondents could have been lesser to strongly affect vitamin A intake of the children. Due to variability of vitamin A, the three-day recall could not have adequately covered the actual average daily intake of this nutrient and the daily average consumption of SPS foods. It is also possible that mothers' attitude to fortified foods could be more influential in their own diets than in the diets of their preschoolers. This result was demonstrated by Colavito and associates (1996) who found that parents' diet-health attitudes were more influential in their diets than in the diets of their preschoolers using data from 1989-1991 US Continuing Survey of Food Intake by Individuals and Diet Health Knowledge Survey. These findings suggest that promotion of SPS foods would be useful to increase the vitamin A intake of the children.

5.5.3 Iron Intake and Contribution of SPS Foods

5.5.3.1 Iron Intake

The daily average iron intakes of the respondents' children were 7.58-mg ±3.02. The average percentage RDA was 80.98% ±33.06. Their iron intake ranged from 2.04-21.76 mg and the percent RDA ranged from 20.5% to 282.5%. As expected, the mean iron intake of the children is lower than the mean one day per capita iron intake of 10.1 mg in the 1993 national survey (64.7% of RDA) (FNRI, 1993). The average percent RDA showed a reasonably good iron intake among the children. However, 53% of the children had intakes below 75% of the RDA, therefore they were at risk of iron deficiency. The iron intake of the preschool children is not surprising considering the 29.6% prevalence rate of anemia among children 1 to 5 years old in the Philippines as shown in the 1998 national nutrition survey (Madriaga, et al, 1999).

The range of iron intake was wide. It was found that that the child with extremely low intake already had a very poor diet and had no intake of SPS foods. In contrast, the child with extremely high iron intake had very high kilocalories but without SPS foods in his diet.

Even with the presence of SPS foods with iron, the average iron intake of the children in this study was below the RDA (80.98%). This study only reflected the inadequate iron intakes of preschool children in the Philippines as shown in previous national nutrition surveys. It is also likely that the contribution of SPS foods to iron intake of the children is lesser than the contribution to vitamin A. On average, the contribution of SPS foods to iron intake was only 15% of the total intake. This finding is consistent with the results of another study in the US in which the mean iron intake of women was well below the RDA even with the inclusion of fortified foods (Subar and Bowering, 1988). These findings suggest that the present level of consumption of SPS foods fortified with iron may not be necessarily enough to meet adequate level for iron intake.

The children's iron intake varied depending on these socio-economic factors. Income had a significant positive linear relationship with iron intake of the children. This is supported by a study of Johnson-Down, et al., (1997) which showed the positive relationship between iron intakes and income in Canada. Food budget also had a significant positive relationship with iron intake of the preschoolers. Children of employed mothers had significantly higher intake of iron compared with children of unemployed mothers. The present study also found that iron intake of the children had a positive significant relationship with label use by the respondents. A possible explanation for these relationships is that households with higher income and food budget plus better control of financial resources on the part of employed mothers can afford iron rich foods and can have more opportunities for access of these foods. Moreover, information seeking behavior such as food label use reflects a general concern for food and nutrition on the part of the mothers as shown in higher iron intake of their children.

The rest of the demographic variables (age, education, husband occupation and family size) had no significant relationship to the children's iron intake. In contrast, Koplan, and associates (1986) found that high intakes of iron and other nutrients (calcium, thiamin, riboflavin, niacin and vitamin C) were observed among people with higher education, older age, and white race in the US. In the present study, there was no variation in iron intake among these demographic variables because it is possible that the amount of iron contributed by SPS foods could have leveled the children's iron intakes. However, this needs to be tested in future studies.

In addition, iron intake was not associated with awareness of the respondents of fortified foods or of SPS foods even if awareness was shown to be a significant predictor of purchase. This finding implies that awareness of fortified food or SPS foods may not increase the iron intake of the children.

5.5.3.2 Contribution of SPS Foods to Total Iron Intakes

Only 44% of all children had iron intakes from SPS foods. This was only 71% of the children who consumed SPS foods. About 56% of all children had no intakes of iron from SPS foods. This can be explained by the fact that only 11 out 28 SPS foods are fortified with iron in combination with vitamin A and iodine (see Appendix 4-2). The mean percentage contribution of SPS foods to iron intakes of the children with SPS foods was only 15%.

These findings could be comparable to the following studies on the contribution of fortified foods to total iron intake. As with the case of vitamin A, fortification will not necessarily solve a deficiency problem. The actual situation in each country is quite different. In the US, Subar and Bowering (1988) found that only 16% of iron intakes of respondents was contributed by fortified cereals, which comprised the major fortified food item consumed by the subjects. The German ten-year trend study (Sichert-Hellert, et al., 2000) showed that fortified foods with iron contributed only 13% to total iron intake, a pronounced increase

observed from 1992 to 1996. Similarly Morgan, et al. (1981) observed significantly higher daily intakes on iron, thiamin, niacin, riboflavin, pyridoxine, vitamin B12, folacin, and vitamin D among children consuming ready to eat fortified cereals thrice a week than the non-ready to eat cereal eaters. Only the mandatory fortification in Sweden resulted to a 40% increase in iron intakes among the people in Sweden for the last 30 years (Beard, 1986). It appears that the nutritional impact of fortification of foods with iron could be manifested only with regular consumption for a period of time.

In general, the contribution of SPS foods to total iron intake was significant. The higher the contribution of SPS foods to total iron intake of the preschool children, the higher is their adequacy level of total iron intakes based on RDA. The percent contribution of SPS foods to vitamin A intake was greater than the percent contribution of iron from SPS foods. It is possible that iron from SPS foods will not be as efficiently absorbed as iron from non-SPS foods, so the actual contribution to iron intakes maybe less than it appears. In addition, there are more SPS foods either fortified with vitamin A alone or in combination with iron. Consumption of these foods was more common among the children in this study. This maybe because these foods (noodles, orange juice, margarine, chips, catsup, cheese and sardines) comprise the basic grocery items most often purchased by the housewives. In addition, more than half of the respondents belonged to lower income groups; therefore they tend to patronize these basic food commodities, which happen to be relatively affordable. SPS foods with iron are also affordable but they are less commonly consumed compared to SPS foods fortified with vitamin A. Examples of these foods are infant cereals, powdered milk drink and hotcake mix. Infant cereal is the only SPS food, which is fortified with iron alone but was not regularly consumed by preschoolers in this study. The children did not usually consume milk or hotcake mix fortified with iron as much as vitamin-A fortified noodles, orange juice, hotdog, crackers, etc. Only noodles which was commonly consumed by the children is fortified with both iron and vitamin A.

This result has an implication to the SPS program. It suggests that it would be useful for the implementors of the program to encourage food manufacturers applying for SPS to fortify their foods with iron since at present, only few SPS foods are fortified with iron.

5.5.3.3 Vitamin A and Iron from SPS Foods and Demographic Information

The amount of vitamin A from SPS foods varied significantly with size of the family. Households with lowest family size (2-4 members) had children with the highest mean intake, which was significantly greater than the intakes of children from households with 8-10 members. The next highest mean intake of vitamin A from SPS foods came from households with only 5-7 members and their intake was significantly higher than those with 8-10 family members. There might be differences on the quantity and quality of food purchases and intake among smaller families. It is partly explained by the tendency of smaller families to have a bigger share of resources for each household member compared with bigger families. Similarly, an analysis of food consumption patterns among low-income households in the Philippines demonstrated that for most households, meal planners with high school or higher education and household size of 4 members or less had better diets (Valerio, et al., 1982).

Income of the households had a marginally significant relationship with the amount of vitamin A from SPS foods. However, income had more significant relationship with iron (P=0.048) from foods with SPS. There was a positive significant relationship between income and the amount of iron and vitamin A from SPS foods. The respondents with household income of P 8,001 and above had the highest mean intake of vitamin A from SPS foods. It is postulated that this income group is well educated or well informed mothers with more accessible resources. Since the high-income group was shown to have the largest amount of SPS foods purchased, it could explain the high intake of vitamin A and iron from these foods among the high-income group. Not surprisingly, those

with the lowest income bracket of P 2,999 and below had the lowest mean intake of iron and vitamin A contributed by SPS foods. With very limited money available, staples and affordable meats, fruits and vegetables could be their priority in purchasing foods. There is no staple food with SPS except fortified bread but it is not always commonly available in the city. Processed foods such as SPS foods could be the last priority in shopping for foods among the low-income group. The results of this study also imply that the lower income maybe getting their iron and vitamin A intakes from other sources such as vegetables. It is also likely that those with higher income have higher contribution of vitamin A from SPS foods since the results also showed that those with higher income had high amount of purchase. These findings also suggest that those with higher income have higher vitamin A even without SPS foods.

The amount of iron and vitamin A from foods with SPS did not vary significantly with respondents' age, education, food budget, respondents' employment status, husband occupation and use of label. The same results were observed on the amount of iron and vitamin A because the most commonly consumed SPS foods are both fortified with iron and vitamin A. If the amount of iron and vitamin A from SPS foods was more evident among smaller family size and middle income families, the food fortification program should strive to promote all SPS foods as affordable and more nutritious so that the low income group could be convinced to purchase them. The low-income group does not have access to SPS foods not only because they have less resources to purchase but also because this type of foods is not their priority when shopping for foods. Given this scenario, the SPS program should consider the fortification of basic food commodities, which are regularly consumed by all segments of the population such as staples and seasonings. In so doing, the amount of iron and vitamin A from SPS foods could be accessed by a larger segment of the population. This is one of the principal aims of the program.

Awareness of SPS foods and of fortified foods among respondents was not associated with the amount of iron and vitamin A from SPS foods consumed by

the children. Even though awareness was significantly related with purchase of SPS foods, it had no significant impact on intakes of iron and vitamin A from these foods. A possible reason for this result could be that the three-day food recall employed in this study was not enough to accurately represent the average daily intake of the children in a week. The problem could also be that some respondents may purchase SPS foods and feed the SPS foods mostly to the preschool children while others may purchase SPS foods and divide these foods among all members of the family. However, these differences could not be distinguished with the aggregate purchase variable. This result may be also due to the "weakness" of awareness variable. Perhaps, this result is also caused by the variability in the amount of iron and vitamin A from various food groups consumed by the children.

Intakes of iron and vitamin A contributed by SPS foods exerted a significant positive effect on average percent RDA of the children for these nutrients. This finding is particularly relevant for those children with inadequate intake of iron and vitamin A since SPS foods can increase their adequacy level.

A pattern emerged that as the percentage RDA on vitamin A increased, there were more children with vitamin A from SPS foods. A similar pattern also emerged in the case of iron from SPS foods. However, this relationship was not statistically significant.

It is possible that the children with SPS foods could have adequate intake even without SPS food as found in the study by Sichert-Hellert, et al (2000). To test this assumption, the effect of removing the contribution of SPS foods in percentage adequacy was examined. With more than 50% increase on the number of children falling well below the recommended level and with 37% decrease on the number of children having more than adequate vitamin A intakes, the impact of SPS food consumption when subtracted from the total intakes could not have been more obvious. The results suggest that absence of SPS foods in the diet could greatly affect the adequacy level of children with poor

quality diets. This implies that the program is effective in targeting children with poor vitamin A status.

The effect of SPS food withdrawal from nutrient intakes is more pronounced in the case of iron intakes compared with vitamin A intakes. Without SPS foods, the number of children with iron intakes less than 50% of RDA doubled, thus they were most greatly affected. Although the children already had an inadequate iron intake, subtraction of SPS foods from their diets substantially reduced their intakes. This finding emphasizes the importance of SPS foods fortified with iron in the diet of the preschool children with inadequate iron intake or at risk of iron deficiency. In general, the results showed that absence of SPS foods in the diet decreased percent RDA of the children's iron intake more than percent RDA of vitamin A.

A possible explanation for a more obvious effect of SPS food withdrawal on iron intake was that the amount of iron from foods with SPS such as chips and milk were enough for each serving to influence total iron intakes of the children in a day. This means that single serving of these foods provides adequate amount of iron. In addition, some SPS foods fortified with iron (e.g. chips, chocolate drink) were more popular with the children compared to other SPS foods fortified with vitamin A alone (e.g. orange juice, sardines, margarine). Thus, taking out the amount of iron coming from these foods resulted in a higher number of children whose iron intakes were well below the recommended level.

In general, the limitation in assessing the nutrient intakes of the children was the appropriateness of the dietary method used in the present study. It is possible that the three 24 hour recall employed by the study were not able to adequately represent the average daily consumption of SPS foods. Three days may not be enough to classify a person's usual intake, therefore three 24 hour recall used in this study may not have been most appropriate. Hence, it is recommended that future studies use the 7-day food record to allow the wide variability in vitamin A intake or accurately assess the source of nutrients in

proportion with the amount of food consumed by respondents. In future studies, it will be beneficial to validate the nutritional status of the children through the use of biochemical analysis.

5.6 Summary

Even with its general limitations, the present study was able to demonstrate the modest rate of awareness on SPS foods, the major considerations in purchasing these foods, the significant contribution of SPS foods to iron and vitamin A intake, the significant effect of awareness on purchase of these foods, the predictors of purchase among the demographic variables and the significant relationship between attitude and purchase and between general opinion and purchase. The results of this study could assist in improving the implementation of the food fortification program and promotion of SPS foods by nutrition educators in the Philippines. Furthermore, the results of this study could also serve as a basis for a national scale study. Lastly, the suggestions and implications of the study's findings are a challenge to nutrition educators.

CHAPTER SIX

CONCLUSION and RECOMMENDATION

6.1 CONCLUSIONS

This study has demonstrated that a moderate rate of awareness on fortified foods (66%) and *Sangkap Pinoy Seal* (SPS) foods (60%) existed among the respondents. Although less than half of participants were not familiar with the term "fortified foods"; some of those who were not aware of the term knew of the existence of foods with added nutrients. Participants who were younger, with higher education and with higher income were more likely to be aware of these foods. Perceptions on SPS foods were generally positive as reflected in the mothers' comments. These perceptions were foods accepted or recommended by the Department of Health, foods with added nutrients, nutritious foods and safe foods. However, the skeptical comment that the *Sangkap Pinoy* Seal was just another propaganda also provided useful information on how SPS foods were perceived by a few participants. The moderate rate of awareness and the skeptical remarks about SPS foods could be attributed to lack of information campaign about these foods to the public. It was found in this study that TV was the main source of information where mothers learned about SPS foods.

Among the respondents who were aware of SPS foods, 64% did not understanding the meaning of SPS foods. Information about SPS foods is provided mainly by aggressive commercial advertisements of food manufacturers on TV. However, these advertisements focus only on their food products and only mention the nutrients added. The advertising does not include detailed information on the benefits of the nutrients and its importance in the elimination

and prevention of micronutrient deficiencies. Thus, the results of the present study suggest a need for more vigorous information dissemination on SPS foods and the need for consumers to better understand the importance of these foods to their diet.

An important finding in the study was that awareness of SPS foods was significantly related with purchase of these foods. However, the effect of awareness was only small compared with income. However, after taking into account income, awareness still had some effect.

The use of label by respondents and respondents' employment status were also significant predictors of purchase of SPS foods. Mothers with paid employment purchased significantly more SPS foods than unemployed mothers, presumably due to better control of income to purchase these foods and more access to information about SPS foods on the part of the employed mothers. Moreover, participants who used labels regularly purchased significantly higher amount of SPS foods than those who never used labels at all. However, even among those not using food labels, mothers who were aware of SPS foods had slightly higher amount of purchase of these foods compared to those who were not aware. The results indicated that those who were aware did not necessarily use labels and not all who used labels were aware of SPS foods. This finding also implies that the seal may not be noticed by all consumers.

If at present, younger people and those with higher income and higher education are more likely to be aware of SPS foods and if those who are aware are more likely to purchase SPS foods, consumption of SPS foods could be more notable among the high income segment of the population. These high income and educated people have the means and resources to follow their choice of foods including SPS foods. The vulnerable groups (low birth weight infants, preschool children, pregnant and lactating women) who also belong to the low income group and are at risk of iron and vitamin A deficiency are the ones most in need of SPS foods. The review of literature shows that socio-economic factors play a

significant role not only in the quantity of foods but also in the nutritional quality of the diets. The results of the present study showed that income was significantly related with energy and iron intake. Food budget and maternal employment status were also associated with iron intake. Vitamin A intake was also related with food budget. The results of the present study showed that the low-income group had significantly lower amount of purchase of SPS foods. Presumably, when it comes to foods, the priorities of the low-income group are staples and cheap fish and vegetables and affordable meats and not processed foods such as SPS foods. Among the processed foods, only noodles was commonly consumed due to its affordability. The result indicated that the children from the low-income group had the least amount of iron and vitamin A intakes from SPS foods. Consumption of SPS foods appeared to be consumed by the children who were not most in need. If this is what is happening, then the children from the low-income group who need SPS foods may not benefit from the added nutrients. This defeats the purpose of food fortification. The food fortification program can only be effective if those who are really in need of additional nutrients in their diets consume fortified foods. Fortification of staple foods can eliminate nutrient deficiencies as have been demonstrated in developed countries by the literature.

In general, most of those who were aware of fortified foods or SPS foods had positive attitude towards fortified foods. Attitude to fortified foods and general opinion on food and health among the participants also made a significant difference on the amount of purchase of SPS foods. However, attitude and general opinion were weak predictors of purchase since it only explained 3% and 6% of the variation in purchase, respectively. This is not surprising considering that the literature has reiterated the marginal effect of general attitude to food intake. In addition, attitude towards fortified foods was significantly related with general opinion. Apparently, people with higher opinion on the importance of food to health perceived fortified foods positively. This positive perception was reflected in their purchase of these fortified foods. More importantly, this effect was seen among all income groups.

If people with more positive attitude towards fortified foods and in food and health in general have a greater tendency to purchase SPS foods, then it might be useful for the nutrition educators to consider attitude in their advocacy of these foods to the public. However, further studies are still needed to establish the aspects of attitude that influence purchase and intake of SPS foods. Although participants who were aware agreed that taste of fortified foods was the same as other foods, the results showed that majority of participants cited taste as one of their priorities in choosing SPS foods. It would have been interesting to see if this cognitive aspect of attitude could significantly affect food purchasing patterns of SPS foods. Validation of the presence of a significant relationship between cognitive attitude and the most important reasons/considerations in their purchase could establish this link. Hence, further research is needed on this aspect of attitude and a measure to validate if it affects their priorities in choosing SPS foods.

This study also determined the major reasons why mothers purchased SPS foods. The finding showed that nutrient addition was one of the top three reasons in purchasing at least the three most commonly bought SPS foods. All in all, only 29% of the participants considered added nutrient as one of the top three reasons in all of their purchase of SPS foods. This suggests a moderate conscious effort on the part of the participants to improve the nutritional content of the family's diets through SPS foods. Moreover, perception of high price as another barrier was not reflected in the result since price did not prove to be a major consideration in purchase of SPS foods and the respondents did not perceive fortified foods as expensive. However, preference of the family and taste were still major considerations in their purchase of SPS foods. Surprisingly, price and brand were not included in the top three reasons for purchasing these foods. If preference of the family and taste were the priority in selecting SPS foods, this finding suggests that the reasons why mothers purchase SPS foods could not be any different when they purchase ordinary foods. It appears that the mothers purchase SPS foods not mainly because of nutrition. It is possible that the choice of taste and preference of the family by the respondents could be because of

thrust of advertising and the quality of SPS foods. Aggressive advertisements on TV and the quality of food products themselves could be their main selling points to consumers.

This finding also suggests that knowledge about the importance of SPS foods is lacking. If people are not well informed about the benefits of added nutrient in these foods and they do not choose SPS foods because of nutrition, then it is very likely that they may purchase SPS foods consistently because of taste. These findings suggest the need to better understand the consumers' beliefs and attitude on food and health and how attitude relates to consumption of SPS foods.

The present study also explored the nutrient intakes of the preschool children, the adequacy of their intakes based on RDA and the contribution of SPS on iron and vitamin A intakes. In general the energy intake of the respondents' children was adequate. Among the demographic variable, only income was significantly related to energy intake. In addition, the average vitamin A intake of the children was considered adequate over a 3-day period, although 48% of the children were at risk of inadequate intake (<75% of RDA). Food budget had a marginally significant relationship with intake of vitamin A. Only the children's iron intake was considered to be below the recommended level. Income, respondents' employment status and use of label were significant predictors of iron intakes. Again, food budget had a marginally significant relationship to iron intake. These findings suggest that socio-economic factors particularly income play a significant role in meeting the adequacy of intakes for iron.

If the diet of some of the children does not improve, they could be prone to iron deficiency anemia. The contribution of SPS foods significantly increased the individual's average iron intake. SPS foods fortified with iron did have an impact on iron status. Removal of these foods from the children's diets resulted to a 100% increase in the number of children whose iron intake was less than 50% of the recommended level. Since less than half of SPS foods are fortified with iron,

the SPS program should prioritize fortification of commonly consumed foods with iron.

Another remarkable finding of the present study is the significant positive contribution of SPS foods to vitamin A intake of the children as far as achieving the recommended level for vitamin A is concerned. The mean percentage contribution of SPS foods to vitamin A was 27.6%. The consumption of SPS foods with vitamin A among the children might be enough to make a significant effect in the level of adequacy for vitamin A. The present number of SPS foods fortified with vitamin A is adequate enough to affect consumption of vitamin A. With consistent consumption of SPS foods with vitamin A, the number of children at risk of vitamin A deficiency may be reduced. Purchase of SPS foods was marginally significantly related with vitamin A intake. This means that SPS foods may potentially lead to adequate intake of vitamin A.

The contribution of SPS foods to iron intake was also significant since their contribution significantly increase the level of percent RDA. The average percentage contribution of SPS foods to iron intakes of the children was only 15%. Consumption of SPS foods with iron was shown to be less than SPS foods with vitamin A. However, iron from SPS foods did have an impact on iron status of the children. The significant contribution of SPS foods to iron and vitamin A intakes maybe a positive indication of the gains of the SPS program after five years of implementation.

The impact of SPS food contribution was more evident among children with poor iron and vitamin A status. Its effect was more obvious among children with poor intakes of these nutrients probably because its contribution (1/3 of RDA) could be enough to increase their intakes. These findings provide evidence to suggest the importance of SPS foods in the diets of the children particularly those with inadequate intakes.

There could be possible over consumption of vitamin A as shown in some children with very high intakes of vitamin A contributed by SPS foods. Although the SPS scheme requires that processed foods be fortified with vitamin A at levels not exceeding 150% of the RDA, studies looking into excessive consumption of SPS foods with vitamin A could be beneficial to address the concern of possible effects of toxicity.

About 62.9% and 61.3% of the children had intakes of vitamin A and iron from SPS foods, respectively. The amount of SPS food consumed by the children in this study was neither as much as nor as frequent as expected (80%). This could be due to the three day 24 hour recall employed in this study being not enough to accurately represent the true average weekly consumption of SPS foods. The study results could be biased due to the self-report amount of purchase of SPS foods among the respondents. Hence, validation of self-report studies is needed to represent the true amount of consumption.

6.2 IMPLICATIONS/RECOMMENDATIONS

The results of this study have implications on promotion of these foods. Most comments reflected a correct processing of information on SPS foods. However these findings imply that SPS foods are not well understood by all consumers because the majority of participants could not articulate the important point of added nutrients in SPS foods and also due to the negative remarks on SPS foods. The present level of awareness suggests that the consumers have not yet realized the benefits of SPS foods and the importance of food fortification possibly due to attitude and priority in food selection. The results of this study suggest the need to redirect nutrition education efforts to emphasize the benefits of nutrient addition and its affordability. The social marketing of SPS foods could make use of the promotion used in iodized salt which created a demand for it among the Filipino population nationwide. Iodized salt has been promoted in print, radio and TV and by health workers. Advertisements on TV had the most impact on consumers since its launch.

A TV campaign promoting all SPS foods is currently underway as part of a national advocacy for these foods. Since TV is one of the most influential media of information and has the widest coverage, awareness and understanding of the nutritional impact of SPS foods among consumers may improve. The TV campaign will also encourage other food manufacturers to apply for the seal. However, before embarking on such costly advertisements, a qualitative research is needed to explore if those who were unaware of SPS foods watch TV and those who have seen the advertisements on TV have understood what they have seen. In this way, the cost-effectiveness of promoting SPS foods on TV will be determined. To reach the low-income segment of the population, a practical approach in the advocacy of SPS foods is to integrate its promotion as part of delivery of public health services in health centers nationwide.

It is recommended that the SPS program implementer should encourage fortification of foods with iron among food manufacturers applying for the seal to increase availability of foods fortified with iron. At present, the majority of SPS foods are fortified with vitamin A. To reach the low-income segment of the population, they should consider the fortification of staple foods and other foods regularly consumed by everyone on a large scale.

It is recommended that future studies should consider measuring the amount of purchase based on a cupboard survey or actual weekly purchase through provision of weekly shopping lists to ensure more reliable results. Measures of attitude and total opinion on food and health should make use of pre-tested statements specifically for the purpose of a future study for more appropriate determination of these variables. Attitude to SPS foods should be directly assessed. Furthermore, future studies should consider the validation of the 24-hour recall with 7-day food record to accurately represent the average weekly food intake of SPS foods and to allow the wide variability in vitamin A intake. Perhaps, validation of the nutritional status of the participants through biochemical analysis should be considered in future studies.

In general, the results of the study provide valuable information to the food fortification program in considering nutrition education efforts to promote SPS foods in the future. In the light of the findings on predictors of purchase, the social marketing of SPS foods should consider the effects of awareness, attitude and beliefs on food and health and socio-economic status with purchase of SPS foods rather than on information transfer alone. The fact that awareness had little impact would be a concern for nutrition educators. It suggests the need to redesign their campaign to emphasize the benefits of added nutrients. On the part of the SPS food manufacturers, it would be useful to address preference of the family and taste of SPS foods to increase acceptance of these foods to the intended consumers. It would be beneficial for the food manufacturers to conduct a follow-up study to investigate if the seal is seen prominently in the food product and determine its impact on food purchasing. Furthermore, the rate of awareness and positive attitude towards fortified foods demonstrated in this study could be used by program implementors to encourage other food manufacturers to apply for the *Sangkap Pinoy* Seal. The benefits of SPS food consumption as implied in this research study could also serve as basis for mandatory legislation for fortification of processed foods. The results of this study could be tested in studies to be conducted nationwide or in rural areas that would be useful to a successful implementation and advocacy of fortification of processed foods. Data from this study could be used to study the inter- and intra-individual variation over the three-day intakes of the children. Future studies could make use of the recommendations outlined in this study particularly in areas that need further analysis.

In conclusion, SPS foods have a good potential to improve the nutritional status of the children.

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Appendix 3-1 Information Sheet (English version)

Date

A Study on Food Purchase and Children's Diets Among Households
Information for the Participants

You are invited to participate in a study about children's diets and the factors that affect your purchase of foods. It aims to relate awareness, attitude and considerations in purchase and intake of some foods.

I am Helena Sta. Ines. I am conducting the research as part of my masterate thesis in Massey University, Palmerston North, New Zealand. My adviser in this study is Dr Janet Weber.

You have been chosen due to our selection of every 50th household in the village. Your involvement in this study will be to take part in one main interview of about 30 minutes and two additional short interviews. In the first interview, you will be asked to answer a questionnaire and describe what your child eats in one day. The questionnaire will consist of questions about your purchasing habits of foods, what you consider in buying foods, your use of vitamin/mineral supplements, and some personal information about yourself. For most of the questions, you will choose one response from a selection of responses. In the second and third visits you will be asked only about what your child ate in the previous day.

Permission for me to conduct the study was granted by the health center and the chief executive of the village. There will be two trained local research assistants who will help me with the interviews.

Participation in this study is voluntary and you may withdraw at any time, decline to answer any questions or retract a response. All responses will be confidential. All questionnaires will be destroyed at the end of the trial. Non participation on your part will not influence your access to health care.

Results of this study will be used to help the Department of Health with its programs. You can have a copy of the results if you wish.

I will contact you in a couple of days to see if you will participate in this study.

Please feel free to discuss your involvement in this study with family or friends. If you want any further information or would like to discuss what your participation in this project would involve, please contact me through this telephone number [redacted]. You could also contact my adviser in New Zealand through e-mail J.L. Weber@massey.ac.nz and through this number ([redacted] [redacted] and we will be very happy to talk to you.

Helena D. Sta. Ines

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Information Sheet (Filipino Version)

Petsa

Isang Pag-aaral sa Pagbili ng Pagkain at sa Kinakain ng mga Bata sa Tahanan

Kaalaman sa mga Sasali sa Pag-aaral

Ako ay si Helena Sta. Ines. Gumagawa ako ng "*research*" o pananaliksik para sa aking pag-aaral. Ang aking tagapayo ay si Dr Janet Weber. Inaanyayahan kitang sumali sa pananaliksik na ito. Ang "*research*" na ito ay tungkol sa kinakain ng inyong anak at ang mga bagay na iyong isinasang-alang sa pagbili at pagpili ng mga pagkain. Ang layunin nito ay upang mag-balik aral sa isang programa ng Kagawaran ng Kalusugan. Ikaw ay aking napili sa pamamagitan ng pagpili ko ng ika-50 bahay sa inyong barangay.

Sa pag-aaral na ito, ikaw ay iinterbyuhin ng isang panayam na tatagal ng 30 minuto at dalawa pang maigsing panayam para sa pagkain ng iyong anak na tatagal ng 15 minuto bawat isa sa loob ng 2 araw. Sa unang panayam, tatanungin kita ng ilang tanong at tatanungin kita ng kinain ng iyong anak ng nakaraang araw. Sa pangalawa at pangatlong panayam, tatanungin kita uli ng kinain ng iyong anak (may isang araw na Linggo ito). Ikaw ay aking tatanungin tungkol sa pagbili mo ng pagkain, ano ang isanasang-alang mo sa pagbili ng pagkain, mga impormasyon tungkol sa iyo at ang kinain ng iyong anak para sa tatlong araw. Sa halos lahat ng tanong, pipili ka lang ng isa mula sa maraming pagpipilian.

Ang "research" na ito ay may permiso mula sa "health center" at sa kapitan ng barangay. May dalawang tao na tutulong sa akin na magtanong sa ibang mga ina. Sila ay sina Gng. Elizabeth Joven at Bb. Perla Castro.

Ang pagsali mo sa pag-aaral na ito ay kusang-loob lang at puwede kang tumangging sumali. Ang itatanong ko ay yun lamang kaya mong sagutin. Lahat ng sagot mo ay mananatiling lihim. Pagkatapos ng pag-aaral na ito, lahat ng sagot mo ay buburahin. Maaari kitang padalhan ng resulta ng pag-aaral na ito kung nais mo ng kopya. Babalik ako pagkaraan ng dalawang araw para malaman kung papayag kang magpainterbiyu.

Puwede mong sabihin ang pagsali mo sa pag-aaral na ito sa iyong pamilya at kaibigan. Kung may gusto ka pang malaman o itanong tungkol sa pagsali mo sa pag-aaral na ito, maaari mo akong tawagan sa telepono bilang [redacted] Maaari mo ring kontakin ang aking tagapayo sa New Zealand sa telepono niya ([redacted] at malugod ka naming sasagutin.

Helena D. Sta. Ines

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Appendix 3-2. Informed Consent (English Version)

A Study on Food Purchase and Children's Diets Among Households

CONSENT FORM FOR PERSONAL INTERVIEW

1) I agree to participate in three personal interviews conducted at times and in a place or places nominated by myself. I understand that I have the right to withdraw at any time and do not have to indicate any reason for such action. I also understand that I may interrupt or shorten the interviews if I need to attend to my family or other matters.

2) I understand that I will not be identified in the reporting of data and I can choose not to answer some questions.

3) I understand that the interviewer's role is restricted to obtaining information and that she is not in a position to provide advice and information on foods.

Signed .....

Date.....

Informed Consent (Filipino Version)

Isang Pag-aaral sa Pagbili ng Pagkain at sa Kinakain ng mga Bata sa Tahanan

Pagsang-ayon sa Personal na Panayam

1) Sumasang-ayon ako na sumali sa tatlong personal na panayam sa oras at lugar na pinili ko. Naiintindihan ko na may karapatan akong tumanggi kahit anong oras at hindi ko kailangang ipaliwanag ang dahilan nito. Naiintindihan ko rin na maaari kong paigsiin ang panayam kung kailangan ako ng aking pamilya o may iba akong aasikasuhin.

2) Naiintindihan ko na hindi ako babanggitin sa pag-uulat ng resulta at maaari kong hindi sagutin ang ibang tanong.

3) Naiintindihan ko rin na ang nagtatanong sa akin ay maaari lamang kumuha ng impormayson sa akin at wala siya sa posisyon na magbigay ng payo at impormasyon tungkol sa pagkain.

Nilagdaan.....
Petsa.....

Appendix 3-3. Questionnaires (English Version)

Massey University
Institute of Food, Nutrition and Human Health
New Zealand

QUESTIONNAIRES

Respondent/Case #:_____
Date of 1st interview:_____
Name of interviewer:_____

Fortified Foods with Sangkap Pinoy Seal and the Micronutrient Intake Among Selected Households in Punta, Sta. Ana, Manila Philippines

In this study, we want to know how you decide what foods to buy; what influences you to buy these foods and the reasons why you buy these foods. I also want to know what your child eats. All the information provided in this study will be kept strictly confidential. Your response will be voluntary. You can stop or skip some questions if you feel you do not want to answer them.

Note to interviewer: administer the 24 hour recall first before asking the questions.

A. AWARENESS

1. Do you look for information in processed food products while shopping? ☐

   ☐ 1 Yes
   ☐ 2 No

2. If yes, what particular information do you look for in the food product? Why?

   _____

   _____

Note: Proceed to the table on the next page.

B. CONSIDERATIONS IN PURCHASE OF FORTIFIED FOODS

1. I am going to ask about your usual use of some foods in a week.

Do you purchase these foods regularly?/at all? If yes, proceed to the next columns. If no, proceed to the next food items.	**What brands do you buy?** **Yes = (all brands With SPS)** **Yes partially = (not all brands with SPS)** **No = (no brand w/ SPS at all)**	**What are the 1st, 2nd, and 3rd most important reasons for buying this brand (only one SPS) according to their importance: (show card # 1)** _____ preferences of family _____ brand name _____ added nutrient _____ taste _____ price	**Do you know of any nutrient addition in this brand?** **Yes** **No** **Maybe** **If yes, identify the nutrient(s)**	**1. How much is your regular purchase of this food in a week?** **2. How often do you buy this brand in a week? (only SPS products) Approximate the weekly purchase by asking the 3rd question:** **3. How much is your regular purchase of this brand (SPS) in a week? (Indicate number of packages and specify in grams or liters)**
Noodles ("noodles")				
Sardines (*sardinas*)				
Cheese (*keso*)				
Margarine (*margarina*)				
Orange Juice (same)				
Infant Cereal (same)				
Chips (*chichirya*)				
Chocolate drink (*same*)				
Cooking oil (*mantika*)				
Sandwich spread (*palaman*)				
Catsup (same)				
Hotdog (same)				

2. What is your understanding of the term "fortified foods?

_____

_____

_____

3. Are you aware of fortified foods available in the market?

☐

☐ 1Yes
☐ 2 No

If yes, proceed to question # 5. If no, proceed to question # 4.

4. Are you aware of foods with added nutrients?

☐

☐ 1Yes
☐ 2 No

If yes, give examples _____
Proceed to question # 6. If respondent can not identify a single food with added nutrient (fortified food), proceed to # 16 part D. Opinions on Foods and Health on page 6. If no, proceed to question # 16 part D. Opinions on Foods and Health on page 6.

5. Have you ever tried fortified foods?

☐

☐ 1Yes
☐ 2 No

If yes, give examples _____
Proceed to question 6. If no, why not? _____
If both answers on q #3 and q # 5 indicate a lack of understanding on the term "fortified foods", proceed to q# 16 on part D. Opinions on Foods and Health (page 6)

6. Are you aware of DOH seal of acceptance (Sangkap Pinoy Seal) on foods?

☐

☐ 1Yes
☐ 2 No

If yes, where did you learn about it? (Choose the first answer that comes to mind)

☐

☐ 1 through advertisement
☐ 2 through family, friends
☐ 3 through health workers
☐ 4 through information at supermarket or groceries
☐ 5 others, please specify

If no, proceed to question # 13 part C. Attitude on page 4.

7. What are the foods which carry this seal?

_____

Have you ever bought this kind of foods?

☐ 1Yes
☐ 2 No

If respondent can not identify any single food with SP seal, proceed to question 13 on part C. Attitude on page 4.

8. What is your understanding on the meaning of the seal?

(Probe)_____

_____

9. Have you seen, heard or read advertisement on foods with SP seal?

☐ 1Yes
☐ 2 No

If yes, where did you learn about it?

☐ 1 advertisement on radio
☐ 2 advertisement on newspapers
☐ 3 advertisement on magazines
☐ 4 promotion on health centers
☐ 5 others, please specify

If no, proceed to question # 10.

10. Do you think there is difference between fortified foods with Sangkap Pinoy seal and other foods?

☐ 1Yes
☐ 2 No

If yes, proceed to question # 11. If no, proceed to question # 13 Attitude on page 4.

11. What is the difference between fortified foods with Sangkap Pinoy seal and other foods?

☐ 1 approved by DOH
☐ 2 assured of nutrient addition
☐ 3 guaranteed to pass the requirement/quality test

☐ 4 others, please specify

12. Do you buy any foods because of the seal?

☐ 1 Yes
☐ 2 No

☐

Which are these foods?_____

C. ATTITUDE (Cognitive)

Express your opinion on these statements. From a scale of 1 to 5 indicate how you feel:

13. a) Compared to other foods, the price of fortified foods is...

☐ 1 surely cheaper
☐ 2 cheaper
☐ 3 about the same
☐ 4 more expensive
☐ 5 surely more expensive

☐

b) Compared to other foods, fortified foods are...

☐ 1 surely safer
☐ 2 safe
☐ 3 about the same
☐ 4 less safe
☐ 5 surely unsafe

☐

c) Compared to other foods, the taste of fortified foods is...

☐ 1 surely more delicious
☐ 2 more delicious
☐ 3 about the same
☐ 4 less delicious
☐ 5 surely less delicious

☐

d) Compared to other foods, fortified foods are...

☐

☐

☐ 1 surely more nutritious
☐ 2 more nutritious
☐ 3 about the same
☐ 4 less nutritious
☐ 5 surely less nutritious

e) Compared to other foods, the quality of fortified foods is...

☐ ☐
☐ 1 surely better
☐ 2 better
☐ 3 about the same
☐ 4 worse
☐ 5 surely worse

f) If I will buy fortified foods, my family will...

☐ ☐
☐ 1 surely they want me to buy
☐ 2 they want me to buy
☐ 3 not sure
☐ 4 they do not want me to buy
☐ 5 surely they do not want me to buy

14. **General Attitude (Affective)**

a) My attitude towards purchasing fortified foods is...

☐ ☐
☐ 1 extremely favourable
☐ 2 favourable
☐ 3 not sure
☐ 4 unfavourable
☐ 5 extremely unfavourable

b) I would say that my feelings about purchasing fortified foods is...

☐ ☐
☐ 1 extremely favourable
☐ 2 favourable
☐ 3 not sure
☐ 4 unfavourable
☐ 5 extremely unfavourable

15. **Attitude (Conative)**

a) I buy fortified foods because I want more nutrients to our diet.

☐ ☐ 1 strongly agree ☐
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

b) I buy fortified foods only if there is no increase in price.

☐ ☐ 1 strongly agree ☐
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

D. OPINIONS ON FOODS AND HEALTH

16. Now, I want to ask about your opinion on the following statements. From a scale of 1 to 5, please indicate how you feel:

a). Foods that are nutritious are important to my children's health.

☐ ☐ 1 strongly agree ☐
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

b). Added nutrients in foods help keep my family healthy.

☐ ☐ 1 strongly agree ☐
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

c). Fresh and natural foods are better than processed foods with added nutrients.

☐ ☐ 1 strongly agree ☐
☐ 2 agree
☐ 3 not sure
☐ 4 disagree

☐ 5 strongly disagree

d) The people who need added nutrients in foods are those who do not eat enough fruits and vegetables.

☐ 1 strongly agree
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

☐

e) The people who buy foods with added nutrients are health conscious.

☐ 1 strongly agree
☐ 2 agree
☐ 3 not sure
☐ 4 disagree
☐ 5 strongly disagree

☐

F. DEMOGRAPHICS

Now I want to ask you a few questions about yourself. You do not need to answer these questions but they will help us in planning health programs. All information is confidential.

17. What is your age?_____

18. How much do you spend on foods per week? _____

19. What is your educational attainment?

☐ 1 Elementary/Undergraduate
☐ 2 High School/Undergraduate
☐ 3 Vocational/Undergraduate
☐ 4 College/Undergraduate

☐

20. How many are you in the family?

21. What is your husband's occupation? _____

22. What is your occupation? _____

23. Which of the following do you have in your house?

☐ 1 running water
☐ 2 electricity
☐ 3 gas/e l ectric stove

☐

☐ 4 refrigerator
☐ 5 radio
☐ 6 TV
☐ 7 vehicle

24. Type of abode (not to be answered by the respondent; as observed by the researcher)

☐ ☐
☐ 1 shanty
☐ 2 wood/bamboo/nipa
☐ 3 wood/bamboo/galbanized iron roof
☐ 4 cement/wood and galvanized iron roof
☐ 5 others, specify

25. Do you own this house?

☐ ☐
☐ 1 renting
☐ 2 own
☐ 3 free (with permission from the owner)
☐ 4 squatting
☐ 5 others, specify

26. Please check which income bracket your family earn in a month. (Show card # 2)

☐
☐ 1 P 2,999.00 and below
☐ 2 P 3,000.00-P 8,000.00
☐ 3 P 8,001.00-P 12,000.00
☐ 4 P 12,001.00-P16,000.00
☐ 5 P 16,001.00 and above

27. How many other households live in this house?_____

28. How many of these households have children aged 2 to 4 years old?_____

Thank you very much for your time and I appreciate your efforts in answering all the questions.

Appendix 3-4 24-Hour Form

24 HOUR RECALL FORM

Name of Mother/and Child:_____
Date:_____ **Interview #:**_____
Barangay # _____ **Age of child:** _____

Hours	Meal types (i.e., breakfast, lunch, supper, snacks)	Food and Drinks consumed, brand, preparation, ingredients, manner of preparation,	Amount taken	Equivalent weight (in grams or liter)

24-Hour Form (Filipino Version)

24 HOUR RECALL FORM

Pangalan ng Nanay/at Bata:_____
Petsa:_____ **Pang-ilang interbiyu:**_____
Barangay # _____ **Edad ng Bata:** _____

Oras ng Pagkain	Uri ng Pagkain (Almusal, tanghalian, meryenda o hapunan)	Pagkain at inumin, tatak, detalye, sangkap, paraan ng pagluluto,	Dami ng nakain	Katumbas na timbang or bigat (sa gramo o litro)

Appendix 4.2 Recommended Dietary Allowance for iron and vitamin A for Filipino Preschool Children (FNRI, 1989)

Age Group	RDA for Iron
2-3 years	8 mg
4 –6 years	10 mg
	RDA for Vitamin A
2-3 years	350 µg
4-6 years	375 µg

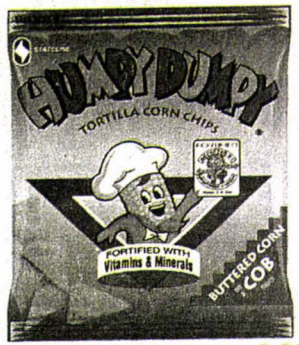
Appendix 4-3 List of SPS Foods and Fortificant(s) As of December, 1999

SPS Food	Fortificant
Tang Juice Drink Flavors: orange, mandarin-orange, pineapple, grape, pomelo, soursop	Vitamin A
555 Sardines	Vitamin A
Eden Pasteurized Filled Cheese Spread	Vitamin A
Star Margarine	Vitamin A
Gerber Infant Cereals	Vitamin A, iron
Swift Mighty Meaty Hotdog	Vitamin A
Pipo Chips (cheese, chili and garlic, sweet corn)	Vitamin A, iron
Nico Chips	Vitamin A, iron
Payless Instant Noodles	Vitamin A
Lucky Me Instant Noodles	Vitamin A, iron
Minola Margarine	Vitamin A
Regain Chips	Vitamin A, iron, iodine
Ovaltine Chocolate Beverage Powder	Vitamin A, iron, iodine
White King Hotcake & Waffle Mix	Iron
Cheezee Pasteurized Processed Filled Cheese	Vitamin A
Papa Banana Catsup	Vitamin A
Maggi Rich Mami Noodles	Vitamin A
Minola Edible Oil	Vitamin A
Magic Flakes Cracker Sandwich	Vitamin A
Jack n' Jill Nacho Cheese	Vitamin A, iron
Jack n' Jill Chiz Curls	Vitamin A, iron
Eight O'clock Orange Instant Mix Juice Drink	Vitamin A
UCARE Powdered Milk Drink	Vitamin A, iron, iodine
Humpy Dumpy Corn Chips	Vitamin A, iron
Tomi Corn Chips	Vitamin A, iron
Nutri-Pak	Vitamin A
Miracle Whip	Vitamin A
Fruit C Orange Drink	Vitamin A
Clover Chips	Vitamin A

Appendix 5-1 Samples of Advertisements of SPS Foods in Print

The following pages are samples of advertisements of SPS foods in print.

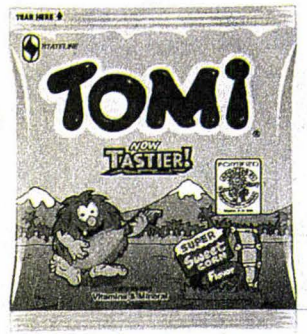
HUMPY DUMPY®
&
TOMI®



BUTTERED CORN on a COB
CHILI & GARLIC
MEXICAN B-B-Q
Royal CHEESE

FORTIFIED
ACCEPTED BY
DEPARTMENT OF HEALTH
Vitamin A & Iron

Your Total Fun Snacks!



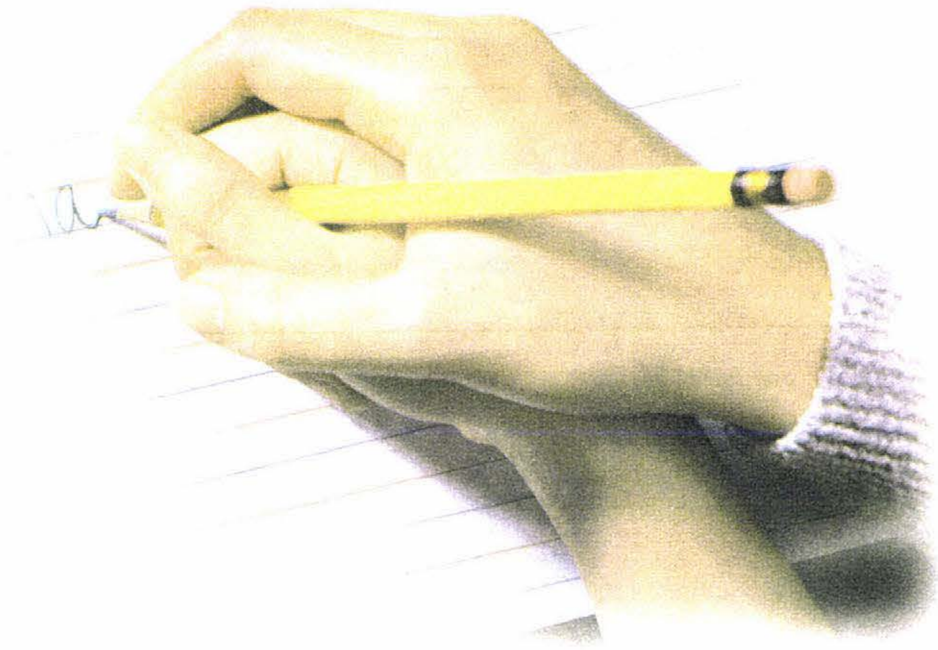
SUPER SWEET CORN
CHICKEN
New! KESO Flavor

A Quality Product of:

STATELINE SNACK FOOD CORPORATION

Llano Rd., Bo.Llano,Kalookan City
Tel.Nos.:9377695/9377696

Dahil 100% ang iyong pagmamahal.



Lahat ibibigay mo basta't para kay bunso. Dahil – sa puso mo – anumang kakulangan n'ya, pagkukulang mo.

Sa dalawang kutsara ng **PAPA BANANA CATSUP**, **100% Vitamin A RDA*** ang maibibigay sa kanya.

Saksi ang DOH Sangkap Pinoy Seal d'yan. Ang Vitamin A sa PAPA ay malaking tulong sa pagpapatalas

ng mata at pagpapalakas ng resistensya para sa malusog n'yang katawan. Kaya araw-araw man s'yang magsulat

at magbasa, ma-expose sa alikabok at bacteria, may aalalay sa kanya. Basta't sa tamang pagkain, tamang

pangangalaga ng katawan, at sa Vitamin A-fortified PAPA BANANA CATSUP, sapat na ang panlaban n'ya.

FORTIFIED
ACCEPTED BY Sangkap Pinoy
Vitamin A

Sa tulong ng PAPA, 100% ng pagmamahal mo, maibibigay kay bunso. At sa school and at play till the end of the day, basta't may Papa, kayang-kaya n'ya!

MASARAP.
MALAMAN.
MASARSA.
MAY BITAMINA.

VITAMIN A

FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
Vitamin A

555 Sardines

Dahil masarap, ubos agad.

Now fortified with Vitamin A

Ibang Magpalaki

Ito lang ang may DOH Sangkap Pinoy Seal.

Ang tanging margarine na may 100% RDA* ng vitamins A, B1 at D para sa malinaw na mata, malakas na buto, at malusog na katawan. KAYA ITO LANG ANG MAY DOH SANGKAP PINOY SEAL.

* RDA - Recommended Daily Allowance

Handog ng *minola*... kalusugan para sa buong bansa

FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
VITAMIN A

Sa ika-sandaang taon ng bansa, handog ng ***minola*** ang likas na kalusugan para sa ating kababayan. Ang ***minola*** TABLE MARGARINE at ***minola*** PREMIUM EDIBLE OIL ay may tatak ng Sangkap Pinoy na nagpapatunay na ito ay may taglay na Bitamina A - ang bitamina na tumutulong magpatibay ng resistensiya laban sa sakit at nagpapalinaw ng paningin. Ito ay kalusugang abot-kaya ng bayan na sadyang napapanahon.

Pinagyamang produkto - alay ng ***minola*** sa mamamayan, lalung-lalo na sa kabataan, sa ika-sandaang taon ng kalayaan ng ating bayan.

minola®

FORTIFIED FOODS KAININ, DAGDAG SUSTANSIYA'Y KAMTIN · *selyong Sangkap Pinoy hanapin*

ental, social and emotional development. ey are starting to be involved in school d social activities and play more active imes

How to feed toddlers and eschoolers. (a) give nutritious snacks e boiled yellow *kamote*, boiled corn or anuts, milk and fruit juices, instead of nk food such as cheese curls, candies d softdrinks which destroy the child's petite during main meals; (b) add more lk to the child's diet for normal growth d development, strong bones and teeth, ength and resistance against infection; give cleansing foods such as turnips, rrots, sugarcane, guava, papaya instead sweet and sticky foods to prevent den- l caries; (d) vary the child's daily meals help him get used to the different tastes, xtures and appearances of foods; (e) oid giving food as reward or keeping it way as punishment for the child; and (f)

Kraft committed to food fortification as sustainable solution to malnutrition.

The National Government has considered food fortification as a sustainable solution to address the country's worsening micronutrient malnutrition problem.

In her latest report, Department of Health – Nutrition Service Director Adelisa Cifra-Ramos noted that food fortification is the most economical and sustainable solution to fight micronutrient deficiency in the country.

The Sangkap Pinoy Seal Program (SPSP) was launched in 1996 as a food fortification strategy in partnership with the private sector. It was designed to encourage food manufacturers to fortify their products with vitamin A, iron and/or iodine – micronutrients which are found deficient among Filipino children.

Kraft Foods (Philippines), Inc. was among the first batch of private food manufacturers to answer the government call fortifying its flagship beverage brand TANG with vitamin A. It was the first consumer product and the first fruit beverage to pass the stringent standards set by the SPSP technical board.

"Kraft had to allocate a substantial amount of investment in the areas of research, product development, fortification technology and advocacy marketing to ensure the success of the program," according to Jo Garde, group product manager for beverages.

"We fortified TANG with vitamin A since vitamin A deficiency (VAD) has reached public significance afflicting for out of 10 children between 6 months to 6 years old. If left untreated, it may lead to poor growth, blindness, weak resistance to infection, poor mental performance and even death," he adds.

All the five flavors of TANG (Orange, Pineapple, Grape, Pomelo, and Guyabano) have been given the approval to highlight the Sangkap Pinoy Seal in their labels. The Seal is the guarantee that consumers are getting not only the best – tasting juice drink that's closest to the taste of the real fruit but also it's high nutrition formulation. It has also passed the stringent fortification requirements of the Department of Health. In line with Kraft's commitment to provide for the nutritional needs of the Filipino consumer, other well-known Kraft products also had gained the approval to use the seal. Eden cheese and, recently, Miracle Whip are already fortified with vitamin A.

To date, there are 24 products registered with the SPS Program that includes juice, cheese, sandwich spread, sardines, hotdogs, margarine, instant noodles, snack foods, cooking oil, catsup and many others.

A survey conducted by the social weather station last June 2 to 16 showed that products with the Sangkap Pinoy Seal already have a high awareness level of 52% among consumers, 34 percent of whom prefer to buy these products with the seal versus those without. The incidence of buying has increased from the 29% level recorded in April 1998.

After 3 years, the pioneering effort and strong partnership between the SPSP and Kraft Foods (Philippines), Inc. remains committed to using food fortification as a sustainable solution to help eliminate malnutrition in our country.

Bakit Mahalaga ang Bitamina A

Ayon sa Department of Health, tinatayang may 17 mga bata ang nabubulag araw-araw dahil sa kakulangan nila sa bitamina A. Dagdag pa rito ang iba pang 25,000 mga batang Pilipino na maagang namamatay dahil rin sa kakulangan sa bitamina A at iba pang "micronutrients." Malaking tulong ang nagagawa ng bitamina A, lalung-lalo na sa mga bata. Ang bitamina A ay:

- *nagpapalinaw at nagpapalusog ng mga mata*
- *tumutulong sa normal na paglaki ng mga bata,*
- *nagbibigay ng karagdagang resistensiya laban sa sakit at inpeksiyon.*

minola

Katulong Mo Sa Pag-aalaga Ng Iyong Kalusugan

Naging tanyag ang Minola Premium Edible Oil dahil ito ay walang kolesterol. Tinanggap at ginamit ito ng milyun-milyong Pilipino sa katangiang ito. Para sa Minola, ang inyong kalusugan ay kayamanang walang katumbas. Ngayon, ang Minola ay mayroon nang bitamina A na higit na magbibigay ng karagdagang proteksiyon at benepisyo sa inyong kalusugan.

Walang kolesterol

May bitamina A

Hindi lasang sebo o maanta

Puro at sariwa

"The only Cooking Oil with Sangkap Pinoy Seal"

Ngayon, ang *minola* Premium Edible Oil ay mayroon nang Seal of Acceptance ng Department of Health.

FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
VITAMIN A

Dahil ito lamang ang kauna-unahan at kaisa-isang cooking oil na may taglay na

Bitamina A

minola

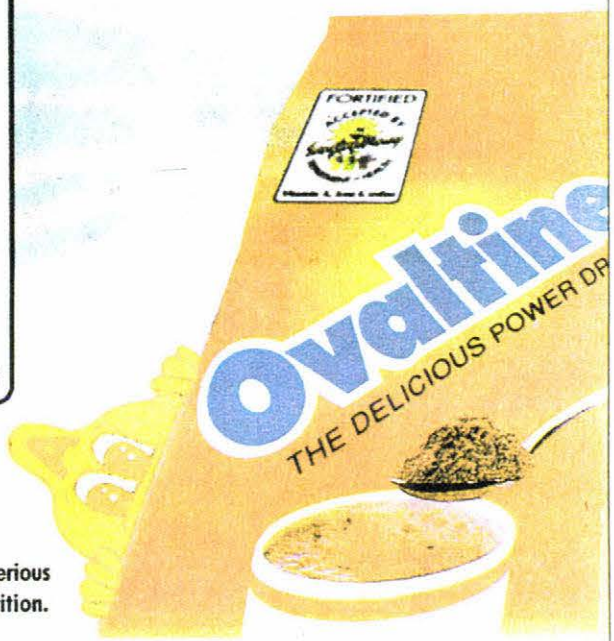
SAN PABLO MANUFACTURING CORP. 140 SCHETELIG AVE., SAN PABLO CITY, PHILIPPINES SPMC

Serious nutrition sealed inside.

FORTIFIED

ACCEPTED BY Sangkap Pinoy DEPARTMENT OF HEALTH

Vitamin A, Iron & Iodine



With the "Sangkap Pinoy" seal on every pack of Ovaltine, your kids can get the kind of nutrition serious enough to fight Micronutrient Malnutrition.

When your kids miss breakfast, experience too much stress, or eat too much sweets and junkfood, they become vulnerable to a condition called Micronutrient Malnutrition. This is a severe deficiency of Vitamin A, Iron or Iodine in their regular diet.

Children need these three micronutrients to sustain their proper growth and development: Vitamin A to protect them from infection, Iron to keep blood circulating properly, and Iodine to ensure proper brain development.

To counter the growing problem of Micronutrient Malnutrition, no less than the Department of Health (DOH) started the "Sangkap Pinoy" campaign. This helps parents determine whether certain products are fortified with the proper amount of micronutrients, as recommended by the DOH.

Protect your children from Micronutrient Malnutrition. Give them the right amount of vitamins and minerals from fruits, vegetables and other healthy foods. And when it comes to choosing manufactured foods, make sure to look for the Sangkap Pinoy Seal.

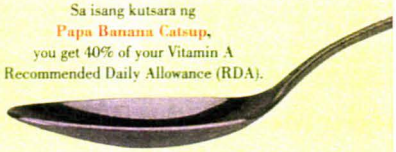
Enjoy the first and only " Sangkap Pinoy" certified chocolate drink!

To make sure your kids stay safe and healthy, Ovaltine now proudly carries the DOH "Sangkap Pinoy" seal of acceptance. Proof that no less than the Department of Health (DOH) attests to the quality of nutrition provided in every Ovaltine drink. Ovaltine has been given the "Sangkap Pinoy" seal of acceptance because it meets the RDA (Recommended Daily Allowance) for all three micronutrients, which have long been included in its formulation. It also contains 4 vitamins and 9 minerals to fulfill our promise - to provide your children with quick minds and quick bodies. And to seriously ensure that they remain safe from the threat of Micronutrient Malnutrition.

Make it a habit to look for the "Sangkap Pinoy" seal.
Make it a habit to give your child Ovaltine at least twice a day.

Quick Body. Quick Mind.

Sa isang kutsara ng
Papa Banana Catsup,
you get 40% of your Vitamin A
Recommended Daily Allowance (RDA).



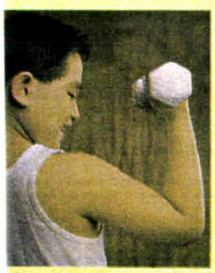
VITAMIN A-FORTIFIED
KA RITO!

PAPA LINAW ng Mata

Vitamin A is essential in maintaining your healthy eyesight. Kung hahayaang lumala ang kakulangan nito, maaaring magdulot ito ng permanenteng pagkabulag. Metabolides of Vitamin A combine with certain proteins to make viscide pigments which help the eyes adjust from bright to dim. Kapag kulang sa Vitamin A, ang coating ng mata (cornea) at puti (conjunctiva) nito ay natutuyo at nagiging sanhi ng *xerophthalmia* o *nightblindness*. Upang mapanatili ang malinaw na mata ng inyong mga anak, it is best to start them young. Bigyan sila ng regular supply ng Vitamin A-fortified Papa Banana Catsup sa kanilang pagkain to keep their healthy eyesight. Papa Banana Catsup helps maintain your child's 20/20 vision. Aba'y, papalinaw ng mata... kaya't papagaling sa eskwela!

PAPA GANDA ng Kutis

Studies positively claim that Vitamin A fights skin disorders and reverses skin aging -- pinananatiling malusog at bata ang ating kutis. Sa Papa Banana Catsup, matatamo ng inyong anak ang sapat na Vitamin A na mahalaga upang protektahan ang kanyang kutis laban sa skin cancer na maaaring ibunga ng excessive sun exposure. Research findings show that children spend more time under the sun than adults do. So now is the best time to supply your children with adequate Vitamin A to protect them from skin cancer. Kaya i-Papa na ang kanyang pambaon upang mapanatili mong makinis at malusog ang kanyang kutis. Remember, a healthy skin is a sign of a healthy body. Dahil ang Vitamin A sa Papa, papakinis talaga!



PAPA LAKAS ng Resistensya

Vitamin A strengthens your child's resistance against infection. Ayon sa scientific studies, pinalalakas nito ang inyong naturalesa -- increases antibody activities at mas mabilis na produksyon ng iba't ibang disease-fighting cells. Vitamin A that's in Papa Banana Catsup protects the skin in and out, pati ang linings ng digestive at respiratory tracts. Sa pamamagitan ng pagpapatibay ng linings na ito, pinoprotektahan ng Vitamin A ang katawan laban sa respiratory infections, diarrhea, tigdas, at iba pang sakit. As Vitamin A enhances the immune system and regulates cell growth, pinalalakas nito ang resistensya ng inyong anak -- pinatitibay laban sa ubo't sipon hanggang sa matinding impeksyon. Upang siya'y mailayo sa sakit, i-Papa lamang ang kanyang pambaon. This way, he won't have to miss a single school day. Towards healthier and more productive growing years... ito ang papalakas!

CLEAR FACTS

It is estimated that 17 children go blind each day in the Philippines from serious Vitamin A Deficiency. *That's over 6,000 per year. Tens of thousands more have their vision either temporarily or permanently impaired.*

Sa Asya, estimadong 5 hanggang 10 milyong bata ang nagkakaroon ng diperensya sa mata dahil sa kakulangan sa Vitamin A bawat taon; *250,000 sa mga ito ang tuluyang nabubulag habang 175,000 sa mga nabubulag ang namamatay taun-taon.*

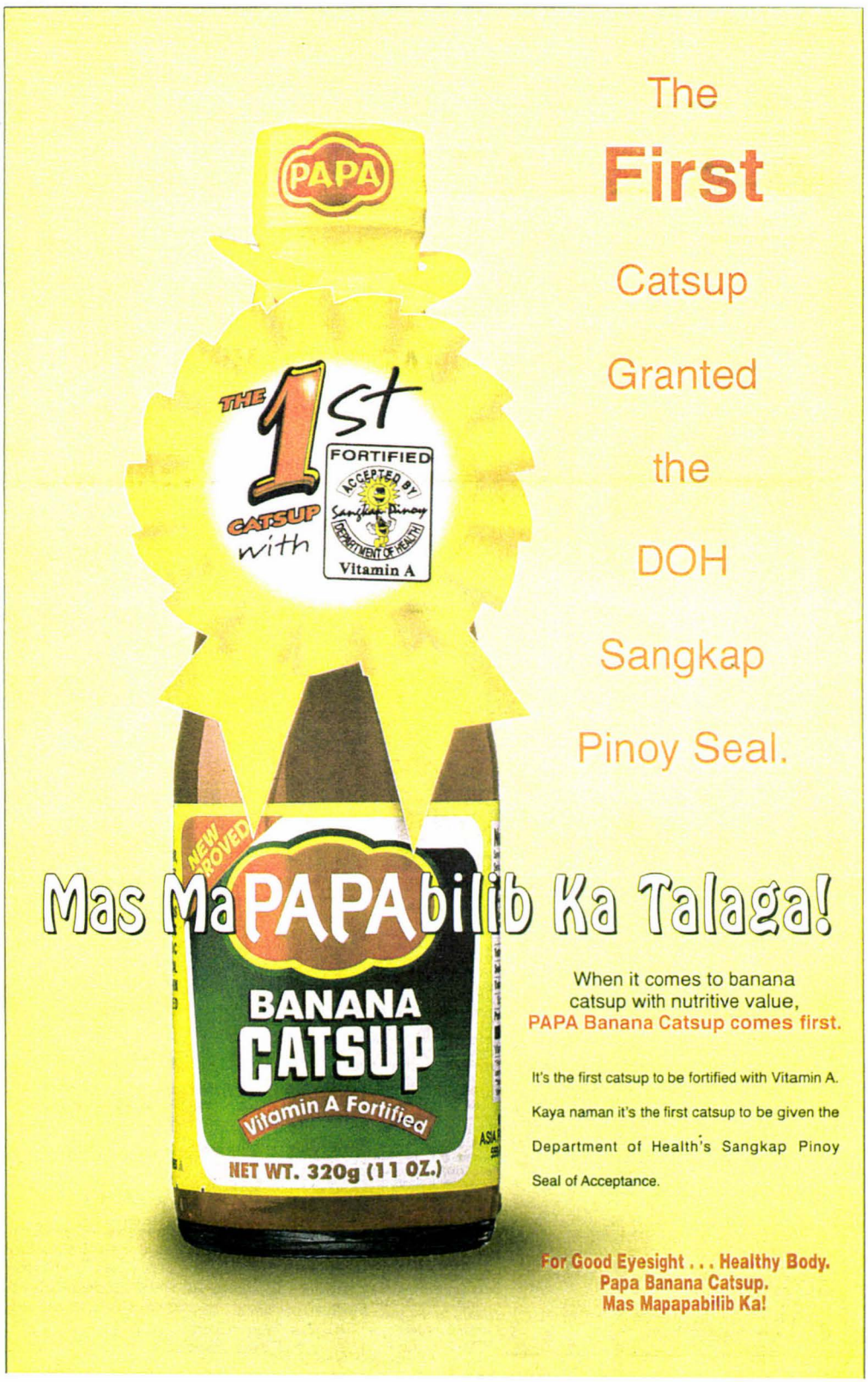
HARD FACTS

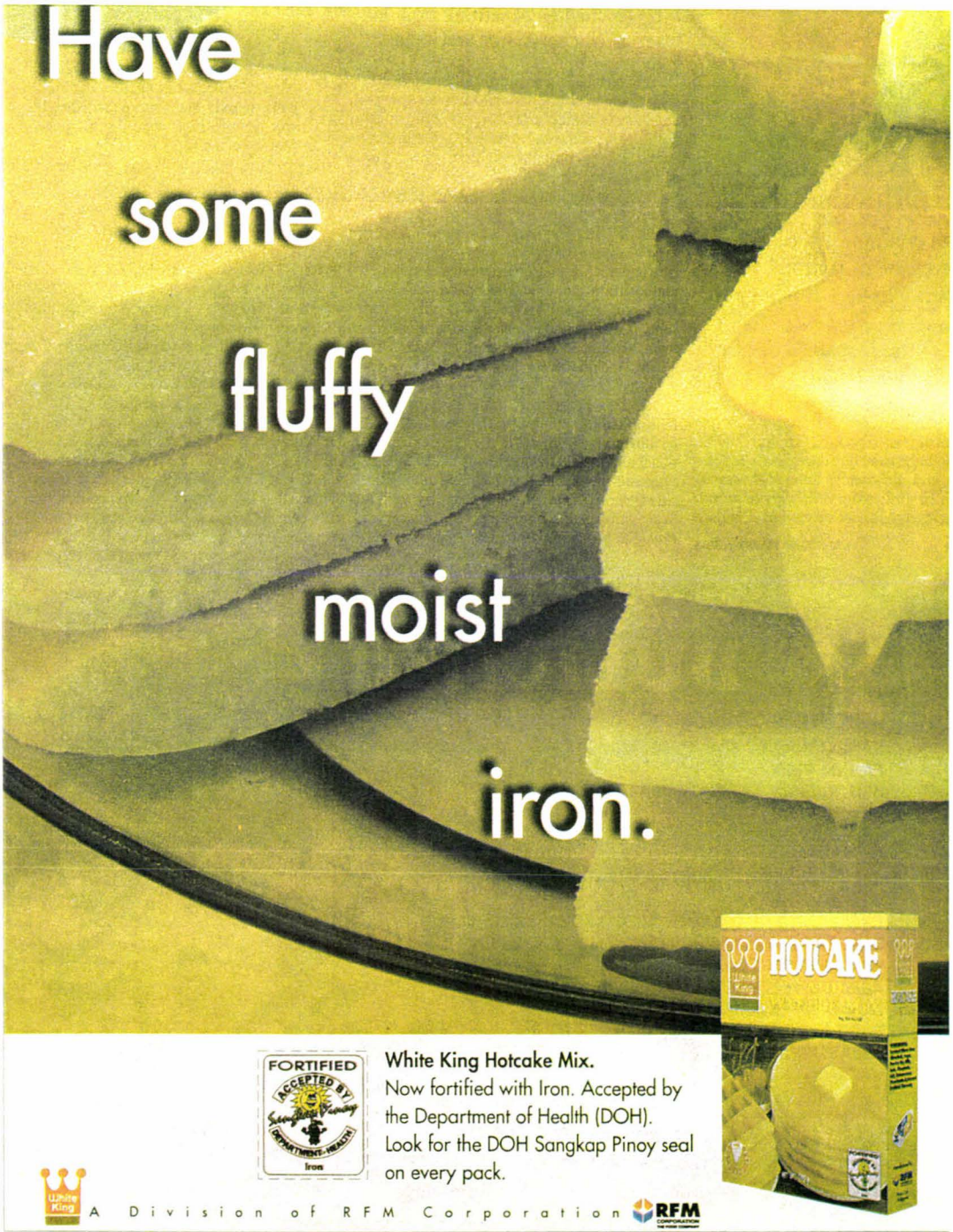
Tens of millions of the world's children are Vitamin A deficient; 1 million or more die or go blind every year.

Children who are deficient in vitamin A have a much higher mortality rate. By improving the Vitamin A status of children alone, 23% of young child deaths could be averted. That is, out of 85,000 child deaths, 20,000 could be averted.

Giving Vitamin A supplements to children in third-world countries where measles continues to be a major problem has cut the death rate among young children by at least 35% in some populations.

Sources: *COMPLETE BOOK OF VITAMINS AND MINERALS* by Arlene Mc Donald, Jeanie Nunn, and Joe-Anne Heales, Ph.D., RD. (Publications International Limited, 1994). • *THE DOCTORS' VITAMIN AND MINERAL ENCYCLOPEDIA* by Sheldon Saul Hendler, M.D., Ph.D. (New York: Simon and Schuster, 1990); • DOH, "Ano ang Nutrisiyon?" Transparency and Talking Points Guide, 1997. • DOH, "Let the Children See." A brochure produced by Helen Keller International Corporation for the DOH, 1998. • *A WOMAN DOCTOR'S GUIDE TO SKIN CARE* by Wilma F. Bergfeld, M.D., F.A.C.P., with Shelagh Ryan Maslow (New York: Lowenstein Associates, 1995).


PAPA
THE 1st
CATSUP with
FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
Vitamin A
NEW IMPROVED
BANANA
CATSUP
Vitamin A Fortified
NET WT. 320g (11 OZ.)
The
First
Catsup
Granted
the
DOH
Sangkap
Pinoy Seal.
Mas MaPAPAbilib Ka Talaga!
When it comes to banana
catsup with nutritive value,
PAPA Banana Catsup comes first.
It's the first catsup to be fortified with Vitamin A.
Kaya naman it's the first catsup to be given the
Department of Health's Sangkap Pinoy
Seal of Acceptance.
For Good Eyesight . . . Healthy Body.
Papa Banana Catsup.
Mas Mapapabilib Ka!



FORTIFIED
ACCEPTED BY
Sangkap Pinoy
DEPARTMENT OF HEALTH
Iron

White King Hotcake Mix.
Now fortified with Iron. Accepted by the Department of Health (DOH). Look for the DOH Sangkap Pinoy seal on every pack.

White King
A Division of RFM Corporation
RFM