

# Knowledge and Use of Complementary Food Fortification with Multiple Micronutrient Powders in Selected Communities in the Philippines

Normahitta P Gordoncillo<sup>1</sup>, Maria Theresa M Talavera<sup>1\*</sup>, Corazon VC Barba<sup>1</sup> & Maria Ana T Quimbo<sup>2</sup>

<sup>1</sup> *Institute of Human Nutrition and Food, College of Human Ecology, University of the Philippines Los Baños, Laguna, Philippines*

<sup>2</sup> *College of Public Affairs and Development, University of the Philippines Los Baños, Laguna, Philippines*

## ABSTRACT

**Introduction:** Micronutrient malnutrition among young Filipino children is attributed to inadequate food intake and improper feeding practices. To improve nutrient intake, home fortification using multiple micronutrient powders (MNPs) targeting 6 -23 month-old children became an intervention program referred to as Point of Use Complementary Food Fortification with Multiple Micronutrient Powders in Zamboanga City and the Municipality of Aurora in Region IX, Philippines. This study aimed to determine the extent of knowledge and use of complementary food with MNPs in the context of the said intervention program and implementation areas. **Methods:** A cross-sectional survey was conducted among 120 randomly selected primary caregivers with 6 -23-month-old children in the covered program areas. A questionnaire designed to elicit knowledge and use of MNPs was developed and pre-tested before data collection. **Results:** Results showed that all respondents were aware of MNPs, with local health workers as the information source. Percentage of respondents with knowledge of the purpose of MNPs varied widely. Among those who did, the most well-known function was improving children's health status. The most common practice of fortifying food with MNP involved adding it to boiled rice and vegetable dishes. Home fortification is popularly practised after cooking the food. Of the 20% respondents who claimed to observe changes in their children due to MNP, the top two positive results were children's increased appetite and increased growth. **Conclusion:** Awareness of the MNP does not necessarily translate into knowledge of what the MNP is made up of or its purpose. Although home food fortification using MNP was practised by most households, this study revealed deviations from recommendations on how to properly fortify their foods using the MNPs. Based on the findings in this study, there is a need to complement awareness of the primary caregivers with knowledge on MNPs through counselling and initiating support groups among caregivers to serve as credible and first hand examples of the proper use of MNPs.

**Key words:** Complementary food, knowledge, multiple micronutrient powders, use

## INTRODUCTION

Proper nutrition for young children aged 6-23 months is important for normal

growth and development. Inadequate food intake and suboptimal feeding practices increase the vulnerability of young

---

\*Correspondence: Maria Theresa M Talavera: Email: [mmtalavera@up.edu.ph](mailto:mmtalavera@up.edu.ph)

children to micronutrient malnutrition. The National Nutrition Council (NNC) and the Department of Health (DOH) in collaboration with United Nations agencies implemented a three-year program to ensure food security and nutrition among children 0-23 months old. This program is complementary to efforts aimed at increasing exclusive breastfeeding rate during the first 6 months and reducing the prevalence of undernutrition in six areas in the country among children 6-24 months old, among others. Under this program, the Multiple Micronutrient Powders (MNP) home fortification program was implemented. MNP is a single dose sachet containing multiple micronutrients like iron and vitamin A and as such addresses simultaneously various nutritional problems (Zlotkin *et al.*, 2005). The MNP from the World Food Programme (WFP) was supplied to the selected study sites. It contains 15 vitamins and minerals as single-serve sachets or packages for easy home use. The guidelines on the MNP's frequency and manner of use, as well as its distribution system and storage, were used by the local health/nutrition workers.

Home fortification is an innovation designed to improve the diet quality of nutritionally vulnerable groups such as young children, according to the Home Fortification Technical Advisory Group (HFTAG, n.d.). In other countries, home fortification with multiple micronutrient powders is an effective intervention to reduce anaemia and iron deficiency in children 6 months to 23 months of age (DeRegil *et al.*, 2011). Home fortification with MNP intends to ensure that the diet, that is, combined complementary food and breast milk, meets young children's nutrient needs. In cases where complementary food does not provide enough essential nutrients, it is possible that dietary diversity is poor due to scarcity or poor affordability of suitable food. Complementary food prepared for the young child has

insufficient nutrient content and density e.g. watery porridges and food with micronutrient content that is too low; and bioavailability of micronutrients is poor due to absorption inhibitors in the diet (fibre, phytate, tannin), which is especially the case in plant-based meals.

For this study, the term MNP refers to sachets containing dry powder with micronutrients that can be added to any semi-solid or solid food ready for consumption. The MNP from the World Food Programme (WFP) was supplied to the selected study sites. It contained 15 vitamins and minerals. It comes in single-serve sachets or packages for easy home use.

While home fortification with MNP is a newly implemented intervention in the Philippines, a sufficient number of relevant policies are in place at the international and national levels. At the international level, the WHO (2011) recommended implementing home fortification with MNP containing at least iron, vitamin A, and zinc to improve iron status and reduce anemia among infants and children 6-23 months old. Subsequently, several guidelines were published, including those developed by Home Fortification Technical Advisory Group (HFTAG), World Health Organization (WHO), and World Food Program (WFP). At the national level, several policies were issued by the DOH (AO 2010-0010, DM 2001-0303, AO 2005-0014), the Department of the Interior and Local Government (Memo Circular 2012-89), and National Nutrition Council (NNC), all of which provide the legal basis for distributing MNPs to identified target groups. The PPAN (Philippine Plan of Action for Nutrition or PPAN 2011-2016) (National Nutrition Council, n.d., Department of Health, n.d.) identified home fortifying complementary food with MNP as one of the strategies to improve below public health levels of Vitamin A deficiency (VAD) and iodine deficiency

disorders (IDD), and to bring down iron deficiency anemia (IDA) to less than 40%. This study aimed to determine the extent of the knowledge on and the use of MNP as a home fortification strategy by primary caregivers of 6-23-month-old children.

## METHODS

### Study population and setting

A total of 120 respondents who were primary caregivers of children aged 6-23 months receiving MNP were randomly selected to participate in the study. Some of the respondents' families were recipients of the *Pantawid Pamilyang Pilipino* Program (also known as 4Ps), the government's conditional cash transfer program.

The respondents belonged to households from one city and one municipality. The households were randomly selected from four barangays (two from the city and two from the municipality). The four villages were Calarian and Boalan in Zamboanga City; and San Jose and La Paz in the Municipality of Aurora. By definition, barangays Calarian and San Jose belong to the urban type relative to site and ranking in the list of barangays with most facilities, while barangay Boalan and La Paz belong to the category with the least number of facilities.

In each village, 30 households were randomly selected. A masterlist of child-recipients of the micronutrient powder was used as basis from which the households were randomly selected. The list is used for other services such as mass weighing locally known as Operation Timbang (OPT), deworming, and immunisation. Before interviewing the respondents, the study's purpose was explained to the respondents to ensure their commitment. Written informed consent was also solicited from them after a thorough explanation of the purpose of the study and measures to safeguard confidentiality of information by treating information at an aggregated level.

### Data collection and analysis

The researchers coordinated with local government officials as part of the preparatory activities before the actual survey. As a matter of protocol under the Philippine setting, this includes sending of letters and meeting with local chief executives and local unit heads of health to explain the research including data collection procedures and period of stay of the researchers in the study areas. The schedule of data collection and logistical requirements were finalised with local health and village officials. The researchers developed a structured questionnaire which was subsequently pre-tested on primary caregivers with characteristics similar to those in the target study areas. The topics in the survey addressed concerns regarding awareness, knowledge, and use of the MNPs. The questionnaire was finalised based on the results of the pretest. Actual interviews were conducted in April and May 2013. Data were analysed using SPSS version 16. Descriptive statistics such as frequency counts and averages were used to describe the data gathered.

## RESULTS AND DISCUSSION

### Socio-demographic characteristics of respondents

The age of the primary caregivers across the four study sites ranged from 29 to 37 years, with 18 years as the mean age. In terms of educational background, a greater proportion of the respondents from Calarian had either completed a college degree (23%) or a high school diploma (23%), with a higher number of the respondents from Boalan (30%) having finished only elementary education. Most of the respondents from the two villages in Aurora (San Jose and La Paz) had completed secondary education (47% and 41%, respectively). With regard to occupation, many of the respondents from the four study sites were stay-at-home or

**Table 1.** Number of MNP child-recipient by age group in Zamboanga City and Aurora Municipality

Age group (months)	Zamboanga City		Aurora Municipality	
	No.	%	No.	%
6-23	51	58.6	46	58.9
24-59	26	29.8	28	35.8
60-71	10	11.4	3	3.8
72-88	0	0	1	1.3
Total	87	100	78	100

full-time homemakers, with a few engaged in small retail store businesses.

### Characteristics of children receiving MNP

The MNP was received by 165 children within the covered 120 households. In the course of interviews with the households, some were found to have two child-recipient, thus making a total of 165 children from all four barangays. The children were 6 to 88 months old (Table 1). While many of the children were boys, those in Calarian were mostly girls. Of the 165 children, majority (58%) belonged to the 6-23-month-old group, followed by 29-35% belonging to the 24-59-month-old group.

### Knowledge on MNP

All respondents from the four study sites expressed awareness of MNP. The majority (80-90%) of the respondents, had varied ideas of what MNP entailed. Respondents' top answers either described it as "source of nutrients" or "nutrients in powder form added to any food items". However, 30% of the respondents in San Jose, Aurora could adequately describe MNP.

The respondents' primary sources of information on MNP were health workers, including *barangay* (village) health workers, *barangay* nutrition scholars and midwives. Some also mentioned leaflets and posters as sources of information, particularly in San Jose (26%) and La Paz (20%), with

a few citing it in Boalan (9%). Despite local health workers' active information campaign on MNP and their distribution of printed information materials, like leaflets and posters, a number of respondents were still unaware of MNP's nature, benefits and nutrient content.

Across all the study areas, a varying proportion of respondents (10% to 40%) admitted to not having adequate information about MNP's purpose, despite being aware of and able to describe it. Among those with knowledge of the MNP's purpose (Table 2), the most common answer was "to improve health status of children" followed by "to prevent micronutrient deficiency." Others said MNPs were for "increasing appetite, [achieving] beautiful skin, and to have a sharp mind." Regarding knowledge about the MNP content, the respondents mentioned all the nutrients that it actually contained in varying amounts except for calcium. The most frequently mentioned nutrient content was B complex vitamins, followed by Vitamin A, Vitamin C, and iron.

### Instructions on how to use MNP

The barangay health worker or *Barangay* Nutrition Scholar (or the village nutrition volunteer) and sometimes the midwives gave respondents instructions on how to use the MNP. The same health/nutrition workers were also responsible for monitoring MNP consumption, which

**Table 2.** Respondents' knowledge of the purpose of MNP (%)

Reasons*	Zamboanga City		Aurora Municipality	
	Calarian	Boalan	La Paz	San Jose
Improve health status of children	85	94	86	90
Prevent micronutrient deficiency	19	6	5	11
Others (increase appetite, sharp mind, beautiful skin)	15	0	9	21

\*Multiple answers

**Table 3.** Food/dishes that respondents fortified with MNP (%)

Foods/dishes	Zamboanga City		Aurora Municipality	
	Calarian	Boalan	San Jose	La Paz
Boiled rice/ + soy sauce	0	87	67	77
Rice porridge/cerelac	37	23	30	17
Vegetable dish	7	20	23	37
Meat broth (chicken, pork, fish)	13	13	37	33
Rice porridge with meat/milk	0	10	0	0
Ground/flaked meat/canned goods	7	7	7	17
Instant noodles	0	13	10	0
Ground mungbean/corn	0	3	0	0
Others (am, juice, chocolate drink, milk)	10	0	3	7

was invariably done by asking how recipients used the MNP. At some point in the program, calendars were distributed to recipient households so that they could record their MNP use. Consequently these were used by the health workers for monitoring MNP consumption. However, this practice was later terminated since children's caretakers often missed recording MNP use on the calendars. Also, households were instructed to keep empty sachets, which health workers collected to aid in monitoring. However, there were reports that the empty sachets were not collected by the monitors, thus recipients just stopped keeping them.

The majority of the health workers (83% to 97%) said they never encountered problems distributing MNP. However, in a few cases, some mothers recalled not receiving MNPs unless they asked for it.

In other cases, they received more than the expected number of boxes based on the number of their children who were entitled to MNP. Ironically, despite claims of MNP surplus, the most common reason given by those who did not receive MNP was insufficient stock and lack of knowledge on where to get the MNP.

#### Utilisation of MNP

In all study areas, the most common practice of food fortification with MNP involved adding it to boiled rice. In Zamboanga City, MNP was regularly added to rice porridge, while in Aurora, it was also popularly used in meat broth (chicken, pork) or in fish broth. It is likewise a common practice to fortify any vegetable dish with MNP. Only a few mixed the MNP in beverages such as juice and milk (Table 3). However, this practice was discouraged due to the

**Table 4.** Method by which respondents added the MNP

Fortification Method	Zamboanga City		Aurora Municipality	
	Calarian	Boalan	San Jose	La Paz
After cooking when cooled	60	100	63	50
After cooking while hot	30	23	50	70
After cooking while warm	43	0	63	63
Before cooking while cold	7	0	0	0
Others	0	0	10	3

possible settling of the undissolved MNP to the bottom of the cup and decreasing its chances of being consumed.

The more popular practice of adding MNP was after cooking and when the food had cooled down, or sometimes while the food was either still somewhat hot or warm. At least four respondents recounted giving MNP to the child in one spoonful of rice, in pure form, followed by a glass of water. Based on such responses (Table 4), there is a need to clarify instructions on how to properly use MNP based on guidelines.

It is common among households for children to consume all food items fortified with MNP. Although some households reported sharing the MNP with other non-target children (within the household or with neighbours, in cases when their own child refused to eat the food), many households indicated that they never shared fortified food with non-entitled members of the household. Food fortified with MNP was given to children every day or every other day until all sachets were consumed within the prescribed six-month period. One respondent thought that the child would get fewer benefits from the MNP when the sachet was divided into two feedings, even if this was consumed within the day. Feeding MNP-fortified food was a problem when the child had fever or was teething. At least one respondent said that she stopped giving her child MNP-fortified food because the child would cry every

time the respondent was seen adding it to the food for fear this was some kind of medicine.

#### **Perceived effects of MNP on children**

A small number of respondents reported no change in their children after being given food fortified with MNP. For those who claimed to have observed changes in their children due to MNP, the top two benefits derived from the use of MNP (across the four study sites) were increased appetite and improved growth among child recipients (Table 5). Some respondents related that MNP use had also improved the children's immune system, sleep and made them hyperactive. Improvements after using MNPs were also reported in other studies. MNPs have demonstrated capability to raise serum hemoglobin levels and reduce anemia significantly but the effect on growth was rather weak (Salam *et al.*, 2013; De-Regil *et al.*, 2011).

#### **Issues on the use of MNP**

About 20% of the respondents noticed some negative side effects on children who consumed MNP-fortified food. Three noted incidence of diarrhoea, vomiting, and food aversion (Table 6). Respondents who encountered these problems generally stopped giving MNP to their children. Some said they reported the problem to those (*barangay* health workers, *barangay* nutrition scholars, or midwives) persons distributing MNP. The recommendations

**Table 5.** Respondents' observed effects of Vita Nutrient Mix on child recipients (%)

Reasons	Zamboanga City		Aurora Municipality	
	Calarian	Boalan	La Paz	San Jose
Increased appetite	73	82	59	60
Increased growth	65	52	45	64
Improved immunity	23	22	28	17
With side effects (sleepy, hyperactive, red lips and checks, sharp mind)	15	17	35	24

**Table 6.** Issues experienced by child- recipients of MNP (%)

Issues	Zamboanga City		Aurora Municipality	
	Calarian	Boalan	San Jose	La Paz
Food aversion due to taste (bitter, rusty), texture (sandy)	71	100	33	57
Vomiting	0	0	50	29
Diarrhea	43	0	33	29

given to them ranged from “stop using the MNP” or to “continue using the MNP” explaining that these were temporary conditions, as the child might still be adjusting to the MNP.

All respondents indicated that they received MNP for free, although the majority did not know who coordinated its distribution. The respondents were also asked about their willingness to pay for the MNP. Many respondents (70% to 90%) expressed willingness to pay for MNP for an amount between ₱4 and ₱6 (<10 US cents) per sachet. The main reasons for not wanting to pay were financial inability, MNP's metallic taste that made some children refuse it, or the fact that it was not prescribed by a doctor. Other reasons given for not using MNP included: it was not effective, or that the child was already getting vitamins, preference for the syrup form, or that the child was already

two years old and may not qualify to be a recipient of MNP.

## CONCLUSION AND RECOMMENDATIONS

Overall, this intervention program on the use of MNP was found to be acceptable, with a larger number of caregivers expressing its benefits on their children rather than its negative effects. However, the findings at the household level surmise that the utilisation of the MNPs still falls on the household members who make decisions on the consumption of foods fortified with the MNP by their children. The seeming lack of knowledge about the MNP, even if all respondents claimed to be aware of it, points to the need to look into the design and/or dissemination of information regarding the use of MNP. Based on these results, it is recommended that proper and adequate information regarding use

and purpose be disseminated to achieve effective behavioural change among target beneficiaries and users. In particular, more than just the routine instructions, counseling to caregivers must be provided, especially when negative comments on initial use of MNP set in. There is also a need to conduct regular counseling and nutrition education activities to reinforce the knowledge of the caregivers and users on MNP's importance and consumption. Moreover, it is necessary to initiate support groups among mothers and caregivers to serve as credible and first-hand examples of the proper use of MNPs so as to encourage others to use MNPs in the process. Finally, it will be beneficial to consider the households' overall dietary context, from the moment the MNPs are introduced until the time it is evaluated for effectiveness.

#### ACKNOWLEDGEMENTS

The authors acknowledge the assistance provided by the local government officials and health and nutrition workers of Zamboanga City and municipality of Aurora, Zamboanga del Sur. The authors likewise extend their gratitude to UNICEF Philippines for the funds used in the implementation of the project entitled "Development of Case Study on JP MDG-F 2030 Point of Use Complementary Food Fortification with Multiple Micronutrient Powders (MNPs)."

#### REFERENCES

- Department of Health (2011). The MNCHN Manual of Operations (2<sup>nd</sup> ed.). Department of Health, National Center for Disease Prevention and Control.
- Department of Health. Micronutrient Program. Retrieved from <http://www.doh.gov.ph/micronutrient-program>
- De-Regil LM, Suchdev PS, Vist GE, Walleser S & Peña-Rosas JP (2011). Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age. *Cochrane Database of Systematic Reviews*, Issue 9. Art. No.: CD008959. DOI: 10.1002/14651858.CD008959.pub2.
- Home Fortification – Technical Advisory Group (n.d.). Programmatic Guidance Brief on Use of Micronutrient Powders (MNP) for Home Fortification.
- National Center for Disease Prevention and Control-Department of Health. Philippines Strategic Plan of Action for 2011-2016. Infant and Young Child Feeding Program. Retrieved from <http://www.doh.gov.ph/infant-and-young-child-feeding>
- National Nutrition Council. (n.d.) The Philippine Plan of Action on Nutrition, 2011-2016. National Nutrition Council.
- Salam RA, MacPhail C, Das JK & Bhutta ZA. (2013) Effectiveness of micronutrient powders (MNP) in women and children. *BMC Public Health. Suppl 3*: S22. DOI: 10.1186/1471-2458-13-S3-S22
- World Health Organization (2011). World Guideline: Use of Multiple Micronutrient Powders for Home Fortification of Foods Consumed by Infants and Children 6-23 Months of Age. WHO.
- Zlotkin, SH, Schauer C, Christofides A, Shariieff W, Tondeur MC & Ziauddin Hyder SM. (2005). Micronutrient sprinkles to control childhood anaemia: A simple powdered sachet may be the key to addressing a global problem. *PLoS Medicine* 2: 0024-0028. From <http://dx.doi.org/10.1371/journal.pmed.0020001>