CHAPTER IV

METHODOLOGY

4.1 Introduction

This study is a one-group pretest/posttest quasi-experimental design. All ASB students in grades 4-6 participated in this project. This design was applied to evaluate the effectiveness or effects of the school health promotion program -- *"Shape for Health"* -- in improving nutrition knowledge, attitudes, beliefs, eating behavior, and physical activity [and ultimately weight status] among the subjects in the study. Measurements of the subjects' eating behavior, physical activity/inactivity patterns, and BMI were taken at the beginning of the program. Socio-demographic, psychosocial and environmental information related to nutrition were gathered on all subjects prior to program intervention through a situation analysis. Information from the situation analysis was used in the formulation of the "Shape-for-Health" program at ASB. The program consisted of five components. A Plan of Action was developed and followed by program implementation.

Following the intervention, the questionnaire was re-administered to all students. Quantitative survey methods were used to measure the outcomes of the program by examining its effect on participants' eating behavior, physical activity/inactivity and nutritional status. Comparisons between the two different measurements, before and after intervention, were conducted. Although BMI was not considered a direct measurement of program success in this study, it was nevertheless collected because it is envisaged that the change in behaviors will ultimately impact

students' nutritional status. BMI was used to assess weight status (underweight, normal, at risk of overweight and overweight) among the students. Surveys and weight/height monitoring were used as methods to collect quantitative data needed for this study. Qualitative data through FGD and ID were used to explore or help explain actions, attitudes or beliefs pertaining to behaviors.

This research project involved three program phases:1) situation analysis (assessments and diagnosis), 2) planning and implementation phase, and 3) evaluation phase. Obtaining commitment from school authorities, mobilization and participation, capacity building of key players and coordination of program activities were used as program mechanisms to ensure program effectiveness. These mechanisms were used to help program players with the means in taking systematic action to resolve overweight and obesity problems among ASB students. For the purpose of this research, the school health program was called "Shape-for-Health".

The understanding of the process of the three program stages allowed more informed change and at the same time was informed by that change by all stakeholders (school authorities, students, school personnel, school food service staff, and parents). All individuals involved in the study, researcher and subjects, were deliberate and contributing actors in this research. These strategies were employed to create a positive change among the students and the school as a whole. In this study, these strategies attempted to achieve two primary tasks. Firstly, to develop an effective school program that assisted students enhance healthful eating and physical activity, that was useful for continuance by the school [after research phase-out]. Secondly, it empowered the students and school personnel and motivated them to sustain the positive results from this study.

4.2 Rationale for the Study Design

The one-group pretest/post test quasi-experimental design was chosen over other designs because of the nature of the study itself. Programs aimed at enhancing healthful eating and physical activity involves a tedious process. Schools have been encouraged by the WHO to carry out health promotion programs since 1995. However, few have complied. There are few recorded experiences in Asia that can be learned from, regarding such program. Let alone, health program in a private international school. To date, no data is available regarding eating habits and physical activity among affluent school-age children, nor data on school-health programs in a private international school. This study was conducted as a pilot project in developing a school health-promotion program in an international school setting like the ASB. Low number of samples allowed the researcher to work in depth with the school in developing and implementing the program.

4.3 Assessments and Application

4.3.1 Quantitative data analysis

A descriptive analysis including percentage, mean, mean, and standard deviation (SD), frequency and percentage distribution of some information were conducted including participants' background and demographics, psychosocial, environmental information, eating behavior, physical activity and BMI. Correlation and chi-square tests were used to test relationships between independent and dependent variables. The associations between selected factors and outcome variables (eating behavior, physical activity and nutritional status) were examined through univariate and multivariate regression analysis. Analysis of variance (ANOVA) with paired t-test was

used to test for differences among the respondents before program intervention and after program intervention. All tests were two-sided and p-value of less than 0.05 was considered statistically significant. All data from the survey were entered and analyzed using the Excel and SPSS programs.

4.3.2 Qualitative data analysis

Focus group discussions in-depth interviews were carried out to explore data from the survey. The interviews were also used to draw opinions collectively from various audiences regarding the issue of eating and physical activity behaviors among ASB students and generating school-based solutions to the problem of overweight. To facilitate interviews, interview guidelines for students, school personnel and parents were developed (Appendix C & D).

Qualitative data were mostly narrated in the research. Some responses by the respondents were also quoted. Special characteristics were identified from documents gathered. Usually, after each interview session, the respondents were consulted to look at the theme or messages to check if they were accurate. This acted as testing the reliability and validation of upcoming research findings. A combination of elements in written messages that were counted in content analysis included words, themes and concepts.

4.3.3 Research Hypotheses

The research questions were stated in general research hypotheses below:

1. Socio-demographic factors (gender, age, maternal education, maternal work status, and family income); psychosocial factors (knowledge, attitude/beliefs

and eating self-efficacy); and environmental factors (number of meals eaten at home, type of meals commonly eaten at home, time constraint and parental influence) are associated with diet (food consumption) among grades 4-6 ASB students.

2. Socio-demographic factors (gender, age, maternal education, maternal work status, and family income); psychosocial factor (exercise self-efficacy); and environmental factors (parental influence, access to, and utilization of recreation/exercise center) are associated with physical activity/inactivity behaviors among grades 4-6 ASB students.
3. Food consumption (diet) and physical activity/inactivity patterns are associated with nutritional status among grades 4-6 ASB students.
4. The school health promotion program is effective in enhancing healthful eating and physical activity among grades 4-6 ASB students as seen by significant differences in psychosocial factors (knowledge, attitude/beliefs and self-efficacy), eating behavior (diet, number of meals eaten at home, and type of food commonly eaten at home), physical activity/inactivity patterns (number of hours spent performing activity/inactivity, recreational/exercise center use) and weight status among grades 4-6 ASB students before and after program intervention.

4.3.4 Population and Samples

Students in grades 4- 6 who are enrolled at ASB were the population for this study. Due to time, resource constraints and the nature of the research itself, the study could not be carried out among all ASB students. Selection of students in grades 4 – 6

was a joint decision by the researcher and school authorities and was based on: a) the high prevalence of overweight among this group of students, b) the ability of the students to respond to the questionnaire and c) ages 9-12 were appropriate ages for cognitive intervention. The parents of these students were also included to enhance data needed in understanding students' eating behavior and physical activity. Only parents who agreed to be involved were included. Students, parents and selected ASB school personnel were also involved in FGD and ID sessions. Only those who can provide rich information were selected as respondents for these interviews.

Convenience sampling is used in exploratory studies where the researcher does not have adequate resources and is interested in getting an estimation of the truth. This is one non-probability sampling method and is commonly used in preliminary attempts to get gross estimates. Samples are selected in a non-random manner (StatPac, 2004). ASB as the study venue was conveniently selected. International schools with similar characteristics as ASB were called upon as potential sites. However, due to lack of interest, the schools declined except ASB.

Based on the assumption that successful implementation of a school health promotion program will improve eating and physical activity behaviors among school age children, is dependent upon the support of those around them. This was a school-based program and for the purpose of this study, three main respondent groups were included.

Group 1: Students in grades 4-6 (N = 72)

All children in grades 4-6, male or female, who ranges in age from 9-12 years and enrolled at ASB, were eligible for this study. There were no students with known

congenital anomaly or chronic medical condition that causes nutritional problems which was an exclusion criterion in this study. Through a prior consent from the school and parents, all 72 grades 4-6 students participated in the nutritional screening and survey. From nutritional screening through program evaluation, the process took nine months to complete. At the end of the project, a second measurement (post test) was taken of the students.

Group 2: Parents of students in grades 4-6 (n = 43)

To understand factors that influence students' eating behaviors, physical activity, and nutritional status, some information were collected from their parents. Parents were requested to respond to the survey. The respondents answered questions that relate to some demographic as well as psychosocial information relating to eating behavior and physical activity patterns. The questionnaires were sent home through the students. Only parents who agreed to participate in the study were asked to fill out the questionnaire. Due to language barrier or the decision of parents not to participate in the study, among potential 72 parents, 43 parents responded to the survey. Parents were asked to fill out the questionnaire only once. No follow-up survey was carried out. A number of parents were also invited to focus group discussion sessions to explore responses from the questionnaire. No direct program intervention was carried out among students' parents. In program evaluation some parents were once again invited to participate in FGDs and IDs.

Group 3: Other key informants (n = 28)

Five different sub-groups of respondents were included in this category

including the school administrator, principal, assistant principal, students, parents and canteen staff. They were selected because of their capability to provide rich information regarding eating behavior, physical activity, school environment (program and organizational structure) and influence the establishment of the school-health program at ASB. The table below shows the number of people involved and the type data collection method that was appropriate for each group.

Table 4.1 Number of key informants and method of data collection

Key informants	Number	Method of data collection
1. School administrator	1	In depth interview
2. School principal	1	In depth interview
3. Assistant principal	1	In depth interview
4. Grades 4-6 students	18	Focus group
5. Parents	5	In depth interview; focus group
6. Canteen staff	2	Focus group
Total	28	

4.3.5 Instrumentation

The measures in this were three major instruments consisting of a survey questionnaire, interview guidelines (used in focus group discussions and in-depth interviews), Food Frequency Questionnaire and BMI-for-age growth charts.

1. Interview-questionnaire

A questionnaire was constructed for this study. The 78-item questionnaire contained five sections: a) background and demographics; b) knowledge; c) attitude and beliefs; d) eating and exercise self-efficacies; and e) eating and physical activity behaviors. The questionnaire was adapted from several sources including Johns

Hopkins Weight Management Center (2003), The Massachusetts Youth Risk Behavior Survey Questionnaire (1999) and Prospective Urban and Rural Epidemiological Study (2003). The questionnaire consisted of true/false, multiple choice items and scales.

The parent questionnaire was almost identical to the students' questionnaire. The purpose of the parent questionnaire was to collect demographic information, parental knowledge, attitudes and beliefs regarding nutrition, eating practices and physical activity patterns. The questionnaire had 45 objective questions (true/false, multiple choice, matching items and scales).

As these instruments were adapted from previous studies, some items were taken intact but some were modified to suit the study context. The questionnaire was pre-tested to a number of students and parents who were not the target groups, to test for consistency and reliability. The questionnaire was used for both pre test and posttest. All scores were classified into two categories and given a categorical score of "1" (good, positive) and "0" (poor, negative).

Background information and demographics

The first part collected information such as grade, age, sex, ethnicity, household size, birth order, number of years living in Thailand, parental education, parental work status, family income, diet (food consumption), meals eaten at home, type of food commonly consumed, access and use of recreation/exercise facilities, and interpersonal influences. This section is very contextual and therefore was constructed by the researcher.

Knowledge and attitude/beliefs (KAB) tests

Regarding nutrition knowledge, attitude and beliefs, this study used knowledge, attitude and beliefs tests. These were subjective tests and were used as both pretest and post test. The majority of the items in the KAB section were adapted from previous studies including Johns Hopkins Weight Management Center (2003), The Massachusetts Youth Risk Behavior Survey Questionnaire (1999) (National Center for Chronic Disease Prevention and Health Promotion, 2002) and Prospective Urban and Rural Epidemiological Study (2003). Some items were taken intact but some were modified and adopted to the study context. Refer to the questionnaire in Appendix A (page 280).

Knowledge test

This consisted of a nutrition knowledge test, which was used to determine what information the participants knew about nutrition. The test contained 10 objective-true/false and multiple-choice questions with 20 correct responses. Outcome variables for knowledge were: ≤10 points (poor) and >10 points (good).

Attitude and beliefs test

Attitude and beliefs scale was used to measure the attitudes and beliefs of the students toward healthful food, their diet, their own weight and about overweight persons. This test includes 20 [5-point scale] items. The total possible score is between 0 and 100 points. Outcome variables for attitude and beliefs were: ≤50 points (negative) and >50 points (positive).

Self-efficacy test

Two self-efficacy questionnaires were utilized for this study: eating self-efficacy and exercise self-efficacy. Perceptions of efficacy are judgments of one's capabilities to perform specific behavior (Bandura, 1998). Self-efficacy judgments determine choice of behavior, effort expended, and persistence. Self-efficacy has been positively linked to behavioral change and maintenance of change in several diet studies. However, few of the studies have included ethnicity as a variable. In this study an eating self-efficacy behavior scale was adapted and used to measure efficacy to engage in diet control and exercise behavior. The questionnaire constructed for self-efficacy were adopted from other studies including

Eating self-efficacy response is on a 7-point scale (10 items), from "no difficulty" (1) to "most difficult" (7). Rating was summed for a possible score between 10 and 70 for diet efficacy. The lower the score, the lower the difficulty to engage in diet control. In this study, the scores were classified as: ≤35 points (good) and >35 points (poor).

For exercise self-efficacy, a 7-point scale (10 items), from "not confident" (1) to "very confident" (7) response was used. Rating was summed for a possible score of 10 to 70. The higher the score, the higher self-efficacy to engage in exercise behavior. The scores were classified as: ≤35 points (poor) and >35 points (good).

Diet (food consumption)

This study used food frequency questionnaire (FFQ) to measure individual diet or food consumption. The FFQ provided an overall picture of the type and frequency of foods students' eat and the variety in their diets. Three FFQs were used to collect food

frequency from which an overall diet can be estimated. The FFQ were classified into six food categories: starches, vegetables, fruit, dairy products, protein sources, and fat/oils/sweets. A total of 53 types most common food were listed. The frequency of consumption was expressed in terms of times per day and classified as: none (1); 1 time per day (2), 2 times per day (3), 3 times per day (4), and >3 times per day (5). The students were asked about what they ate and drank and the frequency of consumption from the previous day. Prior to the administration of the FFQ students were provided with guidelines regarding portions or serving sizes. This provided information on the frequency of consumption of foods and nutrients but also on the amount of foods eaten. Due to the limited number of students, intake level of each food component from the FGP was collapsed into two categories and labeled "good", which was given a score of "1" and "poor", which was given as score of "0". In an effort to provide rating for diet, in this study, overall food consumption (diet) was calculated and reported as total component score. The total possible component score is "6". A component score between 4-6 is considered "good" diet. For example, a score of "4" means that a student consumed the recommended number of servings per day in four of six food components. In contrast, a component score between 0-3 is considered as having "poor" diet. For example, a component score of "3" means that a student exceeded the recommended number of servings per day in three of six food components.

Table 4.2 Classification of food intake by component

Component	Servings/day	Intake level		Label	Score
Starches	6-11 servings/day	<6 servings/day	Low		
		6-11 servings/day	Moderate	Good	1
		>11 servings/day	High	Poor	0
Vegetables	3-5 servings/day	<3 servings/day	Low	Poor	0
		3-5 servings/day	Moderate		
		>5 servings/day	High	Good	1
Fruit	2-3 servings/day	<2 servings/day	Low	Poor	0
		2-4 servings/day	Moderate		
		>4 servings/day	High	Good	1
Dairy products	2 – 3 servings/day	<2 servings/day	Low		
		2-3 servings/day	Moderate	Good	1
		>3 servings/day	High	Poor	0
Protein sources	2 – 3 servings/day	<2 servings/day	Low		
	(6-7 ounces)	2-3 servings/day	Moderate	Good	1
		>3 servings/day	High	Poor	0
Fats/oils/sweets	Use sparingly	0-3 times/day	Low		
	(≤6 times/day)	4-6 times/day	Moderate	Good	1
		>6 times/day	High	Poor	0
TOTAL COMPONENT SCORE					**6**

Physical Activity/Inactivity

To collect data on physical activity, the questionnaire used was a combination of the International Physical Activity Questionnaire and other epidemiological studies regarding determinants of adolescent physical activity and inactivity. Physical activity was based on type, frequency and duration of activity per week. Physical inactivity was based on number of hours spent on TV/video viewing and computer game use. Due to limited number of students, the three categories were collapsed into two categories "*good*" and "*poor*" (Table 4.3).

Socio-demographic, psychosocial and environmental correlates of physical activity and inactivity were used as variables including gender, age, ethnicity, parental education, parental work status, family income, access to recreation/exercise facility, utilization of recreation/exercise facility, exercise self-efficacy and parental influence.

Table 4.3 Physical activity/inactivity chart

Physical activity	Categorical score	MET	Label	Score
0-2 times per week	Low/inactive (1)		Poor	0
3-4 times/week	Moderate (2)	At least 6000 MET-min/week	Good	1
>4 times/week	High (3)	1,500 - 3,000 MET-min/week	Good	1
Physical inactivity				
<3 hours/day	Low		Good	1
3-4 hours/day	Moderate		Good	1
>4 hours/day	High		Poor	0

2. Interview guidelines

Qualitative data were collected pertaining to: a) attitudes and beliefs related to eating behavior and physical activity and; b) opinions about school-promotion program at ASB, were collected through focus group interviews and in-depth among key informants. Overall formulation of the "Shape for Health" program used participatory programming between all school constituents. Data that were collected explore the issue of overweight at ASB as well as reflect school policies or regulations regarding health activities, physical education, and school food service. The ability of the school to sustain the program after research phase-out, was a vital information that was collected.

Focus group discussion (FGD)

Techniques and tools of FGD sessions were developed for the audiences. Included in the FGD sessions were students, school personnel, canteen staff, the PTO and selected parents. FGD sessions were conducted at designated places where the participants were most comfortable to express themselves. The researcher ensured that a dynamic interaction between all members is happening. Members were encouraged to voice their opinions and allowed to react to comments made by other members. Before

ending the interview session, discussion themes were laid out to the participants and validated if they were correct or not.

In-depth interviews

In-depth one-on-one interviews were carried out with the school administrator, principal, assistant principal, selected teachers and parents. Other school personnel who opted for in-depth interviews rather than with FGD were accommodated. The interview guideline was similar with the FGD. Interviews were conducted at suitable venues, normally, office.

3. Body mass index-for-age percentiles

Body mass index-for-age percentiles were used to collect data on the nutritional status of the children in the study. BMI is commonly used in judging nutritional status. Although BMI were collected, it was not used as a main indicator of program effectiveness since the program was implemented in a short time period. The data were collected using a bathroom scale to measure weight and a meter scale to measure height. These data were collected on a monthly basis.

BMI is the best measurement for assessing weight in children. BMI calculation for children is age and gender specific due to the difference in growth rates of boys and girls. Children whose BMI is $<5^{th}$ percentile is considered underweight; children $\geq$5th percentile to $\leq 85^{th}$ percentile are considered normal weight; children $>85^{th}$ percentile to $<95^{th}$ percentile are considered at-risk for overweight; and children $\geq 95^{th}$ percentile are considered overweight (CDC, 2000).

Some researchers refer to the 95th percentile as overweight and others as obesity. The Centers for Disease Control and Prevention (CDC), which provides national statistical data for weight status of American youth, avoids using the word "obesity," and identifies every child and adolescent above the 85th percentile as "overweight". For the purpose of this study, weight status was collapsed and classified into ≤85th BMI-for-age percentile (underweight and normal) and >85th BMI-for-age percentile (at risk of overweight and overweight). BMI for-age was used in this study for the following reasons:

- Students at ASB compose of various nationalities
- According to CDC (2000), BMI-for-age provides a reference for adolescents that can be used beyond puberty
- BMI-for-age in children and adolescents compares well to laboratory measures of body fat
- BMI-for-age can be used to track body size throughout life

Socio-demographic, psychosocial and environmental correlates of weight status were used as variables including gender, age, ethnicity, parental education, parental work status, knowledge, attitudes, beliefs, food frequency, number of meals eaten at home, restaurant food/fast food consumption, physical activity/inactivity levels, self-efficacy and parental influence.

4.3.6 Hypothesis Testing

Establishing and testing hypotheses is an important part of statistical inference. Usually hypothesis is based on some theory, which is put forward for one of two reasons: it is believed to be true or it will be used as a basis for argument, but has not

been proved (StatPac, 2004). The two competing claims are the null hypothesis and the alternative hypothesis. These two hypotheses are not treated on an equal basis with the null hypothesis getting a special consideration. The outcome of a hypothesis test is "reject H_0" or "do not reject H_A".

The general procedures used in this study to test a statistical null hypothesis are:

1. The null hypothesis is stated as H_0 and the alternative hypothesis H_A.
2. The significance level was specified at alpha 0.05.
3. Test statistics included 95% confidence interval.
4. The acceptance of the null hypothesis was based on acceptance region of the test p-value 0.05 or under for both univariate and multivariate analysis.

4.3.7 Variables in the Study

In this study, three variables were examined. Based on the Precede-Proceed framework, the three variables are: intervention variables, intermediate variables and outcome variables. The intervention and intermediate variables and their outcomes on food consumption (diet), physical activity/inactivity and weight status (BMI) were measured separately.

1. Intervention variables

The intervention variable is "Shape-for-Health" program. There are five components under this program including nutrition policy, nutrition education, physical activity, food service and BMI monitoring. The components were investigated based on whether they were implemented or not and the quality of implementation. Obtaining commitment of school authorities, mobilization and involvement of key players,

capacity building of program implementers (school personnel and parents) and coordination of program activities were strategies used to enhance program effectiveness.

Qualitative methods were used to gather data regarding the "Shape-for-Health" program. Observations of the program, whether effective or not, useful or not, good or needs improvements, recommendations and etc., were based on verbal information provided by the respondents. Data collected were analyzed and reported in narrative format.

2. Intermediate variables

The intermediate variables were grouped into three factors: a) predisposing factors, b) enabling factors and c) reinforcing factors.

Predisposing factors

1. Diet (food consumption)

- Socio-demographic factors include gender, age, ethnicity, parental education, parental work status and family income
- Psychosocial factors include students' knowledge, attitude, beliefs, and eating self-efficacy; parental knowledge, attitude and beliefs
- Behavioral/lifestyle factors include type and frequency of food consumption, restaurant food/fast food consumption
- Environmental factor include parental influence

2. Physical activity/inactivity

- Socio-demographic factors include gender, age, ethnicity, parental

education, parental work status and family income

- Behavioral factors include type, frequency and duration of activity or inactivity
- Psychosocial factor include exercise self-efficacy
- Environmental factors include parental influence, physical activity of parents, access, and utilization of recreation/exercise center

3. Weight status

- Socio-demographic factors include gender, age, ethnicity, parental education, parental work status and family income
- Behavioral factors include diet (type and frequency of food consumption), physical activity and inactivity patterns
- Psychosocial factors include eating and exercise self-efficacy

Enabling factors

1. School-health promotion program (Shape-for-Health)
2. Skills to make healthy food choices

Reinforcing factors

1. Regular BMI monitoring
2. Reduction in BMI/weight maintenance

3. Outcome and impact variables

In this study, there are three outcome and impact variables. These variables

were collected [mostly] by utilizing quantitative methods. These variables were students':

1. Diet
2. Physical activity/inactivity patterns
3. Weight status (BMI)

4.3.8 Procedures

The study process was divided into three major stages a) program planning, b) implementation, and c) program evaluation. The conduct of situation analysis obtained data that were vital to rationalize development of the school-health promotion program at ASB. The prevalence of overweight was determined and eating behavior and physical activity factors were investigated to shed light to potential behavioral-related causes of overweight. The information gathered was used as guidelines in the development of the school health promotion program.

The steps taken in this research is shown in Figure 4.1. The steps are outlined in detail.

1. Program planning

Meeting with stakeholders

Program planning is the arranging of pre-requisites for program intervention. Planning involved meeting with various stakeholders (school administration, school personnel, students and parents) to secure their commitment for the development of the school-health program. Information about the development of the *Shape-for-Health*

program was disseminated through teachers' meetings, PTO meetings and letters to parents.

Situation analysis/assessments

A nutrition screening was conducted to determine weight status among all students in grades 4-6. Assessments or situation analysis was carried out to understand the dietary intake and physical activity patterns of these students. To collect the necessary information, three instruments were used including survey questionnaire, interview guidelines and BMI-for-age percentiles. The survey is a structured interview format that was used to gather information on students' eating and physical activity behaviors. Students and their parents were requested to respond to the questionnaire. The survey was administered in the classrooms. The questionnaire was self-administered for most students. Students having language problems, a combination of interview-questionnaire was used. The parent questionnaire was sent home.

Qualitative data were gathered through a combination of structured and open-ended interview methods. Data were used to help explain data obtained from the survey. The interviews were conducted in the classrooms or respective offices of school personnel. Parent interviews were carried out in the conference room and cafeteria.

Establishment of school health team

A school health team was established and their roles outlined and agreed upon. Participation in the health team member was sought from teachers and parents. Being a member of the health team was voluntary. The health team composed of six members. For the school health promotion program to function effectively, manpower is needed.

The philosophy of the school health program was developed as a joint effort by the school, students and parents and reflected and complemented the beliefs and values of everyone concerned. The success and effectiveness of the (school health) program depended in large measure upon the common understanding on the part of each group and each individual involved. The health team was also "key" to program sustainability.

2. Program Implementation

The strategies under the five components of the school health promotion program and how the program was carried out are outlined below. The guidelines for promoting healthy eating and physical activity were adopted from the Missouri Healthy Weight Program (Missouri Coordinated School Health Coalition, 2003).

Components of Shape-for-Health program

The components of the program were nutrition policy, curriculum/instruction, physical activity and school food service program.

Nutrition policy

The policy included guidelines on the other three program components: nutrition curriculum/instruction, physical activity, and school food service. The researcher and the health team drafted the policy and circulated to concerned authorities for comments before its finalization. The policy was evaluated based on the achievement of the objectives set forth. Qualitative data methods were used to collect data on development, use and effect of the policy.

Nutrition curriculum/instruction

The school did not have an existing health curriculum nor did it provide a methodical health or nutrition education to its students. The human body and functions were taught in Science class. Some information regarding consequences of eating unhealthful foods were provided once to some students during a PE class. This study helped ASB in developing a curriculum. Instruction was used as a method to enhance healthful eating and physical activity among the students. The effectiveness of nutrition education was based upon improvements in students' eating behavior and physical activity. The nutrition education criteria that were observed and evaluated were the following:

- Provide nutrition instruction designed to help students develop knowledge, attitudes and behaviors they need to maintain a healthy lifestyle especially healthful eating and physical activity.
- Help the students develop knowledge and skills, not just facts.
- Make nutrition education activities fun.
- Involve students, teachers, administrators, and parents in delivering strong, consistent messages about healthy eating as part of a coordinated school health program.
- Collaborate with school personnel to reinforce the link between sound dietary practices and regular physical activity for weight management.
- School personnel should act as role models and provide effective communication to students on how to improve eating behaviors and promote physical activity.

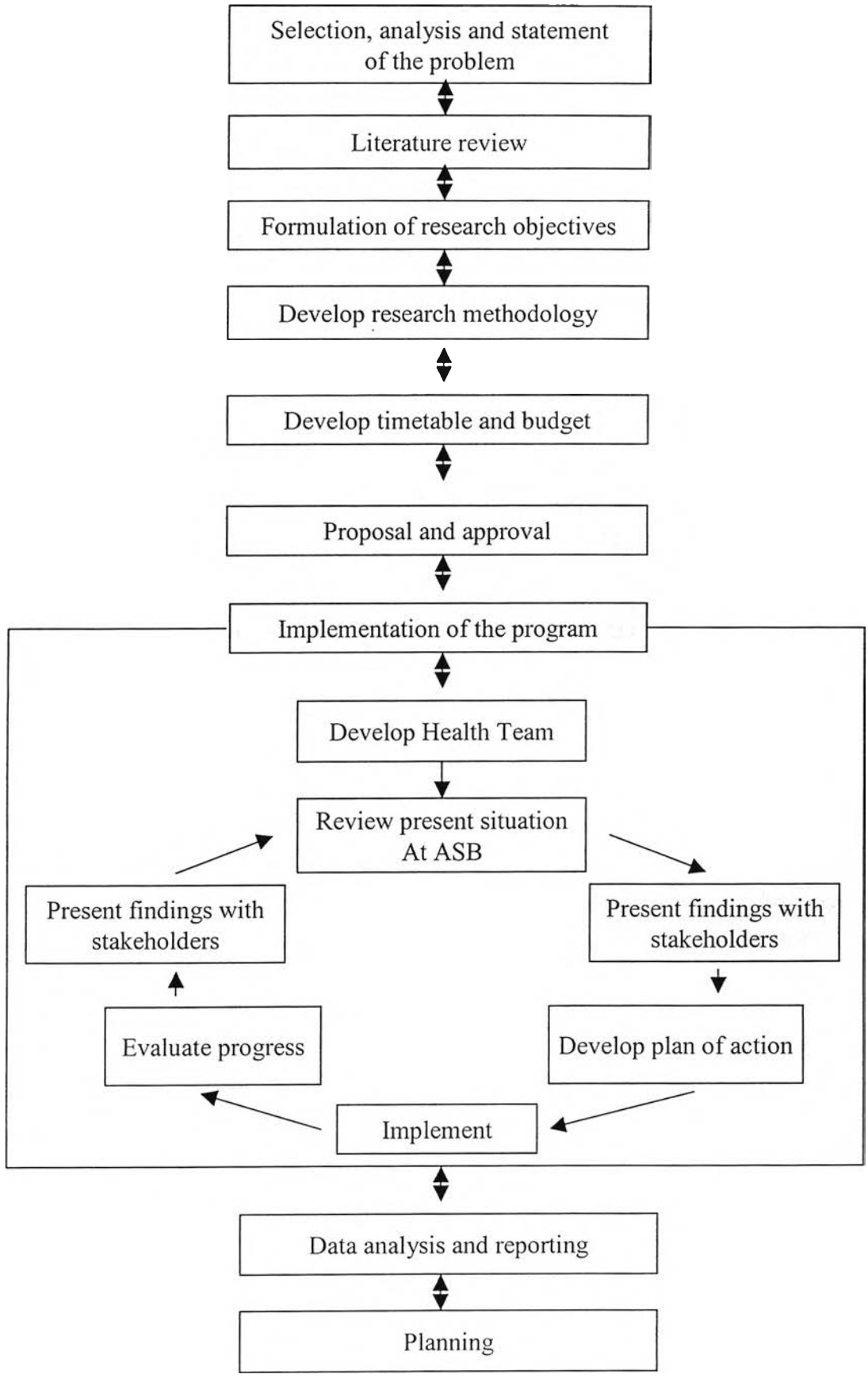

Figure 4.1 Steps in "Shape for Health" Program Research at ASB

A nutrition curriculum was developed for students in grades four through six. Topics and teaching methods were adapted from three main sources:

1. Comprehensive School Health Education (Meeks, Heit and Page, 3rd Edition, 2003)
2. Get To Win (Pongthananikorn, 2003); and
3. Missouri School-Age Children Health Services (MSCHS) Nutrition Training (Arni, 2002).

A wide variety of teaching methods and tools were used to help students understand nutrition concepts. The education curriculum consisted of an 8-week curriculum. Please refer to Annex for the nutrition curriculum. The contents of the curriculum are:

Week	**Topic**
1	Knowing My Body Weight
2	The Foods I Eat/The Food Guide Pyramid
3	Evaluating Food Labels
4	Making Healthful Choices/Planning a Healthful Diet
5	Physical Activity
6	Developing Exercising Skills
7	Maintaining a Desirable Behavior
8	Going for It!

As part of the curriculum, the students were taught to keep a record of their BMI on a monthly basis to monitor their growth. They were also taught to keep a food diary to track the food they eat and then analyzed according to nutrients necessary for

children their age. Teaching methods include hands-on activities, group work and games. A project was also required of the students. Each student was asked to submit at least one healthy recipe. The recipes were combined and bounded as "The Healthy Recipe" book by ASB students.

Physical activity enhancement

Another purpose of this study was to enhance physical activity among the subjects. As part of the "Shape for Health" program, students were taught physical activity skills as well as encouraged to participate in regular physical activity that is to be performed on most days of the week. The PE curriculum was also reviewed and feedback for improvement was provided to PE teachers.

Physical activity was tracked through a questionnaire as well as observations during PE classes, organized sports and Friday club. The criteria of physical activity that were observed were:

- Provision of daily opportunities for physical activity for all students in PE class at least 20 minutes of vigorous physical activity.
- Provision of opportunities for physical activity through Friday clubs.

School food service

The school did not have a written policy on what the aim of the School food service was. Therefore, this study was to assist the School food service to provide written policy on food service. The school food service program was assessed through a survey and interviews conducted among the cafeteria consumers. Improvement to the service conducted. The criteria for food service were to:

- Assure that school meal menus for lunch and breakfast meet the dietary guideline standards.
- Assure that healthy and appealing foods are available in meals, a la carte items in the cafeteria, snacks, and at special events such as staff meetings and PTO meetings.
- Encourage school food service to offer choices that exceed the minimum nutritional requirements.
- Promote awareness of the definition of foods of minimal nutritional value that may be sold inside or outside of the food service area.
- Integrate school food service with nutrition education and with other components of the school-health program to reinforce messages on healthful eating.
- Give students repeated opportunities to practice healthful eating.

BMI monitoring

A monthly weight and height monitoring was conducted to scrutinize changes in nutritional status. Students were taught to monitor their BMI on a monthly basis:

- Each student was given a growth-monitoring chart (BMI-for-age).
- Students were taught how to calculate their BMI.
- Weight and height are collected every month.
- Students plot their BMI on the growth chart.

3. Program evaluation

The purpose of the evaluation was to measure whether the anticipated goals

have been achieved. In this study, there are three indicators of success: 1) If the students improved their eating behavior; 2) If the students enhanced their physical activity; and 3) If there is an improvement in students' nutritional status. A systematic assessment of the outcomes as well as process of the program was conducted. The results were compared to determine differences in scores before and after program intervention. The evaluation instrumentation and methods were similar with the ones used in situation analysis.

4.3.9 Data Analysis

Data were collected in two main categories: quantitative and qualitative. Data collected from this study were analyzed using various statistical methods.

Quantitative measures

Quantitative research methods are normally used by researchers because it allows responses to be quantified. Responses can be counted and expressed in numbers. Quantitative methods are used to compute the size, distribution and association of variables in a given population. Survey method is a popular quantitative research method. A structured questionnaire was used to collect quantitative data needed for this study. Data analysis is usually based on research objectives. Questions that were normally asked in this study are:

- Describe the variables. For example, what is the distribution of overweight in the study population?
- Look for differences between groups. For example, what are the differences between eating behavior among girls and boys?

- Determines the association between variables. For example, what are the associations between eating behavior and physical activity and nutritional status?

Qualitative measures

Qualitative measures involved the use of qualitative data including interviews, document review and participant observation to understand and explain social event. Examples of qualitative methods are action research, case study research and ethnography. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions. Mobilization, participation, capacity building and coordination were used in the conduct of this study to improve program sustainability. It aimed to contribute in increasing awareness regarding overweight among ASB students, parents and school personnel. Program development became a collaborative effort by those concerned to bring about sound solution to the problem at hand.

4.3.10 Validity and reliability

Quantitative and qualitative methods were used to enhance the validity of this study as it dealt with behavioral issues relating to eating and physical activity among the subjects.

To strengthen validity and reliability, this study used existing survey tools in collecting the data needed. Dietary assessment instruments are used in many studies wherein type of food and frequency of intake are of interest. The FFQ comprises a list of foods and beverages on which the respondents report their frequency of

consumption. In this study, students were asked what they consumed the day prior to the survey and responses of none, 1 time/day, 2 times per/day, 3 times/day and >3 times/day, as response choices. Prior to the administration of the FFQ, food portion sizes were provided and discussed. Some types of food were adjusted to reflect types of food that are common among various cultures -- Asians and Westerners. This was necessary since this study was conducted in an international school environment with cultural diversity. Three FFQs were used to assess dietary intake.

FFQ is easily obtained and respondents can usually recall what they have consumed. However, there are some difficulties including: difficulty in estimating portion sizes; difficulty remembering everything; one day food consumption may not be representative of overall diet; and pressure to say what is perceived as desired. In an effort to reduce disadvantages, the following were established:

1. Students were asked to remember how many times each item was consumed; general portions were discussed. For example, ½ cup of cooked rice, a bowl of noodles, a cup or glass of coke/juice, a slice of cake/pie, or a slice of bread, etc. Food consumption was compared with the number of recommended servings from the FGP, in the analysis, number of servings per day serving was emphasized.
2. Surveys were conducted during the first class period.
3. Three FFQs were collected.
4. Students were told that the activity was not a test but rather a survey to understand the eating and physical activity patterns among the students. Students were told that there was no right or wrong response and that the information will be kept strictly confidential.

5. The researcher administered the survey.

Physical activity records have been shown to be quite accurate for capturing total activity. Such records can provide information regarding type of activity, frequency, intensity, and duration. This study used a standard seven-day recall (times/week) questionnaire methodology used in most epidemiological studies. The assessment used questions similar to those used and which was validated in many other similar studies to categorize adolescent physical activity and inactivity patterns. The scoring protocol was patterned after the International Physical Activity Questionnaire (IPAQ) and based on type, duration and frequency per week in various physical activities. Each physical activity was assigned an MET value (Fitmaster, 2004). In this study, the three levels of physical activity were low, moderate and high.

Physical inactivity on the other hand lacks reference. There is little known in the literature about reliability and validity of inactivity. Therefore, this study used what was developed by Johns Hopkins Weight Management Center. For example, number of hours watching TV/video, and number of hours in computer game use.

Knowledge, attitudes and beliefs questionnaire were adapted from existing dietary and physical activity questionnaires including the Youth Risk Behavior Surveillance System (YRBSS) developed by CDC (2002), KAB questionnaire (Stevens et. al., 1999).

The Eating Self-Efficacy Scale was adapted from other studies is a seven-point Likert scale. This is a 10-item instrument developed to test a student's confidence to make dietary choices from 1 (no difficulty) through 7 (very difficult). The total score is computed by adding all 10 items. Lower score means having little difficulty in making dietary choices. Higher score means having more difficulty in making dietary choices.

Likewise, the Exercise Self-Efficacy Scale was adapted from other studies is a seven-point Likert scale. This is a 10-item instrument developed to test a student's confidence to exercise to perform physical activity from 1(not confident) though 7 (very confident).

BMI is commonly used to classify overweight and obesity among adults but is also recommended for use in children to identify those who are overweight or at risk of becoming overweight. Cut off criteria are based on the CDC BMI-for-age growth charts that was developed in 2000 for the United States. BMI was used in this study to judge weight status among students in grades 4-6 at ASB.

4.3.11 Ethical Issues

Before the conduct of this research, the investigator clarified what the study aimed to accomplish. What the study can and cannot do, were clearly stated with all concerned including school personnel, parents and students. Key ethical agreements were observed in the conduct of this study:

1. Voluntary participation. All participants were informed that their participation in the research is voluntary. Consent was sought from school authorities, teachers, parents, students and other school personnel prior to the nutritional screening and interviews by the use of an information sheet, which was circulated one month prior to data collection and consent form before administration of the questionnaire.

2. Anonymity/confidentiality of data. Spoken or written information that were provided were ensured by the coding of records. Rules were also established for the participants and researcher at the start of the interviews. Members of FGDs agreed to keep what each other said confidential. Although findings from the study were

presented, those who provided information were kept anonymous. In the case of student participants who were under the age of 16, and as part of the program intervention, parents or guardians were informed of their child's BMI.

4.4 Assumptions and Limitations

Gathering preliminary information on nutrition behaviors among students enrolled at the ASB was the initial step of this research. The goal of the research was to establish a school health promotion program to enhance healthy eating and physical activity among the students attending ASB. The primary assumption of this research was that eating behaviors and physical activity among students enrolled at the American School of Bangkok are not radically different from other children in affluent countries. Based on experience from other countries, it was assumed that students at ASB have poor eating behaviors and low physical activity that may lead to poor nutritional status, overweight or obesity in particular.

Another assumption pertained to the school as a valuable entry point for enabling children to grow healthy. The school provides the most effective and efficient way to reach children, school personnel, and families; to improve both eating behaviors and physical activity and prevent nutrition-related health problems and that these behaviors can be modified through effective education.

Three limitations should be considered in this study. The first deals with methodological limitation. Most gathering-data tools were adapted from the United States. Most of the Asian studies similar to this current study also utilized materials developed in the West. However, in the U.S. these tools were used among subjects from various ethnic backgrounds including Asians. In particular, the food frequency

method that was used has the following limitation (Labadarios, 1999): 1) Estimation of food quantities may not be as accurate as the recall method. The FFQ may over or under estimate dietary intakes; 2) Detailed information on day-to-day variation in the diet cannot be collected; 3) Results may be influenced by the foods included in the list; and 4) A FFQ developed for one population may not be appropriate for use in other populations. To help control limitations in this study, before the tools were used, items were modified where appropriate, a field test was conducted and adjustments were made to reflect contextual conditions.

Secondly, materials and resources pertaining to eating behavior, physical activity and nutritional status among affluent school-age children, children in an international school with multi-ethnic background are very limited. Limited materials made it difficult to make comparisons with similar groups of Asian children.

Thirdly, the number of subjects is quite small. Therefore, findings in this report were subject to the limitation that these data apply only to grades 4-6 children who attend a private international school and, therefore, are not representative of all children in this age group. Interpretation of data from this study should be approached with caution. The generalizability of these results is limited, because the intervention's intensity was aimed at one group of students, no control schools were studied, and the long-term effects of the intervention were not examined.

4.5 Summary

Chapter IV presented the purpose of this study and the questions examined. The rationale, setting of this study was described and the population and samples discussed in detail. The instrumentation and methodology section included a description of the

tools used in data collection including reliability and validity issues. Assumptions and limitations of the study were also discussed. Finally, the chapter outlined the analysis of data, the statistics that were used and the approaches taken with qualitative information.