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A COMPARATIVE STUDY OF NUTRITION AND HEALTH OF MOTHERS IN JAPAN AND THE PHILIPPINES

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Abstract. When comparing nutrition and health among mothers in both Japan and Philippines, it can be concluded that, in regard to nutrition, the results of the total dietary scores for mothers in divided into pregnant and after-delivery stages showed that pregnant Filipino mothers' average are lower than those of pregnant Japanese mothers.

Pregnant Filipino mothers and those just after delivery to 4 months had lower average dietary scores than Filipino mothers 5 months and later after delivery. These results are thought to be an important factor in the improvement of health condition and life expectancy of Filipino mothers and their children. In Japanese mothers, such differences were not found.

When comparing inidividual dietary scores and the rate of nutrients consumed to the optimum amounts, significant differences were found among mothers in both countries. Analysis of food diaries of mothers from both countries found that Japanese mothers had average intakes of nutrients such as energy, protein, fat, vitamin B1 and vitamin B2 and were deficient in calcium, iron and vitamin A. Filipino mothers took in average amounts of protein, calcium, iron, vitamin B2 and vitamin C and were deficient in energy, fat and vitamin B1.

INTRODUCTION

In the Philippines, as of 1990, communicable diseases were still the main causes of illness, but the proportion of deaths due to such diseases is slowly decreasing. The proportions of deaths due to cardiovascular diseases and accidents are increasing (Western Pacific Regional Office of WHO, 1992). Regarding nutrition, malnutrition is primarily manifested in 3 forms: 1. the lack of sufficient calories and protein in diets among low-income groups; 2. malnutrition among the very young and among pregnant and lactating mothers; 3. diet imbalance resulting in vitamin and mineral deficiencies (Tan, 1991). Malnutrition is a known factor which accelerates communicable diseases. In 1990, the percentages of underweight preschoolers among the total preschool populations in 4 selected cities and 7 selected provinces in the Philippines ranged from 8.63 to 33.1% (National Statistical Coordination Board, 1992). Mortality and morbidity rates, however, will surely change and continue to decline if socioeconomic and environmental conditions continue to improve. Proper education plays a very important part in these changes, especially in nutrition education.

In Japan, changes in diet were relatively limited until after World War 2. The Japanese Ministry of Health and Welfare has conducted national nutrition annual surveys since 1946. These surveys indicate that there has been large increase in meat and fat consumption. The well-recognized increase in the growth rates of Japanese children seems to be closely linked to the intake of dietary protein (Murata and Hibi, 1992). Comparing average nutritional intakes of Japanese (Ministry of Health and Welfare, 1984 and 1989) and Filipinos in 1982 and 1987 (National Statistical Coordination Board, 1993), intakes of energy, protein, fat, vitamins B1, B2 and C were greater in Japan than in the Philippines. Changes in life expectancy in Japan reflect improvements in diet, as do reductions in infant mortality and deaths from pneumonia, bronchitis and

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tuberculosis since the end of World War 2. Later increases occurred in mortality from cancer, heart disease and diabetes which are major issues related to food intake and stress.

The health situation and health system in Japan are entirely different from those in the Philippines. Mothers deliver their babies in hospitals so that doctors are able to monitor the health of both mothers and children. This is one reason why mortality rates for infants and mothers have decreased compared with the Philippines. As of 1993, Japan's infant death rate, in the first year of life, was 4.3 per 1,000 live births while it was 45.0 in the Philippines (UNICEF, 1995). In Japan as of 1990, the 3 top causes of infant mortality were congenital anomalies, hypoxia, birth asphyxia and other respiratory conditions, whereas in the Philippines, the major causes of death among infants in 1988 were pneumonia, hypoxia, birth asphyxia and other respiratory diseases, and enteritis and diarrhea (Mothers' and Children's Health and Welfare Association, 1992). With Japan's advanced health support system and rapid socioeconomic development, the average life span also increased rapidly. With the development of the health delivery system in Japan, however, some Japanese have experienced disadvantages. For example, the feeling of motherhood is missing for mothers who deliver their babies by using artificial delivery in a hospital. Many Japanese people also cannot completely adapt to the country's rapid pace of change and socioeconomic development. This is thought to be a reason for mental illnesses in Japan (Ministry of Health and Welfare, 1995), including among mothers.

This study began with the cataloging of nutritional beliefs and practices of Filipino mothers in the Philippines (Ocampo, 1991) during conception, pregnancy and the lactating and weaning stages. The gathered beliefs and practices of Filipino mothers were then compared with those of Japanese mothers. The comparative results showed that Japanese mothers did not generally agree with the beliefs and practices of Filipino mothers, except that "sweet food is prohibited during pregnancy", with which they moderately agreed. In general, Japanese mothers did not agree with beliefs and practices during conception, pregnancy, specific procedures in weaning babies, while mothers from the Philippines agreed moderately with these items (Ocampo and Moriya, 1994). Finally, the nutrition, health and lifestyles of mothers in these two countries were compared.

MATERIALS AND METHODS

Respondents who were pregnant, lactating and weaning mothers were asked 3 separate times to answer the designed questionnaire and complete a food diary for 1 week, in order to learn the changes in mothers during pregnancy and after delivery and the growth of their children. The study took 1.5 years to finish. Gathering of data began in November 1993 and ended in January of 1995. Gathering of data began when mothers were in either their pregnant or after delivery stages, and continued until every body had reached after delivery stages. The study included 39 respondents from Japan and 40 from Philippines. Respondents in Japan who lived in a village, a town and 2 cities, were under the supervision of the health personnel, nurses, midwives and kindergarten teachers, while those in the Philippines, were under the care of Community-Based Health Program staff, provincial nutritionists and sanitary inspectors. In Japan, there was only one mother from a village (Kamoenai), 18 mothers from a town (Toyoura) and 19 mothers from 2 cities (Sapporo and Kushiro). In the Philippines, there were 9 mothers from a village (Guimba), 13 from 2 towns (Munoz and Quezon) and 17 from 2 cities (Cabanatuan and San Jose) (Fig 1 and Table 1).

Respondents answered a questionnaire that was composed of 6 different parts: 1) symptoms of health consciousness of mothers; 2) lifestyle which includes the stress coping methods and their effectiveness; 3) family profile; 4) nutrition and health status of mother and child; 5) mother's food dairy; 6) child's food diary. During the first data gathering period, 38 mothers in Japan and 39 in the Philippines answered the questionnaire. Of these, 33 mothers in Japan and 37 mothers in the Philippines completed their food diaries. In the second gathering period, 25 mothers in Japan and 29 in the Philippines answered the questionnaire. Of these, 24 in Japan and 26 in the Philippines completed their 1-week food diaries. In the third data-gathering period, 25 Japanese and 29 Filipino mothers answered the questionnaire and of these 25 Japanese and 27 Filipino mothers completed their food diaries. Mothers who answered the questionnaires all 3 times (from the first to third survey) numbered 16 in Japan and 21 in the Philippines. Of those who answered 3 times, 16 mothers from Japan and 19 from the Philippines answered concerning health symptoms. There were 12 Japanese and 13 Filipino

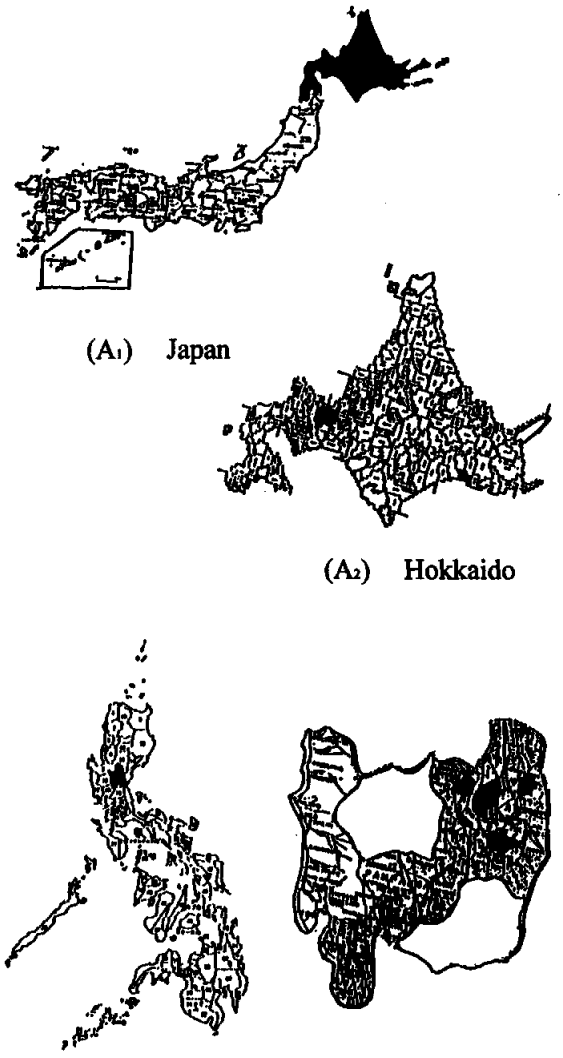

Fig 1–The areas of this study (Shaded parts show the areas of survey).

mothers who wrote their food diaries in the 3 consecutive surveys.

Two methods were used for the evaluation of foods they ate. The first was by counting dietary points according to the 3 basic food groups: the main sources of protein and calcium; fruits, vegetables and seaweeds as vitamin and mineral sources; the main sources of energy such as fats and carbohydrates including sugar, rice, bread and noodles. These 3 basic groups, were divided into 11 sub-food groups which had 3 - 5 points each in the calculation of basic points (total 50 points). The 11 sub-groups were milk and milk products; eggs, meat and fish; beans and bean products; green leafy vegetables; light colored vegetables such as radishes; tubers such as potatoes; fruits; seaweeds; oils, fats and fat products; grain products such as rice, bread and noodles; and sugars, chocolates and other sweets. Then, for the calculation of the balance point, these 11 sub-groups were clustered into 6 groups in which milk and milk products, sources of protein from animals and beans, vegetables rich in vitamin A, tubers and vegetables were given 10 points, while energy sources such as fat and grain products were given 5 points each. Thus, the sum of the basic and balance points (total 50 points) served as the total dietary points for mothers' dietary evaluation. This point system method was used for all 3 surveys following the usage of Moriya (1986). Respondents who did not eat were given scores of zero. The points for snacks were included in the nearest meal, *ie* breakfast, lunch or dinner.

The second procedure used was the NAPS system (Nutritional Advice Personal Computer System), based on the Japanese food standard compositions (Science and Technology Agency, 1982). While in the Philippines, analysis was done by using standard table food composition (Abdon *et al*, 1990) to compute the nutrients available in the foods eaten. Only the food diaries of Japanese and Filipino mothers from the third data-gathering were analyzed using this method. The following nutrients were evaluated from their food diaries; energy, protein, fat, calcium, iron, vitamins A, B_1, B_2 and C.

RESULTS AND DISCUSSION

Profile

Mothers' present condition, such as whether they were pregnant and in the after-delivery stage, were important factors in food decisions and health consciousness. Accordingly, the stages were divided into 6 substages: 1) pregnancy - 5 months; 2) 6 pregnancy months - to delivery; 3) after-delivery - 4 months; 4) child's age is 5 - 8 months; 5) child's age is 9 - 12 months; and 6) child's age is 1 year and above. The numbers of mothers belonging to each stage over the 3 surveys are shown in Table 2.

Table 1

Living places of respondent mothers in Japan and Philippines.

	First survey				Second survey				Third survey			
	Questionnaire		Food diary		Questionnaire		Food diary		Questionnaire		Food diary	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Japan (Hokkaido)												
Kamoenai Village	1	2.6	1	3.0	0	0	0	0	1	4.0	1	4.0
Toyoura Town	18	47.4	15	45.5	11	44.0	11	45.8	10	40.0	10	40.0
Sapporo City	12	31.6	12	36.3	9	36.0	9	37.5	8	32.0	8	32.0
Kushiro City	7	18.4	5	15.2	5	20.0	4	16.7	6	24.0	6	24.0
Total	38	100.0	33	100.0	25	100.0	24	100.0	25	100.0	25	100.0
Philippines (Nueva Ecija)												
Guimba Village	9	23.1	9	24.3	5	17.2	4	15.4	9	31.0	9	33.3
Munoz Town	11	28.2	10	27.0	9	31.0	9	34.6	9	31.0	9	33.3
Quezon Town	2	5.1	2	5.4	1	3.4	1	3.8	1	3.4	1	3.7
San Jose City	2	5.5	2	5.4	0	0	0	0	0	0	0	0
Cabanatuan City	15	38.5	14	37.8	14	48.3	12	46.2	10	34.5	8	29.6
Total	39	100.0	37	100.0	29	100.0	26	100.0	29	100.0	27	100.0

Table 2

Present status of respondent mothers in Japan and Philippines.

	First survey				Second survey				Third survey			
	Questionnaire		Food diary		Questionnaire		Food diary		Questionnaire		Food diary	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Japan (Hokkaido)												
Pregnant 2-5 months (Stage 1)	10	26.3	8	24.2	0	0	0	0	0	0	0	0
Pregnant 6 months-delivery (Stage 2)	5	13.2	5	15.2	0	0	0	0	0	0	0	0
After delivery-4 months (Stage 3)	5	13.2	4	12.1	7	28.0	7	29.2	0	0	0	0
Delivery 5-8 months (Stage 4)	8	21.0	7	21.2	5	20.0	4	16.7	7	28.0	7	28.0
Delivery 9-12 months (Stage 5)	10	26.3	9	27.2	6	24.0	6	25.0	8	32.0	8	32.0
Over 1 year after delivery (Stage 6)	0	0	0	0	7	28.0	7	29.2	10	40.0	10	40.0
Total	38	100.0	33	100.0	25	100.0	24	100.0	25	100.0	25	100.0
Philippines (Nueva Ecija)												
Pregnant 2-5 months (Stage 1)	0	0	0	0	0	0	0	0	0	0	0	0
Pregnant 6 months-delivery (Stage 2)	31	79.5	29	78.4	0	0	0	0	0	0	0	0
After delivery-4 months (Stage 3)	8	20.5	8	21.6	25	86.2	23	88.5	0	0	0	0
Delivery 5-8 months (Stage 4)	0	0	0	0	4	13.8	3	11.5	10	34.5	10	37.0
Delivery 9-12 months (Stage 5)	0	0	0	0	0	0	0	0	19	65.5	17	63.0
Over 1 year after delivery (Stage 6)	0	0	0	0	0	0	0	0	0	0	0	0
Total	39	100.0	37	100.0	29	100.0	26	100.0	29	100.0	27	100.0

As shown in Table 3, ages of Japanese mothers were found to differ from those of the Filipino mothers, as the Filipino mothers had representatives in all listed age groups. Filipino respondents included young mothers whose ages were 15-20 years old, while in Japan there were no representatives in that group. This table shows that more Filipino than Japanese mothers were either younger or older.

Table 3

Respondent mothers' age in Japan and Philippines.

	First survey				Second survey				Third survey			
	Questionnaire		Food diary		Questionnaire		Food diary		Questionnaire		Food diary	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Japan (Hokkaido)												
15-20 years of age	0	0	0	0	0	0	0	0	0	0	0	0
21-25	7	18.4	6	18.2	4	16.0	4	16.7	5	20.0	5	20.0
26-30	19	50.0	17	51.5	11	44.0	10	41.7	12	48.0	12	48.0
31-35	11	28.9	9	27.3	9	36.0	9	37.5	7	28.0	7	28.0
36-40	1	2.6	1	3.0	1	4.0	1	4.1	1	4.0	1	4.0
Total	38	100.0	33	100.0	25	100.0	24	100.0	25	100.0	25	100.0
Philippines (Nueva Ecija)												
15-20 years of age	4	10.3	4	10.8	2	6.9	2	7.7	2	6.9	2	7.4
21-25	6	15.4	6	16.2	5	17.2	4	15.4	4	13.8	3	11.1
26-30	19	48.7	19	51.4	14	48.3	13	50.0	16	55.2	15	55.6
31-35	9	23.1	8	21.6	5	17.2	5	19.2	4	13.8	4	14.8
36-40	1	2.5	0	0	3	10.3	2	7.7	3	10.3	3	11.1
Total	39	100.0	37	100.0	29	100.0	26	100.0	29	100.0	27	100.0

Table 4

Educational attainment of respondent mothers in Japan and Philippines.

	First survey				Second survey				Third survey			
	Questionnaire		Food diary		Questionnaire		Food diary		Questionnaire		Food diary	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Japan (Hokkaido)												
Junior high school	2	5.3	2	6.1	1	4.0	1	4.2	0	0	13	52.0
Senior high school	19	50.0	16	48.5	10	40.0	10	41.7	13	52.0	9	36.0
Junior college *et al*	13	34.2	11	33.3	10	40.0	9	37.5	9	36.0	3	12.0
College *et al*	4	10.5	4	12.1	4	16.0	4	16.6	3	12.0	0	0
Total	38	100.0	33	100.0	25	100.0	24	100.0	25	100.0	25	100.0
Philippines (Nueva Ecija)												
No school	0	0	0	0	0	0	0	0	1	3.4	1	3.7
Elementary school	5	12.8	5	13.5	4	13.8	2	7.7	3	10.3	3	11.1
Junior high school	5	12.8	4	10.8	4	13.8	4	15.4	4	13.8	3	11.1
Senior high school	7	17.9	7	18.9	6	20.7	5	19.2	6	20.7	6	22.2
College *et al*	6	15.4	6	16.2	3	10.3	3	11.5	3	10.3	3	11.1
Graduate course *et al*	16	41.0	15	40.5	12	41.4	12	46.2	12	41.4	11	40.7
Total	39	100.0	37	100.0	29	100.0	26	100.0	29	100.0	27	100.0

The numbers of family members in Japan were smaller than those for the Philippines. Numbers of children also differed. Numbers of children in Japan ranged from 1- 3, while in the Philippines it ranged from 1 - 5 children.

The final educational level attained for Japanese

Table 5

Dietary points evaluated for each meal of respondent mothers in Japan and Philippines.

	Breakfast						Lunch						Dinner					
	First survey		Second		Third		First survey		Second		Third		First survey		Second		Third	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Japan																		
0-50 (Group A)	129	57.1	108	64.3	108	62.1	115	50.9	55	32.7	74	42.5	83	36.7	31	18.5	40	23.0
51-100 (Group B)	97	42.9	60	35.7	66	37.9	111	49.1	113	67.3	100	57.5	143	63.3	137	81.5	134	77.0
Total	226	100	168	100	174	100	226	100	168	100	174	100	226	100	168	100	174	100
Philippines																		
0-50 (Group A)	169	72.8	171	73.4	108	58.7	127	54.7	129	55.4	38	20.7	168	72.4	170	73.0	84	45.7
51-100 (Group B)	63	27.2	62	26.6	76	41.3	105	45.3	104	44.6	146	79.3	64	27.6	63	27.0	100	54.3
Total	232	100	233	100	184	100	232	100	233	100	184	100	232	100	233	100	184	100

number = meals' number of mothers, less than 50 point of each meal is thought to be dangerous for healthy life.

Table 6

Dietary points evaluated from each meal of all food diaries of respondent mothers in Japan and Philippines.

	First survey			Second			Third		
	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner
Japan									
n	33	33	33	24	24	24	25	25	25
mean	43.5	50.2	55.6	44.1	56.6	62.5	47.3	55.0	61.7
SD	16.7	8.8	10.4	16.4	8.4	6.2	15.1	11.1	8.9
Philippines									
n	37	37	37	26	26	26	27	27	27
mean	38.6	48.7	41.8	45.9	59.1	51.0	48.6	61.1	53.2
SD	12.9	8.8	6.9	10.7	8.5	6.2	8.3	7.8	8.9
Comparison between both countries									
Cochran t-value			6.4			6.3			3.4
t-test	NS	NS	**	NS	NS	***	NS	NS	**

n = number of mothers, NS = not significant, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

mothers was divided into 4 groups: junior high school, senior high school, junior college and vocational school, and university and graduate course. Filipino mothers' educational level attained were divided into 6 groups: did not enter school, elementary, junior high school, senior high school, vocational, college and university, and graduate courses. The numbers of mothers from the first and third surveys belonging to these groups are shown in Table 4.

Mothers' nutritional condition and status

The distribution of total dietary points for dietary evaluation of each meal (breakfast, lunch and dinner) for all mothers is shown in Table 5. Less than 50 points per meal was thought to be dangerous to health. As a fact, these total dietary points for each meal in the first to third surveys were gathered into 2 groups: less than 50 points (Group A) and

Table 7

Dietary points evaluated from each meal of all food diaries of mothers who answered for three surveys in Japan and Philippines.

	First survey			Second			Third		
	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner	Breakfast	Lunch	Dinner
Japan									
n	12	12	12	12	12	12	12	12	12
mean	49.2	51.5	54.3	40.9	58.0	61.9	47.3	60.0	62.9
SD	18.7	9.6	9.9	20.9	10.6	7.3	20.8	12.1	10.1
Philippines									
n	13	13	13	13	13	13	13	13	13
mean	42.3	48.9	42.8	46.6	59.2	49.6	48.2	59.4	53.5
SD	8.9	9.2	6.7	7.5	9.2	5.8	8.9	8.7	9.2
Comparison between both countries									
Cochran	t-value		3.4			4.7			2.5
t-test	NS	NS	**	NS	NS	***	NS	NS	*

n = mothers' number, NS = not significant, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

Table 8

Average rate of consumed desired nutrient amount of mothers in Japan and Philippines.

	Japan (n = 25)		Philippines (n = 25)	
	Mean	SD	Mean	SD
Energy %	105.4	17.6	84.3	17.2
Protein	124.1	26.6	141.8	25.7
Fat/oil	135.4	32.0	78.5	35.6
Calcium	76.9	32.3	160.9	42.4
Iron	66.4	13.4	169.2	44.9
Vitamin A	87.6	34.6	93.7	42.9
Vitamin B1	108.2	28.4	71.2	24.3
Vitamin B2	112.6	31.0	114.1	56.6
Vitamin C	117.0	58.0	228.9	81.2

Consumed nutrient amount a day/desired nutrient amount a day × 100 was used for each mother.

more than 50 points (Group B). Japanese and Filipino mothers' dietary points for breakfast were more frequently distributed in Group A than Group B. At lunch, the distribution percentage for dietary point of Japanese mothers in their first survey were almost the same for Groups A and B, but in the second and third surveys, Group B was higher than Group A. For Filipino mothers, the distribution in the third survey showed that Group B was greater than Group A, while their first and second surveys showed that Group A was slightly more than Group B. At dinner, the distribution percentage for Japanese mothers' dietary points in all surveys showed that Group B was greater than Group A, while in the Philippines, the first and second surveys showed higher percentages for Group A than in Group B, whereas Group B was found to be higher than Group A in the third survey.

As shown in Tables 6 and 7, average value and standard deviation of total dietary points for dietary evaluation of all mothers and mothers who wrote their food diaries for 3 surveys (from the first to the third surveys) showed that the average total dietary points for dinner of Japanese mothers were higher than those for Filipino mothers. Breakfast and lunch did not significantly differ in the collected data. The individual ratios of consumed amounts of nutrient to the optimum amounts were calculated based on mothers' ages, weights, heights, present condition (pregnant or lactating), and physical activity are shown for 25 Japanese mothers and 25 Filipino mothers, based on the third dietary diary. Significant individual differences for mothers in both countries can be found in these data.

Table 8 shows the average rate of desired nutrient amount consumed in both countries. Analyzing the foods eaten according to their nutrient values, it was found that Japanese mothers generally ate foods rich in energy, protein and fat, but deficient in calcium, iron and vitamin A. Filipino mothers ate foods rich in protein, calcium, iron and vitamin C, but deficient in energy, fat and vitamin B_1. Out of 522 meals eaten by the Japanese mothers, the following traits were found to be common: rice had a frequency of 61.3% (320 times/522 meals), meat had a frequency of 33.0% (172/522) and eggs 20.3% (106/522) for protein sources. Among vegetable sources, green onions had a frequency of 27.8% (145/522), onions 20.5% (107/522), carrots 17.6% (92/522). Oranges had a frequency of 7.5% (39/522), seaweed 28.2% (147/522) and milk 17.6% (92/522). In the Philippines, out of 513 meals, rice had a much greater frequency of 93.0% (477/513), meat only 21.8% (114/513) and egg 14.4% (74/513). For vegetables sources, they ate tomatoes with 28.1% frequency (144/513), onions 17.5% (90/513) and garlic 17.3% (89/513). Filipino mothers ate more bananas 7.6% (39/513), papaya 5.8% (30/513) and tamarind 5% (26/513). Filipino mothers often ate different kinds of fish, such as marine oil 21.2% (109/513), "*alamang*" 11.5%, "*bagoong*" 11.5% and others. From the results, it can be inferred that as Japanese mothers chose foods such as meat, egg, seaweeds, milk and milk products over vegetables and fruits, their nutrient intakes became deficient in calcium, iron and vitamin A. In the Philippines, the following were often found in the respondents' menus; "*dilis*" (small fish), "*bagoong*" (fermented fish) and "*alamang*" (small shrimp or shrimp paste) as sources of calcium. For vitamin A and iron, they ate "*malunggay*" (horse radish), "*saluyot*" (jute), tomatoes and "*ampalaya*" (bitter melon oramargozo). Intake of energy, fat and vitamin B_1 among Filipino mothers, however, was not sufficient.

Japan has experienced ever more rapid socioeconomic development, and changes in eating habits (westernized lifestyles) have greatly influenced the growth of Japanese (Murata and Hibi, 1992). These results for the Japanese mothers' nutrient intake do not contradict the data for Hokkaido's average food consumption (Ministry of Health and Welfare, 1994). Calcium intake in Hokkaido was the lowest among all prefectures in Japan. The consumption of protein from animals, fish and dairy products was found to be high, but diet was low in fruits and vegetables.

A study conducted over 6 survey periods from 1974 to 1987 in Metro Manila in the Philippines to identify trends in food selection revealed the following: increasing trends in consumption of sugars and syrups, as well as dried beans, nuts and seeds (which have high fat contents) and decreasing trends for cereal products, fruits and vegetables, and condiments and others. There was a decrease in overall food consumption among Metro Manila households during economic crises in 1984 and 1985. However, there was a steady consumption of rice, and significant increase in the intake of some food items, particular green leafy and yellow vegetables, which were among the cheapest food items available in Metro Manila markets (Florentino *et al*, 1992). It can be inferred from this report that socioeconomic development has affected food selection or food habits in the Philippines, and that the direction of change is similar to that of Japanese food selection.

Mother's health consciousness

As shown in Table 9, comparison of first survey data for mothers' health symptoms showed that Japanese mothers suffered stiff shoulder and constipation more often than Filipino mothers, but Filipino mothers experienced headaches, quickness to anger, anxiety, general worry, a desire for perfection, mood swings, sudden weight changes, muscle pain, nightmares and impatience. These symptoms are related more to emotional states, while physical symptoms felt by Filipino mothers were muscle pain, and sudden weight change.

The results of second survey on mothers' health symptoms from both countries did not significantly differ from those of the first survey. Japanese and Filipino mothers still felt the same symptoms they had in the first survey. Symptoms felt more often by Filipino mothers included fatigue, shortness of breath and loss of appetite.

The third survey showed that most symptoms for Japanese mothers had gone, except for stiff shoulder, while Filipino mothers still often felt the symptoms they had during the first and second surveys, except headaches and sudden weight changes.

Some of the health symptoms experienced by mothers were thought to be related to diet, as indi-

Table 9

Comparison of health symptoms felt by respondent mothers between Japan and Philippines in the first survey.

Health symptoms	Japanese mothers						Filipino mothers						Comparison between both countries
	often		sometimes		no		often		sometimes		no		
	n	%	n	%	n	%	n	%	n	%	n	%	x^2-test
1. Do you feel you're very easy to get tired?	11	28.9	21	55.3	6	15.8	14	35.9	17	43.6	8	20.5	NS
2. Do you feel you're very easy to catch cold?	8	21.1	7	18.4	23	60.5	4	10.3	10	25.6	25	64.1	NS
3. Do you feel that you don't have appetite?	4	10.5	13	34.2	21	55.3	1	2.6	19	48.7	19	48.7	NS
4. Do you have headache?	4	10.5	12	31.6	22	57.9	3	7.7	25	63.2	11	29.0	*
5. Do you have insomnia?	3	7.9	8	21.1	27	71.0	1	2.7	14	36.1	24	61.1	NS
6. Do you easily have shortness of breathing?	5	13.2	11	28.9	22	57.9	3	7.6	18	46.2	18	46.2	NS
7. Does dizziness occur?	3	7.9	16	42.1	19	50.0	4	10.3	21	53.8	14	35.9	NS
8. Does slight fever occur?	4	10.5	8	21.1	26	68.4	2	5.4	4	10.8	33	83.8	NS
9. Do you have stiff shoulder?	19	50.0	10	26.3	9	23.6	1	2.6	13	33.3	25	64.1	**
10. Does constipation occur?	9	23.7	16	42.1	13	34.2	3	7.9	6	15.8	30	76.3	**
11. Do you have digestive upset?	4	10.5	15	39.5	19	50.0	8	20.5	20	51.3	11	28.2	NS
12. Does nervousness occur?	5	13.2	24	63.2	9	23.7	3	8.1	20	51.3	16	40.5	NS
13. Do you easily get angry?	3	7.9	18	47.4	17	44.7	16	41.0	19	48.7	4	10.3	**
14. Are you absent-minded?	1	2.6	13	34.2	24	63.2	7	17.9	19	48.7	13	33.3	*
15. Do you have anxious feeling?	1	2.6	9	23.7	28	73.7	11	28.2	19	48.7	9	23.1	**
16. Do you feel to be worried about everything?	1	2.6	13	34.2	24	63.2	7	17.9	19	48.7	13	33.3	*
17. Do you want other people see you perfect?	4	10.5	13	34.2	21	55.3	14	35.1	16	40.5	9	24.3	**
18. Does your mood swings very easy?	4	10.5	15	39.5	19	50.0	9	23.1	26	66.7	4	10.2	**
19. Do you have difficulty to get up in the morning?	10	26.3	14	36.8	14	36.8	13	33.3	15	38.5	11	28.2	NS
20. Do you experience that your face was noticed to be pale by other people?	5	13.2	11	28.9	22	57.9	2	5.4	16	40.5	21	54.1	NS
21. Does your weight change very easy?	3	7.9	11	28.9	24	63.2	7	17.1	27	68.6	5	14.3	**
22. Do you have muscle pain?	3	7.9	6	15.8	29	76.3	6	16.2	18	45.9	15	37.8	**
23. Does your teeth grind at night?	1	2.6	3	7.9	34	89.5	0	0	6	15.4	33	84.6	NS
24. Do you have nightmares?	0	0	3	7.9	35	92.1	2	5.3	24	60.5	13	34.2	**

n = respondents' number, NS = not significant, * = $p < 0.05$, ** = $p < 0.01$

Table 10

Dietary points evaluated from food diary among subgroups divided by present status of respondent mothers in Japan and Philippines.

All three surveys	Pregnant 2-10 months (A)			0-4 months after delivery (B)			5-8 months after delivery (C)			Over 9 months after delivery (D)		
Japan (Hokkaido)	Breakfast	Lunch	Dinner									
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
n	13	13	13	10	10	10	18	18	18	40	40	40
mean	46.2	51.9	60.1	44.7	49.8	55.9	41.5	54.9	59.8	43.4	52.4	59.0
SD	16.4	9.6	6.1	14.3	14.5	18.1	19.8	11.1	9.6	12.4	7.2	8.4
Philippines (Nueva Ecija)	Breakfast	Lunch	Dinner									
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
n	28	28	28	27	27	27	14	14	14	16	16	16
mean	39.9	49.7	42.5	43.5	56.2	48.5	50.2	59.9	55.1	47.3	60.3	49.9
SD	11.1	8.1	6.9	9.6	9.9	7.7	10.7	9.0	7.4	7.3	7.1	7.2
Comparison among Japanese mothers												
(A) and (B)	NS	NS	NS									
(B) and (C)				NS	NS	NS						
(C) and (D)							NS	NS	NS			
Comparison among Filipino mothers												
t-value		2.6	3.0									
(A) and (B)	NS	*	**			2.0						
(B) and (C)				NS	NS	*						
(C) and (D)							NS	NS	NS			
Comparison between Japanese and Filipino mothers												
t-value			7.9								3.7	4.0
	NS	NS	***	NS	NS	NS	NS	NS	NS	NS	**	***

Cochran *t*-test, n = number of meal (one meal means average value of 7 times),
NS = not significant, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$.

cated in the dietary diaries. Japanese mothers ate less fruits and vegetables than Filipino mothers, which explains constipation because they lacked fiber in their diet (Tuji, 1990). Filipino mothers had low total dietary scores and less energy intake during pregnancy, which make them feel symptoms of fatigue and sudden weight change. Deficiency of vitamin B_1 is known to affect health consciousness, for example, anxiety, fatigue and loss of appetite (Baba, 1976). The factors contributing to Filipino mothers having more emotional problems need to be studied further.

In the study, about 16 mothers from Japan and 19 from the Philippines wrote their own states of health for all 3 surveys. When comparing data for Japanese mothers, no significant differences were found for the 3 surveys. Filipino mothers reported more fatigue in the first survey probably because at that time most of them were pregnant. The same was found for constipation and difficulty in getting up in the morning. The low total dietary scores for Filipino mothers explains why they suffered from fatigue in the third survey.

Nutritional status of subgroups divided by present condition (pregnant and lactating), living place and educational attainment

Present condition (pregnant and lactating): Table 2 shows that the Japanese mothers who wrote

their food diaries during the first survey were scattered across all stages. In the Philippines, 29 mothers who wrote their food diaries in the first survey were concentrated in the during pregnancy stage, and 8 monthers were in the after-delivery stage. During the second and the third survey, all respondents from both countries were in the after-delivery stage.

As shown in Table 10, total dietary scores for breakfast, lunch and dinner of Japanese mothers were not different among the conditions of pregnancy, 0-4 months after delivery, 5-8 months after delivery and 9 months and more after delivery. Dietary scores for lunch and dinner among Filipino mothers were significantly lower in pregnant than in 0-4 months after delivery. Dietary scores for dinner of Filipino mothers who were at 0-4 months after delivery were lower than those for mothers 5-8 months after delivery. There were no differences in total dietary scores for Filipino mothers' meals between 5-8 months and 9 months and later after delivery.

When total dietary scores for each meal of mothers in Japan and Philippines were compared, differences were found in pregnancy and 9 months and later after delivery. During pregnancy, scores for dinner were higher for Japanese rather than in Filipino mothers. Scores for lunch were higher for Filipino mothers rather than Japanese mothers 9 months and later after delivery, scores for dinner were inversely higher for Japanese mothers than for Filipino mothers. It is considered important for mothers during pregnancy and the lactating period to eat more. As pregnant Filipino mothers and those just after delivery showed lower dietary scores than mothers in other conditions, they need to improve their dietary habits.

Living place: Mothers from the cities in Japan had higher total dietary scores, as compared with mothers from the village or town. In the Philippines, total dietary scores for mothers from the village and towns did not differ except for lunch during the second survey. Even for Filipino mothers' breakfast in the third survey, those living in the village scored higher than mothers from the cities.

Comparing the total dietary scores for both countries, Japanese mothers' total dietary scores from the village, town and cities were found to be higher for dinner during the first and second surveys, while in the third survey, Japanese mothers' total dietary score for dinner in cities increased, in comparison to the Filipino mothers. Filipino villagers' total dietary score was higher than Japanese mothers from the village, town and cities in the second and third surveys.

Educational level: Comparison of the total dietary scores for Japanese mothers according to their educational levels found that mothers who had attained higher educational levels had higher total dietary scores than mothers with 9-12 years of education. In the Philippines, the total dietary scores of mothers with 6-12 and 13-19 years of educational levels did not differ. However, comparison of the total dietary scores of these 2 countries found that Japanese mothers' total scores were higher than Filipino mothers for dinner from the first to the third surveys. In the third survey regarding lunch, Filipino mothers with 6-12 and 13-19 years of education had higher total dietary scores than Japanese mothers with 9-12 years of education. On the other hand, total dietary scores for Japanese mothers were higher than Filipino mothers at dinner in all education groups, except 9-12 in Japan and Filipino mothers with 6-12 years of education. These results show that the higher the educational level, the higher the total dietary score.

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