

DEVELOPMENT OF PROMOTING HEALTHY EATING BEHAVIOR MODEL
FOR OBESE SCHOOL-AGE CHILDREN IN
MAHASARAKHAM PROVINCE

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Healthy eating behavior leads to optimal growth and development, and reduce the risk of diseases during childhood. However, the problems of unhealthy eating behavior are increasing among Thai school-age children, especially these children with obesity. This action research aimed to develop and evaluate the promoting healthy eating behavior model for Thai obese school-age children. Methods contained 3 phases of situation analysis, development of the model, and the model evaluation. School-age children with obese and non-obese, parents of obese school-age children, teachers, and nurses in Mahasarakham province in 2015 were invited to participate in the study. Data were collected through self-administered questionnaires, in-depth interviews, focus groups, observation, and field notes. Descriptive statistics, Pearson's product moment correlation, Chi-square test, and content analysis were used to analyze the data.

The promoting healthy eating behavior [PHEB] model for obese school-age children was developed with 2 main components of promoting healthy eating behavior [PHB] and changing belief of chefs and vendors [CBPHF] by collaboration of the family, school, and health care provider. This model was effective by the findings that knowledge about healthy foods and eating, belief about healthy eating, healthy eating self-efficacy and healthy eating behavior in obese school-age children after receiving the model were higher than those of before. It also could raise awareness of obese school-age children and parents and change belief of chefs and vendors for promoting healthy eating behavior in obese school-age children. Therefore, nurses should apply this model to promote healthy eating for obese school-age children. Consequently, appropriate weight among obese preschool-age children would be achieved.

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CHAPTER 1

INTRODUCTION

Statement and significance of the problem

Healthy eating behavior refers to consuming a balance diet of all essential nutrients that can enable a person to achieve good health and well-being. For school-age children, healthy eating behavior can promote optimal health, growth and cognitive development, prevents diseases, and reduces risks associating with both immediate and long-term health problems such as iron deficiency anemia, dental caries, obesity, heart diseases, diabetes, and cancer (Bordi, Paek, Watkins, Caldwell, & Devitis, 2002; Van Cauwenberghe et al., 2010; Department of Health and Human Services, United State, 2010). It also can improve concentration, behavior, social skills, and maintain a healthy weight in children (UK Net Guide, 2010). Therefore, healthy eating behavior needs to be established during school-age children and sustain thereafter.

Despite healthy eating behavior is significant during the school-age years, many school-age children have unhealthy eating behaviors that do not meet dietary guidelines. For instance, about 32 % of school-age children, aged 10-16 years in the UK skipped breakfast before school (Cambell, 2010). In USA, 56.4 % of primary school age children and 79.9 % of high school age children in 2010 did not meet vegetable consumption guideline (Centre for Population Health, 2012). For Thailand, unhealthy eating behaviors in school-age children have been increasingly problematic in recent years. During 2004-2007, the number of Thai children who regularly consume carbonated drinks and junk foods increased 1.8-and 1.5-fold respectively. School-age children consumed vegetables 1.5 spoonfuls per day but in fact they should have vegetable at least 12 spoonfuls per day (Department of Health, Ministry of Public Health, 2010). In 2011, 49.6 % of 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, 2011).

Unhealthy eating behaviors could affect physical, psychological, and psychosocial problems in childhood and carried over to adulthood. For physical problem, children may have nutritional problems that include under nutrition and over nutrition such as protein-energy deficiencies, overweight, and obesity. Such problems have negative effect on growth and development and association with chronic diseases. Particularly, overweight and obesity are major risk factors of chronic diseases such as 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). Recently, a study also mentioned that unhealthy eating behavior among overweight or obese children aged 7-9 years in Korea were significant lifestyle risk factors of metabolic syndrome in comparison to other factors such as physical activity, and television watching (Lee et al., 2011).

In Thailand, recent data showed the prevalence of overweight and obesity in children had increased. In 2005, 5 % and 12 % of school-aged children in grade 6 were overweight and obese respectively (Thailand Research Fund, 2010) and about 9 % of Thai children aged 1 to 14 years were obese in 2009 (Ministry of Public Health, 2010). Besides, the negative consequences of overweight and obesity in children were increased. The prevalence of children and adolescent with diabetes were 2 % in 1999 and these rates had increased 18 % in 2004 (Department of Health, Ministry of Public Health, 2010). One in ten school-age children will be vulnerable to diabetes, high blood pressure and other heart diseases due to obesity by the year 2015 (Department of Health, Ministry of Public Health, 2010). Additionally, the prevalence of metabolic syndrome is high among Thai children and adolescents with moderate, severe, and morbid obesity which are 10.5 %, 23.1 % and 22.2 % respectively (Iamopas, Chongviriyaphan, & Suthutvoravut, 2011).

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 shift from agriculture to industrial that lead to life style and culture change in food consumption of people. Hua Khwang municipality community has local markets including municipality market or called “Talad Tessaban” and flea market or called “Talad nud”. These

markets sell ingredients for cooking and various kinds of foods including ready-to-eat foods and convenience foods. Moreover, there were distributions of convenience stores in this community. These stores sell most of ready-to-eat and convenience foods.

Traditional dietary patterns within the family were diet rich in vegetables and fruits, low in animal foods, and high in fish meat. These may be called “Isan foods”. Food consumption was influenced by commercial and advertising. Most fathers and/ or mothers of school-age children went to work outside home which lead to the change of food consumption patterns in family. They had less time to prepare food for family. These patterns have changed from eating food prepared at home to food purchased from local markets or convenience stores such as ready-to-eat foods and convenience foods. However, most of these foods much more often contain higher proportion of fat, animal meat, and high sugar. Therefore, eating behavior of school-age children is influenced from food consumption patterns in their family that leads to increasing unhealthy eating behavior in school-age children in this community.

Moreover, various kinds of unhealthy foods are available in school and nearby Hua Khwang municipality community. One public school in this community was found that there were many food shops and one convenient store opened near school. Many kinds of foods containing higher proportions of fat, animal meat, starch, sugary, and less vegetables and fruits were available in this school. For school lunch in this school, Institute of Nutrition, Mahidol University [INMU]-school lunch program of Institute of Nutrition, Mahidol University under Office of the Basic Education Commission of Thailand was used to guide for school-lunch’s menu. This menu provided for all of school-age children in this school. It was not specific for overweight/ underweight school-age children. Therefore, food available in/ near school and school lunch in this school may influence on eating behavior in school-age children. Moreover, the prevalence of overweight and obese school-age children has become a serious health problem and concerned to researchers and health professionals. The prevalence rate of overweight and obese among school-age children were very high, 14.68 % and 13.14 % in 2010 and 2011, respectively (Primary Care Unit of Kosumpisai Hospital, 2011). Based on these findings, overweight and obese school-age children in this school might establish a segment of an extremely high risk population of particular metabolic syndrome and chronic diseases such as type 2

diabetes mellitus and heart diseases. Therefore, intervention for promoting healthy eating behavior especially among overweight and obese school-age children is needed in this school.

A wide range of interrelated factors have been found associated with eating behavior in school-age children, including individual, social, environmental factors (Fitzgerald, Heary, Nixon, & Kelly, 2010). For instance, socio-environmental factors (e.g. family, home food availability, school food environment) may have an indirect influence through attitudes/ beliefs on eating behavior. Numbers of research suggested that intra-individual factor (e.g. foods preferences, beliefs and attitudes, self-efficacy, and nutrition knowledge) and intra-familial factor (e.g. parents' preferences and attitude, grandparents' attitudes, parents' and grandparents' nutrition knowledge, and foods available at family) were the main factors related to healthy and/ or unhealthy eating behaviors in school-age children (Taylor, Evers, & McKenna, 2005; Veselá & Grebeňová, 2010). In addition, they also asserted that intra-school factors (e.g. school nutritional policy, and foods available at school) were significant factors related to healthy and/ or unhealthy eating behaviors in school-age children.

For intra-individual factors, child's beliefs and attitudes, self-efficacy, nutritional knowledge, and food preferences were found association with healthy and unhealthy eating behavior (Brug, Tak, Velde, Bere, & Bourdeaudhuij, 2008; Lin, Yang, Hang, & Pan, 2007; Hendrie, Cox, & Coveney, 2008). However, the school-age child is beginning to eat away from home and much more independent for making their own food choice (Tessmer, 2002). Some study also revealed that children's food preference was a strong predictor of children's food intake (Bere & Klepp, 2005; Taylor et al., 2005). Thus, school-age children's food preference is the most significant factor influencing healthy eating behavior. Moreover, Atik and Ertekin (2013) and Zeinstra, Koelen, Kok, and Graaf (2007) found that foods preferences for healthy foods and perceptions of healthy foods were interrelated. A child's thought and perception may significant to intervention for changing food preference and intake (Zeinstra, Koelen, Kok, & Graaf, 2007). The study also suggested that children's perceptions of healthy foods and/ or healthy eating behaviors should be taken into develop intervention for promote healthy eating behavior in children (Fitzgerald et al., 2010; Zeinstra et al., 2007).

Intra-family factors are also key factors related to school-age children's healthy eating behaviors because family is the first social group that has a close relationship with the child. The study 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). In addition, grandparents' attitudes were found to be dominant in forming children's eating behaviors in three-generation families (Jingxiong et al., 2007). Parents and grandparents with high nutritional knowledge related 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).

Likewise, the 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 & Grebeňová, 2010). Addition to intra-family and intra-school factors, most research revealed that food available at home and school were obviously significant factor influencing children's healthy and/ or unhealthy eating behavior (Patrick & Nicklas, 2005; Shepherd et al., 2006; Taylor et al., 2005). Therefore, it may conclude that the crucial factors influencing on healthy and/ or unhealthy eating behaviors in school-age children are food preferences, perceptions about healthy foods and/ or healthy eating behavior, and food available at their home and school.

To promote healthy eating behavior in school-age children, Thailand has activities under the health promoting school [HPS]. This project has been launched by the Thai government in accordance with recommendations from the World Health Organization [WHO] (1998). HPS provides opportunity for students, parents, and the local community members to participate with school staffs for creating and participating activities and/ or strategies to achieve the objective according to the slogan. For school-age children's nutrition, most of schools have many activities to provide healthy foods and healthy eating behavior in school age children (e.g. school lunch program and nutritional education). However, school administrators and/ or school staffs were familiar with a top-down approach. Most of them did not invite students, parents, and community members to participate and make a decision in creating the programs or activities for promoting healthy eating behavior in school-age children.

For this reason, these programs or activities might not appropriate with school-age children to maintain healthy eating behavior.

A review of literature revealed that various intervention programs to promote healthy eating behavior for school-age children have been carried out in Thailand (Boonju, Chulakarangka, & Utaipatanacheep, 2008; Chotibang, Fongkaew, Mo-suwan, Meininger, & Klunklin, 2009; Katesira, 2004; Praphaiphin, 2007; Punnarong & Boonyasana, 2011), but few intervention program has been specifically for obese school-age children (Duangchan, Yoelao, Macaskill, Intarakamhang, & Suprasonsin, 2010; Thiangtham, Powwattana, Lagampan, & Maneedang, 2009; Pinsaimoon, & Banchonhattakit, 2009). Some of interventions to promote healthy behavior for obese school-age children found that the experimental group significantly improved healthy eating behavior after intervention implementing. Besides, some study had showed that intervention could decrease body mass index [BMI] of obese school-age children. The components of successful healthy eating intervention were training food skills, nutritional education, and social support. However, most of interventions did not derived from obese school-age children and their family's views including lack of their family and their school participation in the intervention process. Therefore, these interventions might not fit to the needs and the contexts in various regions of obese school-age children that lead to promoting healthy eating behavior in obese school-age children have to be unsustainable.

Studies suggested that the successful and sustainable intervention should be developed according to children's view and concerned children's contexts (e.g. family, school, and culture). Additionally, family and school should participate in the intervention (Van Cauwenberghe et al., 2010; Chotibang et al., 2009; Thomas et al., 2003). As the literature review, it seems that the effective intervention is needed to sustain healthy eating behavior. Therefore, developing suitable intervention for promoting healthy eating behavior in obese school-age children to meet their needs in each context is required. Besides, understanding children's perspectives and contexts, and participation between family and school are needed to develop intervention. These leads to obese school-age children can maintain their healthy eating behavior in later.

Bronfenbrenner's bioecological model (2005) is an evolving theoretical system for the scientific study of human development over time. This model views human development as the phenomenon of continuity and change in the biopsychological characteristics of human beings over the life course. The individual's behavior or development occurs within the interaction between various aspects of the individual and of the context in his or her environment. Studies suggested that this theory could provide insight and understanding of individual and contextual factors affecting the behavior's development (Tudge, Mokrova, Hatfield, & Karnik, 2009; Tudge, Otero, Hogan, & Etz, 2003). Therefore, this model is useful for a greater understanding the multiple factors influencing healthy eating behavior in obese school-age children that leads to develop appropriate promoting healthy eating behavior model for obese school-age children.

Action research would be an appropriate research approach to develop an effective intervention since it is a collaborative activity between the researcher and participants that can provide an opportunity to hear participants' opinion and voices for a wide understanding the problems in a specific context and try to seek and carry out solutions within that context (Meyer, 2006; O'Leary, 2004). As a result, the researcher concerns that action research is appropriate approach to develop a promoting healthy eating behavior model for obese school-age children because the collaboration between the researcher and participants (obese school-age children, parents, teachers, and nurses) can provide deeper understand problems and its factors regarding healthy eating behavior in obese school-age children within the actual context. Besides, the action process can empower obese school-age children and their parents to think systematically on how to change behavior for promoting healthy eating. Consequently, unhealthy eating behaviors in obese school-age children might be changed. For this study, the researcher facilitates the process, identifies, and creates action/ intervention plan for promoting healthy eating behavior in obese school-age children. The participants participate by confirming the problems and suggesting for modify the action/intervention plan. The effectiveness of the promoting healthy eating behavior model for obese school-age children will be test. Therefore, the researcher will employ a bioecological model of human development (Bronfenbrenner, 2005) as a conceptual framework and an action research [AR] as a methodology in this study to

develop promoting healthy eating behavior model for obese school-age children in Mahasarakham province, Thailand.

Research questions

1. What are healthy eating behaviors in obese school-age children?
2. What are the risk and protective factors of healthy eating behavior in obese school-age children?
3. What is an appropriate model of promoting healthy eating behavior for obese school-age children in Mahasarakham province?
4. How does a promoting healthy eating behavior model influence healthy eating behavior in obese school-age children in Mahasarakham province?

Research objectives

1. To analyze the current situation and factors related to healthy eating behavior in obese school-age children.
2. To develop a model of promoting healthy eating behavior for obese school-age children.
3. To evaluate the effectiveness of a promoting healthy eating behavior model for obese school-age children.

Research hypotheses

1. Knowledge about healthy food and healthy eating, beliefs about healthy eating, and healthy eating self-efficacy in obese school-age children have positive correlation with healthy eating behavior in obese school-age children.
2. Availability of healthy food at obese school-age children's home and school can enable healthy eating behavior in obese school-age children.
3. Action research process can be used as the process to develop of promoting healthy eating behavior model for obese school-age children.
4. After receiving the promoting healthy eating behavior model, the scores of belief about healthy eating, knowledge about healthy food and healthy eating, and healthy eating self-efficacy in obese school-age children will be higher than before

receiving the model.

5. After receiving the promoting healthy eating behavior model, scores of healthy eating behavior in obese school-age children will be higher than before the receiving the model.

6. After receiving the promoting healthy eating behavior model, availability of healthy food at obese school-age children's home and school will be better than before the receiving the model.

7. Obese school-age children, parents of obese school-age children, teachers, and nurses will be satisfied with the model of promoting healthy eating behavior in obese school-age children.

Philosophical underpinning

The philosophical underpinning of this study is critical theory. The ontology of critical theory is socially constructed. The reality is influenced by societal structures such as social, political, cultural, and economic. It is ideological and historically bound. The epidemiology of critical theory is transactional and subjectivist. The investigator and the investigated object are assumed to be interactively linked, with the value of the investigator. The findings are value mediated (Campbell & Bunting, 1991; Koshy, Koshy, & Waterman, 2011; Guba & Lincoln, 1994). Knowledge is created by inquiry through a dynamic interaction with the environment. To understand knowledge or the patterns of human behavior, the investigator must understand societal structures as well. The goal is to free participants from effect of ideology or free from constraint domination (Campbell & Bunting, 1991; Newman, 1992). At the methodology level, the aim is to transform the reality by raising the consciousness of participants. Dialogic approach is used seeks to eliminate false consciousness, energize, and facilitate transform (Guba, 1990).

For this study, the reality is promoting healthy eating behaviors model for obese school-age children that is shaped by societal structures. Naturally, school age-child have personality development and ability to focus cognitive activity on the important elements of a problem or situation. They enter a formal learning environment. School-age children learn to cooperate in group activities and develop increasing cognitive capacity and the ability to understand people, situations, and

events within their surrounding environments (Hutchison, 2008; Schlenker & Roth, 2011). Therefore, a nutrition concept can be learned in the school-age child.

School-age children's eating behaviors are developed through their cognitive process. They can interact with social environments (e.g. family food practices, school food service, and culture in food consumption of people in their community) to develop their healthy or unhealthy eating behavior. Therefore, obese school-age children's societal structures can shape developing their eating behavior (healthy or unhealthy eating behavior).

For epistemology of this study, because promoting healthy eating behavior for obese school-age children is shaped by societal structures, understanding individual obese school-age children and understanding their contexts or their environments are significant for the researcher. In order to access this reality, the researcher interacts with obese school-age children and other participants (e.g. their parents and teachers) to share understanding, intersubjectivity, to free them (obese school-age children) from dominant (emancipate) and bringing self knowledge and self reflection. The researcher interprets participants' telling about healthy eating behavior in obese school-age children (what participants say and how?) including understanding the contexts of obese school-age children through the researcher's experiences. Thus, the findings are value mediated.

The methodology of this study, the researcher modifies intervention aim to transform promoting healthy eating behavior for obese school-age that is shaped from societal structures by raising awareness or conscious of obese school-age children. Obese school-age children are energized and facilitated toward transformation. Additionally, both qualitative method and quantitative method are employed for collecting the data. Qualitative method include observing the contexts (e.g. home, school, and community environment), participants observation, interviewing participants (obese school-age children, parents, teachers, and public health nurses), and focus group discussion of participants. The questionnaires (e.g. healthy eating behavior, knowledge about healthy food and healthy eating, and healthy eating self-efficacy) are used for quantitative method.

Conceptual framework

The bioecological model of human development (Bronfenbrenner, 2005) is applied as the conceptual 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 individual's behavior or development occurs within the interaction between various aspects of the individual and of the context in his or her environment. The process-person-context-time model [PPCT] is the last revised Bronfenbrenner's theory of human development and has become the core of his theory for this time (Bronfenbrenner, 2005). This model relates to the interaction among four principal concepts (process, person, context, and time). Processes play a key role of human development and the forms of interaction between organism and environment are called proximal processes. These processes are the fundamental to theory that function as constructing the engines of development (Bronfenbrenner & Morris, 2006). The nature of the proximal processes producing development varies depending on the features of individual and of the context in environment, continues, and changes over time.

Person or the person characteristics refer to the biological and genetic aspects of the person in Bronfenbrenner's theory (2005). He divided three types of person characteristics that consist of demand, resource, and force characteristics. Demand characteristics act as personal stimulate to another person such as gender, age, and physical appearance. Resource characteristics are the characteristics that related to mental and emotional resource such as past experience, intelligence, skill, and knowledge. Force characteristics are related to the different in temperament, motivation, persistence, and the like.

The context, or environment, involves four interrelated systems that include microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 2005). The microsystem is first system such as the characteristics of parents or family, teachers, close friends, and others who participate in the life of developing person spends a good deal of the time engaging. For example, the parents' behavior may influence the child's behavior and the child's behavior may also influence parents' behavior. The mesosystem refer to people spend time in more than one microsystems. The interactions or activities will occur between two or more microsystems. For

instance, when the child spends time in home and school, the child's development will occur by interaction or activities between the child's home and school. The exosystem refers to a larger social system that the child may not be directly involved at this level, but it affects him/her anyway such as the parents' place of work, the school board, the mass media, and agencies of government. The macrosystem is the outermost layer in the child's environment. This layer refers to attitudes, ideologies, cultures, values, beliefs, and laws that affect the other system (micro-, meso-, and exosystem) (Bronfenbrenner, 1979, 2005).

Time is the final element of the PPCT model. Time plays an important role in the human development theory. It has a prominent place at three levels that consist of micro, meso, and macro. Micro-time refers to what is occurring during specific episodes (activities or interactions) of proximal processes. Meso-time refers to the extent to which these episodes over the time interval (such as days, weeks, and years). Macro-time or the chronosystem in the Bronfenbrenner's earlier writing is the developmental processes vary according to the specific historical events or occurring in large society across generations, and lifespan (Tudge et al., 2009).

For 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 including their personal characteristics [e.g. gender and any past experiences related to healthy eating behavior (food preferences, nutritional knowledge, perceptions of healthy eating behavior)]. 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. Obese school-age children's healthy eating behavior will be developed by interactions or activities with the immediate environment surrounding. For family characteristics, parents' perceptions of healthy eating behavior, family income, and family food practice can influence school-age children's healthy eating behavior. In school, characteristics of school such as school food policies, school food service, and school environment (e.g. close friends or peer group, chefs, and vendors

in school, and food shops in/ near school).

The mesosystems refer to the connection between obese school-age children's home and school. Obese school-age children spend time in both home and school. Thus, 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 are health care providers, community local markets, and food advertisement and mass media. Finally, healthy eating behavior in obese school-age children may be influenced by the macrosystems including cultures/ values of food consumption of people. Bronfenbrenner's bioecological model (2005) can provide a framework for identifying and conceptualizing the multi-system factors that influence children's behavior or development. Therefore, this model is useful for a greater understanding the multiple factors influencing healthy eating behavior in obese school-age children and help for developing appropriate promoting healthy eating behavior model for obese school-age children.

To promote healthy eating behavior in obese school-age children, obese school-age children, parents, teachers, and nurses should sharing information, experiences, and discussion for understanding factors related to healthy eating behavior in obese school-age children and developing the programs or strategies to promote healthy eating behavior in obese school-age children. Therefore, an approach that provides collaboration of obese school-age children, parents, teachers, and nurses to promote healthy eating behavior in obese school-age children is required.

Action research [AR] is performed as methodology to develop promoting healthy eating behavior model for obese school-age children. This approach is a group activity that emphasizes on collaboration between the researcher and participants in research process for improvement practices (Meyer, 2006). The process of AR is dynamic that involving the problem identification, planning, action and evaluation are interlinked (Waterman, Tillen, Dickson, & de Koning, 2001). The cyclical process of AR based on Kemmis and McTaggart (2000) are four steps that include the planning, implementing, reflecting, and re-planning.

In this study, the data collection comprised of three phases including 1) Situation analysis, 2) Model development, and 3) Model evaluation.

Phase I: Situation analysis is to analyze the current situation and factors related to healthy eating behavior in obese school-age children based on the bioecological model (Bronfenbrenner, 2005) by using quantitative and qualitative data. What problems, barriers, and noises that participants (obese school-age children, parents, teachers, and nurses) want to solve related to eating behavior, and risk and protective factors related to healthy eating behavior in school-age children will be identified by the researcher.

Phase II: Model development is to develop the promoting healthy eating behavior model for obese school-age children. The researcher created the draft of action plan based on data analyzing and synthesizing in phase I and literature reviews from existing interventions. All participants collaborated with the researcher for development promoting healthy eating behavior model for obese school-age children through the action research process. This process consists of four steps: 1) planning, 2) implementing, 3) reflecting, and 4) re-planning. The model was developed based on the results of phase I through the process of AR based on Kemmis and McTaggart (2000).

Phase III: Model evaluation is to evaluate the effectiveness of a promoting healthy eating behavior model for obese school-age children. The researcher assessed the outputs and outcome at one month after the end of the implementing process. The outputs consist of: 1) knowledge about healthy food and healthy eating, 2) beliefs about healthy eating, 3) healthy eating self-efficacy, 4) availability of healthy food at home and school, and 5) participants' satisfaction toward the model. The outcome is healthy eating behavior in obese school-age children. The conceptual framework, based on bioecological model (Bronfenbrenner, 2005) and research procedures through action research process (Kemmis & McTaggart, 2000), is shown in figure 1-1.

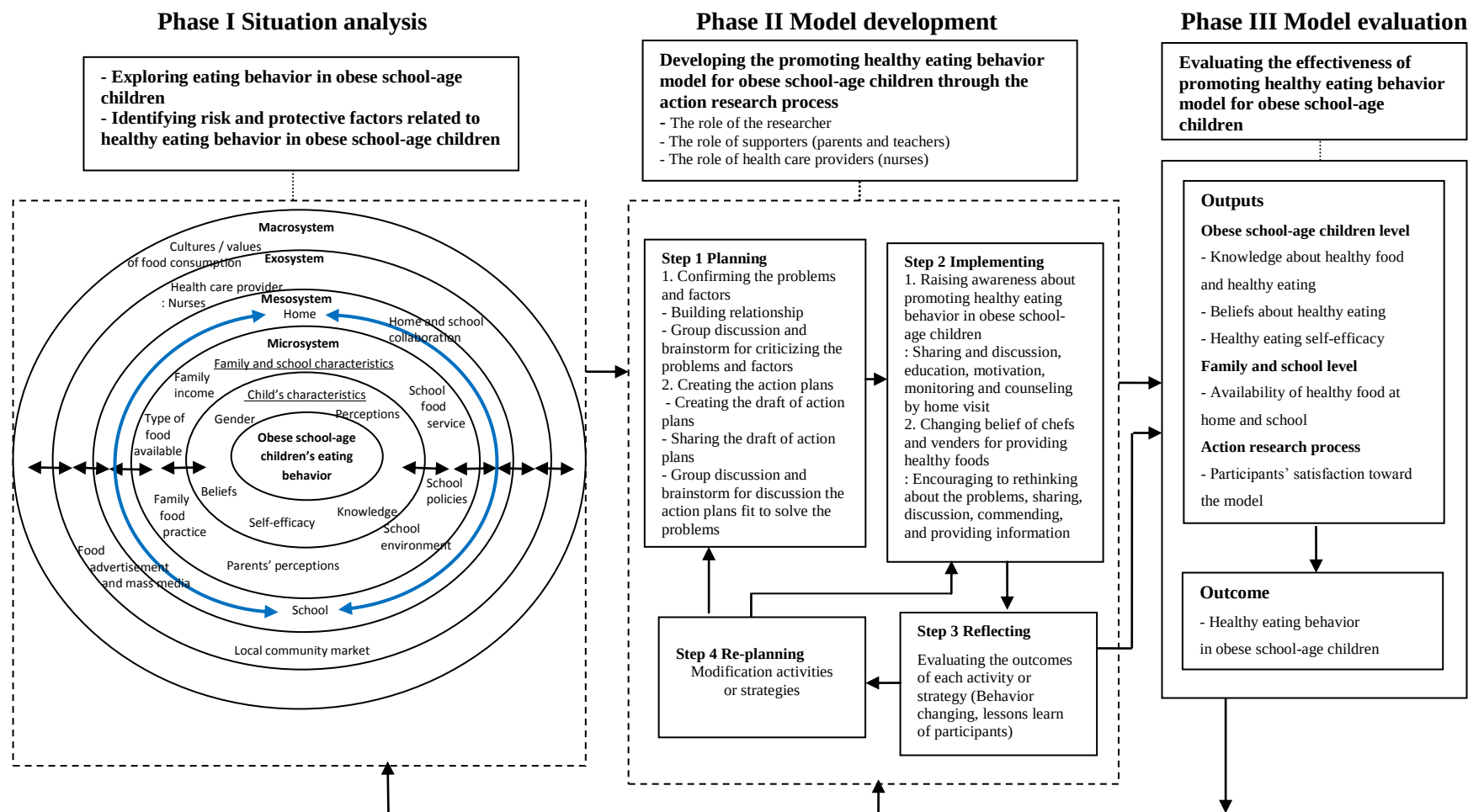


Figure 1-1 Conceptual framework and research procedures of development of a promoting healthy eating behavior model for obese school-age children

Scope of study

The action research aimed to develop promoting healthy eating behavior model for obese school-age children in Mahasarakham province, the Northeastern Thailand. The population of this study consisted of school-age children from one primary public school, parents of obese school-age children, teachers, and nurses in “Hua Khwang Municipality Community” located in Hua Khwang sub-district, Kosumpisai district of Mahasarakham province from April 2014 to May 2015.

The independent variable was the promoting healthy eating behavior model for obese school-age children. The dependent variables consisted of obese school-age children’s knowledge about healthy food and healthy eating, beliefs about healthy eating, healthy eating self-efficacy, availability of healthy food at obese school-age children’s home and school, obese school-age children, parents of obese school-age children, teachers, and nurses’ satisfaction toward the model, and healthy eating behavior in obese school-age children.

Definition of terms

Promoting healthy eating behavior model for obese school-age children refers to a model to promote healthy eating behavior for obese school-age children. This model was developed based on the bioecological model of human development perspective. The model components were developed based on the results analysis in situation analysis of phase I, synthesis of the activities occurring within the process of action research, and by reviewing related concept.

Obese school-age children are children studying in grades 4-5, aged between 10-12 years and defined as overweight or obese by weight for height (wt/ ht) $\geq 2 SD$ (Department of Health, Ministry of Public Health, 1999).

Knowledge about healthy food and healthy eating refers to obese school-aged children’s remembering and understanding in the fact about healthy food, healthy eating behavior, and the advantages of healthy eating behavior and disadvantages of unhealthy eating behavior. It was measured by questionnaire modified from food consumption knowledge questionnaire (Sukaranandana, 2005).

Belief about healthy eating refers to obese school-age children’s conviction of healthy eating behavior is good for their health including four components are as

follows: 1) perceived susceptibility of overweight or obesity, 2) perceived severity of overweight or obesity, 3) perceived benefits and barriers of healthy eating behavior, and 4) cues to action for healthy eating behavior. It was measured by questionnaire modified from beliefs in practice on healthy eating behavior questionnaire (Plengkratoke, 2011) based on health belief model of Becker and Maiman (1975).

Healthy eating self-efficacy refers to confidence in the ability to perform healthy eating behavior of obese school-age children. It was measured by questionnaire modified from healthy eating self-efficacy questionnaire (Duangchan, 2010).

Availability of healthy food at home and school refers to the foods that are good for health and provided by parents of obese school-age children and school personnel. These foods are easily gettable to eat for obese school-age children in their home and school. It was assessed with questionnaire and observation guidelines developed by the researcher.

Healthy eating behavior refers to eating practices of obese school-age children that include eating well-balanced diet according to the 5 food groups and appropriate amounts of nutrients for the body requirement, eating plenty of vegetables and fruits regularly, and avoiding eating high fat foods, high sugary foods, sugar-sweetened drinks, and snacks. It was assessed by questionnaire modified from healthy eating behavior questionnaire (Duangchan, 2007), in-depth interviewing obese school-age children, and observation.

Participant's satisfaction toward the model refers to a participant's perception of promoting healthy eating behavior model for obese school-age children that includes feeling pleasure to collaborate with the strategies for promoting healthy eating behavior in obese school-age children and getting advantages from these strategies. It was assessed by focus group discussion with obese school-age children, parents of obese school-age children, teachers, and nurses.

Parent is defined as 1) a father or a mother, 2) a person acting as a father, a mother or guardian (Collins English Dictionary, 2014). For this study, a parent refers to a father, a mother, or relative who is the most significant person that looks after the obese school-age children's daily activities, foods, and school tasks.

CHAPTER 2

LITERATURE REVIEWS

This chapter describes a review of related literature as covering the topics are as follows: 1) The nature of school-age children, 2) Healthy eating behavior among school children, 3) Unhealthy eating behavior among school children, 4) Factors influencing healthy eating behavior among school children, 5) Overweight and obesity in school-age children, 6) Programs for promoting healthy eating behavior in obese school-age children, 7) Action research approach to promote healthy eating behavior in obese school-age children, and 8) Related concepts used for the development of the study interventions.

The nature of school-age children

School-age children refer to children between 6 and 12 years old. Each year children grow 2 to 3 inches of height and add 6 pounds of weight. The school-age period has been called the latent time of growth. The rate of growth slows, and body changes occur gradually. However, resources are being laid down for the rapid adolescent growth ahead (Williams, 1994; Boyd & Bee, 2009). Girls in the school-age are ahead of boys in their overall rate of growth. Normally, girls mature two years faster than boys. Adolescent age starts from around 10-11 years old for girls and 12-13 for boys. The maturity is related more to total body weight than to age. It seems to be initiated when the weight reaches about 30 kg (66 lb). At this point, there is a very marked increase in height followed in six months to one year by marked gain in weight (Wiseman, 2002). At the beginning, girls are usually taller and heavier than boys. Girls have slightly more body fat and slightly less muscle tissues than boys. They also experience breast development. Generally, boys have more lean body mass per centimeter of height. At about 12 years of age, girls have attained around 94 % of their adult height, while boys have reached only 84 % of theirs (Tanner, 1990).

One of the core psychosocial developments of school-age children is the development of a sense of industry versus feeling of inferiority. A major development of children is to develop belief in the ability to be industrious instead of a belief in

being inferior to their friends (Erikson, 1963). The feelings of inferiority in children will not be developed or occurred if they are able to realize a sense of industry. Children develop increasing mental powers, ability to work out problems, and deal with competitive activities. They develop abilities to participate in group activities and begin to experience a sense of adequacy and accomplishment. However, sometimes children have frustration over not winning. Children have a growing desire to assert individuality and independence. Children begin to move from dependence on parents to peers which is the first step in preparing themselves for maturity and self-growth. They can be critical of peers and adults and are self-conscious of their ability. Moreover, pressures are initiated for self-control of a growing body and also produce changes in previously learned habits and negative attitudes (Williams, 1994).

For nutrition, when it comes to food choice, school-age children are much more independent. Frequently, they start eating away from home and make their own choice of food. An adequate intake of energy and other essential nutrients is critical to support normal growth and development of children. During this period, food requirement per unit of body weight is gradually decline due to the slower rate of growth. There is little difference between sexes before approaching adolescence. Children need energy vary according to age, body size, and physical activity (Sardesai, 2012). Obesity at this age is a serious and alarming public health problem. It is a significant risk factor for morbid obesity in later years. Research indicated that about 40 % of obese children become obese adults. Significant weight gain generally begins between ages 5 and 7, during puberty, or during the teenage years (Wardlaw & Smith, 2009).

Consequences of overweight in childhood include psychosocial and physical effects such as discrimination from others, depression, a negative self-image, diabetes mellitus, and hypertension. Especially, overweight and obesity are major risk factors of chronic diseases. Although genetic predisposition is an important factor in obesity development, the increases in the prevalence of overweight children cannot be explained by genetic alone. Factors that lead to excess energy intake for the pediatric population are children making more food and eating decision, large portion sizes, decreased physical activity, abundant availability of high-calorie food choices, and parental neglect (Lucas, Feucht, & Ogata, 2012; Wardlaw & Smith, 2009). Besides,

research mentioned that unhealthy eating behavior was significant lifestyle risk factor of metabolic syndrome in comparison to other factors (Lee et al., 2011). Therefore, promoting healthy eating behavior is totally essential and immediately needed, especially among obese school-age children.

Healthy eating behavior among school-age children

Healthy eating behavior was defined as eating a varied and balance diet of all essential nutrients (carbohydrates, fat, proteins, minerals, vitamins, and water) that can enable a person to achieve “a state of optimal physical, mental, and social well-being; relative freedom from disease or disability” (Nix, 2013; WHO, 2011). However, people have different beliefs, cultures, traditions, and religion that influence behavioral patterns and lifestyles. Many studies suggested that the meanings of healthy eating behavior are maintaining national food guide (House, Su, & Levy-Milne, 2006; Paquette, 2005).

For instance, in USA, the Department of Health and Human Services [HHS] Secretary Kathleen Sebelius announced the 2010 Dietary Guidelines for Americans to promote health, reduce the risk of chronic diseases, and reduce the prevalence of overweight and obesity through improved nutrition and physical activity. These guidelines focus on balancing calories with physical activity, and encourage Americans to consume more healthy foods like vegetables, fruits; whole grains, fat-free and low-fat dairy products, seafood, and to consume less sodium, saturated and trans fats, added sugars, and refined grains (Department of Health and Human Services, United State, 2010). To meet a healthy eating pattern while staying individuals' calories needs, the following guidelines are the key recommendations for foods and nutrients to increase: 1) Vegetable and fruit intake, 2) A variety of vegetables, especially dark-green and red and orange vegetables and beans and peas, 3) Consume at least half of all grains as whole grains. Increase whole-grain intake by replacing refined grains with whole grains, 4) Intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages, 5) Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds, 6) The amount and variety of seafood consumed by choosing seafood in place of some meat and poultry, 7) Replace protein foods that are higher in

solid fats with choices that are lower in solid fats and calories and/ or are sources of oils, 8) Use oils to replace solid fats where possible, and 9) Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D.

For Thailand, to have optimal growth and promote health, Bureau of Nutrition, Department of Health, Ministry of Public Health suggests Thai people eat enough food and eat good food. Eat enough food means eat foods from the five food groups in the amount that is appropriate for the body's requirement. Eat good food that means eat a wide variety of foods daily. Moreover, Bureau of Nutrition, Department of Health, Ministry of Public Health, other nutritionist, and health personnel from various universities had developed Thai food-based dietary guidelines [FBDGs] to promote healthy eating behavior in Thai population (for Thai 6 years of age and older). There are two parts that include nine guidelines and food guide model “nutrition flag” (Sirichakwal & Sranacharoenpong, 2008; Working Group on Food-Based Dietary Guidelines for Thai People, Nutrition Division, Department of Health, Ministry of Public Health, 2001). The nine guidelines are: 1) eat a variety of food from each of the five main food groups and maintains proper weight, 2) eat adequate of rice and alternative carbohydrate sources, 3) eat plenty of vegetables and fruits regularly, 4) eat fish, lean meat, eggs, legumes and pulses regularly, 5) drink milk in appropriate quality and quantity amounts for one's age, 6) eat a diet containing appropriate amount of fat, 7) avoid sweet and salty foods, 8) eat clean and safe food, and 9) avoid or reduce the consumption of alcoholic beverages.

In the Thai food guide model “nutrition flag”, it is designed to be “wider at the top then narrower toward the bottom” to indicate foods required in various amounts that Thai people should have each day (Figure 2). The amount of foods from each level in this model is recommended in range that needed depend on age, sex, daily activity, and adult need more than children, and male need more food than female. The following is the portions in the “nutrition flag”.

Level 1: Rice and starchy food group. People should eat this group the most and it is recommended about 8-12 rice-serving spoons. This group provides the main source of carbohydrate and energy.

Level 2: Vegetable and fruit group. Vitamins, minerals, and dietary fiber are the main source in this group. The recommendation of vegetable and fruit is 4-6

rice-serving spoons and 3-5 portions, respectively.

Level 3: Meat, legumes, egg, and milk group. Eating appropriate amount in this group provide good quality protein, iron, and calcium. The amount of meat is recommended 6-12 spoons, and 1-2 glasses of milk.

Level 4: Oil, sugar, and salt. This group should eat limit amount.



Figure 2-1 Thai food guide model “nutrition flag” (Working Group on Food-Based Dietary Guidelines for Thai People, Nutrition Division, Department of Health, Ministry of Public Health, 2001).

For school-age children, healthy eating behavior is crucial for their growth and development. It also can increase good learning at school and improve concentrate, behavior, and social skill. Most of studies indicated healthy eating behavior in school-age children are as describes following:

1. Eating a balanced diet which consists of fruit, vegetables and starchy foods, as well as some protein-rich foods, milk and dairy products (low fat versions where possible are recommended, such as skimmed, semi-skimmed or 1 % fat milk),

and small amounts of foods high in fat and sugar, including eating a variety of foods in line with the UK healthy eating model (O'Connor, 2011).

2. Eating regarding fruit, vegetable, whole-grain, and dairy choice, including drinking minimal amounts of sugared soft drinks (Wardlaw & Smith, 2009).

3. Eating a variety of foods from each food group, including plenty of fruits, vegetables, whole grains, and lean sources of protein, low-fat dairy and healthy fats (Martinez, 2011).

4. Eating a variety of foods, adequate amounts of vitamins and minerals, large amounts of vegetables and fruits, and moderate amounts of fat (Florence, Asbridge, & Veugelers, 2008; MacLellan, Taylor, & Wood, 2008; Wang & Veugelers, 2008), including eating less amount of higher in sugar and/ or fat and low in vitamins and minerals, such as potato chips, French fries, hamburgers, hotdogs, and sweetened beverages (Kristjansson, Sigfusdottir, & Allegrante, 2010).

In conclusion, it seems that healthy eating behavior in school-age children should be defined as 1) Eating a balance diet according to the main food group, 2) Eating vegetables and fruits, 3) Eating whole grains, lean sources of protein, and 4) Eating small amount of foods high in fat and sugar as well as sugared soft drinks.

Unhealthy eating behaviors among school-age children

Unhealthy eating behaviors in children refer to consuming food that is high in fat, sugar and salt, including low intake of fruits, vegetables, and whole grains and calcium-rich foods or do not meet recommended dietary guidelines (Gregory et al., 2000; Institute of Medicine, 2007; Story, Neumark-Sztainer, & French, 2002). Such the school-age child begin eat food prepared away from home and they are much more independent for making their own food choices (Tessmer, 2002). Besides, the increasing numbers of socio-economic phenomena changes in diets and lifestyle currently. Consequently, school-age children have been increasing unhealthy eating behaviors. Several aspects of unhealthy eating behaviors among school-age children should be concerned: 1) consuming high sugary beverages, 2) consuming fast foods, high fat foods, and unhealthy snacks, 3) skipping breakfast, and 4) consuming vegetables and fruits not meeting recommendation (Kanchanachitra, Podhista, Archavanitkul, & Im-em, 2005; Department of Health, Ministry of Public Health,

2010; MacKay, Antonopoulos, Martin, & Swinburn, 2011).

Consuming high sugary beverages

School-age children regularly eat beverages may not be taking in the nutritional value because many of these beverage are convenient or easy to find. Studies indicated that more than half of children in school consume at least one soft drink each day at school (Whitney & Rolfes, 2008). Sugar-sweetened beverages [SSBs] are beverages that contain added caloric sweeteners such as sucrose, high-fructose corn syrup or fruit-juice concentrates, all of which result in similar metabolic effects. They include the full spectrum of soft drinks, carbonated soft drinks, fruitades, fruit drinks, sports drinks, energy and vitamin water drinks, sweetened iced tea, cordial, squashes, and lemonade. In U.S., the prevalence of heavy total SSBs consumption (≥ 500 kcal/ day) increased among children aged 2-11 years from 4 % to 5 % (Han & Powell, 2013). From the Korea National Health and Nutrition Examination Survey, 2008-2011, it found that 20.8 % of Korean children and adolescents aged 7 to 18 years consumed ≥ 1 cup/ day of SSBs (Lee, Kwon, & Lee, 2013), which is lower than the figure of 22.8 % reported in a study of Australian children aged 2 to 16 years (Grimes, Riddell, Campbell, & Nowson, 2013). In Thailand, Thai school children consume an average of 200 cc of sugared soda drinks per day in 2007 (Department of Health, Ministry of Public Health, 2010).

Research found that SSBs were associated with long-term weight gain, type 2 diabetes, and cardiovascular disease [CVD] risk (Hu & Malik, 2010). The review of effects of soft drink consumption on nutrition and health revealed that soft drink intake was association with increased energy intake and body weight, and lower intakes of milk, calcium, and other nutrients and with an increased risk of several medical problems (e.g. diabetes) (Vartanian, Schwartz, & Brownell, 2007). Therefore, consuming high sugary beverage daily among school-age children can lead to increased energy intake, body weight, the health risk of chronic disease, especially type 2 diabetes.

Consuming fast foods, high fat foods, and unhealthy snacks

Presently, diet and life style has changed from the shift of the socio-economic. School-age children and their family often eat prepared away from home. Most of restaurants serve as increasingly larger portions of food and food high in fat,

salt, and sugar. Fast food restaurants extensively market to young people in USA. Study found that about 42 % of the children ate fast food. Moreover, this study revealed that children who reported eating fast food had higher intake of energy, fat, saturated fat, sodium, carbonated soft drink, and lower intake of vitamins A and C, milk, fruits and vegetables than those who did not reported eating fast food (Paeratakul, Ferdinand, Champagne, Ryan, & Bray, 2003). Studies also showed that children were consuming too much saturated fat, most of which comes from whole milk, full fat dairy product, and fatty meats (Wardlaw & Smith, 2009).

Unhealthy snacks refers to foods that have inappropriate proportions of carbohydrates, protein, and fat, and low vitamins and minerals (Chearsawud, 2001). Snacks are commonly eaten by school-age children, primarily after school and in the evening. Because school-age children have independency for making choice their own foods and have money to spend, they tend to consume more snacks from vending machines, fast food restaurant, and stores. In Thailand, there are many kinds of fast food with high calories, high fat, carbohydrate, and sugar contents. For example, readily available foods included fried chicken, fried meatballs, fried sausage, French-fried potatoes, donuts, hamburgers, hotdogs, pizza, sandwiches, roti (fried unleavened bread), crepes, and packaged snacks. There are many Thai school-age children often like to eat snacks. For instance, one study found that more than 90 % of students in primary school in Sarabri province, Thailand, ate fried chicken 3-4 times per week, and more than 80 % had eaten fried meatballs 3-4 times per week (Banchonhattaki, Tanasugarn, Pradipasen, Miner, & Nityasuddhi, 2009). Moreover, about 49.6 % of Thai school-age children consumed unhealthy snack foods in 2011 (Department of Health, Ministry of Public Health, 2011).

Studied indicated that consuming too much snacks and fast foods can lead to health risk problems such as high cholesterol and hyperlipidemia (Wardlaw & Smith, 2009; U.S. Department of Health and Human Services, Substance Abuse & Mental Health Service Administration, 2012). Consequently, these problems contribute to chronic diseases (e.g. hypertension, diabetes, and heart diseases).

Skippping breakfast

Today many school-age children are responsible for preparing their own breakfast. It is not uncommon for children to skip this meal completely, even children

in the primary grades. Study found about 32 % of school-age children aged 10-16 years in the UK skipped breakfast before school (Cambell, 2010). About 22 % of the Northern Italian children aged 6-14 years was skipping breakfast. Moreover, 27.5 % and 9.6 % of these children were overweight and obesity, respectively (Vanelli et al., 2005). In Thailand, skipping breakfast in school-age children should be concerned. Research revealed that 2.7 % and 3.8 % of the Thai children grade 5-6th skipped breakfast on weekdays and weekends, respectively. About 59.9 % of children skipped breakfast on weekdays because they were not hungry and 47.7 % of these children did not have time or wake up late (Nounmusig, 2007).

Breakfast is particular crucial for a school-child. Breakfast prepares the child for problem-solving and memory spans in the learning hour at school. Studies suggested that children who eat breakfast are more likely to meet their needs for vitamins and minerals and eat more calories and nutrients than those who skip breakfast (Wardlaw & Smith, 2009; Wilson, Parnell, Wohlers, & Shirley, 2006). In addition, skipping breakfast also related to body weight. A cross sectional study conducted by Ming, Ying, and Kassim (2006) in Kuala Lumpur found that breakfast skipping was significantly associated with body mass index. Therefore, skipping breakfast among school-age children may contribute dietary inadequacies and an unbalanced diet may impact on their growth and development.

Consuming vegetables and fruits not meeting recommendation

Vegetables and fruit contain essential nutrients that are important for a child's health, growth and development. Vegetables and fruit have multiple health benefits because they can provide vitamins, minerals, fibers; also have other plant substances that are thought important to help reduce the risk of some cancers and heart disease. However, most of school-age children do not meet vegetables and fruit recommendation. Research found that two-thirds of the children aged 4-11 years in West Midlands and Worcestershire of England did not consume any fruit at lunchtime and only 3 % of children consumed at least one portion as part of their school meal. The proportion of children consuming some quantity of vegetable at lunchtime was more than double that consuming fruit (Upton, Upton, & Taylor, 2012). In Thailand, school-age children consumed vegetables 1.5 spoonfuls per day but in fact they should have vegetable at least 12 spoonfuls per day (Department of Health, Ministry

of Public Health, 2010). In 2011, 68 % and 55 % of school-age children consumed vegetables and fruits respectively were less than one serving spoons per day (Department of Health, Ministry of Public Health, 2011). Thus, school-age children do not consume vegetable and fruit as dietary recommendation school-age children may have the risk of chronic disease such as cardiovascular disease, stroke and cancer.

In conclusion, unhealthy eating behaviors among school-age children have several aspects that lead to negative short and long term health effects. Eating unhealthy foods such as food contain high fat can affect heart health, high sugar can lead to type 2 diabetes, and high salt can raise blood pressure (Building Blocks for a Health Future, 2012). The World Health Organization [WHO] also mentioned that unhealthy eating behaviors (such as eating low vegetable and fruits, high fat and sugar foods) can promote obesity and lead to chronic diseases such as diabetes, cardiovascular diseases, and cancer. Particular low fruit and vegetable intake is among the top 10 selected risk factors for global mortality (WHO, 2003). Besides, not having breakfast can affect children's intellectual performance (Pollitt & Matthews, 1998; Kleinman et al., 2002). Therefore, in order to promote healthy eating behavior in school-age children, understanding factors related to unhealthy and/ or healthy eating behavior is required.

Factors influence healthy eating behaviors among school-age children

1. Intra-individual factors

Psychological aspects include feelings and emotions that can force school-age children to eat and drink. Preference, children do not eat foods that they do not like. A study found that school-age children's preference and liking in Iceland were significant of fruits and vegetable intake (Kristjansdottir et al., 2006). School-age children in Europe with positive liking and taste preference of fruits and vegetables were more likely to eat fruits and vegetables (Brug et al., 2008). Gallaway, Jago, Baranowski, Baranowski, and Diamond (2007) found that fruits, juice, and vegetables preference and availability were both significant predictors of FJV consumption in school-age children in USA. The review of determinants of healthy eating behavior in children also suggested that food preference is a strong factor of healthy eating

behavior (Taylor et al., 2005). Child's preference also associated with foods exposure and consumptions (Wardle, Herrera, Cooke, & Gibson, 2003).

Beliefs and attitudes were indicated that associated with food choice and eating behavior. Health-related behavior and beliefs established during childhood have been linked to patterns of behavior in adulthood (Wadsworth, 1992). Rozin (1996) revealed that beliefs about food "which foods are thought to be good for you" are indirect individual influencing food choice. Studies also suggested that attitudes to food are related to human eating behavior (Eertmans, Baeyens, & Van den Bergh, 2001; Roefs & Jansen, 2002). Better knowledge increased positive attitude toward nutrition and led to selecting healthy diet and eating behavior among Taiwanese elementary school children (Lin et al., 2007).

Emotions such as anger, joy, grief, and sympathy are related to children's eating behavior (Veselá & Grebeňová, 2010). Negative emotions such as anger, frustration, and insecurity can lead to disturbances in eating behavior that lead to undernourished or over-nourished status (Pender, Murdaugh, & Parsons, 2006). Yang, Kim, and Yoon (2010) found that depression, anxiety and low self-esteem were correlated with disturbed eating attitudes and behaviors in 4th and 7th grade South Korean students. Stress coping was found to be positively correlated with snacking behavior among 4th to 9th grade students from elementary schools and high schools (Shimai, Kawabata, Nishioka, & Haruki, 2000). Moreover, Puder and Munsch (2010) mentioned that depression and anxiety were associated with uncontrolled eating behavior leading to childhood obesity.

Nutrition knowledge, a child learns at an early age and nutrition knowledge is gradually gained throughout childhood (Ayieko & Anyango, 2011). Many researchers indicated that nutrition knowledge was associated with children's eating behaviors. Donkitphai (2001) mentioned that knowledge was an intrinsic factor influencing eating behaviors. Choi et al. (2008) suggested that proper nutritional education and intervention are required for the improvement of elementary school children's nutrition knowledge, nutrition attitudes and dietary behaviors in the Seoul area. Hendrie et al. (2008) found that nutrition knowledge was a significant predictor of dietary intakes, and it was needed for better dietary intake habits. Nutrition knowledge, caring about nutrition behaviors, and dietary quality scores were in positive

relationship among Taiwanese elementary school children (Lin et al., 2007). Oldewage-Theron and Egal (2010) found poor nutrition knowledge was associated with malnutrition of primary schools in rural QwaQwa, South Africa. Moreover, research has demonstrated that obesity among school children was associated with limited nutrition knowledge and unhealthy eating habits (Triches & Giugliani, 2005). However, Pirouznia (2001) found that the relationship between nutrition knowledge and eating behaviors in children was insignificant for 6th grade students in middle schools in Lima, Ohio. Reinehr, Kersting, Chahda, Wollenhaupt, and Andler (2001) also found that the lack of nutrition knowledge was not more likely to be a cause of obesity in childhood.

2. Intra-family factors

Families play a main influence on children's eating behaviors because it is their first social group and the basis of resource for growth and development of children.

Parents act as an essential role in their children's lives such as nurturers, teachers, disciplinarians, role models, and supervisors. Parents could shape children's early experiences with foods and eating strongly (Savage, Fisher, & Birch, 2007). Parents' preferences, beliefs, and attitudes were related to children's knowledge, preferences, and consumption (Patrick & Nicklas, 2005). Parental modeling, the role of parents could affect children's eating behaviors since children learnt about eating by watching others. Lazarou et al. (2008) mentioned that parenting styles seemed to be associated with the development of their children's dietary beliefs and behaviors. Positive/ negative parental modeling of dietary behaviors was related to intakes and eating patterns of children (Brown & Ogden, 2004; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002; Tibbs, Haire-Joshu, & Schechtman, 2001). Parents' nutrition knowledge and educational status affected purchasing nutritional qualities and size of portions served to children (Davison & Birch, 2001; Zive, Pelletier, Sallis, & Elder, 2002). Parents with high nutrition knowledge were more likely to have a lower prevalence of overweight children in primary schools in Kuala Lumpur (Variyam, 2001). Ra'sa'nen et al. (2003) also revealed that parents' nutrition knowledge related to making healthy food choices for children. However, they suggested that other factors as well as knowledge probably influenced parents' dietary decisions. For

parents' educational status, Veselá and Grebeňová (2010) mentioned that the education of parents had a significant impact on a family lifestyle and an eating pattern of children. Moreover, higher parental education had been associated with health consciousness in food choices of children (Patrick & Nicklas, 2005).

Grandparents took a major role for caring of grandchildren in recent years (Nanthamongkolchai, Munsawaengsub, & Nanthamongkolchai, 2009; Kataoka-Yahiro, Ceria, & Yoder, 2004; Davidhizar, Bechtel, & Woodring, 2000). Jingxiong et al. (2007) revealed that grandparents were dominant in shaping children's eating behaviors in three-generation families in urban China areas since they were the primary caretakers of children and their attitudes influenced young children's nutrition and eating habits. In addition, Kicklighter et al. (2009) established that increasing nutrition knowledge of African-American grandparents was associated with healthy eating for their grandchildren. However, some research found grandparents in Australian families provided their children with unhealthy foods (Roberts & Pettigrew, 2010).

Family income, higher income families were more likely to meet the recommended daily consumption of fruits and vegetables and recommended numbers of daily servings for daily products more than lower income families (Xie, Gilliland, Li, & Rockett, 2003). Slusser et al. (2011) found that the cost of foods was the most common barrier to have healthy foods in low income families from the Los Angeles Unified School District. However, some studies showed that family income was not related to the consumption of vegetables in children aged 6-11 years (Pearson, Biddle, & Gorely, 2008).

Food availability and accessibility at home, Taylor et al. (2005) revealed that food availability at home were significant factors of healthy eating behaviors in children. Children were more likely to eat more fruits and vegetables that were available and easily accessible at home (Cullen, Baranowski, Rittenberry, & Olvera, 2000; Wardle et al., 2003). Moreover, some research indicated that exposure to foods was significantly related to school-age children's liking and consumption of those foods (Wardle et al., 2003).

Family meals had a positive and negative influence on healthy foods and nutrients of children. Frequency of family meals was positively associated with

intakes of fruits, vegetables, grains, calcium-rich foods, protein, calcium, iron, fiber, and vitamins, but family meals were negatively associated with soft drink consumption (Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003).

Family relationship, the relationship between parents and children associated with child's food consumptions (Veselá & Grebeňová, 2010). Kaplan, Kiernan, and James (2006) found intergenerational family conversations related to decision making about healthy eating behaviors in school-aged children in Pennsylvania. Moreover, intergenerational eating pattern was correlated to childhood obesity (Kime, 2011).

3. Peer influence

Peer is an important influence on children's health beliefs and behaviors. School-age children spend most of the day at school or anywhere that they meet with their peers or friends (Veselá & Grebeňová, 2010). School-age children are influenced by what their peers eat. Research suggested that peers are considered to be a model eating behavior for children and adolescents (Taylor et al., 2005). Greenhalgh et al. (2009) found positive peer modeling effected on children's consumption of new food. Another study determined the increasing of fruits and vegetables consumption in children linked to peer modeling (Lowe, Horne, Tapper, Bowdery, & Egerton (2004). In another way, Myer and Gast (2008) ascertained peer modeling and reinforcement constructed disordered eating behavior among 6th, 7th, and 8th grade school children. However, studies suggested that peer modeling is strong predictors of eating behavior in adolescents (Lieberman, Gauvin, Bukowski, & White, 2001; Veselá & Grebeňová, 2010).

4. Intra-school factors

School environment provides several opportunities for delivering content and skills on health and development issues among students and teachers as well as parents (WHO, 2006). Schools are considered as educational, social and physical environment for children. For Taiwanese elementary school, unfavorable overall school performance was positively associated with unhealthful eating patterns in children, which included high intake of low-quality food such as sweet and fried foods (Fu, Cheng, Tu, & Pah, 2007). School administrators were viewed as significant role models for children and accelerators for the achievement of healthy eating behavior in

children (Shahid, 2003). School nutritional policies and school food service could improved student's dietary intake and decreased overweight and obesity (Jaime & Lock, 2008). School meals can affect healthy eating behavior in children. Research found that food available to school-age children at school had a significant impact to the healthy foods consumed (Taylor et al., 2005). Additionally, Gleason and Dodd (2009) mentioned that school breakfast program participation may be a protective factor of childhood obesity.

5. Mass media factors

Nowadays, mass media has become a crucial influence on children's eating behaviors. There are multiple medium channels (e.g. television, radio, magazines, and the internet) to deliver food advertisements to raise public interests. Food advertisements could have an effect on food preferences, food purchases, children's food requests, knowledge, attitudes, development of dieting behaviors, and body weight (Taylor et al., 2005; Story & French, 2004). They could have positive/negative effects on eating behaviors on children. The media, particularly television, had great impact on children's healthy eating (Taylor et al., 2005). Studies found that television advertisements affected increasingly unhealthy food consumption in children such as sweets and/ or soft drinks (Cullen et al., 2000; Vereecken, Todd, Roberts, Mulvihill, & Maes, 2005).

6. Cultural factors

Cultural practices in most countries had very great influences on what people ate, how they prepared foods, their feeding practices and the foods they preferred (Jerome, Pelto, & Kandel, 1980). Cultural beliefs and practices related to food vary among ethnic groups. For example, African-American children and adolescents had higher total energy intakes and greater consumption of cholesterol, fats, and carbohydrates as compared to Euro-Americans (Nicklas et al., 1995). Cultural traditions were associated with eating patterns of adults and their children for choosing foods to eat (Kumanyika, 2008) and childhood obesity, especially in developed countries (Carprio et al., 2008; Kumanyika, 2008; Lockyear, 2004). In addition, studies found that family cultures were related to healthy eating behaviors in children and childhood obesity (Kime, 2009, 2011).

Overweight and obesity in school-age children

Overweight and obesity in children is defined as children have excessive weight gain more than is appropriate for their height, age, and sex (Boyd & Bee, 2009). According to the Centers for Disease Control and Prevention [CDC] in United States of America, weight status is measured by body mass index [BMI] are:

1. Children are overweight if their BMI is above the 85th percentile (but below the 95th) for children of the same age and sex.
2. Children are obese if their BMI is equal or above the 95th percentile for children of the same age and sex.
3. Children are normal weight if their BMI between the 5th and less than the 85th percentile for children of the same age and sex.
4. Children are underweight if their BMI below the 5th percentile for children of the same age and sex.

In Thailand, standard growth chart weight for height ration developed by The Nutrition Division of the Ministry of Public Health (Department of Health, Ministry of Public Health, 1999) is used to specific determined for overweight and obese among Thai children from birth to nineteen years as described following:

1. Children who are above +3 *SD* are classified as obesity.
2. Children who are between +2 *SD* to +3 *SD* are classified as overweight.
3. Children who are +1.5 *SD* to +2 *SD* are classified slightly overweight.
4. Children who are +1.5 *SD* to -1.5 *SD* are classified normal weight.
5. Children who are -1.5 *SD* to -2 *SD* are classified slightly thin
6. Children who are under -2 *SD* are classified underweight.

Currently, overweight and obesity is a significant increasingly becoming a problem among school-age children (Nix, 2013). It is alarming serious public health problem because obese children have a greatly increased likelihood of becoming obese adults. Obese adults who were overweight as children also have higher levels of weight-related morbidity, and a higher risk of preventable mortality, than those obese adults who only became obese in adulthood. The consequences of overweight and obesity in school-age children will be described next.

1. Consequences of overweight and obesity in school-age children

Consequences of overweight and obesity in school-age children include physical and psychosocial consequences. These consequences are presented as follows.

1.1 Physical consequences

Overweight children are more likely to become obese adults, and direct correlation with increased risk for developing cardiovascular disease, hypertension, diabetes, metabolic syndrome, sleep apnea, and other diseases.

1.1.1 Heart and cardiovascular health consequences

Overweight and obesity is a risk factor for developing high blood pressure, high blood cholesterol and atherosclerosis, all of which are risk factors for cardiovascular disease [CVD] (Government of South Australia, 2006). A recent study revealed that children ages 7 to 13 who are overweight are at an increased risk of developing heart disease beginning at age 25 (King, Tergerson, & Wilson, 2008). Although studies found that childhood obesity was associated with cardiovascular risk factors, evidence suggested that there may not be a direct, independent relationship between childhood obesity and cardiovascular risk factors in adulthood, and instead they may be indirectly related through obesity tracking from childhood to adulthood (Australian Institute of Health and Welfare and National Heart Foundation of Australia, 2004; Lloyd, Langley-Evans, & McMullen, 2010).

1.1.2 Type 2 diabetes

Overweight and obesity is a major risk factor for type 2 diabetes. Particular when excess fat is located in the abdominal region (WHO, 2000). Previously, type 2 diabetes is generally through to be an adult condition, which was once referred to as “adult onset” diabetes. It is largely preventable with proper diet and physical activity. For children, most newly diagnosed cases of diabetes were for type 1, which is mainly genetic in origin. However, today about 45 percent of newly diagnosed diabetes cases in children are type 2 (Fagot-Campagna et al., 2000). Research found that childhood obesity was associated with insulin resistance, which in turn led to glucose intolerance (impaired fasting glucose, impaired glucose tolerance and diabetes mellitus (Lee, 2009). Moreover, type 2 diabetes can lead to short- and long-term serious health effects including chronic kidney disease and loss

of vision (Australia Institute of Health and Welfare [AIHW], 2006).

1.1.3 Metabolic syndrome

Overweight and obesity has strong relationship with metabolic syndrome. Metabolic syndrome refers to a constellation of metabolic disorders consist of three of the following criteria abdominal obesity as measured by waist circumference, hypertriglyceridemia, low HDL cholesterol, high blood pressure, and elevated fasting glucose, and individuals with diabetes (Sardesai, 2012). This definition developed by the national cholesterol education panel. However, the definition developed by the national cholesterol education program's ATP III has five criteria:

1.1.3.1 Central/ abdominal obesity as measured by waist circumference (men-greater than 40 inches [102 cm]; women-greater than 35 inches [88 cm]).

1.1.3.2 Fasting triglycerides greater than or equal to 150 mg/ dl (169 mmol/ L).

1.1.3.3 HDL cholesterol (men-less than 40 mg/ dl [1.04 mmol/ L]; women-less than 50 mg/ dl [1.29 mmol/ L]).

1.1.3.4 Blood pressure greater than or equal to 130/ 85 mmHg.

1.1.3.5 Fasting glucose greater than or equal to 110 mg/ dl (61 mmol/ L).

Studies found that overweight and obese children were more likely to have other MetS (metabolic syndrome) related components. It showed that the prevalence of MetS was much higher in obese children than in their normal weight counterparts (27.6 % and 0.2 %) (Chen et al., 2012). Research showed that subjects with metabolic syndrome were more obese with higher percentage weight for height, percentage body fat and higher insulin resistance (Lee, 2009). Moreover, study revealed that metabolic syndrome in itself is not a disease, but the metabolic abnormalities it encompasses undoubtedly put affect individuals at increased risk for cardiovascular disease (Sardesai, 2012).

1.2 Psychosocial consequences

Psychological and social consequences are probably more prevalent than physical consequences. Many overweight and obese children may suffer from psychological stress, poor body image, and low self-esteem. Besides, they may

encounter prejudice and discrimination, which often begins from an early age (Loke, 2002). Overweight and obese children often face negative stereotyping and negative attitudes, even from health professionals (WHO, 2000). Studies found that obese children were targets for social discrimination (Latner & Stunkard, 2003; Richardson, Goodman, Hastorf, & Dornbusch, 1961). Evidence also revealed that obesity was associated with psychiatric illness, such as depression and anxiety states (Lobstein, Baur, & Uauy, 2004). Individual who were obese in childhood were more likely to have poor body image, low self-esteem, and confidence, as mid-childhood is the critical period of development of body image and self-esteem (Monello & Mayer, 1963; Stunkard & Burt, 1967). Moreover, these negative factors work against the child with a weight problem and those with childhood obesity may have fewer opportunities in school, and smaller social circle (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993; Sargent & Blanchflower, 1994).

Therefore, in order to prevent overweight and obesity in school-age children from becoming obese adults and other consequences of these problems, factors related overweight or obese in school-age children should be understood.

2. Factors related to overweight and obesity in school-age children

Research points to many causes of overweight and obesity in school-age children. However, both genetics and environments play major roles in the risk for overweight and obesity and are likely covariates.

2.1 Genetic factors

Studies indicated that parents obese are more likely to have childhood obesity. Obese parents can predict an early increase in a young child's BMI, and it more doubles the chances that a young child will become an obese adult. Children with both obese mother and father have 80 % chance of being obese. Children with one obese mother or father have 40 % chance of the risk to becoming obese, whereas children with neither parent obese have a less than 10 % chance to becoming obese. Moreover, as children grow older, their body weight is a significant factor associated with their overweight and obesity as adults (Whitney & Rolfes, 2008; Zeller & Daniels, 2004).

2.2 Environmental factors

Environmental factor is an important factor to promote obesity development including dietary intake and physical activity.

2.2.1 Dietary intake

Presently, several changes in the society children life contribute to childhood obesity. In many families today, parents work outside the home and work longer hours. The school-age child begin eat food prepared away from home and convenience food much more often (Tessmer, 2002). Besides, many restaurants serve increasingly larger portions of food and foods high in fat and sugar (U.S. Department of Health and Human Services, Substance Abuse & Mental Health Service Administration, 2013). These foods may not be taking in the nutritional value needed for healthy growth and can lead to significant health risks such as overweight or obesity, hyperlipidemia, and metabolic syndrome. Studies indicated that eating excessive snacking, high-fat foods, high-calories convenience foods, and high sugary foods, especially sugared soft drinks contribute to childhood obesity (Nix, 2013; Wardlaw & Smith, 2009). Each 12-ounce can of soft drink provides the equivalent of about 10 teaspoons of sugar and 150 kcalories. Evidence showed most of children in school consumed at least one soft drink each day at school. Study indicated that children consumed one soft drink daily lead to 60 % increases of the risk of obesity (Whitney & Rolfes, 2008).

Moreover, some research revealed that food attitude and behaviors of parents are the key determinants of the development children eating behavior. Parents play significant roles in teaching and eating healthy and/or unhealthy foods (Benton, 2004). Kime (2009, 2011) found that intergenerational eating pattern and family culture were correlation with childhood obesity. Television also becomes a strong source of food selection in the school-age child. Studies revealed that television advertisements affected interesting unhealthy food consumption in children such as sweets and/ or soft drinks (Cullen et al., 2000; Vereecken et al., 2005). Breakfast is particular important for a school child. Gleason and Dodd (2009) suggested that participation of school breakfast program may be a protective factor of childhood obesity.

2.2.2 Physical activity

Inactivity plays a major role in obesity development. Studies indicated that children who have more sedentary have more often overweight (American Academy of Pediatrics, Council on Sports Medicine and Fitness and Council on School Health, Active healthy living, 2006). A child spends much free time in sedentary activities (e.g. watching television, playing video, and computer) can become overweight or obesity (Wardlaw & Smith, 2009). Research revealed that poor aerobic capacity in elementary school-age Taiwanese children was associated with children's weight status (Chen, Kennedy, Yeh, & Kools, 2005). Bansal et al. (2013) found that school-age children in Jaipur, India played outdoor games even at least weekly had lower risks of developing obesity and this risk lowered significantly when the outdoor games were played daily and regularly. In addition, many research suggested that television watching plus a low activity level is the greater risk of overweight than increased television watching, computer, and handheld video game use (Ritchie, Welk, Styne, Gerstein, & Crawford, 2005). Therefore, school-age children who do not regularly participate in sports or activities outside school are more likely to be overweighed or obese compared with children who participate in free-time physical activity.

In conclusion, overweight and obesity in school-age children are increasing currently. Health consequences of this problem are significant to be concerned from health care provider. The factor seems to be the major of these is eating behaviors. For this reason, promoting healthy eating behavior in obese school-age children is required.

Programs for promoting healthy eating behavior in obese school-age children

A review of the literature revealed that most of the promoting healthy eating behavior programs or interventions for obese school-age children have carried out in the United States of America [USA], the United Kingdom [UK], Canada, and Australia. These programs were school-based interventions and based on the application of behavior change theory, self-efficacy theory, and social cognitive theory (Gorely, Nevill, Morris, Stensel, & Nevill, 2009; Saksvig et al., 2005; Silveira,

Taddei, Guerra, & Nobre, 2011). Most of the previous studies were randomized controlled trials [RCT] and the components of effective intervention were nutritional education, school food services, and parental involving.

In Thailand, there were some intervention programs for promoting healthy eating behavior in obese school-age children (Duangchan, 2010; Thiangtham et al., 2009; Pinsaimoon & Banchonhattakit, 2009). Duangchan (2010) studied the effect of healthy eating intervention and physical activity intervention on knowledge about obesity-related Type 2 diabetes, healthy eating self-efficacy, healthy eating self-control, healthy eating behavior, and BMI in obese elementary schoolchildren, aged 9-11 years. The results of this study showed knowledge about obesity-related Type 2 diabetes, healthy eating self-efficacy, healthy eating self-control, and healthy eating behavior significantly increased from the baseline, and BMI significantly decreased. The components of intervention were training food skills and nutritional education, and the Theory of Planned Behavior was used to develop intervention.

Thiangtham et al. (2009) studied the effectiveness of health behavior development program applying self-efficacy theory and social support for improving dietary and exercise behavior in overweight school-age children, aged 10-12 years. This study was a quasi-experimental and used social cognitive theory to develop intervention. The students were divided into two groups, the experimental group and a control group. Students from the experimental group were received five weeks for dietary and exercise behavior development program that included health education about obesity and nutrition, skill training for develop self-efficacy and motivation, social support from family and school. The results showed that increasing knowledge about obesity, dietary, exercise, and self-efficacy after receiving the intervention.

Another study was a quasi-experimental study (Pinsaimoon & Banchonhattakit, 2009). The aim of this study was to study the effects of behavior modification on exercise and food appropriate consumption among overweight primary school students. Students were divided into two groups including experimental and control group. The experimental group was exposed to a behavior modification program for ten weeks and using telephone and letter for monitoring. The results of this study found knowledge about nutrition, exercise, consuming appropriate food, perceived self-efficacy, and outcome expectation in experimental group significantly improve

more than before the intervention. This study used social cognitive theory as conceptual framework and the component of intervention were nutritional education and modeling.

In conclusion, most of component for successful healthy eating intervention were training food skills, nutritional education, social support, school food service, and parent involving. Therefore, these components should be considered for developing successful intervention.

Action research approach to promote healthy eating behavior in obese school-age children

Defining action research

Action research is a collaborative approach for improving practice involving participants in both the change and research process that includes action, evaluation, and critical reflection (Koshy et al., 2011). Action research was first proposed by the social psychologist Kurt Lewin during the 1940s. In his paper (Lewin, 1946), “action research and minority problems”, he described action research as “a comparative research on the conditions and effects of various forms of social action and research leading to social action” using a process of “a spiral of steps, each of which is composed of a circle of planning, action, and fact finding about the result of the action” (Lewin, 1946, p. 203). Avison, Lau, Myers, and Nielsen (1999, p. 94) mentioned that action research as an approach that “combines theory and practice (and researchers and practitioners) through change and reflection in an immediate problematic situation within a mutually acceptable ethical framework”. It was designed specifically to bridge the gap between theory, research, and practice and incorporate both humanistic and naturalistic scientific method (Holter & Schwartz-Barcott, 1993).

It is difficult to defining one definition of action research because it is known by various names, including participatory action research [PAR], community-based study, co-operative enquiry, action science, and action learning (Koshy et al., 2011). From the extensive investigation and reflection on the literature review, Waterman et al. (2001, p. 4) defined action research as following:

Action research is a period of inquiry, which describes, interprets, and explains social situations while executing a change of intervention aimed at improvement and involvement. It is problem-focused, context specific and future-oriented. Action research is a group activity with an explicit value basis and is founded on a partnership between action researchers and participants, all of whom are involved in the change process. The participatory process is educative and empowering, involving a dynamic approach in which problem-identification, planning, action, and evaluation are interlinked. Knowledge may be advanced through reflection and research, and qualitative and quantitative research method may be employed to collect data. Different types of knowledge may be produced by action research, including practice and propositional. Theory may be generation and refined and its general application explored through cycles of the action research process.

The characteristics of action research

Action research has different from other methodologies. There are some important characteristics that highlight the uniqueness of action research (Carr & Kemmis, 1986; Speziale, 2002). These characteristics are presented as follows:

1. Collaboration is a fundamental characteristic of action research. Action research requires interaction between researcher and participants. The researcher and participants work together throughout the research process in order to participants met their needs and change. Thus, collaboration between the researcher and participants is important for achieve the effective solutions.

2. Action research focuses on the practical and in context specific. Action research is context-bound. The problems are defined within a specific setting or situation. The researcher and participants or other (group, organization, and community) engages in the process to share and work together to understand and solve the problems. Therefore, the purpose of action research is to solve practical problem or improve practice in the particular situation.

3. Democratic impulse is a one feature of action research. To be seen as equal with participants, the researcher work as co-workers researching with participants. The role of the researcher is not an expert, but it is a facilitator of change, consulting with participants on the process and evaluation as well. Additionally, the findings of the research process are fed back to participants for validity. Hence,

concerning equal between the research and participants is important for action research.

4. The outcome of action research is to construct new knowledge. This new knowledge should not only contribute theory (social science), but contribute to practical changes and improvement in the problem areas identified (social change). Therefore, the knowledge arising from action research seems to fit with the uniqueness of the situation, but not generalization as others such as randomized controlled trials.

Type of action research

There are three broad types of action research in the literature. The first, technical-scientific and positivist action research is the researcher see themselves as expert and has predetermine intervention. The main aim of the research is to test the effectiveness of a particular predetermine intervention. While participants are seen as insufficient expert to get involved in the process of research, they act as at the level of providing and feedback. The second, mutual-collaboration and interpretivist action research is the researcher, policy makers, and health care providers come together within the context of the research for identify problems, try out solutions, and monitoring the process and outcome of change. The third, critical and emancipator action research is explicit in its political and critical expression. It challenges the forces that will profit from maintaining particular view points and values the notions of participation, empowerment, and emancipation. The researcher and participants in this type work and collaborate together in critical and emancipatory approaches to changing practice (Koshy et al., 2011; Meyer, 2006).

Methods of data collection

The data collection of action research focuses on three stages of the inquiry including exploration, intervention, and evaluation phase (Meyer, 2006). The participants can be involved in each stage as a co-researcher possible. The stages of data collection are present as following:

The first is exploratory phase, the researcher collect the data through the questionnaires, interviews, and focus group for seeking the participants' opinions and their needs related to problems. If the researcher is an outsider, some participant observations are included to gather the data because it can help the researcher familiar

with participants and setting. Besides, the finding of this phase will be fed back and negotiated from participants. The baseline data also are collected by researcher at the end of the exploratory phase to measure change over time.

Second, intervention phase is the cyclical phase that consists of a period of planning, acting, observing, reflecting, and re-planning. It is a spiral activity. The monitoring the process of change and reflecting on learning being gained are important for this phase. The data are collected through the participant observation, reflective journals, field notes, and others. The findings in the intervention phase are fed back to participant to guide their action. The researcher should keep self-reflective field notes throughout the study because these help the researcher to freedom from bias.

The third is evaluation phase, although participants wish to continue with the change process, the researcher need to withdraw from the field to analyze and reflect on what have the participants learnt from the research project. The participants are invited to reflect on what has been achieved and explain this. The data are repeated to measure the change has occurs over time. In addition, the findings of the research project should be shared with the participants to comment critically on whether they feel adequate in their views.

In conclusion, action research is a collaborative approach to investigation that involving participants in the process with the researcher for understand problems in their context specific. Through the cyclical process of action research including planning, acting, observing, reflecting, and re-planning, the strategies or intervention model will be developed by participation of participants and researcher to take systematic action for solving the problems that lead to a change in behavior.

Related concepts used for the development of the study interventions

Perceived severity, perceived benefits, and self-efficacy of health belief model [HBM] of Rosenstok, Strecher, and Becker (1988) was applied to develop intervention for promoting healthy eating behavior in obese school-age children in this study. The HBM is a psychological model that attempts to explain and predict health behavior that focuses on the attitudes and beliefs of individuals. The underlying concept of the original HBM is that health behavior is determined by personal beliefs

or perceptions about a disease and the strategies available to disease its occurrence (Hochbaum, 1958). The main constructs of the model include perceived severity, perceived susceptibility, perceived benefits, perceived barriers, cues to action, and self-efficacy.

In this study, the researcher applied perceived severity, perceived benefits, and self-efficacy to develop intervention I promoting healthy eating behavior [PHB] in obese school-age children for obese school-age children and their parents group. According to HBM, perceived severity refers an individual's belief about the severity of a disease. It may conclude an evaluation of the personal clinical consequences (such as pain, disability, or death) and its impact on life style (working ability, social relationship, etc.). Perceived benefits refer to a person's opinions of the value or benefit of a new behavior in decreasing the risk of developing a disease. It is possible by allowing them to get early treatment or preventing them from infecting others. Perceived benefit play a significant role in the adoption of secondary prevention behavior such as health screening.

Self-efficacy is belief in one's own ability to do something (Bandura, 1977). The role of self-efficacy has been added to the model to explain long-term behaviors. Self-efficacy is the confidences we have that we can perform such as perform to eat healthy foods. There are four main sources that drive people's belief in themselves (Redmond, 2010) were 1) Mastery experience, positive and negative experiences can influence the ability of an individual to perform a given task. If one has performed well at a task previously, they are more likely to feel competent and perform well at a related task, 2) Vicarious experience, people can develop high or low self-efficacy vicariously through other people's performances. A person can watch another perform and then compare their competence with the other's competence. If a person sees someone similar to them succeed, it can increase their self-efficacy, 3) Social persuasion, self-efficacy is also influenced by encouragement and discouragement pertaining to an individual's performance or ability to perform. Using verbal persuasion in a positive light leads individual's to put forth more effort; therefore, they have a greater chance at succeeding, and 4) Somatic and emotional states, people experience sensations from their body and how they perceive these emotional arousals influences their beliefs of efficacy. Such a stress, anxiety, worry, and fear all negatively

affect self-efficacy.

To develop intervention I PHB, the aim of this intervention was to raise awareness of obese school-age children and their parents about the consequences of unhealthy eating behavior and perceiving the significant of promoting for healthy eating behavior in obese school-age children. Therefore, to increase perceived severity about healthy eating behavior and benefits of healthy eating behavior, group meeting of obese school-age children and their parents was conducted for sharing and discussion. The researcher also provided information about negative effects of unhealthy eating behavior and the importance of healthy eating behavior in obese school-age children for obese school-age children and their parents. The researcher asked the question for thinking and finding suitable method to promote healthy eating behavior in obese school-age children. To increase obese school-age children's perceive self-efficacy to perform healthy eating behavior in obese school-age children, mastery experiences including educating nutrition knowledge via school broadcast and education on nutrition knowledge exhibition were used in this intervention. Furthermore, good obese school-age children modeling was used to motivate obese school-age children to see and learn for promote healthy eating behavior in obese school-age children (The detail of components of intervention I PHB see in Chapter 4).

Therapeutic conversation

Therapeutic conversation was described as conversation in which opportunities for personal transformation take place through a healing change or alteration in the way in which people perceive their life circumstance (Sluki, 1992). Clinical scholarship (Bell, 2003; Diers, 1995) requires an immersion in the therapeutic conversation while examining, analyzing, and synthesizing what is occurring between the nurse and the family. For this study, intervention II changing belief of chefs and vendors and providing healthy food [CBPHF] for obese school-age children at school was developed based on therapeutic conversation process (Wright, Wason, & Bell, 1996 cited in Wacharasin, 2007). Therapeutic conversation consists of 4 steps as follows:

- 1. Creating a context for changing beliefs:** It is searching and synthesizing proper contexts to changes which comprise of sub-step as follows:

1.1 Preparing and maintaining the ground: This is the beginning with introducing oneself, describing the characteristics of work, informing the schedule and the duration, and the scope of discussion, conversation without authority, focusing on patients and their families which bring about good relationships between nurses, patients, and families. Most importantly, all mentioned result in revealing the patients and families' information based on true beliefs.

1.2 Distinguishing the problems or illness: It is a main element to create relationships through questioning for searching and giving meaning with the problems more clearly. The problems distinguished derive from jointly determination between nurses and patients' family members. The most popular approach is asking questions which need answers from one question (one question question).

1.3 Removing obstacles to change: This can be seen between building and maintaining good relationships. The obstacles are caused by family members refusing to attend activities. Some are dissatisfied with the advancement of the services, vagueness of the expectation towards services, previously bad experiences with health care personnel, getting service among several occupations simultaneously, and the anticipation of referral not to be appropriate to real circumstances.

2. Uncovering and distinguishing illness beliefs: It is the conversation for care which is not related to symptoms, medicines, or any treatment; however, it is an invitation to family members and patients to narrate about diseases and treatment towards the stories concerning illness, particularly for the thing that patients and family members realize that it is the hardest for dealing with sickness by means of invitation so as to provide the reflective thoughts which are beneficial to healing practices, beliefs about illness search, and drawing interesting distinctions, such as beliefs about diagnosis, beliefs about etiology, beliefs about healing and treatment, beliefs about mastery, control, and influence, beliefs about prognosis, beliefs about religion-spirituality, and beliefs about the place of illness in our lives.

3. Intervening and challenging constraining beliefs: Family members are invited to reflect their thoughts and adjust beliefs which are obstacles to changes. There are various methods as follows:

3.1 Offering commendation: It is the conversation for confirmation, affection, generosity to families which can indicate a strength point, the ability of an

individual and his or her family. Admiration given will be done when there are obvious evidences that the families have truly made; otherwise, families may feel insincere. Languages used in the families should be employed, and important beliefs should be integrated to be confident. Within 10 minutes of the first seeing, admiration or commendation should be given to families which can practice very well when they are found strength. To strengthen the relationships with families, they should obtain commendation before suggesting any idea and gaining advice at the end of the meeting.

3.2 Asking interventive questions: Questions used are asked by nurses. They include beliefs. The questions are asked so that families are able to narrate their thoughts, beliefs, feelings about families or ailment. It is asking questions which reflect on the results. The questions will urge the families to reflect the impacts occurred from illness, invite family members to ask questions, and ask them to externalize internalized questions.

3.3 Drawing destinations: Asking questions, suggesting any idea, giving an idea are included in drawing destinations, which causes new beliefs.

3.4 Speaking the unspeakable: This is the speaking instead of patients and families, especially in the issues that they cannot talk about, and it will reveal the beliefs that are the keys of the problems.

3.5 Distinguishing incongruence between beliefs and behavior. It is an indication of incongruence between beliefs and behavior practiced. It is not blame or a reproach; nevertheless, it is an explanation to an individual to be more understandable and more knowledgeable to incongruence between his or her beliefs and behaviors. Distinguishing incongruence between beliefs and behavior can be done through searching for the beliefs which are not associated with individual behaviors and placing importance to be seen by individuals on incongruence when they accept any. Individual behaviors can be changed in order to be applied to their beliefs. Therefore, their behaviors will be changed better.

3.6 Offering hypothetical facilitating belief: It is using hypothetical questions in order that families try to have new approaches to alter their beliefs.

3.7 Externalizing problems, symptom, and solutions: Problems are from external influences which are not individuals. Solving problems doesn't stress on the

problems; however, solutions will be concentrated. Therefore, asking questions to encourage family member to understand problems, solutions, and influences of illness problems.

3.8 Offering alternate beliefs about illness: To open up a chance for family members to listen to ideas or new beliefs through story narration or the results of other families, it is offering alternatives or new beliefs about family members' illness, and families can change their beliefs full of obstacles.

4. Affirming facilitating beliefs: It is a type of discussion with patients and families about the effect of changes, arising from changing beliefs and behaviors to retain such good behaviors and practices as follows:

4.1 Exploring change: It is distinguishing changes which must be done obviously in every part of the system through members' different views.

4.2 Exploring the effects of change: It can cause stable changes by way of exploring and reflecting related ideas in the change process.

4.3 Inviting explanations of change: It is the explanation how changes take place, and it is an approach to confirm changes based on the belief: if families can explain any change, it means that such a change will continue.

4.4 Distinguishing facilitating beliefs: It is distinguishing the differences of beliefs which cause achievement, the beliefs which support any success and open up a chance and new ideas, relationships, and individuals and families' ability in solving problems. In addition, it is able to change the belief which is an obstacle into the one which contribute to success.

As therapeutic conversation process above, intervention II CBPHF was developed to change belief of chefs and vendors for providing healthy foods for obese school children at school. The steps of therapeutic conversation of this intervention were as follows: for uncovering and distinguishing illness beliefs, chefs and vendors were induced to explore the problems related to providing healthy foods, negative consequences of providing unhealthy food by asking the question and narrative the story. These lead to understand the problems and find out to solving the problems. Intervening and charging constraining belief, chefs and vendors were induced for rethinking problems, obstacles, needs for solving the problems and sharing and exchanging experience for finding the appropriate methods. Offering commending

was given to chefs and vendors who can practice very well for strengthen confidence for providing healthy foods. This step could reflect them to understand the problems and distinguishing incongruence between belief and behavior. Affirming facilitating beliefs, in order to realize providing healthy food for obese school-age children, chefs and vendors were invited to discussion about behavior changing and effect of changing belief to provide healthy foods (The detail of components of intervention II CBPHF see in Chapter 4).

Summary

Healthy eating behavior is essential for optimal health and well-being in school-age children. Factors influencing healthy eating behavior in school-age children are complex. No single factor influencing healthy eating behavior has been identified. However, significant factors regarding healthy eating behavior in school-age children are individual child, family, and school factors. Presently, overweight and obesity in school-age children are increasing and health consequences of this problem are major to be concerned from health care providers. For this reason, promoting healthy eating behavior in obese school-age children is required. Previous studies showed that the intervention significantly improved healthy eating behavior in obese school-age children and the components of successful healthy eating interventions were training food skills, nutritional education, social support, school food service, and parent involving. However, these previous intervention did not derived from obese school-age children and their family' views including lack of participation from family and school. Hence, these interventions might not fit to the needs and the context of obese school-age children. Many obese school-age children could not maintain healthy eating behavior.

Action research requires collaboration between the researcher and participants in the process of action research to share and work together for understanding and solving the problems that lead to improve practice in the particular situation. This process can provide an opportunity to hear opinions and voices from obese school-age children and other participants (e.g. parents and teachers) for a wide understanding the problems and factors regarding healthy eating behavior in obese school-age children within the actual context. Besides, the researcher and participants can collaborate in

the action process to create the strategies or intervention model for improving healthy eating behavior in obese school-age children within the actual context. Consequently, obese school-age children and their family can easily follow these strategies or intervention model that lead to achieve and sustain healthy eating behavior in obese school-age children. Therefore, developing successful and sustainable intervention for promoting healthy eating behavior in obese school-age children through the process of action research is considered in this study.

To develop intervention, based on data analysis in situation analysis of phase I and reviewing related concepts. The intervention for promoting healthy eating behavior in obese school-age children consisted of 2 interventions. These interventions were 1) intervention I promoting healthy eating behavior [PHB] in obese school-age children for obese school-age children and their parents group. This intervention was developed based on perceived severity, perceived benefits, and self-efficacy of health belief model (Rosenstock et al., 1988), 2) intervention II changing belief of chefs and vendors and providing healthy food [CBPHF] for obese school-age children at school. This intervention was developed based on therapeutic conversation process (Wright, Wason, & Bell, 1996 cited in Wacharasin, 2007).

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research methodology including research design, research setting, population and participants, research instruments, protection of human subject, data collection, and data analysis.

Research design

The action research was conducted for develop promoting healthy eating behavior model for obese school-age children in Mahasarakham province. In this study, the action research process was modified from action research approaches and methodology developed by Kemmis and McTaggart (2000). This process had four steps that consisted of planning, implementing, reflecting, and re-planning. The study was divided into three phases of inquiry including three months for situation analysis, eight months for model development, and two months for model evaluation phase as following:

Phase I Situation analysis

The researcher investigated the current situation and factors related to healthy eating behavior in obese school-age children by using questionnaires, in-depth interviews, and observation. To have a deeper understanding situation and factors related to healthy eating behavior in obese school-age children, the self-administered questionnaire was used with all school-age children studying in grades 4-5 aged between 10-12 years for comparing between obese and normal weight group. Only socio-demographic information questionnaire was used with parents of obese school-age children, teachers, and nurses in primary care unit in hospital. In-depth interviews were used for obese school-age children, parents of obese school-age children, teachers, and nurses. Besides, the researcher observed about eating behavior in school-age children and food available at food shop in/near school including local community market near school.

Quantitative data and qualitative data were analyzed and summarized by the researcher. The researcher identified the problems and factors regarding healthy

eating behavior in obese school-age children. Then, these problems and factors were confirmed by obese school-age children, parents, teachers, and nurses.

Phase II Model development

The aim of this phase was to develop appropriate promoting healthy eating behavior model for obese school-age children. The obese school-age children, parents, teachers, and nurses were empowered to participate in model development. The action plans or intervention were constructed by the researcher based on the results from situation analysis and literature reviews of existing interventions. Then, participants were invited to discuss these plan fit to solve the problems. The appropriate model of promoting healthy eating behavior for obese school-age children was developed through the processes of planning, implementing, reflecting, and re-planning from the collaboration between researcher and participants.

Phase III Model evaluation

The researcher evaluated the outputs and outcome of the model for promoting healthy eating behavior in obese school-age children at one month after the end of implementing process. For quantitative data, the same self-administered questionnaire (except socio-demographic information) used in phase I was employed with obese school-age children. To assess qualitative data, focus group discussion was employed with obese school-age children, parents, teachers, and nurses group for assessing how the intervention affected participants and participants' satisfaction.

Research setting

The setting was “Hua Khwang Municipality Community” located in Hua Khwang sub-district, Kosumpisai district, Mahasarakham province, the Northeastern Thailand. This area was far from Meuang district, Mahasarakham province around 33 kilometers. Travelling to the Hua Khwang Municipality Community was convenient either by private and public. It was a big community that consists of around 8,415 populations and 2,363 households. There were 2 primary public schools and around 1,696 children who studying in these school. One primary public school was the center of this area. This school was established in this community around 100 years. In 2013, there were around 1,530 children who were studying in this school. Some of them came from the closet community to the Hua Khwang Municipality

Community. Total school-age children studying in grade 4 and 5 were 409. 131 school-age children studying in grade 4 and 5 were situated in the research setting. For school lunch in school, the Institute of Nutrition, Mahidol University school lunch program was used to guide for school-lunch's menu. There were 6 chefs, responsible for cooking school lunch meal for school-age children in grade 1 to grade 6. Besides, many shop vendors and carts situated in and surrounding near the school. This school was situated near local fresh market "Talad Tessaban Hua Khwang" around 2-3 kilometers. Many food shops also situated in areas surrounding this school, especially a convenience store was close to the school.

For school-age children's family in Hua Khwang Municipality Community, most families were situated in area surrounding the school around 1-4 kilometers. Most people had semi-urban lifestyle. Some of them worked out their home and had limit time. Most of them worked as agricultures and government officers. There were many markets and food shops or stores surrounding their home around 1-5 kilometers such as local fresh market ("Talad Tessaban Hua Khwang"), "Talad nud", convenience stores, and minimart stores. Most families sold ready-to-eat foods or ingredients for cooking food from local market and "Talad nud". Moreover, they sold ready-to-eat or convenient foods from convenience stores or minimart stores if they had limit time such as in the morning before school and worked.

The researcher purposively selects this setting because it was an area facing with unhealthy eating behavior in school-age children. Since this area had shift from agricultural to industrial, the food consumption pattern of people was replaced by diet containing a higher proportion of fats, animal meat, and high food in rich sugar from changing in eating food prepared at home to food purchased away from home. Particular the statistics of one primary public school 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). Moreover, the prevalence rate of overweight and obesity among school-age children were increased in school-age children studying in grade 4 and 5, 17.85 % (Primary Care Unit of Kosumpisai Hospital, 2013). Therefore, this school was a risk area of unhealthy eating behavior among school-age children, especially among obese school-age children. As a result, the researcher collaborated with obese school-age

children, parents (father, mother, or relative), teachers, and nurses to develop promote healthy eating behavior model for obese school-age children in this school by using the school as a center for doing the research activities.

Population and participants

Population

The population of this study were 131 school-age children studying in grade 4 and 5 (10-12 years old), 12 teachers, 6 chefs, and 5 vendors from a primary public school, 30 parents of obese school-age children, and 6 nurses from primary health care unit of Kosumpisai Hospital in the research setting, year 2014.

Participants

The participants were school-age children, parents of obese school-age children, teachers, chefs, vendors, and nurses. The inclusion and exclusion criteria of each group were as follows:

Inclusion criteria

1. School-age children

School-age children consisted of over, normal, and underweight school-age children. These participants were recruited for assessing quantitative data in phase I situation analysis. The inclusion criteria for school-age children including 1) children in grade 4 and 5, 2) children aged between 10-12 years. On the other side, the inclusion criteria for obese school-age children including 1) obese children in grade 4 and 5, 2) obese children aged between 10-12 years, 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).

2. Other participants

For parents of obese school-age children, the inclusion criteria for parents of obese school-age children including 1) parents could be fathers, mothers, or guardians who look after daily activities, foods, and school tasks of the obese school-age children 2) parents had to be able to communicate verbally with the researcher. The inclusion criteria for teachers was they had to be the ones who were responsible for grade 4 and 5 students' school health sector, school food service, or class teacher, or teaching nutrition subjects. For chefs and vendors, the inclusion criteria for chefs

and vendors were chefs had to be in charge of school lunch meal for children studying in grade 1-6 and vendors sold drinks and fried foods for children in the school. The inclusion criteria for nurses were they were responsible for school and family health service at primary care unit at hospital in the setting.

Exclusion criteria

The exclusion criteria for participants of this study were as follows:

1. Participants of each group who moved away from the selected community before completion of the study.
2. Participants of each group who could not involve in the whole process of the study due to problems such as illness or accident.

Number of participants and sampling method in each phase

The participants were selected from the target setting. The number of participants and sampling method in each phase were presented as follows:

1. Phase I: Situation analysis

Participants of this phase were school-age children (over, normal, and underweight), parents of obese school-age children, teachers, and nurses.

1.1 All 131 target school-age children who were in grade 4 and 5 (10-12 years of age), and lived in the target community. The desired number of school-age children was calculated by using this formula $n = N / 1 + N(e)^2$ (n is the sample size, N is the population size, and e is the level of precision z (e = .05) (Yamane, 1973). Thus, the sample size was the number of 102 school-age children, which was close to the population number. Therefore, this research studied target population of 131 school-age children. They were asked to answer the self-administered questionnaire for assessing quantitative data (healthy eating behavior and factor related to healthy eating behavior). For assessing qualitative data, key informants of all target obese school-age children who met the inclusion criteria was selected by purposive sampling for in-depth interview. The number of participants was based on the data saturation.

1.2 For other all target participants who met the inclusion criteria were 30 parents of obese school-age children, 12 teachers, and 6 nurses. However, 2 obese school-age children moved out from the target school, 1 parent was not willing to join, and 7 parents had no time to join in the activities. There were 4 teachers had no time

to join the activities. In conclusion, participants who could participate in the activities and answer socio-demographic information questionnaire were 20 obese school-age children-parents dyads, 8 teachers, and 6 nurses. For qualitative data, key informants of parents of obese school-age children, teachers, and nurses who met the inclusion criteria were selected by purposive sampling for in-depth interview. The number of participants was based on the data saturation or 6 key informants (Morse, 1994).

2. Phase II: Model development

The participants were obese school-age children, parents of obese school-age children, teachers, and nurses. All 20 obese school-age children, 20 parents of obese school-age children, 8 teachers, and 6 nurses were invited to participate in the activities or strategies in phase II including planning, implementing, reflecting, and re-planning. However, 2 parents who had no time to join in the activities to participate in only the planning step. Besides, 6 chefs and 2 vendors who met inclusion criteria were participated in the activities of intervention II changing belief of chefs and vendors and providing healthy food at school.

3. Phase III: Model evaluation

For evaluating quantitative data in phase III Evaluation, effect size was used to compare the differences of means of variables before and after implementing intervention. In this study, 20 obese school-age children were recruited to answer the same self-administered questionnaire in phase I. In evaluating qualitative data, the participants was be divided into 3 groups of obese school-age children, 3 groups of parents of obese school-age children, 1 group of teachers, and 1 group of nurses for focus group discussion (6-8 persons/ group). A number of participants enrolled in each phase of the research project were shown in table 3-1.

Table 3-1 Numbers of participants enrolled in each phase of the research project

Phase of the research project	Numbers of participants	Reasons for losing or adding
All targets	131 school-age children (30 obese), 30 parents of obese school-age children, 12 teachers, and 6 nurses	
1. Phase I Situation analysis		
1.1 Quantitative data	All 131 school-age children	
1.1.1 Self-administered questionnaire		
1.1.2 Only socio-demographic information questionnaire	20 parents of obese school-age children, 8 teachers, and 6 nurses	2 obese school-age children moved from the target school 1 parent were not willing to join, 7 parents had no time to joint 4 teachers had no time
1.2 Qualitative data In-depth interview	12 obese school-age children-parents dyads, 6 teachers, and 6 nurses	Based on data situation or 6 key informants
2. Phase II Model development		
2.1 Planning step	22 obese school-age children-parents dyads, 8 teachers, and 6 nurses	2 obese school-age children-parents dyads had no time to joint at the first came to join in only the planning step
2.2 Implementing, reflecting, and re-planning step	20 obese school-age children-parents dyads, 8 teachers, 6 nurses, 6 chefs, and 2 vendors	
3. Phase III Model evaluation		
3.1 Quantitative data self-administered questionnaire	20 obese school-age children	
3.2 Qualitative data focus group discussion	20 obese school-age children-parents dyads, 8 teachers, and 6 nurses (6-8 persons/ group)	

Research instruments

The instruments of this study included the instruments for quantitative data collection and the instruments for qualitative data collection. These instruments was I used following the research phase.

1. Phase I Situation analysis

Both qualitative data and quantitative data were collected in this phase to analyze the current situation and factors related to healthy eating behavior in obese school-age children. The instruments for these data collection were as follows:

1.1 Instruments for quantitative data collection (Appendix A)

The self-administered questionnaire (6 parts) was used to collect the quantitative data from school-age children (underweight, normal weight, and obese school-age children). Only socio-demographic information questionnaire was used to collect the data from parents of obese school-age children, teachers, and nurses.

1.1.1 Socio-demographic information: Participants were asked about socio-demographic information in this part that includes age, gender, marital status, allowance, income, family food practice, occupation, education, position, experiences about promoting healthy eating behavior for school-age children. This part was constructed by the researcher based on literature reviews. The questions were both checklist and words filling in the blank.

1.1.2 Knowledge about healthy food and healthy eating: In this part, the knowledge about healthy food and healthy eating test was modified from food consumption knowledge questionnaire developed by Sukaranandana (2005). Knowledge about healthy food and healthy eating questionnaire consisted of 16 items covering eating five food groups and the advantages of healthy foods and disadvantages of unhealthy foods. The score was given for each item according to the answer either “true” or “false”. Score “1” was given for correct answer and “0” was given for an incorrect answer. The score ranged from 0 to 16, with high score indicated high knowledge about healthy eating. The range score divided with 3 was the cut of point of each level. The range of each level was presented as follows:

0-5 points	it means low level
6-10 points	it means moderate level
11-16 points	it means high level

1.1.3 Beliefs about healthy eating: This part was modified from beliefs in practice on healthy eating behavior questionnaire developed by Plengkratoke (2011). This questionnaire consisted of 10 items that included 4 components covering perceive susceptibility from healthy eating behavior, perceive severity from healthy eating behavior, perceive benefit and barrier of healthy eating behavior, and cues to action healthy eating behavior. Each item had a 3-Likert-type scale (1 = disagree to 3 = agree). The score ranged from 10 to 30, with high score indicated high belief about healthy eating. The range score divided with 3 was the cut of point of each level. The range of each level was bellows.

10-16 points	it means low level
17-23 points	it means moderate level
24-30 points	it means high level

1.1.4 Healthy eating self-efficacy: The healthy eating self-efficacy questionnaire developed by Duangchan (2010) was modified to measure healthy eating self-efficacy for obese school-age children in this study. The healthy eating self-efficacy questionnaire consists of 10 items for asking the participants to rate how confident/ sure they were that they could eat fruit and vegetables, avoid fast food, fatty food and snacks, and avoid sugar foods and sugar-sweetened soft drinks. Each item has a 3-point Likert-type scale from “sure I could not do it” (score = 1) to “sure I could do it” (score = 3). The total scores ranged from 10 to 30, with high scores indicating a high self-efficacy. The range score divided with 3 was the cut of point of each level. The range of each level was presented as follows:

10-16 points	it means low level
17-23 points	it means moderate level
24-30 points	it means high level

1.1.5 Healthy eating behavior: The researcher was modified this questionnaire from healthy eating behavior questionnaire developed by Duangchan (2007). This questionnaire consisted of 10 items covering food groups as follows: 1) fruit and vegetables, 2) fatty foods, and 3) sugary foods and drinks. Obese school-age children were asked about the frequency to do eating behavior in the previous one week. It was a 3-points scale: everyday = 3, sometimes = 2, and never = 1. The total scores ranged from 10 to 30, with higher scores indicating greater healthy

eating behavior. The range score divided with 3 was the cut of point of each level.

The range of each level was presented below.

10-16 points	it means low level
17-23 points	it means moderate level
24-30 points	it means high level

1.1.6 Availability of healthy food at home and school: This part was developed by the researcher. It was an open-ends questionnaire. School-age children were asked about the foods that were provided by parents of school-age children and school personnel. These foods were easily gettable to eat for school-age children in their home and school.

1.2 Instruments for qualitative data collection (Appendix B)

In this study, the researcher acted as the primary instrument of qualitative data collection through in-depth interview guidelines and observation guidelines. The instruments were presented as follows:

1.2.1 The researcher was an instrument. The researcher acted as the primary instrument of data collection and interpreting data instrument from participants to meaningful information. Thus, the researcher was considered as the main instrument in qualitative research (Denzin & Lincoln, 2000). To be a qualified instrument of this study, the researcher studied one course of qualitative and quantitative methodology in Burapha University in Thailand. The researcher completed 12 days training in action research course of the Institute for Population and Social Research, Mahidol University. Therefore, these experiences guided the researcher in the processes of data collection and interpretation effectively.

1.2.2 The in-depth interview guidelines consisted of open-end questions. These guidelines were developed by the researcher. It was used to explore current situation and factors related to healthy eating behavior in obese school-age children. Contents for interviewing obese school-age children consisted of eating behavior and factors related to healthy eating behavior. Examples of guideline questions are as follows: 1) in typical day, what are foods that you eat and how?, 2) what are foods that you eat in weekend and how?, 3) what are things that can help you to eat more healthy foods?.

For interviewing parents, teachers, and nurses, they were asked about eating behavior and factors related healthy eating behavior in obese school-age children. Questions for interviewing of them are similar. The examples of guideline questions are: 1) do you (parents) think you can manage or provide healthy foods for your children (obese school-age children) or not and how?, 2) What are the type of foods that you children (obese school-age children) eat in each meal and day?, 3) what are things or reasons that can encourage your child (obese school-age children) to have healthy eating behavior?

1.2.3 The observation guidelines were developed by the researcher. These guidelines focused on school-age children's eating behavior, food available at food shop in/ near school, and local community market near the target school regarding eating behavior and factors related to healthy eating behavior in obese school-age children.

1.2.4 Other instruments such as an audiotape recording, a digital camera, and video recording.

2. Phase II Model development

In this phase, the researcher synthesized the promoting healthy eating behavior model based on the results of phase I (situation analysis) and existing intervention from literature reviews. Participants were invited for collaboration with the researcher for developing model through the action research process including planning, implementing, reflecting, and re-planning step. The observation and participant observation guidelines were used for collecting qualitative data.

2.1 Instruments for qualitative data collection

2.1.1 The observation guidelines were developed by the research. It was used for monitoring the behavior changes of obese school-age children, food available at home and school during the implementing.

2.1.2 The participant observation guidelines were developed by the researcher. It was used to observe the interaction of group members during group process in this phase. Besides, the role of all participants and the change from activities were noticed during activities or implementing.

3. Phase III Model evaluation

The quantitative and qualitative evaluation was employed in this phase.

3.1 Instruments for quantitative evaluation

The same self-administered questionnaire (except socio-demographic information) used at initial intervention was employed to collecting quantitative data from obese school-age children at one month after the end of implementing process.

3.2 Instruments for qualitative evaluation (Appendix B)

Focus group guidelines consisted of open-end questions that were developed by the researcher for collecting the data about how the new practice or intervention affects participants and participants' satisfaction toward the model. The content of these guidelines for obese school-age children, parents, teachers, and nurses group were similar. The examples of guideline questions were showed as follows: 1) how do you think (or feel) about collaboration with the process for promoting healthy eating behavior in obese school-age children?, 2) do you think (or feel) the process or the model of healthy eating have advantages for you or not and could you tell me what the advantages that you get from the model of promoting healthy eating behavior for obese school-age children?, and 3) what have you learnt from the implementing the promoting healthy eating behavior model for obese school-age children?

Test of validity and reliability of the research instruments

Validity

After all research instruments were developed from the researcher, these instruments were firstly reviewed by dissertation advisory committee. Five experts were asked to assess the content validity of all instruments. The experts were two experts in nutrition and health science, and one expert in behavioral science. The content validity index [CVI] of knowledge about healthy food and healthy eating test, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior questionnaires were 0.86, 0.90, 0.88, and 1.00, respectively.

Reliability

The questionnaire was tested for reliability by trying out with 30 obese school-age children in the school; which had as similar characteristics as the

participants. This school was a public primary school that was situated in municipality community of Kuntarawichai sub-district, Mahasarakham province. It was a semi-urban area. Most people had lifestyle and culture in food consumption was similar as Hua Khwang Municipality Community in Kosumpisai district, Mahasarakham province. 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 [KR-20] for knowledge about healthy food and healthy eating test was .72. Additionally, the interview guidelines were tried out with one or two of these participants before collecting the data.

Protection of human rights

Before conducting the research project, the research proposal and instruments were approved by the Institutional Review Board [IRB] for graduate study Faculty of Nursing, Burapha University, Thailand. All participants including school-age children, parents of obese school-age children, teachers, and nurses were informed about the research objectives, methods, the potential risk, and the benefits of participation. The parents of obese school-age children, teachers, and nurses who agree to participate in the research project asked to sign consent forms. For school-age children who agree to participate in the research project was asked to sign assent forms and consent forms from their parents. All participants were assured that they could discontinue the research project at any time without any notice. Besides, all participants had the right to agree to participate in the research project or terminate their participation without negative effects. To protect confidentiality, all participants were, assured that the reporting data was used a code number instead the real name. The data were used only for the research objectives analyzed as a group. Therefore, the individual participants cannot be identified by their responses. All of data records such as interviewing record, and written documents kept in a secure place and were available only to the researcher. Records destroyed 1 year after the research results were published

Data collection

After the proposal was approved by IRB for graduate study Faculty of Nursing, Burapha University, Thailand, the researcher contacted the eligible study setting, Hua Khwang Municipality Community, Hua Khwang sub-district in Kosumpisai district, Mahasarakham province, the Northeastern of Thailand.

The procedures were as follows:

1. A letter asking for permission to collect the data sent to the school director. The researcher contacted the school director to inform about the research objectives and the benefit to the school.
2. After obtaining permission from the school director, the researcher met all school-age children (obese, normal weight and underweight school-age children) were in grade 4 and 5. All of them were measured their weight and height. Obese school-age children were identified by weight for height ($wt/ht \geq 2SD$) (Department of Health, Ministry of Public Health, 1999).
3. All participants including school-age children (obese, normal weight, and underweight school-age children), parents of obese school-age children, teachers, and nurses were recruited by purposive sampling according to the inclusion criteria.
4. The researcher met school-age children, parents of obese school-age children at home, teachers at school, and nurses who met the inclusion criteria at primary care unit [PCU], Kosumpisai Hospital, Mahasarakham province and informed them 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 collecting data.
5. The researcher informed a consent form for the individual who agreed to participate in this study. For school-age children were obtained the assent forms and consent forms from their parents after they agreed to participate in this study.
6. The researcher collected the data from the participants. Data collection was divided into three phases: 1) Situation analysis, 2) Model development, and 3) Evaluation phase as follows:

Phase I: Situation analysis

The researcher conducted this phase over a period of three months. The data collection procedures of situation analysis phase as follows:

1. The researcher explored the current situation and factors related to healthy eating behavior in obese school-age children by:

1.1 Questionnaires

The questionnaire was distributed to total target school-age children (obese, normal weight, and underweight school-age children), parents of obese school-age children, teachers, and nurses who were agree to participate in the research project. The procedures for collecting data were as follows:

1.1.1 The researcher made apportionment to meet total target school-age children at school for completing the self-administered questionnaire. The researcher explained how to answer the questionnaires and allowed them to ask the questions if they feel unclear. School-age children were free to answer all questions for around 30 minutes. After completing the questionnaires, total target school-age children returned to the researcher.

1.1.2 The researcher visited each parent of obese school-age children at their home and interviewed them through the questionnaire (socio-demographic information).

1.1.3 The researcher invited each teacher at school and nurses at PCU to complete the questionnaire (socio-demographic information) and then returned back to the researcher.

1.2 In-depth interview

In-depth interview aimed to understand participants' views related to eating behavior and risk and protective factors affecting healthy eating behavior in obese school-age children. The researcher made appointment to the participants for the date of interviews. Obese school-age children interviewed at school or home and their parents at home when they were available. Besides, the researcher interviewed teacher at school and nurses at PCU on their available time. Each participant was interviewed around 45-60 minutes. The researcher asked for permission from participants to audiotape recording during interview before starting the interview. After that, the researcher wrote the field note and transcribes the data. The data were analyzed by content analysis.

1.3 Observation

The researcher observed eating behavior of school-age children at school before class, lunch, and after class for five days (Monday-Friday). Besides, the researcher observed school lunch menu and foods available at shop vendors, food carts in/ near school, and food shops closet to the school.

2. Quantitative data and qualitative data were analyzed and then the researcher integrates both results together. The researcher summarized the results and draws the picture of overview of the current situation and factors regarding healthy eating behavior in obese school-age children.

Phase II Model development

This phase consisted of four steps: 1) planning, 2) Implementing, 3) reflecting, and 4) re-planning. These steps were undertaken over a period of eight months.

Step 1: Planning

In this step, the results regarding problems and factors related to healthy eating behavior in obese school-age children and the action plan created by the researcher was discussed with participants.

1. Confirming the problems and factor related to healthy eating behavior

1.1 The researcher invited participants to group meeting and build relationship with participants. The researcher introduced herself and presented the overview of the situation related to eating behavior in obese school-age children.

1.2 Group discussion was employed for confirming the results.

The researcher divided three groups of obese school-age children, three groups of parents, one group of teacher, and one group of nurses. Each group asked to brainstorm for criticizing the problems and factor related to healthy eating behavior in obese school-age children listed by the researcher. It was performed around 30 minute.

1.3 All group leaders presented their conclusion and the researcher summarized and concluded the final problems and factors.

2. Creating the action plan

2.1 The researcher created the first draft of action or intervention plan based on the results of situation analysis in phase I and the literature review of existing interventions. Perceived severity, perceived benefits, and self-efficacy of

health belief model (Rosenstok et al., 1988) and therapeutic conversation process (Wright, Wason, & Bell, 1996 cited in Wacharasin, 2007) were applied to develop intervention for promoting healthy eating behavior for obese school-age children. The researcher also consulted the advisor for constructing the first draft of action or intervention plan.

2.2 The researcher presented the draft of two intervention plans to participants. Then, each group shared and discussed whether the draft of action plan or interventions fit to solve the problems of healthy eating behavior and what they would change or modify them.

2.3 The researcher summarized and set up the action plan for acting or implementing in the next step.

Step 2: Implementing

The researcher implemented the two interventions (The detail of content of activities of interventions in Appendix C) including 1) intervention I promoting healthy eating behavior [PHB] in obese school-age children for obese school-age children and parents group, 2) intervention II changing belief of chefs and vendors and providing healthy food [CBPHF] for obese school-age children at school.

1. Intervention I: PHB

This intervention was to raise awareness of obese school-age children and their parents about the consequences of unhealthy eating behavior and perceiving the significant of promoting healthy eating behavior in obese school-age children.

20 obese school-age children-parents dyads were invited to group meeting at school for sharing and discussion about the negative consequences of unhealthy eating behavior in obese school-age children and the benefits of healthy eating behavior in obese school-age children. Besides, obese school-age children and parents were developed their ability for promoting healthy eating behavior. After finished each activity, the researcher commended all of participants for their doing activity in order to encourage them to continue activities and achieve the goals. The researcher provided the promoting healthy eating behavior record book for obese school-age children and their parents in order to assess, evaluate, and monitor their behaviors and change. For develop ability for promoting healthy eating behavior, educating nutritional knowledge via school broadcast, exhibition on nutritional knowledge, and

providing more information about healthy food and healthy eating were used. After that, the researcher visited them at home for strengthening confidence in promoting healthy eating behavior in obese school-age children and maintaining healthy eating behavior. The researcher evaluated behaviors of obese school-age children and their parents and provided consulting for improving promoting healthy eating behavior in obese school-age children. The main of intervention I: PHB consisted of five stages as follows:

Stage I: Raising awareness about healthy eating behavior. This stage consisted of two main activities including 1) exchanging information and experience and 2) finding the suitable guidelines to promote healthy eating behavior activity.

Stage II: Developing ability for promoting healthy eating behavior. The stage II included 1) educating week and 2) learning group of parent-child dyad activity.

Stage III: Strengthening confidence in ability and motivation for promoting healthy eating behavior. This stage consisted of 1) encouraging and consulting by home visiting and 2) giving reward and observing good model of eating behavior at school activity.

Stage IV: Maintaining healthy eating behavior. The activities were monitoring, evaluating, and modified suitable action plan for succession.

Stage V: Reflecting the program. This stage included reflecting about changes and evaluates satisfaction of obese school-age children and their parents.

The researcher role: The researcher acted as a facilitator and organizer for all possible resources directed toward participant needs and achievement of their goals, such as consulting and nutritional education. For the group discussion, the researcher acted as stimulator to encourage obese school-age children and parents to share idea in group discussion and to be facilitator to provide atmosphere for group discussion.

2. Intervention II: CBPHF

This intervention was to change belief of chefs and vendors to provide healthy foods for obese school-age children. All 6 chefs and 5 vendors were invited to participated in the activity. However, there were 3 vendors did not meet inclusion criteria including fruits, Zushi, and ice-cream shops. Therefore, there were 6 chefs and

2 vendors participated in the intervention. Group meeting was conducted for 6 chefs and vendors for one time at school. All of them were induced by asking question about the problems related to providing healthy eating behavior for obese school-age children such as “what do you think about your problems of providing healthy foods for obese school-age children?” In addition, the researcher induced chefs and vendors to tell the negative effect if they provided unhealthy foods for obese school-age children. Chefs and vendors were encouraged to find out the appropriate method for providing healthy foods for obese school-age children. The researcher provided more information about providing healthy food and discussion with participants. After finished each activity, the researcher commended all of participants for their doing activity in order to encourage them to continue activities and achieve the goals. The researcher provided behavior change recording book for chefs and vendors. In addition, the researcher visited them at school for evaluating, consulting, and reflecting about behaviors and change and the effect of changing belief as well. The main of intervention II: CBPHF consisted of four stages as follows:

Stage I: Exploring problems related to promoting healthy eating foods. This stage included exploring problems and realizing providing healthy food by asking and telling activity.

Stage II: Encouraging the plan to provide healthy foods. This stage consisted of 1) rethinking problems, causes, obstacles, and needs for solving problem and 2) finding appropriate guidelines or method for providing healthy foods activity.

Stage III: Reflecting about changes in providing healthy foods. It consisted of reflecting about changes in chefs and vendors’ belief.

Stage IV: Maintaining providing healthy foods. This stage consisted of exploring the effect of changes, discussion, and conclusion the effect of changes.

The researcher role: The researcher facilitated and provided all possible resources for participants needs and toward their achievement of the goals such as consulting and providing more information about providing healthy foods. The researcher also stimulated participants to share ideas in group and provided atmosphere for group discussion.

Step 3: Reflecting

Reflection provided an insight into the process of implementation and the effect of the change. After finished intervention I: PHB, some parents reflected that they had no confident to provide healthy foods for their children. Therefore, the intervention was arranged for these parents again. For intervention II: CBPHF, most of chefs and vendors reflected that all of them could change belief and behavior. They provided more healthy foods. Therefore, intervention II: CBPHF was not re-planning.

Step 4: Re-planning

In this stage, the intervention 1: PHB was arranged activities for some parents and the researcher visited their home. The main contents that were arranged including 1) arranging conversation by focusing on the family competence in providing healthy foods for parents, 2) using an example of successful parent and obese school-age children for promoting healthy eating behavior, 3) providing more information about the appropriate foods fit with individual family context. After finished arranged activity one time, all of parents had the new methods that were suitable for them. All of them attempted to do new methods for promote healthy eating behavior for obese school-age children. Therefore, the intervention I: PHB was modified one time.

Phase III Model evaluation

This phase was undertaken over a period of one month for evaluating the outputs and outcome of the model implementation. The data collection was collected one month after the end of implementing process.

1. Self-administered questionnaire

The same self-administered questionnaire including knowledge about healthy food and healthy eating, beliefs about healthy eating, healthy eating self-efficacy, availability of healthy foods at home and school, and healthy eating behavior questionnaires (5 parts) were collected quantitative data from obese school-age children.

2. Focus group discussion

The researcher performed focus group discussion [FGDs] among participants. The purpose was to evaluate how the new practice or intervention

affected participants after implementing and participants' satisfaction toward the model. The focus group discussion took place at the school. There were 3 groups of obese school-age children and their parents group (6-8 persons/ group), 1 group of teachers (8 persons), 1 group of nurses (6 persons). All participants in each group were free to share feeling or thought or opinions toward the new practice. Contents of FGDs were recorded by taking field note by the research assistant (note taker) and audiotape recording during group process. The researcher acted as moderator and observer to stimulate participant for discussion and sharing ideas with others during group process. The data from FGDs were transcribed and analyzed by content analysis. The action research procedure was shown in figure 3-1 and the data collection was showed in table 3-2.

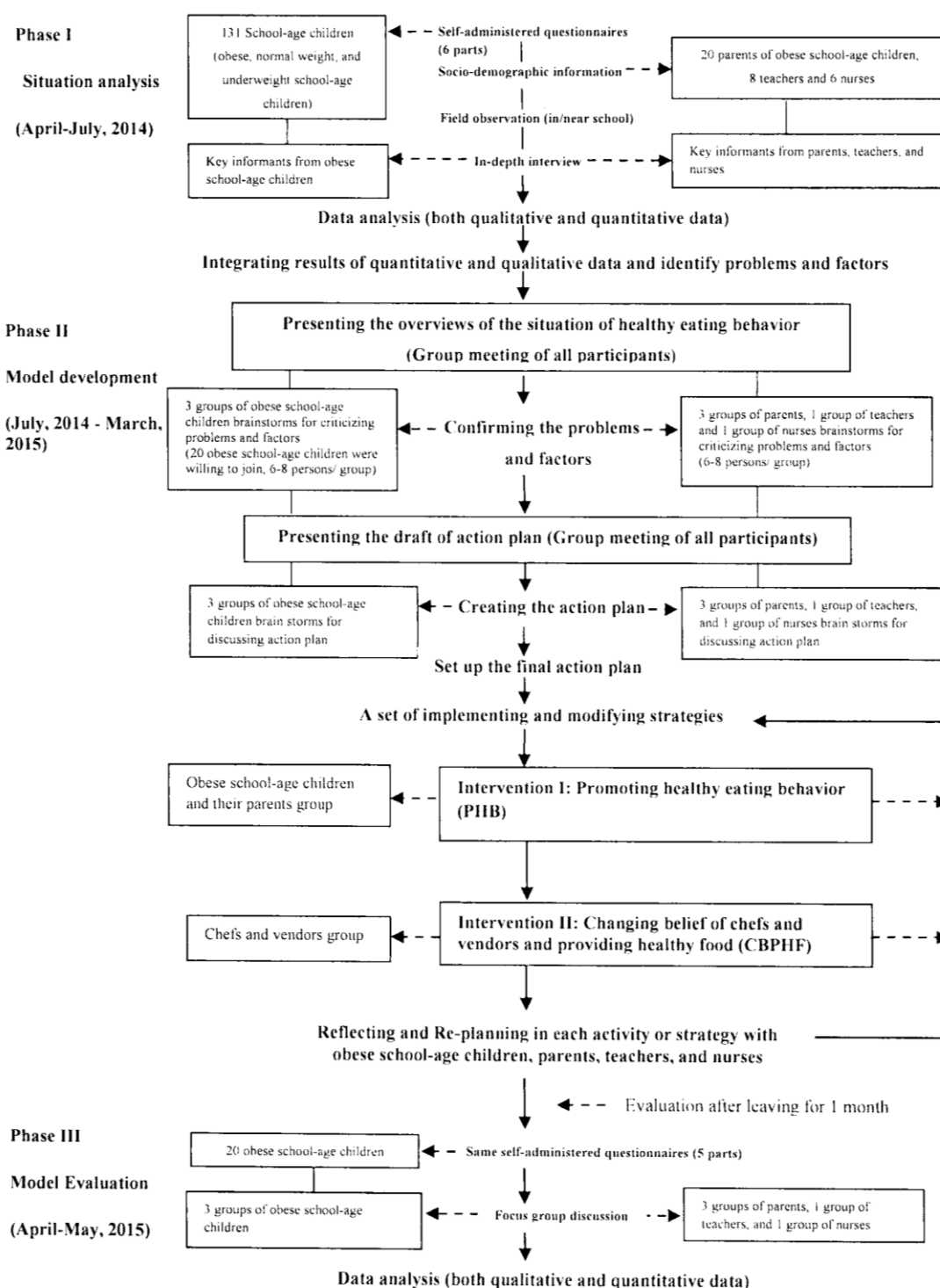


Figure 3-1 The action research procedures

Table 3-2 Summary data collection

Phase	Data required	Method	Participant	Study setting
Phase I Situation analysis	1. Healthy eating behavior in school- age children	1. questionnaires	131 school-age children (obese, normal weight, and underweight school-age children)	school
		2. observation	131 school-age children	in/ near school
	2. Healthy eating behavior in obese school-age children	in-depth interview	12 obese school-age children	home/ school
	3. Factors related to healthy eating behavior in school- age children	questionnaires	131 school-age children	school
	4. Factors related to healthy eating behavior in obese school-age children	in-depth interview	12 obese school-age children	home/ school
			12 parents	home
			6 teachers	school
			6 nurses	PCU
	5. Availability of healthy food at school	1. questionnaires	20 obese school-age children	school in/ near
		2. observation	6 chefs and 5 vendors	school

Table 3-2 (continued)

Phase	Data required	Method	Participant	Study setting
Phase II Model development	1. Model for promoting healthy eating behavior	observation	20 obese school-age children 20 parents 8 teachers 6 nurses	home/ school
	2. Eating behavior in obese school-age children	observation (home and school visit)	20 obese school-age children 20 parents 8 teachers	home/ school
Phase III Model evaluation	1. Factors related to healthy eating behavior in obese school-age children	questionnaires	20 obese school-age children	school
	2. Qualitative evaluation and participants' satisfaction toward the model	focus group discussion	20 obese school-age children 20 parents 8 teachers 6 nurses	school/ PCU

Data analysis

The qualitative data and quantitative data from each phase were analyzed by the method as follows:

Phase I Situation of analysis

1. Individual in-depth interviews about eating behavior, factor related to healthy eating behavior in obese school-age children, including needs for promoting healthy eating behavior in obese school-age children was analyzed by content analysis method (Kyngäs & Vanhanen, 1999).

2. The qualitative data about availability of healthy food at home and school from open-ended questionnaire and field observations were analyzed by content analysis method.

3. 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 of obese school-age children were analyzed by descriptive statistics (percentages, range, mean, and standard deviations).

4. Pearson's product moment correlation coefficient was used to describe the relationship between the knowledge about healthy food and healthy eating, beliefs about healthy eating, healthy eating self-efficacy, and healthy eating behavior in obese school-age children, while categorical data was used chi-square test.

Phase II Model development

The qualitative data from field noted taking of observations and participant observations during group discussion was analyzed by content analysis method.

Phase III Model evaluation

1. The qualitative data from open-ended questionnaire (availability of healthy food at home and school) and focus group discussion were analyzed by content analysis method.

2. Effect size (γ) was used to examine the differences of mean scores of knowledge about healthy food and healthy eating, beliefs about healthy eating, healthy eating self-efficacy, and healthy eating behavior before (phase I situation analysis) and after implementing intervention (1 month after the end of implementing process). The formula for γ (gamma) is $\gamma = \mu_0 - \mu_1 / \sigma$ ($\mu_0 - \mu_1$ is the difference of mean, σ is the standard deviation of population) (Howell, 1999).

CHAPTER 4

RESULTS

This chapter presents the results of the research on development of healthy eating behavior model for obese school-age children in Mahasarakham province. The results are presented in three parts: situation analysis, model development, and model evaluation.

Part I Situation analysis

The results of situation analysis in phase I consisted of the study context and the quantitative and qualitative results including the characteristics of participants, factors related healthy eating behavior in obese school-age children, characteristics of eating behavior in obese school-age children, and appropriate activities or guidelines to promote healthy eating behavior for obese school-age children. All results are presented as follows:

The study context

This current research study was carried out in one primary public school located in Hua Khwang Municipality Community, Hua Khwang sub-district, Kosumpisai district, Mahasarakham province. This school was center of this area and established in this community around 100 years. There were various places and organizations available for public access and facilities surrounding this school such as a police station, a community hospital (Kosumpisai hospital), post office, and commercial banks. The school used the Institute of Nutrition, Mahidol University-school lunch program to guide for school lunch menus of each school-age children's class. There were 6 chefs who cook school lunch meal for school-age children grade 1-6. For shop vendors and food carts, there were 5 food shops and 1 food cart in school that included fruit shop, ice cream shop, fried chicken and fried meatball shop, Zushi shop, drinking shop, and Tokyo cart. After school, there were 4 food carts at left side of school included meatball, grilled squid, papaya salad, and sweet drinking cart. Two food carts behind school sold meatball and sweet drinks. Additionally, this school was situated near local market "Talad Tessaban Hua Khwang" around 2-3

kilometers. There were food shops situated surrounding close to this school that included convenience store, curry food shop, and drinking shop. Moreover, health care providers from Primary Care Unit of Kosumpisai hospital, Mahasarakham province, were responsible for promoting student's health such as general health assessment and vaccination once a year. There were some projects to promote about nutrition for students including nutritional surveillance and nutritional education.

Quantitative results

1. Characteristics of participants

1.1 Characteristics of school-age children

Participants responding to complete the self-administrated questionnaires in phase I situation analysis composed of 131 school-age children. The school-age children's nutritional status was categorized by using weight for height chart (Department of Health, Ministry of Public Health, 1999). The results showed that most school-age children were normal weight (69.47 %) and followed by obese (22.90 %) see in table 4-1. The socio-demographic characteristics of each group were shown in table 4-2.

Table 4-1 Number and percent of school-age children's nutritional status ($N = 131$)

Nutritional status	Number	Percent
Normal weight	91	69.47
Obese	30	22.90
Underweight	10	7.63

Table 4-2 Socio-demographic characteristics of school-age children by school-age children's nutritional status

Socio-demographics	School-age children’s nutritional status (Number (%))		χ^2	p-value
	Obese (N = 30)	Normal weight (N = 91)		
Grade level				
Grade 4	21 (70.0)	50 (54.9)	6.190	.013
Grade 5	9 (30.0)	41 (45.1)		
Gender				
Boy	21 (70.0)	46 (50.5)	.130	.718
Girl	9 (30.0)	45 (49.5)		
Age (years)				
10	18 (60.0)	46 (50.5)	1.177	.278
11-12	12 (40.0)	45 (49.5)		
Living with				
Mother and/ or father	12 (40.0)	45 (49.5)	.431	.934
Grandparents	6 (20.0)	22 (24.2)		
Relatives	12 (40.0)	24 (26.3)		
Number of family member (persons)				
2-5	15 (50.0)	64 (70.3)	.219	.640
> 5	15 (50.0)	27 (29.7)		
Number of siblings (persons)				
1-2	24 (80.0)	63 (69.2)	1.208	.547
≥ 3	6 (20.0)	28 (30.8)		
Child’s birth order				
First	15 (50.0)	51 (56.0)	1.126	.569
Second or above	15 (50.0)	40 (44.0)		

By chi-square test, significant difference at $p < .05$

Table 4-2 (continued)

Socio-demographics	School-age children's nutritional status (Number (%))		χ^2	p-value
	Obese (N = 30)	Normal weight (N = 91)		
Allowance (baht/ day)				
≤ 20	9 (30.0)	31 (34.1)	.889	.641
21-100	21 (70.0)	60 (65.9)		
	(Range = 20-50, M = 30.50, SD = 9.75)	(Range = 10-100, M = 33.74, SD = 14.29)		
Pay for food (baht/ day)				
≤ 10	24 (80.0)	71 (78.0)	3.081	.079
11-30	6 (20.0)	20 (22.0)		
	(Range = 0-25, M = 6.83, SD = 7.93)	(Range= 0-30, M = 7.14, SD = 8.27)		
Pay for sweets or snacks (baht/ day)				
≤ 10	9 (30.0)	46 (50.5)	1.589	.207
11-40	21 (70.0)	45 (49.5)		
	(Range = 5-35, M = 15.33 SD = 7.18)	(Range = 0-40, M = 14.73, SD = 7.97)		

By chi-square test, significant difference at $p < .05$

The results (table 4-2) presented there was only significant difference in grade level among obese and normal weight group. Most obese and normal weight was similar in terms of socio-demographics. These results were presented as following.

Obese group

Majority of the students in this group were in grade 4 (70 %), boys (70 %), and 10 years old (60 %). Half of them (50 %) lived in the family of 2-5 and over 5

persons. More than one-third of them (40 %) lived with their mother and/ or father. Half of them (50 %) were the first or second child's birth order and most of them had 1 or 2 children in family. The allowance of the students in this group ranged from 20 to 50 baht per day with the mean of 30.50 ($SD = 9.75$). More than two thirds of them (70 %) had allowance between 21-100 baht per day. Most of them (80.0 %) also spent allowance on food about 10 baht and below per day, while more than two thirds of them (70 %) spent allowance on sweets or snacks between 11-40 baht per day.

Normal group

More than half of the student in this group (54.9 %) was in grade 4, boys (50.5 %), and 10 years old (50.5 %). Nearly half of them (49.5 %) lived with mother and/ or father and more than two thirds of them (70.3 %) lived in the family of 2-5 persons. More than half of them (56 %) were the first child's birth order and more than two thirds of them (69.2 %) had 1 or 2 children in family. The allowance of them ranged from 10 to 100 baht per day with mean 33.74 baht per day ($SD = 14.29$). Two thirds of them (65.9 %) had allowance between 21-100 baht per day. Most of them (78 %) spent allowance on food 10 baht and below per day and more than half of them (50.5 %) spent allowance on sweets or snacks 10 baht and below per day.

Underweight group

Most of the students in this group were in grade 5 (80 %), and nearly two thirds boys (60 %), and 11 years old. Majority of them (70 %) lived with mother and father and lived in the family of 3-5 persons (80 %). Half of them (50 %) were the second child's birth order and had 2 children in family. Nearly two thirds of them (60 %) had allowance between 21-40 baht per day. All of them (100 %) and half of them (50 %) spent allowance on food and snack 10 baht and below per day, respectively.

1.2 Characteristics of participants

Participants continued responding to involve in activities from phase I situation analysis through phase III Model evaluation composed of 20 obese-parent pairs, 8 teachers, and 6 nurses.

Table 4-3 illustrates most obese school-age children were in grade 4 (85 %), more than half of them were boy (55 %), and more than two thirds of them (70 %) were 10 years-old. More than two thirds of them (75 %) lived in the family of

over 5 persons. Nearly half of them (45 %) lived with mother, father, grandparents, and relatives. Nearly half of them (45 %) were the first child's birth, more than two thirds (70 %) of them had 2 children in family. The allowance of the student in this group range between 20-40 baht with mean 29.25 baht per day ($SD = 7.30$). More than two thirds of them (70 %) had allowance between 21-40 baht per day and spent allowance on food and sweets or snacks 10 baht and below, 95 % and 50 %, respectively. Besides, the results revealed that nearly half of them (45 %) spent allowance on sweets or snacks more than foods between 11-20 baht per day such as bread sweet with filling and crunchy snack, and followed by fried chicken. The socio-demographic characteristics of individual obese school-age children were presented in table 4-4.

Table 4-3 Socio-demographic characteristics of obese school-age children ($n = 20$)

Socio-demographics	Number	Percent
Grade level		
Grade 4	17	85.0
Grade 5	3	15.0
Gender		
Boy	11	55.0
Girl	9	45.0
Age (years)		
10	14	70.0
11	6	30.0
Living with		
Mother and father	8	40.0
Grandparents	1	5.0
Relatives (uncle or aunt)	2	10.0
Others (mother, father, grandparents, and relatives)	9	45.0

Table 4-3 (continued)

Socio-demographics	Number	Percent
Number of family member (persons)		
2	1	5.0
3-5	4	20.0
> 5	15	75.0
Number of siblings (persons)		
1	2	10.0
2	14	70.0
≥ 3	4	20.0
Child's birth order		
First	9	45.0
Second	8	40.0
Third or above	3	15.0
Allowance (baht)		
≤ 20	6	30.0
21-40	14	70.0
Range = 20-40, <i>M</i> = 29.25, <i>SD</i> = 7.30		
Pay for food (baht)		
≤ 10	19	95.0
21-30	1	5.0
Range = 0-25, <i>M</i> = 5.25, <i>SD</i> = 6.78		
Pay for sweets or snacks (baht)		
≤ 10	10	50.0
11-20	9	45.0
21-30	1	5.0
Range = 5-30, <i>M</i> = 13.5, <i>SD</i> = 6.51		

Table 4-4 Socio-demographic characteristics of individual of obese school-age children ($n = 20$)

No. of children	Socio-demographics									
	Grade level	Gender	Age (years)	Living with	No. of family (persons)	No. of sibling (persons)	Child's birth order	Allowance (baht)	Pay for food (baht)	Pay for sweets or snacks (baht)
1	4	Boy	10	Mother and father	4	2	2	30	10	5
2	4	Boy	11	Mother and father	4	2	1	30	10	5
3	4	Boy	10	Uncle and aunt	5	1	1	20	0	15
4	4	Boy	10	Mother and grandmother	7	2	2	50	20	20
5	4	Boy	10	Mother, father, and grandfather	5	2	2	20	0	20
6	4	Girl	10	Mother and father	5	2	1	20	0	15
7	4	Girl	11	Father and grandfather	4	2	2	40	0	20
8	4	Girl	10	Mother and father	3	2	1	40	0	15
9	4	Boy	10	Mother, father, and grandfather	5	2	2	30	10	15
10	4	Boy	10	Mother, father, and grandmother	5	2	2	20	0	10
11	4	Boy	10	Mother and father	4	2	2	20	0	15
12	4	Girl	10	Grandmother	2	3	3	30	10	10
13	4	Girl	10	Mother and father	3	1	1	35	10	15
14	4	Boy	10	Mother and father	4	2	1	30	0	20

Table 4-4 (continued)

No. of children	Socio- demographics									
	Grade level	Gender	Age (years)	Living with	No. of family (persons)	No. of sibling (persons)	Child's birth order	Allowance (baht)	Pay for food (baht)	Pay for sweets or snacks (baht)
15	4	Boy	10	Uncle and aunt	3	3	3	30	25	5
16	4	Boy	11	Mother, father, and grandfather	8	3	2	30	10	10
17	4	Girl	10	Grandmother and grandfather	7	3	3	20	0	5
18	5	Boy	11	Mother and father	4	2	2	30	0	30
19	5	Girl	11	Mother and father	4	2	1	30	10	10
20	5	Girl	11	Mother, father, grandfather, and aunt	6	2	1	40	10	10

Socio-demographic characteristics of parents of obese school-age children were presented in table 4-5. The results showed that majority of the parents were mother (70 %) and one third of them (35 %) aged range from 35-39 years old. More than one third of them (40 %) finished primary school and half of parents (50 %) were agriculture. More than two thirds of them (75 %) lived in the family of over 5 persons. The personal monthly income range from 3,000-25,000 baht with the mean of 10,713 ($SD = 6,797.45$). One third of parents (30 %) had personal income 10,000 baht and below while half of them (50 %) had family income more than 20,000 baht.

Table 4-5 Socio-demographic characteristics of parents of obese school-age children ($n = 20$)

Socio-demographics	Number	Percent
Family relation		
Father	3	15.0
Mother	14	70.0
Grandparent	2	10.0
Other	1	5.0
Sex		
Male	3	15.0
Female	17	85.0
Age (years)		
30-34	3	15.0
35-39	7	35.0
40-44	3	15.0
45-49	1	5.0
≥ 50	6	30.0
Marital status		
Married	16	80.0
Widowed	3	15.0
Separated	1	5.0

Table 4-5 (continued)

Socio-demographics	Number	Percent
Education level		
Primary school	8	40.0
Secondary school	2	10.0
Technical school	4	20.0
Bachelor degree	6	30.0
Occupation		
Housewife	1	5.0
Business/ Trader	3	15.0
Agriculture	10	50.0
Government officer	6	30.0
Number of family members (persons)		
3-5	5	25.0
> 5	15	75.0
Personal monthly income (baht)		
≤ 5,000	6	30.0
5,001-10,000	6	30.0
10,001-15,000	5	25.0
> 15,000	3	15.0
Range = 3,000-25,000, $M = 10,713$, $SD = 6,797.45$		
Family monthly income (baht)		
5,001-10,000	6	30.0
10,001-15,000	2	10.0
15,001-20,000	2	10.0
> 20,000	10	50.0
Range = 6,000-50,000, $M = 24,400$, $SD = 14,755.55$		

The results also found that most families prepared and cooked foods themselves. Most mothers were responsible for cooking foods. For two families, father and mother were responsible for cooking foods. Only one family, father and grandmother were responsible for cooking. Most foods were fried foods and followed by soup and salad. Almost foods were simple foods and fried foods in the morning such as fried eggs, fried chicken, and grilled pork. For lunch, all of obese school-age children ate school meal. In the evening, most food was difficult dishes for cooking such as green curry with chicken and fish or chicken Thai curry with vegetables. The food menus preparing or cooking from parents of obese school-age children were showed in table 4-6

Table 4-6 The food menus preparing or cooking from parents of obese school-age children

Fried foods	Soup or salad and others	Streamed, grilled, and boiled foods
- Fried eggs	- Thai snail curry	- Fish powder with chili
- Fried chicken	- Thai curry with vegetables	- Grilled chicken
- Fried fish	- Chicken soup with pork	- Grilled fish
- Fried rice	- Clear soup with chicken or fish	- Grilled pork
- Fried pork	- Papaya salad	- Steamed eggs
- Sauted mixed vegetables in oyster sauce	- Fried noodle in minced beef sauce	- Boiled eggs
- Stir-fried pork and basil	- Green curry chicken in coconut milk	- Thai streamed curry
- Fried mackerel	- Spicy noodle salad and other	
	- Spicy salad with pork and other	
	- Spicy soup	
	- Fried mackerel with shrimp paste sauce	
	- Spicy curry	
	- Spicy minced pork	
	- spicy shredded bamboo-shoot salad	
	- Fried noodle with pork and broccoli	

Table 4-7 Characteristics of teachers ($n = 8$)

Characteristics	Number	Percent
Responsibility of teachers		
School health sector and class teacher	1	12.5
School lunch program	2	25.0
School lunch meal providing and class teacher	5	62.5
Sex		
Female	8	100.0
Age (years)		
41-50	3	37.5
51-60	5	62.5
Education		
Bachelor's degree	6	75.0
Master's degree	1	12.5
Doctor's degree	1	12.5

Two thirds of the teachers (62.5 %) were responsible for providing school lunch and class teachers. All of them (100 %) were female and aged range from 51 to 60 years old (62.5 %). Most of them (75 %) finished bachelor's degree (table 4-7). Besides, the results revealed that most of the teachers had experiences about promoting healthy eating behavior in school-age children such as teaching about nutrition for school-age children in grade 4 and 5, examination and monitoring school-age children's nutritional status, and supervised cooks for providing school lunch meal.

Table 4-8 Characteristics of nurses ($n = 6$)

Characteristics	Number	Percent
Sex		
Female	6	100.0
Age (years)		
≤ 30	1	16.7
41-50	5	83.3
Position		
General nurse	1	16.7
Senior professional nurse	5	83.3
Education		
Bachelor's degree	3	50.0
Master's degree	3	50.0

As shown in table 4-8, all of the nurses were female (100 %). Majority of them were senior professional nurses with age range from 41 to 50 years old (83.3 %). A half of them finished Bachelor's degree and master's degree (50 %). Furthermore, the results revealed that most of the nurses had experiences in teaching nutrition, nutritional status survey, monitoring nutritional health problem of school-age children.

In addition, there were chefs and vendors in school participated in the intervention II CBPHF in phase II model development. There were 6 chefs and 5 vendors in school. For chefs, all of them were female. Chefs had experiences in providing school lunch for school-age children studying grade 1-6 for 2 to 7 years. For vendors, there were 5 vendors including 4 vendors were female and 1 vendor was male. 4 vendors sold fried food, sweet drinks, ice cream, and Zushi. 1 male vendor sold vegetable. They sold these foods for 2 to 4 years.

2. Descriptive statistics for healthy eating behavior in obese and normal weight school-age children

Table 4-9 illustrates normal weight school-age children had healthy eating behavior scores ranged from 14 to 28 with the mean of 21 ($SD = 2.79$). Obese school-

age children had healthy eating behavior scores ranged from 12-23 with mean of 18.40 ($SD = 2.70$). Normal weight school-age children had the mean scores of healthy eating behavior at a high level while obese school-age children had the mean scores of healthy eating behavior at a moderate level.

Table 4-9 Descriptive statistics of healthy eating behavior in obese ($n = 20$) and normal weight school-age children ($N = 91$)

Level of healthy eating behavior	Obese Number (%)	Normal weight Number (%)
Low	7 (35.0)	9 (9.9)
Moderate	13 (65.0)	69 (75.8)
High	0 (0.0)	13 (14.3)
$M \pm SD$	18.40 ± 2.70	21 ± 2.79
Min-Max	12-23	14-28

3. Descriptive statistics for factors regarding healthy eating behavior in obese and normal weight school-age children

As shown in table 4-10, the mean scores of knowledge about healthy food and healthy eating in obese school-age children was 11.90 ($SD = 2.36$). The mean scores of knowledge about healthy food and healthy eating in normal weight school-age children was 11.96 ($SD = 1.90$). Both obese and normal weight school-age children had knowledge about healthy food and healthy eating behavior at a high level.

For belief about healthy eating behavior, the mean scores of beliefs about healthy eating in obese school-age children was 22.45 ($SD = 2.76$). The mean scores of beliefs about healthy eating in normal weight school-age children was 23.82 ($SD = 3.13$). For overall, normal weight school-age children had beliefs about healthy eating at a high level while obese school-age children had beliefs about healthy eating at a moderate level.

Similarly, normal weight school-age children had healthy eating self-efficacy at a high level while obese school-age children had beliefs about healthy

eating at a moderate level. Normal weight school-age children had healthy eating self-efficacy scores ranged from 16 to 30 with the mean of 23.64 ($SD = 3.03$). The mean scores of healthy eating self-efficacy in obese school-age children was 21.00 ($SD = 2.00$).

Table 4-10 Descriptive statistics of factors regarding healthy eating behavior in obese ($n = 20$) and normal weight school-age children ($N = 91$)

Factors	Possible range	Actual range	<i>M</i>	<i>SD</i>	Level
Knowledge about healthy food and healthy eating					
Obese group	0-16	8-15	11.90	2.36	High
Normal weight group	0-16	5-15	11.96	1.90	High
Beliefs about healthy eating					
Obese group	10-30	16-26	22.45	2.76	Moderate
Normal weigh group	10-30	16-29	23.82	3.13	High
Healthy eating self-efficacy					
Obese group	10-30	17-24	21.00	2.00	Moderate
Normal weight group	10-30	16-30	23.64	3.03	High

4. Relationship between healthy eating behavior and factors regarding healthy eating behavior in obese and normal weight school-age children

The results in table 4-11 showed that there was significant positive relationship between healthy eating self-efficacy and healthy eating behavior in normal weight school-age children ($r = .296, p < .01$). Knowledge about healthy food and healthy eating in both obese and normal weight school-age children ($r = .139, p > .05, r = .105, p > .05$) and belief about healthy eating in both obese and normal weight school-age children ($r = .102, p > .05, r = .132, p > .05$) had low positive relationship with healthy eating behavior. Moreover, healthy eating self-efficacy had low positive relationship with healthy eating behavior in obese school-age children ($r = .214, p > .05$).

Table 4-11 Relationships between healthy eating behavior and factors regarding healthy eating behavior in obese and normal school-age children

Variables	Healthy eating behavior (<i>r</i>)	
	Obese (<i>n</i> = 20)	Normal weight (<i>N</i> = 91)
Knowledge about healthy food and healthy eating	.139	.105
Beliefs about healthy eating	.102	.132
Healthy eating self-efficacy	.214	.296*

Note: * $p < .01$

Qualitative results

The qualitative data were assessed by in-depth interviewed of 12 obese school-age children, 12 parents of obese school-age children, 6 teachers, and 6 nurses. Besides, the qualitative data from open-ends about available foods at home and school and field observations were analyzed. The qualitative results consisted of the perceptions of healthy eating behavior in obese school-age children, eating behavior in obese school-age children, factors related to healthy eating behavior in obese school-age children, and appropriate activities or guidelines to promote healthy eating behavior in obese school-age children. All results are presented as follows:

1. The perceptions of healthy eating behavior in obese school-age children

The results found that the perceptions of healthy eating behavior in obese school-age children from obese school-age children and their parents were similar. There were three categories including eating vegetables and fruits, eating fish, meat, eggs and milk, and eating foods containing low fat and oil.

1.1 Eating vegetables and fruits

Most obese school-age children viewed healthy eating behavior in obese school-age children as eating vegetable regularly. This behavior could help their children to be healthy. Obese girl said that:

“Eating more vegetable made me healthy. I like to eat some kind of vegetables but I eat every kind of fruits” (obese girl no 12, aged 10 years).

Another obese school-age said that: “Vegetables help me have a good health. I like to eat some kind of them such as white radish, and Chinese kale. I also like to eat mangosteen and rambutan” (obese girl no 13, age 10 years).

1.2 Eating fish, meat, eggs and milk

The results indicated that most of parents viewed healthy eating behavior in school-age children as eating fish, egg, and milk. Most of parents believed that protein from foods could help their children have normal health and grow.

A mother said that: “Eating fish, eggs, milk is ok for my child. Egg and milk help my son grow up and healthy” (a-41-year-old-mother of 10 years old obese boy no 9).

Another mother said that: “Fish, milk, and meat are healthy food. These food provide protein for my daughter. If she eats these foods regularly, her health will be normal” (a-34-year-old-mother of 10 years old obese girl 13).

1.3 Eating food containing low fat and oil

Some of obese school-age children believed that food containing low fat and oil was healthy food for them. They think that high fat food made overweight. Moreover, these kinds of food would latter cause some diseases in them.

An obese school-age child said that: “Healthy eating behavior is eating food containing less oil and fat. I think that if I eat more and more fatty foods, these foods made me have a disease such as hypertension. I don’t want to be this disease” (obese girl 20, aged 11 years).

An obese girl said that: “Foods containing high oil are not healthy foods for me. These foods make me have overweight. However, I like to eat some of these foods” (obese girl no 6, age 10 years).

2. Eating behavior in obese school-age children

The results showed that three major categories of the characteristics of eating behavior in obese school-age children which were eating less vegetable and fruits, eating much carbohydrate or sugary foods and sweet drinks, and eating foods containing high fat and oil. These results were presented as follows:

2.1 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 and less than 4-6 rice-serving spoons and less than 3-6 portions per day for vegetable and fruits, respectively. Besides, many obese school-age children often ate only vegetables and fruits that they like such as Chinese cabbage, Chinese kale, and yard long bean, mango, and water melon. One of the obese school-age children said that:

“I don’t like eating vegetables. I eat only Yard long bean. If my mother cooks food containing other vegetables, I will pick those vegetables out before I eat.For fruit, I like only mango and eat 1-2 mangoes every day if a vendor sell this fruit in school” (obese boy no 5, aged 10 years).

“I don’t like eating vegetables. I eat food containing less vegetable and 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).

“He likes to eat food containing fatty meat or meat more than vegetables such as pork and chicken liver.....When I provide foods with more vegetables for him, he will not eat” (a-50-years-old-mother of 10 years old obese boy no 5).

2.2 Eating much carbohydrate or sugary food and sweet drinks

Most obese school-age children consumed too much sugary food and sweet drinks after meal every day. They often ate carbonate 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 rice 1-2 dishes per meal (6-12 rice serving spoons/day). After breakfast, I always drink 1 box of low fat milk or “Ovaltine” (180 ml) and yogurt milk 1 box (100 ml). 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 1 piece, or a bag of crunchy snack 1 bag (5 baht) such as “Lay” and “Doramon” (obese girl no 6, aged 10 years).

“He likes to eat 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).

“I drink sweet drinks every day..... I buy 1 bottle of sweet drink or sweet fruit smoothies (200 ml) after lunch and school such as cantaloupe, grape, and cocoa.

Every day after school, I also buy 1 bottle of carbonate beverage (450 ml)” (obese boy no 5, aged 10 years).

2.3 Eating food 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, fried fish, and eggs boiled and pork stewed in the gravy, fried noodle with pork in gravy, rice topped with stir-fried pork and basil, and oily rice steamed with chicken soup.

An obese school-age child stated that: “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 rice steamed with chicken soup, and crispy chicken with rice. Every day after lunch, I buy some snacks such as such as sausages and 1-2 pieces of fried chicken from shop vendorsFor dinner, the kind of foods that my mother cooks or buy for family 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).

“If school lunch has foods that I like, I will eat 2 dishes such as fried rice and oily steamed rice with chicken soup. Besides, I buy fried food after lunch (2-3 days per week) such as 2 pieces of chicken pop and 1-2 pieces of sausages. In the evening, my mother also cooks fried food for family as same as the weekend or holiday (such as fried chicken, fried rice, and fried fish)” (obese boy no 16, aged 11 years).

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

In addition, the results of eating behavior in obese school-age children from observation had shown that most obese school-age children ate a lot more unhealthy food than healthy on every day. Although some obese school-age children ate breakfast from home, they often bought some food from shop vendors at school to eat before class. Chicken pop and crispy chicken were the popular food for obese school-age children in the morning. For school-age children grade 4 and 5, school lunch would start at 11.30 a.m. to 12.30 p.m. All school-age children (obese, normal

weight, and underweight) would be served the same kind of food. All obese school-age children ate at the school's cafeteria. Some of obese school-age children ate 2 dishes of school meal. Someday most obese school-age children ate few amounts of foods if school meal were foods containing large amount of vegetables. Some days when school served food containing large amount of vegetables, most obese school-age children would eat less. Some of them didn't eat school meal at all if there was no food they liked. They would buy other foods to eat for lunch. However, most obese school-age children often bought other food and drinks to eat after school meal. After school, most of them also bought fried food and sweet drinks every day.

In conclusion, the findings revealed that the data from in-depth interviews and observations were similar. Most of obese school-age children ate large amount of foods and ate the kind of foods that they liked. The characteristics of eating behavior in obese school-age children included eating less vegetable and fruits, eating much carbohydrate or sugary food and sweet drinks, and eating food containing high fat and oil. These characteristics were negative behaviors. Therefore, promoting healthy eating behavior for obese school-age children in this school was important.

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

Factors related to healthy behavior in obese school-age children were divided into risk and protective factors. The results were presented as follows:

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

The findings revealed that there were three categories of risk factors including lack of awareness, inadequate knowledge, and availability and accessibility of unhealthy foods.

3.1.1 Lack of awareness

Most obese school-age children and their parents had lack 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. For instance, obese school-age children said that:

"I always eat 1 piece of bread with sausage and 1 box of chocolate milk (180 ml) for breakfast every day..... I like to eat fried chicken and oily steamed rice with

chicken.....moreover, I drink carbonate 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:

“Obese school-age children like to eat fried food very much. Some of them buy fried food such as fried chicken and fried snacks. However, they eat only fried piece” (teacher aged 53 years, in charge of school lunch meal providing).

Another teacher said that: “The child likes to eat fried food, unhealthy snacks, carbonate beverages or sweet drinks. They don’t like to eat vegetables” (teacher aged 54 years, in charge of health sector).

Furthermore, 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 or friends ate or ordered. Obese school-age children did not concern about the advantage of food that they ate. Most of foods that they and their friends like to eat such as crispy chicken, chicken pop and fried chicken. Some nurses indicated that:

“Usually, school-age child like to eat what their friends eat. Most of obese school-age children like to eat snack and carbonate 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 ignore 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 provide food that my daughter likes to eat, especially fried food such as fried eggs, omelet, fried chicken, roast chicken and pork, and fried rice.....Besides, I provide less fruits for her and always serve my daughter bananas. For dinner, I also cook fried foods that my daughter likes” (a-38-years-old mother of 10 years old obese girl no 6).

“I ask my daughter...What do you want to eat?...I will cook any food that she likes. Mostly, she like fried food. For breakfast, there are fried pork, fried eggs, and rice topped with stir-fried pork.....For dinner, grandmother always cooks food for her such as spicy curry or curry with coconut milk” (a-41-years-old father of 11 years old obese girl no 7).

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 foods 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 almost all of ready-to-eat foods at convenience stores were food containing high fat and oil such as fried pork, fried chicken, and grilled pork. Moreover, many parents gave their children money to buy food on their own preference. For instance, a nurse said that:

“Nowadays, many parents work outside home that make them have no time to cook for their children, especially breakfast. Many parents ignore the consequences of unhealthy eating behavior of their 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 the usefulness” (nurse aged 49 years, responsible for supervising school health promoting).

3.1.2 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 are low calorie and appropriate for obese school-age children. For example, parents indicated that:

“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)

Another parent said that: “I mean healthy food as fried chicken and fried pork are good for my child, but my child doesn’t eat. I think my child is obese because he eats more amount of rice” (a-37-years-old mother of 11 years old obese girl no 17).

An obese school-age child said that: “Healthy food is vegetables and the five food groups.vegetables provides protein, fruits provide carbohydrate” (obese boy no 5, aged 10 years).

Another obese school-age child indicated that: “I know only healthy foods are vegetables and meat. However, I don’t know others”(obese boy no 9, aged 10 years).

Moreover, some of nurses expressed that obese school-age children and their parents had inadequate knowledge of healthy foods and healthy eating behavior.

A nurse said that:

“The first factor is knowledge. Some obese school-age children eat foods that they don’t know these foods are important for them or not. They eat and eat more until they have overweight. They don’t know the consequences of overweight or obesity” (nurse aged 47 years, in charge of family health).

Another nurse said that: “Many parents don’t know what are the types and amount of food are appropriate for their children? These led to provide high calories food for their child” (nurse aged 49 years, responsible for school health education).

3.1.3 Availability and accessibility of unhealthy foods

The results from the observation found that unhealthy or inappropriate foods for obese school-age children were 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 to guide for lunch’s menu of each school-age children’s class. For example, the lunch’s 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 mince 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, water melons, and banana. From these results, school lunch meal’s menus were not specific for obese school-age children. Besides, it might be concluded that some foods in school lunch meal were 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 were high sugar that was not appropriate for obese school-age children such as banana and mango.

Most of food shops and carts in/near school sold many foods and drinks were not appropriate for obese school-age children including foods containing high sugar and carbohydrate such as carbonate beverage, sweet smoothies, cola sweet

drinks, and bread with milk or butter or chocolate. Food shops and carts also sold foods containing high fat and oils such as crispy chicken, chicken pop, fried chicken, meatball, and grilled squid. At home, the results from the open-ends questionnaire of 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, rice streamed with chicken soup. Some family provided foods containing less fat and oil such as clear soup, papaya salad, boiled fish, boiled eggs, and grilled fish. Although some family provided healthy foods for obese school-age children, most of them preferred to eat more unhealthy foods than healthy foods. Most obese school-age children ate unhealthy foods ever day (6-7 days/ week).

Moreover, the results from in-depth interview of obese school-age children, parents of obese school-age children, teachers, and nurses and interview of chefs and vendors in school found that all of them provided or sold many unhealthy foods for obese school-age children because they believe that these foods were children liked to eat. For instance, 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, responsible for school lunch meal providing).

“Sometime the vendors concern only cost of foods but they don’t concern quality for children. So, they select food containing high fat and oil, and little vegetables serve for school-age children” (nurse aged 49, responsible supervising health promoting school).

A chef that: “Most of obese school-age children don’t like vegetable. So, I cook foods 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 fried shop vendor at school).

At home, the results found that many parents of obese school-age children provided unhealthy foods for their children. Most parents believe that obese school-age children ate any food was better than they did not eat. Therefore, most of them

cooked or provided any food including unhealthy food for their children. A father said that:

“I like to cook food that my daughter likes to eat such as fried pork, stir-fried pork and basil, and fried squid with garlic and pepper. Sometime grandmother cooks dessert for her such as mango with sticky rice” (a-41-years-old father of 11 years old obese girl no 7).

A grandmother stated that: “I want my niece to eat large amount of food. So, I almost cook the kinds of foods that she likes such as fried fish, fried eggs, and fried mackerel and shrimp paste chili sauce” (a-62-years-old grandmother of 10 years old obese girl no 17).

3.2 Protective factors of eating behavior in obese school-age children.

The findings revealed that local Thai food and parents’ talking and teaching about healthy eating behavior were category of protective factors of eating behavior in obese school-age children. The results are present as following:

Local Thai “Isan” food

From observation, the results showed that most of the local Thai food in this area was healthy food. This food can promote obese school-age children to have healthy eating behavior. Hua Khwang Municipality Community, Kosompisai district, Mahasarakham province is Northeastern of Thailand or Thai people call “Isan area”. Local Thai food of people in this area or Thai people call “Isan food” that were the food containing large amount of vegetables, low fat, oil, and sugar. The kinds of these foods were available in the market and food shops in this area such as 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 person. Some deserts 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 in-depth interviews revealed that many families of obese school-age children like to eat “Isan foods”. A parent said that:

“I almost cook “Isan food” for family every day such as fish Thai curry with more 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).

Another parent expressed that: “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 foods containing high fat and oil. My child eats every food that I cook at home” (a-50-years-old aunt of 11 years old obese girl no 15).

Parents’ talking and teaching about healthy eating behaviors

From in-depth interviews of 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 to cook or provide foods for family. Therefore, they could choose healthy foods or good ingredients to cook healthy food for their child. Moreover, they could talk and teach or support obese school-age children about healthy eating behavior for obese school-age children. A mother stated that:

“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 foods. 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).

A grandmother said that: “I always cook fish and eggs for my niece such as spicy mackerel salad, and boil eggs.....My niece often steal to buy carbonate beverage to drinks. If I know that, I will talk to her about the disadvantage of carbonate beverage” (a-75-years-old-grandmother of 10 years old obese girl no 12).

In summary, factors regarding eating behavior of obese school-age children included risk and positive factors. Local Thai food and parents’ talking and teaching of eating behavior were positive effect for eating behavior of obese school-age children. However, risk factors related to healthy eating behavior of obese school-age children were significant lead to health problem for obese school-age children. Obese school-age children and their parents had both lack of awareness, inadequate knowledge about healthy foods and healthy eating, and availability and accessibility of unhealthy foods were presented negative factors of obese school-age children’s healthy eating behavior. Therefore, to promote healthy eating behavior for obese school-age children, these risk factors should be concern to develop intervention.

4. Appropriate activity or guideline to promote healthy eating behavior in obese school-age children

The findings from in-depth interviews revealed that appropriate activities or guidelines to promote healthy eating behavior for obese school-age children divided into five categories including raising awareness about healthy eating behavior, providing healthy foods, giving information about healthy food and healthy eating, creating course of behavior change, and collaboration.

4.1 Raising awareness about healthy eating behavior

Most parents indicated that raising awareness about healthy eating behavior in obese school-age children was important for obese school-age children and their parents. It could make them to concern about the important of healthy eating behavior and consequences of unhealthy eating behavior that led to increase healthy eating behavior in obese school-age children. For instance, a mother said that:

“I think that the activity for raising awareness for obese school-age children and parents is important. The activity should provide information about positive effect of healthy eating behavior and negative effect of unhealthy eating behavior, especially diseases. This lead to help obese school-age children and parents had concern about healthy eating behavior in obese school-age children” (a-38-years-old-mother of 10 years old obese girl no 6).

“My mother and nurses should help me to know about negative consequences of unhealthy eating behavior.....I want to lose weight. So, my mother and nurses should control and advise me to have healthy eating behavior” (obese girl no 20, aged 11 years).

A teacher expressed that: “raising awareness about healthy food and healthy eating can help obese school-age children to have healthy eating behavior. For raising awareness, we may use example case that had death or negative effects from obesity” (teacher aged 54 years, responsible for school health sector).

4.2 Providing healthy food

Most participants expressed their opinion about providing healthy food into two sub-categories including providing healthy food at school and providing healthy food at home. The findings indicated that providing healthy food at school and home was crucial to promote healthy eating behavior in obese school-age children. Obese school-age children needed to have normal weigh and good health. If family and school provided health foods for obese school-age children, they could eat more

healthy foods. For instance, a parent said that:

“I always provide fried foods for my child. So, I must change old menu to boil and steam such as fish boil and stream..... The school must provide specific school meal for obese school-age children such as food containing low fat and oil” (a-50-years-old-mother of 10 years old obese boy no 5).

“My mother should cook food containing more vegetable and school should provide more healthy drinks such as fresh fruit juice and water” (obese girl no 6, aged 10 years).

“To make me slim and healthier, chefs in school, my mother, and grandmother should cook healthy food for me” (obese girl no 13, aged 10 years).

4.3 Giving information about healthy food and healthy eating

Some of participant expressed that giving information about healthy food and healthy eating for obese school-age children and parents could help them to gain knowledge about nutrition for practicing or promoting healthy eating behavior in obese school-age children. For instance, a teacher stated that:

“To solve unhealthy eating behavior in obese school-age children, I think the first activity is giving knowledge about healthy food and healthy eating for them.....These activities can help obese school-age children to practice healthy eating behavior and then have normal weight in the future” (teacher aged 58 years, responsible for school lunch meal providing).

A parent said that: “giving information about healthy food and the amount of calories in food for obese school-age children and their parents is an activity that can promote healthy eating behavior for obese school-age children” (a-34-years-old-mother of 10 years old obese girl no 13).

4.4 Creating course of behavior change

Some of nurses indicated that obese school-age children should be into course of behavior change. Particular obese school-age children who had high score of unhealthy eating behavior (nurse aged 49 years, responsible for supervising health promoting school, nurse aged 47 years, responsible for family health, and nurse aged 49 years, responsible for school health education). Moreover, some parents stated that course of behavior change might be an effective activity to change their child to change eating behavior and lose or control weight quickly.

A nurse said that: “to help obese school-age children to change eating behavior and lose weight effectively, we will make the project or course for changing behavior called “Obese child camp”. This course can help obese school-age children learn with other to change their eating behavior that leads to lose weight and have good health” (nurse aged 49 years, responsible for supervising health promoting school).

Moreover, a parent expressed that: “school and hospital should set course of change eating behavior for obese school-age children in order to changing eating behavior and slim quickly” (a-37-years-old-mother of 11 years old obese girl no 19).

4.5 Collaboration

The results indicated that collaboration among teacher, parents, and nurses was significant to promote healthy eating behavior for obese school-age children. A mother stated that:

“teachers, nurses, and parents should participate in promoting healthy eating behavior in obese school-age children. Teachers and nurses should invite parents to know about nutrition problem of their children and help to finding the method to solve the problem” (a-34-years-old-mother of 10 years old obese girl no 13).

A nurse expressed that: “this problem cannot solve by only parent. Collaboration among parents, teachers, and nurses is significant. At home, parents should provide healthy food and encourage and monitor them to eat as same as teachers. Nurses should check nutritional status and provide information about nutritional for parents and children” (nurse aged 50 years, responsible for health promoting school).

Integrating results of quantitative and qualitative data in order to identify problems and factors regarding healthy eating behavior in obese school-age children

According to the results in phase I situation analysis, the researcher integrated quantitative and qualitative results in order to identify the problems and factors regarding eating behavior in obese school-age children. The researcher integrated and concluded quantitative and qualitative results of situation analysis in phase I was shown in table 4-12.

Table 4-12 Conclusions the results from quantitative and qualitative data analysis

Quantitative results	Qualitative results
1. Healthy eating behavior in obese and normal weight school-age children Obese school-age children had the mean scores of healthy eating behavior at a moderate level ($M \pm SD = 18.40 \pm 2.70$) while normal weight school-age children had the mean scores of healthy eating behavior at a high level ($M \pm SD = 21 \pm 2.79$). 2. Factor related to healthy eating behavior in obese and normal weight school-age children Knowledge about healthy food and healthy eating and belief about healthy eating had low positive relationship with healthy eating behavior in obese and normal weight school-age children. Moreover, healthy eating self-efficacy had low positive relationship with healthy eating behavior in obese school-age children. However, there was significant positive relationship between healthy eating self-efficacy and healthy eating behavior in normal weight school-age children ($r = .296, p < .01$).	1. The perception of healthy eating behavior in obese school-age children of obese school-age children and their parents There were three categories including eating vegetables and fruits, eating fish, meat, eggs, and milk, and eating foods containing low fat and oil. 2. Eating behavior in obese school-age children were 1) eating less vegetable and fruits, 2) eating much carbohydrate or sugary foods and sweet drinks, and 3) eating foods containing high fat and oil. 3. Factors related to eating behavior in obese school-age children 3.1 Risk factors of healthy eating behavior in obese school-age children were: 3.1.1 Lack of awareness in both obese school-age children and their parents about healthy eating behavior in obese school-age children Most obese school-age children and their parents ignored about the negative effects of unhealthy eating behavior and the benefits of healthy eating behavior. Most of obese school-age children ate unhealthy food and their parents also provided more unhealthy food for obese school-age children. 3.1.2 Inadequate knowledge about healthy foods in obese school-age children and their parents Most obese school-age children and their parents had no enough knowledge about the menus of healthy foods and amount of calories in foods. 3.1.3 Availability and accessibility of unhealthy foods at school and home School lunch meals were not specific for obese school-age children. Most foods providing at school were food containing high fat and oil. Chefs in school belief that they should provide school lunch

Table 4-12 (continued)

Quantitative results	Qualitative results
	meal that children preferred to eat. Besides, there were shop vendor sold more unhealthy foods in school such as sweet drinks and fried foods. At home, there was more availability of unhealthy foods. Most parents provided foods that their children liked to eat. Most of these foods were foods containing more fatty foods and less vegetable such as fried chicken, fried eggs, grilled pork. 3.2 Protective factors of healthy eating behavior in obese school-age children were: 3.2.1 Local Thai foods in Northeastern of Thailand or “Isan Food” Local Thai food or called “Isan Food” was a kind of foods that were available in this area. Most of these foods were less fat and oil and more vegetables such as Thai curry with vegetable and fish, fish powder with chili and vegetables, and grilled fish. Most people in this area liked to cook these foods to eat or sell. Therefore, some obese school-age children could eat more healthy foods from their home or market or food shops. 3.2.2 Parents’ talking and teaching about eating behavior in obese school-age children Parents could promote healthy eating behavior for their children because parents play a role to provide food and promote healthy eating for their children. Therefore, parents could talk to and teach their children about healthy eating and healthy food. These could lead to promote healthy eating behavior in obese school-age children. 4. Appropriate activities or guidelines to promote healthy eating behavior for obese school-age children 4.1 Raising awareness about healthy eating behavior in obese school-age children for obese school-age children and their parents

Table 4-12 (continued)

Quantitative results	Qualitative results
	Most parents indicated that providing more information about the negative effect of unhealthy eating behavior and the benefits of healthy eating behavior in obese school-age children were necessary for them. Besides, the activity for encouraging them and increasing ability for promoting healthy eating behavior in obese school-age children was important.
	4.2 Providing healthy foods at school and home
	Most obese school-age children expressed that they wanted to have healthy and control weight. Therefore, family and school should provide healthy foods for them. For example, parents should change to cook more steamed or boiled or grilled foods more than food containing high fat and oil. School should provide specific food for obese school-age children. Moreover, chefs in school should provide more vegetables and less oil food for obese school-age children.
	4.3 Giving information about healthy foods and healthy eating behavior for obese school-age children and parents
	Most parents and obese school-age children had no enough knowledge about healthy food and healthy eating. Particularly, they wanted to know more about the kinds of healthy foods and amount of calories in foods.
	4.4 Creating course of behavior change for obese school-age children
	To change behavior and lose weight quickly in obese school-age children who had severity case, course of behavior change was needed. For example, nurses from PCU will make the course “Obese child camp” for severity cases.
	4.5 Collaboration among parents, teachers, and nurses to promote healthy eating for obese school-age children

Table 4-12 (continued)

Quantitative results	Qualitative results
	Most of parents, nurses, and teachers agreed that promoting healthy eating behavior in obese school-age children should collaborate among parents, teachers, and nurse because obese school-age children stayed at home and school. Therefore, parents should be invited to know about nutritional problems of their children and participated in promoting eating behavior in obese school-age children. Parents and teachers should provide healthy foods for obese school-age children. Moreover, nurses were healthy care provider should acted as counselor and facilitator for providing information for them.

As shown in table 4-12, the results from quantitative data analysis showed that healthy eating self-efficacy had only significant positive relationship with healthy eating behavior in normal weight school-age children ($r = .296, p < .01$). For qualitative data analysis, the perspectives of obese school-age children and their parents about healthy eating behavior in obese school-age children were eating vegetables and fruits, eating fish, meat, eggs, and milk, and eating foods containing low fat and oil. The results also indicated that obese school-age children had unhealthy eating behaviors including eating less vegetables and fruits, eating much carbohydrate or sugary foods and sweet drinks, and eating foods containing high fat and oil. The risk factors related to healthy eating behavior were 1) obese school-age children and their parents ignored about the negative effects of unhealthy eating behavior and the benefits of healthy eating behavior in obese school-age children, 2) obese school-age children and their parents had not enough knowledge about healthy eating behavior, especially healthy foods, and 3) most unhealthy foods were available and accessible at school and home such as foods containing high fat and oil and high sugary drinks.

For protective factors, most local Thai “Isan” foods were food containing low fat and oil and more vegetables such as Thai curry with fish and vegetables, grilled fish, and fish powder with chili. Most people in this area liked to cook local

Thai foods to eat or sell. Therefore, obese school-age children could eat more these foods at home or buy to eat. Parents' talking and teaching about eating behavior in obese school-age children also was a protective factor of healthy eating behavior in obese school-age children. Parents could controlled or restricted unhealthy foods for their children at home and also could teach and talk with them to promote healthy eating behavior for obese school-age children. To promote healthy eating behavior in obese school-age children, the appropriate guiltiness or methods from participants' opinions, especially obese school-age children and their parents were as following.

1. Raising awareness about healthy eating behavior for obese school-age children. Most parents indicate providing more information about the negative effects of unhealthy eating behavior and benefits of healthy eating behavior could help them to realize the important of healthy eating behavior in obese school-age children.

2. Providing healthy foods at school and home. Family and school should change to provide more healthy foods for obese school-age children. Parents should change to cook or provide more healthy foods such as steamed, boiled, and grilled foods. School should provide specific foods for obese school-age children or chefs should change belief and provide more healthy foods for obese school-age children at school.

3. Giving information about healthy foods and healthy eating behavior for obese school-age children. Obese school-age children and their parents wanted to know more about healthy foods and healthy eating behavior, especially the kinds of healthy foods and amount of calories in foods.

4. Creating course of behavior change for obese school-age children. For severity case of obese school-age children, nurses should make the course "obese child camp" for change obese school-age children's behavior and lose their weight.

5. Collaboration among parents, teachers, and nurses to promote healthy eating behavior in obese school-age children. Most participants expressed that collaboration among parents, teachers, and nurses for promoting healthy eating behavior in obese school-age children could lead to success.

In summary, it might conclude that the problems of healthy eating behavior in obese school-age children were the perceptions about healthy eating behavior of obese school-age children and their parents. Most of them did not concern about

healthy eating and healthy food, the negative consequences of unhealthy eating behavior, and the important of healthy eating behavior in obese school-age children. Most obese school-age children and their parents also had not enough knowledge about healthy foods and healthy eating. The results also found that healthy eating self-efficacy was significant positive relationship with healthy eating behavior in normal weight school-age children. Therefore, healthy eating self-efficacy should be concerned to promote healthy eating behavior in obese school-age children. Besides, availability and accessibility of unhealthy foods at school was a problem of healthy eating behavior in obese school-age children. The results from interview of chefs found that they believed they should provide school lunch meal that children preferred to eat. Therefore, changing belief for providing healthy food of chefs should be concerned to promote healthy eating behavior in obese school-age children at school.

Part II Model development

The results of situation analysis in phase I was used for constructing strategies or intervention to promote healthy eating behavior in obese school-age children. The promoting healthy eating behavior model in obese school-age children was developed throughout the process of action research including planning, implementing, reflecting, and re-planning step. The outcomes of phase II model development were presented as follows:

Step 1: Planning

The researcher constructed the action plan or intervention plan based on the integrated results of quantitative and qualitative data analysis in phase I situation analysis. The problems, factors regarding healthy eating behavior in obese school-age children, and the draft of action plan or intervention were confirmed by group discussion of participants included obese school-age children, parents, teachers, and nurses. The results found that all of participants agreed with the action or intervention plan. Group meeting at school and home visit activity for raising awareness about healthy eating behavior for obese school-age children was planned for obese school-age children and their parents group. For chefs and vendors, group meeting and school visit activity was planned for changing belief and providing healthy foods for obese school-age children.

Step 2: Implementation

The interventions consisted of promoting healthy eating behavior [PHB] in obese school-age children for obese school-age children and their parents group and changing belief of chefs and vendors group and providing healthy food [CBPHF] for obese school-age children at school. The results were emerged from the processes of implementation that were collected by the researcher's observation and participants' expression. The interventions and the outcomes of these interventions were presented as below.

Intervention I: PHB

The participants were 20 obese school-age children and 20 their participants that were divided into each 3 groups (6-7 persons/ group). The aim was to raise awareness of obese school-age children and their parents about the consequences of unhealthy eating behavior and perceiving the significant of promoting for healthy eating behavior in obese school-age children.

The researcher's role: The researcher acted as a facilitator and organizer for all possible resources directed toward participant needs and achievement of their goals, such as consulting and nutritional education. For the group discussion, the researcher acted as stimulator to encourage obese school-age children and parents to share idea in group discussion and to be facilitator to provide atmosphere for group discussion.

The participants' role: The participants acted as participators. Participants formed team group with the leader and the member, and organized the group process. They acted following the activities of intervention I including sharing and discussion, presentation of problems and negative consequences of unhealthy eating behavior, drew picture and presentation of the dream picture and presentation of the healthy food menu, writing the action plan, reflecting about changes and evaluating the intervention.

The summary of the PHB intervention was presented in table 4-13 (The details of content of activities of the PHB intervention in Appendix C).

Table 4-13 Promoting healthy eating behavior [PHB] in obese school-age children
intervention for obese school-age children and their parents group

Week	Stage/ Objectives	Activities
1-2	Stage 1: Raising awareness about healthy eating behavior Objective: 1. To build relationship between the researcher and participants 2. To realize the consequences of unhealthy eating behavior and perceive the importance of healthy eating behavior in obese school-age children 3. To find suitable methods or guidelines to promote healthy eating behavior in obese school-age children	Week 1: Exchanging information and experiences 1. Building relationship between the researcher and the group of obese school-age children and their parents 2. Exchanging information related to the problems, negative consequences of unhealthy eating behavior, and the benefit of healthy eating behavior in obese school-age children in each group 3. Presenting the problems, negative consequences of unhealthy eating behavior, and benefit of healthy eating behavior in obese school-age children 4. Enhancing knowledge about the definition, and benefit of healthy eating behavior, and negative consequences of unhealthy eating in obese school-age children 5. Discussion about the negative consequences of unhealthy eating behavior and benefit of healthy eating behavior in obese school-age children 6. Commending obese school-age children and their parents' abilities in realizing the consequences of problems and perceive the important of healthy eating behavior in obese school-age children Week 2: Thinking and finding suitable methods 1. Inviting obese school-age children-parents dyads to imagine and draw the dream picture of obese school-age children's health/ weight in the future 2. Presenting an example of dream picture from each group 3. Asking question for thinking and finding suitable methods or guidelines to achieve the dream picture

Table 4-13 (continued)

Week	Stage/ Objectives	Activities
		4. Discussing suitable guidelines or methods to promote healthy eating behavior for obese school-age children 5. Writing action or activities plan to practice by each parent-child dyad, commending and guiding for writing 6. Commending obese school-age children and their parents' abilities in finding suitable methods or guidelines to promote healthy eating behavior in obese school-age children 7. Giving diary promoting healthy eating behavior record book and advising obese school-age children and their parents to record
3	Stage II: Developing ability for promoting healthy eating behavior Objective: To develop ability for promoting healthy eating behavior in obese school-age children	Week 3 Activity 1: Educating week 1. Educating nutritional knowledge via school broadcast for 5-10 minute after lunch on Monday-Friday (1 week) 2. Exhibition on nutritional knowledge for 1 week and continue at school's meeting room (inviting teachers and nurses to participate or visit) Activity 2: Learning group of parent-child dyad (6-7 dyads per group) 1. Playing "healthy foods card" 2. Inviting the group to think and present about the healthy food menu, the ingredients, and the benefits of these menu 3. Providing more information about healthy foods and healthy eating behavior

Table 4-13 (continued)

Week	Stage/ Objectives	Activities
4-5	Stage III: Strengthening confidence in ability and motivation for promoting healthy eating behavior Objective: To strengthen confidence in ability and motivation for practicing healthy eating behavior in obese school-age children	4. Discussion about practicing healthy eating behavior and providing or preparing healthy foods for obese school-age children Activity 1: Encouraging and consulting by home visiting 1. Analyzing and evaluating promoting healthy eating behavior from dairy behavior record and conversation with obese school- age children and their parents 2. Commending obese school-age children and parents in appropriate promoting healthy eating behavior 3. Inviting obese school-age children express their feelings about the problems and providing consultation for improving practicing and promoting healthy eating behavior 4. Encouraging parents for conversation about healthy eating with their children and support them for practicing healthy eating 5. Writing activities plan to promote healthy eating behavior in obese school-age children for next week Activity 2: Giving reward and observing good model of eating behavior at school 1. Proposing the names of obese school-age children who were good practicing healthy eating behavior and reward (one name/ group) 2. Inviting obese school-age children who were received award to present about “How to stay active and be successful in practicing

Table 4-13 (continued)

Week	Stage/ Objectives	Activities
		healthy eating behavior”
		3. Inviting the director and teachers for participating to encouraging obese school-age children to practice healthy eating behavior in school
6-9	Stage IV: Maintaining healthy eating behavior Objective: To monitor and evaluate outcome of practicing and promoting healthy eating behavior	Week 6: Monitor, evaluating, and modifying suitable action plan for succession 1. Visiting at home to monitor and evaluate outcome of practicing and promoting healthy eating behavior 2. Inviting nurses to participate in visiting at home 3. Modifying the action plan to achieve the goal if they had an obstacle (In this stage or activity, the researcher should do activity by focusing on the family competence or the problems in providing healthy foods. Besides, encouraging and provide information about the appropriate foods should concern the individual family context) Week 7-9 Visiting via phone call or visiting home (visiting home if having problem)
10	Stage V: Reflecting the program Objective: To evaluate the program	Week 10: Reflecting about change and evaluating participants’ satisfaction 1. Reflecting and conclusion about changing in practicing and promoting healthy eating behavior in obese school-age children 2. Evaluating participants’ satisfaction to participate in the program

The results of the intervention I

There were 20 obese school-age children-parents dyads participated in the activities of this intervention. For activities of the 1st to 3rd weeks, group meetings were conducted for 40-60 minutes/ time at school. The researcher divided participants into 3 groups of obese school-age children and their parents. For the first week, participants were interested to participate in group discussion, especially sharing their information about the negative effects of unhealthy eating behavior in obese school-age children. This activity made them alert about the effect of unhealthy eating behavior in obese school-age children. The researcher played a role of facilitator providing update information about negative impact of unhealthy eating and benefits of healthy eating behavior. The second week, obese school-age children felt free and happy to draw their dream pictures of obese school-age children's health/ weight in the future. However, it was found that the activity of writing action plans to promote healthy eating behavior in obese school-age children were difficult for obese school-age children and their parents. Therefore, the researcher had to provide obese school-age children and their parents with idea and information about healthy eating behavior, then encouraged them to write the plans, and commended them after they finished. Finally, most obese school-age children-parents dyads could write the action plans but some had not finished them. The researcher suggested them to write their plan at home.

Third week was a week for nutritional knowledge education; the researcher provided nutritional knowledge via school broadcast for 5-10 minutes after lunch on Monday to Friday. The content of nutritional knowledge focused on unhealthy foods related to obesity problem in school-age children. Children were interested in this activity. Some of them walked to the researcher asking and talking about healthy foods. For the activity of exhibition on nutritional knowledge, the researcher invited teachers and nurses to participate. There were three teachers visited the exhibition on nutritional knowledge during the activity. After that, five teachers and three nurses who were responsible for health promoting school and health education in school also visited the exhibition on nutritional knowledge at the meeting room. For learning group of parent-child dyad, the participants presented healthy food menu for obese school-age children such as Thai curry with fish or pork and vegetables, clear soup

with pork and vegetables, and spicy mackerel salad. All participants were interested in joining this activity enthusiastically. During those three weeks, the researcher always commended obese school-age children and parents when they finished each activity in order to encourage them to achieve their goals of having healthy eating behavior.

In the fourth and fifth weeks, the researcher visited obese school-age children and their parents at home to strengthen confidence and motivation in practicing healthy eating behavior. This activity would take about 30-45 minutes/ each time. There were three nurses joining these home visits including nurses who were responsible for health promoting school, health education in school, and family health. The researcher would evaluate each family's action plan and activity for promoting healthy eating behavior in obese school-age children. If some family had problems to write or practice their plan, the researcher would act as a counselor to guide them an appropriate method. Then, the researcher would encourage parents to talk about healthy food and healthy eating with their children. The researcher also commended obese school-age children and their parents if they could do according to their plan. The researcher also gave rewards to obese children of three groups by asking each group to propose a name of the obese children who was the best good model of eating behavior. The rewarded obese school-age children were 2 children studying in grade 4 and 1 studying in grade 5. They also gave presentation of "How to stay active and be successful in practicing healthy eating behavior" for all school-age children in this school at the school's flagstaff.

For keeping the families maintain healthy eating behavior, the researcher and two nurses who looked after school's health education and obese child clinic visited obese children and their parents at their home. At this stage, the researcher visited the obese children and their parents in order to monitor and evaluate the outcome at their home. Some parents failed in promoting healthy eating behavior in their children. The researcher would look through the problems and then planned to home-visit them again on week 7 to 9 to inspect the solution. On week 10, obese school-age children and their parents who have not problems were interviewed about behavior change and were asked to evaluate their satisfaction for the intervention. The researcher continued to do modifying the action plan until finished at week 13. The results of change were found as follows:

1. Awareness of the consequences of unhealthy eating behavior

All obese school-age children and their parents had increasing concern about the negative consequences of unhealthy eating behavior in obese children. Group discussions gave them an opportunity to share and exchange information of the severity of the consequences of unhealthy eating behavior. Unhealthy eating behavior could lead obese school-age children to many diseases and death.

“I know more about the bad effect of unhealthy eating behavior. This behavior makes obese school-age children get diabetes mellitus and hypertension. Moreover, group discussion made me know information about this behavior can make obese school-age children death” (a 50-year-old mother of 10 years old obese boy no 5).

“After I participated with your activity, I more understand the bad effect of unhealthy eating behavior. I try to think about foods before eat, is it O.K. for me or not?” (obese girl no 7, aged 11 years).

2. Perceiving the significance of promoting healthy eating behavior

Obese school-age children and parents had increasing perception of how important healthy eating behavior and healthy food were. These activities helped them gain knowledge about healthy foods and healthy ingredients. For example, some parents became to know more about low calorie fruits that were better for their children.

“I know only eating more fruits is useful for me but I don’t know about the kind of fruits that have low calories. Now I know rose apple and guava have low calories that are appropriate for obese child” (a 46-year-old mother of 11 years old obese boy no 18).

3. Changing to promote healthy eating behavior

Most parents and obese school-age children who participated in the program were alert and tried to practice and promote healthy eating behavior. Hopefully, the activities would make other obese children at the school more alert to adopt healthy eating behavior.

“I see many people around me such as my friends, my parents, and other school-age children in my school alert to have healthy eating behavior.....I want to be slim. I eat more foods containing vegetables, and low fat. I also receive award from

your activities” (obese boy no 18, aged 11 years).

Most of obese school-age children and their parents were satisfied with the PHB intervention because they learnt a lot from this intervention such as the negative effects of unhealthy eating behavior. They were happy to learn about the methods of how to promote healthy eating behavior in obese school-age children by sharing with other participants during group discussions. Obese school-age children and their parents became more watchful of food they ate and tried to promote healthy eating behavior among other obese children. However, there were 5 parents who did not change and still served unhealthy food to their obese children. Therefore, the researcher paid another home-visit to them for reflection.

Step 3: Reflecting

For this step, the researcher visited obese school-age children and their parents at their home and induced them to reflect their ability for promoting healthy eating behavior in obese school-age children. Most parents were not confident to promoting healthy eating behavior because they believed it was difficult. Moreover, their children might not eat healthy foods. Therefore, the researcher rearranged activities and visited them at home again.

Step 4: Re-planning

Modified intervention I

According to the reflection of parents, they were not confident to provide healthy foods for their children. The researcher visited their home again. The activities were rearranged in the modified intervention for them as follows:

1. The researcher rearranged conversation by focusing on the family competence in providing healthy foods.
2. The researcher used an example of successful parent and obese school-age child for promoting healthy eating behavior in order to strengthen confidence in providing healthy foods for obese school-age children in these parents. An example was presented as follows:

“For example of a successful mother and obese school-age child, they alert to promote healthy eating behavior. For a mother, she provides more healthy foods and reduces unhealthy foods at home such as crispy chicken with rice oil and carbonate behavior. Moreover, a mother tries to providing healthy foods by increase

a little bit of vegetable every day. First, she starts at dinner because it has time that she talks about important of healthy foods for him. For obese school-age children, he eats more vegetable and less carbonate beverages. He received a ward from my activities and lose weight around 1 kilogram”

3. The research also provided information about the appropriate foods which fit with individual family context.

The results of modified intervention I

After modified intervention, parents had more confidence in promoting healthy eating behavior and start to provide healthy foods for their children. Some of them paid more attend to provide healthy foods for obese school-age children. Some parents often told the researcher about their changing behavior and asked the researcher for evaluating when the researcher visited them at home or phone call.

“Not only I provide more foods containing more vegetables for my son, I also restrict amount of rice for him. Usually, my family eats sticky rice. So, I use “Small Kratip Khao Niew” (Kratip rice) for my son to eat per meal. Moreover, I often talked to my son about the bad effect of unhealthy foods” (a 50-year-old mother of 10 years old obese boy no 5). Also, she asked the researcher for evaluating that “My behavior is good for my son and I must change anything or not?”

In summary, obese school-age children and their parents were very interested during the activities of the PHB intervention. They paid attention to the questions and participated in the activities. This intervention made them increased awareness of negative consequences of unhealthy eating behavior and perceived benefits of healthy eating behavior in obese school-age children. Encouraging and motivating from other persons such as parents, obese school-age children’s friends, and teachers made obese school-age children to alert to practicing healthy eating behavior. Finally, most of obese school-age children and their parents changed belief and behavior for promoting healthy eating behavior in obese school-age children.

However, some parents were not confident to promoting healthy eating behavior because they believed it was difficult. The researcher visited them at their home and rearranged activities focusing the method fit for individual family. Finally, all parents could provide healthy foods for their children. All obese school-age children and their parents were satisfied the PHB intervention. For the problems and

obstacles for doing this intervention, because of some parents of obese school-age children had to work and busy on their business, it was difficult to make an appointment and organizing the group activities and home visit for all of them. The researcher made an appointment 2-3 times for some activities. However, finally, all of them could participate in all activities of the intervention I.

Intervention II: CBPHF

The participants were 6 chefs (cooking food for student grade 1 to 6) and 2 vendors (selling fried foods and sweet drinks). The aim of this intervention was to change belief of chefs and vendors to provide healthy foods for obese school-age children at school.

The researcher's role: the researcher facilitated and provided all possible resources for participants needs and toward their achievement of the goals such as consulting and providing more information about providing healthy foods. The researcher asked question to find out the problems and rethinking problems, obstacles, and needs for solving the problems. The researcher commended chefs and vendors in their ability for doing activities. The researcher also stimulated participants to share ideas in group and provided atmosphere for group discussion.

The participants' role: the participants acted as participators. Participants formed team group with the leader and the member, and organized the group process. They acted following the activities of intervention II including sharing and discussion about the problems related to providing healthy food, telling the negative effects of unhealthy food, rethinking problems, obstacles, and needs to solve the problems, sharing and exchanging about the appropriate methods to provide healthy food, reflecting about changes in belief and providing healthy food, and discussion the effect of changes.

The summary of the CBPHF intervention was presented in table 4-14 (The details of content of activities of the CBPHF intervention in Appendix C).

Table 4-14 Changing belief of chefs and vendors and providing healthy food
[CBPHF] for obese school-age children at school

Week	Stage/ Objectives	Activities
1	Stage I: Exploring problems related to providing healthy foods Objective: 1. To build relationship between the researcher and chefs and vendors 2. To find out the problems providing healthy foods for obese school-age children 3. To realize providing healthy foods for obese school-age children	Activity: Exploring problems and realizing providing healthy food by asking question and telling 1. Building relationship between the researcher and chefs and vendors 2. Asking question to chefs and vendors and induce each chef and vendor find out the problems related to providing healthy foods for obese school-age children 3. Discussion about the problems related to providing healthy foods 4. Commending their ability in finding out the problems related to providing healthy food 5. Inducing individual chef and vendor to tell the negative effects of unhealthy or inappropriate foods for obese school-age children 6. Discussion about the negative effects of providing unhealthy or inappropriate foods for obese school-age children
	Stage II: Encouraging the plan to provide healthy foods Objective: 1. To analyze cause and obstacles of the problems and the needs for solving the problems	Activity 1: Rethinking problems, obstacles, and needs for solving problems 1. Inducing chefs and vendors group to rethink about the problems, causes, and obstacles of providing healthy foods for

Table 4-14 (continued)

Week	Stage/ Objectives	Activities
	2. To find the appropriate guidelines or methods for solving problems	obese school-age children 2. Inviting chefs and vendors group to analyze the needs for solving problems 3. Commending and encouraging chefs and vendors in considering and making decision for solving problems 4. Discussion the needs for solving the problems of providing healthy foods Activity 2: Finding appropriate guidelines or methods 1. Inducing chefs and vendor group to offer the guidelines or the methods for solving the providing unhealthy or inappropriate foods for obese school-age children (1 method/ 1 person) 2. Encouraging chefs and vendors to share and exchange the experiences for finding out the appropriate methods 3. Providing additional information about the methods for providing healthy foods 4. Commending chefs and vendors for participating in sharing for finding appropriate method 5. Discussion the appropriate guidelines for providing healthy foods 6. Giving record book for providing healthy food and advising them to write

Table 4-14 (continued)

Week	Stage/ Objectives	Activities
2	Stage III: Reflecting about changes in providing healthy foods Objective: To reflect about change in providing healthy foods	Activity: Reflecting about changes in chefs and vendors' belief 1. Visiting at school for reflecting about changes in chefs and vendors' belief to provide healthy foods for obese school-age children 2. Discussion and conclusion new methods for providing healthy eating behavior
3, 4	Stage IV: Maintaining providing healthy foods Objective: To maintain proving healthy foods	Activity: Exploring, discussion, and conclusion about the effect of changing 1. Visiting at school for exploring the effect of changing belief to provide healthy foods 2. Discussion and conclusion the effect of change in belief of chefs and vendors to provide healthy foods

The results of intervention II

Participants of this intervention were 6 chefs, 2 vendors, and 1 teacher who were in charge of the school lunch program. First week was spent to explore problems, all chefs and vendors felt difficulties in cooking or providing healthy food for obese school-age children. However, all of them were willing to participate in the activity. All chefs and vendor intended to answer this question from the researcher "what are the problems of providing healthy foods for obese school-age children". They were eager watching video about the unhealthy eating behavior and the negative effect on obese children. The researcher was a facilitator helping summarize the problems and negative effects from providing unhealthy food. The researcher also encouraged chefs and vendors to discuss among themselves about the problems and negative effects they had seen. Finally, chefs and vendors understood the problems and negative effects of providing unhealthy food for school-age children, especially

obese school-age children. At first, all participants could not find the appropriate guidelines or methods of providing healthy food. Therefore, the researcher provided more information about the methods to provide healthy food then encouraged them to rethink. Finally, all of them came up with appropriate methods to provide healthy foods. Chefs planned to cook food containing more vegetables and less oil. Vendors who sold fried foods planned to reduce oil from the food and add more steamed food on menu such as steamed meatball. They also planned to reduce sugar in chicken sauce. The vendors who sold sweet drinks planned to reduce sugar adding in those drinks. The researcher used this opportunity to compliment chefs and vendors for their care and responsibility and encourage them to provide healthy foods right after these activities. The researcher asked all participants to keep record by giving them record keeping book of healthy food provided and behavior change, then advised them how to record.

For reflection, the researcher visited chefs and vendors at school in week 2. All of chefs and vendors changed their beliefs and provided healthy food for all school-age children. On week 2, chefs, who cooked school meals for students studying in grade 4 and 5, had reduced oil for cooking food and added more vegetables and fruits, especially for obese children. At this point, most obese children had reduced eating portion from 2 to 1 dish. They removed vegetable from their dish before eating. For fried food shop, the vendor had used less oil, provided more steamed meatball, and reduced sugar in chicken sauce. However, only few obese school-age children ate steamed meatball. Some avoided eating fried food because after they join in the intervention I PHB. For sweet drinks shop, the vendor reduced sugar from 2 kilograms per 14 liters to 2 kilograms per 15 liters when preparing sweet drinks. Normally, obese school-age children drank sweet drinks. Some of them changed to drink plain water. The researcher acted as a facilitator and counselor for providing healthy food. The researcher also discussed with chefs and vendors about the next plan. Finally, chefs planned to continue cooking food containing less oil and more vegetables. They agreed to reduce starch when preparing fried chicken and crispy food. They also tried to talk to encourage obese children during lunch time to go for healthy food for the benefit of their own health. Vendors planned to continue to reduce oil in fried food by using oil absorbing sheet or oil lining. For sweet drinks, the

vendor planned to reduce sugar from 2 kilograms to 1.5 kilograms per 15 liters of water.

On week 3, the researcher visited chefs and vendors at school. The researcher also invited two teachers, who were in charge of school lunch program and school health sector, and two nurses, who took care of health promoting school and school health education, to visit chefs and vendors. At school lunch meal, most obese children started to eat more healthy food because they were already alert about negative effects of unhealthy eating behavior by PHB intervention. In addition to that, they were encouraged to eat good food by teachers, chefs and vendors. Therefore, most of obese children had inspiration to eat more healthy food and reduce their food portion. Plus, obese children tended to eat more steamed meatball than fried food, especially obese girls. Many obese school-age children drank plain water instead of sweet drinks. All chefs and vendors felt happy for providing healthy food at school. Most obese children at school also had better health due to consuming healthy food. The examples of some chefs and vendors' expressions were presented as following.

“I change to use more lean meat for cooking. For fried food, I use little of oil for cooking such as stir-fried pork and basil and curry coconut milk with pork” (a chef cooking school lunch meal for student studying in grade 4).

“I am very happy when I know the appropriate way to change behavior for providing healthy foods. I change from fried meatball to steam meatball. First, I worry about obese school-age children might eat foods that I sell. But I was wrong. Finally, many obese school-age children eat foods that I sell such as steam meatball” (a vendor of fried food shop vendor in school).

“At the first time, I saw obese school-age children ate less food when I cook more vegetables and less oil. Finally, I see they eat more healthy foods that I cook. So, I felt very happy to continue providing more healthy foods for them” (a chef cooking school lunch meal for student studying in grade 4).

As the results above, it seemed that chefs and vendors alerted to provide healthy foods for obese school-age children because the changes of obese school-age children to have more healthy eating behavior in week 3. Most obese school-age children ate more healthy foods. This led to chefs and vendors felt very happy and changed their belief to promote food for obese school-age children. In week 4, the

researcher also visited chefs and vendors at school. Chefs and vendor provided healthy food for obese school-age children as they plan. Obese school-age children also ate more healthy foods that chefs and vendor cooked. Therefore, chefs and vendor were very happy to continue cook and provide healthy food for obese school-age children.

In summary, although chefs and vendors felt difficult for cooking and providing healthy foods for obese school-age children, all of them were willing to participate in the activities and intended to attention to learn all activities with the researcher during the activities. They alerted to respond the questions and discussion with the researcher. The CBPHF intervention provided opportunity for chefs and vendors to find out and understand the problems or obstacles of providing healthy foods. After the activities finished, all of chefs and vendors changed belief and attempted to provide healthy foods for school-age children (obese and normal weight). Most school-age children still ate the foods that they cooked and sold. Chefs and vendors felt happy to provide more healthy foods for school-age children, especially obese school-age children. All of them felt increase self-worth and were very happy to maintain providing healthy foods for obese school-age children.

Step 3: Reflecting

In the reflecting step of action process, all of chefs and vendors changed to provide healthy foods for obese school-age children. They also were satisfied with the intervention. Therefore, this intervention was not needed to modify.

In conclusion, the intervention program consisted of intervention I PHB and intervention II CBPHF. For the first intervention, some parents were not confident to change their behavior to provide healthy foods for their children after intervention finished. Therefore, the researcher re-planed by arranging activities and visited their home again. After modified intervention finished, parents were confident to provide healthy foods for their child. The second intervention could change belief of chefs and vendors for providing healthy foods. All of them were very happy and felt increase self-worth for providing foods for obese school-age children. In this intervention, the researcher had no problems about doing the activities because all of chefs and vendors had available at afternoon every day. Therefore, researcher could make an appointment and visit them as the intervention plan. All participants and the

researcher felt free to participate in this intervention. The researcher did not re-planning for this intervention.

The promoting healthy eating behavior model for obese school-age children

The promoting healthy eating behavior [PHEB] model for obese school-age children was developed based on the results analysis in situation analysis of phase I, synthesis of the activities occurring within the process of the research, and by reviewing related concepts. The components of PHEB model for obese school-age children were identified based on the ecological system theory (Brenfenbrenner, 2005) that provided conceptual framework in Phase I. Therefore, family, school, and health care provider level were the components of this model. The model of PHEB model was emerged through the action process including identified the problems of healthy eating behavior in obese school-age children, planning the action or intervention plan for solving the problems including the intervention I: PHB and II: CBPHF, implementing intervention I and II, after that reflecting the interventions, and re-planning or modifying the intervention. Perceived severity, perceived benefits, and self-efficacy of health belief model (Rosenstock et al., 1988) was applied to develop intervention I PHB and therapeutic conversation process (Wright, Wason, & Bell, 1996 cited in Wacharasin, 2007) was applied to develop intervention II CBPHF.

Intervention I: PHB

According to the results of situation analysis in phase I, obese school-age children and their parent did not concern or perceive about the negative consequences of unhealthy eating behavior and benefits of healthy eating behavior in obese school-age children. In order to increased concerning about promote healthy eating behavior in obese school-age children, group meeting of obese school-age children and their parents was used to sharing information related to the problems, the consequences of unhealthy eating behavior and the benefits of healthy eating behavior. Most obese school-age children and their parents increased concerning about negative effects of unhealthy eating behavior. Also, they perceived the importance of healthy eating behavior in obese school-age children. Participants group was encouraged to find out the suitable guidelines for promoting healthy eating behavior in obese school-age children. This activity was difficult for obese school-age

children-parents dyads. However, they tried to write. To develop ability for promoting healthy eating behavior in obese school-age children, nutritional education was used.

After obese school-age children and their parents had knowledge about healthy food and healthy eating, all of them were visited at their home for strengthening confidence in ability for promoting healthy eating behavior in obese school-age children by consulting. Moreover, obese school-age children were motivated for practicing healthy eating behavior by lived modeling and giving reward. Obese school-age children alerted to practicing healthy eating behavior and tried to do after that. Furthermore, all obese school-age children and their parents were monitor and evaluated about achievement of the goals. These activities or action plans would be modified to fit with their family or context. Some parents could not promote healthy eating behavior for their children. However, the researcher rearranged the activities and helped them to find out suitable method fit for them. Finally, they could promote healthy eating behavior for their children. In order to continue and achieve the goal, the researcher would commend obese school-age children and their parents after they did appropriate.

After finished the PHB intervention, the changes were occurred as follows: 1) obese school-age children and their parents increased awareness of consequences of unhealthy eating behavior. They understood the negative consequences of unhealthy eating behavior after group sharing and discussion about the negative consequences of unhealthy eating behavior in obese school-age children, 2) obese school-age children increased perceiving the important of promoting healthy eating behavior after they had sharing about the benefit of healthy foods and healthy eating and the researcher provided add information about healthy foods and healthy eating, and 3) obese school-age children and their parents alerted and tried to promote healthy eating behavior for obese school-age children. The summary of stages and activities of the intervention I: PHB as follows:

Stage I: Raising awareness about healthy eating behavior. This stage consisted of two main activities including 1) exchanging information and experiences and 2) finding the suitable guidelines to promote healthy eating behavior activity. Group sharing and discussion provided obese school-age children and their parents increased concern about promoting healthy eating behavior in obese school-age

children.

Stage II: Developing ability for promoting healthy eating behavior. The stage II included 1) educating week and 2) learning group of parent-child dyad activity. In this stage, nutritional education could increase obese school-age children and their parents knew more about healthy foods that lead to they could cook and provide these foods for their children at home.

Stage III: Strengthening confidence in ability and motivation for promoting healthy eating behavior. This stage consisted of 1) encouraging and consulting by home visiting and 2) giving reward and observing good model of eating behavior at school activity. Obese school-age children were motivated from good modeling of healthy eating behavior. Moreover, the researcher visited obese school-age children at home for evaluating and consulting about promoting healthy eating behavior.

Stage IV: Maintaining healthy eating behavior. The activities were monitoring, evaluating, and modified suitable action plan for succession. This stage, the researcher should do activity by focusing on the family competence or the problems in providing healthy foods. Besides, encouraging and provide information about the appropriate foods should concern the individual family context.

Stage V: Reflecting the program. This stage included reflecting about changes and evaluates satisfaction of obese school-age children and their parents. Obese school-age children and their parents were asked to reflect about behavior changes in promoting healthy eating behavior and their satisfaction of the intervention.

Intervention II: CBPHF

Availability and accessibility of unhealthy foods at school was the problem of healthy eating behavior in obese school-age children. All of chefs and vendors belief that obese school-age children liked to eat food that they liked. Therefore, all of them provided unhealthy foods that obese school-age children liked. Intervention II: CBPHF was developed for chefs and vendors for changing belief to provide healthy foods for obese school-age children at school. Chefs and vendor were invited to explore their problems about providing healthy foods for obese school-age children. First, all of them felt difficult to provide healthy foods for obese school-age children. However, they were willing to participate in the activities and helped to share and

discussed. After that, chefs and vendors understood the problems and find out the method to solved the problems. At last, all of them could find the appropriate method for providing healthy food for obese school-age children. They were felt happy to do. Chefs and vendors were asked for reflecting about changing their belief and behavior. All of them changed their belief and behavior for providing healthy foods for obese school-age children. At the first, obese school-age children ate fewer amounts of foods that they provided. However, obese school-age children started to eat healthy foods that they cooked or sold for them. This intervention made them were very happy and increased self-worth to provide healthy food for obese school-age children. All of them would maintain to provide healthy foods for obese school-age children. The stages and activities of the intervention II: CBPHF was summarized as follows:

Stage I: Exploring problems related to promoting healthy foods. This stage included exploring problems and realizing providing healthy food by asking and telling activity. This activity provided chefs and vendors thought more about the problems of providing healthy foods. Besides, they could understand the problems that led to find the methods to solve the problem.

Stage II: Encouraging the plan to provide healthy foods. This stage consisted of 1) rethinking problems, causes, obstacles, and needs for solving problem and 2) finding appropriate guidelines or method for providing healthy foods activity. Chefs and vendors were induced to rethinking problems, causes, and obstacles for providing healthy foods. Besides, all of them were invited to analyze the needs for solving problems and finding appropriate methods for providing healthy foods.

Stage III: Reflecting about changes in providing healthy foods. It consisted of reflecting about changes in chefs and vendors' belief. Chefs and vendors were invited to reflect about changes belief and providing healthy food for obese school-age children.

Stage IV: Maintaining providing healthy foods. This stage consisted of exploring the effect of changes, discussion, and conclusion the effect of changes. This stage, chefs and vendors were induced to explore, discuss, and conclude the effect of providing healthy foods. These effects could make them to maintain their behavior.

There were found from after finished intervention II: CBPHF including changing belief and behavior for providing healthy foods. All chefs and vendors started to provide healthy foods after participated in the intervention next week. After that, obese school-age children started to eat foods from they cooked. They were very happy and felt increase self-worth for providing healthy foods for obese school-age children. Finally, chefs and vendors changed belief and providing healthy foods for obese school-age children. This intervention was not modified.

Furthermore, to develop the PHEB model for promoting healthy eating behavior in obese school-age children, collaboration among parents, teachers, and nurses throughout the action process were needed. The collaborative activity among nurses (the researcher and nurses), obese school-age children, parents, and teachers could provide an opportunity to hear participants' opinions and voices, especially obese school-age children and their parents. This led to wide understanding the problems and factors related to healthy eating behavior in obese school-age children and then could solve these problems. The role of participants participated in promoting healthy eating behavior for obese school-age children in the PHEB model as following.

1. Parents: the roles of parents in the model were 1) providing healthy foods for obese school-age children, 2) sharing the information about healthy foods and healthy eating with obese school-age children, 3) encouraging obese school-age children to have healthy eating behavior, and 4) discussing with nurses and teachers about the problems related to healthy eating behavior in obese school-age children.

2. Teachers: the roles of teachers in the model were 1) encouraging obese school-age children at school, 2) monitoring healthy eating behavior and nutritional status of obese school-age children, and 3) coordinating with parents and nurses to promote healthy eating behavior in obese school-age children

3. Chefs and vendors: the role of chefs and vendors were 1) providing healthy foods at school, 2) discussion with teachers and nurses about the problems related to healthy eating behavior in obese school-age children.

4. Nurses: the roles of nurses were 1) providing information about healthy foods and healthy eating behavior, 2) consulting for promoting healthy eating behavior, and 3) nutritional surveillance for promoting healthy eating behavior in

obese school-age children.

After implementing the PHEB model, the expected outputs of the model were increased knowledge about healthy foods and healthy eating, changing belief about healthy eating, increased healthy eating self-efficacy, availability of healthy foods at home and school, and participants were satisfied with the model (obese school-age children and their parents, teachers, and nurses). The expected outcome of the PHEB model was improved healthy eating behavior. Therefore, the critical components of the PHEB model were collaboration at family, school, and health care provider level and two interventions including PHB and CBPHF intervention. The PHEB model was shown in figure 4.

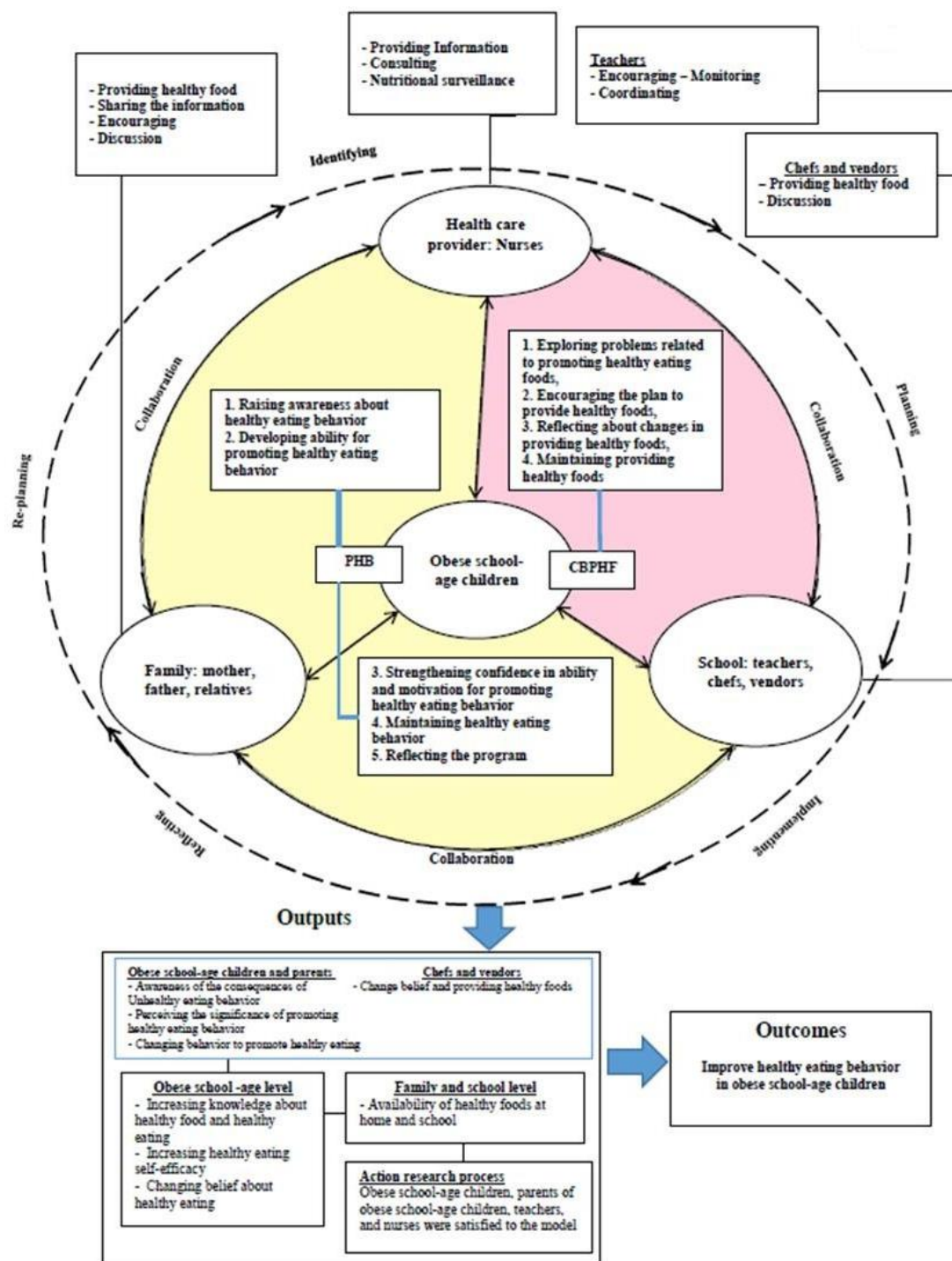


Figure 4-1 Promoting health eating behavior (PHEB) model for obese school-age children

Part III Model evaluation

The evaluation of the PHEB model for obese school-age children was carried out at one month after the end of intervention program implemented. The outputs included knowledge about healthy foods and healthy eating, belief about healthy eating, healthy eating self-efficacy, participants' satisfaction toward the model, and how the new model affected participants after implementation. The outcome was healthy eating behavior in obese school-age children. The results were divided into 2 parts of quantitative evaluation and qualitative evaluation as the following:

1. Quantitative evaluation

The quantitative evaluation focused on the significant change in knowledge about healthy foods and healthy eating, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior in obese school-age children. There were 20 obese school-age children participating throughout the research project and all of them completed the self-administrated questionnaires.

1.1 The mean scores and standard deviation of healthy eating behavior and its factors by item analysis

The results in table 4-15 showed that there were 8 items of knowledge about healthy food and healthy eating increased after receiving the model. All obese school-age children had full mean score of 4 items ($M = 1.00$, $SD = .00$) were: 1) vegetables and fruits are high fiber nutrients, 2) crunchy snacks are useful and these foods can eat for main meal, 3) eating more vegetables make body get high fiber and can prevent overweight, and 4) eating sweet drinks regularly make overweight. Besides, only 1 item had full mean score before and after receiving the model that was eggs and fish are good protein for health ($M = 1.00$, $SD = .00$; $M = 1.00$, $SD = .00$). However, 7 items of knowledge about healthy food and healthy eating were not different between before and after receiving the model. These items consisted of 1) eating breakfast every day can help prevent overweight ($M = .70$, $SD = .47$; $M = .70$, $SD = .47$), 3) noodle constant provide completely nutrients for body requirement ($M = .80$, $SD = .41$; $M = .80$, $SD = .41$), 4) fatty foods are foods to avoid for preventing overweight ($M = .60$, $SD = .50$; $M = .60$, $SD = .50$), 5) eating some foods every day can make body get more or not enough for body requirements

($M = .70$, $SD = .47$; $M = .70$, $SD = .47$), 6) fruits such as jackfruits, durian, and ripe mango are high calories ($M = .75$, $SD = .44$; $M = .75$, $SD = .44$), 7) eating high amount of animal fat foods can make the risk of overweight and cancer ($M = .85$, $SD = .37$; $M = .85$, $SD = .37$), and 8) eating 3 main meals per day can promote growth ($M = .80$, $SD = .41$; $M = .80$, $SD = .41$).

For belief about healthy eating, every item of belief about healthy eating was different between before and after receiving the model. There was different between before and after receiving the model and full mean score of belief about healthy eating in only 1 item ($M = 2.65$, $SD = .67$; $M = 3.00$, $SD = .00$). It was belief about eating fried foods regularly make the risk of overweight. The lowest mean score of belief about healthy eating after receiving the model was belief about fashion models makes obese school-age children feel staving for losing weight ($M = 2.20$, $SD = .61$).

For healthy eating self-efficacy, every item of healthy eating self-efficacy was different between before and after receiving the model. The highest mean score of healthy eating self-efficacy after receiving the model ($M = 2.90$, $SD = .30$) were obese school-age children had confidence to eat a variety food in five food groups every day and eat breakfast every day. The lowest mean score of healthy eating self-efficacy after receiving the model ($M = 2.40$, $SD = .50$) was obese school-age children had confidence to avoid eating dessert and high sugary candy.

For healthy eating behavior, every item of healthy eating behavior was different between before and after receiving the model. The highest mean score of healthy eating behavior after receiving the model ($M = 2.80$, $SD = .41$) was eating 3 main meals per day. The lowest mean score of healthy eating behavior after receiving the model were avoiding eating sweet dessert such as ice cream, chocolate, sweet candy, sweet ice flakes ($M = 2.25$, $SD = .64$) and avoiding eating crunchy snacks such as crispy potato and crispy chip ($M = 2.25$, $SD = .55$).

Table 4-15 The mean scores and standard deviation of knowledge about healthy food and healthy eating before and after receiving the model by item analysis

Knowledge about healthy food and healthy eating	Before receiving the model		After receiving the model	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Vegetables and fruits are high fiber nutrients	0.90	.31	1.00	.00
2. Crunchy snacks such as crispy potato chips and crisp chips are useful for health and these foods can eat for main meals	0.80	.41	1.00	.00
3. Eating more vegetables makes body get high fiber and fell quickly full that it can prevent overweight	0.90	.31	1.00	.00
4. Sweet milk makes body get high calories that are useful more than low fat and sugar milk.	0.25	.44	0.85	.37
5. Eggs and fish are good protein for health	1.00	.00	1.00	.00
6. Streamed and boiled foods provide less fat or oil than fried foods	0.50	.51	0.95	.22
7. Eating sweet drinks regularly such as red sweet drinks, green sweet drinks, and sweet cocoa drinks that make overweight	0.75	.44	1.00	.00
8. Sweet bread such as cake, cookie, donut, and Tokyo crepe provide carbohydrate that can eat for each main meal	0.70	.47	0.95	.22
9. Eating breakfast every day can help prevent overweight	0.70	.47	0.70	.47
10. Noodle constant provide completely nutrients for body requirements	0.80	.41	0.80	.41
11. Eating five food groups and variety every day can make body get nutrients completely	0.90	.31	0.90	.31
12. Fatty foods such as streamed chicken, stewed pork leg, and curry coconut milk are foods to avoid for preventing overweight	0.60	.50	0.60	.50
13. Eating some food every day can make body get more some nutrients or not enough for body requirements	0.70	.47	0.70	.47
14. Fruits such as jackfruits, durian, and ripe mango are high calories foods	0.75	.44	0.75	.44
15. Eating high amount of animal fat foods can make the risk of overweight and cancer	0.85	.37	0.85	.37
16. Eating 3 main meals per day can promote growth	0.80	.41	0.80	.41
Total	0.74	.39	0.86	.26

Table 4-16 The mean scores and standard deviation of belief about healthy eating, before and after receiving the model by item analysis

Belief about healthy eating	Before receiving the model		After receiving the model	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. I believe that eating fried foods regularly make the risk of overweight	2.65	.67	3.00	.00
2. I believe skipping breakfast make the risk of overweight	1.70	.73	2.60	.50
3. I believe eating fruits and vegetables regularly can reduce overweight	2.40	.75	2.95	.22
4. I believe avoiding sweet milks, dessert, and high sugary foods can prevent overweight	2.15	.88	2.65	.50
5. I believe eating pizza, hamburger, and fried chicken regularly make overweight and hyperlipidemia	2.50	.69	2.85	.37
6. I believe eating enough amount of five food groups every day make slender body and not fat	2.75	.55	2.95	.22
7. I believe drinking low fat and sugar milk, soy milk, and low sweet soybean milk are limit amount of sugar in body	1.80	.76	2.50	.60
8. I believe eating green vegetables and fruits every day are difficult for me	1.90	.79	2.60	.60
9. When I saw fashion models, It makes me feel staving for losing weight	2.00	.79	2.20	.61
10. When close friends or father or mother suggest me about healthy eating behavior, I understand and want to do more	2.60	.60	2.85	.49
Total	2.24	.72	2.71	.41

Table 4-17 The mean scores and standard deviation of healthy eating self-efficacy before and after receiving the model by item analysis

Health eating self-efficacy	Before receiving the model		After receiving the model	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. I confident I can eat a variety food in five food groups every day	2.55	.69	2.90	.30
2. I confident I can eat vegetables every meal	2.30	.57	2.85	.37
3. I confident I can eat fruits instead of ice creams and desserts	2.40	.60	2.85	.37
4. I confident I can eat breakfast every day	2.55	.76	2.90	.30
5. I confident I can 3 main meal every day	2.20	.77	2.80	.41
6. I confident I can streamed or boiled foods instead of fried foods every day	1.95	.60	2.75	.44
7. I confident I can low calories foods in dinner such as fish, chicken and lean pork every day	2.15	.67	2.45	.60
8. I confident I can drink plain water instead of carbonate beverage and sweet drinks	1.90	.55	2.55	.51
9. I confident I can avoid to eat crispy snacks such as crispy potato chip and crispy chip	1.80	.61	2.50	.51
10. I confident I can avoid to eat dessert and high sugary candy such as donut	1.75	.55	2.40	.50
Total	1.90	.64	2.70	.43

Table 4-18 The mean scores and standard deviation of healthy eating behavior before and after receiving the model by item analysis

Healthy eating behavior	Before receiving the model		After receiving the model	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Eating a variety in five food groups	1.85	.59	2.35	.67
2. Eating green vegetable such as morning glory, kale, and white green	2.05	.51	2.45	.51
3. Eating low calories fruits such as papaya, guava, watermelon, orange, and apple	2.25	.64	2.55	.51
4. Eating 3 meals per day	2.20	.69	2.80	.41
5. Avoiding fast foods such as fried chicken, pizza, hamburger, fren fried, streamed chicken with oily rice, strewed pork legs,	1.60	.60	2.30	.73
6. Avoiding eating sweet breads such as donut, cookies, Tokyo crepe, and Tokyo candy	1.80	.69	2.45	.60
7. Avoiding eating sweet desserts such as ice cream, chocolate, sweet candy, and sweet ice flakes	1.70	.57	2.25	.64
8. Avoiding drinking sweet drinks such as sweet red drinks, sweet ice tea drinks, and sweet cocoa drinks	1.80	.61	2.60	.50
9. Avoiding drinking carbonate beverages such as carbonate beverage	1.60	.60	2.45	.60
10. Avoiding eating crunchy snacks such as crispy potato chip and crispy chip	1.65	.50	2.25	.55
Total	1.85	.60	2.44	.57

1.2 Comparison of mean scores of knowledge of healthy food and healthy eating, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior before and after receiving the model

The effect size was used to examine the differences of mean scores of knowledge of healthy food and healthy eating, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior after and before receiving the model. The results were presents as follows:

Knowledge about healthy foods and healthy eating

The result showed that the mean score of knowledge about healthy foods and healthy eating was difference between after and before receiving the model at large effect size ($M_2 = 15.40$, $SD = 0.68$ and $M_1 = 11.90$, $SD = 2.36$, effect size $> .80$). Therefore, the finding indicated that the model of promoting healthy eating behavior in obese school-age children improved knowledge about healthy foods and healthy eating in obese school-age children.

Belief about healthy eating

The result showed that the mean score of belief about healthy eating was difference between after and before receiving the model at large effect size ($M_2 = 27.15$, $SD = 1.53$ and $M_1 = 22.45$, $SD = 2.76$, effect size $> .80$). Therefore, the finding indicated that the model of promoting healthy eating behavior in obese school-age children changed belief about healthy eating in obese school-age children.

Healthy eating self-efficacy

The result showed that the mean score of healthy eating self-efficacy was difference between after and before receiving the model at large effect size ($M_2 = 26.95$, $SD = 1.73$ and $M_1 = 22.25$, $SD = 2.27$, effect size $> .80$). Therefore, the finding indicated that the model of promoting healthy eating behavior in obese school-age children increased healthy eating self-efficacy in obese school-age children.

Healthy eating behavior

The result showed that the mean score of healthy eating behavior was difference between after and before receiving the model at large effect size ($M_2 = 24.45$, $SD = 2.84$ and $M_1 = 18.50$, $SD = 2.62$, effect size $> .80$). Therefore, the finding indicated that the model of promoting healthy eating behavior in obese

school-age children improved healthy eating behavior in obese school-age children.

In conclusion, the PHEB model for obese school-age children was effective on all variables. It induced improved knowledge about healthy foods and healthy eating, increased belief about healthy eating and healthy eating self-efficacy, and improved healthy eating behavior in obese school-age children.

2. Qualitative evaluation

The qualitative data about the available of healthy food at home and school was carried out from the open-end questionnaire. How the new model affected participants and participants' satisfaction toward the model were conducted by focus group from participants including 20 obese school-age children and parents dyads, 8 teachers, and 6 nurses. The results were presented as below.

2.1 Availability of healthy foods at home and school

The results of availability of healthy foods at home and school revealed that there were variety kinds of healthy foods at home and school after received the PHEB model for obese school-age children. The foods were more vegetables and low fat and oil as the following.

At home after receiving the model, the available foods were foods containing low fat and oil. Most parents changed cooking to boil (such as boil eggs and chicken), and grilled foods more than fried foods. Moreover, parents provided more "Isan foods" that containing large amount of vegetables such as Thai curry. Obese school-age children alerted to eat less amount carbohydrate per meal. They decreased eating rice from 2 dishes to 1 dish per meal (1 dish equal to 2 rice serving spoon). Besides, obese school-age children drank low sweet drinks than before receiving intervention. For example, they used to drink 1-2 (1 bottle equal to 180 ml) bottles per day but now they drank 1 bottle per day.

At school, the kind of foods was the same kinds before participating in the model such as stir-fried pork and basil with rice, spicy mince pork with rice, and minced pork with Chinese cabbage soup. However, chefs changed to using less oil in the school meal food and vendors changed to reduce sugar in sweet drinks and food for obese school-age children. Obese school-age children also ate fewer amounts of carbohydrate and food containing oil. For example, they decreased eating 2 dishes of rice with stir-fried pork and basil to 1 dish. Similarly, obese school-age children drank

low sweet drink after the received the model such as carbonate beverage. Most of them drank 1 bottle of 150 ml after lunch per day.

2.2 The affecting of the new interventions or the model on participants

The results were divided into two folds including the advantages of the model and learning from the participation.

2.2.1 The advantages of the interventions or the model

Two categories emerged in the advantages of the interventions for promoting healthy eating in obese school-age children including changing inappropriate eating habit and losing weight and easier to promote healthy eating behavior.

2.2.1.1 Changing inappropriate eating habit and losing weight

Most of the participants indicated that the interventions were very useful for them. Particular it could help obese school-age children changed to healthy eating behavior and losing weight. The mother aged 50 years stated that “I think this activity is the best. It makes my son good eating and losing weight. Now my son is careful about eating and body weight. He selects to eat more vegetables. Moreover, he plays football every day”.

“It helps my boy child have healthy and lose weight. Usually, he likes to eat foods containing high fat and carbonate beverage. Now he decrease eating high fat foods and carbonate beverage such as he drinks carbonate beverage only 1-2 plastic glasses for 3 times per week from 1-2 plastic glasses every day before promoting healthy eating behavior activities” (a-44-years-old-mother of 10 years old obese boy no 3).

A teacher aged 58 years, responsibility of school lunch meal providing said that “my students have better eating. They have more understand about eating for health. From my observation, I saw many students talked about healthy foods and unhealthy foods before they bought. Moreover, they eat more vegetable”

2.2.1.2 Easier to promote healthy eating behavior

Nurses indicated that the model could help them to promote healthy eating behavior for obese school-age children easily. The model could raise awareness about healthy eating behavior in obese school-age children of parents and obese school-age children. Most of them alerted to practice or promote healthy eating

behavior in obese school-age children and then continued to participate in other projects about promoting healthy eating and changing behavior for losing weight.

A nurse aged 28 years, responsibility of health education in school, said that “Your activities encourage me to promote healthy eating behavior for obese school-age children easily because these activities help parents and obese school-age children alerted and interested in the activities about healthy eating”

“I think parents and child alert to participate in promoting healthy eating behavior project after these activities. If we have the project about promoting healthy eating behavior or changing behavior for losing weight, I think many parents and obese school-age children interests to participate in our project” (nurse aged 49 years and responsible for obese child clinic).

2.2.2 Learning from the participation

The results revealed that there were three categories for participants learning including being enduring healthy eating, encouraging and warning, and collaboration.

2.2.2.1 Being enduring healthy eating

The results showed that obese school-age children felt very endure with healthy eating. After receiving the intervention, most obese school-age children had learnt that if they wanted to healthy eating behavior, they would have to endure.

An obese boy aged 10 years said that “before activities, I brought carbonate beverage to school every day. I drank 1.25 liters of carbonate beverage per day. At present, someday I drink carbonate beverages only one bottle (180 ml) at lunch. I feel very endure with to practicing healthy eating”.

“Nowadays, I eat less bread with filling. I eat it 1 piece per day before school. Sometime I think that I want to eat more and more bread with filling. However, I don’t eat it” (obese girl no 7, aged 10 years).

2.2.2.2 Encouraging and warning

Some parents indicated that the activities made them understand about responsibility for encouraging their child for promoting healthy eating and warning their child about unhealthy eating behavior. In order to promote healthy eating for obese school-age children, parents should often talk about healthy foods and healthy eating and encourage their child to eat healthy foods at home. A mother

aged 44 years of 10 years obese boy no 3 said that “the activities made me know that I am the person who is responsible to encourage and warn my child to have healthy eating behavior. When I saw my son buy carbonate beverages to home, I tell him “You have to be obese or not? If you don’t want, you must don’t drink it”

“I saw my daughter often ate crunchy snack after school. I told her about the disadvantage of these foods and encouraged her to eat fruits instead crunchy snack. She obeys me and starts to eat more fruits. I think I can encourage her to have healthy eating” (a-37-years-old-mother of 11 years obese girl no 19).

2.2.2.3 Collaboration

Most participants expressed that the interventions made them learned about collaboration among parents, teachers, and nurses. It was important for promoting healthy eating in obese school-age children. Collaboration among parents, teachers, and nurses could provide understanding problems and find out the good method to solve the problems.

“Collaboration among parents, teachers, and nurses can have the good results of promoting healthy eating behavior for obese school-age children. It provide us to talk and find out method to solve unhealthy eating behavior for obese school-age children” (teacher aged 53 years, responsible for school meal providing).

“Collaboration among parents, teachers, and nurses is good that can help child to have effective practicing healthy eating behavior. Unhealthy eating behavior in obese school-age children should be solved at home and school.” (nurse aged 49 years, responsible for obese clinic and nurse aged 28 years, responsible for school health education)

2.3 Participants’ satisfaction toward the model

The results revealed that there were four categories of participants’ satisfactions toward the model including feeling good, proud of achievement, feeling pleasure, and accepting benefit.

2.3.1 Feeling good

Most parents expressed that they felt good with involving in the action or intervention activities. These led their children to have more healthy eating behavior that led to good health in the future.

A grandmother aged 75 years of 10 years obese girl no 12 stated that “after I and my niece joined in the project, I feel good with the project because the project made my niece have more healthy eating behavior. She drinks less sweet drinks and eats more low fat foods such as ground the mackerel and spicy mackerel salad”.

“It is very good. It can make my son eat healthy foods and lose weight. Before participating activities, my son ate large amount of rice and foods. He did not think about healthy foods. After activities, he loses 2-3 kilograms of weight. I feel very good” (a 50-year-old mother of 10 years obese boy no 5).

2.3.2 Proud of achievement

Some obese school-age children expressed that they learned about promoting healthy eating from the involving the action or intervention. Obese school-age children gained knowledge about healthy foods and healthy eating. Moreover, other person encouraged them to have eating behavior. They felt proud of achievement about healthy eating and losing weight.

“I am proud of my achievement about healthy eating and losing weight because the activities help me to change behavior. I have award from the activity and be a model for other school-age children” (obese boy no 8, aged 11 years).

“I have award from your activities. Today I select more healthy food to eat than in the past time. I am proud of my healthy eating behavior when I go to school and my friends want to talk with me about healthy eating behavior. Moreover, my mother proud of my healthy eating behavior too” (obese girl no 13, aged 10 years).

2.3.3 Feeling pleasure

Many teachers felt pleasure with the action or intervention because these could help their students to have good health. Moreover, chefs and vendors could provide more healthy foods.

“I feel pleasure with the project. It can help my student to have healthy. They eat more healthy foods. Also, some students lose weight” (teacher aged 58 years, responsible for school meal providing).

“I agree with Ajarn....The project made student eat more healthy foods. Moreover, chefs and vendors change to cook more healthy foods for school-age children. I feel pleasure it” (teacher aged 50 years, responsible for school meal providing).

2.3.4 Accepting benefit

Nurses expressed that the action or intervention had benefit for obese school-age children and parents. It could help them realized the important of healthy eating behavior and the consequences of unhealthy eating behavior. Most of obese school-age children and parents changed their behavior to better.

“It can raise awareness of obese school-age children and their parents about the benefits of healthy eating behavior and the bad effects of unhealthy eating behavior. I accept that it is good project and we should do this project continue” (nurse aged 49 years, responsible for obese clinic).

“It is good project for school-age children, especially obese school-age children. Obese school-age children and their parents have more concern about bad effect of unhealthy eating behavior. They eat more healthy foods that lead to have good health in the future” (nurse aged 28 years, responsible for school health education)

For recommendations of the action or intervention, most participants suggested that 1) the project for promoting healthy eating behavior in obese school-age children should be provided 2-3 month per time, and 2) the project for promoting healthy eating behavior should be expand to other group such as obese school-age children living out of Municipality community.

CHAPTER 5

CONCLUSION AND DISCUSSION

This chapter presents summary and discussion of the research findings, strength and limitations, the implications of the research findings, and recommendations for the future research

Summary of the study

This action research aimed to develop promoting healthy eating behavior model for obese school-age children in Mahasarakham province. The participants were school-age children (obese, normal weight, underweight) studying in grade 4 and 5 at a primary public school in Mahasarakham province, parents of obese school-age children, teachers, and nurses. This study was divided into three phases including phase I situation analysis, phase II model development, and phase III model evaluation. Quantitative and qualitative methods were used to collect the data in this study.

For assessing quantitative in phase I situation analysis, there were 131 school-age children (including 30 obese school-age children) responded to answer self-administered questionnaires. For other participants, there were 30 parents of school-age children, 12 teachers, and 6 nurses. However, 10 parents of obese school-age did not participate in the research project. The reasons of them were 2 obese school-age children moved from the target school, 1 parent were not willing to join, and 7 parents had no time. For teachers, 4 teachers had no time to joint with the activity. Therefore, there were 20 parents, 8 teachers, and 6 nurses could participate in the research project and they responded to answer socio-demographic information questionnaire. For assessing qualitative data, 12 obese school-age children-parents pairs, 6 teachers, and 6 nurses were selected by purposive sampling for in-depth interview. There were 20 obese school-age children and 20 parents of obese school-age children, 8 teachers, and 6 nurses participated through phase II model development and phase III model evaluation. In phase II model development, the observation guidelines were used for collecting qualitative data through the action

research process. For phase III model evaluation, the same self-administered questionnaire (except socio-demographic information) used at phase I was employed to collect quantitative data from 20 obese school-age children. Focus group guidelines were used for assessing qualitative data from 20 obese school-age children, 20 parents of obese school-age children, 8 teachers, and 6 nurses for assessing qualitative data.

All instruments were examined by using the content validity index [CVI] by the five experts in nutrition, health science, and behavioral science. The CVI of all instruments ranged from 0.86 to 1.00. The Cronbach's alphas coefficient of belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior questionnaires were .76, .79, and .75, respectively. Kuder-Richardson formulation 20 [KR-20] for knowledge about healthy food and healthy eating test was .72. Quantitative data were analyzed using descriptive statistics, chi-square test, Pearson's product moment correlation, and effect size. Qualitative data were analyzed by content analysis. The results of each phase were presented as the following.

Phase I Situation analysis

Quantitative results

1. The characteristics of participants

Participants responding to complete the self-administered questionnaires were 131 school-age children. The results of school-age children's nutritional status showed that most school-age children were normal weight (69.4 %) and followed by obese (20 %). The characteristics of obese and normal weight school-age children were similar in terms of socio-demographics among these groups. There was only significant difference in grade level between obese and normal weight school-age children. Participants continued responding to participate in phase II and III were 20 obese school-age children and their parents, 8 teachers, and 6 nurses.

The characteristics of obese school-age children showed that most of them (85 %) were grade 4 and more than half of them (55 %) were boys. More than two thirds of obese school-age children (75 %) lived in the family over 5 persons. Nearly half of them (45 %) live with mother, father, grandparents, and relatives. The allowance of the students in this group ranged from 20 to 40 baht per day with the mean of 29.25 ($SD = 7.30$). Half of obese school-age children (95.0 %) spent allowance on food 10 baht and below per day. Nearly half of them (45 %) spent allowance on sweets and

snacks between 11-20 baht per day.

For parents, the majority of parents of obese school-age children were mother (70 %) aged ranged from 35 to 39 years. Most of them (70 %) finished primary school. Half of them were agriculture (50 %) and family income was more than 30,000 baht. The teachers were female (100 %), aged ranged from 51 to 60 years. Most of them finished bachelor's degree and all of them had experiences related to promoting healthy eating behavior in school-age children. They supervised chefs for providing school meal. For nurses, all of them were female (100 %), aged ranged from 51 to 60 years, and senior professional nurse (83.3 %). Half of them (50 %) finished bachelor's and master's degree. All of them had experiences related to 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 and normal weight school-age children.

Normal weight school-age children had healthy eating behavior scores ranged from 14 to 28 with the mean of 21 ($SD = 2.79$). Obese school-age children had healthy eating behavior scores ranged from 12-23 with the mean of 18.40 ($SD = 2.70$). Normal weight school-age children had the mean scores of healthy eating behavior at a high level ($M \pm SD = 21 \pm 2.79$) while obese school-age children had the mean scores of healthy eating behavior at a moderate level ($M \pm SD = 18.40 \pm 2.70$).

3. Descriptive statistics for factors regarding healthy eating behavior in obese and normal weight school-age children

Both obese and normal weight school-age children had knowledge about healthy foods and healthy eating at high level ($M \pm SD = 11.90 \pm 2.36$, $M \pm SD = 11.96 \pm 1.90$). Normal weight school-age children had beliefs about healthy eating at a high level ($M \pm SD = 22.45 \pm 2.76$) while obese school-age children had beliefs about healthy eating at a moderate level ($M \pm SD = 23.82 \pm 3.13$). The healthy eating self-efficacy of normal weight school-age children was at a high level ($M \pm SD = 23.64 \pm 3.03$) while obese school-age children was at a moderate level ($M \pm SD = 21.00 \pm 2.00$).

4. Relationship between healthy eating behavior and its factors

The results showed that there was not significant relationship between knowledge about healthy food and healthy eating, belief about healthy eating and healthy eating behavior in both obese and normal school-age children. There was only significant positive relationship between healthy eating self-efficacy and healthy eating behavior in normal weight school-age children ($r = .296, p < .01$).

Qualitative results

1. The perceptions of healthy eating behavior in obese school-age children from obese school-age children and their parents were eating vegetables and fruits, fish, meat, eggs, and milk, and eating foods containing low fat and oil.

2. Eating behavior in obese school-age children were three categories including eating less vegetable and fruits, eating much carbohydrate or sugary foods and sweet drinks, and eating foods containing high fat and oil.

3. Factors related to healthy eating behavior in obese school-age children were divided into two themes including risk and protective factors. The risk factors were three categories including lack of awareness, inadequate knowledge, and availability and accessibility of unhealthy foods. The protective factors were two categories including local Thai “Isan” food and parents’ talking and teaching of eating behavior.

4. Appropriate activities or guidelines to promote healthy eating behavior in obese school-age children were divided into five categories including raising awareness, providing healthy foods, giving information about healthy food and healthy eating, creating course of behavior change, and collaboration.

Phase II Model development

The promoting healthy eating behavior model for obese school-age children was developed through the process of action research including planning, implementing, reflecting, and re-planning step. The researcher constructed action or intervention plans based on the results in situation analysis of phase I. There were two interventions that included promoting healthy eating behavior in obese school-age children for obese school-age children and their parents (intervention I) and changing belief of chefs and vendors and providing healthy foods for obese school-age children at school (intervention II).

After intervention I [PHB] finished, the results revealed that obese school-age children and their parents increased awareness about negative consequences of unhealthy eating behavior and the important of healthy foods and healthy eating behavior in obese school-age children. Besides, most of obese school-age children changed to eat more healthy foods. Parents also provided more health foods for their children. For first round of intervention 1, five parents still were not confident to provide healthy foods for their children because they thought it was difficult. Therefore, the researcher modified the intervention I. The researcher rearranged activities and visited them at their home again. The main components of rearranged were conversation by focusing on family competence in providing healthy foods for obese school-age children, using an example of successful of parents and obese school-age children for promoting healthy eating behavior for strengthening confidence in ability for promoting healthy eating for their children, providing more information about appropriate foods which fit with individual family context. Finally, parents had changed to providing more healthy foods for their children. The intervention I was re-planned one time.

For intervention II [CBPHF], the results found that chefs and vendors changed belief about providing healthy food for obese school-age children after intervention II finished. Chefs modified school meal to be healthy foods. They provided foods containing more vegetable and low fat and oil. Beside, vendors provided low fat and oil, and low sugar or sweet drinks. All of them felt increase self-worth and were very happy to provide healthy foods for obese school-age children. This intervention was not modified.

Phase III Model evaluation

Quantitative evaluation

The results showed that the mean scores of knowledge about healthy foods and healthy eating, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior in obese school-age children were difference between after and before receiving the model at large effect size (effect size $> .80$). Therefore, the model of promoting healthy eating behavior in obese school-age children could improve knowledge about healthy foods and healthy eating, increase belief about healthy eating and healthy eating self-efficacy, and improve healthy eating behavior in

obese school-age children.

Qualitative evaluation

After implementing the PHEB model, there were various kinds of healthy foods at home and school after receiving the model of promoting healthy eating behavior in obese school-age children than before receiving the model. At home, the foods were more vegetables and low fat and oil. Most parents changed cooking to boil, steam, and grilled foods more than fried foods. They also provided more “Isan food” that containing large amount of vegetables such as Thai curry with vegetables. Moreover, obese school-age children ate less amount carbohydrate per meal and drank low sweet drinks than before interventions. For school, chefs and vendors could not change the menu. However, they changed to cook food by using less oil in foods and vendors changed to add more streamed meatball and reduce sugar in sauce and reduce sugar in sweet drinks. Moreover, most obese school-age children ate fewer amounts of carbohydrate, less amount of food containing oil, and drank low sweet drinks.

For the advantages of the PHEB model, the results revealed that there were two categories including changing inappropriate eating habit and losing weight among obese school-age children and easier to promote healthy eating behavior. The categories emerged in learning from the participation in the intervention or the model were being enduring healthy eating in obese school-age children, encouraging and warning related to healthy eating behavior of parents, and collaboration among parents, teachers, and nurses for promoting healthy eating behavior. For participants’ satisfaction toward the model, there were four categories including feeling good, proud of achievement, feeling pleasure, and accepting benefit.

Discussion of the research findings

This part presents discussion of the research findings. The discussion of the findings is presented in three parts: 1) healthy eating behavior in obese school-age children and its factors, 2) the process of the PHEB model development, and 3) the efficacy of the PHEB model for obese school-age children.

1. Healthy eating behavior in obese school-age children and its factors

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 results also found that knowledge about healthy food and healthy eating, belief about healthy eating, and healthy eating self-efficacy had low positive relationship with healthy eating behavior in obese school-age children. All of these factors were not significant relationship with healthy eating behavior in obese school-age children. However, the results showed that there was only significant relationship between healthy eating self-efficacy and healthy eating behavior in normal weight school-age children in this school. These results might depend on the number of sample size. The small sample size did not reach statistical significance. Increasing sample size is a way to increase statistical power of test (Cohen, 1988). In this study, the sample size of obese school-age children was 20 while normal school-age children were 91.

Although the quantitative results in this study found that there were no significant difference between healthy eating behavior and its factors in obese school-age children group, the qualitative results showed that there were the risk factors of healthy eating behavior in obese school-age children including lack of awareness about healthy eating behavior, inadequate knowledge about healthy food and healthy eating, and availability of unhealthy food at home and school. Therefore, it may 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 parent, lack of awareness of healthy eating behavior in obese school-age children and their parents were the factor related to healthy eating behavior in obese school-age children. This result was supported by previous research. The study of Fitzgerald et al. (2010) revealed that the perceptions of young people from three age groups (9-10, 13-14, and 16-18 years) about healthy eating behavior influenced on healthy food choices. That was their awareness of healthy eating behavior influenced their healthy food choices. This 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 et al. (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 lack of awareness about healthy eating behavior in obese school-age children and their parents contributed 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 the factor related to healthy eating behavior in obese school-age children. These results were consistent with the previous study. Choi et al. (2008), Oldewage-Theron and Egal (2010) found that poor nutrition knowledge was associated with healthy eating in school-age children. The study of Klicklighter et al. (2009) found that parents and grandparents with high nutritional knowledge related to children's healthy foods consumption. Knowledge about healthy food and healthy eating is needed as basic to make healthy food choices of obese school-age children and their parents (Patrick & Nicklas, 2005; Ra'sa'nen et al., 2003).

For availability of unhealthy foods at home and school came from the life style and culture change in food consumption of people and their family in this area at the present time. The social and economic structure of the research setting had changed from agriculture to industry. The lifestyle and culture food consumption of the people had changed from eating food prepared at home to ready-to-eat food purchased from local markets or convenience stores surrounding in 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 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 is supported by Sheperd et al. (2006) and Taylor et al. (2005), suggested that food availability and accessibility at home and school was 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 for choosing food to eat. Besides, Kime (2009, 2011) found that family cultures were related to healthy eating behaviors in children and childhood obesity. Therefore, the available unhealthy foods in this area and culture changed in food consumption patterns of people or family could influence 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 were the protective factors

of healthy eating behavior in obese school-age children. There were various kinds of local Thai “Isan” foods 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 river snail (44 kilocalories/ 100 gram edible portion) were 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 “Isan” foods could be a good protective factor of healthy eating behavior in obese school-age children in this area.

In addition, parents talking and teaching of healthy eating behavior could lead to improve healthy eating behavior for their children. Usually, parents take a role to provide foods and promote healthy eating for their children. Therefore, parents’ talk and teach about healthy eating behavior could promote healthy eating behavior for their children. This is supported by Savage et al. (2007), mentioned that parents act as an essential role in their children’s lives by teaching, role modeling, and supervising. Parents could shape children’s early experiences with foods and eating strongly. Therefore, providing nutritional information and offering an alternative for eating local Thai “Isan” foods including parents’ talking and teaching about healthy eating behavior could promote healthy eating behavior for obese school-age children.

2. The process of the PHEB model development

The promoting healthy eating behavior [PHEB] model for obese school-age children was developed through the action process including planning, implementing, reflecting, and re-planning. This model consisted of the critical components including collaboration at the family, school, and health care provider level, and two interventions. These interventions included intervention I: PHB and intervention II: CBPHF. The process of action research and the results of two interventions were discussed as following.

Step I: Planning

In this step, the problems identification was conducted. The plan was developed by synthesis of factors related to healthy eating behavior and related concepts. In addition, the group meeting among obese school-age children, parents, teachers, and nurses was set up to discussion. These activities provided opportunity for participants to share and discuss the problems and factors related to healthy eating behavior in obese school-age children. They also participated in creating the guidelines for solving these problems based on their needs. These activities made participants and the researcher realized the reality related the problems and its factors that led to create appropriate guideline to solve the problems. All participants accepted the problems and action/ intervention plan. Therefore, this action/ intervention belonged to everyone. As Koshy et al. (2011) and Guba and Lincoln (1994) notes, the investigator and the investigated object are assumed to be interactively linked, with the value of the investigator. The findings are value mediated. Knowledge is created by inquiry through a dynamic interaction with the environment. To understand knowledge or the patterns of human behavior, the investigator must understand societal structures as well. The goal is to free participants from effect of ideology or free from constraint domination (Campbell & Bunting, 1991; Newman, 1992). Therefore, these activities in the planning step provided deep understanding the view and opinions of obese school-age children and their parents. The researcher interacted with obese school-age children, parents, teachers, and nurses to share understanding, intersubjectivity, to free obese school-age children from dominate and bringing self-knowledge and self-reflection. The researcher interpreted their needs and understood the context of obese school-age children related to problems for constructing action/ intervention plan to promote healthy eating behavior in obese school-age children.

Step II: Implementing

There were two interventions in the implementing step including intervention I (PHB) and intervention II (CBPHF). For the intervention I, the participants were 20 obese school-age children-parents dyads. The aim was to raise obese school-age children and their parents aware of the consequences of unhealthy eating behavior and perceiving the significant of practicing and promoting healthy eating behavior in

obese school-age children. The results of intervention I found that obese school-age children and parents were very interested during the activities of the PHB intervention. They paid attention to the questions and participated in the activities. After finished the intervention I, the results found that 1) obese school-age children and their parents increased awareness of consequences of unhealthy eating behavior. They understood the negative consequences of unhealthy eating behavior after group sharing and discussion about the negative consequences of unhealthy eating behavior in obese school-age children, 2) obese school-age children and their parents increased perceiving the important of promoting healthy eating behavior in obese school-age children, and 3) obese school-age children and their parents changed to healthy eating behavior. They alerted and tried to promote healthy eating behavior for obese school-age children.

There were some explanations for these findings. In the intervention I, there were activities aiming to raise awareness of healthy eating behavior and increase ability to promote healthy eating behavior in obese school-age children. These activities included group meeting of obese school-age children and their parents for sharing and discussion about the negative consequences of unhealthy eating behavior and the importance of healthy eating behavior, and finding out suitable methods to promote healthy eating behavior, enhancing knowledge about the benefits of healthy eating behavior and negative consequences of unhealthy eating behavior, set a plan for their development, and home visiting individual family to strengthening confidence in ability for promoting healthy eating behavior. Firstly, it may be due to group meeting for sharing and discussion. This activity encouraged obese school-age children and their parents to become involve in sharing and discussing about negative effects of unhealthy eating behavior and the importance of healthy eating behavior in obese school-age children. Moreover, it could help them to have freedom to make independent decisions about methods or guidelines to promote healthy eating behavior in obese school-age children. This is supported by Daramas, Chontawan, Yenbut, Wittayasooporn, and Nantachaipan (2008) using group meeting for encouraging involving in decision making their care, enhancing their autonomy, and gaining a power of practice. Secondly, it may be due to home visit for strengthening confidence in ability for promoting healthy eating behavior in individual family. This activity

helped obese school-age children and their parents could promote healthy eating behavior by self-monitoring, evaluating, and counseling with the researcher. This is consistent with Rattanagreethakul, Lapvongwatana, Thiangtham, Sunsern, and McMullen (2010), suggested that home visit could increase the families' confidence in improving health promoting behaviors.

Thirdly, it may be due to enhancing knowledge about the benefits of healthy eating behavior and negative consequences of unhealthy eating behavior and educating nutrition knowledge via school broadcast, and exhibition on nutrition knowledge. From these activities, obese school-age children and their parents may perceived severity of unhealthy eating behavior and benefits of healthy eating behavior, and thereby increased awareness of healthy eating behavior in obese school-age children. Besides, obese school-age children had knowledge more about nutritional knowledge from educating nutrition at school that led them improve healthy eating behavior. This result is consistent with the study of Duangchan, Yoelao, and Macaskill (2010), suggested that increased awareness of self-control on healthy eating might be due to educating in knowledge about obesity-related Type 2 diabetes. Fourthly, it may be due to good modeling of healthy eating behavior and giving reward. These activities could motivate obese school-age children to improve healthy eating behavior. This is supported by Pinsaimoon, and Banchonhattakit (2009) Thiangtham et al. (2009), suggested that modeling could develop school-age self-efficacy for improving healthy eating behavior in obese school-age children.

For intervention II, the aim of the intervention II was to change belief of chefs and vendors to provide healthy foods for obese school-age children. The participants were 6 chefs and 2 vendors. During intervention, the results found that chefs and vendors intended to attention to learn all activities with the researcher. They alerted to respond the question and discussion with the researcher. After finished intervention II, the results revealed that all of chefs and vendors changed belief and attempted to provide healthy foods for obese school-age children. Most school-age children still ate the foods that they cooked and sold. Chefs and vendors felt happy to provide more healthy foods for school-age children, especially obese school-age children. All of them felt increase self-worth and were very happy to maintain providing healthy foods for obese school-age children.

The succession of the intervention II may be due to the activities of this intervention including asking question for exploring the problems, telling the negative effects of unhealthy foods, and group discussion process focusing re-thinking about the problems, causes, and obstacle of the problems, the needs for solving the problems, the suitable methods for providing healthy foods, and offered commendations chefs and vendors' competency. The asking question for exploring the problems and telling about the negative effects of unhealthy eating behavior helps chefs and vendors reflect to think about the important problems related to providing unhealthy foods. This leads to understand the problems, negative consequences of providing unhealthy foods, and needs for solving the problems. Offering commendation for their competency could lead them to have confidence in providing healthy foods for obese school-age children. After that, effect of providing healthy foods such as obese school-age children ate more foods that they cook made chefs and vendors changed belief and continued to promote healthy food for obese school-age children. This is supported by Nupath, Doerisres, and Wacharasin (2014), found that after receiving family therapeutic conversation program could improve family care behaviors of adolescent with hyperventilation syndrome. The study of Svavarsdottir and Sigurdardottir (2013) found that primary caregivers of children and adolescent in active cancer treatment perceived significantly family support, significantly higher expressive family functioning, and significantly higher emotional communication after the intervention after receiving a belief therapeutic conversation intervention.

Step III: Reflecting

In this step, the researcher provided opportunity for obese school-age children, their parents, chefs, and vendors to reflect their ability or obstacles about promoting healthy eating behavior for obese school-age children. This activity made the researcher and participants realized how to promote healthy eating behavior in obese school-age children. As Taylor, Wilkie, and Baser (2006) notes, after the action, observation and analysis of its impact will take place, followed by reflection.

Step IV: Re-planning

For re-planning step, the intervention I was re-planned based on the reflection of some participants. The new plan was conducted to increasing the family competency in providing healthy food, which fit with each individual family context.

Finally, this intervention was successful. Parents changed to provide healthy foods for their children. Taylor et al. (2006) assert that the action research cycle is complete and may be started again, with a view to refining and repeating the action research process.

According to the findings above, the action process can be used as the process to develop the PHEB model for obese school-age children. This process provides opportunity of group activity of obese school-age children, parents, teachers, and nurses to share, discuss, and learning throughout the process. The involving the participants in the process of decision making and practicing could make participants to greater understand and carry out the intervention to be successful and sustainable (Hampshire, Blair, Crown, Avery, & Williams, 1999; Øen & Stormark, 2013). The previous studies used the action research process and participants' involving to solve effectively the problems. The results of these studies showed that this process is a successful method promoting changing behavior in participants and potential for sustainability (Kara, Aydos, & Aydm, 2015; Rattanagreethakul et al., 2010; Siriarunrat, Lapvongwatana, Powwattana, & Leerapan, 2009). For this study, after finished the cycle of process, the results showed that obese school-age children and their parents increased awareness of consequences of unhealthy eating behavior and perceiving the important of promoting healthy eating behavior in obese school-age children. They also changed to healthy eating behavior. Besides, chefs and vendors changed belief to provide healthy foods for obese school-age children.

3. The efficacy of the PHEB model for obese school-age children

This section presents discussion of the efficacy of the PHEB model for obese school-age children. It was divided in to two parts including quantitative and qualitative results as follows:

For quantitative results, the results found that the mean scores of knowledge about healthy foods and healthy eating, belief about healthy eating, healthy eating self-efficacy, and healthy eating behavior in obese school-age children were different between after and before receiving the PHEB model for obese school-age children at large effect size (effect size $>.80$). Discussion of the results would be presented as follows:

Increasing in knowledge about healthy food and healthy eating

The analysis demonstrated that knowledge about healthy food and healthy eating in obese school-age children increased from before receiving the model. It may be due to the activities in the intervention I promoting healthy eating behavior in obese school-age children aimed to increased nutritional knowledge including educating nutritional knowledge via broadcast, exhibition on nutritional knowledge, and providing information about healthy food and healthy eating behavior. Therefore, the knowledge about healthy food and healthy eating increased from before receiving the model. This is consistent with the study of Duangchan, Yealao, Makcaskill, Intarakamhang, and Suprasonsin (2010) suggested that lecture about nutritional knowledge was likely to increased knowledge about obesity-related Type 2 diabetes. Youngiam, Pavadhgul, Pradipasen, and Iamee (2013) also suggested that nutritional knowledge activities significantly increased knowledge on fruit and vegetable in school-age children after intervention.

Changing in belief about healthy eating

The result showed that belief about healthy eating in obese school-age children increased from before receiving the model. Some points may can be explained this finding. It may be due to the activity in the intervention I were group meeting for sharing and discussion about the consequences of unhealthy eating behavior and the benefits of healthy eating behavior could help obese school-age children increased belief about healthy eating. This was the activity that had applied from the literature related health believe model (Rosenstock et al., 1988). This is support by Plengkrate and Sauwamas (2012) suggested that perceived healthy eating behavior in obese school-age children was like to increase healthy eating behavior in obese school-age children.

Enhancing in healthy eating self-efficacy

The result showed that healthy eating self-efficacy in obese school-age children enhanced from before receiving the model. There have been some possible explanations for this. First, it may be due to the activities in the intervention I had applied from the literature related self-efficacy (Bandura, 1977) including mastery experience and modeling. First, mastery experience could help obese school-age children to gain direct experience form skill training that lead to have healthy eating

behavior. It may be due to the activities in intervention I including playing games, obese school-age children-parents dyads for sharing and discussion about healthy food menu and the ingredients. These activities could help obese school-age children developed belief in their competence. This is consistent with the previous studies (Duangchan et al., 2010; Pinsaimoon, & Banchonhattakit, 2009). They suggested that playing games, small group discussion, and thinking practice at both individual and group level was likely to increase belief in obese school-age children's competence related to eating behavior.

Second, modeling or vicarious experience was used in the intervention I. the successful model about healthy eating behavior were presented to other obese school-age children in the school that helped them have increased self-efficacy and were able to perform healthy eating behavior in later. This is supported by the previous studies (Pinsaimoon & Banchonhattakit, 2009; Thiangtham et al., 2009). These studies suggested that modeling could develop school-age self-efficacy for improving healthy eating behavior in obese school-age children.

Improving healthy eating behavior

After receiving the PHEB model for obese school-age children, it was demonstrated that mean score of healthy eating behavior were higher than from before receiving the model. It may be due to the intervention I applied self-efficacy to develop intervention and education nutritional knowledge that could help obese school-age children improved healthy eating behavior. This result is consistent with the previous studies (Duangchan et al., 2010; Pinsaimoon & Banchonhattakit, 2009), applied self-efficacy concept in the intervention and used nutritional knowledge for improving healthy eating behavior in obese school-age children. Moreover, the group discussion process of the activities involving parents such as discussion of the consequences of unhealthy eating behavior and benefits of healthy eating behavior could help obese school-age children to increase healthy eating behavior. This is consistent with the study of Wacharasin, Phaktoop, and Sananreangsek (2015), suggested that group discussion process help the participants to gain a new comprehension of their problems, needs, and find out the method to solve the problems. Moreover, Silveira et al. (2011) and Chotibang et al. (2009) suggested that parents involving in the process for promote healthy eating behavior in school-age children

could enable them to be the key person in promoting healthy eating behavior for their children.

For qualitative results, the findings revealed there were four categories emerged from participants' satisfaction toward the PHEB model were feeling good, proud of being achievement, feeling pleasure, and accepting benefit. It might be conclude that participants were satisfied for participated in the research process. This led to the successful of the model. These results were consistent with the previous study that participants were satisfied with the action process. They were the key success of the outcome of the action research (Mubuuke & Leibowitz, 2013). Therefore, the model of PHEB for obese school-age children in this study might be sustainable because there were the key success including collaboration among parents, teachers, and nurses, developing model based on the needs of parents and obese school-age children. Besides, most of participants were satisfied with the PHEB model.

Strength and limitations

Because of the promoting healthy eating behavior [PHEB] model for obese school-age children was evolved based on the problems and needs of obese school-age children and parents. It could provide suitable guidelines for obese school-age children, their family, and school to practice. Consequently, obese school-age children might maintain their healthy eating behavior. In addition, there were the crucial process in the intervention I promoting healthy eating behavior in obese school-age children including the monitoring, evaluating, and consulting activity every week after group activities around 1 month and modifying intervention to fit with individual family. Therefore, obese school-age children could maintain healthy eating behavior in obese school-age children.

The limitation of this study was the low number of obese school-age children ($n = 20$) participated in the activities. This number could affect the effective of intervention to promote healthy eating behavior in obese school-age children.

Implication of the research findings

1. Nurses in primary care unit and community nurses should apply activities of the promoting healthy eating model for obese school-age children such as healthy eating monitoring and consulting on healthy eating behavior in order to promote healthy eating in obese school-age children at home and school.

2. School health nurse should apply the promoting healthy eating behavior model for obese school-age children to promote healthy eating behavior in obese school-age children such as group meeting for identifying problems related to unhealthy eating behavior among obese school-age children. School health nurse should work with the school to include healthy eating behavior among obese school-age children as one of the school health policies focusing on promoting healthy eating behavior among obese school-age children.

3. School health teachers should apply activities of healthy eating behavior model among obese school-age children such as educating students and obese students and their parents about nutritional knowledge via school broadcast and exhibition.

4. School administrators and teachers who are in charge of school lunch program should promote healthy eating behavior among obese children by making a school lunch policy and school lunch menu fit into the healthy eating behavior promotion program for obese school-age children.

Recommendation for future research

1. The future research should test the model in different area with large sample size in order to improve and develop the model to be more effective and to be applied in the population.

2. A longitudinal study is need for future research in order to investigate the effects of model in terms of maintenance of healthy eating behavior and weight in obese school-age children can be achieved over the longer term.

3. School lunch program is important for promoting healthy eating behavior among obese school-age children. Therefore, future research should involving school administrators and local government because they are essential to develop school lunch policy for obese school-age children

4. To promote healthy eating behavior model for obese school-age children can improved healthy eating behavior in obese school-age children and may help maintain the obese children's weight. However, in order to lose weight, physical activity intervention is needed to be included in the program.

REFERENCES

- Adamo, K. B., Papadakis, S., Dojeiji, L., Turanau, M., Simmons, L., Parameswaran, M., & Cunningham, J. (2010). Using path analysis to understand parents' perceptions of their children's weight, physical activity, and eating habits in the Champlain region of Ontario. *Paediatr Child Health*, 15(9), e33-e41.
- American Academy of Pediatrics, Council on Sports Medicine and Fitness and Council on School Health, Active healthy living. (2006). Prevention of childhood obesity through increased physical activity. *Pediatrics*, 117, 1834-1842.
- Atik, D., & Ertekin, Z. O. (2013). Children's perception of food and healthy eating: Dynamics behind their food preferences. *International Journal of Consumer Studies*, 37(1), 59-65.
- Australia Institute of Health and Welfare. (2006). *Chronic diseases and associated risk factors in Australia, 2006*. Canberra: Australia Institute of Health and Welfare.
- Australian Institute of Health and Welfare and National Heart Foundation of Australia. (2004). *The relationship between overweight, obesity and cardiovascular disease*. Canberra: Australian Institute of Health and Welfare.
- Avison, D., Lau, F., Myers, M., & Nielsen, P. A. (1999). Action research. *Communications of the ACM*, 42(1), 94-97.
- Ayieko, M. A., & Anyango, J. L. (2011). Evaluation of nutrition knowledge and perception of good food among nursery school pupils in Kisumu Municipality-Kenya. *Advance Journal of Food Science and Technology*, 3(3), 165-172.
- Banchonhattaki, P., Tanasugarn, C., Pradipasen, M., Miner, K. R., & Nityasuddhi, D. (2009). Effectiveness of school network for children obesity prevention (SNOCOP) in primary school of Saraburi province, Thailand. *Southeast Asian Journal Tropical Medicine Public Health*, 40(4), 816-834.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review*, 84(2), 191-215.

- Bansal, A. K., Manohar, R., Yadav, R., Sharma, D., Yadav, N., & Lohani, H. (2013). Prevalence of obesity and its lifestyle risk factors in school-age children in Jaipur. *Journal of Research in Medical Sciences*, 3(2), 16-19.
- Becker, M. H., & Maiman, L. A. (1975). Sociobehavioral determinants of compliance with health and medical care recommendations. *Medical Care*, 13(1), 10-24.
- Bell, J. M. (2003). Clinical scholarship in family nursing. *Journal of Family Nursing*, 9(2), 127-129.
- Benton, D. (2004). Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity Relate Metabolic Disorders*, 28(7), 858-869.
- Bere, E., & Klepp, K. I. (2005). Changes in accessibility and preferences predict children's future fruit and vegetable intake. *International Journal of Behavioral Nutrition and Physical Activity*, 2, 15.
- Boonju, W., Chulakarangka, S., & Utaipatanacheep, A. (2008). Nutrition education to encourage school children's behavior on Thai food consumption. *Journal of Community Development Research*, 2(2), 83-91.
- Bordi, P. L., Paek, J. E., Watkins, S., Caldwell, D., & Devitis, C. A. (2002). *Impact of the environment on food choices and eating habits of school-age children: A USDA-sponsored research agenda conference*. Retrieved from <http://docs.schoolnutrition.org/newsroom/jcnm/02fall/>
- Boyd, D., & Bee, H. (2009). *Lifespan development*. Boston: Pearson Education.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (2005). The bioecological theory of human development. In U. Bronfenbrenner (Ed.), *Making human beings human: Bioecological perspectives on human development* (pp. 3-15). Thousand Oaks, CA: Sage.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology, vol. 1: Theoretical models of human development* (6th ed., pp. 793-828). New York: John Wiley.

- Brown, R., & Ogden, J. (2004). Children's eating attitudes and behavior: A study of the modeling and control theories of parental influence. *Health Education Research, 19*(3), 261-271.
- Brug, J., Tak, N. I., Velde, S. J., Bere, E., & Bourdeaudhuij, I. (2008). Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: Results from observational studies. *British Journal of Nutrition, 99*(Suppl 1), S7-S14.
- Bruss, M. B., Morris, J. R., Dannison, L. L., Orbe, M. P., Quitugua, J. A., & Palacios, R. T. (2005). Food, culture, and family: Exploring the coordinated management of meaning regarding childhood obesity. *Health Communication, 18*, 155-175.
- Building Blocks for a Health Future. (2012). *Obesity and unhealthy eating*. Retrieved from http://bblocks.samhsa.gov/family/talkingListening/childhood_obesity.aspx
- Bureau of Dental Health, Department of Health, Ministry of Public Health. (2010). *Dental health promotion among school-age children*. Retrieved from http://eng.anamai.moph.go.th/main.php?filename=01_dhpasac
- Campbell, D. (2010). *32 % of pupils skip breakfast before school*. Retrieved from <http://www.guardian.co.uk/society/2010/aug/16/third-pupils-skip-breakfast>
- Campbell, J. C., & Bunting, S. (1991). Voices and paradigms: Perspectives on critical and feminist theory in nursing. *Advances Nursing Science, 13*(3), 1-15.
- Carprio, S., Daniels, S. R., Drewnowski, A., Kaufman, F. R., Pailinkas, L. A., Rosenbloom, A. L., & Schwimmer, J. B. (2008). Influence of race, ethnicity, and culture on childhood obesity: Implications for prevention and treatment. *Diabetes Care, 31*(11), 2211-2221.
- Carr, W., & Kemmis, S. (1986). *Becoming critical: Education, knowledge, and action research*. London: Falmer.
- Centre for Population Health. (2012). *Childhood obesity*. Retrieved from <http://www.health.nsw.gov.au/obesity/pages/default.aspx>

- Chearsawud, S. (2001). *The effect of self-control skill development on avoidance of unhealthy snack consumption among grade five students in Tak province*, Master's thesis, Public Health Nursing, Graduate School, Mahidol University.
- Chen, F., Wang, Y., S, X., Cheng, H., Hou¹, D., Zhao¹, X., Wang, T., Zhao, D., & Mi, J. (2012). Association between childhood obesity and metabolic syndrome: Evidence from a large sample of Chinese children and adolescents. *Plos One Journal*, 7(10), e47380. doi: 10.1371/ journal.pone.0047380.
- Chen, J. L., Kennedy, C., Yeh, C. H., & Kools, S. (2005). Risk factors for childhood obesity in elementary school-age Taiwanese children. *Progress in Cardiovascular Nursing*, 20(3), 96-103.
- Cheng, C., Chiu, H. J., Loh, E. W, Chan, C. H, Hwu, T. M., Liu, Y. R., & Lan, T. H. (2012). Association of the ADRA1A gene and the severity of metabolic abnormalities in patients with schizophrenia. *Progress in neuro-psychopharmacology biological psychiatry*, 36, 205-210.
- Choi, E. S., Shin, N. R., Jung, E. I., Park, H. R., Lee, H. M., & Song, K. H. (2008). A study on nutrition knowledge and dietary behavior of elementary school children in Seoul. *Nutrition Research and Practice*, 2(4), 308-316.
- Chotibang, J., Fongkaew, W., Mo-suwan, L., Meininger, J. C., & Klunklin, P. (2009). Development of a family and school collaborative (FASC) program to promote healthy eating and physical activity among school-age children. *Thai Journal of Nursing Research*, 13(2), 133-147.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cohen. L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th ed). London: RoutledgeFalmer.
- Collins English Dictionary. (2014). *English dictionary*. Retrieved from <http://www.collinsdictionary.com/dictionary/english/parent>
- Crussell, L. A. (2011). *Definition of healthy eating*. Retrieved from <http://www.livestrong.com/article/396464>

- Cullen, K. W., Baranowski, T., Rittenberry, L., & Olvera, N. (2000). Social-environmental influences on children's diet: Results from focus groups with African-, Euro- and Mexican-American children and their parents. *Health Education Research*, 15(5), 581-590.
- Daramas, T., Chontawan, R., Yenbut, J., Wittayasooorn, & Nantachaipan, P. (2008). Enhancing nursing practice in developmental care for preterm infants. *Thai Journal Nursing Research*, 12(2), 83-94.
- Davidhizar, R., Bechtel, G. A., & Woodring, B. C. (2000). The changing role of grandparenthood. *Journal of Gerontological Nursing*, 26(1), 24-29.
- Davison, K. K., & Birch, L. L. (2001). Childhood overweight: A contextual model and recommendations for future research. *Obesity Reviews*, 2(3), 159-171.
- Denzin, N. K., & Lincoln, Y. S. (2000). *Handbook of qualitative research*. Thousand Oaks, California: Sage.
- Department of Health and Human Services, United State. (2010). *Nutrition school health guidelines*. Retrieved from <http://www.cdc.gov/healthyyouth/nutrition/guidelines/summary.htm>
- Department of Health, Ministry of Public Health. (1999). *The reference guide for the weight, height growth of Thai children aged 1 day-19 year olds*. Nonthaburi: Nutrition Division, Department of Health, Ministry of Public Health. Brochure.
- Department of Health, Ministry of Public Health. (2010). *Suffer the little children*. Retrieved from <http://www.bangkokpost.com/opinion/opinion/33074/>
- Department of Health, Ministry of Public Health. (2011). *Innovation for Thai children age appropriate nutrition*. Retrieved from <http://www.manager.co.th/QOL/viewnews.aspx?News>
- Department of Human Services. (2001). *Review of children's healthy eating interventions: Evidence based health promotion*. Melbourne: Victorian Government Department of Human Services, Australia. Research report.
- Diers, D. (1995). Clinical scholarship. *Journal of Professional Nursing*, 11, 24-30.
- Donkitphai, Y. (2001). *Knowledge and food consumption behavior of teenagers in Bunyawat Withayalai school, Changwat Lampang*. Master's thesis, Commercial Technology College, Graduate School, Chiang Mai University.

- Duangchan, P. (2007). *Causal factors obesity prevention behaviors and body index in fourth grade school children at Denonstration schools, Bangkok*. Doctoral dissertation, Applied Behavioral Science Research, Graduate School, Srinakharinwirot University.
- Duangchan, P. (2010). *The effectiveness of behavioral intervention programs utilizing self-control, self-efficacy, and implementation intervention for modifying psychological variables, eating behavior and physical activity, and BMI in elementary school children, Bangkok*. Doctoral dissertation, Applied Behavioral Science Research, Graduate School, Srinakharinwirot University.
- Duangchan, P., Yoelao, D., Macaskill, A., Intarakamhang, U., & Suprasonsin, C. (2010). Intervention for health eating and physical activity among obese elementary schoolchildren: Observing changes of the combined effects of behavioral models. *The Journal of Behavioral Science*, 5(1), 46-59.
- Eertmans, A., Baeyens, F., & Van den Bergh, O. (2001). Food likes and their relative importance in human eating behavior: Review and preliminary suggestions for health promotion. *Health Education Research*, 16(4), 443-456.
- Erikson, E. H. (1963). *Childhood and society* (2nd ed.). New York: Norton.
- Fagot-Campagna, A., Pettitt, D. J., Engelgau, M. M., Burrows, N. R., Geiss, L. S., Valdez, R., Beckles, G. L., Saaddine, J., Gregg, E. W, Williamson, D. F., & Narayan, K. M. (2000). Type 2 diabetes among North American children and adolescents: An epidemiologic review and public health perspective. *Journal of Pediatric*, 136, 664-672.
- Fisher, J. O., Mitchell, D. C., Smiciklas-Wright, H., & Birch, L. L. (2002). Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association*, 102(1), 58-64.
- Fitzgerald, A., Heary, C., Nixon, E., & Kelly, C. (2010). Factors influencing the food choices of Irish children and adolescents: A qualitative investigation. *Health Promotion International*, 25(3), 289-298.
- Florence, M. D., Asbridge, M., & Veugelers, P. J. (2008). Diet quality and academic performance. *Journal of School Health*, 78(4), 209-215.

- Francis, L. A., Lee, Y., & Birch, L. L. (2003). Parental weight status and girls' television viewing, snacking, and body mass indexes. *Obesity Research*, 11, 143-151.
- Fu, M. L., Cheng, L., Tu, S. H., & Pah, W. H. (2007). Association between unhealthful eating patterns and unfavorable overall school. *Journal American Diet Association*, 107(11), 1935-1943.
- Gallaway, M. S., Jago, R., Baranowski, T., Baranowski, J. C., & Diamond, P. M. (2007). Psychosocial and demographic predictors of fruit, juice and vegetable consumption among 11-14-year-old boy scouts. *Public Health Nutrition*, 10(12), 1508-1514.
- Gerrish, K., & Laccey, A. (2006). *The research process in nursing* (5th ed.). Oxford: Blackwell Publishing.
- Gleason, P. M., & Dodd, A. H. (2009). School breakfast program but not school lunch program participation is associated with lower body mass index. *Journal of the American Dietetic Association*, 109(2), S1, S118-128.
- Gorely, T., Nevill, M. E., Morris, J. G., Stensel, D. J., & Nevill, A. (2009). Effect of a school-based intervention to promote healthy lifestyles in 7-11 year old children. *International Journal of Behavioral Nutrition and Physical Activity*, 6(5), 1-12.
- Gortmaker, S. L., Must, A., Perrin, J. M., Sobol, A. M., & Dietz, W. H. (1993). Social and economic consequences of overweight in adolescence and young adulthood. *The New England Journal of Medicine*, 329, 1008-1012.
- Government of South Australia. (2006). *Causes and consequences of overweight and obesity*. Retrieved from <http://www.health.sa.gov.au/pehs/branches/health-promotion/healthy-weight-factsheet2.pdf>
- Greenhalgh, J., Dowey, A. J., Horne, P. J., Fergus Lowe, C., Griffiths, J. H., & Whitaker, C. J. (2009). Positive- and negative peer modeling effects on young children's consumption of novel blue foods. *Appetite*, 52(3), 646-653.
- Gregory, J., Lowe, S., Bates, C. J., Prentice, A., Jackson, L. V., Smithers, G., & Wenlock, R. (2000). *National diet and nutrition survey: Young people aged 4-18 years (vol. 1)*. London: The Stationery Office.

- Grimes, C. A., Riddell, L. J., Campbell, K. J., & Nowson, C. A. (2013). Dietary salt intake, sugar-sweetened beverage consumption, and obesity risk. *Pediatrics*, 131, 14-21.
- Guba E. G. (1990). The alternative paradigm dialogue. In E. G. Guba (Ed.), *The paradigm dialog* (pp. 17-30). Newbury Park: Sage.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.). *Handbook of qualitative research* (pp. 105-117). London: Sage.
- Hampshire, A., Blair, M., Crown, N., Avery, A., & Williams, I. (1999). Action research: A useful method of promoting change in primary care?. *Family Practice*, 16(3), 305-311.
- Han, E., & Powell, L. M. (2013). Consumption patterns of sugar-sweetened beverages in the United States. *Journal of the Academy of Nutrition and Dietetics*, 113(1), 43-53.
- Hendrie, G., Cox, D., & Coveney, J. (2008). Nutrition knowledge as a predictor of nutrient intake and diet quality. *Journal of Nutrition Education and Behavior*, 40(4), S50-51.
- Hochbaum, G. M. (1958). *Public participation in medical screening programs: A socio-psychological study*. Washington, DC: Government Printing Office.
- Holter, I. M., & Schwartz-Barcott, D. (1993). Action research: What is it? How has it been used and how can it be used in nursing? *Journal of Advanced Nursing*, 18, 298-304.
- House, J., Su, J., & Levy-Miline, R. (2006). Definitions of healthy eating among university students. *Canada Journal of Dietetic Practice and Research*, 67(1), 14-18.
- Howell, D. C. (1999). *Function statistics for the behavioral sciences* (4th ed.). Pacific Grove: Duxbury Press.
- Hu, F. B., & Malik, V. S. (2010). Sugar-sweetened beverages and risk of obesity and type 2 diabetes: Epidemiologic evidence. *Physiology Behavior*, 100(1), 47-54.
- Hutchison, E. D. (2008). *Dimensions of human behavior: The changing life course* (3th ed.). Virginia: Sage.

- Iamopas, O., Chongviriyaphan, N., & Suthutvoravut, U. (2011). Metabolic syndrome in obese Thai children and adolescents. *Journal of the Medical Association of Thailand*, 94(suppl 3), s126-32.
- Institute of Medicine. (2007). *Nutrition standards for food in schools: Leading the way towards healthier youth*. Washington, DC: National Academies Press.
- Jackson, D., Mannix, J., Faga, P., & McDonald, G. (2005). Overweight and obese children: Mothers' strategies. *Journal of Advanced Nursing*, 52(1), 6-13.
- Jaime, P. C., & Lock, K. (2008). Do school based food and nutrition policies improve diet and reduce obesity?. *Preventive Medicine*, 48, 45-53.
- Jerome, N. W., Pelto, G. H., & Kandel, R. F. (1980). An ecological approach to nutritional anthropology. In N. W. Jerome, R. F. Kandel, & G. H. Pelto (Eds.), *Nutritional anthropology: Contemporary approaches to diet and culture* (pp. 13-45). Pleasantville: Redgrave Press.
- Jingxiong, J., Rosenqvist, U., Huishan, W., Greiner, T., Guangli, L., & Sarkadi, A. (2007). Influence of grandparents on eating behaviors of young children in Chinese three-generation families. *Appetite*, 48, 377-383.
- Kanchanachitra, C., Podhista, C., Archavanitkul, K., & Im-em, W. (2005). *Thai health 2005*. Nakhon Pathom: Institute for Population and Social Research, Mahidol University.
- Kaplan, M., Kiernan, N. E., & James, L. (2006). Intergenerational family conversations and decision making about eating healthfully. *Journal of Nutrition Education Behavior*, 38, 298-306.
- Kara, G. E., Aydos, E. H., & Aydm, Ö. (2015). Changing preschool children's attitudes into behavior towards selected environment issues: An action research survey. *International Journal of Education in Mathematics, Science and Technology*, 3(1), 46-63.
- Kataoka-Yahiro, M. R., Ceria, C., & Yoder, M. (2004). *Grandparent care giving role in Filipino American families*. Retrieved from http://findarticles.com/p/articles/mi_moMJU/ss_3_11/
- Katesira, R. (2004). *Promotion of fruit consumption for substitution of snack among school children, grade 5 in Bangkok municipality*. Master's thesis, Nutrition, Faculty of Graduate School, Mahidol University.

- Kelly, J. W. (2010). *The importance of healthy eating in children*. Retrieve from <http://www.livestrong.com/article/74307-important-eating-children>
- Kemmis, K., & McTaggart, R. (2000). Participatory action research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed, pp. 567-605). Thousand Oaks, CA: Sage.
- Kicklighter, J. R., Whitley, D. M., Kelley, S. J., Lynch, J. E., & Melton, T. S. (2009). A home-based nutrition and physical activity intervention for grandparents raising grandchildren: A pilot study. *Journal of Nutrition Elderly*, 28(2), 188-199.
- Kime, N. (2009). How children eat may contribute to rising levels of obesity children's eating behaviors: An intergenerational study of family influence. *International Journal of Health Promotion & Education*, 47(1), 4-11.
- Kime, N. (2011). Changes in intergenerational eating pattern and the impact on childhood obesity. *Health Education Journal*, 71(2), 173-179.
- King, K. A., Tergerson, J. L., & Wilson, B. R. (2008). Effect of social support on adolescents' perceptions of and engagement in physical Activity. *Journal of Physical Activity Health*, 5, 374-384.
- Kleinman, R. E., Hall, S., Green, H., Kore Korzec-Ramirez, K., Patton, K., & Pagano, M. E. (2002). Diet, breakfast, and academic performance in children. *Annals of Nutrition & Metabolism*, 46(suppl.), 24-30.
- Koshy, E., Koshy, V., & Waterman, H. (2011). *Action research in healthcare*. London: Sage.
- Kraemer, H. C., & Thieman, S. (1978). *How many subjects? statistical power analysis in research*. Newbury Park, CA: Sage.
- Kristjansdottir, A. G., Thorsdottir, I., Bourdeaudhuij, I. D., Due, P., Wind, M., & Klepp, K. I. (2006). Determinants of fruit and vegetable intake among 11-year-old schoolchildren in a country of traditionally low fruit and vegetable consumption. *International Journal of Behavioral Nutrition and Physical Activity*, 3(41), 1-9.

- Kristjansson, A. L., Sigfusdottir, I. D., & Allegrante, J. P. (2010). Health behavior and academic achievement among adolescents: The relative contribution of dietary habits, physical activity, body mass index, and self-esteem. *Health Education Behavior*, 37(1), 51-64.
- Kumanyika, S. K. (2008). Environmental influences on childhood obesity: Ethnic and cultural influences in context. *Physiology & Behavior*, 94, 61-70.
- Kumar, S. P. (2011). *Malnutrition*. Retrieved from <http://www.diet.com/g/malnutrition>
- Kyngäs, H., & Vanhanen, L. (1999). Content analysis (Finnish). *Hoitotiede*, 11, 3-12.
- Latner, J. D., & Stunkard, A. J. (2003). Getting worse: The stigmatization of obese children. *Obesity Research*, 11(3), 452-456.
- Lazarou, C., Kalavana, T., & Matalas, A. L. (2008). The influence of parents' dietary beliefs and behaviors on children's dietary beliefs and behavior: The CYKIDS study. *Appetites*, 51, 690-696.
- Lee, H. A., Lee, W. K., Kong, K. A., Chang, N., Ha, E. H., Hong, Y. S., & Park, H. (2011). The effect of eating behavior on being overweight or obese during preadolescence. *Journal of Prevention Medicine and Public Health*, 44(5), 226-233.
- Lee, H. S., Kwon, S. O., & Lee, Y. (2013). Weight status and dietary factors associated with sugar-sweetened beverage intake among Korean children and adolescents-Korea national health and nutrition examination survey, 2008-2011. *Clinical Nutrition Research*, 2, 135-142.
- Lee, Y. S. (2009). Consequences of childhood obesity. *Annals of the Academy of Medicine, Singapore*, 38, 75-81.
- Lewin, K. (1946). Action research and minority problems. In G. W. Lewin (Ed), *Resolving social conflict* (pp. 201-216). London: Harper & Row.
- Lieberman, M., Gauvin, L., Bukowski, W. M., & White, D. R. (2001). Interpersonal influence and disordered eating behaviors in adolescent girls: The role of peer modeling, social reinforcement, and body-related teasing. *Eating Behavior*, 2(3), 215-236.
- Lin, W., Yang, H. C., Hang, C. M., & Pan, W. H. (2007). Nutrition knowledge, attitude, and behavior of Taiwanese elementary school children. *Asia Pacific Journal of Clinical Nutrition*, 16(Suppl 2), 534-546.

- Lloyd, L. J., Langley-Evans, S. C., & McMullen, S. (2010). Childhood obesity and adult cardiovascular disease risk: A systematic review. *International Journal Obesity London*, 34(1), 18-28.
- Lobstein, T., Baur, L., & Uauy, R. (2004). Obesity in children and young people: A crisis in public health. *Obesity Reviews*, 5(Suppl 1), 4-85.
- Lockyear, P. L. B. (2004). *Childhood eating behaviors: Developmental and socio-cultural considerations*. Retrieved from <http://www.medscape.com/viewarticle/467523>.
- Loke, K. Y. (2002). Consequences of childhood and adolescent obesity. *Asia Pacific Journal Clinical Nutrition*, 11(3), S702-S704.
- Lowe, C. F., Horne, P. J., Tapper, K., Bowdery, M., & Egerton, C. (2004). Effects of a peer modeling and rewards-based intervention to increase fruit and vegetable consumption in children. *European Journal of Clinical Nutrition*, 58(3), 510-522.
- Lucas, B. L., Feucht, S. A., & Ogata, B. N. (2012). Nutrition in childhood. In Y. Alexopoulos (Ed.), *Krauses's food & nutrition care process* (pp. 389-409). St. Louis: Clearance Center and the Copyright Licensing Agency.
- MacKay, S., Antonopoulos, N., Martin, J., & Swinburn, B. (2011). *A comprehensive approach to protecting children from unhealthy food advertising*. Melbourne: Obesity Policy Coalition.
- MacLellan, D., Taylor, J., & Wood, K. (2008). Food intake and academic performance among adolescents. *Canadian Journal of Dietetic Practice and Research*, 69(3), 141-144.
- Martinez, E. (2011). *Healthy eating for school-age children*. Retrieve from <http://www.livestrong.com/article/409018>
- Mayer, T. A., & Gast, L. (2008). The Effects of peer influence on disordered eating Behavior. *The Journal of School Nursing*, 24(1), 36-42.
- Meyer, J. (2006). Action research. In K. Gerrish, & A. Lacey (Eds), *The research process in nursing* (pp. 274-288). Oxford: Blackwell Publishing.

- Ming, M. F., Ying, G. C., & Kassim, S. Z. M. (2006). Eating patterns of school children and adolescent in Kuala Lumpur. *Malaysian Journal of Nutrition*, 12, 1-10.
- Ministry of Public Health. (2010). *Quality of life in Thai children*. Retrieved from <http://talkaboutsex.thaihealth.or.th/news/775>
- Monello, L. F., & Mayer, J. (1963). Obese adolescent girls: Unrecognized 'minority' group? *American Journal Clinical Nutrition*, 13, 35-49.
- Morse, J. M. (1994). Designing funded qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 220-235). Thousand Oaks, CA: Sage.
- Mubuuke, A. G., & Leibowitz, B. (2013). Participatory action research: The key to successful implementation of innovations in health professions education. *African Journal of Health Professions Education*, 5(1), 30-33.
- Nanthamongkolchai, S., Munsawaengsub, C., & Nanthamongkolchai, C. (2009). Influence of child rearing by grandparent on the development of children aged six to twelve years. *Journal of the Medicine Association of Thailand*, 92(3), 430-434.
- National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health . (2010). *Nutrition school health guidelines*. Retrieved from <http://www.cdc.gov/healthyyouth/nutrition/guidelines/summary>
- Neumark-Sztainer, D., Hannan, P. J., Story, M., Croll, J., & Perry, C. (2003). Family meal patterns: Association with socio-demographic characteristics and improved dietary intake among adolescents. *Journal of American Diet Association*, 103, 317-322.
- Newman, M. A. (1992). Prevailing paradigms in nursing. *Nursing Outlook*, 40(1), 10-32.
- Nicklas, T. A., Baranowski, T., Baranowski, J. C., Cullen, K., Rittenberry, L., & Olvera, N. (1995). Family and child-care provider influences on preschool children's fruit, juice, and vegetable consumption. *Nutrition Reviews*, 59(7), 224-235.

- Nicklaus, S., Boggio, V., Chabanet, C., & Issanchou, S. (2004). A prospective study of food preferences in childhood. *Food Quality Preferences*, 15(7-8), 805-818.
- Nix, S. (2013). *Williams' basic nutrition and diet therapy* (14th ed.). St. Louis: Elsevier Mosby.
- Nounmusig, V. (2007). *The contribution of breakfast to nutrient intakes of Thai school-age children: Case study in basic education commission (BEC) area*. Master's Thesis, Science Program in Nutrition, Faculty of Graduate Studies, Mahidol University.
- Nupath, V., Deorisres, W., & Wacharasin, C. (2014). Effect of a family therapeutic conversation program on family relationship, adolescents self-care behaviors and family care behaviors of adolescents with hyperventilation syndrome. *Journal of Faculty of Nursing Burapha University*, 22(1), 50-60.
- Nutrition Division, Department of Health, Ministry of Public Health. (2001). *Nutritive value of Thai foods*. Nonthaburi: Nutrition Division.
- O'Connor, Á. (2011). Promoting healthy eating and an active lifestyle in schoolchildren. *Nursing Standard*, 25(48), 48-56.
- O'Leary, Z. (2004). *The essential guide to doing research*. London: Sage.
- Øen, G., & Stormark, K. M. (2013). Participatory action research in the implementing process of evidence-based intervention to prevent childhood obesity: Project design of the "healthy future" study. *Journal of Obesity*, 27(2), 142-162.
- Ogden, C. L., Carroll, M. D., & Flegal, K. M. (2008). High body mass index for age among U. S. children and adolescents, 2003-2006. *JAMA*, 299(20), 2401-2405.
- Oldewage-Theron, W. H., & Egal, A. A. (2010). Nutrition knowledge and nutritional status of primary school children in QwaQwa. *South African Journal of Clinical Nutrition*, 23(3), 149-154.
- Paeratakul, S., Ferdinand, D. P., Champagne, C. M., Ryan, D. H., & Bray, G. A. (2003). Fast-food consumption among US adults and children: Dietary and nutrient intake profile. *Journal of the American Dietetic Association*, 103(10), 1332-1338.

- Paquette, D., & Ryan, J. (2001). *Bronfenbrenner's ecological systems theory*. Retrieved from http://www.cms-kids.com/providers/early_steps/training/documents/bronfenbrenners_ecological.pdf
- Paquette, M. C. (2005). Perceptions of healthy eating: State of knowledge and research gaps. *Canada Journal of Public Health*, 96(3), S15-19.
- Parkin, P. (2009). *Managing change in healthcare: Using action research*. London: Sage.
- Patrick, H., & Nicklas, T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition*, 24(2), 83-92.
- Pearson, N., Biddle, S. J. H., & Gorely, T. (2008). Family correlates of fruit and vegetable consumption in children and adolescents: A systematic review. *Public Health Nutrition*, 12(2), 267-283.
- Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2006). *Health promotion in nursing practice* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Perez-Rodrigo, C., Ribas, L., Serra-Majem, L., & Aranceta, J. (2003). Food preferences of Spanish children and young people: The enKid study. *European Journal of Clinical Nutrition*, 57(Suppl.), S45-48.
- Pinsaimoon, S., & Banchonhattakit, P. (2009). The effects of behavioral modification on exercise and appropriate food consumption among overweight primary school students, Muang District, Uttaradit Province. *Journal for Public Health Research*, 2, 10-22.
- Pirouznia, M. (2001). The influence of nutrition knowledge on eating behavior-the role of grade level. *Nutrition and Food Science*, 31(2), 62-66.
- Plengkatoke, S. (2011). *The relationship between selected factors and the power in practicing of the consumption behaviors for health and nutritional status of youth in secondary school in Ampur Maung, Khon Kaen province*. Master's thesis, Child Health Nursing, Graduate School, Khon Kaen University.

- Plengkratoke, S., & Sauwamas, T. (2012). The relationship between selected factors and the power in practicing of the consumption behaviors for health and nutritional status of youth in secondary school Ampur Maung, Khon Kaen province. *Journal of Nurses Association of Thailand North-Eastern Division*, 30(2), 2012.
- Polit, D. F., & Beck, C. T. (2004). Assessing data quality. In D. F. Polit, & C. T. Beck (Eds.), *Nursing research-principals and methods* (pp. 413-447). Philadelphia PA: Lippincott Williams & Williams.
- Pollitt, E., & Matthews, R. (1998). Breakfast and cognition: An integrative summary. *American Journal of Clinical Nutrition*, 67(suppl.), 804S-813S.
- Powell, L., Szczypka, G., & Chaloupka, F. (2007). Adolescent exposure to food 15. Advertising on television. *American Journal of Preventive Medicine*, 33(4S), S251-S256.
- Praphaiphin, P. (2007). The effective of nutritional promoting program using game on food consumption behavior of school-age children. *Journal of Nursing Science Chulalongkorn University*, 19(2), 1-16.
- Primary Care Unit of Kosumpisai Hospital. (2011). *Health school children monitoring report in 2010-2011*. Mahasarakham: Primary Care Unit of Kosumpisai Hospital, Mahasarakham province, Thailand.
- Primary Care Unit of Kosumpisai Hospital. (2013). *Health school children monitoring report in 2013*. Mahasarakham: Primary Care Unit of Kosumpisai Hospital, Mahasarakham province, Thailand.
- Puder, J. J., & Munsch, S. (2010). Psychological correlates of childhood obesity. *International Journal Obesity London*, 34(Suppl 2), S37-43.
- Punnarong, S., & Boonyasana, P. (2011). An enhancement of a chance in consumption behavior of school-children. *Journal of Srinakharinwirot Research and Development*, 3(5), 159-171.
- Raˆsaˆnen, M., Niinikoski, H., Keskinen, S., Helenius, H., Talvia, S., Ronnemaˆ, T., Vikari, J., & Simell, O. (2003). Parental nutrition knowledge and nutrient intake in an atherosclerosis prevention project: The impact of child-targeted nutrition counseling. *Appetite*, 41, 69-77.

- Racher, F. E., & Robinson, S. (2002). Are phenomenology and postpositivism strange bedfellows? *Western Journal of Nursing Research*, 25(5), 464-481.
- Rattanaagreethakul, S., Lapvongwatana, P., Thiangtham, W., Sunsern, R., & McMullen, P. C. (2010). Development of a model of family management for overweight prevention in urban Thai preschoolers. *Pacific Rim International Journal of Nursing Research*, 14(1), 45-60.
- Redmond, B. F. (2010). *Self-efficacy theory: Do I think that I can succeed in my work? attitudes and motivation*. Pennsylvania: The Pennsylvania State University, World Campus.
- Reinehr, T., Kersting, D. M., Chahda, D., Wollenhaupt, A., & Andler, W. (2001). Nutritional knowledge of obese and nonobese children. *Journal of Pediatric Gastroenterology & Nutrition*, 33(3), 351.
- Richardson, S. A., Goodman, N., Hastorf, A. H., & Dornbusch, S. M. (1961). Cultural uniformity in reaction to physical disabilities. *American Sociological Review*, 26, 241-247.
- Ritchie, L. D., Welk, G., Styne, D., Gerstein, D. E., & Crawford, P. B. (2005). Family environment and pediatric overweight: What is a parent to do? *Journal of American Diet Association*, 105(5 Suppl 1), S70-79.
- Robert, M., & Pettigrew, S. (2010). The influence of grandparents on children's diets. *Journal of Research for Consumers*, 18, 1-8.
- Roefs, A., & Jansen, A. (2002). Implicit and explicit attitudes toward high-fat foods in obesity. *Journal of Abnormal Psychology*, 111(3), 517-521.
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and health belief model. *Health Education Quarterly*, 15(2), 175-183.
- Rozin, P. (1996). The socio-cultural context of eating and food choice. In H. L. Meiselman, & H. H. MacFie (Eds.), *Food choice, acceptance, and consumption* (pp. 83-104). New York: Blakie Academic & Professional.
- Saksvig, B. I., Gittelsohn, J., Harris, S. B., Hanley, A. J., Valente, T. W., & Zinman, B. (2005). A pilot school-based healthy eating and physical activity intervention improves diet, food knowledge, and self-efficacy for native Canadian children. *Journal of Nutrition*, 135(10), 2392-2398.

- Sardesai, V. (2012). *Introduction to clinical nutrition* (3rd ed.). Boca Raton: Taylor & Francis Group.
- Sargent, J. D., & Blanchflower, D. G. (1994). Obesity and stature in adolescence and earnings in young adulthood: Analysis of a British birth cohort. *Archives of Pediatrics & Adolescent Medicine*, 148, 681-687.
- Savage, J. S., Fisher, J. O., & Birch, L. L. (2007). Parental influence on eating behavior: Conception to Adolescence. *Journal of Law, Medicine & Ethics*, 35(1), 22-34.
- Schlenker, E. D., & Roth, S. L. (2011). *William's essentials of nutrition and diet therapy* (10th ed.). St. Louis: Elsevier Mosby.
- Shadish, W. R., Cook, T. D., & Camble, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.
- Shahid, B. (2003). A study of school principals and the promotion of nutritional health in middle grade schools. *ProQuest Research Library*, 123(3), 552-569.
- Shepherd, J., Harden, A., Rees, R., Brunton, G., Garcia, J., Oliver, S., & Oakley, A. (2006). Young people and healthy eating: A systematic review of research on barriers and facilitators. *Health Education Research*, 21(2), 239-257.
- Shimai, S., Kawabata, T., Nishioka, N., & Haruki, T. (2000). Snacking behavior among elementary and junior high school students and its relationship to stress-coping. *Japan Journal Public Health*, 47, 8-19.
- Silveira, J. A. C., Taddei, J. A. A. C., Guerra, P. H., & Nobre, M. R. C. (2011). Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: A systematic review. *Journal de Pediatria*, 87(5), 382-392.
- Siriarunrat S, Lapvongwatana P, Powwattana A, & Leerapan P. (2010). Development of a model for parent-adolescent daughter communication about sexuality. *Southeast Asian Journal of Tropical Medicine and Public Health*, 41, 961-72.
- Sirichakwal, P. P., & Sranachareoenpong, K. (2008). Practical experience in development and promotion of food-based dietary guidelines in Thailand. *Asian Pacific Journal Clinical Nutrition*, 17(S1), 63-65.

- Slusser, W., Prelip, M., Kinsler, J., Erausquin, J. T., Thai, C., & Neumann, C. (2011). Challenges to parent nutrition education: A qualitative study of parents of urban children attending low-income schools. *Public Health Nutrition*, 14(10), 1833-1841.
- Sluzki, C. E. (1992). Transformations: A blueprint for narrative changes in therapy [Electronic version]. *Family Process*, 31(3), 217-230.
- Smith, A., Kellett, E., & Schmerlaib, Y. (1998). *The Australian guide to healthy eating: Background information for nutrition educators*. Canberra: Department of Health and Ageing.
- Speziale, S. (2002). Action research. In H. J. Streubert, & D. R. Carpenter (Eds.), *Qualitative research in nursing: Advancing the humanistic imperative* (3rd ed., pp. 253-268). Philadelphia: Lippincott.
- Sprenkle, D. H., & Piercy, F. P. (2005). *Research methods in family therapy* (2nd ed.). New York: The Guilford Press.
- Story, M., & French, S. (2004). Food advertising and marketing directed at children and adolescents in the US. *International Journal of Behavioral Nutrition and Physical Activity*, 1, 1-17.
- Story, M., Neumark-Sztainer, D., & French, S. (2002) Individual and environmental influences on adolescent eating behaviours. *Journal of the American Dietetic Association*, 102, S40-S51.
- Stringer, E. (1999). *Action research* (2nd ed.). London: Sage.
- Stunkard, A., & Burt, V. (1967). Obesity and the body image, II: Age at onset of disturbance in the body image. *American Journal Psychiatry*, 123, 1443-1447.
- Sukaranandana, K. (2005). *The application of health belief model and social support on food consumption behavior changing of primary school students Muang district, Khonkaen province*. Master's thesis, Health Education and Health Promotion, Graduate School, Khon Kaen University.
- Svavarsdottir, E. K., & Sigurdardottir, A. O. (2013). Benefit of a belief therapeutic conversation intervention for families of children and adolescents in active cancer treatment. *Oncology Nursing Forum*, 40(5), E346-E357.

- Tanner, J.M. (1990). *Fetus into man physical growth from conception to maturity, revised edition*. Cambridge, MA: Harvard University Press.
- Taylor, C., Wilkie, M., & Baser, J. (2006). *Doing action research a guide for school support staff*. London: Paul Chapman Publishing.
- Taylor, J. P., Evers, S., & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal Research*, 96, S20-S26.
- Teerarungsikul, N., Phuphaibul, R., Loveland-Cherry, C. J., Pookboonmee, R., Kijboonchoo, K., & Nityasuddhi, D. (2009). Effectiveness of a physical activity promotion program on perceived self-efficacy, physical activity and physical fitness among Thai adolescent girls. *Thai Journal Nursing Research*, 13(2), 81-94.
- Tessmer, K. A. (2002). *Nutrition for children and teenagers*. Retrieved from <http://life.familyeducation.com/nutrition-and-diet/growth-anddevelopment/44301>
- Thailand Research Fund. (2010). *Obese children in Thailand*. Retrieved from http://www.trt.or.th/index.php?option=com_content&view=article
- Thiangtham, W., Powwattana, A., Lagampan, S., & Maneedang, P. (2009). The effectiveness of dietary and exercise behavior development program for overweight students in Bangkok area. *Journal of Public Health*, 39(3), 245-257.
- Thomas, J., Sutcliffe, K., Haden, A., Olakley, A., Oliver, S., Rees, R., Brunton, G., & Kavanagh, J. (2003). *Children and healthy eating: A systematic review of barriers and facilitators*. London: EPPI-Centre.
- Tibbs, T., Haire-Joshu, D., & Schechtman, K. B. (2001). The relationship between parental modeling, eating patterns, and dietary intake among African-American parents. *Journal American Diet Association*, 101(5), 535-541.
- Triches, R. M., & Giugliani, E. R. J. (2005). Obesity, eating habits and nutritional knowledge among school children. *Revista de Saúde Pública*, 39(4), 1-7.
- Tudge, J. R. H., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Use and misuses of Bronfenbrenner's biological theory of human development. *Journal of Family Theory & Review*, 1(4), 198-210.

- Tudge, J. R. H., Otero, D. A., Hogan, D. M., & Etz, K. E. (2003). Relations between the everyday activities of preschoolers and their teachers' perceptions of their competence in the first years of school. *Early Childhood Research Quarterly, 18*, 42-64.
- U. S. Department of Health and Human Services, Substance Abuse & Mental Health Service Administration. (2013). *Good talking, good listening obesity and unhealthy eating*. Retrieve from http://bblocks.samhsa.gov/family/talkingListening/childhood_obesity.aspx
- U. S. Department of Health and Health Services. (2011). *New dietary guidelines to help Americans make healthier food choices and confront obesity epidemic*. Retrieved from <http://www.hhs.gov/news/press/2011pres/01/20110131a.html>
- U. S. Department of Health and Human Service. (2001). *The surgeon general's call to action to prevent and decrease overweight and obesity*. Retrieved from <http://www.surgeongeneral.gov/library/calls/obesity/index.html>
- U. S. Department of Health and Human Services, Substance Abuse & Mental Health Service Administration. (2012). *Obesity and unhealthy eating*. Retrieved from http://bblocks.samhsa.gov/family/talkingListening/childhood_obesity.aspx
- UK Net Guide. (2010). *Healthy eating for children*. Retrieved from http://www.uknetguide.co.uk/Lifestyle_and_Leisure/Article/Healthy_Eating_for_Children-100214.html
- Upton, D., Upton, P., & Taylor, C. (2012). Fruit and vegetable intake of primary school children: A study of school meals. *Journal of Human Nutrition and Dietetic, 25*(6), 557-562.
- Van Cauwenberghe, E., Maes, L., Spittaels, H., van Lenthe, F. J., Brug, J., Oppert, J. M., & De Bourdeaudhuij, I. (2010). Effectiveness of school-based interventions in Europe to promote healthy nutrition in children and adolescents: Systematic review of published and 'grey' literature. *British Journal of Nutrition, 103*(6), 781-797.

- Vanelli, M., Iovane, B., Bernardini, A., Chiari, G., Errio, M. K., Gelmetti, C., Corchia, M., Ruggerini, A., Volta, E., & Rossetti, S. (2005). Breakfast habits of 1, 202 Northern Italian children admitted to a summer sport school. Breakfast skipping is associated with overweight and obesity. *Acta Biomed*, 76, 79-85.
- Variyam, J. N. (2001). Overweight children: Is parental nutrition knowledge a factor? *Food Review*, 24(2), 18-22.
- Vartanian, L. R., Schwartz, M. B., & Brownell, K. D. (2007). Effects of soft drink consumption on nutrition and health: A systematic review and meta-analysis. *American Journal of Public Health*, 97(4), 667-675.
- Vereecken, C. A, Todd, J., Roberts, C., Mulvihill, C., & Maes, L. (2005). Television viewing behaviour and associations with food habits in different countries. *Public Health Nutrition*, 9(2), 244-250.
- Veselá, J., & Grebeňová, S. (2010). The influence of psychological and social aspects on the eating habits of primary school children. *School and Health*, 21, 271-284.
- Wacharasin, C. (2007). *Theoretical foundations for advanced family nursing*. Chonburi: Printing House.
- Wacharasin, C., Phaktoop, M., & Sananreangsak, S. (2015). Examining the usefulness of a family empowerment program guided by the illness beliefs model for families caring for a child with Thalassemia. *Journal of Family Nursing*, 21(2), 295-321.
- Wadsworth, M. (1992). *The imprint of time: Childhood, history and adult life*. Oxford: Clarendon Press.
- Wang, F, & Veugelers, P. J. (2008). Self-esteem and cognitive development in the era of the childhood obesity epidemic. *Obesity Reviews*, 9(6), 615-623.
- Wardlaw, G. M., & Smith, A. M. (2009). *Contemporary nutrition*. New York: McGraw-Hill.
- Wardle, J., Herrera, M. L., Cooke, L., & Gibson, E. L. (2003). Modifying children's food preferences: The effects of exposure and reward on acceptance of an unfamiliar vegetable. *European Journal of Clinical Nutrition*, 57, 341-48.

- Waterman, H., Tillen, D., Dickson., R., & de Koning, K. (2001). Action research: A systemic review and guidance for assessment. *Health Technology Assessment*, 5(23), 1-166.
- Whitney, E., & Rolfes, S. R. (2008). *Understanding nutrition* (7th ed.). Belmont, CA: Thomson Learning.
- Williams, S. R. (1994). *Essentials of nutrition and diet therapy*. St. Louis: Mosby-Year Book.
- Willson, N. C., Parnell, W. R., Wohlers, M., & Shirley, P. M. (2006). Eating breakfast and its impact on children's daily. *Nutrition & Dietetics*, 63, 15.
- Win, S. S. C. (2009). *Factors affecting eating behavior of Thai high school students in Muang District, Surin Province, Thailand*. Master's thesis, Science in Biostatistics, Faculty of Graduate Studies, Mahidol University.
- Wiseman, G. (2002). *Nutrition and health*. New York: Great Britain by MPG Books, Bodmin.
- Working Group on Food-Based Dietary Guidelines for Thai People, Nutrition Division, Department of Health, Ministry of Public Health. (2001). *Manual nutrition flag eating for Thais*. Nonthaburi: Nutrition Division, Department of Health, Ministry of Public Health.
- World Health Organization [WHO]. (1998). *Healthy nutrition an essential element of a health-promoting school*. Geneva: World Health Organization.
- World Health Organization [WHO]. (2000). *Obesity: Preventing and managing the global epidemic: Report of a WHO consultation on obesity*. Geneva: World Health Organization.
- World Health Organization [WHO]. (2003). *Promoting fruit and vegetable consumption around the world*. Retrieved from <http://www.who.int/dietphysicalactivity/fruit/en/index2.html>
- World Health Organization [WHO]. (2006). *What is the evidence on school health in improving health or preventing diseases and specifically, what is the effectiveness of the health promoting school approach?* Geneva: World Health Organization.
- World Health Organization [WHO]. (2011). *Diet health topic*. Retrieved from <http://www.who.int/topics/diet/en/>

- Worsley, A., & Crawford, D. (2004). *Children's healthy eating: What works*. Melbourne: Victorian Government Department of Human Services.
- Xie, B., Gilliland, F. D., Li, Y. F., & Rockett, H. R. H (2003). Effects of ethnicity, family income, and education on dietary intake among adolescents. *Preventive Medicine*, 36, 30-40.
- Yamane, T. (1973). *Statistics, an introductory analysis* (2nd ed.). New York: Haper and Row.
- Yang, S. J., Kim, J. M., & Yoon, J. S. (2010). Disturbed Eating Attitudes and Behaviors in South Korean boys and girls: A school-based cross-sectional study. *Yonsei Medicine Journal*, 51(3), 302-309.
- Youngiam, W., Pavadhgul, P., Pradipasen, M., & Imamee, N. (2013). Promoting fruit and vegetable intake through the application of social cognitive theory among 4th grade students in Phrompiran District, Phitsanulok province. *Journal Public Health*, 43(2), 126-137.
- Zeinstra, G. G., Koelen, M. A., Kok, F. J., & Graaf, C. D. (2007). Cognitive development and children's perceptions' of fruit and vegetables: A qualitative study. *International Journal of Behavioral Nutrition and Physical Activity*, 4(30), 1186-1479.
- Zeller, M., & Daniels, S. (2004). The obesity epidemic: Family matters. *The Journal of Pediatrics*, 145, 3-5.
- Zenzen, W., & Kridli, S. (2009). Integrative review of school-based childhood obesity prevention programs. *Journal of Pediatric Health Care*, 23(4), 243-258.
- Zive, M. M., Pelletier, R. L., Sallis, J. F., & Elder, J. P. (2002). An environmental intervention to improve a la carte foods at middle schools. *Journal of the American Dental Association*, 102, S76-S78.

APPENDICES

APPENDIX A
Questionnaires (in Thai)

ส่วนที่ 1 ข้อมูลส่วนบุคคล

คำชี้แจง ให้นักเรียนตอบคำถามต่อไปนี้โดยทำเครื่องหมาย ✓ ลงใน ☐ หน้าข้อความ หรือเติมลงในช่องว่างให้สมบูรณ์

1. นักเรียนชั้น.....
2. เพศ ☐ 1. ชาย ☐ 2. หญิง
3. อายุ.....ปี วัน เดือน ปี ที่เกิด.....
4. ปัจจุบันมีน้ำหนักตัว.....กิโลกรัม (ซึ่งวันที่.....)
มีส่วนสูง.....เซนติเมตร (วัดวันที่.....)
5. ปัจจุบันอาศัยอยู่กับใคร.....
6. จำนวนสมาชิกทั้งหมดในบ้าน..... คน
7. นักเรียนมีพี่น้องทั้งหมด.....คน (รวมนักเรียนด้วย)
8. นักเรียนเป็นบุตรคนที่.....
9. นักเรียนได้รับเงินมาโรงเรียนวันละ.....บาท นักเรียนใช้เงินเป็นค่าอาหาร.....บาท
นักเรียนใช้เงินเป็นค่าขนม.....บาท
10. ในช่วง 1 สัปดาห์ที่ผ่านมา นักเรียนนำเงินที่ได้รับในแต่ละวันไปซื้ออาหารอะไรบ้างมา
รับประทาน
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ส่วนที่ 2 ความรู้เกี่ยวกับอาหารเพื่อสุขภาพและการบริโภคอาหารเพื่อสุขภาพ

คำชี้แจง ให้นักเรียนใส่เครื่องหมาย ✓ ลงในช่องว่างที่นักเรียนคิดว่าเป็นคำตอบที่ตรงกับความคิด
ของนักเรียนมากที่สุด

ข้อความ	ถูก (1)	ผิด (0)
1. ผัก และผลไม้ ให้สารอาหารประเภทกากใยอาหารสูงแก่ร่างกาย		
2. ขนมขบเคี้ยว เช่น มันฝรั่ง ข้าวเกรียบ มีประโยชน์ต่อร่างกาย สามารถที่จะ รับประทานแทนอาหารหลักในแต่ละมื้อได้		
.....		
.....		
5. ไข่ และปลา ให้สารอาหารประเภทโปรตีนที่ดีแก่ร่างกาย		
6. อาหารประเภทหนึ่ง ลวก อบ ให้ไขมันแก่ร่างกายน้อยกว่าอาหารประเภทผัด และทอด		
.....		
.....		
9. การรับประทานอาหารเช้าทุกวัน จะช่วยให้ป้องกันภาวะอ้วนได้		
10. บะหมี่สำเร็จรูปให้สารอาหารครบถ้วนตามความต้องการของร่างกาย		
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.....		
15. การรับประทานสารอาหารไขมันที่ได้จากสัตว์ปริมาณที่สูงจะทำให้เสี่ยงต่อ การเป็นโรคอ้วนและมะเร็งได้		
16. การรับประทานอาหารเช้าครบ 3 มื้อใน 1 วัน จะช่วยส่งเสริมการเจริญเติบโต		

ส่วนที่ 3 ความเชื่อเกี่ยวกับการบริโภคอาหารเพื่อสุขภาพ

คำชี้แจง ให้นักเรียนใส่เครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความคิดเห็นของนักเรียนมากที่สุด โดยใช้เกณฑ์เลือกตอบดังนี้

เห็นด้วย หมายถึง นักเรียนมีความคิดเห็นตรงกับข้อความนั้นมากที่สุด

ไม่แน่ใจ หมายถึง นักเรียนยังบอกไม่ได้ว่าเห็นด้วยหรือไม่เห็นด้วยกับข้อความนั้น

ไม่เห็นด้วย หมายถึง นักเรียนมีความคิดเห็นไม่ตรงกับข้อความนั้นเลย

ข้อความ	เห็น ด้วย (3)	ไม่ แน่ใจ (2)	ไม่เห็น ด้วย (1)
1. ฉันเชื่อว่าการรับประทานอาหารประเภทผัด ทอด เป็นประจำจะทำให้เสี่ยงต่อการมีน้ำหนักเกิน			
2. ฉันเชื่อว่าการงดรับประทานอาหารมื้อเช้า ทำให้เสี่ยงต่อการเกิดภาวะอ้วนได้			
.....			
.....			
5. ฉันเชื่อว่าการกินพืชช้า แสมเบอเกอร์ ไข่ทอดเป็นประจำทุกวันจะทำให้เกิดโรคอ้วน และไขมันในหลอดเลือดสูงได้			
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10. เมื่อเพื่อนสนิทหรือพ่อ แม่ของฉันแนะนำข้อดีของการบริโภคอาหารเพื่อสุขภาพ ทำให้เข้าใจ และรู้สึกอยากปฏิบัติตามมากขึ้น			

ส่วนที่ 4 การรับรู้ความสามารถของตนเองในการบริโภคอาหารเพื่อสุขภาพ

คำชี้แจง ให้นักเรียนใส่เครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความคิดเห็นของนักเรียนมากที่สุด

โดยใช้เกณฑ์ในการเลือกตอบดังนี้

มั่นใจ หมายถึง นักเรียนมีความคิดเห็นตรงกับข้อความนั้นมากที่สุด

ไม่แน่ใจ หมายถึง นักเรียนยังบอกไม่ได้ว่าเห็นด้วยหรือไม่เห็นด้วยกับข้อความนั้น

ไม่มั่นใจ หมายถึง นักเรียนมีความคิดเห็นไม่ตรงกับข้อความนั้นเลย

ข้อความ	มั่นใจ (3)	ไม่ แน่ใจ (2)	ไม่ มั่นใจ (1)
1. ฉันมั่นใจว่าสามารถรับประทานอาหาร หลากหลายชนิดในแต่ละหมู่ได้ครบ 5 หมู่ทุกวัน			
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.....			
4. ฉันมั่นใจว่าสามารถรับประทานอาหารเข้าได้ทุกวัน			
5. ฉันมั่นใจว่าฉันสามารถรับประทานอาหารครบ 3 มื้อได้ทุกวัน			
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10. ฉันมั่นใจว่าสามารถหลีกเลี่ยงการรับประทานของหวานและ ขนมที่มีน้ำตาลมาก เช่น เค้ก โดนัท เป็นต้นได้			

ส่วนที่ 5 พฤติกรรมการบริโภคอาหารเพื่อสุขภาพ

คำชี้แจง ให้นักเรียนใส่เครื่องหมาย ✓ ลงในช่องว่างที่ตรงกับความเป็นจริงของนักเรียนว่าใน 1 สัปดาห์ที่ผ่านมา นักเรียนรับประทานอาหารต่อไปนี้บ่อยเพียงใด โดยใช้เกณฑ์ในการเลือกตอบดังนี้

- เป็นประจำ หมายถึง นักเรียนมีการปฏิบัติสัปดาห์ละ 6-7 วัน
(อย่างน้อย 1 ครั้งต่อวัน)
- เป็นบางวัน หมายถึง นักเรียนมีการปฏิบัติสัปดาห์ละ 3-5 วัน
(อย่างน้อย 1 ครั้งต่อวัน)
- นาน ๆ ครั้งหรือไม่เคย หมายถึง นักเรียนไม่ได้ปฏิบัติ หรือมีการปฏิบัติสัปดาห์ละไม่เกิน 2 วัน (อย่างน้อย 1 ครั้งต่อวัน)

ข้อความ	นาน ๆ ครั้งหรือ ไม่เคยเลย (1)	เป็น บางวัน (2)	เป็น ประจำ (3)
1. รับประทานอาหารเช้าครบ 5 หมู่ แต่ละหมู่ให้หลากหลาย ใน 1 วัน			
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.....			
.....			
.....			
6. หลีกเลี่ยงการรับประทานขนมปังที่มีรสหวาน เช่น โดนัท คุกกี้ เค้ก เครป คุกกี้ โดเกีย			
7. หลีกเลี่ยงการรับประทาน เช่น ไอศกรีม ช็อคโกแลต ลูกกวาด/ลูกอม น้ำแข็งไสราดน้ำหวาน			
.....			
.....			
10. หลีกเลี่ยงการรับประทานขนมกรุบกรอบ ขบเคี้ยว เช่น มันฝรั่งทอด ข้าวเกรียบ			

ส่วนที่ 6 การเข้าถึงแหล่งอาหารเพื่อสุขภาพที่บ้านและที่โรงเรียน

คำชี้แจง ให้นักเรียนตอบคำถามต่อไปนี้ โดยเขียนตอบลงไปในช่วงว่างที่เว้นไว้

1. ใน 1 สัปดาห์ที่ผ่านมาประเภทอาหารที่พ่อ แม่ หรือผู้ดูแล จัดหาไว้รับประทานที่บ้าน

ประเภทอาหารที่พ่อ แม่ หรือผู้ดูแลจัดไว้ให้ที่บ้าน		
เป็นประจำ 6-7 วันต่อสัปดาห์	บางครั้ง 3-5 วันต่อสัปดาห์	ไม่เคยหรือนานๆครั้งไม่เกิน 2 วันต่อสัปดาห์

2. ใน 1 สัปดาห์ที่ผ่านมาเมนูอาหารที่โรงเรียนจัดไว้ให้นักเรียนรับประทานที่โรงเรียน

เมนูอาหารที่โรงเรียนจัดไว้ให้ที่โรงเรียน		
เป็นประจำ 6-7 วันต่อสัปดาห์	บางครั้ง 3-5 วันต่อสัปดาห์	ไม่เคยหรือนานๆครั้งไม่เกิน 2 วันต่อสัปดาห์

3. นักเรียนชอบรับประทานอาหารที่พ่อ แม่ หรือผู้ดูแล จัดหาไว้ให้หรือไม่ (ประเภทที่ชอบ และประเภทที่ไม่ชอบมีอะไรบ้าง) เพราะอะไรถึงคิดอย่างนั้น

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4. นักเรียนชอบรับประทานอาหารที่โรงเรียน จัดหาไว้ให้หรือไม่ (ประเภทที่ชอบ และประเภทที่ไม่ชอบมีอะไรบ้าง) เพราะอะไรถึงคิดอย่างนั้น

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APPENDIX B

The in-depth interview guidelines, focus group discussion guidelines, and
observation guidelines (in Thai)

แนวคำถามในการสัมภาษณ์เชิงลึกสำหรับเด็กวัยเรียนที่มีภาวะอ้วน

**การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ
สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม**

1. ในวันปกติที่ไปโรงเรียน นักเรียนรับประทานอาหารเช้าอะไรบ้าง อย่างไร
2. ในวันเสาร์-อาทิตย์ นักเรียนรับประทานอาหารเช้าอะไรบ้าง อย่างไร
3. นักเรียนคิดว่าอะไรบ้างที่ทำให้นักเรียนรับประทานอาหารเพื่อสุขภาพได้มากขึ้น
4.
5.

แนวคำถามในการสัมภาษณ์เชิงลึกพ่อ แม่ หรือผู้ดูแล

**การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ
สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม**

1. ท่านคิดว่าได้จัดอาหารเพื่อสุขภาพให้ลูก/ หลานท่านหรือไม่ และลูก/ หลานท่านได้รับประทานอาหารเพื่อสุขภาพที่ท่านจัดหรือไม่ อย่างไร
2.
3.

แนวคำถามในการสัมภาษณ์เชิงลึกครูในโรงเรียน

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ
สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. ท่านคิดว่าอะไรบ้างที่มีผลต่อพฤติกรรมการบริโภคอาหารเพื่อสุขภาพของเด็กวัยเรียนที่มีภาวะอ้วน
2.

แนวคำถามในการสัมภาษณ์เชิงลึกพยาบาล

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ
สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. ท่านคิดว่าอะไรบ้างที่มีผลต่อพฤติกรรมการบริโภคอาหารเพื่อสุขภาพของเด็กวัยเรียนที่มีภาวะอ้วน
2.

แนวคำถามในการสนทนากลุ่มกับเด็กวัยเรียนที่มีภาวะอ้วน

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. นักเรียนรู้สึกอย่างไรเมื่อได้เข้ามามีส่วนร่วมในกระบวนการส่งเสริมการรับประทานอาหารที่ดีต่อสุขภาพของเด็กวัยเรียนที่มีภาวะอ้วน
2.
3.
4. หากมีการจัดกิจกรรมแบบนี้อีก นักเรียนคิดว่าอยากให้เพิ่มหรือปรับปรุงอะไร

แนวคำถามในการสนทนากลุ่มพ่อ แม่ หรือผู้ดูแล

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. ท่านรู้สึกอย่างไรเมื่อได้เข้ามามีส่วนร่วมในกระบวนการส่งเสริมการรับประทานอาหารที่ดีต่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน
2.
3.
4. หากมีการจัดกิจกรรมแบบนี้อีก ท่านคิดว่าอยากให้เพิ่มหรือปรับปรุงอะไร

แนวคำถามในการสนทนากลุ่มครูในโรงเรียน

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. ท่านรู้สึกอย่างไรเมื่อได้เข้ามามีส่วนร่วมในกระบวนการส่งเสริมพฤติกรรมการกินอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน
2.
3. ท่านได้เรียนรู้อะไรบ้างจากการเข้าร่วมพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพสำหรับเด็กที่มีภาวะอ้วน
4.

แนวคำถามในการสนทนากลุ่มพยาบาล

การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม

1. ท่านรู้สึกอย่างไรเมื่อได้เข้ามามีส่วนร่วมในกระบวนการส่งเสริมพฤติกรรมการกินอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน
2.
3. ท่านได้เรียนรู้อะไรบ้างจากการเข้าร่วมพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพสำหรับเด็กที่มีภาวะอ้วน
4.

แบบสังเกตอาหารและพฤติกรรมการบริโภคอาหารเพื่อสุขภาพของเด็กวัยเรียน

**การวิจัยเรื่อง การพัฒนารูปแบบการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ
สำหรับเด็กวัยเรียนที่มีภาวะอ้วนในจังหวัดมหาสารคาม**

1. แบบสังเกตอาหารที่มีอยู่ในโรงเรียน และการบริโภคอาหารของเด็กวัยเรียน จันทร - สุกร

วันที่สังเกต	ช่วงเวลา	ชนิด/ ประเภทอาหารที่พบ	อาหารที่เด็กวัยเรียน ชอบรับประทาน
จันทร	ก่อนเข้าโรงเรียน เวลา.....ถึง.....		
	กลางวัน เวลา.....ถึง.....		
	หลังเข้าโรงเรียน เวลา.....ถึง.....		
อังคาร	ก่อนเข้าโรงเรียน เวลา.....ถึง.....		
	กลางวัน เวลา.....ถึง.....		
	หลังเข้าโรงเรียน เวลา.....ถึง.....		
พุธ	ก่อนเข้าโรงเรียน เวลา.....ถึง.....		
	กลางวัน เวลา.....ถึง.....		
	หลังเข้าโรงเรียน เวลา.....ถึง.....		
พฤหัสบดี	ก่อนเข้าโรงเรียน เวลา.....ถึง.....		
	กลางวัน เวลา.....ถึง.....		
	หลังเข้าโรงเรียน เวลา.....ถึง.....		

2. แบบสังเกตอาหารที่มีอยู่ในร้านค้าบริเวณรอบ ๆ โรงเรียน

วัน/ เดือน/ ปี	ช่วงเวลา	ชนิด/ ประเภทอาหารที่พบ	อาหารที่เด็กวัยเรียน ชอบรับประทาน

ประเด็นสำคัญ/ ข้อสังเกตที่พบ

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3. แบบสังเกตอาหารที่มีอยู่ในร้านค้าหรือตลาดในชุมชนในระยะที่ห่างจากโรงเรียนไม่เกิน 2 กิโลเมตร

วัน/ เดือน/ ปี	สถานที่สังเกต	ช่วงเวลา	ชนิด/ ประเภทอาหารที่พบ

ประเด็นสำคัญ/ ข้อสังเกตที่พบ

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APPENDIX C

Interventions

แผนกิจกรรมการส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กวัยเรียนที่มีภาวะอ้วน

สำหรับกลุ่มเด็กวัยเรียนที่มีภาวะอ้วน และพ่อ แม่ หรือผู้ดูแล

สัปดาห์ที่ 1 ที่โรงเรียน ใช้เวลา 60 นาที

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
วัตถุประสงค์ เพื่อให้เด็กวัยเรียนที่มีภาวะอ้วน และ พ่อ แม่หรือผู้ดูแลตระหนักถึง ความสำคัญ และสามารถปฏิบัติเพื่อ ส่งเสริมพฤติกรรมกรรมการบริโภคอาหาร เพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะ อ้วนได้ ยุทธศาสตร์ เสริมสร้างให้เด็กวัยเรียนที่มีภาวะ อ้วน และพ่อ แม่ หรือผู้ดูแลตระหนักถึง ความสำคัญ และพัฒนาศักยภาพของ ตนเองเพื่อส่งเสริมพฤติกรรมการ บริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัย เรียนที่มีภาวะอ้วนโดยการประยุกต์ใช้ แนวคิดความเชื่อเกี่ยวกับการเจ็บป่วย (Health Belief Model)	1. เพื่อสร้างสัมพันธภาพ ระหว่างผู้วิจัยกับกลุ่มเด็ก วัยเรียนที่มีภาวะอ้วน และ กลุ่มพ่อ แม่หรือผู้ดูแล 2. เพื่อให้รับรู้และเข้าใจถึง ผลดีของพฤติกรรมกรรมการ บริโภคเพื่อสุขภาพ และ ผลเสียของพฤติกรรมการ บริโภคอาหารที่ไม่ดีต่อ สุขภาพของเด็กวัยเรียนที่มี ภาวะอ้วน	1. เด็กวัยเรียนที่มี ภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล	ขั้นตอนที่ 1 การรับรู้ และเข้าใจถึงผลดี และผลเสียเกี่ยวกับการปฏิบัติ และไม่ ปฏิบัติเพื่อส่งเสริมพฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพในเด็กวัยเรียนที่ มีภาวะอ้วน กิจกรรมที่ 1 แลกเปลี่ยนข้อมูล และประสบการณ์ 1. สร้างสัมพันธภาพระหว่างผู้วิจัยกับกลุ่มเด็กวัยเรียนที่มีภาวะอ้วน และ กลุ่มพ่อ แม่หรือผู้ดูแล โดยการกล่าวทักทาย แนะนำตัว ร่วมกับการเล่นเกม ทำความรู้จักกัน 2. ให้สมาชิกแต่ละกลุ่มได้แลกเปลี่ยนเกี่ยวกับผลดีของการปฏิบัติ และ ผลเสียของการไม่ปฏิบัติเพื่อส่งเสริมพฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพ ของเด็กวัยเรียนที่มีภาวะอ้วน 3. ให้แต่ละกลุ่มส่งตัวแทน 1 คน มานำเสนอผลดี และผลเสีย จากการ แลกเปลี่ยนกันในกลุ่ม 4. ผู้วิจัยให้ความรู้เพิ่มเติมเกี่ยวกับความหมาย ประโยชน์ของอาหารเพื่อ สุขภาพ และผลเสียจากการมีพฤติกรรมกรรมการบริโภคอาหารที่ไม่ดีต่อสุขภาพ 5. อภิปรายผลดีของการปฏิบัติ และผลเสียของการไม่ปฏิบัติเพื่อส่งเสริม พฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพของเด็กวัยเรียนที่มีภาวะอ้วน 6. ผู้วิจัยจะกล่าวชื่นชมเด็ก และพ่อ แม่หรือผู้ดูแลที่ได้ตระหนักถึงผลดี และผลเสีย เพื่อเป็นการเสริมแรงในการปฏิบัติกิจกรรม	10 นาที 15 นาที 15 นาที 10 นาที 10 นาที	- กระบวนการ กลุ่ม - การอภิปราย - กระดาษ flip chart - ปากกา ดินสอ - กระดาษ A4

สัปดาห์ที่ 2 ที่โรงเรียน ใช้เวลา 70 นาที

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	3.เพื่อหาแนวทาง เหมาะสมที่จะนำไปสู่ การปฏิบัติเพื่อส่งเสริม พฤติกรรมกรบริโภค อาหารเพื่อสุขภาพของ เด็กวัยเรียนที่มีภาวะอ้วน	1. เด็กวัยเรียนที่มี ภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล	<u>ขั้นตอนที่ 1 การรับรู้และเข้าใจถึงผลดี ผลเสีย</u> <u>กิจกรรมที่ 2 การร่วมกันหาทางเลือกที่เหมาะสม</u> 1. ผู้วิจัยให้เด็กๆ และพ่อ แม่ หรือผู้ดูแล คิดภาพฝันเกี่ยวกับ สุขภาพ/น้ำหนักของเด็กวัยเรียนที่มีภาวะอ้วนที่หวังไว้ในอนาคต อาจจะวาดภาพ หรือเขียนลงในกระดาษ 2. ให้แต่ละกลุ่มส่งตัวแทนกลุ่มละ 1 คน นำเสนอตัวอย่างภาพฝันที่ หวังไว้ 3. ผู้วิจัยถามคำถาม และให้สมาชิกในแต่ละกลุ่มร่วมกันคิดวิธีการ/ แนวทางที่เหมาะสมอันจะนำไปสู่ความสำเร็จตามภาพฝันที่หวังไว้ “ทำอย่างไรตนเองจึงจะสามารถปฏิบัติเพื่อส่งเสริมพฤติกรรมกร บริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน แล้วเกิด ความสำเร็จตามภาพฝันที่หวังไว้” (ในกลุ่มเด็กทำอย่างไรถึงจะ ปฏิบัติ ส่วนพ่อ แม่หรือผู้ดูแล ทำอย่างไรถึงจะส่งเสริมหรือ สนับสนุนให้เด็กสามารถปฏิบัติได้) โดยให้เขียนลงในกระดาษ Flip chart ของแต่ละกลุ่ม 4. อภิปรายวิธีการ/แนวทางที่เหมาะสมซึ่งจะนำไปสู่การปฏิบัติการ ส่งเสริมพฤติกรรมกรบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียน ที่มีภาวะอ้วน	15 นาที 15 นาที 15 นาที 10 นาที	- การระดม สมอง - การอภิปราย - กระดาษ flip chart - ปากกา ดินสอ - กระดาษ A4 - สมุด ประจำตัว และ แบบบันทึกการ ปฏิบัติการ

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
			5. ให้เด็กวัยเรียนที่มีภาวะอ้วนจับคู่กับพ่อ แม่หรือผู้ดูแล ร่วมกันเขียนแผนในการปฏิบัติ และกำหนดเป้าหมายเพื่อนำไปสู่ความสำเร็จลงในกระดาษ (ผู้วิจัยช่วยแนะนำในการเขียนแผน และการกำหนดเป้าหมาย) 6. ผู้วิจัยจะกล่าวชื่นชมเด็ก และพ่อ แม่หรือผู้ดูแลที่สามารถหาทางออกได้เหมาะสม เพื่อเป็นการเสริมแรงในการปฏิบัติกิจกรรม 7. ผู้วิจัยแจกสมุดบันทึกการปฏิบัติเพื่อส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน และแบบบันทึกกิจกรรมระหว่างลูก/หลาน และพ่อ แม่หรือผู้ดูแล พร้อมทั้งแนะนำให้เด็กและพ่อ แม่หรือผู้ดูแล ได้มีเวลาพูดคุยสนับสนุนให้กำลังใจอย่างน้อย 2 ครั้งต่อสัปดาห์ แล้วบันทึกลงในแบบบันทึกกิจกรรมระหว่างลูก/หลาน และพ่อแม่ (พูดคุยถึงความสำเร็จ ปัญหา อุปสรรคในการปฏิบัติ)	15 นาที	

สัปดาห์ที่ 3 ที่โรงเรียน ตลอดสัปดาห์

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	เพื่อพัฒนา ความสามารถในการ ส่งเสริมพฤติกรรมการ บริโภคอาหารในเด็กวัย เรียนที่มีภาวะอ้วน	1. เด็กวัยเรียนที่มี ภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล 3. ครูในโรงเรียน 4. พยาบาล	<u>ขั้นตอนที่ 2</u> การพัฒนาศักยภาพเพื่อส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อ สุขภาพ <u>กิจกรรมที่ 1</u> สัปดาห์แห่งความรู้ 1. ผู้วิจัยให้ความรู้เรื่องอาหารสุขภาพ อาหารที่เหมาะสมกับเด็กวัยเรียนที่มีภาวะ อ้วนผ่านเสียงตามสายของโรงเรียนในช่วงเข้าก่อนเข้าเรียนวันจันทร์-ศุกร์ 2. จัดนิทรรศการร่วมกับเด็กวัยเรียนที่มีภาวะอ้วนเพื่อส่งเสริมพฤติกรรมการ บริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน (จัดบอร์ด เช่น “กินไม่ดี แล้วเป็นไง” “นี่หรือคือตัวฉันในปัจจุบันและอนาคต” จัดบอร์ด และวีซีดีความรู้ เกี่ยวกับการบริโภคอาหารที่ถูกต้อง) 3. เชิญครูผู้บริหาร ครูในโรงเรียน พยาบาลหน่วยปฐมภูมิ เข้าเยี่ยมชมนิทรรศการ เพื่อส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะ อ้วน <u>กิจกรรมที่ 2</u> จัดการเรียนรู้เด็ก และพ่อ แม่ ผู้ดูแล 1. นำเข้าสู่กิจกรรม โดยการเล่นเกม “บัตรคำอาหารสุขภาพ” โดยการจับคู่เด็ก และพ่อ แม่หรือผู้ดูแลแล้วแบ่งกลุ่มออกเป็น 3 กลุ่ม (กลุ่มละ 6-7 คู่) ให้แต่ละกลุ่ม ส่งตัวแทนจากเด็กคู่กับพ่อ แม่ หรือผู้ดูแล เข้าร่วมเล่นเกม และแจกรางวัลให้กับทีม ที่ชนะ	5-10 นาที ตลอด สัปดาห์ 15 นาที	- บรรยาย - จัดบอร์ดให้ ความรู้ - วีซีดีความรู้ “การ บริโภคอาหารที่ ถูกต้อง” - เล่นเกม - กระบวนการกลุ่ม - การบรรยายให้ ความรู้ - การอภิปราย

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
			2. ให้นักเรียนแต่ละกลุ่มร่วมกันคิดเมนูอาหารเพื่อสุขภาพ ส่วนประกอบของอาหาร และประโยชน์ที่จะได้รับจากเมนูอาหารนั้น แล้วให้นักเรียนแต่ละกลุ่มนำเสนอ 3. ผู้วิจัยให้ความรู้เพิ่มเติมเกี่ยวกับพฤติกรรมโภชนาการเพื่อสุขภาพ และอาหารสุขภาพ 4. อภิปรายเกี่ยวกับการปฏิบัติพฤติกรรมโภชนาการเพื่อสุขภาพ และการจัดอาหารสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน 5. แจกเอกสารความรู้เกี่ยวกับอาหารสุขภาพและการจัดอาหารสุขภาพ/อาหารที่เหมาะสมกับเด็กวัยเรียนที่มีภาวะอ้วน	20 นาที 10 นาที 15 นาที 5 นาที	- การให้คำปรึกษาทางโทรศัพท์ - กระดาษ flip chart - ปากกา ดินสอ- กระดาษ A4 - เอกสารความรู้

สัปดาห์ที่ 4-5 ที่บ้าน ใช้เวลา 35 นาที

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	เพื่อสร้างความมั่นใจ ในการปฏิบัติ	1. เด็กวัยเรียนที่มี ภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล	ขั้นตอนที่ 3 การเสริมสร้างความมั่นใจ และการจูงใจเพื่อส่งเสริมพฤติกรรม การบริโภคอาหารเพื่อสุขภาพ กิจกรรม 1 สัปดาห์แห่งการเรียนรู้ 1. ผู้วิจัยถามคำถามเพื่อประเมินความมั่นใจในการปฏิบัติตามแผน “จากแนวทางปฏิบัติที่เราได้วางแผนทำนั้น นักเรียน และคุณพ่อ คุณแม่ หรือ ผู้ดูแล คิดว่าจะทำตามแผนได้ไหม อย่างไร” 2. ผู้วิจัยกล่าวชื่นชม และเสริมให้เกิดความเชื่อมั่น โดยพูดคุยสนับสนุนให้ กำลังใจ และชักชวนให้สมาชิกในแต่ละกลุ่มช่วยให้กำลังใจซึ่งกันและกันในการ การปฏิบัติเพื่อส่งเสริมพฤติกรรมการบริโภคอาหารเพื่อสุขภาพ “เราต้องคิดว่าเราสามารถทำได้ มันไม่ได้ยากเกินกว่าที่เราจะทำ เราอาจจะฝึก ให้กำลังใจตัวเราที่หน้ากระจก และบอกกับตัวเองว่า - เราทำได้เพื่อ สุขภาพของเรา (ลูกหลานของเรา)” 3. ผู้วิจัยให้บอกถึงปัญหา อุปสรรคในการปฏิบัติ เพื่อจะได้ให้คำปรึกษา 4. กระตุ้นให้พ่อ แม่หรือผู้ดูแลพูดคุยกับเด็กเกี่ยวกับการบริโภคอาหารเพื่อ สุขภาพ และสนับสนุน 5. เขียนแผนในการส่งเสริมพฤติกรรมการบริโภคเพื่อสุขภาพในสัปดาห์ ต่อไป	10 นาที 15 10 นาที	- การพูดคุย ให้กำลังใจ - กระบวนการ กลุ่ม

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	เพื่อกระตุ้นให้เด็ก วัยเรียนที่มีภาวะ อ้วนมีกำลังใจและ มั่นใจในการปฏิบัติ พฤติกรรมการ บริโภคอาหารเพื่อ สุขภาพ	1. เด็กวัยเรียน ที่มีภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล 3. ครูใน โรงเรียน	<u>ขั้นตอนที่ 3</u> การเสริมสร้างความมั่นใจ และการจูงใจเพื่อ ส่งเสริมพฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพ <u>กิจกรรม 2</u> การให้รางวัลและการสังเกตจากตัวแบบ 1. ให้เด็กวัยเรียนที่มีภาวะอ้วนเสนอชื่อเพื่อนในกลุ่มที่ สามารถปฏิบัติพฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพที่ เหมาะสม 1 คนต่อ 1 กลุ่ม (ทั้งหมด 3 กลุ่ม) 2. เชิญเด็กวัยเรียนที่มีพฤติกรรมกรรมการบริโภคอาหารเพื่อ สุขภาพที่ดีมาเล่าเกี่ยวกับการปฏิบัติตนเองว่าปฏิบัติอย่างไร และทำอะไรถึงประสบผลสำเร็จที่หน้าเสาธงวันละ 1 คน (เชิญครูผู้บริหาร ครูใน โรงเรียน มอบรางวัลให้กับเด็กวัย เรียนที่มีภาวะอ้วนที่ปฏิบัติพฤติกรรมกรรมการบริโภคอาหารเพื่อ สุขภาพที่เหมาะสมที่เป็นแบบอย่างที่ดี) 3. เชิญชวนครูใน โรงเรียนช่วยกระตุ้นให้เด็กวัยเรียนที่มี ภาวะอ้วนปฏิบัติพฤติกรรมกรรมการบริโภคอาหารเพื่อสุขภาพ	3-5 นาที/ คน	- กระบวนการ กลุ่ม - การจูงใจ โดยใช้ตัว แบบ

สัปดาห์ที่ 6-9 ที่บ้าน ใช้เวลา 30-45 นาที

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	เพื่อติดตามเฝ้าระวัง ประเมินผล และ ส่งเสริมพฤติกรรม การบริโภคอาหาร เพื่อสุขภาพ	1. เด็กวัยเรียนที่ มีภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล 3. พยาบาล	<u>ขั้นตอนที่ 4 การสนับสนุนให้คงไว้ในการปฏิบัติ</u> <u>กิจกรรม การติดตามเฝ้าระวัง ประเมินผล และ</u> <u>ปรับเปลี่ยนแผนให้เหมาะสม</u> 1. ติดตามเยี่ยมบ้าน เพื่อให้คำปรึกษา ให้กำลังใจ และ ประเมินผลการปฏิบัติว่ามีปัญหา อุปสรรค หรือประสบ ผลสำเร็จ 2. เชิญพยาบาลในหน่วยปฐมภูมิเข้าเยี่ยมบ้านร่วมด้วย 3. ถ้ามีครอบครัวที่มีปัญหาจะปรับเปลี่ยนแผน ปรับเปลี่ยนแผนกิจกรรม เพื่อให้เหมาะสมกับบริบทใน แต่ละครอบครัว <u>สัปดาห์ที่ 7-9</u> - ติดตามเยี่ยมที่บ้านกรณีที่มีปัญหา ส่วนครอบครัวที่ไม่ มีปัญหาจะติดตามเยี่ยมทางโทรศัพท์	30-45 นาที/ ครั้ง	- ติดตาม เยี่ยมบ้าน - การ สะท้อนคิด - สมุด ประจำตัว และแบบ บันทึก

สัปดาห์ที่ 10 ที่บ้าน ใช้เวลา 30 นาที

วัตถุประสงค์/ ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	เพื่อประเมินผล กิจกรรม	1. เด็กวัยเรียนที่มี ภาวะอ้วน 2. พ่อ แม่หรือ ผู้ดูแล	<u>ขั้นตอนที่ 5</u> การสรุปและสะท้อนคิดเกี่ยวกับการเข้าร่วม กิจกรรม <u>กิจกรรม</u> การสะท้อนคิดเกี่ยวกับการเปลี่ยนแปลง และ ประเมินผล 1. ผู้วิจัยให้เด็กวัยเรียนที่มีภาวะอ้วน และพ่อ แม่หรือ ผู้ดูแล ร่วมกันสะท้อนคิดเกี่ยวกับการเปลี่ยนแปลงที่ เกิดขึ้นหลังจากเข้าร่วมกิจกรรมการส่งเสริมพฤติกรรม การบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มี ภาวะอ้วน 2. ประเมินผลความพึงพอใจในการเข้าร่วมกิจกรรม	30 นาที	

แผนกิจกรรมการปรับเปลี่ยนความเชื่อของแม่ครัว และผู้จำหน่ายอาหารในโรงเรียน
เพื่อส่งเสริมพฤติกรรมการบริโภคเพื่อสุขภาพในเด็กวัยเรียนที่มีภาวะอ้วน

สำหรับกลุ่มแม่ครัว และผู้จำหน่ายอาหารในโรงเรียน

สัปดาห์ที่ 1 ที่ โรงเรียน ใช้เวลา 45 นาที

วัตถุประสงค์หลัก/ยุทธศาสตร์	วัตถุประสงค์ย่อย	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
วัตถุประสงค์หลักเพื่อให้แม่ครัว/ ผู้จำหน่ายปรับเปลี่ยนความเชื่อ และเห็นความสำคัญในการจัด อาหารสุขภาพให้เด็กวัยเรียนที่มี ภาวะอ้วน ยุทธศาสตร์ ปรับเปลี่ยนความเชื่อให้เห็น ความสำคัญในการจัดอาหาร สุขภาพให้เด็กวัยเรียนที่มีภาวะ อ้วนรับประทานโดยการสนทนา เพื่อการบำบัด (Therapeutic communication)	1. เพื่อสร้างสัมพันธภาพ ระหว่างผู้วิจัยกับแม่ครัว/ผู้ จำหน่ายอาหาร 2. เพื่อให้แม่ครัว/ผู้ จำหน่ายอาหารได้ค้นหา ปัญหา และเกิดความ ตระหนักในปัญหา	1. แม่ครัว/ผู้จำหน่าย อาหาร 2. ครูรับผิดชอบเรื่อง อาหารกลางวัน หรือ ครูอนามัยโรงเรียน	ขั้นตอนที่ 1 สำรวจปัญหาที่เผชิญเกี่ยวกับการจัดอาหารสุขภาพสำหรับเด็กวัย เรียนที่มีภาวะอ้วน และผลเสียที่ตามมาจากการจัดอาหารที่ไม่เหมาะสมกับเด็ก วัยเรียนที่มีภาวะอ้วน กิจกรรม 1. สร้างสัมพันธภาพระหว่างผู้วิจัยกับแม่ครัว/ผู้จำหน่ายอาหาร โดยการทักทาย แนะนำตัว และการร้องเพลง 2. ผู้วิจัยถามคำถาม และให้แม่ครัว/ผู้จำหน่ายอาหารแต่ละคนเขียนปัญหาใน การจัดการอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน “คุณคิดว่าอะไร คือ ปัญหาที่คุณ ไม่สามารถจัดอาหารสุขภาพให้เด็กอ้วนกินได้” 3. อภิปรายเกี่ยวกับปัญหาในการจัดการอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียน ที่มีภาวะอ้วน 4. ผู้วิจัยกล่าวชื่นชมแม่ครัว และผู้จำหน่ายอาหารที่สามารถค้นพบปัญหา เกี่ยวกับการจัดอาหารสุขภาพได้ 5. ผู้วิจัยให้แม่ครัว/ผู้จำหน่ายอาหารบอกเล่าถึงผลเสียของการจัดอาหารที่ไม่ดี/ ไม่เหมาะสมกับเด็กวัยเรียนที่มีภาวะอ้วน “ช่วยเล่าถึงผลเสียหากว่าเด็กอ้วน ไม่ได้กินอาหารสุขภาพหรือไม่ได้รับอาหาร สุขภาพให้ฟังหน่อยค่ะ” 6. อภิปรายเกี่ยวกับผลเสียของการจัดอาหารที่ไม่ดี/ไม่เหมาะสมกับเด็กวัยเรียน ที่มีภาวะอ้วน	5 นาที 10 นาที 10 นาที 10 นาที	- การอภิปราย - การกล่าวชื่น ชม - วิดีซี “ผลเสีย ของเด็กอ้วน” - กระดาษ flip chart - ปากกา ดินสอ - กระดาษ A4

สัปดาห์ที่ 1 ที่ โรงเรียน ใช้เวลา 45 นาที

วัตถุประสงค์หลัก/ วัตถุประสงค์ย่อย	ยุทธศาสตร์/วิธีการ	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
2. เพื่อให้แม่ครัว/ผู้จำหน่าย อาหาร ได้วิเคราะห์หาสาเหตุ อุปสรรค และความต้องการ ในการแก้ไข		1. แม่ครัว/ ผู้จำหน่ายอาหาร 2. ครูรับผิดชอบ เรื่องอาหาร กลางวัน หรือครู อนามัยโรงเรียน	ขั้นตอนที่ 2 การส่งเสริมการวางแผนการจัดอาหารสุขภาพ กิจกรรมที่ 1 : การคิดทบทวนเกี่ยวกับปัญหา สาเหตุ และความต้องการในการแก้ไข 1. ผู้วิจัยให้แม่ครัว/ผู้จำหน่ายอาหารคิดทบทวนถึงปัญหา สาเหตุ และอุปสรรคที่ทำให้เกิดปัญหาเกี่ยวกับการจัดอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน “จากที่เราได้พูดคุยกันถึงปัญหาเกี่ยวกับการจัดอาหารสุขภาพให้เด็กอ้วนกันมาแล้ว อยากจะให้ทุกคนร่วมกันคิดทบทวนถึงปัญหาว่าปัญหานั้นมีอะไรที่เป็นสาเหตุ หรือสิ่งที่ทำให้เกิดปัญหานี้บ้าง” (ให้แม่ครัวร่วมกันคิดทบทวนถึงปัญหา สาเหตุ ลงในกระดาษ flip chart) 2. ผู้วิจัยให้แม่ครัว และผู้จำหน่ายร่วมกันวิเคราะห์ถึงความต้องการในการแก้ปัญหา “หลังจากเราเห็นปัญหา และสาเหตุแล้ว คุณมีวิธีการแก้ไขปัญหานี้อย่างไรบ้างแล้ว ต้องการแก้ไขสิ่งใด หรือปัญหาใดเพิ่มเติม” 3. ผู้วิจัยกล่าวชื่นกับพฤติกรรมที่แม่ครัว/ผู้จำหน่ายอาหารปฏิบัติเหมาะสม และได้พยายามในการแก้ปัญหา รวมทั้งให้กำลังใจในการที่จะช่วยกันแก้ปัญหา 4. อภิปรายถึงความต้องการในการแก้ปัญหาเกี่ยวกับการจัดอาหารสุขภาพให้เด็กวัยเรียนที่มีภาวะอ้วน	10 นาที 15 นาที 10 นาที	- การระดมสมอง - การกล่าวชื่นชม - การอภิปราย - กระดาษ flip chart - ปากกา ดินสอ - กระดาษ A4

ปัญหา	วัตถุประสงค์หลัก/ วัตถุประสงค์ย่อย	ยุทธศาสตร์/วิธีการ	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ สื่อ อุปกรณ์
	3. เพื่อหาแนวทางในการแก้ปัญหาที่เหมาะสม		1. แม่ครัว/ผู้ จำหน่ายอาหาร 2. ครูรับผิดชอบ เรื่องอาหารกลางวัน หรือครูอนามัย โรงเรียน	<u>ขั้นตอนที่ 2</u> <u>กิจกรรมที่ 2</u> การช่วยคิด ช่วยหาทางออกในการแก้ปัญหา 1. แม่ครัว/ผู้จำหน่ายอาหารช่วยกันเสนอแนวทางในการแก้ไข ปัญหาเกี่ยวกับการจัดอาหารสุขภาพสำหรับเด็กวัยเรียนที่มี ภาวะอ้วน “หลังจากที่รู้แล้วว่าอุปสรรคที่ทำให้เราไม่สามารถจัดอาหาร สุขภาพให้เด็กวัยเรียนที่มีภาวะอ้วนได้คืออะไร ต่อมาเราจะมา ร่วมกันช่วยคิดหาวิธีการหรือแนวทางที่จะปัญหาเกี่ยวกับการจัด อาหารสุขภาพสำหรับเด็กนะคะ” “ให้แต่ละคนคิดวิธีการหรือแนวทางในการแก้ไขปัญหาคือ เกิดขึ้นนั้นๆ อย่างน้อย 1 วิธีนะคะ” 2. ผู้วิจัยกระตุ้นให้แม่ครัว และผู้จำหน่ายอาหารแลกเปลี่ยน ประสบการณ์ เพื่อหาแนวทางที่เหมาะสม 3. ผู้วิจัยให้ข้อมูลเพิ่มเติมเกี่ยวกับการจัดอาหารสุขภาพที่ เหมาะสมให้กับเด็กวัยเรียนที่มีภาวะอ้วน 4. ผู้วิจัยกล่าวชื่นชมแม่ครัว และผู้จำหน่ายอาหารในการ มี ส่วนร่วมในการแลกเปลี่ยนเพื่อหาแนวทางที่เหมาะสม 5. อภิปรายเกี่ยวกับวิธีการหรือแนวทางในการแก้ไขปัญห และการจัดอาหารเพื่อสุขภาพที่เหมาะสมกับเด็กวัยเรียนที่มี ภาวะอ้วน	20 นาที 15 นาที 10 นาที 10 นาที	- การระดม สมอง - การอภิปราย - การให้ ความรู้เพิ่มเติม - เอกสาร ความรู้ เกี่ยวกับการ จัดอาหาร สุขภาพที่ เหมาะสม - กระดาษ flip chart - ปากกา - ดินสอ - กระดาษ A4

ปัญหา	วัตถุประสงค์หลัก/ วัตถุประสงค์ย่อย	ยุทธศาสตร์/วิธีการ	ผู้ร่วมกิจกรรม	กิจกรรม	เวลา	วิธีการ/ อุปกรณ์ สื่อ
	4. เพื่อส่งเสริมให้เกิด การเปลี่ยนแปลงที่ เหมาะสม		1. แม่ครัว/ ผู้จำหน่ายอาหาร 2. ครูรับผิดชอบ เรื่องอาหารกลางวัน หรือครูอนามัย โรงเรียน	ขั้นตอนที่ 4 การสะท้อนคิด การสนับสนุนให้เปลี่ยนแปลง และ คงไว้ซึ่งการปฏิบัติที่เหมาะสม กิจกรรม 1. ให้แม่ครัว/ผู้จำหน่ายอาหารร่วมกันสะท้อนคิดว่าแนวทาง ใดที่ได้ปฏิบัติอยู่แล้วซึ่งเป็นแนวทางที่เหมาะสมที่จะปฏิบัติ ต่อไป และแนวทางใดที่เป็นทางเลือกใหม่ที่เราจะทดลองปฏิบัติ เพื่อแก้ปัญหา “จากที่เราได้ร่วมกันหาแนวทางที่เหมาะสมแล้วนั้น อยากจะให้ ทุกคนได้ร่วมกันคิดทบทวนถึงแนวทางที่เราได้เสนอมานั้นอีก ครั้งว่าแนวทางใดที่เราทำอยู่แล้วและเป็นแนวทางที่เหมาะสม ซึ่งจะปฏิบัติต่อไป และแนวทางใดที่เป็นแนวทางใหม่ที่เรควร เพิ่มในการปฏิบัติ” 2. ผู้วิจัยชื่นชมการปฏิบัติแนวทางเหมาะสมที่ปฏิบัติอยู่แล้ว และให้กำลังใจในการที่จะปฏิบัติแนวทางใหม่ต่อไป 3. แจกสมุดบันทึกการเปลี่ยนแปลงประจำตัว และแนะนำการ บันทึก 4. อภิปรายให้แม่ครัว/ผู้จำหน่ายอาหารร่วมกันสรุปกิจกรรม และประเมินความพึงพอใจในการเข้าร่วมกิจกรรมในครั้งนี้ “ก่อนที่จะแยกกันไปในครั้งนี้ อยากให้แม่ครัว/ผู้จำหน่าย อาหารได้ช่วยกันสรุปหน่อยว่าเราได้ทำกิจกรรมอะไรบ้าง และ มีความพึงพอใจในกิจกรรมใหม่ อย่างไร”	10 นาที 5 นาที 10 นาที	- การสะท้อน คิด - สมุดบันทึก การ เปลี่ยนแปลง ของแม่ครัว/ผู้ จำหน่าย อาหาร

ปัญหา	วัตถุประสงค์หลัก/ วัตถุประสงค์ย่อย	ยุทธศาสตร์/วิธีการ	ผู้ร่วมกิจกรรม	กิจกรรมการติดตามประเมินผล	เวลา	วิธีการ/ อุปกรณ์ สื่อ
	- เพื่อติดตาม ประเมินผล ให้ คำปรึกษา และ สนับสนุนให้คงไว้ซึ่ง การปฏิบัติที่เหมาะสม		1. แม่ครัว/ ผู้จำหน่ายอาหาร 2. ครูรับผิดชอบ เรื่องอาหารกลางวัน หรือครูอนามัย โรงเรียน 3. พยาบาล	กิจกรรม การติดตามเยี่ยม 1. ติดตามเยี่ยมการจัดอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วนในโรงเรียน ร่วมกับครูผู้รับผิดชอบเรื่องอาหาร หรือครูอนามัยโรงเรียน และพยาบาลในหน่วยปฐมภูมิ โรงพยาบาลโกสุมพิสัย เพื่อประเมินการเปลี่ยนแปลงที่เกิดขึ้น พุดคุยถามถึงปัญหา อุปสรรค แนวทางแก้ไข พร้อมทั้งชี้แจงให้กำลังใจในการเปลี่ยนแปลง (เข้าเยี่ยม 2 ครั้ง ห่างกันครั้งละ 1 สัปดาห์) “ตอนนี้คุณมีการเปลี่ยนแปลงเกี่ยวกับการจัดอาหารสุขภาพให้เด็กวัยเรียนที่มีภาวะอ้วนกินอย่างไรบ้างคะ” “คุณได้สังเกตเห็นถึงพฤติกรรมการกินอาหารของเด็กวัยเรียนที่มีภาวะอ้วนอย่างไรบ้างคะ” “คุณมีปัญหา หรือมีความลำบากใจในการการจัดอาหารสุขภาพเพื่อเด็กวัยเรียนที่มีภาวะอ้วนไหม อย่างไร” “ถ้าคุณมีปัญหา หรือความลำบากใจ คุณได้แก้ไขอย่างไรบ้างแล้วผลออกมาเป็นอย่างไรบ้าง” 2. ประเมินความพึงพอใจในกิจกรรมการส่งเสริมพฤติกรรม การบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน “คุณรู้สึกพอใจกับกิจกรรมการส่งเสริมพฤติกรรมบริโภคอาหารเพื่อสุขภาพสำหรับเด็กวัยเรียนที่มีภาวะอ้วน หรือไม่อย่างไร”	45-60 นาที/ ครั้ง	- การสะท้อน คิด - สมุดบันทึก การ เปลี่ยนแปลง ของแม่ครัว/ผู้ จำหน่ายอาหาร

APPENDIX D

Inviting documents of experts

ที่ ศธ ๖๖๐๗/ ๐๖๗



คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
ต.แสนสุข อ.เมือง จ.ชลบุรี ๒๐๑๓๑

๗

มกราคม ๒๕๕๗

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์ มหาวิทยาลัยเชียงใหม่

สิ่งที่ส่งมาด้วย ๑. คำร้องย่อคุณฉันทน์
๒. เครื่องมือที่ใช้ในการวิจัย

ด้วย นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำคุณฉันทน์ เรื่อง “Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province” โดยมี รองศาสตราจารย์ ดร.จินตนา วชิรสินธุ์ เป็นประธานกรรมการควบคุมคุณฉันทน์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการวิจัย เนื่องจาก ผู้ช่วยศาสตราจารย์ ดร.จุฑามาศ โชติบาง บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูงเกี่ยวกับการวิจัยดังกล่าว คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์รัชนิกร ทรัพย์กรานนท์)

คณบดีคณะพยาบาลศาสตร์

ฝ่ายบัณฑิตศึกษา

โทรศัพท์ ๐๓๘-๑๐๒๘๓๖ โทรสาร ๐๓๘-๓๙๓๔๗๖

ผู้วิจัยโทร ๐๘-๑๙๓๖-๘๔๘๐, ๐๘-๘๕๖๒-๘๘๕๖

สำเนาเรียน ผู้ช่วยศาสตราจารย์ ดร.จุฑามาศ โชติบาง

ที่ ศธ ๖๖๐๗/๐๒๘

คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
ต.แสนสุข อ.เมือง จ.ชลบุรี ๒๐๑๓๑

๕

มกราคม ๒๕๕๗

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัย

เรียน คณบดีคณะเภสัชศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ

สิ่งที่ส่งมาด้วย ๑.เค้าโครงย่อคู่มือ
๒. เครื่องมือที่ใช้ในการวิจัย

ด้วย นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำคู่มือเรื่อง “Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province” โดยมี รองศาสตราจารย์ ดร.จินตนา วัชรสินธุ์ เป็นประธานกรรมการควบคุมคู่มือ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการวิจัย เนื่องจาก อาจารย์ ดร.พัชรี ดวงจันทร์ บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูงเกี่ยวกับการวิจัยดังกล่าว คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์รัชนิกร ทรัพย์กรานนท์)

คณบดีคณะพยาบาลศาสตร์

ฝ่ายบัณฑิตศึกษา

โทรศัพท์ ๐๓๘-๑๐๒๘๓๖ โทรสาร ๐๓๘-๓๙๓๔๗๖

ผู้วิจัยโทร ๐๘-๑๙๓๖-๘๔๘๐, ๐๘-๘๕๖๒-๙๘๕๖

สำเนาเรียน อาจารย์ ดร.พัชรี ดวงจันทร์

ที่ ศธ ๖๖๐๗/ ๐๒๙



คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา
ต.แสนสุข อ.เมือง จ.ชลบุรี ๒๐๑๓๑

มกราคม ๒๕๕๗

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัย

เรียน ผู้อำนวยการสถาบันวิจัยโภชนาการ มหาวิทยาลัยมหิดล

- สิ่งที่ส่งมาด้วย ๑. คำขอขอย่อยดัชนีพนธ์
๒. เครื่องมือที่ใช้ในการวิจัย

ด้วย นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำดัชนีพนธ์ เรื่อง “Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province” โดยมี รองศาสตราจารย์ ดร.จินตนา วัชรสินธุ์ เป็นประธานกรรมการควบคุมดัชนีพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการวิจัย เนื่องจาก ดร.อุรุวรรณ แยมบริสุทธิ์ บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูงเกี่ยวกับการวิจัยดังกล่าว คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์รัชนิกร ทรัพย์กรานนท์)

คณบดีคณะพยาบาลศาสตร์

ฝ่ายบัณฑิตศึกษา

โทรศัพท์ ๐๓๘-๑๐๒๘๓๖ โทรสาร ๐๓๘-๓๔๓๔๗๖

ผู้วิจัยโทร ๐๘-๑๙๓๖-๘๔๘๐, ๐๘-๘๕๖๒-๙๘๕๖

สำเนาเรียน ดร.อุรุวรรณ แยมบริสุทธิ์



บันทึกข้อความ

ส่วนงาน ฝ่ายบัณฑิตศึกษา คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา โทร. ๒๘๓๖
 ที่ ศธ ๖๖๐๗/๐๔๓ วันที่ ๑ มกราคม พ.ศ. ๒๕๕๗
 เรื่อง ขอเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัย

เรียน รองศาสตราจารย์ ดร.อาภรณ์ คีนาน

ด้วย นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำดุษฎีนิพนธ์ เรื่อง “Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province” โดยมี รองศาสตราจารย์ ดร.จินตนา วัชรสินธุ์ เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการวิจัย เนื่องจากท่านเป็นผู้มีความเชี่ยวชาญและประสบการณ์สูงเกี่ยวกับการวิจัยดังกล่าว คณะฯ จึงขอเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาด้วย จะขอบคุณยิ่ง

(ผู้ช่วยศาสตราจารย์รัชนิกร ทรัพย์กรานนท์)
 คณบดีคณะพยาบาลศาสตร์



บันทึกข้อความ

ส่วนงาน ฝ่ายบัณฑิตศึกษา คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา โทร. ๒๕๓๖

ที่ ศธ ๖๖๐๗/๐๔๔

วันที่ ๓ มกราคม พ.ศ. ๒๕๕๗

เรื่อง ขออนุญาตเชิญบุคลากรในสังกัดเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัย

เรียน คณบดีคณะสาธารณสุขศาสตร์

ด้วย นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ได้รับอนุมัติให้ทำดุษฎีนิพนธ์ เรื่อง “Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province” โดยมี รองศาสตราจารย์ ดร.จินตนา วัชรสินธุ์ เป็นประธานกรรมการควบคุมดุษฎีนิพนธ์ ซึ่งอยู่ในขั้นตอนการเตรียมเครื่องมือเพื่อการวิจัย เนื่องจาก ผู้ช่วยศาสตราจารย์ ดร.ศิริพร จันทร์ฉาย บุคลากรในสังกัดของท่านเป็นผู้มีความเชี่ยวชาญ และประสบการณ์สูงเกี่ยวกับการวิจัยดังกล่าว คณะฯ จึงขออนุญาตเชิญเป็นผู้ตรวจสอบความตรงตามเนื้อหาของเครื่องมือเพื่อการวิจัยของนิสิต

จึงเรียนมาเพื่อโปรดพิจารณาอนุญาตด้วย จะเป็นพระคุณยิ่ง

(ผู้ช่วยศาสตราจารย์รัชนีกรณ์ ทรัพย์กรานนท์)

คณบดีคณะพยาบาลศาสตร์

สำเนาเรียน ผศ.ดร.ศิริพร จันทร์ฉาย

ผู้วิจัยโทร ๐๘-๑๙๓๖-๘๔๘๐, ๐๘-๘๕๖๒-๙๘๕๖

APPENDIX E

Permission instruments



ที่ ศธ 0519.13/ 9/3

คณะพยาบาลศาสตร์
มหาวิทยาลัยบูรพา
ปี ๐๐๑๒
วันที่ 3 ม.ค. 57
๑๖๗๔

สถาบันวิจัยพฤติกรรมศาสตร์
มหาวิทยาลัยศรีนครินทรวิโรฒ
สุขุมวิท 23 เขตวัฒนา กรุงเทพฯ 10110

19 ธันวาคม 2556

เรื่อง อนุญาตให้ใช้เครื่องมือเพื่อการวิจัย

เรียน คณบดีคณะพยาบาลศาสตร์

อ้างถึง หนังสือที่ ศธ 6607/2190 ลงวันที่ 2 ธันวาคม 2556

ตามหนังสือที่อ้างถึง นางสาววิราวรรณ คำหวาน นิสิตหลักสูตรปริญญาตรีบัณฑิต สาขาวิชาพยาบาลศาสตร์ (นานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา ขออนุญาตใช้เครื่องมือวิจัย ของ นางพัชรี ดวงจันทร์ นิสิตสาขาวิชาการวิจัยพฤติกรรมศาสตร์ประยุกต์ สถาบันวิจัยพฤติกรรมศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ เพื่อนำมาปรับใช้เก็บข้อมูลการทำดัชนีนิพนธ์ ความละเอียดแจ้งแล้ว นั้น

สถาบันฯ พิจารณาแล้วอนุญาตให้ นางสาววิราวรรณ คำหวาน ใช้เครื่องมือวิจัยดังกล่าว ประกอบการทำดัชนีนิพนธ์ เรื่อง "Development of Promoting Healthy Eating Behavior Model for Obese School-Age Children in Mahasarakham Province" ได้

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

ดร. เทียน

(รองศาสตราจารย์ดุขฎิ โยเหลา)

ผู้อำนวยการสถาบันวิจัยพฤติกรรมศาสตร์

เรียน คณบดี

ตามสภามหาวิทยาลัยบูรพา พ.ศ. ๒๕๕๖ พ.ศ. ๒๕๕๖

นิตยสารสุขภาพเพื่อคนไทย (Health for Thai People) ฉบับที่ ๑๐๐

จึงเรียนมาเพื่อ

๑. โปรดทราบ

๒. เห็นควรแจ้งงานวิจัย, ๑. ที่ปรึกษา

เพื่อแจ้งนิพนธ์ต่อไป

ดร. เทียน

สำนักงานผู้อำนวยการ

โทร. 0-2649-5000 ต่อ 17600

โทรสาร 0-2649-5182

๐๐๑๓ ๒๖/๑/๕๗

๐๐๑๓ ๘/๑/๕๗

Kann/D:หนังสือภายนอก/kann-ตอบ

APPENDIX F

Institutional review board approval



**THE INSTITUTIONAL REVIEW BOARD (IRB) FOR GRADUATE STUDY
FACULTY OF NURSING, BURAPHA UNIVERSITY, THAILAND**

Thesis Title Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province

Name Ms. Wiravan Kumvan
ID: 53810011
Doctor of Philosophy in Nursing Science Program (International Program)

Number of the IRB approval 05 – 12 – 2556

The Institutional Review Board (IRB) for graduate study of Faculty of Nursing, Burapha University reviewed your submitted proposal. The contingencies have been addressed and the IRB **approves** the protocol. Work on this project may begin. This approval is for a period of one year from the date of this letter and will require continuation approval if the research project extends beyond **January 29th, 2015**.

If you make any changes to the protocol during the period of this approval, you must submit a revised protocol to the IRB committee for approval before implementing the changes.

Date of Approval January 29th, 2014

Nujjaree Chaimongkol, R.N., Ph.D.

Chairperson of the IRB Board
Associate Dean for Research and Academic Services
Faculty of Nursing, Burapha University, THAILAND

Tel.: 66-038-102863
Fax: 66.038-393476
E-Mail: naruemit@buu.ac.th



**THE INSTITUTIONAL REVIEW BOARD (IRB) FOR GRADUATE STUDIES
FACULTY OF NURSING, BURAPHA UNIVERSITY, THAILAND
(Supplement 1)**

Thesis Title: Development of Promoting Healthy Eating Behavior Model for Obese School-age Children in Mahasarakham Province

Name: Ms. Wiravan Kumvan
ID: 53810011
Doctor of Philosophy in Nursing Science Program (International Program)

Number of the IRB approval: 05 – 12 – 2556

The Institutional Review Board (IRB) for graduate studies of Faculty of Nursing, Burapha University reviewed your revised research protocol. The IRB approved your request and agreed to extend **until December 31st, 2015**.

Date of 2nd approval: January 22, 2015

Chintana Wacharasin

Chintana Wacharasin, R.N., Ph.D.

Chairperson of the IRB
Faculty of Nursing, Burapha University, THAILAND

Tel.: 66-038-102863
Fax: 66.038-393476
E-Mail: naruemit@buu.ac.th

APPENDIX G

Photographs of activities







