

Mothers' perceptions of children's food behaviors: use of focus group interview study*

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Abstract

Children's food behaviors have been expressed in a various ways because of recent changes in their family environment. Thus, this study was performed to investigate in-depth qualitative research on the mother's perception on children's food behaviors by focused group interview. This study was designed in four steps of planning, collection of participants, process, and analysis. Participants for the focus group interview were recruited and sampled from households with elementary school students in the Seoul and Gyeonggi-do areas. Groups were divided by total income and education expense levels. 1) High income household: It is better to improve currently existing web sites for nutrition education. 2) Mid income household: Easy, practical, and inexpensive off-line cooking class/nutrition education classes for mothers are needed. Nutrition programs for children should be developed through mass media and be promoted in the broadcasting circle. 3) Low income household: Motivation is required for mothers' education and the serious nutritional problems of children should be informed through mass media and home correspondence from school. And interesting educational materials should be developed for children to read whenever they want.

Key Words: Mother's perception, children's food behaviors, focus group interview study

Introduction

Increased household incomes and the increased number of working married couples due to industrialization have brought changes in values of food, which further brought changes of food behaviors of children in addition to changes of food habits because of the increased numbers of people eating out in addition to decreased opportunities of eating at home. According to the National Nutrition Survey (KFDA, 2007; Ministry of Health and Welfare, 2005), the ratio of eating out costs to total expenses of urban workers has been increasing annually, and the ratio of elementary students who dined out more than once a day has increased from 42% in 2001 to 85% in 2005. Because of such changes in the social environment, the children's available pocket money has been increased and they directly join in the consumption behavior to satisfy their desires due to food advertisements through mass media, and thus independent food selection and purchase behaviors of children who are out of their parents' control have been greatly increased compared to the past, and most of such purchases have been made on the way from school to home after classes (Lee, 2006). In particular, the management of foodstuff around the schools, which is out of

parents' reach, is poor and the snacks such as candies, chocolates, and jellies made of cheap and low-quality ingredients are sold at stationery shops or small shops, and it has been reported that cheap (100~200 won) food products were mainly sold near elementary schools (KFDA, 2007). Related facilities for such foodstuff around schools cooked and sold foods without sanitation facilities such as refrigeration and food storage shelving, increases concerns for the development of food poisoning (KFDA, 2007).

Thus, children's food behavior problems could allow for potential deficiency of nutrients caused by nutrient imbalance due to increased intakes of fast foods (Park, 2006; Yoon, 2002). Children are easily enticed by food advertisements due to the lack of senses, and they have conventionally preferred salty tastes and thus the sodium intake of elementary, middle, and high school students was more than twice as high as the WHO 1 day recommendation (2,000 mg) and has continuously been increasing (KFDA, 2007; Ministry of Health and Welfare, 2005). Also, the increase in carbonated beverages favored by children, along with decreased intake of milk, which is a source of calcium, has caused the excessive intake of sugars. The consumption of sweet processed foods such as carbonated beverages in elementary school students

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was increased 1.8 times in 2005 compared to that in 1998 and they were reported as having 50% more high-sugar, high-fat, and high-sodium snacks such as cookies, beverages, bread, and ramyeon than snacks such as fruit and milk (KFDA, 2007; Ministry of Health and Welfare, 2005).

These problems developed by the purchasing decisions of the children themselves and most of the selected foods are processed foods and the intake of those processed foods not only brought nutritional imbalance and adverse influence on the establishment of proper dietary habits but also raised problems of safety following excessive intake of harmful food additives and of various risks related to food sanitation (Ahn & Kim, 2003; Chung *et al.*, 2008). Also, trans fat, currently used in the process of food processing to improve the quality of products, might cause problems. Trans fat has been known as a factor causing health problems if ingested excessively and thus concerns for such problems have been raised (Lee *et al.*, 2005). Thus, WHO has recommended less than 1% intake to the daily total energy intake, and the obligation is established in Korea for the trans fat content to be marked on the packages of cookies and products in the market since December of 2007, but children lack nutritional knowledge and preference is the main factor for selecting foods, resulting in the selection of sweet, buttery and crisp cookies, chocolate, pie and cakes as snacks (Joo, 2004).

Children's nutrition and health problems are due to increased and excessive intake rates of fat and energy, which could lead to increased child obesity and the morbidity rates of various related diseases, and could proceed to various lifestyle-related diseases in the long term (Manios *et al.*, 2002; Richter *et al.*, 2000). The rates of child obesity in Korea were 2~4% in 1974 and then increased to 15~20% in the late 90s with about 10 times increase, and the morbidity rates of child obesity were increased in 2005 by about 1.5 times compared to 1998 (Ministry of Health and Welfare, 1998, 2002, 2005). The morbidity rates of obesity for male elementary, middle, and high school students were over 20% in 2005, and that of female students were about 13~14%. Child obesity has had higher transition rates to adult obesity (40% of child obesity, 70% of adolescent obesity) and the incidence of chronic degenerative diseases in the country will be rapidly increased in 10~20 years if morbid obesity is left untreated and if the current dietary lifestyle is continued (KFDA, 2007; Ministry of Health and Welfare, 2005).

Children spend more time alone at home due to working parents or more time at private institutes after school, and thus children eat instant foods or insufficient meals with limited kinds of foods as eating alone rather than eating together with family has increased, and increased frequency of eating alone in children has decreased psychological satisfaction and stability. According to the study on the consumption behaviors of directly purchasing foods in case of higher grades in elementary school (Lee, 2006), children purchased foods mainly at stationery shops and supermarkets near school for the average of 2~3 days per week, and usually selected cookies, gum, candy, and frozen snacks, mostly concerning

the 'taste' of products when purchasing. Such eating out behaviors of children can interfere with regular meal eating rhythms and bring nutritional imbalance by selecting undesirable foods in the aspect of nutrition, and also cause problems in the aspect of food safety in children with less accurate judgment on foods (Kim *et al.*, 2007).

Therefore, children themselves and multi-dimensional approaches, which can be summarized as active guidance at home and at school, are needed to solve nutrition and health problems (Kim *et al.*, 2007; Le & Dodds, 2006). At school, nutrition education measures that a nutritionist can conveniently use should be prepared because active participation of classroom teachers and nutrition teachers inform children of proper food behaviors to solve problems. Also, perception changes of parents for children's nutrition education are important because parents should show a model for children's food behaviors at home (Briggs *et al.*, 2003). Thus, this study was performed to investigate in-depth qualitative research on the mothers' perceptions on children's food behaviors by focused group interview.

Subjects and Methods

This study was performed by using focus group interview and designed as four steps of planning, collection of participants, process, and analysis.

Study design

This study was designed, as a part of qualitative study, to analyze interview data using focus group and its contents by steps as follows (Fig. 1).

It was performed as four steps including planning step, collection step, process step, and analysis step. In the planning step, scheduled plans for important items in each step were drawn up. In the participant collection step, three steps, including first contact (2 weeks ahead), participation confirmation mail contact (1 week ahead) and attendance check (1 day ahead) proceeded. In the process step, the progress of the focus group used objective expression methods as a qualitative study because interview content itself became study data. That is, participants were selected by systematic procedures using clearly defined selection

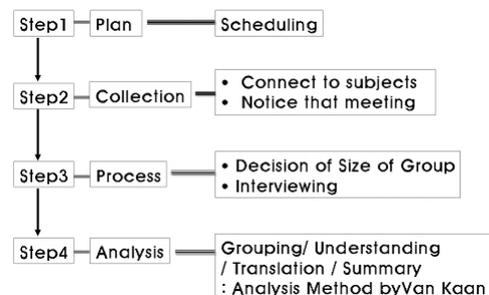


Fig. 1. Study Design

criteria appropriate for the study purpose. It was constructed to describe two concepts of homogeneity and segmentation. For group sizes, it was usually made of 6-10 participants per group with a total of 3-5 groups, and thus in this study, it was 6-8 per group with a total of 3 groups. Finally, in the analysis step in which data are classified, understood, interpreted, and summarized, Van Kaam's method (Han *et al.*, 2005) was applied to understand the phenomena through categorization and categorization of statements and thus to analyze the statements of participants and to clarify the core of human experience.

Selection of study participants

Participants for focus group interview were recruited and sampled from households with elementary school students in the Seoul and Gyeonggi-do areas. Groups were divided by total income and education expense levels. That is, it was grouped such that total income was over 6 million won and educational expense was over 0.6 million won per child per month in case of high income households, and 3~6 million won and over 0.3 million won in case of mid income households, and then below in both total income and expense in low income households. Thus, 7 high-income households, 8 mid-income households, and 7 low-income households were selected for study participants. Subjects for interview were decided as mothers and no age limitation was set for participants in each group Table 1.

Study procedures

Table 1. Participations on Focus Group Interview

Group	No. of persons	Group criteria (Total income / educational expense)	Education level
High income household	7	• Total income 6~20 million won/month • Educational expense 0.6~1.5 million won/person/month	Over college school
Mid income household	8	• Total income 3~6 million won/month • Educational expense 0.3~1 million won/person/month	High school
Low income household	7	• Total income 0~2 million won/month • Educational expense 0~0.2 million won/person/month	Middle school

Table 2. Expected questions

Time	Theoretical criteria	Question contents
10 min.	Children's food behaviors	<ul style="list-style-type: none"> • Children's general food behaviors • Food behaviors at home • Children's dietary problems
90 min.	Children's nutritional problems and related variables	<ul style="list-style-type: none"> • Children's grade, age, gender, and physique • Number of family living together • Total income and educational expenses per month • Parents' education level • Dietary contents at home • Children's dietary problems at home • Children's eating out & snacking behaviors • Dietary manager at home • Dietary guidance at home

1. Preparation before interview

Questions which would be used in the discussion stressing on the study purpose were planned and prepared ahead of time. Selected participants were contacted 1 week ahead of the interview and received a questionnaire so that they could prepare their opinions on questionnaires in advance for smooth discussion on the interview day. Questions for discussion were developed by the investigator on the basis of the results from preceding studies on individual and familial characteristics and food behaviors related to children's nutritional problems. Questions were presented as open-ended question method, and simple and clear expression was used for participants' easy understanding Table 2.

2. Interview process

(1) Trial discussion before interview

A trial discussion was carried out 1 week ahead of the first interview. Before the actual interview, investigators and observers performed this trial discussion in preparation for the circumstances that might appear during the actual interview. Virtual discussion was carried out on the basis of a questionnaire prepared ahead of time. After the virtual interview, possible problems were checked and then actual interview materials were modified and complemented (Table 3).

Table 3. Procedure of Focus Group Interview

Method	Required materials	Staff	Time (min.)
Setting			
1. Make a seat with name tag of moderator and participants for focus group interview.	Paper (colors), pen, drink and snack, video/audio recording system, video/audio tape	Assistant	20
2. Say some drink and snack on the table.			
3. Set video/audio.			
Preparation			
1. Check the appointment before the day of FGI session.			
2. Let the participants sit down on the seat labeled with name tag.	Questionnaire, stationery	Moderator	5
3. Administer the simple questionnaire to the participants regarding general characteristics.			
Introducing			
1. Before the start, make it clean that the data be used to only for the research and get permission to use audio/video.	Sheets for interview, stationery	Moderator	15
2. Introduce each other briefly and explain the purpose of focus group interview.			
Interview			
1. Trained moderator refer to 1st prepared subject.	Sheets for interview, stationery	Moderator	80
2. Handle the subject following guideline (about 20min per each theme).			
Termination			
1. Adjustment of session.		Moderator	10
2. Give thanks for participation.			

(2) *Performing interview*

The focus group interview was performed according to the following process. Overall, the place for interview was arranged and the process of preparation, introduction, development, and finishing of interview was performed.

1) *Preparation*

Investigators and observers arrived about 30 minutes ahead of time to arrange the seats in a circle and to prepare a snack and drink before participants entered the interview room. Then the investigator and observers prepared for the recording.

2) *Introduction*

Among investigators, a moderator for interview progress took the process of interview and explained to participants that information produced from the discussion would only be used as data for the research, and then started the interview after asking their consent for recording a tape. The moderator briefly explained the purpose of interview and rules that participants should follow during the interview-greeting-purpose-guideline.

3) *Discussion*

During the discussion, terms used in the conversation and all terms used in questions had to be clear, and no prior knowledge on children's dietary problems currently examined was provided. Upcoming topics for discussion were roughly introduced ahead of time and explained for the order of discussion by categories. Discussion for each topic lasted for about 20 minutes and the investigator arranged ideas generated from the discussion and confirmed participants for additional information or missing points when the discussion by topics; children's dietary problems, dietary education, nutrition education at school, and nutrition education at home that mothers recognize was finished.

The types of questions for all subjects in four categories used the questioning method and process suggested by Krueger (1998) and progressed in the order of Opening questions, Introductory questions, Transition questions, Key questions, and Ending questions.

① *Opening questions*

Participants for the discussion introduced themselves. Their names and ages, number of children, and genders and grades of their children were introduced. It took about 10 minutes.

② *Introductory questions*

Topics for discussion were introduced and then thoughts related to those topics were induced. Questions were made of what participants could find clues for their opinions by inducing first impression of participants on the topics of brainstorming.

③ *Transition questions*

Conversation was induced by important questions leading to the study. Another person's opinion on the topic was understood through these questions and participants were asked for their experiences in relation to the topic.

④ *Key questions*

More time was provided to these questions than to other questions so that participants could have enough time to talk about their thoughts or experiences.

⑤ *Ending questions*

When the discussion on related topics were finishing, the moderator arranged opinions generated from the discussion on related topics and confirmed participants for additional information or missing points.

4) *Matters for attention during the discussion*

When opinions for other categories, which were not intended by the moderator, developed in the middle of discussion for each topic, the moderator reminded participants of the relevant topic and guided the discussion to remain on track.

5) *Finishing up*

When arranging the contents of discussion, the moderator confirmed important topics from the response of participants, then integrated and summarized, and finally distributed prepared thank-you gifts to participants after the interview.

Data analysis

Evaluation for the focus group has been continuously done during the entire process of group discussion. The content of one section of the group discussion was summarized whenever needed and all data collected through copies and audio tapes were reflected in the evaluation. Results of the group discussion already performed were referred in the next group discussion through modification of the type of questions.

The interview content was analyzed by dividing into opening coding and axial coding, and by using the cross-case interview analysis instead of the case interview analysis. Details of analytical methods proceeded as follows:

① All data obtained from the process of focus interview, that is, all data including verbal and non-verbal interaction used by participants in the focus group discussion were transcribed. In addition, the conversation of participants, responses and facial expression and attitudes of other participants during the conversation were recorded in detail. Transcribed data were copied and examined for the confirmation of important information after the original copy was saved.

② Open coding was performed to search themes in all interview contents. Themes for interview content were selected and the criteria was established and then classified by themes. For the reliability of content analysis, investigators performed cross-validation of each other for the classification by themes for coding results.

③ Axial coding was performed to decide category and subcategory by the relationship among themes established in Step 2. Each theme was understood for the category largely relevant to the study problem, and further relationship among themes were searched to decide category and subcategory.

Results

The perception for children's nutritional problems was arranged by the following themes, after the analysis of results of focus group interview by different income levels.

Children's nutritional problems

1. Nutritional problems

Results of focus group interview by different income levels showed that all of high-income, mid-income, and low-income groups had common nutritional problems. First, there was an unbalanced diet, in which children tended to prefer meat and dislike vegetables. Second, children preferred processed foods. In case of the high-income group, children purchased processed foods by themselves as they had increased opportunities for eating out. Third, the high-income group and the mid-income group were not largely exposed to adulterated foods and their children were educated by their parents to some degree, but children in the low-income group were greatly exposed to adulterated foods and developed serious nutritional problems. Fourth, there was a problem of irregular dietary lifestyles. Children in the high-income group were concerned for obesity due to over-nutrition and children in the mid-income group were concerned for reduced height growth due to the unbalanced diet. Children in the low-income group frequently skipped their breakfasts and were less experienced with various kinds of foods, and nutritional imbalance was a concern. Parents had something in common for nutritional problems but their reasons were different depending on their income levels (Table 4).

These groups had the biggest nutritional problem in common for elementary students that they preferred meat and avoided vegetables and thus one-sided food habits. Also, children were used to many instant foods and had different nutritional problems depending on the circumstances, such as obesity for high-income group, reduced growth for mid-income group, and reduced growth and nutritional imbalance of obesity for low-income group. Skipping breakfast was a serious problem, too. Some elementary school teachers mentioned that adulterated foods were bad but had some good points such as providing pleasure to children and being a part of growing process.

"I think the problem is unbalanced diet with meat preference." (High-income group)

"Children eat fast foods and processed foods, and the chances for eating out has been increased as they become higher grades and thus eat foods outside the house." (High-income group)

"Mothers prefer simple meal preparation and do not prepare what they dislike, and thus meals with balanced nutrients are not provided and one-sided nutrient intake might cause reduced growth." (Mid-income group)

"Skipping breakfast has been increased because of working parents." (Low-income group)

"Snacks are not provided at home and thus children are

Table 4. Nutritional problems by group

Group	Contents
High income group	1. Unbalanced diet 1) Prefer meat
	2. Food intake outside the house 1) Fast foods or processed foods 2) Increased opportunities for eating out by themselves as children become older (avoid prepared snacks)
	3. Irregular meal time and snacking 1) Irregularity of meals and frequent snacking due to school/private institute schedules. (4 meals a day, imbalance of daily rhythm)
	4. Wrong food habits 1) Eating breakfast in a hurry 2) Overeating (concerning obesity)
Mid income group	1. Unbalanced diet 1) Avoid vegetables / prefer meat and instant foods (fried chicken, pizza, ramyeon) 2) Insist on eating favorite foods (increased eating time for unfavorable foods)
	2. Instant foods 1) Food additives and unsanitary manufacturing process are concerned
	3. One-sided nutrient intake 1) Mothers prefer simple meal preparation 2) Difficulties in preparing meals with balanced nutrients 3) Mothers do not prepare their dislikes 4) Reduced growth (short height)
	1. Unbalanced diet & nutrition imbalance (too thin or obese) 1) Avoid eating vegetables 2) Rejection to new foods due to the lack of opportunities of experiencing various foods
Low income group	2. Skipping breakfast 1) Increase in skipping breakfast due to working parents
	3. Adulterated food 1) Difficulties in home snacking 2) Children are exposed to many adulterated foods near school

exposed to many adulterated foods around the school area." (Low-income group)

2. Reasons for nutritional problems

In all income groups, a one-sided diet was the nutritional problem at home. In the high- and mid-income groups, parents prepared meals that their children preferred or pursued simple meals for convenience causing one-sided nutrient intake. Also, parents mainly prepared meals that they liked. In addition, children have already been used to the taste of processed foods, resulting in one-sided nutritional habits. In the low-income group, difficulties in family circumstances and not much parents' interests in children's nutritional habits caused one-sided dietary lifestyle. For adulterated foods, it was not a big problem in the high-income group and the mid-income group, but a serious problem in the low-income group. It was because children were greatly exposed to adulterated foods and children purchased those foods. Also, this was partially due to poor regulation by the government. Another nutritional problem was obesity and undernutrition caused by improper nutritional habits, in which obesity developed by improper snacking due to busy study schedules or by irregular intakes of simple instant snacks in the

high- and mid-income groups and improper dietary lifestyle developed due to frequent skipping of breakfasts and lack of interests and efforts at home in the low-income group. In addition, there was no part for learning proper food habits at school for children in their 1st and 2nd grades and a lack of nutritional knowledge of parents and poor perceptions for the seriousness of nutritional problems. Also, instant foods were diversified and seduced children, causing changes in the tastes of children to too sweet or salty.

“Mothers mainly prepare meals that parents like due to the influence of parents’ dietary habits.” (High-income group)

“Daily rhythm is changed with irregular meal time and eating out snacks due to busy study schedule.” (High-income group)

“As instant foods are diversified, the curiosity for selection is increased and housewives who prefer convenience purchase instant foods.” (Mid-income group)

“Children are used to the taste of adulterated foods in front of school due to poor government regulation, and do not like home-made meals.” (Mid-income group)

“I do not pay much attention to dietary education at home.” (Low-income group)

“I don’t know much about the seriousness of children’s nutritional problems.” (Low-income group)

Degree of nutrition education needed for nutritional problems

1. Need 1: Nutrition education contents for solving nutritional problems

In the high- and mid-income groups, nutritional education at home through parents is important and food selection and cooking methods should be diversified to prevent one-sided diets in children. Efforts of school and public organizations are needed for the education of children and parents, and thus nutrition education methods and materials appropriate for target subjects should be developed and nutritional status examination education program is required. In addition, the government should improve the system at a comprehensive level, and the development of foods with sanitation, nutrition, and taste appropriate for children should be developed. Good TV programs and effective nutrition advertisement are needed too. In the low-income group, parents should try to take care of children in spite of busy schedules. Continuous free education for parents and children is needed at school and public organizations. Also, more thorough education should be made at school because education at home is difficult, and also strong regulation and supervision for adulterated foods in front of school are needed because children purchase those foods available. Also, the development of TV programs and effective nutrition advertisement should be made, and an education for fathers is needed by arranging good TV programs in the evenings that can be watched by fathers. For nutrition education methods and content improvements by target subjects, it is desirable to provide parents education through meetings, lectures, and internet materials for the high-income group, and

Table 5. Reasons for nutritional problems

Group	Contents
High income group	1. Influence of parents' food habits 1) Meal is prepared with emphasis of parents' favorite foods 2) Meat preference by parents (difficulty of cooking fish because of smell)
	2. Influence of peer group 1) Children prefer eating out with friends rather than eating at home
	3. Busy study schedule and daily rhythm 1) Irregular meal time / eating snacks outside
Mid income group	1. Mother's problems 1) Mothers seldom prepare meals they don't like 2) Limited number of side dishes due to simpler cooking method for convenience 3) Mothers do not prepare meals that children dislike
	2. Diversification of instant foods 1) Causing curiosity for selection 2) Purchasing instant foods for convenience
	3. Influence of nuclear family 1) Less diversity in foods, more convenience in cooking
	4. Poor regulation by government 1) Many adulterated foods in front of school 2) Children are used to the taste of those adulterated foods and dislike home-made meal
	5. Daily busy rhythm. 1) All Family members are busy → decreased number of eating at home with family → simple meal preparation 2) Irregular meal time and frequent snacking / midnight snack 3) Developing habits of eating in a hurry and pursuing convenient meals
Low income group	1. Lack of nutritional education at home 1) Not interested in dietary education 2) Parents do not recognize the seriousness of children's nutritional problems 3) Lack of parents' cooperation and knowledge of nutrition education
	2. Wrong food habits 1) Skipping breakfast / eating while watching TV 2) Frequent ordering of pizza or chicken instead of appropriate snacks
	3. Lack of nutrition education at school 1) No learning about proper dietary habits in 1 and 2 grades

home correspondence and cooking class for mid-income group, and children’s education at school rather than parents education, home correspondence, and free education for the low-income group.

“Dietary education at home through parents is important and urgent.” (High-income group)

“Nutrition education methods and materials appropriate for children should be developed.” (High-income group)

“It is expensive for individual purposes and thus the effort of school and public organizations for parent education is needed.” (Mid-income group)

“Good TV programs should be developed for effective nutritional advertisements.” (Mid-income group)

“Schools and public organizations should support continuous free education programs for parents and children, particularly schools should provide more thorough education.” (Low-income group)

“Good TV programs should be developed for effective

Table 6. Nutrition education contents by focus group

Group	Contents
High income Group/ Mid income group	<ol style="list-style-type: none"> 1. Need parents' efforts <ol style="list-style-type: none"> 1) Importance of nutritional education at home through parents → urgent education for parents 2) Diversification of food selection and cooking methods to prevent one-sided diet in children 3) Parents' efforts are needed for obtaining proper nutritional knowledge 2. Need efforts of school and public organizations for children and parents education <ol style="list-style-type: none"> 1) Development of proper nutrition education methods and materials for target subjects 2) Need for nutritional status examination (diagnosis) education program <ul style="list-style-type: none"> - Too expensive for individual purpose - To Develop interests in individual's own health 3. Need government's efforts <ol style="list-style-type: none"> 1) Improvement of the system at comprehensive level → need for thorough supervision (monitoring) for food companies/products <ul style="list-style-type: none"> - Increased anxiety for unsanitary and not nutritious snacks sold outside 2) Need For developing foods with sanitation, nutrition, and taste appropriate for children <ul style="list-style-type: none"> - Avoid organic products in general (taste, economic aspect, unfavorable sensory aspect) 3) Development of good TV programs and effective nutrition advertisement
	<ol style="list-style-type: none"> 1. Need efforts at home <ol style="list-style-type: none"> 1) Changes in mother's attitude → take care of children in spite of busy schedule 2. Need efforts at school and public organizations <ol style="list-style-type: none"> 1) Need For continuous free education for parents and children → cultural center, church-based study room 2) Need more thorough education at school because education at home is difficult 3. Need government's efforts <ol style="list-style-type: none"> 1) Need for strong regulation and supervision for adulterated foods in front of school <ul style="list-style-type: none"> - Children purchased those foods because they were present there 2) Development of good TV programs and effective nutrition advertisement <ul style="list-style-type: none"> - Development of programs for improving children's lifestyle → helpful - Need for parents' lifestyle improvement program showing changes in children's attitudes as lifestyle and perception of parents change - Arrangement of good TV program at evening that can be watched with fathers → need education for fathers 4. Most of low income group did not know the solution <ol style="list-style-type: none"> 1) No perception on the seriousness of nutritional problems and thus no interests in nutrition education
Low income group	<ol style="list-style-type: none"> 1. Need efforts at home <ol style="list-style-type: none"> 1) Changes in mother's attitude → take care of children in spite of busy schedule 2. Need efforts at school and public organizations <ol style="list-style-type: none"> 1) Need For continuous free education for parents and children → cultural center, church-based study room 2) Need more thorough education at school because education at home is difficult 3. Need government's efforts <ol style="list-style-type: none"> 1) Need for strong regulation and supervision for adulterated foods in front of school <ul style="list-style-type: none"> - Children purchased those foods because they were present there 2) Development of good TV programs and effective nutrition advertisement <ul style="list-style-type: none"> - Development of programs for improving children's lifestyle → helpful - Need for parents' lifestyle improvement program showing changes in children's attitudes as lifestyle and perception of parents change - Arrangement of good TV program at evening that can be watched with fathers → need education for fathers 4. Most of low income group did not know the solution <ol style="list-style-type: none"> 1) No perception on the seriousness of nutritional problems and thus no interests in nutrition education

Table 7. Nutrition education methods by focus group

Group	Contents
High income group	<ol style="list-style-type: none"> 1. Methods <ol style="list-style-type: none"> 1) Need guidance from professional teachers, invitation of outside instructor to school 2) Regular practice at school like sex education. 3) Objection to on-line education or computer game type education 2. Contents <ol style="list-style-type: none"> 1) Selection of interesting educational topics by ages (growth, obesity, appearance) 2) Induce a desire for participation in nutrition education by establishing interesting topics 3. Materials <ol style="list-style-type: none"> 1) Preference for events, experience, cooking practice, and comic books rather than textbook oriented education → preference for off-line education 2) Preference for audio-visual materials
	<ol style="list-style-type: none"> 1. Methods <ol style="list-style-type: none"> 1) Regular nutrition education at school like sex education or antismoking education 2) Education during lunch hour → showing nutrition education materials in animation 3) Objection to on-line education or computer game type education 4) Encourage to read 1 book/week or 1 book/month about nutrition 2. Contents <ol style="list-style-type: none"> 1) Need to select topics with interesting and strong impression for children 2) More information on the influence of foods on health 3. Materials <ol style="list-style-type: none"> 1) Need for developing audio-visual materials (cartoon, comic books → for off-line education)
Mid income group	<ol style="list-style-type: none"> 1. Methods <ol style="list-style-type: none"> 1) Regular nutrition education at school like sex education or antismoking education 2) Practice dietary education (including table manners) starting at lower grades 3) Objection to on-line education or computer game type education 4) Place nutrition education related books at school 2. Contents <ol style="list-style-type: none"> 1) Need to select topics with interesting and strong impression for children 2) Thorough education for food selection ability and bad effects of adulterated foods <ul style="list-style-type: none"> - currently there is no education at home, and children are largely exposed to adulterated foods 3. Materials <ol style="list-style-type: none"> 1) Need for developing audio-visual materials (for off-line education) 2) Preference for story books, comic books, and picture books as educational materials
Low income group	<ol style="list-style-type: none"> 1. Methods <ol style="list-style-type: none"> 1) Regular nutrition education at school like sex education or antismoking education 2) Practice dietary education (including table manners) starting at lower grades 3) Objection to on-line education or computer game type education 4) Place nutrition education related books at school 2. Contents <ol style="list-style-type: none"> 1) Need to select topics with interesting and strong impression for children 2) Thorough education for food selection ability and bad effects of adulterated foods <ul style="list-style-type: none"> - currently there is no education at home, and children are largely exposed to adulterated foods 3. Materials <ol style="list-style-type: none"> 1) Need for developing audio-visual materials (for off-line education) 2) Preference for story books, comic books, and picture books as educational materials

nutritional advertisement.” (Low-income group)

“Good TV programs should be arranged in the evenings when fathers can watch those programs.” (Low-income group)

“Most parents in the low income group do not know and are not interested in the solution because they do not perceive the seriousness of nutritional problems.” (Low-income group)

2. Need 2: Nutrition education methods for solving nutritional problems

Parents in all levels of income groups generally require

common nutrition education in the aspects of methods, contents, and materials. For nutrition education methods, parents wanted that regular education through professionals should be performed and they also wanted interest-oriented education using free activity class time or lunch hour, which should be started at least from the lower grades. Also, they wanted that materials should be developed for easier approach by children but were opposed to Internet nutrition education, which can be directly used by children, concerning games. For nutrition education contents, nutrition education should be interesting and create desire for

participation by setting interesting topics, and also should cover many influences of foods on health, and finally should provide thorough education for food selection ability and the bad effects of adulterated foods. In selecting materials, audio-visual materials, comic books, and off-line education materials (cooking class) were preferred. The working parents group also preferred the same nutrition education like general parents group.

"Instructors from outside should be invited to school because the guidance from professional teachers are needed." (High-income group)

"I have preference for off-line education such as events, experience, cooking practice, and comic books and by using audio-visual materials rather than textbook oriented education." (High-income group)

"Nutrition education materials in animation can be watched during lunch hours." (Mid-income group)

"Topics with interesting and strong impression for children should be selected." (Mid-income group)

"I oppose online education or computer game type education." (Low-income group)

"Thorough education for food selection ability and bad effects of adulterated foods should be performed." (Low-income group)

"Audio-visual materials should be developed." (Low-income group)

3. Need 3: Nutrition education for parents for solving nutritional problems

Nutrition education for parents showed differences depending on income levels. For methods, parents in the high-income group needed meetings or professional lectures, online education and thought that the guidance by parents at home was more important. Parents in the mid-income group wanted helpful materials or information from Internet easily or free nutrition education and home correspondence from the nearby cultural center or public health center. Parents in the low-income group needed encouragement and support for the participation in nutrition education and also needed visiting education and free education from the community hall or cultural center. Also, home correspondence with helpful information should be mailed regularly and should be approached through mass media in a natural way. For contents, parents in the high-income group wanted nutritional information and practical contents and parents in the mid-income group wanted practical contents and recipes, and parents in the low-income group needed the motivation from mothers. For materials, parents in the high income group wanted lectures from invited professionals and parents in the mid-income group wanted home correspondence and audio-visual materials for simple snacks and side dishes, and parents in the low-income group needed not boring education using home correspondence and audio-visual materials.

"Education program is necessary for parents of school and community because the guidance by parents at home is more important." (High-income group)

"Practical education for natural and convenient application to

actual lifestyle." (High-income group)

"Good and helpful materials and information for parents should be easily provided through the Internet." (Mid-income group)

"Free nutrition education at the nearby cultural center or public health center should be provided." (Mid-income group)

"It should be naturally approached through mass media." (Low-income group)

"The seriousness of nutritional problems and the need for nutrition education should be recognized." (Low-income group)

4. Need 4: Nutrition education method at home for solving nutritional problems

In the high- and mid-income groups, mothers usually prepared meals and snacks and their families were trying to eat together if possible, but fathers had difficulties in participation. Also, they were very interested in children's dietary lifestyles and concerned about snacking, food sanitation, and food quality and tended to practice food limitation mostly to their children. In the low-income group, mothers or grandmothers usually prepared for meals and snacks and their families seldom ate together at home. Children had their lunches at school and dinners at a study room or outside or late at night at home. Also, they were less interested in their children's dietary lifestyles and thus practiced poor dietary education at home. In general, parents in the low-income group had poorer dietary management for their children.

"In most days, fathers seldom join eating with family and the family can eat together on weekends." (High-income group)

"I am greatly interested in children's dietary lifestyles and tend to limit foods based on snacking, food sanitation, and food quality." (High-income group)

"Mothers or grandmothers usually prepare for meals and snacks." (Low-income group)

Conclusion

The following directions for nutrition education could be established according to the results from the focus group interview analysis.

High-income household: It is better to improve currently existing web sites for nutrition education rather than to develop a new Internet site for nutrition education, and also the development of nutrition education materials (books, video tapes, and nutrition education materials at public health centers and schools) instead of the Internet and the efforts of related organizations (performing regular nutrition education for children, parents, and business) are urgent.

Mid-income household: Easy, practical, and inexpensive off-line cooking class or nutrition education programs for mothers are needed. Only materials can be obtained through the Internet. The influence of mothers in children's nutritional education is significantly great, and currently, parents have less nutritional information and knowledge, and thus it is urgent and

Table 8. Nutrition education methods for parents by focus group

Group	Contents
High income group	1. Methods 1) Educational programs for parents of school and community are needed (lecture, meeting) - guidance at home by parents is more important 2) Online education → banners on school web site can attract the viewers
	2. Contents 1) Natural and practical education
	3. Materials 1) Lectures by invited professionals
Mid income group	1. Methods 1) Good and helpful materials and information are provided by parents through Internet (including recipes) 2) Free nutrition education at nearby cultural center or public health center
	2. Contents - More practical, fun, and simple contents rather than boring, difficult, and formal topics are needed (example: healthy snacks for children, development of snack recipes for children)
	3. Materials 1) Home correspondence is most easy to read 2) Recipes for simple snack and side dishes (with sufficient nutrients)
Low income group	1. Methods 1) Encouragement for participating in nutrition education is needed along with visiting education and free education - Community center, cultural center 2) Home correspondence with helpful information should be mailed regularly 3) It should be approached naturally through mass media
	2. Contents - Contents for the recognition of serious nutritional problems - Curiosity for education should be induced with educational topics
	3. Materials - Home correspondence - Not-boring education using audio-visual materials

Table 9. Nutrition education methods at home by focus group

Group	Contents
High income group/ Mid income group	1. Mothers usually prepare for meals and snacks 2. The family is trying to eat together if possible, father's participation is difficult 1) Family eating together mostly on weekends
	3. Much interested in children's food behaviors 1) Concerns for snacking, food sanitation, and food quality 2) Tend to practice food limitation mostly to children (no eating between meals or do eat vegetables)
Low income group	1. Mothers or grandmothers usually prepare for meals and snacks 2. Family seldom eat together - Lunch at school and dinner at study room or outside or late at night at home
	3. Less interested in children's food behaviors - Poor dietary education for children at home

necessary for high-quality nutrition education at school on a regular basis for children's dietary lifestyles. A program for correcting one-sided dietary habits using audio-visual materials and activities is importantly urgent. Also, nutrition programs for children should be developed through mass media and should be promoted in the broadcasting circle.

Low-income household: Steady and thorough education is needed. Dietary education at home has not been well practiced and thus school has to put more effort and provide education for food selection ability and the bad effects of adulterated foods. Motivation is required for mothers' education and the serious nutritional problems of children should be informed through mass media and home correspondence from school. Curiosity for education should be induced in the mind of people in the low-income group by selecting attractive educational topics and concerns should be made in selecting topics such as tasty and nutritious snacks for children with less money. Parents' education and the convenience for obtaining information are needed, nutrition information should be easily approached, home correspondence with helpful information should be regularly mailed, nutrition education programs should be arranged in evenings when fathers can watch with their families, and encouragement for participating in nutrition education meetings is needed along with visiting education and free education (at community center or cultural center). Interesting educational materials should be developed for children, and then comic books or picture books instead of nutrition education sites directly targeting children should be developed for children to watch and should be placed in the classroom so that children can read whenever they want.

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