พฤติกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กไทยวัยเรียนที่มีภาวะอ้วน และปัจจัยที่เกี่ยวข้อง

HEALTHY EATING BEHAVIOR IN OBESE SCHOOL-AGE CHILDREN IN THAILAND AND ITS RELATED FACTORS

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บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ พฤติกรรมการบริโภคอาหาร ปัจจัยที่เกี่ยวข้องกับพฤติกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กวัยเรียนที่มีภาวะอ้วนในบริบทชุมชนกึ่งเมือง จังหวัดมหาสารคาม ผู้ร่วมวิจัยประกอบด้วยเด็กวัยเรียนที่มีภาวะอ้วน จำนวน 20 คน พ่อ แม่หรือผู้ดูแล จำนวน 20 คน ครูในโรงเรียน จำนวน 8 คน และพยาบาล จำนวน 6 คน เก็บข้อมูลโดยแบบสอบถาม การสัมภาษณ์เชิงลึก และการสังเกต วิเคราะห์ข้อมูลเชิงปริมาณด้วยสถิติพรรณนา และวิเคราะห์ข้อมูลเชิงคุณภาพโดยใช้การวิเคราะห์เนื้อหา

ผลการวิจัยพบว่าเด็กวัยเรียนที่มีภาวะอ้วนมีพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ ความเชื่อเกี่ยวกับการบริโภคอาหารเพื่อสุขภาพ และการรับรู้ความสามารถของตนเองในการบริโภคอาหารเพื่อสุขภาพ อยู่ในระดับปานกลาง ส่วนความรู้เกี่ยวกับอาหารเพื่อสุขภาพและการบริโภคอาหารเพื่อสุขภาพนั้นอยู่ในระดับสูง พฤติกรรมการบริโภคอาหารในเด็กวัยเรียนที่มีภาวะอ้วน พบว่ามี 4 ประเด็นย่อย คือ 1) การบริโภคผัก และผลไม้ในปริมาณที่น้อย 2) การบริโภคคาร์โบไฮเดรต อาหารที่มีน้ำตาลสูง และเครื่องดื่มที่มีความหวานมาก และ 3) การบริโภคอาหารที่มีปริมาณไขมันสูง พบปัจจัยเสี่ยงที่มีผลต่อพฤติกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กวัยเรียนที่มีภาวะอ้วน 3 ประเด็นย่อยซึ่งประกอบด้วย 1) การขาดความตระหนักเกี่ยวกับพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ 2) ความรู้เกี่ยวกับโภชนาการไม่เพียงพอ และ 3) การเข้าถึงอาหารที่ไม่ดีต่อสุขภาพที่บ้านและที่โรงเรียน ส่วนปัจจัยที่ส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กวัยเรียนที่มีภาวะอ้วน ประกอบด้วย 2 ประเด็น คือ 1) อาหารไทยประจำท้องถิ่น “อาหารอิสาน” และ 2) การพูดคุยและการสอนของพ่อแม่ผู้ดูแลเกี่ยวกับพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ ซึ่งผลการวิจัยในครั้งนี้น่าจะเป็นประโยชน์ที่จะนำไปพัฒนารูปแบบกิจกรรม หรือโปรแกรมเพื่อส่งเสริมพฤติกรรมการบริโภคอาหารในเด็กวัยเรียนที่มีภาวะอ้วนต่อไป

คำสำคัญ: เด็กวัยเรียนที่มีภาวะอ้วน; พฤติกรรมการบริโภคอาหารเพื่อสุขภาพ; พฤติกรรมการบริโภคอาหาร

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Abstract

This study aimed to explore healthy eating behavior, eating behavior, factors related to healthy eating behavior in obese school-age children in semi-urban context of Mahasarakham province. Participants of this study consisted of 1) 20 obese school-age children studying in grade 4 and 5 at a public primary school in Mahasarakham province, 2) 20 parents or guardians of obese school-age children, 3) 8 teachers, and 4) 6 nurses. Data were collected through self-administered questionnaires, in-depth interviews, and observations. Descriptive statistics and content analysis were used to analyze quantitative and qualitative data, respectively

Results revealed that obese school-age children had moderate healthy eating behavior, moderate belief about healthy eating, and moderate healthy eating self-efficacy while having high knowledge about healthy food and healthy eating. There were three categories of eating behavior in obese school-age children including 1) Eating less vegetable and fruits, 2) Eating much carbohydrate or sugary food and sweet drinks, and 3) Eating food containing high fat and oil. Three categories of the risk factors of healthy eating behavior in obese school-age children were 1) Lack of awareness about healthy eating behavior, 2) Inadequate of nutritional knowledge, and 3) Availability and accessibility of unhealthy foods. The protective factors of healthy eating behavior in obese school-age children were 1) Local Thai "Isan" food and 2) Parents' talking and teaching about healthy eating behavior. These findings might be useful for a development of effective interventions or programs to promote healthy eating behavior in obese school-age children.

Keywords: obese school-age children; healthy eating behavior; eating behavior

Introduction

Healthy eating behavior is important during school-age children. It can promote growth and development of school-age children. The child grows well physically, performs well at school, and will not develop nutrition-related diseases or other nutrient deficiencies. Finally, they will grow into healthy and confident adults. Recently, unhealthy eating behaviors in school-age children become one of the main concerning problems of researchers and health professionals. For instance, in the USA, 56.4% of primary school children and 79.9% of high school children in 2010 did not meet vegetable consumption guideline (Center for Population Health, 2012). In 2011, 49.6% of Thai school-age -children consumed unhealthy snack foods and 68% and 55% of them consumed vegetables and fruits respectively less than one serving spoons per day (Department of Health, Ministry of Public Health, Thailand, 2011). Unhealthy eating behavior in school-age children could lead to negative effects on physical, psychological, and psychosocial in childhood and carry over to adulthood. For physical effects, children may face with nutritional problems that include undernutrition and overnutrition such as protein-energy deficiencies, overweight, and obesity. Such problems have negative effects on children's growth and development. Moreover, the problems also strongly associate with chronic diseases. Particularly, overweight and obesity are

major risk factors of chronic diseases including metabolic syndrome, diabetes mellitus, heart diseases, and cancer. Besides, obese children may have psychological and psychosocial effects such as low self-esteem, social isolation, and social burden (Jackson, Mannix, Faga, & McDonald, 2005; Kumar, 2011; Lee et al., 2011). The promotion of healthy eating behavior in school-age children especially among obese school-age children is certainly needed.

To develop intervention for promoting healthy eating behavior in obese school-age children, it is necessary to understand factors related to healthy eating behavior in obese school-age children. Numbers of research suggested that intra-individual factors, intra-familial factors, and school factors were the main factors related to healthy and/or unhealthy eating behaviors in school-age children (Taylor, Evers, & McKenna, 2005; Veselá & Grebenová, 2010). For intra-individual factors, the study indicated that children's food preference was a strong predictor of children's food intake (Bere, & Klepp, 2005; Taylor et al., 2005). Studies revealed that food preferences for healthy food and perceptions of healthy food were interrelated (Atik, & Ertekin, 2013; Zeinstra, Koelen, Kok, & Graaf, 2007). A child's thought and perception might be a significant factor to design an intervention for changing food preference and intake (Zeinstra et al., 2007). The study also suggested that children's perceptions of healthy foods and/or healthy eating behaviors should be taken into account in order to develop intervention for promoting healthy eating behavior in children (Fitzgerald, Heary, Nixon, & Kelly, 2010; Zeinstra et al., 2007).

Intra-family factors are also one of the key factors related to school-age children's healthy eating behaviors because family is the first social group that has close relationship with a child. Studies indicated that parents' preferences, attitudes, behaviors, and parents modeling were associated with children's eating patterns (Brown & Ogden, 2004; Lazarou, Kalavana, & Matalas, 2008; Patrick & Nicklas, 2005). Parents and grandparents with high nutritional knowledge related directly to children's healthy foods consumption and selecting and preparing healthy foods at home (Klicklighter, Whitley, Kelley, Lynch, & Melton, 2009; Ra¨sa¨nen et al., 2003). Similarly, a school is another major factor influencing school-age children's healthy eating behaviors. School meals and nutritional policies were associated with school-age children's food intake (Patrick & Nicklas, 2005; Veselá & Grebenová, 2010). Addition to intra-family and intra-school factors, most research revealed that foods available at home and school were obviously significant factors influencing children's healthy and/or unhealthy eating behavior (Patrick & Nicklas, 2005; Shepherd et al., 2006; Taylor et al., 2005). To promote healthy eating behavior in obese school-age children, studies suggested that the successful and sustainable intervention should be developed according to children's views, contexts, and concerned. In addition, family and school should participate in the intervention (Cauwenberghe et al., 2010; Chotibang, Fongkaew, Mo-suwan, Meininger, & Klunklin, 2009). Therefore, better understanding in healthy eating behavior and factors related to healthy eating behavior in obese school-age children from their points of view and their contexts are unquestionably needed.

In Hua Khwang municipality community, Kosumpisai district, Mahasarakham province, many public schools in this area are facing with unhealthy

eating behavior in school-age children. Recently, this area has shifted from agricultural society to industrial society leading to a change in lifestyle and culture of food consumption. Nowadays, most fathers and/or mothers of school-age children go to work outside home leading to the change of food consumption patterns in family. Parents have less time to prepare food. Food consumption is influenced by commercial and advertising. These patterns have changed their eating style from eating slow cooked food prepared at home to fast food, food purchased from local markets or convenient stores such as ready-to-eat foods and convenient foods. Moreover, the statistics of one primary public school located at the center of this area showed that the prevalence rate of overweight and obesity among school-age children were very high, 14.68% and 13.14% in 2010 and 2011, respectively (Primary Care Unit of Kosumpisai Hospital, 2011). In 2013, the prevalence rate of overweight and obesity among school-age children increased in school-age children studying in grade 4 and 5, 17.85% (Primary Care Unit of Kosumpisai Hospital, 2013). To develop intervention for promoting healthy eating behavior in obese school-age children in this area, better understanding factors related to healthy eating behavior is needed. Therefore, the purpose of this study was to explore healthy eating behavior, eating behavior, and factors related to healthy eating behavior in obese school-age children in grade 4 and 5 at a public primary school in semi-urban context of Mahasarakham province, Thailand.

Research Objective

The purposes of this study were to explore healthy eating behavior, describe eating behavior, and identify factors related to healthy eating behavior in obese school-age children in semi-urban context of Mahasarakham province, Thailand.

Conceptual Framework

The bioecological model of human development (Bronfenbrenner, 2005) provided the framework for this study. This model views human development as the phenomenon of continuity and change in the biopsychological characteristics of human beings over the life course. The Process-Person-Context-Time Model (PPCT) is the last revised Bronfenbrenner's theory of human development (Bronfenbrenner, 2005). This model relates to the interaction among four principal concepts (process, person, context, and time). It is useful for a greater understanding the multiple factors influencing healthy eating behavior in obese school-age children in this study. Based on the bioecological model of Bronfenbrenner (2005), proximal processes refer to obese school-age children's characteristics engage in activities or interaction with the environment or context (such as characteristics of parents and teachers) immediately for developing their healthy eating behavior. Person, the person at the center is obese school-age children and their personal characteristics. For the development of obese school-age children's healthy eating behavior, obese school-age children may be influenced from the context or environment that includes micro-, meso-, exo-, and macrosystems. The microsystems refer to characteristics of family and school. For family, characteristics of parents such as parents' perceptions of healthy eating behavior and family food practice. In school, characteristics of school such as school food policies, school food service, and school environment.

The mesosystems refer to the connection between obese school-age children's home and school. Healthy eating behavior in obese school-age children will be developed by collaboration between parents and teachers for promoting obese school-age children's healthy eating behavior. The exosystems include nurses, teachers, and community local markets that influence school-age children's healthy eating behavior. Finally, healthy eating behavior in obese school-age children may be influenced by the macrosystems including cultures/values of food consumption of people and food advertisement and mass media.

Research Methodology

Design and study setting

This study employed a descriptive design with a mix methodology using both quantitative and qualitative methods. The setting was "Hua Khwang Municipality Community" located in Hua Khwang sub-district, Kosumpisai district, Mahasarakham province, the Northeastern region of Thailand.

Participants

The participants were 20 obese school-age children studying in grade 4 and 5 (10-12 years old), 8 teachers from a public primary school, 20 parents of obese school-age children, and 6 nurses from primary health care unit of Kosumpisai Hospital. Purposive sampling was used in the selection of participants. All of participants were willing to participate in this study.

The inclusion criteria for obese school-age children were 1) obese children in grade 4 and 5; 2) obese children aged between 10-12 years; and 3) obese children defined as overweight or obese by weight for height (wt/ht) ≥ 2 S.D (Department of Health, Ministry of Public Health, 1999). For parents of obese school-age children, the inclusion criteria were 1) parents (fathers, mothers, or guardians) who looked after obese school-age children's daily activities, foods, and school tasks of the obese school-age children; 2) parents had to be able to verbally communicate in Thai. The inclusion criteria for the teachers were they must be persons who took care of school's health sector, food service, or teaching nutrition subjects for children grade 4 and 5. The inclusion criteria for the nurses were they must be in charge of school or family health service at the primary care unit of hospital in the setting. For qualitative data, key informants were selected by purposive sampling for in-depth interview. The number of participants was based on the data saturation or at least six persons (Morse, 1994).

Research instruments

1. Instruments for quantitative data collection

1.1 The self-administered questionnaire for obese school-age children was divided in to six parts as follows: 1) Part 1 Socio-demographic information; 2) Part 2 Knowledge about healthy food and healthy eating: this part was modified from food consumption knowledge questionnaire developed by Sukaranandana (2005). It consisted of 16 items. The score ranged from 0 to 16, with high score indicated high knowledge about healthy food and healthy eating; 3) Part 3 Beliefs about healthy eating: this part was modified from beliefs in practice on healthy eating behavior questionnaire developed by Plengkratoke (2012). This questionnaire consisted of 10 items and the total scores ranged from 10 to 30, with high score indicated high belief about healthy eating; 4) Part 4 Healthy eating self-efficacy: this part was modified from the healthy eating

self-efficacy questionnaire developed by Daungchan (2010). It consisted of 10 items and the total scores ranged from 10 to 30, with high scores indicating a high self-efficacy; 5) Part 5 Healthy eating behavior: this part was modified from the healthy eating behavior questionnaire developed by Daungchan (2007). This questionnaire consisted of 10 items and the total scores ranged from 10 to 30, with higher scores indicating greater healthy eating behavior; 6) Part 6 Availability of healthy food at home and school: this part was developed by the researcher. It was an open-ended questionnaire about the foods provided by parents of school-age children and school staff.

1.2 Socio-demographic information for parents of obese school-age children, teachers, and nurses. This part was developed by the researcher. It included age, sex, marital status, income, occupation, education, experience about promoting healthy eating behavior among obese school-age children.

2. Instruments for qualitative data collection

This instrument consisted of 1) the in-depth interview guide for participated obese school-age children and their parents, teachers, and nurses. The researcher developed this to explore eating behavior and factors related to healthy eating behavior in obese school-age children; and 2) the observation guidelines were developed by the researcher. These guidelines focused on obese school-age children's eating behavior, school lunch meal, and foods available at shop vendors, food carts in/near school, and food shops closest to school.

Five experts were asked to assess the content validity of all instruments. The questionnaire was tested for reliability with 30 obese school-age children in the school who had as similar characteristics as the participants. The Cronbach's Alpha coefficient for belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior questionnaires were .76, .79, and .75, respectively. Kuder-Richardson Formulation 20 for knowledge about healthy food and healthy eating test was .72. Additionally, the interview guide was tried out with one or two of these participants before collecting the data.

Procedures

After the proposal was approved by the Institutional Review Board (IRB) for graduate study Faculty of Nursing, Burapha University, Thailand, the researcher found an eligible study setting. The researcher contacted the school director to inform about the research objectives and the benefits. After that, a letter asking for permission to collect data was sent to the school director. After obtaining permission from the school director, the researcher met the target obese school-age children to measure their weight and height. The researcher informed all participants about the purpose and method of the research, the role of participants, the benefits of participation, and the right to participate or withdraw from the research project before data collecting. The researcher also asked participants who agreed to participate in this study to sign consent forms. For obese school-age children, they were asked to sign assent forms and consent forms from parents of obese school-age children after they agreed to participate in this study. Subsequently, the researcher started the process of data collection.

To complete the questionnaires, the researcher met obese school-age children at school

and visited each parent at home. For each teacher and nurse, the researcher met them for the purpose at their workplaces. For In-depth interview, the researcher made appointments with each participant on their convenient dates and time for the interviews. Each participant was interviewed approximately 45-60 minutes. For observation, the researcher did a 5-weekday-observation (Monday-Friday) on the obese school-age children's eating behavior at school before class, lunch, and after class. Besides, the researcher observed school lunch menu and food available at shop vendors, food carts in/near school, and food shops near the school.

Data analysis

The socio-demographic data of the participants, knowledge about healthy food and healthy eating, beliefs about healthy eating, healthy eating self-efficacy, and healthy eating behavior in obese school-age children were analyzed by descriptive statistics. The qualitative data about eating behavior and factor related to healthy eating behavior were analyzed by content analysis method (Kyngäs & Vanhanen, 1999).

Results

Quantitative results

1. Characteristics of participants

Participants were obese school-age children from grade 4 (85%), more than half of them were boys (55%), and more than two thirds of them (70%) were 10 years old. Nearly half of them (45%) lived with mother, father, grandparents, and relatives. Most obese school-age children had a daily allowance of 20 to 40 baht with mean of 29.25 baht per day (SD=7.30). Most of them (95%) and half of them (50%) spent their allowances on food and sweets or snacks around 10 baht and below, respectively. For parents of obese school-age children, the majority of them were mother (70%) aged from 35 to 39 years. Most of them (70%) finished primary school. Half of them (50%) were in agricultural career (50%) and family income was more than 20,000 baht per month. The teachers were all female (100%) aged from 51 to 60 years. Most of them finished bachelor degrees and all of them had experiences related to promoting healthy eating behavior in school-age children. They supervised chefs in preparing and providing school meal for children. For nurses, all of them were female (100%) aged from 51 to 60 years. Most of them (83.3%) were senior professional nurse. Half of them (50%) finished bachelor and master degrees. All of them had experiences in promoting healthy eating behavior in school-age children. They conducted nutritional status survey, teaching nutrition, and health education in school.

2. Descriptive statistics for healthy eating behavior in obese school-age children and its factors Obese school-age children had healthy eating behavior scores ranged from 12-23 with mean of 18.40 (SD=2.70). The mean scores of knowledge about healthy food and healthy eating was 11.90 (SD= 2.36), belief about healthy eating behavior was 22.45 (SD= 2.76), and healthy eating self-efficacy was 21.00 (SD= 2.00). Overall, obese school-age children had a moderate level of healthy eating behavior, moderate belief about healthy eating, and moderate healthy eating self-efficacy. However, their knowledge about healthy food and healthy eating was at a high level.

Qualitative results

The qualitative data were assessed by in-depth interviews of 12 obese school-age children, 12 parents of obese school-age children, 6 teachers, and 6 nurses. Besides, qualitative data retrieved from

open-ended questions about available food at home and school and field observations were analyzed. The qualitative results were presented as follows:

1. Eating behavior in obese school-age children

The results revealed that three major categories of eating behavior in obese school-age children were eating less vegetable and fruits, eating much carbohydrate or sugary foods and sweet drinks, and eating foods containing high fat and oil.

Eating less vegetables and fruits

Many obese school-age children had low intake of vegetables and fruits. Most of them did not eat vegetables and fruits regularly. They ate vegetables and fruits 3-5 times per week. Obese school-age children ate vegetable less than 4-6 rice-serving spoons and fruit less than 3-6 portions per day. These did not meet Thai food guidelines (Working Group on Food-Based Dietary Guidelines for Thai People, Nutrition Division, Department of Health, Ministry of Public Health, 2001). Besides, many obese school-age children often ate only vegetables and fruits they like. One of the obese school-age children stated that:

"I don't like eating vegetables....Some vegetables that I like such as Chinese kale and Yard long bean.....I like mango and eat 1-2 mangoes for 2-3 days per week" (Obese boy no. 9, aged 10 years).

Similarly, a mother of obese school-age children stated that:

"He likes to eat food containing fatty meat or meat more than vegetables.....When I provide food with more vegetables for him, he will not eat" (A 50-year-old mother of 10 years old obese boy no. 5).

Eating much carbohydrate or sugary food and sweet drinks

Most obese school-age children consumed too much sugary food and sweet drinks after meals every day. They often ate carbonated beverages, sweet smoothie, red or green sweet drinks, cola sweet drinks, bread with milk, butter, or chocolate, and bread sweet with filling.

An obese school-age child said that: *"Every day, I eat rice1-2 dishes per meal (6-12 rice serving spoons/day). After breakfast, I always drink 1 carton of low fat milk or "Ovaltine" (180 ml) and 1 carton (100 ml) of yogurt milk. After lunch, I drink 1 bottle (200 ml) of sweet drink for 3-4 days per week such as orange tea sweet drink. I also eat a piece of bread with chocolate or butter, or a bag of crunchy snack (5 baht) such as "Lay" and "Doraemon"* (Obese girl no. 6, aged 10 years).

"He likes sweet drinks. I saw him often drink oranges sweet drinks. These drinks cost 5-10 baht for one bottle (120-200 ml). He also often eats sweet fruits such as durian and ripe mango" (A 41-year-old mother of 10 years old obese boy no. 9).

Eating foods containing high fat and oil

Many obese school-age children ate food containing high fat and oil at home and school every day. They were in love with food like fried chicken, chicken pop, crispy chicken, sausages, fried pork, fried rice, rice topped with stir-fried pork and basil, and oily steamed rice with chicken soup, as described by two participants:

"For breakfast, I often eat 1.5 dishes of fried chicken or fried eggs with rice at home. For lunch, I eat school lunch (1 dish) such as a dish of fried noodle with pork in gravy, oily steamed rice with chicken soup, and crispy chicken with rice. Every day after lunch, I buy some snacks such as sausages and 1-2 pieces of fried chicken from shop vendors ..... For dinner, the kind of foods that my mother cooks or buy for family are such as fried rice and pork

pan. I often eat large amount of food (2 dishes or until full) in the evening" (Obese girl no. 13, aged 10 year).

"I always cook fried food such as fried eggs, fried pork, and stir-fried pork and basil for her because she likes to eat. Sometimes she cooks by herself. Most of food contains high fat such as stir-fried pork and basil, fried pork with garlic pepper" (A-41-year-old father of 11 years old obese girl no. 7).

From observation, the results found that most obese school-age children ate a lot more unhealthy food than healthy food every day. Most of them often bought fried food and sweet drinks from food shops in/near school before class, after lunch, and after school. Chicken pop and crispy chicken were the popular food for obese school-age children in the morning. Some of them did not eat school meal at all if there was no food they liked, especially food containing large amount of vegetable. Most obese school-age children often bought other food and drinks to eat after school meal every day. After school, most of them also bought fried food and sweet drinks. In conclusion, the findings revealed that the data from in-depth interview and observation were similar. Most of obese school-age children ate large amount of food and ate the kind of food that they liked. Most of them had unhealthy eating behavior including eating less vegetable and fruits, eating much carbohydrate or sugary food and sweet drinks, and eating food containing high fat and oil.

2. Factors related to healthy eating behavior in obese school-age children

2.1 Risk factors of healthy eating behavior in obese school-age children

The findings revealed that three categories of risk factors of healthy eating behavior in obese school-age children were emerged from the data including lack of awareness, inadequate knowledge, and availability and accessibility of unhealthy foods.

Lack of awareness

Most obese school-age children and their parents lacked of awareness about obese school-age children's healthy eating behavior. For obese children, the findings revealed that most obese school-age children selected food from his/her preference. They only ate food that they liked. Obese school-age children often ate food containing high fat and oil, and sweet drinks. They ignored healthy food. An obese school-age child indicated that:

"I always eat 1 piece of bread with sausage and 1 carton of chocolate milk (180 ml) for breakfast every day..... I like to eat fried chicken and oily steamed rice with chicken.....Moreover, I drink carbonated beverage every day" (Obese girl no. 7, aged 11 years).

Similarly, most teachers indicated that obese children did not concern about healthy eating behavior. They ate food that they liked. A teacher said that:

"The child likes to eat fried food, unhealthy snacks, carbonated beverages or sweet drinks. They don't like to eat vegetables" (Teacher aged 54 years, in charge of health sector).

Besides, peer modeling could affect the food selection of obese school-age children. The results found that few obese school-age children ate the type of food as same as their peers ate or ordered. Obese school-age children did not concern about the advantage of food that they ate. All of them liked to eat food such as crispy chicken, chicken pop, and fried chicken. A nurse indicated that:

"Usually, school-age child likes to eat what their friends eat. Most of obese school-age children like to eat snack and carbonated beverage. So, all of them happily agree to eat these foods" (Nurse aged 28 years, in charge of school health education).

For parents of obese school-age children, the findings revealed that most of them ignored consequences of obese school-age children's unhealthy eating behavior. They almost provided the kinds of foods that their children liked. A parent stated that:

"I always provide food that my daughter likes, especially fried food such as fried eggs, omelet, fried chicken, roasted chicken and pork, and fried rice" (A-38-year-old mother of 10 years old obese girl no. 6).

Most nurses indicated that parents of obese school-age children did not concern about the consequences of unhealthy eating behavior in obese school-age children. Many parents of obese school-age children worked. They did not have enough time to cook food for their children, especially the breakfast. Parents thought that there were a lot of ready to eat at convenience stores that their children liked and easy to buy. But, they forgot to think that all of those ready-to-eat foods at convenience stores were food containing high fat and oil. Many parents gave their children money to buy food on their own preference. A nurse said that:

"Nowadays, many parents work outside home that make them have no time to cook for their children, especially breakfast. They ignore the consequences of unhealthy eating behavior of obese children.....Therefore, they give children some money to buy food on own. Obese school-age children often buy food that they like without concerning about its usefulness" (Nurse aged 49 years, responsibility for supervising school health promoting).

Inadequate knowledge

Some of obese school-age children and their parents had inadequate healthy food information. Most of them could not tell which types of food or menu that were in low calorie and appropriate for obese school-age children, as described by three participants:

"I think healthy food mean meat, fish, vegetables, and fruits. However, I don't know what are low calories? (A-62-years-old grandmother of 10 years old obese girl no.17).

"I think healthy foods are fried chicken and fried pork. They are good for my child, but my child doesn't eat much. I think my child is obese because he eats more amount of rice" (A-50-years-old aunt of 10 years old obese boy no. 15).

"Healthy food is vegetables and the five food groups. ....vegetables provide protein, fruits provide carbohydrate" (Obese boy no. 5, aged 10 years).

Moreover, some of nurses expressed that obese school-age children and their parents had inadequate knowledge of healthy food and healthy eating behavior. A nurse said that:

"The first factor is knowledge. Some obese school-age children eat food that they don't know these food are good for them or not. They eat more and more until they get overweight. They don't know the consequences of overweight or obesity" (Nurse aged 47 years, responsible for family health).

Another nurse said that: *"Many parents don't know what are the types and amount of appropriate food for their children? These lead to providing*

high calories food for their child" (Nurse aged 49 years, in charge of school health education).

Availability and accessibility of unhealthy food

From observation, the results showed that unhealthy food was available and accessible in/near school. For school lunch, this school used the Institute of Nutrition, Mahidol University School program under Office of the Basic Education Commission, Thailand as a guideline for lunch menu for all school-age children. For example, the lunch menu for one week (Monday-Friday) for school-age children in grade 4 and 5 included fried rice, rice topped with stir-fried pork and basil, spicy minced pork with rice, crispy chicken with rice, and minced pork with Chinese cabbage soup. There were some fruits with each day's menu. These fruits were seasonal fruits such as mango, rose apple, watermelon, and banana. These showed that school lunch menu was not made specific for obese school-age children. Besides, it might be concluded that some foods served at the school lunch meal was moderate or high fat and oil and less vegetable such as crispy chicken with rice and rice topped with stir-fried pork and basil. Some fruits such as banana and mango were high sugar that was not appropriate for obese school-age children

Most of food shops and carts in/near school sold a lot food and drinks that were not appropriate for obese school-age children including food containing high sugar and carbohydrate such as carbonated beverage, sweet smoothies, cola sweet drinks, and bread with milk or butter or chocolate. Food shops and carts also sold food containing high fat and oil such as crispy chicken, chicken pop, fried chicken, meatball, and grilled squid. At home, the results from the open-ended questionnaire for obese school-age children found that most family often provided foods containing high fat and oil for their children such as fried eggs, fried chicken, and grilled pork. Moreover, there were fried rice, rice topped with stir-fried pork and basil, oily streamed rice with chicken soup. Some family provided food containing less fat and oil such as clear soup, papaya salad, boiled fish, boiled eggs, and grilled fish. However, most obese school-age children preferred eating unhealthy food to healthy ones and they ate unhealthy food ever day (6-7 days/week).

Moreover, the results from in-depth interview revealed that chefs and vendors at school provided or sold much unhealthy food for obese school-age children because they believed that children liked to eat these kinds of food. A teacher stated that:

"The vendors in/near school don't concern about healthy food and healthy eating of school-age children. Most of them serve any food that children like" (Teacher aged 58, in charge of school lunch meal providing).

A school chef indicated that: "Most of obese school-age children don't like vegetable. So, I cook food containing less vegetable" (A chef cooking school lunch meal for student studying in grade 4).

"Children like to eat fried food, especially crispy chicken and fried chicken. So, I sell these foods for them" (A vendor of a fried food and snack shop at school).

At home, it was found that many parents of obese school-age children provided unhealthy food for their children. Most parents believed that as long as their children ate, any kind of food was better than they did not eat. Therefore, most of them cooked or provided any food their kids would eat including unhealthy food for their children. A father said that:

"I like to cook food that my daughter likes such as fried pork, stir-fried pork and basil, and fried

squid with garlic and pepper. Sometime grand-mother cooks dessert for her such as mango with sticky rice" (A-41-years-old father of 11 years old obese girl no. 7).

2.2 Protective factors of eating behavior in obese school-age children

The findings revealed that local Thai "Isan" food and parents' talking and teaching about healthy eating behavior were categorized as protective factors of eating behavior in obese school-age children. The results were presented as follows:

Local Thai "Isan" food

From observation, it was found that most of the local Thai food in Hua Khwang Municipality Community (Northeastern of Thailand or "Isan area") was healthy food. This food would contribute to healthy eating behavior in obese school-age children. Local Thai food or "Isan Food" contained large amount of vegetables, low fat, low oil, and sugar. Most food available in the market and food shops in this area were boiled fish, boiled chicken, sauce with pounded fish, and Thai curry fish with more vegetables. For dessert, some people in this area liked to eat Thai dessert more than sweet drinks, especially older people. Some desserts were available in the market such as mortar-toasted pastry, deep fried banana, sweet banana crisp, sun dried banana, bananas in coconut sauce, and stuffed crispy egg-crepe.

The results from the in-depth interviews revealed that many families of obese school-age children liked to eat "Isan Food", as two parents stated that:

"I almost cook "Isan Foods" for family every day such as Thai fish curry with a lot of vegetables, chili sauce with pounded fish, and boiled chicken. My child likes to eat these foods" (A-50-years-old mother of 10 years old obese boy no. 5).

"I like to cook "Isan Food" for my family such as mushroom composting, chili sauce with pounded mackerel, and boiled fish. I don't cook food containing high fat and oil. My child eats every food that I cook at home" (A-50-years-old mother of 11 years old obese boy no. 15).

Parents' talking and teaching about healthy eating behaviors

From the in-depth interviews with parents, the findings showed that parents' talking and teaching about healthy eating behaviors could promote healthy eating behavior in obese school-age children. Usually, most parents were responsible for cooking or providing foods for family. Therefore, they could choose healthy food or good ingredients to cook healthy food for their children. Moreover, they could talk and teach obese school-age children about healthy eating behavior, as explained by two parents:

"My son likes to eat food containing high fat and oil such as rice with stir-fried pork and basil. So, I try to talk with him about the negative effect of eating high fat food. At this time, he decreases eating these foods from every day to someday" (A 46-years-old mother of 11 years old obese boy no. 18).

"I always cook fish and eggs for my nice such as spicy mackerel salad, and boiled eggs....My niece often sneaks buying carbonated beverage to drinks. If I know that, I will talk to her about the disadvantages of carbonated beverage" (A 75-years-old grandmother of 10 years old obese girl no. 12).

In summary, there were risk and protective factors related healthy eating behavior in obese school-age children. Local Thai "Isan" food and parents' talking and teaching about healthy eating behavior were positive factors for healthy eating

behavior in obese school-age children. However, lack of awareness about healthy eating behavior, inadequate knowledge about healthy foods and healthy eating, and availability and accessibility of unhealthy food were the risk factors of healthy eating behavior in obese school-age children leading to obese school-age children's health problems. Therefore, these factors should be taken into consideration to develop an intervention for promoting healthy eating behavior in obese school-age children.

Discussion

The results revealed that obese school-age children had unhealthy eating behaviors including eating less vegetable and fruits, eating much carbohydrate or sugary food and sweet drinks, and eating food containing high fat and oil. The risk factors of healthy eating behavior in obese school-age children included lack of awareness about healthy eating behavior, inadequate knowledge about healthy food and healthy eating, and availability and accessibility of unhealthy food at home and school. Therefore, it could be concluded that unhealthy eating behavior in obese school-age children in this area was associated with these factors. For obese school-age children and their parents, lack of awareness about healthy eating behavior in obese school-age children and their parents were the factor related to healthy eating behavior of the children. This finding was supported by the data from the in-depth interviews with all participants of this study. The findings from interviews revealed that both obese school-age children and their parents did not concern about healthy eating behavior in obese school-age children. This result corresponded to previous researches. The study of Fitzgerald, Heary, Nixon, and Kelly (2010) revealed that the perceptions of young people from three age groups (9-10, 13-14, and 16-18 years) about healthy eating behavior was influenced by healthy food choices. Thus, the awareness of healthy eating behavior in obese school-age children and their parents had an influence over their healthy food choices which led to healthy eating behavior in children. This study also indicated that there was a link between food preferences and awareness of healthy eating in children. Adamo and colleagues (2010) found that parents' perception of children's eating habits was positively related to perceived fruits and vegetables consumptions. Therefore, it could be concluded that the lack of awareness about healthy eating behavior in obese school-age children and their parents contributed to unhealthy eating behavior in obese school-age children.

Obese school-age children and their parents' inadequate knowledge about healthy food and healthy eating were also a factor related to healthy eating behavior in obese school-age children. This study's finding was supported by the data from the in-depth interviews with obese school-age children, parents of obese school-age children, and nurses in this study. It revealed that many obese school-age children and their parents had inadequate knowledge about healthy food and healthy eating. This result was consistent with previous studies. Choi et al. (2008) and Oldewage Theron and Egal (2010) found that poor nutrition knowledge was associated with healthy eating in school-age children. The study of Klicklighter and colleagues (2009) found that high nutritional knowledge in parents and grandparents related to children's healthy foods consumption. Knowledge about healthy food and healthy eating was needed as basis to make healthy

food choices of obese school-age children and their parents (Patrick & Nicklas, 2005; Ra¨sa¨nen et al., 2003).

Availability and accessibility of unhealthy food at home and school were attributed to lifestyle and culture change in the families' food consumption. The social and economic structure of the research setting had changed from agricultural society to industrial society. The lifestyle and cultural food consumption had changed from eating food prepared at home to ready-to-eat food purchased from local markets or convenient stores surrounding this area. Most of these foods contained high fat and oil, less amount of vegetables, and high sugar. Therefore, there were more availability and accessibility of unhealthy food in this area. Food consumption was influenced by commercial and advertisement. Most fathers and/or mothers of obese school-age children worked outside home. They had less time to prepare food for family. Hence, obese school-age children increased more unhealthy eating behaviors. This was consistent with the studies of Sheperd et al. (2006) and Taylor, Evers, and Mckenna (2005), who suggested that food availability and accessibility at home and school were obviously found one of the significant factors of healthy eating behavior in school-age children. The study of Kumanyika (2008) also indicated that cultural traditions were associated with eating patterns of adults and their children in choosing food to eat. Besides, Kime (2009) and Kime (2011) found that family cultures were related to healthy eating behaviors in children and childhood obesity. Therefore, the increasing availability and accessibility of unhealthy food, changes in culture of people's food consumption patterns had influences over healthy eating behavior in obese school-age children.

Furthermore, the qualitative results revealed that local Thai "Isan" food and parents talking and teaching about healthy eating behavior could be the protective factors of healthy eating behavior in obese school-age children. There were various kinds of local Thai "Isan" food that had low calories and were available in local market or food shops. For example, papaya salad (25 kilocalories/ 100 gram edible portion), grilled fish (131 kilocalories/ 100 gram edible portion), Thai curry with fish or pork and vegetables (53-55 kilocalories/ 100 gram edible portion), and curry with river snail (44 kilocalories/ 100 gram edible portion) contained low calories range from 25-131 kilocalories/ 100 grams edible portion (Nutrition Division, Department of Health, Ministry of Public Health, 2001). Moreover, grilling and boiling were the predominant methods of cooking in this area. Therefore, local Thai foods could be a good protective factor of healthy eating behavior in obese school-age children in this area.

Usually, parents took a major role in providing foods and promote healthy eating of their children. Therefore, parents' talking and teaching about healthy eating behavior could improve their children's eating behavior. This was supported by Savage, Fisher, & Birch (2007), who mentioned that parents acted as an essential role in their children's lives by teaching, role modeling, and supervising. Parents could strongly shape children's early experiences with foods and eating. Therefore, offering an alternative for eating of local Thai "Isan" food and parents' talking and teaching about healthy eating behavior could promote healthy eating behavior in obese school-age children. The findings of this study provided a greater understanding of healthy eating behavior and the risk and protective factors of healthy eating behavior

in obese school-age children in semi-urban context of Mahasarakham province. The limitation of this study was that it examined specific context of Mahasarakham province. The findings might not be appropriate for being used to describe about healthy eating behavior in obese school-age children and its related factors in different contexts.

Implementation of Research Findings

The findings of this study provided in-depth information about healthy eating behavior and its factors in obese school-age children from the perceptions of participants within actual context, especially obese school-age children and their parents. Therefore, these findings might be useful for health care providers in designing interventions or programs for promoting healthy eating behavior in obese school-age children in this area or context. School administrators could also use the findings of this study for planning a school lunch policy and menu in order to promote healthy eating behavior in obese school-age children.

Recommendation for Future Research

Future research should focus on appropriate interventions culturally tailored to address factors related to healthy eating behavior in obese school-age children to promote healthy eating behavior for obese school-age children and fit with in Isan (Northeastern region of Thailand) context.

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