Original Article

Theories of nutrition education and promotion in Japan: enactment of the "Food Education Basic Law"

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The objective of this paper was to identify the necessity of a theory incorporating "a holistic view of food and nutrition dynamics". The generation of this theory and its potential to effect nutrition education practices, was also examined using examples of practice in Japan. The necessity and potential of a nutrition theory with "a holistic view of food and nutrition dynamics" was shown through discussions about the "Food Education Basic Law" (The Basic Law on Shokuiku) enacted in 2005 in Japan and the following case examples: a study of daily fish consumption of 2,110 school children in Japan from the viewpoint of human and food ecology; a study of school children's eating habits with their families which involved drawing a meal picture; a nutrition intervention that used a 5 point meal box system (3:1:2 meal box magic) to measure the quantity and quality appropriate for one meal; and a nutrition education program for school-aged children. Finally, a definition of nutrition education aimed at the sustainable and harmonious coexistence of both quality of life (QOL) and quality of environment (QOE) was suggested.

Key Words: Nutrition education and promotion, food and nutrition dynamics, human and food ecology, Food Education Basic Law, food and nutrition environment

INTRODUCTION

Objective

One of the difficulties of linking theory to practice in nutrition education is the lack of theories that grasp the true content of practice. In other words, theories that involve a holistic view of food and nutrition dynamics. This paper will discuss the necessity of such a theory and its potential to effect nutrition education practices, using examples of practice in Japan.

The necessity of theory as a foundation for "a holistic view of food and nutrition dynamics"

Necessity of theory at a community level. The double burden of a low and decreasing food self-sufficiency rate and overnutrition and undernutrition due to overeating and picky eating, are growing serious problems in Japan.

Overeaters often eat large amounts of meat and poultry, which are foods that rely on imports from foreign countries.

They are also often cooked using a large amount of oil. On the other hand, consumption of rice and vegetables, of which nearly 100% are produced in Japan, is decreasing. The Ministry of Agriculture, Forestry and Fisheries plays a major role in increasing the food self-sufficiency rate by making food and nutrition policies based on agricultural research findings. The Ministry of Health, Labour and Welfare plays a central role in resolving nutritional problems by making health policies and conducting health education, based on medical , public health and nutrition research findings. Despite each ministry having made efforts to achieve its own goals; however, they have not been able to contribute to any common goals between ministries. In other words, the two ministries have rarely tried to examine goals and improved approaches where both ministries can "co-exist". This has resulted in the worsening of problems in both ministries. As resolution of these problems was considered unlikely, the development and promotion of the "Food Education Basic Law", which will be introduced later in this paper, was put forward as a fundamental reform and means of improving this situation. This law has placed the management of the issue in the Cabinet office, above the level of the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Health, Labor and Welfare. Stakeholders require a conceptual model of "food and nutrition dynamics in the community" that will provide a comprehensive overview of nutrition in the entire community and nation, in order to discuss issues, solutions, evaluation, and organizational development.

Necessity of theory at a meal level. Different approaches have been adopted in the psychological dimension, such as improving quality of dietary life and developing human relationships, and in the food intake dimension. When implementing nutrition education, the psychological dimension is often considered to contribute to better quality of food intake. However, it is necessary to identify the point of overlap of both these dimensions and hence better contribute to behavior change and food choices. Based on research findings on the relationship between family meals

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and food intakes, the author and colleagues have developed a conceptual model indicating associations among family relationships, life style, dietary behavior, and food environment. The authors have also discussed goal setting and methods of nutrition education focusing on family meals.

Necessity of theory at a food level. People usually choose what to eat for their meals. Therefore, knowing "what and how much to eat in a meal" will determine a specific goal for behavior change. In nutrition science, the Dietary Reference Intake (DRI) of each macronutrient is set based on research findings; however, it does not show the amount that is necessary for one meal. This is due to different measurement units of nutrients. Because people eat in dishes, it would be more beneficial if people were able to understand the overall amount and proportion of nutrients by dish. This would enable them to understand the combination of dishes that would be the most practical for obtaining their nutritional requirements. Theory and conceptual models, that are fundamental to providing an overall picture of combination of foods required for a meal, are essential.

Research Methods

The usefulness of the conceptual model "food and nutrition dynamics in the community", developed by Miyuki Adachi for the improvement of food and nutrition will be discussed as follows: 1) the "Food Education Basic Law" and the "Food Education Promotion Plan" in Japan; 2) a study focused on "views about the natural environment" and its association with food choices, eating behaviors, and their determinants; 3) a study about eating together with the family, using the method of meal picture drawing; 4) nutrition intervention studies using a 5 point "3:1:2 meal box magic" system; and 5) a nutrition education program for school-aged children in a community.

RESULTS AND DISCUSSION

The conceptual model of "food and nutrition dynamics in the community" (Figure 1). Figure 1 is the conceptual model indicating the structure of food and nutrition dynamics among people (specifically school children) in the community. Three components that comprise human nutrition practices are indicated: children as the subject of the practice, food as the object of the practice, and the community as the setting for the practice. These three components are surrounded, regulated, and influenced by natural, social, and cultural conditions and history. As seen at the bottom of figure 1, the relationship between children and food consists of various behaviors. These behaviors can be classified into three categories: eating behavior, preparing and cooking behavior, and development of dietary-life capacity. The right half of the figure depicts the food system and the left half indicates nutrition information and communication systems; both of which are closely interrelated. The food system consists of food production, processing, distribution, and cooking. The division of labour in modern society means that foods are imported in consumable forms from the foreign market. Cooking has historically been carried out mainly in homes as well as schools, worksites, hospitals, and welfare institutions. Recently, however, many dishes are commercially cooked in food factories, and meals are also commonly prepared in other commercial settings such as restaurants and dining halls. The locations for food distribution and distribution patterns have diversified and now include markets, supermarkets, shops, vending machines, convenience stores, restaurants, and many others. Nutrition information and communication systems are part of the food environment along with the food system. Major information-transmission settings are indicated in the figure: from the bottom to the top, personal information within families, and from neighbors and friends; small group information from schools, after school programs,

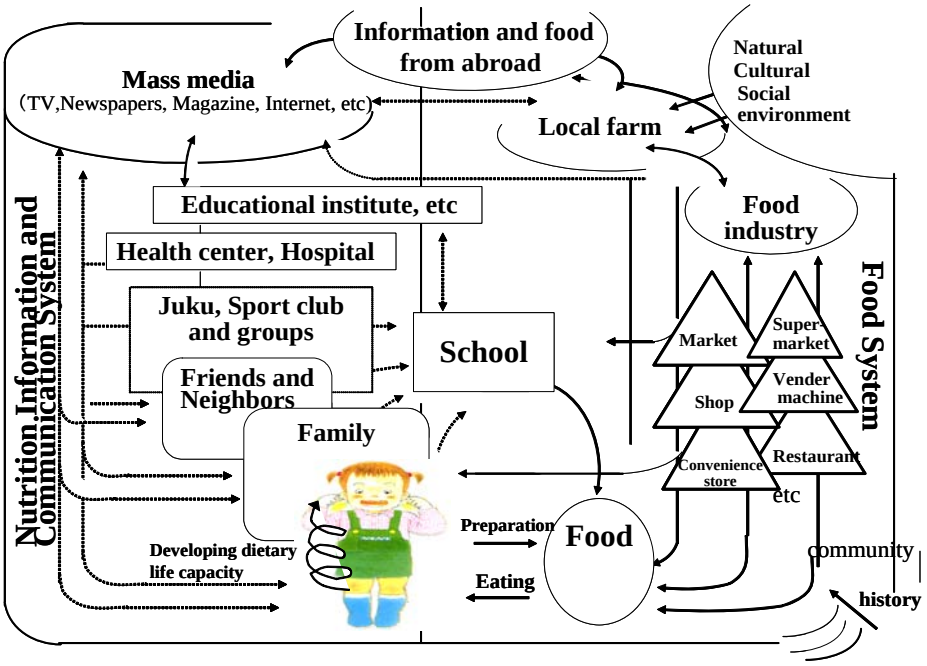

Figure 1. Food and Nutrition Dynamics in the Community: A Case Study of School Children (Adachi, M. 1987 Revised)

sports clubs, tutoring schools, health centers, hospitals, and educational institutions; and mass media information from television, newspapers, magazines, and the internet. As mentioned previously, the food system and the food and nutrition information system are closely related: for example, the relationship between the distribution of meals and information in the home or neighborhood, school meals and in-class lectures at school, foods and related food labels and commercial information in the convenience store and supermarket. Such dynamic practices and activities are continuously repeated, establishing conditions for further practices which over time affect cultural and social practices. Food and nutrition related activities are estimated to account for more than 60% of total human activities; therefore, the influence of food and nutrition practices on a person's life and environment is enormously powerful.

Is a theory with "a holistic view of food and nutrition dynamics" necessary?: Discussion based on the "Food Education Basic Law" and "Food Education Promotion Plan" in Japan. The "Food Education Basic Law" was enacted in June 2005 in Japan.[1] This new law has since been promoted at the local, prefectural, and federal government level.[2] As mentioned previously, in the Japanese government, food- and nutrition- related ministries are in charge of a relevant section of bureaucracy. Despite the exchange of information and accomplishments or collaboration in some aspects of programs between ministries, systems have not been put in place to develop an integrated approach to program development that identifies similarities, differences, and/or contradictions between the separate tasks and goals of these different government ministries. This new law that has been passed in collaboration with different ministries is considered an innovative solution for food and nutrition issues and has come about due to the seriousness and urgency of these issues.

Discussion based on a study entitled "Daily consumption of marine products and its effectiveness on dietary life: from the viewpoint of human and food ecology". Fish consumption among Japanese people has decreased in recent times, due to an increase in meat consumption. Most nutrition education regarding fish intake focuses on the benefit to health of certain nutrients contained in fish. However, nutrition education rarely includes the fact that fish has an important place in Japanese dietary culture, as indicated by the term "fish eating culture", and that fish is also an important food for national land conservation. In the study "Daily consumption of marine products and its effectiveness on dietary life: from the viewpoint of human and food ecology",[3] associations among knowledge and attitudes towards the quality of the environment, food choices, the determinants of food choices, and improvement in quality of life were examined. This was carried out through self-administered questionnaires completed by 2,110 pairs of fifth grade children and their parents from six regions in Japan in November, 2004.

When children were asked "do you think about the importance of conserving the natural environment?", 28.3% of children answered "often" (highest interest in the environment group), 27.7% (lowest interest in the environment group) answered either "never"(4.8%) or "rarely" (22.9%), and 44.0% (medium interest in the environment group) answered "sometimes" (Figure 2). The proportions of children with better health perception, food perception, interest in fish production, interest in fish consumption, conversation with family members, fish consumption behavior, and quality of dietary life were significantly greater among children in the high interest group, compared to those in the low interest group. Figure 3 shows pathways from "views about the natural environment" to fish intake attitudes, to fish intake behaviors, and finally to quality of dietary life among children in the high interest in the environment group. Pathways from "views about the natural environment" to other variables were not revealed in the low interest in the environment group. These results indicate the necessity of including an environmental perspective in nutrition education and confirm the importance of capturing food and nutrition dynamics at a community level.

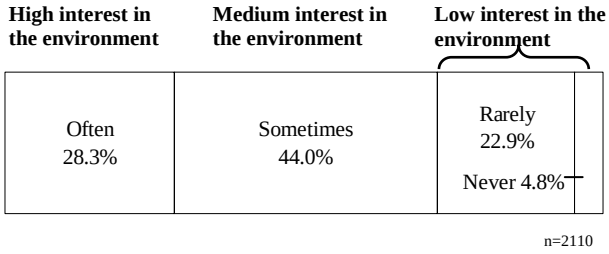

Figure 2. Do you think about the importance of protecting the natural environment? (Views about the natural environment)

Discussion based on a study of eating together as a family using the method of drawing a meal picture. The drawing a meal picture method was developed to identify not only food and nutrient intakes but also overall meal circumstances including emotions and human relationships. It was also developed to identify what components of the meal respondents place importance on.[4] Using this qualitative method, the author and colleagues researched the associations between eating together as a family and food intakes, health, and quality of life among elementary school children. Figures 4-1 and 4-2 are pictures drawn by fifth grade school children when asked: "How was your breakfast this morning (or your dinner last night)? Please draw a picture of the mealtime including foods you consumed and the people you ate with." These pictures represent "a holistic view of food and nutrition dynamics at meal times" as children drew a picture incorporating the entirety of food and nutrition dynamics during a mealtime from their viewpoint.

These pictures are from research conducted in 1999, with 2067 school children in 7 regions in Japan.[5] The combination of dishes in the meal, time of the meal, family members at the meal, and mealtime environment can be identified from the picture. The frequency of eating meals with family, involvement in meal preparation, views and attitudes towards meals, and health status were also examined through self-administered questionnaires. A total of 12.6% of children ate their breakfast on the survey day with all members of their family (family

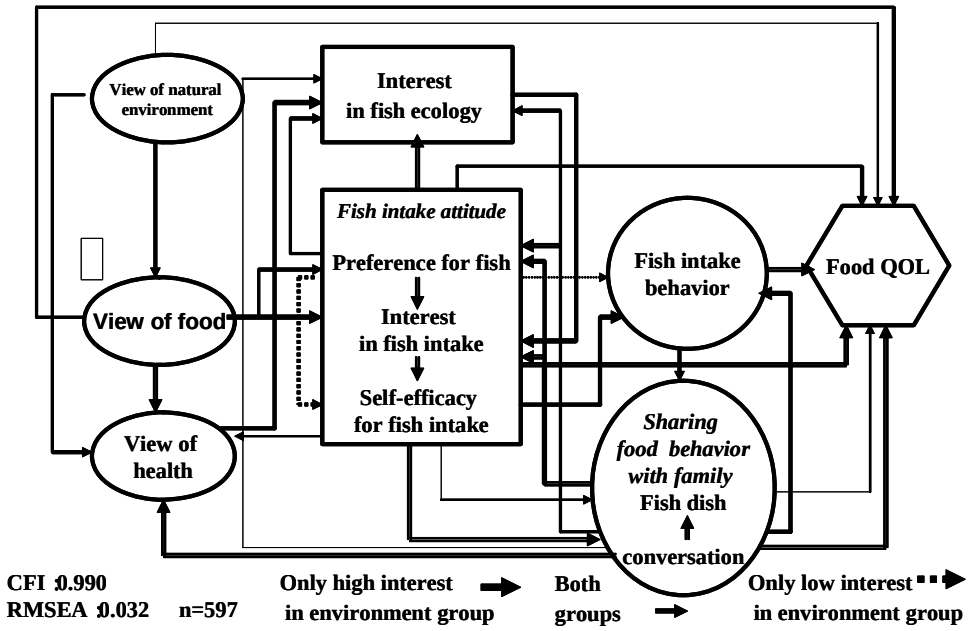

Figure 3. The Inter-relationships between 'Views about the Natural Environment' and 'Fish Intake Behavior' (High Interest in the Environment Group)

Figure 4-1. Food and Nutrition Dynamics at Mealtime (Eating with Family)

Figure 4-2. Food and Nutrition Dynamics at Mealtime (Eating Alone)

group). This is a 10% decrease compared to a similar study conducted approximately 20 years ago (in 1981).[5,6] On the other hand, 26.4% of children ate breakfast alone (alone group), and 24.5% ate with only other children without any adult present. These two groups combined showed a 12% increase compared to results from 20 years ago. [5,6] Children in the alone group were more likely to eat meals alone regularly and eat less-balanced meals, mainly with staple dishes. They were also less likely to report having an appetite before meals, enjoying eating meals, eating breakfast, being involved in meal preparation, and being healthy. A meal picture was useful in examining associations among variables because researchers and other stakeholders could develop an understanding of the whole picture of food and nutrition dynamics from each child's viewpoint.

Discussion based on a nutrition intervention study using a 5 point "3:1:2 meal box magic" system. People do not eat nutrients and foods merely as they are in their natural state, but rather prefer to prepare tasty dishes by cooking foods containing particular nutrients. This enables the enjoyment of a meal that has a combination of different dishes, while at the same time ingesting many nutrients. Unlike nutritional supplements which are taken for the sole purpose of providing nutrient intake, people choose foods and dishes that will enable them to enjoy a meal, as well as taking into consideration the nutrients provided by such choices. However, most nutrition education starts from the perspective of a certain nutrient intake requirement which then determines foods to be included in a meal, especially in nutrition education aimed at improving health conditions.

We developed a meal preparation method which begins with a holistic view of a meal, assesses specific details, and then adjusts the meal as a whole to fit with requirements. The learning effects of this meal preparation method have been examined by intervention studies.[7-9] This method has been called the "3:1:2 meal box magic" (Figure 5) method. Everyone using this method is able to easily put together a tasty meal with recommended energy and nutrient intakes, just like magic, by simply sticking to the following 5 points: 1) choose an appropriate sized box; 2) ideal ratio of foods is 3 Shushoku (staple foods with grains), 1 Shusai (main dish with meat, poultry, fish, and egg), and 2 Fukusai (side dish with vegetables); 3) cook

only one dish using oil at the most; 4) fill the box completely with dishes; and 5) make sure it looks nice.

At the initial stage of development, the meal box magic method was used for 1,000 meals with various combinations of different dishes and the resulting data were analyzed.[7] As a result of this intervention trial, participants acquired skills in making meals with the proper combination of dishes. Taking an approach that took a holistic view of meals, participants developed skills that enabled them to select the appropriate size and combination of dishes based on their individual needs. Participants also developed overall food choice skills.[8] As a result of this trial, the meal box can be recognized as a means of measuring the amount of an entire meal. Furthermore, after 59 middle-aged Japanese women at risk for developing chronic diseases used this method for one month, they showed positive health effects.[9] In addition, in this method grains (Shushoku) and vegetables (Fukusai) account for five sixths of the entire meal. Meals using this method would contribute to increased use of domestic products. As a result, it is provisionally estimated that the food self-sufficiency rate would increase by up to 50%.

I suggest "dish-focused nutrition education" as a framework for nutrition education. This approach looks at a meal from a holistic perspective and selects a combination of dishes using the ratio of 3:1:2. It also considers the appropriate amount of food for the individual concerned. This framework has become the basis for the "Dietary Guidelines for Japanese" and the "Japanese Food Guide Spinning Top".

Discussion based on a nutrition education program for school-aged children aimed at depicting "a holistic view of food and nutrition dynamics". Some may believe that it is difficult for children to have a holistic perspective of meals. On the other hand, others point out that children are more likely to be better at perceiving the overall picture than at understanding specific details. To examine children's potential to develop an understanding of a holistic perspective to food and nutrition dynamics, a nutrition education program appropriate for individual children's developmental stage was conducted.[10] This program was part of a four-day nutrition education program, aimed at the development of a holistic perspective of meals from nature to the dining table. Program components were based on the conceptual model "Children, food, and the environment", and program staff created a food environmental map of the community where the seminar was held (S community). Children were divided into three groups and each group explored an assigned food environment area in S community. After considering the above points, the necessity and potential of nutrition education focused on a holistic picture of food and nutrition dynamics were examined at the community, meal, and food levels.

Suggested definition of nutrition education from a holistic perspective of food and nutrition dynamics. Nutrition education and promotion is defined as: aiming for the sustainable and harmonious coexistence of quality of life (QOL) and quality of the environment (QOE). Nutrition education and promotion is the process by which people develop a holistic understanding of food and nutrition dynamics. This enables them to put this holistic perspective into practice in their dietary life and promote a positive food and nutrition environment, including partnership formation with other stakeholders. This requires not only the integration of educational and environmental approaches but also the integration of the food system, nutrition information and communication systems. Nutrition educators and promoters are the persons who select and reorganize science-based evidence on various challenges regarding these issues and support nutrition education[11].

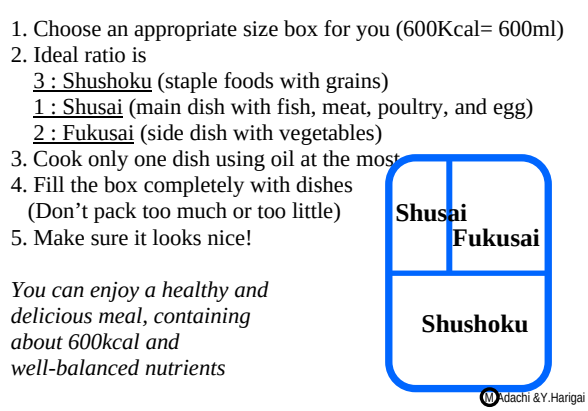

Figure 5. Five points of "3:1:2 Meal box Magic"

AUTHOR DISCLOSURES
Miyuki Adachi, no conflicts of interest.

REFERENCES

1. Cabinet Office, Government of Japan. Food Education Basic Law. 2005.
2. Cabinet Office, Government of Japan. Food Education Promotion Plan. 2006
3. Adachi M. (Chief Researcher). A report of daily consumption of marine products and its effectiveness on dietary life: from the viewpoint of human and food ecology. Tokyo Fisheries Promotion Foundation, 2007. (In Japanese)
4. Adachi M. Attempt at comparative sketch method of meals. J Home Econ Jpn. 1987;38:1035-41.
5. Adachi M, Project member of NHK Program. Naze Hitoride Taberuno (Why do you eat alone?). Tokyo: Japan Broadcast Publishing, 1983. (In Japanese)
6. Adachi M, Project member of NHK Program. Shitteimasuka Kodomotachino Shokutaku (Do you know about children's meal?). Tokyo: Japan Broadcast Publishing, 2000. (In Japanese)
7. Adachi M. A study on the Core-dishes and These Combination as a Framework of Nutrition Education on the Basis of Dish-selecting Method. Jpn. J. Human Ecology. 1984;50:70-107. (In Japanese)
8. Adachi M, Harigai Y. 3・1・2 Bentoubakohou (Let's enjoy the 3・1・2 Meal Box Magic). Tokyo: Gunyosya, 2004 (In Japanese)
9. Harigai Y. A Study on the Development of Meal-planning Skills of One Meal Unit Based on the Dish-selecting Method of Nutrition Education. Jpn J Nutr Diet. 2003;61:349-56. (In Japanese)
10. Adachi M, Yoshioka Y. How to Develop the Key Person of Community-based Nutrition Education Program. Jpn Health Sciences. 2006;48:729-34. (In Japanese)
11. Adachi M, Eto Kumi. Expectation for "Shokuiku" (Food and Nutrition Education and Promotion). Jpn J Nutr Diet. 2005;63:201-12. (In Japanese)