CHAPTER II

LITERATURE REVIEW

2.1 Introduction

No study has been carried out to understand eating habits and physical activity patterns among students enrolled in a private international school. Nor is there a study regarding school-health program in an international school setting.

Many principal determinants of diseases and death worldwide are due to poor behavioral choices including poor eating habits and inadequate exercise. Many relevant literatures provide scientific evidence that diet plays a vital role in health promotion and disease prevention (American Obesity Association, 2004). Healthy eating habits and physical activity have the potential to lower the risk of chronic disease. Health promotion is one of the best way strategies in preventing and decreasing the effects of chronic diseases.

The Alma Ata Conference in 1978 stated that millions of people do not have access to health care. Therefore, health had to be recognized as a human right. "Health for All by the year 2000" was a plan developed so that all people in all countries should have at least such a level of health so that they can be productive and active. It was also agreed upon that health, can only be reached through multidimensional coordination of the health and other social and economic development sectors. Eight years later, the First International Conference on Health Promotion took place and the Ottawa Charter was drafted. It was recognized that health promotion requires a change on people's view on health. As delineated in the Ottawa Charter, a paradigm shift is needed from

illness prevention to wellness orientation. Analogous to the Alma Ata Conference, the first conference on Health Promotion in 1986 presented the Charter for action, as a strategy to achieve "Health for All" by the year 2000 and beyond. The map to attaining equity in health includes a secure foundation in a supportive environment, access to information, life skills and opportunities for making healthy choices. Health should be accessible to people within the settings of their everyday life. The School Health Promotion program was conceived to reach children where they learn, play, build character and form values.

The following literature relevant to nutrition among adolescents aged 9-12 years was reviewed:

1. Eating behavior and factors influencing eating behavior
2. Physical activity/inactivity and factors influencing physical activity/inactivity
3. Nutritional status and factors influencing nutritional status
4. School health promotion program
5. Coordinated school health promotion program and models

2.2 Review of Previous Studies

2.2.1 Eating behavior

Multiple interacting factors impact eating behaviors and ultimately nutrient intake. There are two main factors that influence eating behaviors.

Behavior, environment and genetic factors have an effect in causing people to be overweight and obese. Although genetics play a role in obesity, genes alone cannot be responsible for it. Some illnesses or intake of certain drugs may also lead to obesity

or weight gain. For many though, obesity is a consequence of excess calorie intake inadequate exercise.

Other risk factors associated with obesity and overweight were also determined. Regarding consumption of fruit and vegetables by overweight, it was revealed that those who are overweight or obese are eating less fruit and vegetables. In relation to physical activity, those who regularly exercise are less likely to be overweight or obese.

Trends in the US that may contribute to children of unhealthy weight are (Doyle and Associates):

- Eating patterns have changed.
- Approximately 70 percent of children consume diets exceeding dietary recommendations for total fat and saturated fat.
- Fruits and vegetables are less eaten. At least 90 percent of children 6-11 years old are not consuming the recommended minimum of five servings of vegetables and fruits per day.
- The food choices of most children do not meet the recommended intake of food groups according to the Food Guide Pyramid.
- Although lower fat milk has replaced higher fat milk, milk consumption has decreased by 36 percent. The decrease in consumption has been followed by increase in soft drinks and non-citrus juices.

2.2.2 Factors influencing eating patterns

1. Socio-demographic factors

The Healthy Eating Index (HEI), a method used to measure American diet, revealed that females tended to have better diet than males (Kennedy et al, 1996).

Among students surveyed, only 30% of females and 42.5% of males consumed the recommended amount of calcium (1300 mg or more per day). Approximately 45% of both females and males ate more than 2 servings of fruit per day, while only about 16% ate more than 3 servings of vegetables per day. Only about 30% of teens met the "5 a day" nutrition recommendation for fruits and vegetables. Grain intake was also low, with only 36% of females and about 44% of males consuming 6 or more servings per day. Over half of the females and almost 45% of the males surveyed met the recommendations for a low fat diet (30% or less calories from fat). According to Story, Neumark-Sztainer & French (2002) recent national data show that only 1% of adolescent males and females meet national recommendations for all the Food Guide Pyramid (8) groups, and 18% of girls and 7% of the boys did not meet any of the recommendations.

Age may play a role in helping to define the risk from obesity. In a study, younger adults, especially men, were found to be more at risk of overweight (www.wy/traveldiet/fataspect.html). According to the researchers at the USDA Center for Nutrition Policy (1996), healthful eating declines the teenage years into early and middle adulthood. Their study revealed that healthful eating is at its highest levels during early childhood and among adults aged 55 and older. Younger students (junior high) had higher calcium, fruit, vegetable, and grain intakes than older students. Fat intakes increased with age for females and remained relatively constant for males across ages. HEI study by CDC showed that diet quality tends to improve with age.

The Healthy Index (USDA, 1998) showed that ethnicity is one factor that affects diet quality. The study showed that blacks and Hispanics had lower HEI scores compared to whites and non-Hispanics. Across ethnicity, nutrient intakes varied

considerably. Fewer African- American and Native American females and African-American males met the recommendations for a low fat diet, as compared to their White, Asian-American, and Hispanic peers. Fewer Asian-American and Hispanic females met calcium intake recommendations compared to their peers. White males most frequently met calcium recommendations, while few Asian-American males met calcium recommendations. Asian-American and Hispanic youth most frequently met the "5 a day" fruit and vegetable recommendation.

Little information exists regarding difference in eating habits between several Asian adolescent groups. Newman (1999) reviewed a study about changes in eating patterns of Asian students in the United States. The students came from China, Hong Kong, Japan, Korea, and Taiwan. This study suggests negative long-term health effects are possible. Another study that was reviewed by Newman (1999), compared nutritional status of three Asian populations and found that Chinese elderly consume traditional foods that are quite healthy. The study also revealed that it was similar with other comparable groups of Koreans and Japanese. The comparison showed minor differences between the groups. Food consumption among Indian population in the US also revealed that unhealthful food is also rampant among Indians. Food is one of the most important aspects of Indian culture. Traditionally, Indian food platters are elaborate and rich. For example, most foods consist of sweets with very high sugar content, rice, and snacks cooked in fats/oils. Sticking to a healthy diet is made harder because more than half the Asian Indian populations are vegetarians.

HEI scores (USDA, 1998) also showed an increase with increasing levels of education. HEI scores were highest among those having four or more years of college

education. In fact, HEI score increase was more related with education than with income.

Previous studies have shown that income and education have positive effects on diet quality. This is mainly due to the fact they provide better opportunities for nutrition information. The same study also revealed that individuals with higher income or education tend to improve the quality of their diet. In the United Kingdom, a study showed that affluence is a key factor in facilitating more frequent eating out (Mintel International Group, 2003).

2. Behavioral factors

Food consumption

A number of studies reveal that unhealthful food consumption is the leading cause of obesity. A diet high in fats and sugars increases calories. High levels of fats are usually found in fast foods and snack type foods. The most popular perpetrators are soft drinks and other sugared beverages (Children, Youth and Family Consortium, 2003). HEI survey revealed that American adolescents have poor diets. According to According to Southwestern Vermont Health Care (SVHC) (2001) sugar intake is a significant problem. Soft drinks, other sugared beverages and fruit juice may be the major contributors to childhood obesity. In the review of the literature, SVHC reported that drinking soft drinks regularly increases a child's risk for obesity by 60%. Fruit and vegetables consumptions among American adolescents do not meet dietary guidelines (Sallis et. al., 2003)

Restaurant food/fast food

Millions of Asians, regardless of their small sizes and seemingly lack of extra fat, have symptoms of obesity. Asian immigrants are becoming obese as a result of the western influence. In the U.S. people seriously rely on prepackaged foods, fast food restaurants and carbonated soft drinks. Although these foods are convenient, they also tend to be high in fat, sugar, salt and calories. Sedentary lifestyle, television, fast-food restaurants, and high technology have influenced Asian behaviors, especially their eating behaviors.

Lifestyle factors such as cost, time demands, convenience, eating away from home and the mass media, marketing, and advertising affect eating behavior. Perceived time constraints, inconvenience, and high cost of foods are lifestyle factors that influence food choices. For example, lack of time is identified as a barrier to healthful eating. One reason given for plate waste in school meal programs is insufficient time for students to eat. Healthful eating is perceived by some consumers to be inconvenient and costly. Recent economic conditions have increased the importance of low food prices for consumers, especially those of lower socioeconomic status. Health professionals need to communicate to consumers that cost need not be a barrier to a healthful diet.

Eating behaviors and dietary quality are influenced by where food is consumed-at home, school, or away from home at restaurants and fast food establishments. Frequently eating at restaurants or fast food establishments may negatively affect the nutritional quality of the diet because of the large portion sizes of foods served and the types of foods often selected. A recent study of nearly 5,000 adolescents found that frequency of fast food restaurant use was positively associated with daily intake of high

fat, high sugar food choices (e.g., french fries, soft drinks) and negatively associated with consumption of healthful foods (e.g., milk, fruit, vegetables, grains). Studies show that children and adults consume more energy from fat and saturated fat and less calcium, fiber, and iron from restaurant and fast food meals than from at-home meals. Children and adults need to recognize how foods consumed away from home contribute to the overall nutritional quality of the diet and learn how to make healthful food and beverage choices when eating outside the home (Dairy Council Digest, 2003).

Numerous lifestyle factors including time constraints, inconvenience and cost of foods, influence food preparation at home and eventually impacting the diet and eating behaviors of children and their nutritional status. A changing environment has also changed the eating habits of Americans (CDC, 2004). Increased selection of food items has caused many to stock their cupboards with all kinds of food, many unhealthful. Ma et. al. (2003) confirms that restaurant food was an important factor in obesity. People who often ate breakfast or dinner in restaurants had two times the risk of being obese compared with those eating at home. Ma et. al. explain that restaurant meals ten to be higher in calories and higher in fat and people tend to overeat in restaurants, which eventually impacts their nutritional status. Marmitt (1991) agrees that fast food restaurants are very common in most city streets. Adolescent are particularly vulnerable for these places. In the U.S., besides restaurant food, other harmful environmental factors include advertising low-priced products, actual sale of low-priced energy-dense food products, marketing of larger portion sizes and prizes, and the country's increased use of convenience foods (Journal of American Diet Association, 2002).

3. Psychosocial factors

Knowledge, attitudes, and beliefs

Knowledge or health information influences food choices. There is much evidence that support the relationship between poor nutrition knowledge and poor food choices.

Results from USDA's 1994-96 Diet and Health Knowledge Survey reveal that nutrition knowledge among Americans (number of servings/day, healthy food, awareness of health problems related to eating behavior, or being overweight) is quite poor.

In a survey conducted among Malaysian children, results show that the level of understanding of children food concept is very shallow and simple. Responses by children regarding eating include: to satisfy hunger, not get hungry, not get stomach ache, to be healthy, not to get sick, or not to die. Only a very small percentage of children understood that eating is needed for growth and to provide energy for play. It was concluded that Malaysian children still do not possess a clear grasp of the concept of eating. Furthermore, the research show that majority of children (91%) indicated that they like eating vegetables, however unclear of the reason why. When asked why they need to eat a variety of food, the respondents provided various answers. Fifty three percent of the children indicated they like drinking Milo or milk but are unaware why water is important.

Greater parental nutrition knowledge and a lower prevalence of overweight among children is another example of the importance of knowledge. However, knowledge alone does not necessarily translate into healthful eating behaviors.

Knowledge may provide the information to implement a behavior change, but it is the individual's attitude or belief that ultimately determines whether or not this knowledge is translated into actual behavior. The association between greater parental nutrition knowledge and a lower prevalence of overweight among children has been established. However, knowledge alone does not necessarily translate into healthful eating behaviors. Knowledge may provide the information to implement a behavior change, but it is the individual's attitude or belief that ultimately determines whether or not this knowledge is translated into actual behavior.

Understanding the multiple factors influencing eating behaviors will assist in bridging the disparity between actual and optimal diets. With this information, health professionals can develop effective nutrition interventions that reduce hindrances and create more prospects to engage in healthful eating behaviors.

Attitudes and beliefs, many of which reflect cultural values, can have either positive or negative effects on eating behaviors. In the review of the literature, a recent study of adolescents in California found that those with positive attitudes about healthful eating intended to consume a healthful diet. Mintel International Group (2003) examined consumer's attitudes toward diet and exercise and found that attitudes play a role in performing actual behaviors. The authors said that although many Americans know that they should eat healthy or exercise, the reality is that they continue their unhealthy habits.

Adolescents who believe that they are too young to be worried about their health are unlikely to make dietary changes. In 1998, Doyle Research Associates was commissioned to undertake a research initiative to explore practices and perceptions about healthy eating and physical activity among adolescents ages 12-17 from low-

income households by The California Nutrition Network for Healthy Active Families (Network) and California Project LEAN (Leaders Encouraging Activity and Nutrition) of the California Department of Health Services (DHS) and the Public Health Institute (PHI). In this study, the Doyle Research Associates found that: a) teens believe there are few healthy choices in fast food restaurants. They feel that salads offered at some fast food restaurants are healthy but do not taste as good as other alternatives and are sometimes more expensive and b) they feel that dinners prepared at home offer the best opportunity for healthy eating because at home one can have more control of types and styles of food preparation and can enlist the cooperation of family members to minimize unhealthy "temptations."

Eating self-efficacy

Weight is determined by a variety of factors: genetics, environment, activity, and emotions. Psychological factors can also lead to eating problems. Psychological factor such as low self-esteem is one cause or the effect of eating problems.

In the review of the literature Schwarzer & Renner (2000) state that dieting, weight control and preventive nutrition can be governed by self-efficacy. In studies they have reviewed, Schwarzer & Renner remarked that self-confident clients of intervention programs were less likely to relapse into previous unhealthy diet. Another study found that people who were overweight were most responsive to behavioral treatment when their sense of self-efficacy is high.

A study by Mounir, Fatohy and Mahdy (1998) on dietary self-efficacy revealed that for almost all items in the self-efficacy questionnaire, boys were more likely to eat healthy food than girls. The range of responses varied from high to low. For example,

when asked about drinking fruit juice or soft drink, the percentage of students reported being "very sure" was 70.1 while adding salt to food was low 16.5%. Overall result showed that the three areas of greatest perceived competence were: ability to drink fruit juice instead of soft drink, eat fresh fruit instead of a candy bar, and to remove or not to eat the fat of meat. Self-efficacy according to the author influences a variety of human actions, especially the self-control of behavior. The researchers went on to say that self-efficacy positively boosts ones' decision to act, the amount of effort made, the persistence of the effort and the emotional and cognitive encouragement. It makes it all the more vital to collect self-efficacy data because self-efficacy connects knowledge and action since the belief in ones self to successfully perform a behavior happens prior to actually attempt the behavior. In the review of the literature, they remarked that self-efficacy also affects the choice of behavior. The results from the study established that knowledge was a predictor of self-efficacy; that self-efficacy and knowledge were predictors of usual food choices. Similarly, the study by Parcel et al (1995) revealed that the strongest predictor of usual food choices was self-efficacy.

Story, Neumark-Sztainer & French (2001) concur that self-efficacy for healthful eating has been found to be an improved variable for predicting eating behavior in studies with adolescents. In the review of the literature, the authors state that high levels of self-efficacy for making specific, healthful food choices were associated with low consumption of high-fat foods and high-sugar foods.

4. Environmental factors

Parental influence

Johnson (2003) states that factors affecting eating behavior of children include: children's food acceptance patterns, familial and psychosocial influences, relationship to parental obesity and eating patterns, and relationship of school environment to learning and performance.

Parents, eating away from home and the mass media can influence food choices and eating behaviors. Maternal modeling of healthful patterns of food intake can have a positive effect on children's dietary patterns. When intakes of milk, soft drinks, and calcium were examined in mothers and their 5-year-old daughters, researchers found that mothers who drank milk more frequently tended to have daughters who drank milk more often and consumed fewer soft drinks.

Parents, mothers in particular, play an important role in shaping young children's eating behaviors by their own dietary behaviors, their attitudes toward food, and the availability of food in the home. Parents can also support more healthful dietary patterns among adolescents, for example, by encouraging family meals.

Other studies indicate that parents, through role modeling, expectations, or attitudes, influence young children's intake of food. Clearly, mothers can positively impact their children's nutritional status, particularly by setting a good example. To improve children's eating behaviors, health professionals need to focus on parents' eating behaviors and encourage them to adopt healthful patterns of food intake.

There is significant number of studies that investigated genetic links between parent and child weight status. However, research on the degree to which parents

(especially overweight parents) choose environments that promote overweight among their children, has been limited. Parents are the first and significant providers of food for their children's and thus provide the environment for their child's early experiences with food and eating including their own eating behaviors and child-feeding practices.

In the review of the literature, Birch and Davison say that research indicates that parents' own eating behaviors and their parenting practices influence the development of children's eating behaviors. In particular, parents who are overweight, who have problems controlling their own food intake, or who are concerned about their children's risk for overweight may adopt controlling child-feeding practices in an attempt to prevent overweight in their children. Unfortunately, research reveals that these parental control attempts may interact with genetic tendency to promote the development of problematic eating styles and childhood overweight. A primary public health goal should be the development of family-based prevention programs for childhood overweight. Especially during early and middle childhood, family environments are the key contents for the development of food preferences, patterns of food intake, eating styles, and the development of activity preferences and patterns that shape children's developing weight status.

Working parents has also shown to complicate and aggravate the problem. Children usually eat at least one meal in school. After school, they once again are in the care of somebody else other than the parent. Research also shows that at least 30% of a family's income is spent on food consumed outside of the home (Dietz, 1998).

2.2.3 Physical activity/inactivity

While poor eating habits have been blamed for weight problems, studies among US children suggest that food intake appear to be the same. However, physical activity among children has significantly decreased. According to Kids Healthworks (2003) a physically inactive child is more likely to have a weight problem. Overweight and sedentary lifestyle has become a health concern. Lack of exercise is one of two reasons that contribute to increase in overweight.

In Canada, research show that young people face several problems such as poor eating patterns that contribute to chronic health problems, such as cardiovascular disease, diabetes, cancer and osteoporosis, later in life; obesity in children is increasing and appears to be related to inadequate physical activity with 25% of children and youth found to be inactive.

2.2.4 Factors influencing physical activity/inactivity

1. Socio-demographic factors

CDC (2002) remarked that males tended to be more active than females. It concluded that gender difference were the same among various ethnic groups. In the review of the literature, CDC stated that this difference might be attributed to disparities in development of motor skills, body composition and their socialization toward sport and physical activity. On the other hand, inactivity prevalence was not different for adolescent males and females but at age 17, where a high percentage of females were physically inactive. Forty eight percent of girls and 26 percent of boys do not exercise vigorously on a regular basis. One fourth of all children watch four or more hours of television per day.

The finding above was also concurred by a study conducted among Asian children, 8-10 years of age, from Kuala Lumpur, Bogor and Manila, which found girls to be less active than boys at all ages (AFIC, 2004).

A study by Gordon-Larsen, McMurray and Popkin (2000) utilized gender as one socio-demographic variable in the correlates of physical activity and inactivity. Findings revealed that among males, the proportion of adolescents participating in the highest level of moderate to vigorous physical activity showed little variability by ethnicity. However, in females, more Hispanic whites and Asians participated in the highest category of moderate to vigorous physical activity and fewer among non-Hispanic blacks and Hispanics. Inactivity level was highest among non-Hispanic black males and females and Hispanic males and females and lowest among Asians and non-Hispanic while females.

Gordon-Larsen, McMurray and Popkin also found that physical activity was low among adolescent samples and declining, as children got older.

The study also revealed that physical activity and inactivity levels were different among various ethnic groups. Physical activity was lower and inactivity higher among non-Hispanic black and Hispanic adolescents. CDC studies in 2002 also showed ethnic differentials with non-Hispanic black and Hispanic children less likely involving in organized activities.

Likewise, adolescent whose mothers had a graduate or professional degree was associated with high inactivity among the sample adolescent (Gordon-Larsen). Studies have shown a consistent relationship between socioeconomic status and health. Education and income are the two most commonly used indicators of socioeconomic status and there is a clear relationship of those having lower education being at an

increased risk for obesity. Among adolescent children 9-13 years, CDC found that involvement in organized activities was lower among children whose parents had lower education levels.

High income in the same study has also shown to be associated with physical activity and inactivity levels. For example, high family income was associated with increased moderate to vigorous physical activity and decreased inactivity (Gordon-Larsen, McMurray and Popkin). In the review of the literature, CDC said that income has a strong inverse relationship with sedentary lifestyle among males and females and across every race and ethnic group. Those with lower socioeconomic status are more likely to be sedentary as those with higher income. Among adolescent children 9-13 years, CDC found that involvement in organized activities was lower among children whose parents had lower incomes.

Students in the US were found to be fairly active. However, students also reported watching TV and videos for an average of 2.6 hours per day on weekdays; close to 50% reported three or more hours per day and 20% reported for five pr more hours per day. Approximately 16% of students use computer (not for homework) for three or more hours per day.

In the review of the literature, Gordon-Larsen, McMurray and Popkin state that inactivity, especially TV viewing, has been associated with obesity. They concluded that higher socioeconomic status measured by mother's education and family income has a significant impact on likelihood of engaging in inactivity. Higher education level was related with lower levels of inactivity. In The United States, excessive television watching was particularly higher among girls and minority children. According to a study, physical activity is decreasing among many pre-pubertal girls.

In the review of literature AFIC (2004) quotes that results for a survey conducted in three Asian countries (Kuala Lumpur, Bogor and Manila) regarding physical activity in children showed that the most popular leisure activities are playing computer games, reading and watching television.

2. Psychosocial factors

Knowledge, attitude, and beliefs

According to Craig, Goldberg and Dietz (1996), identification of factors that contribute to participation in physical activity is important so that effective intervention can be developed. Results from their study of psychosocial correlates of physical activity among 5^{th} and 8^{th} graders revealed that perceived behavioral control and attitude forecasted children's intent to participate. Their findings also found that girls reported to be less good at vigorous activity that boys. Fewer hours of vigorous activity was higher among eight grader girls than boys. Trost et al (1997) concluded that positive beliefs regarding physical activity outcomes is an important predictor of physical activity behavior among the study subjects. DiLorenzo et al (1998) study agrees with these studies. In their study of determinants of exercise among US children, the researchers found that exercise knowledge was one of several important factors to participation in exercise among boys in the study. Likewise, a study by Nader et al (1996) to test the effect of adult participation in school-based family intervention to improve children's diet and physical activity also revealed that dose effects were found for knowledge and attitudes related to diet and physical activity. The researchers

concluded that dose response of a family intervention has been shown in the acquisition of positive knowledge and attitudes toward changes in health behavior.

In regards with physical activity, a study among U.S. Teens by Doyle and Associates show that perceptions, beliefs, attitudes toward physical activity among these Teens were the following:

- Although some Teens describe themselves as less energetic than in the past, many feel they are currently active enough.
- Those who would like to be more active (girls in particular) feel they could be if: schools solicited them more actively for sports; programs were more readily available and affordable; neighborhoods were safer.
- Respondents characterize inactive Teens as: too involved in sedentary activities like TV, computer/video games, shopping; lazy/out of shape; afraid they'll fail or look bad when participating in sports/activities; having unsupportive parents; lacking money and/or transportation.

Exercise self-efficacy

Self-efficacy as a cognitive factor has been shown to be consistently associated with physical activity (CDC, 2004). Accordingly, self-efficacy can be compared to the level of confidence and is founded on judgments of capabilities. In the review of the literature, CDC (2002) stated that studies have shown an association between self-efficacy and physical activity. For example, exercise self-efficacy increases as the person moves from an accustomed sedentary lifestyle to long-term maintenance of regular exercise, and that level of self-efficacy can be both a determinant and a

consequence of exercise. This variable was also found to be a significant predictor of physical activity among Taiwanese eight graders (Wu, 2000).

Self-efficacy is the variable with the strongest and most consistent association with physical activity in different subgroups from the same large study sample. Self-efficacy has been positively related to physical activity among men, women, younger adults, older adults, Latinos, overweight persons, and persons with injuries or disabilities.

The concept has been used as a predictor of health behaviors. Albert Bandura developed the construct of self-efficacy. Bandura's works focus on perceived self-efficacy. He defined self-efficacy as a belief in one's capabilities to organize and execute the course of action required to attain a goal. Within this framework, motivation is the causal predictor of behavior wherein a person believes in her/his capability to perform an act (Bandura, 1997). Bandura says that self-efficacy expectations consist of three dimensions: magnitude, generality, and strength. According to Kids Healthworks the most successful program in weight management concentrates not only on dietary modifications and exercise, but also boosting a child's self-esteem. The author went on to say that losing weight is an inappropriate goal for many children. The goals that is agreed upon should not be principally about weight but about healthy living – healthful eating and physical activity.

3. Environmental factors

Parental influence

Human interactions with others can have an effect on behavior. Social support

has been shown to be positively associated with physical activity. When a child begins school, factors outside the home begin to influence food choice, the frequency of eating, and activity. In the U.S. working parents has shown to complicate and aggravate the problem. A study on parent-child relationship of physical activity patterns and obesity conducted by Fogelholm et al (1999) showed that parent inactivity was a strong and positive predictor of child inactivity. However, parental activity appeared to be a weaker predictor of child vigorous activity. The researchers concluded that parents play an important role in childhood activity patterns and obesity.

Access to recreation/exercise facility

In many Asian countries, opportunities for physical activity are hampered by the lack of space and equipment (AFIC, 2004). In other studies, access to play spaces and facilities were positively related to physical activity. A study among American adolescents aged 9-13 years revealed that opportunities in the area (access) were reportedly a barrier to participation in physical activity (CDC, 2003). CDC went on to say that physical activity among young people is also positively correlated with having access to convenient play spaces, sports equipment, and transportation to sports or fitness programs. In the review of the literature Suminski and Buckworth (1996), concurs that convenient play spaces and facilities play significant roles in physical activity participation.

Utilization of recreation/exercise facility

Use of exercise center showed to have a significant association with engaging in physical activity (Gordon-Larsen, McMurray, Popkin, 2000). Literature review

suggests that there are multiple barriers to use of recreation facilities for physical activity among adolescent. Because of unsafe neighborhood, parents in the US opt to driving their kids to school rather than have them walk to school. Based on the study by Doyle and Associates regarding several activities to promote physical activity among inactive teens, dancing was shown to be a promising activity. It is not only popular but also considered fun and non-competitive. Both walking and biking are limited by neighborhood safety. Some adolescents do not have bicycles. The teens report that exercise equipment or gym memberships are expensive and/or may not be convenient. Regarding opportunities for increased physical activities, the study shows that to get kids be more physical active, respondents feel schools and community groups must more actively solicit and encourage teen participation by promoting programs more effectively, developing activities for all levels of participation, making inactive teens more aware of the benefits of participation (exercise, fun, socializing), awarding participation and creating supportive, encouraging environments for those who are reluctant. The subjects also concur that having someone to exercise/play with is a very important part of becoming and staying active. They feel that learning about the benefits of exercise could also be helpful.

2.2.5 Overweight and obesity

According to estimates by CDC, 10-15 percent of American children are overweight and obese. A study conducted among 18,000 10-14 year old children of all backgrounds, show that children had higher weights and BMI compared to children of ten years ago. They also had higher blood pressure. This is disturbing since high blood pressure usually continues through adulthood, increasing the risk for hypertension and

heart disease. Accumulation of excess abdominal fat in childhood and adolescence increases the risk of diseases later in life.

Obesity has reached significant proportions in the U.S. and threatens to impact the health and well-being of considerable number of children and adolescents. Currently, there are about 13 percent of American children and adolescents who are overweight (NGA Center for Best Practices, 2002). Cardiovascular disease, cancer, and diabetes, which cause more than 70% of all deaths in the United States, are rooted in risk factors that are usually established during youth: tobacco use, unhealthy diet, inadequate physical activity, and obesity. Once poor health habits are adopted, they are difficult to change. Data show that many young people are already at risk for serious chronic diseases and premature death: 70% of high school students have tried smoking at least once, 71% do not attend daily physical education classes, and 25% are overweight or at risk of becoming overweight (National Center for Chronic Disease Prevention and Health Promotion, 2001).

A common way to classify overweight and obesity is BMI. BMI is calculated as weight (kg) / height (cm) / height (cm) x 10,000. The standard of BMI for Asians is different from that of Caucasians. World Health Organization recommends an optimal BMI of 23 for Asians and 25 for Caucasians. Studies show that as Asian and Caucasian may be the same weight and height, the Asian is at greater risk of fat-related illnesses such as heart diseases, diabetes, etc. A BMI-for-age percentile that was used in this study was developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (CDC, 2000).

2.2.6 Factors influencing overweight and obesity

1. Socio-demographic factors

According to Birch and Davison (2002), multiple interacting factors, both individual-level and environmental-level, influence eating behaviors. In the review of the literature, Birch and Davison state that eating behaviors are influenced by concerns about dietary fat and body weight. The fat content of the diet continues to be a top nutrition concern for consumers and weight concerns or dieting, particularly among adolescent girls, is prevalent.

According to the American Obesity Association (2004) gender is related to obesity. In the US overweight prevalence is higher in boys (32.7 percent) than girls (27.8 percent). In adolescents, overweight prevalence is about the same for females (30.2 percent) and males (30.5 percent).

Kraus et al (1998), Kasmini et al (1997) agree that age is a determinant of obesity. The authors concur that weight gain varies among men and women. In men, the greatest weight gain happens when they are older. Compared to women, they also live longer. However, women tend to gain weight in the younger age groups.

During growth spurts, around puberty, children may have higher normal fat levels (Southwestern Vermont Health Care, 2001). Several studies have shown that age is related to overweight and obesity. A study regarding the prevalence of overweight and obesity in Kula Lumpur (Kasmimi et al) revealed that overweight prevalence in children ranges from 2.4% to 7.9% whereas obesity prevalence by age ranges from .09% to 5.1%. In addition, the children were found to slowly become overweight as they got into pubertal age (maximum age, 12) but obesity was more rampant among children who were nine years old.

The incidence of obesity in Asian American children and adolescents is also growing dramatically. About 25 to 30 % of America's school- age children are overweight, which puts them at a high risk for many weight-related problems. Time spent watching television and playing video games as supposed to playing outside is also contributing to the increase of obesity. Poor eating habits and inactivity are main causes of childhood obesity. The Asian Americans are eating more than the body requires. This is aggravated if treatment if not sought. Usually, when Asians become obese, they feel embarrassed to seek advice or treatment.

In the review of the literature Kasmini et al reported that the prevalence of obesity in childhood varied across different countries/races. The prevalence was 7.5% among Indian children, 16.1% among Singapore school children, 14.3% among Thais, and 7.8% among Malaysian school children. In their study of three ethnic Malaysian groups revealed that 8.2% of Indians were overweight followed by Chinese 6.5% and Malays 5.3%. Obesity was highest among Indians (3.8%) followed by Malays (3.6%) and Chinese (3.4%).

Similarly, in the United States the increase of overweight rate in 1986 and 1998 was higher among African-American and Hispanics (120%) than among Caucasians (50%) (Southwestern Vermont Health Care, 2001). Lower education was found to be a significant risk factor for obesity.

African American, Hispanic American and Native American children and adolescents have particularly high obesity prevalence (American Obesity Association, 2002). Gender and race differences are the following:

- Among female youth, the highest overweight and obesity prevalence is found in black (non-Hispanic) girls (ages 6 to 11), 37.6 percent and 22.2 percent

respectively, and black (non-Hispanic) adolescent females (ages 12 to 19), 45.5 percent and 26.6 percent respectively.

- Among male youth, the highest overweight and obesity prevalence is found in Mexican American boys (ages 6 to 11), 43 percent and 27.3 percent respectively, and Mexican American adolescent males (ages 12 to 19), 44.2 percent and 27.5 percent respectively.
- Overweight prevalence for Native American children and adolescents (ages 5 to 17) was reported in a 1999 study as 39 percent for males and 38 percent for females in the Aberdeen area Indian Health Service.
- Asian American adolescents (ages 13 to 18) were reported to have an overweight prevalence of 20.6 percent in the 1996 National Longitudinal Study of Adolescent Health.
- Asian-American and Hispanic-American adolescents born in the U.S. to immigrant parents are more than twice as likely to be overweight as foreign-born adolescents who move to the U.S.

In the United States many people opt for convenience such as fast food, eating out and packaged food rather than preparing a meal. In part, this is a result of working couples and higher income levels (Southwestern Vermont Health Care, 2001).

Many studies suggest that family income is a determinant of overweight and obesity. According to Southwestern Vermont Health Care (2001), obesity is more prevalent among lower economic groups.

2. Behavioral factors

Eating behavior

In the review of the literature Anderson (2001) states that nutritional requirement and dietary behavior change significantly during the adolescence. In the US between five to ten percent of children are obese and a greater percent who are overweight. Diet analysis among high school students revealed that they are consuming more that what is required, consuming more food energy than what is needed. Also, students had high intake of protein, fat and sodium. LaVelle (2002) remarks that shifts to urbanization, non-manual labor, high calorie foods, and decrease in physical activity are factors causing overweight and obesity. High calorie foods can cause excess weight gains. Unhealthful eating is a major contributing factor to the development of overweight. A diet high in fats and sugars adds calories very quickly. Excess calories are normally converted into fat for storage. If an individual does not balance energy input and output through physical activity, then fat builds up and the individual becomes overweight. Also see 2.2.1 Eating behavior (page 20).

Although the research was conducted among low-income American adolescents, the research findings concur with other similar research among adolescents from different socioeconomic strata. Following are the results of the study by Doyle Research Associates conducted for California Project Lean, Food on the Run and California Nutrition Network for Healthy Active Families of the California Department of Health Services (1998):

- Convenience is a driving factor in determining Teens' diet; they eat from 1-10 fast food meals per week, 3-5 on average.

- Breakfast consists mainly of traditional convenience breakfast foods (sweetened cereals, Pop Tarts, toaster waffles), with some youth occasionally having a more substantial breakfast, often from a fast food restaurant (e.g., bacon & eggs, pancakes, french toast). Breakfast is typically accompanied by milk, juice, or soda. Some Teens skip breakfast entirely.
- Lunch is by and large "fast food" purchased at the school cafeteria, snack bar, or off-campus; bag lunches are considered neither convenient nor cool.
- Most drink soda with their lunch.
- Dinner is a mix of: home cooking (basic meat, starch, vegetables, an occasional salad with creamy dressing); Teen-prepared convenience foods; fast food/restaurant food. Teens drink milk, juice, Kool Aid or sodas with dinner.
- A majority snack between meals on chips, candy, cookies, sodas and occasionally fruit. Boys in particular drink a lot of soda throughout the day.
- Weekday cooking and sit-down meals are rare in many of the households; many fend for themselves during the week, scavenging ready-to-eat convenience foods from the refrigerator and cupboards. Caucasian moms seem somewhat more involved in preparing meals for their children during the week. Overall, the parents who are most involved in preparing healthy meals for their families are those who are on weight loss or medically restricted diets, with emphasis on reduced fat and sugar-free.

Physical activity/inactivity

Lack of physical activity has been blamed for the increase in the prevalence of

overweight and obesity. More and more people prefer to live a sedentary lifestyle as seen in their practices of driving, television watching, video games and the computer. Walking is no longer a common alternative to get from one place to another. In the US a student found that the annual distance walked by children has dropped from 30% since 1972. Safety was sighted as the main reason for parents driving their kids. However, excessive television watching was found to play a critical role in obesity in children (www.wv/traveldiet/fataspect.html). Also see 2.2.3 Physical activity (page 32).

2.2.7 School health promotion program and models

1. WHO: Multifaceted Components of a Health Promoting School

In 1995, WHO launched the Global Health Initiative intended to mobilize and strengthen health promotion and education activities at various levels including local, national, regional as well as global. The program is designed to improve the health of students, school personnel, families and other members of the community. A "Health-Promoting Schools" according to WHO is characterized as a school that constantly strengthens its capacity as a healthy setting for living, learning and working. A health promoting school:

- Fosters health and learning with all the measure at its disposal.
- Encourages health and education officials, teachers, teachers' unions, students, parents, health providers and community leaders in efforts to make the school a healthy place.
- Strives to provide a healthy environment, school health education, and school health services along with school/community projects and outreach, health

promotion programs, opportunities for physical education and recreation, and programs for counseling, social support and mental health promotion.

- Implements policies and practices that respect an individual's well-being and dignity, provide multiple opportunities for success, and acknowledge goof efforts and intentions as well as personal achievements.
- Strives to improve the health of school personnel, families and community members as well as pupils; and works with community leaders to help them understand how the community contributes to, or undermines, health and education. The focus of health promoting schools is:
- Caring for oneself and others
- Making healthy decisions and taking control over life's circumstances
- Creating conditions that are conducive for health (through policies, services
- Building capacities for peace, shelter, education, food, income, a stable ecosystem, justice, sustainable development.
- Preventing leading causes of death, disease and disability.
- Influencing health-related behaviors: knowledge, beliefs, skills, attitudes, and values.

The concept of the health promoting school has been developed since 1995. It is actively being promoted by the WHO and because of this the concept is popular globally but especially in Europe, North America, Australia and the Western Pacific Region. The concept is called by many names including comprehensive school health education, health promotion in schools, school health promotion and health promoting schools. The various models were discussed in detail.

Good nutrition is essential to proper growth during childhood. To grow up healthy, with vitality and energy, children need adequate nutrition. Their early experiences of eating nutritious food can have an impact on their long term eating preferences and habits. This study seeks to prove that we can instill in children healthy eating habits that would hopefully be continued through their lives. Many other similar studies have been conducted particularly in the US show that they successfully promoted food and nutrition education among school-age children. Positive impacts were shown in relation to the social and physical environment of the school, staff development, school lunch provision, exercise programs, aspects of health related behavior such as dietary intake, and aspects of health such as fitness. In the review of other school health promotion initiatives, the study concluded that overall, a multifaceted approach is likely to be most effective, combining a classroom program with changes to the school ethos and/or environment and/or with family community involvement. This is consistent with the health-promoting schools approach.

Nutrition is fundamental to a sense of well-being, and to meet the growth, development and activity needs of children and youth. Communities, schools and parents can work together to help students develop attitudes and skills for healthy eating. By creating supportive environments and encouraging children and youth to make informed choices, they are assisted to establish patterns for healthy living that they'll carry into adulthood. The four strategies on which schools can take action include the following: 1) Reinforce healthy eating practices by providing nutrition education, by including quality daily physical education, by emphasizing practical skill development, by training service providers and by working with the media to promote nutrition initiatives; 2) Support nutritionally vulnerable populations by participating in

data collection to better define vulnerable populations and their food and nutrition issues, by supporting broader access to prenatal nutrition education and by supporting community- based policies and programs that assist vulnerable families; 3) Enhance the availability of foods that support healthy eating through food policies that influence food choices available at school cafeterias, vending machines, special events and fundraisers, by discussing food safety, quality and new technologies with students and by working with the food service sector; 4) Support nutrition research by participating in the monitoring of school and community indicators and participating in making the data available to decision makers in the education, health, recreation and social services sectors. As part of both physical and social environments for students and staff, schools play an important role in influencing food choices and health behaviors, thus contributing to the health of children and youth.

The WHO Director-General (2000) states that an effective school health program be one of the most cost effective investments a nation can make to simultaneously improve education and health. Young children are facing daunting health problems including worm infections, vitamin A deficiency, iodine deficiency, injury, tobacco-related illness, deaths attributable to alcohol use, and HIV infections. All of these health problems can be prevented or significantly reduced through effective school health and youth health programs.

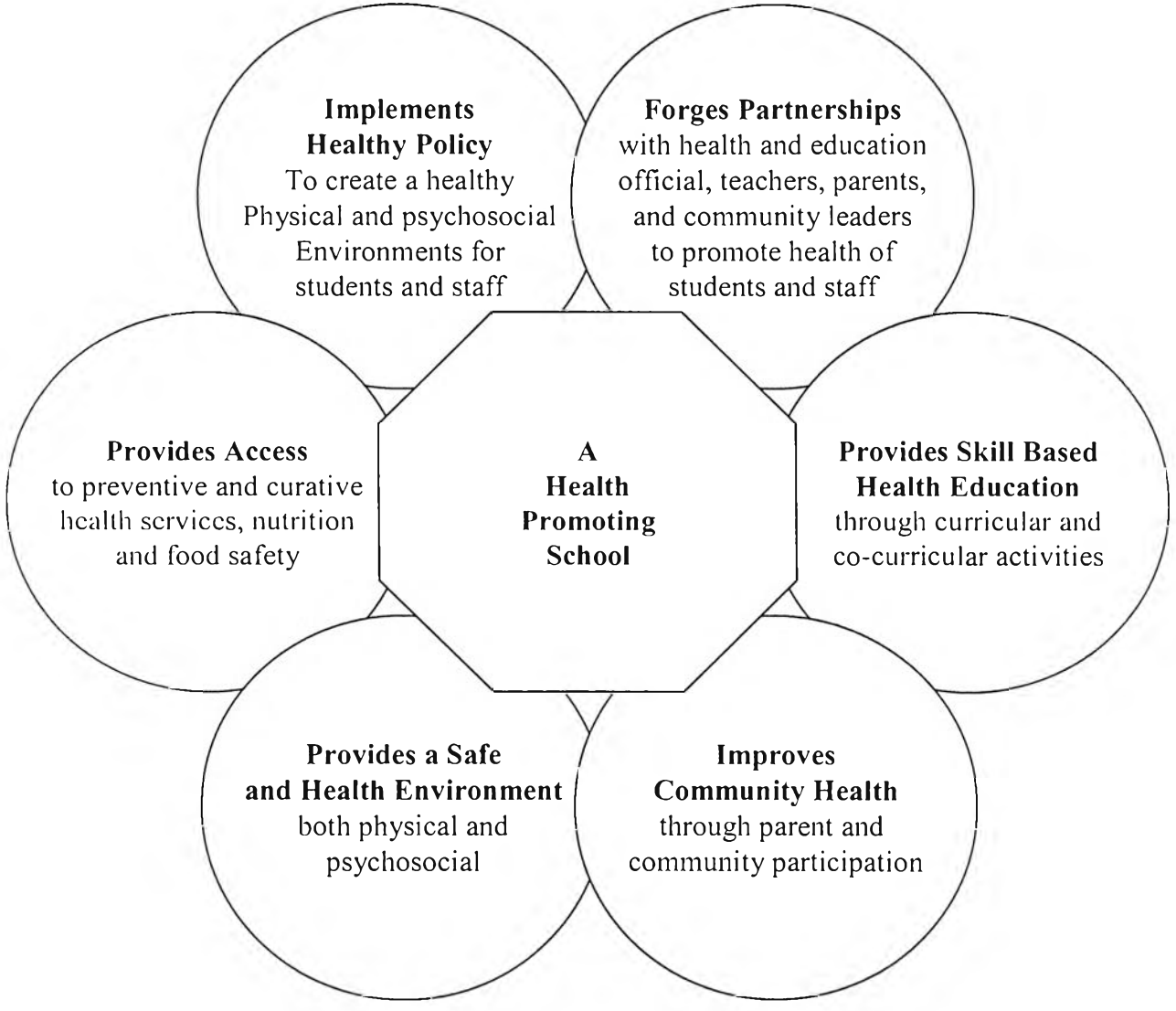

Figure 2.1 The multifaceted components of a Health Promoting School (WHO, 2001)

WHO provides a holistic view of a Health Promoting School (HPS). The HPS components are: 1) Implements healthy policy to create a healthy physical and psychosocial environment for students and staff, 2) Forges partnerships with health and education official, teachers, parents and community leaders to promote health of students and staff, 3) Provides skill-based education through curricular and co-curricular activities, 4) Improves community health through parent and community participation, 5) Provides a safe and healthy environment both physical and psychosocial, and 6) provides access to preventive and curative health services, nutrition and food safety.

2. Kolbe & Allensworth: School Health Promotion Components and Outcomes

In the US, the basic conceptual framework of the school health program consisted of three interlinked components namely school health services, school health education, and healthful environment (Green & Kreuter, 1999). This straightforward and comprehensive structure gave school health planners with reliable and solid foundation by which to work on. However, during the late eighties Kolbe and Allensworth came up with an expanded framework of school health by adding another five components including: 1) integrated school and community health promotion efforts, 2) school physical education, 3) school food service, 4) school counseling, and 5) school-site health promotion program for faculty and staff (refer to Figure 2.2 on page 54 for details). As illustrated in figure 5, the program components have been expanded. The vertical arrows between the program components suggest the

interdependence of the program activities. The other arrows show various ways in which intermediate, short-term, and long-term outcomes can be influenced.

Green and Kreuter provided three advantages to the conceptual model developed by Kolbe and Allensworth. Firstly, it provided importance to the program activities and its relationship to the comprehensiveness of school health. By doing this, the program became more apparent because the additional components provided a larger perspective--thus, obtaining greater attention. The activities under school food services such as lunches and vending machines, and physical education are too vital to the achievement of health and therefore its inclusion in the overall strategy of school health.

The second advantage deals with the necessity for a concerted, team approach to school health. It determines the various stakeholders involved in the program.

Thirdly, the use of the expanded framework echoes the basic obligation of schools: that is to educate children. As clearly illustrated, the short-term and long-term outcomes of cognitive and educational achievements are seen as equally important to the health status of the child.

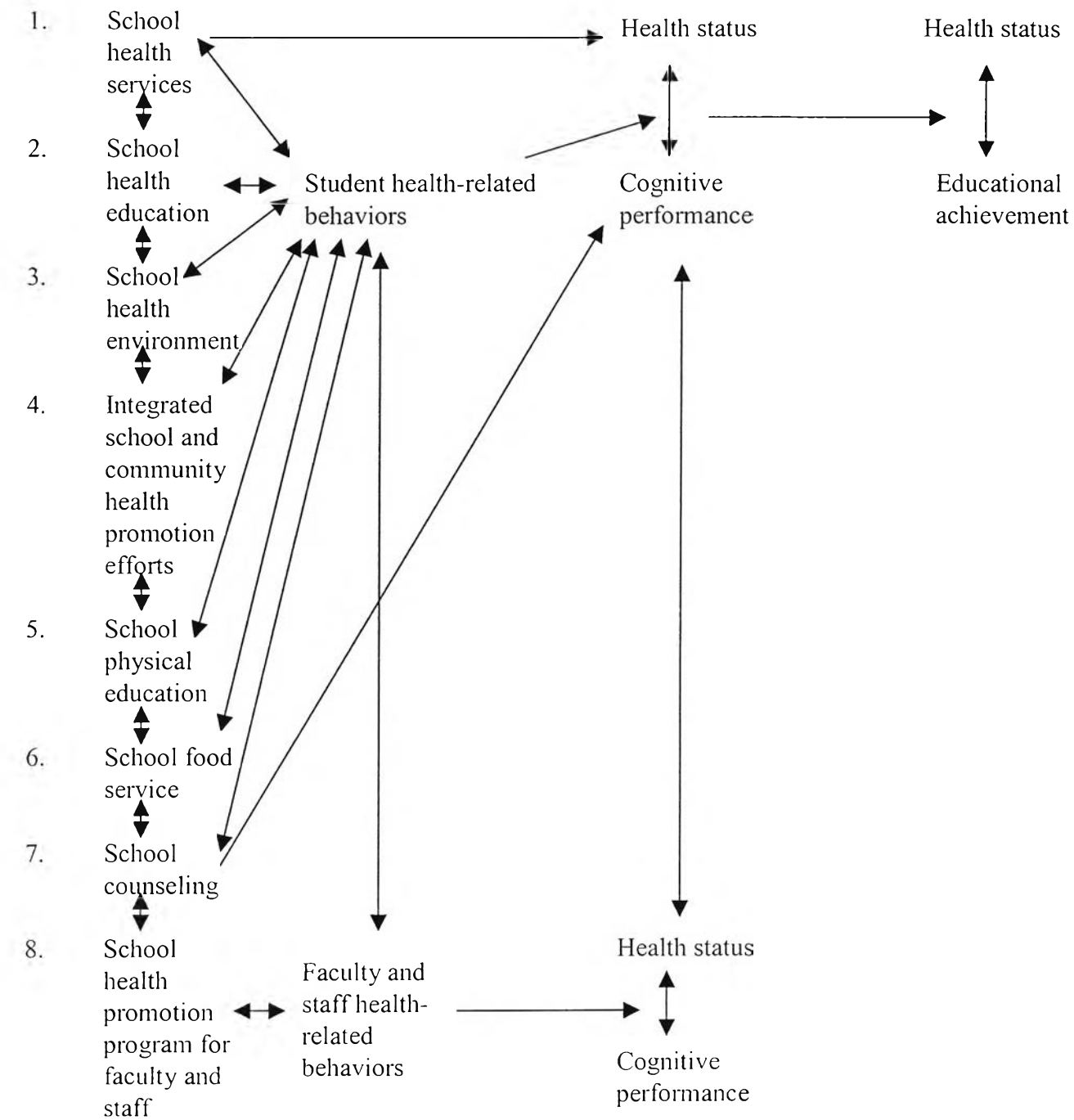

Figure 2.2 School Health Promotion Components and Outcomes (Kolbe, 1986)

Interventions targeting adolescents in the United States were mostly implemented through schools. School-health promotion model utilized an integrated model that combines classroom, family, environmental, policy, and community approaches (Sallis et. al., 2003). The results of Sallis' study revealed a significant intervention effect for physical activity for the total group ($p<0.009$) and boys ($p<0.001$) but not girls ($p<0.40$). The intervention was not effective in reducing fat intake. However, survey data suggested that the interventions reduced BMI for boys ($p<0.05$).

In the review of the literature, Dietz (1998) sates that in the U.S., a variety of school-based interventions have been tried. The two earliest school-based interventions targeted already overweight middle and/or elementary school children. Both involved the provision of nutrition information to students and a physical education program, although the programs varied in intensity and scope. In both programs children and adolescents lost weight although the results varied by age and gender. For example, in the first program, significantly more overweight elementary school boys, but not girls enrolled in the program lost weight than their counterparts who were not enrolled in the program. A more comprehensive program that engaged the school food service, physical education classes, and parents produced substantial weight losses among 63 overweight 5-12 year old children. However, the results of this study cannot be totally generalized, because the intervention's intensity made it more of a clinical trial, the intervention was aimed only at overweight children, no control schools were studied, and the long term effects of the intervention were not examined.

Three recent major school health programs have been focused on the prevention or reduction of cardiovascular risk factors and have included obesity prevention as one

among several cardiovascular risk factors. Each intervention was directed at a different age group. First involves exclusively classroom based, secondly was classroom based but involved the school food service and other activities, and the third involved modifications of the curriculum, school food service and physical education classes. Results indicate that only one of the three methods showed significant changes in body weight or body mass index (BMI). BMI decreased among overweight adolescent girls and the rate of increase of BMI was lower among overweight adolescent boys enrolled in the intervention schools.

Another experiment that has focused on weight change as the primary outcome used a health curriculum that focused on increases in foods of low caloric density and reductions in television time. This has been the only school based study to focus on reducing inactivity rather than increasing activity. The results show of the intervention show significant losses of weight among girls, but not among boys.

According to Dietz, the age of pre-adolescence characterizes the plausible target for interventions, because they are cognitively prepared to understand abstract concepts, responsive to health messages, and because behavioral changes in this age group may have a lasting influence on their behavior as adolescents and young adults. However, although school based interventions offer assuring opportunities for interventions that reach large numbers of children and adolescents, limited programs have been tried. Furthermore, school based interventions are unlikely to have a lasting impact without complementary shifts in parental and cultural attitudes and practices.

3. Missouri, USA: Berg's Model Healthy Children of All Sizes

In Missouri, USA, in an effort to work on issues affecting school children's health and academic success, a number of groups came together to develop the guidelines, promoting Healthy Weight in Missouri's Children: A Guide for Schools, Families, and Communities. The guidelines provide information to help school and community partners develop local policies, programs and environmental supports to promote health eating and physical activity. The components of CSHP include: healthy school environment with a safe physical facility and a healthy and supportive environment for learning; health education; nutrition services; physical education; school health services; counseling, psychological and social services; staff wellness to promote students' health by serving as positive role models; and family and community involvement.

The "healthy weight concept" utilizes Berg's model (page 65). The goal of healthy children of all sizes may be realized when students receive consistent messages and support for: healthy eating, physical activity, self-respect, and respect for others. Those surrounding the students including school personnel, families, community, media and other students should convey these messages throughout the day. The eight-component model for a CSHP includes:

1. Healthy physical environment

A healthy and safe physical environment helps prevent injuries and disease, and facilitates healthy behavior. Aspect of a healthy environment to support good nutrition includes hygiene, sanitation and other environmental standards. The following guidelines for promoting healthy physical environment are:

- Provide a school environment where students and staff feel safe, comfortable and supported.
- Provide time within the school day for unstructured physical activity.
- Discourage the practice of withholding recess and other physical activity as punishment.
- Discourage the use of food as a punishment/reward.
- Assure that lunch is provided at reasonable times around mid-day.
- Give students adequate time to consume to consume a complete meal, at least 10 minutes to eat breakfast and so minutes to eat lunch, beginning when the student is seated.
- Encourage school organizations to sell non-food items at fund-raisers.
- Encourage the use of non-food items as incentives.
- Avoid selling foods of low nutritional value.
- Provide opportunities for students to obtain healthy snacks during after-school activities.
- Assure food safety equipment for physical activities.
- Assure food safety practices are in place.
- Develop and enforce policies regarding discrimination.
- Offer family activity nights to promote school and family wellness.
- Encourage administrators, teachers, food service staff and parents to serve as role models by practicing healthy eating on the school premises.

2. Comprehensive health education curriculum

- Implement nutrition education from preschool through high school as part of a sequential, comprehensive, school health education curriculum designed to

help students develop knowledge, attitudes and behaviors they need to maintain a healthy lifestyle.

- Feature active learning strategies and follow national health education standards for health education and instruction.
- Use evidence-based curriculum for teaching nutrition.
- Provide staff involved in nutrition education adequate pre-service and ongoing in-service training that focuses on teaching strategies for behavioral change.
- Collaborate with physical education teachers to reinforce the link between sound dietary practices and regular physical activity for weight management.
- Seek innovative opportunities to involve families in nutrition education curriculum at the elementary school level.
- Staff should act as role models and provide effective communication to families on how to improve eating behaviors.

3. Nutrition services

- 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, snack bars and vending machines, as classroom snacks, and at special events such as staff meetings and parents' association meetings.
- Encourage school food service to offer choices that exceed the minimum nutritional requirements.

- Promote awareness pf the definition of foods of Minimal Nutritional Value that may be sold outside of the food service area.
- Encourage alternative commercial-free funding sources to supplement the school food services budget.
- Offer continuing education activities in nutrition education to food service personnel so that staff can reinforce classroom instruction through the school meal program.
- Integrate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating.
- Help young people develop knowledge and skills, not just facts.
- Give students repeated opportunities to practice healthy eating.
- Make nutrition education activities fun.
- Involve students, teachers, administrators, families and community leaders in delivering strong, consistent messages about healthy eating as part of a coordinated school health program.
- Physical education
- Encourage physical education teachers to attend professional development and in-service to promote high quality physical education instruction for all students using age appropriate teaching strategies based on best practices.
- Implement physical education curricula and instruction by certified physical education specialists that emphasizes enjoyable participation in a variety of age appropriate activities designed to foster the development of knowledge,

attitudes, motor skills, behavioral skills and confidence needed to adopt and maintain a physically active lifestyle throughout the life cycle.

- Design a Physical Education Curricula and Physical Education Programs.
- Use assessment result and other programs and revise and update curriculum.
- Teach the Healthy Weight Concept and provide fitness education and assessment to help children understand, improve and/or maintain their physical well-being.
- Promote physical activity through all components of a CSHP and develop links between school and community programs to encourage physical activity outside the school day.
- Provide daily opportunities for physical activity for elementary and middle school students.

4. Health services

- Identify students with physical activity and/or nutrition-related problems and refer them to appropriate school or community-based services.
- Communicate with school staff about the widespread problem, in childhood and adolescence, of weight discrimination.
- Advocate for all students with special health care needs so they have an opportunity for a dull and safe participation in physical education.
- Link students to community physical activity programs and use community resources to support extracurricular physical activity programs.

5. Guidance and counseling

- Work with staff to develop appropriate interventions related to social isolation and discrimination for overweight students.

- Promote healthy eating and physical activity as part of the total learning environment.
- Assure access or referral to assessments, interventions and other services for students with mental, emotional and social health problems related to eating disorders.
- Identify community resources for physical activity and nutrition counseling.
- Consider unique abilities of students when scheduling physical education classes.
- Work with children, parents, and the school nurse to assure all children have opportunities to be physically active at school.

6. School staff wellness

- Provide health promotion programs for school faculty and staff.
- Encourage staff to serve positive role models for students by demonstrating healthy physical activity and eating behaviors.
- Family and community involvement

a. Families

- Be physically active role models, support children's participation in physical activity and include physical activity in family events.
- Limit children's television time to two hours or less per day.
- Advocate for physical education and activity and sound nutrition policies at school.
- Influence policies related to physical activity and nutrition by participating on the school health advisory committee.

- Participate on the school health advisory committee in order to identify opportunities for partnership and advocacy.
- Work with local policymakers and school officials to make the area around the school safe for children to walk or bike to school.
- Teach children about making healthy food choices when eating away from home.
- Walk or bike with your child to establish a Safe Route to School.
- Avoid restrictive eating practices that can result in the development of eating disorders.

b. Communities

- Provide a community environment that makes it easy and safe for children to walk, bike and be physically active close to home.
- Participate on the school health advisory committee in order to identify opportunities for partnership and advocacy to enhance the health and well being of children.
- Provide a range of developmentally appropriate community sports and recreation programs that are attractive to children and families.
- Make physical activity programs accessible to all families with low incomes by providing transportation and appropriate equipment.
- Partner with schools to use school facilities after school, and on evenings, weekends and holidays.
- Advocate for community health promotion programs that are linguistically and culturally appropriate for children and families of diverse backgrounds.

- Develop and offer adapted sports and recreation programs to meet the needs of children and youth with disabilities.
- Design zooming that preserves green space, and assures sidewalks, walking and bike paths and recreational facilities.
- Fund school programs at a level that supports physical education programs.
- Fund school food service programs at a level do that schools do not have to rely on sale of soft drinks and candy for revenue.
- Provide a safe environment for indoor and outdoor physical activity in the community.
- Promote the development and use of neighborhood parks and recreation facilities.
- Fund school extracurricular activities at an adequate level, or use non-food items to raise funds.

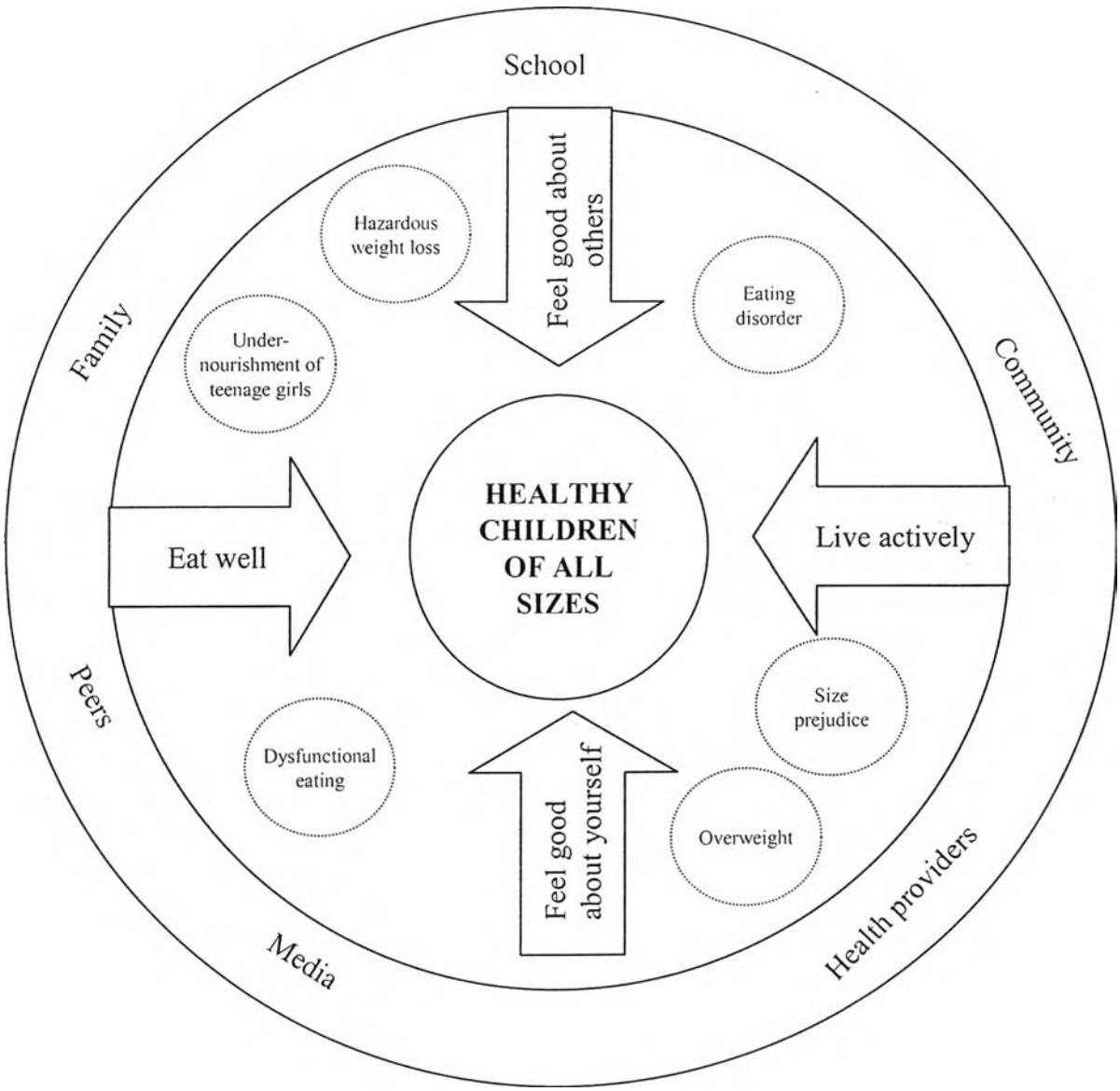

Figure 2.3 Healthy Weight Concept
(Berg's model, Missouri Coordinated School Health Coalition, 2002)

4. Australia: National Health Promoting Schools Initiative Framework, 2000-2003

In Australia, a national framework was developed to guide interaction between the health and education sectors in order to promote health gains for children and young Australians (see Figure 2.4, page 67). In contrast with the previous models, the Australian model has three major components including curriculum teaching learning; school organization, ethos and environment; and partnerships and services. The framework is designed to: enhance coordination between the education and health sectors, and between different levels of government and the non-government sector; guide policy and infrastructure development at a national, state and local level; set priorities to inform national, state and local planning and guide strategies, programs and initiatives; and promote sustainable national and state health-promoting school activity and strengthen community-based involvement.

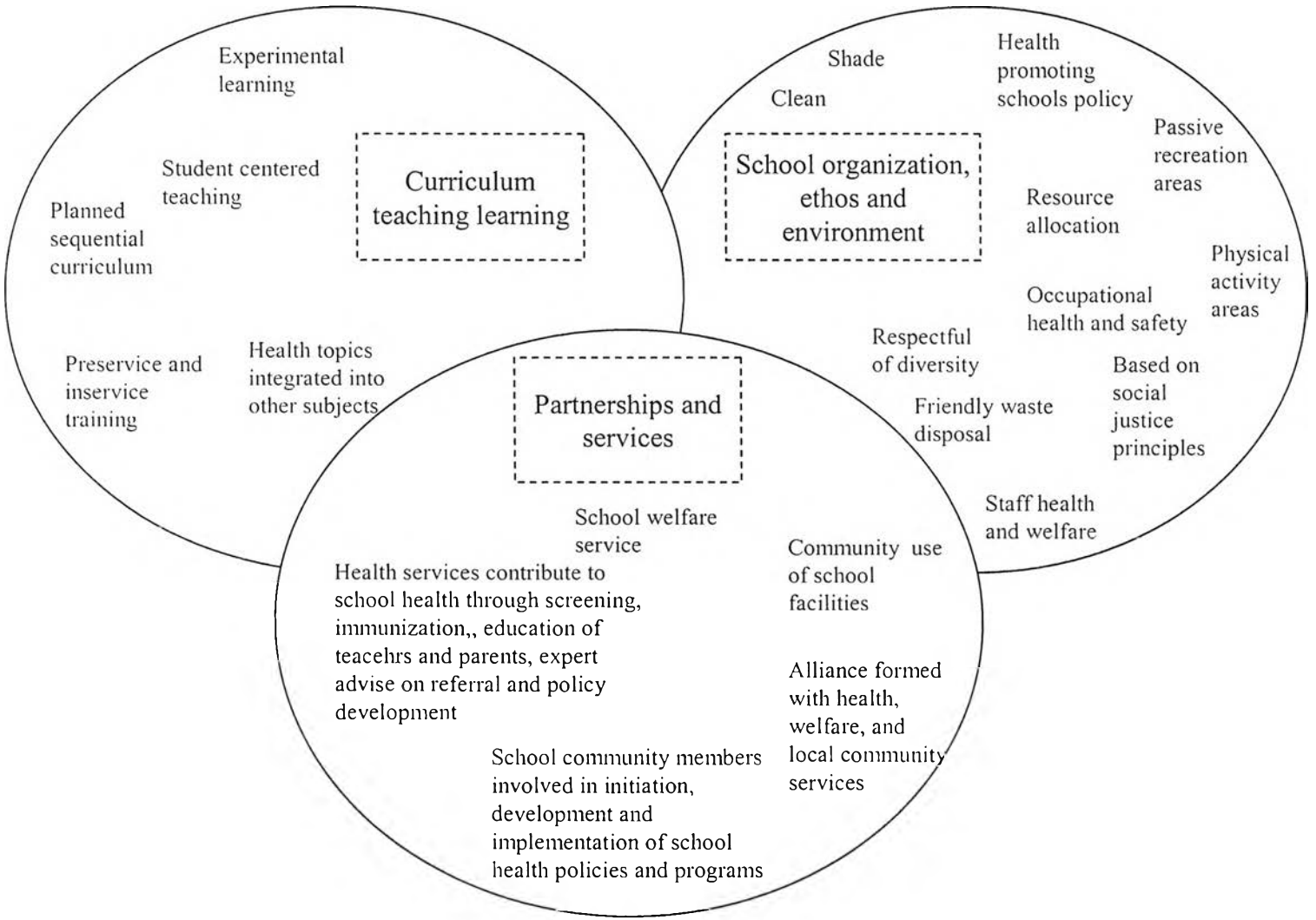

Figure 2.4 National Health Promoting Schools Initiative Framework, 2000-2003 (Commonwealth Department of Health and Family Services & Australia Health Promoting Schools Association)

5. Thailand: Dimensions of Health Promotion in Thailand

According to Colquhoun (1996) there are many models of health promoting schools in existence. However, many researchers are correct with their assertion that prescriptions of the concept of the health promoting school tend to focus on four major issues: 1) the school curriculum; 2) the school social and physical environment; 3) school/community linkages or relationship and 4) links between school and health/welfare services. The health promoting school is actively being promoted by the World Health Organization and because of this the concept is popular globally but especially in Europe, North America, Australia and the Western Pacific Region. The concept is variously known as "comprehensive school health education", "health promotion in schools", "school health promotion", and the most common usage in Australia - health promoting.

In 1996, the National Health and Medical Research Council recommended the adoption of a health-promoting school. The report examined evidence concerning school health programs in order to identify necessary criteria for successful health promotion in schools. It concluded that: "the evidence points overwhelmingly to the adoption of comprehensive and integrated approaches to teaching and learning, which foster teams within the school and in the local community and which support healthier behaviors by addressing the physical and psychosocial environment of the school, through supportive policies and practices".

The Ottawa Charter and the social-ecological model of health developed within a context of growing disillusionment with the increasing costs and decreasing returns of the traditional bio-medical model of health and illness. The health promoting school

approach is a major contrast from traditional school health education, which in the past, has focused merely on classroom or formal curriculum based activities.

In South-East Asia Region, many countries are adopting the health promoting school concept and are gaining momentum. A number of schools in countries like Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand, have initiated activities such as introducing life skills education for students, mobilizing parents and the community to participate in health promotion activities, and built the capacity of teachers.

In Thailand, a research project in 1997 culminated to the development of a school health promotion program model. The country adopted a nationwide campaign to expand life skills education on AIDS, tobacco use and drug dependence. Figure 2.5 (page 71) illustrates the dimensions of health promotion in Thailand.

An analysis of the health promotion in Thailand was reported on the Health Promoting Schools Project (1997). Based on the illustration, there is limited effectiveness of the current health promoting strategies. Secondly, groups who are targeted for health promotion are mainly pregnant women and under-five children. Other risk groups such as children, adolescents, workers, disabled, and elderly are not targeted. There is no one currently responsible to provide comprehensive health services for these groups. Thirdly, the health promotion strategies are limited to individual or group education activities. In addition, the strategies have not been proven effective in modifying health behaviors among Thai people. Fourthly, there is a need for a coordinated health promotion activities on the various key settings.

Young people depend on support from people around them to make healthy lifestyle decisions. Peers, families, school staff and others in the community have an

important role to play in promoting healthy living. However, schools cannot single-handedly address the health-related needs of our youth. Creating a school community environment that truly supports youth reach their greatest potential can only be accomplished by strong partnerships. Partnerships among families, schools, local government, religious organizations, businesses, local health agencies and others must be included to be most effective.

Prevention of health problems through promotion programs can be achieved through the joint efforts of – school personnel, parents, and students. This is also a prerequisite for improving school food service and sustaining access to healthy food and for instituting nutrition improvement among schoolchildren. School health program should build the capacities and empowering people to identify nutritional issues and to effectively demand for its improvement. The involvement, especially of mothers, in this process is vital.

Research continues to indicate that helping children make healthful changes in their eating and lifestyle habits requires coordinated efforts of families, communities and schools.

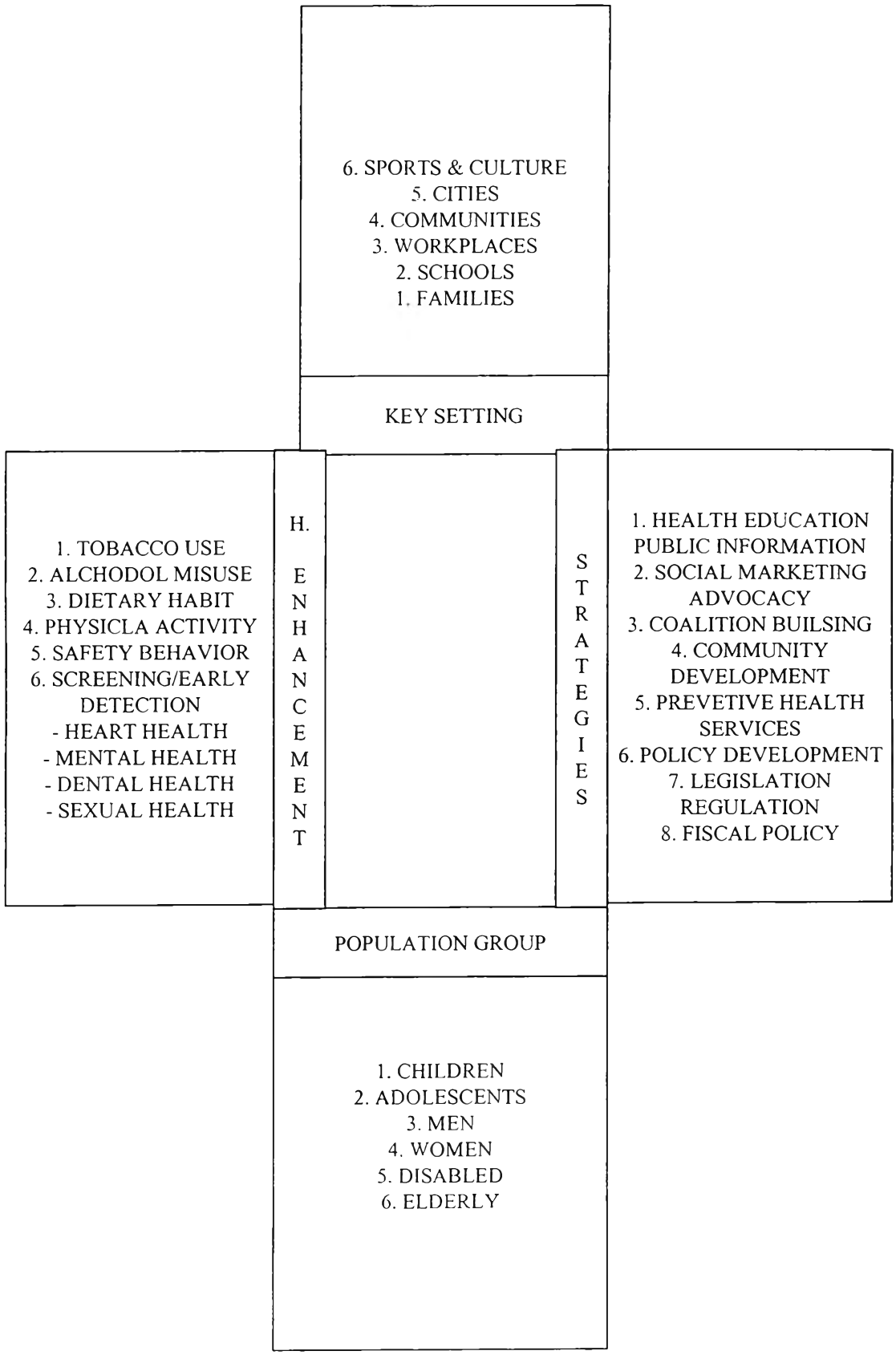

Figure 2.5 **Dimensions of Health Promotion in Thailand**
(Health Promoting Schools Project Report, 1997)

6. Green and Kreuter: PRECEDE-PROCEED Model

The Precede-Proceed model is a theoretical framework for planning and evaluating health promotion programs. Health promotion programs usually can operate at any of the three stages of prevention (primary, secondary and tertiary). Health promotion provides actions to either, stop the progress of an illness or injury, increase health and enhance quality of life through the modification of harmful behaviors or harmful environmental conditions. The Precede-Proceed model provides a holistic approach in determining health and quality of life. The model has nine phases – beginning at social assessment and ending at outcome evaluation (see Figure 2.6). The phases include the following: Phase 1-social assessment; Phase 2-epidemiological assessment; Phase 3-behavioral and environmental assessment; Phase 4-educational and ecological assessment; Phase 5-administrative and policy assessment; Phase 6-implementation; Phase 7-process evaluation; Phase 8-impact evaluation; and Phase 9-outcome evaluation. As illustrated in Figure 2.6, the model shows the lines of causation from inputs to outcomes by the direction of the arrows, and it shows the order of analysis in planning and evaluation in the phases (Green & Kreuter, 1999). The assessment of situation, detection of priorities and setting objectives in the Precede phases paves the way for policy development, program implementation and evaluation in the Proceed phases.

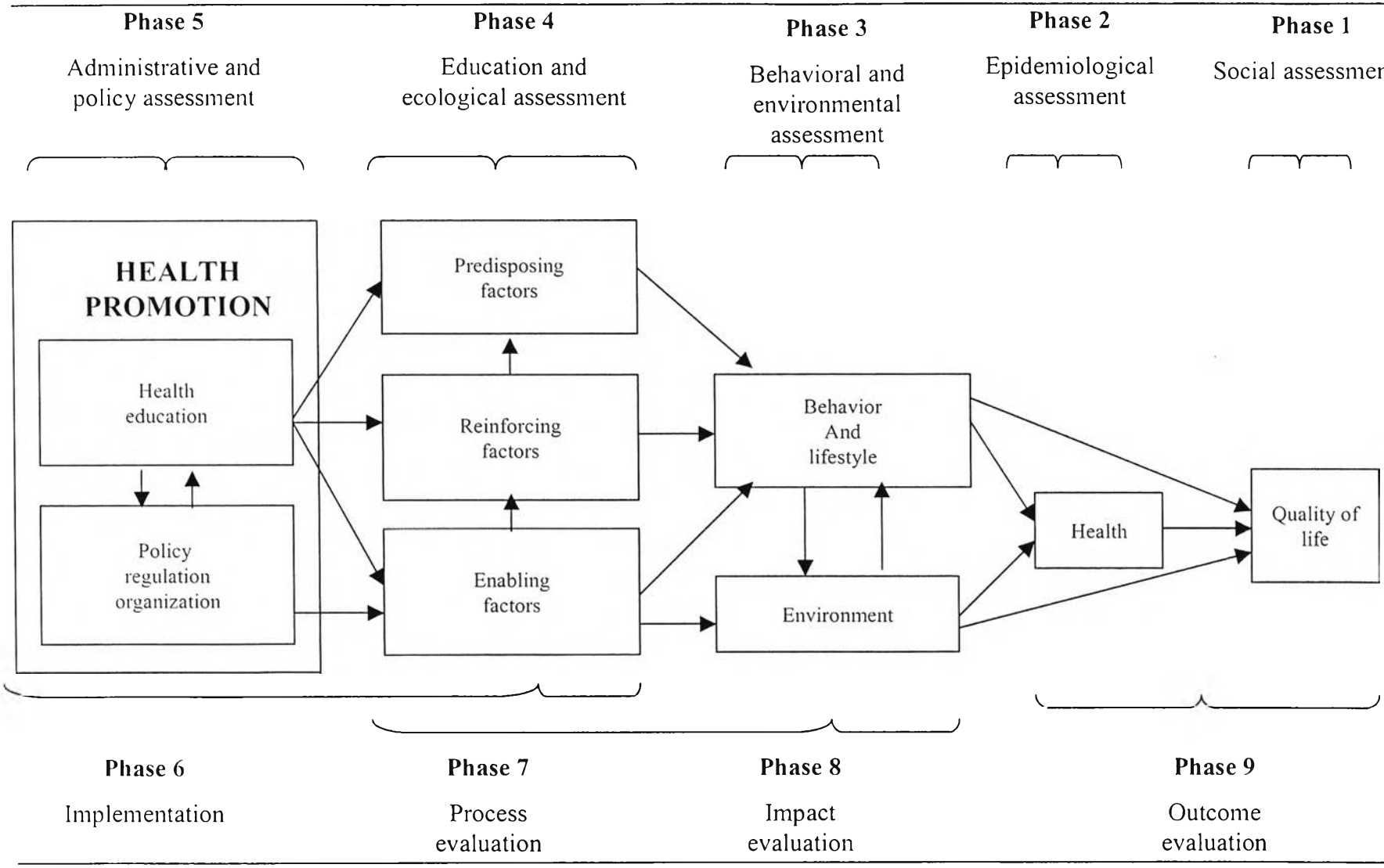

Figure 2.6 The PRECEDE-PROCEED model for health promotion planning and evaluation (Green and Kreuter, 1999)

There is no doubt that the school has a role to play in health promotion. The school can play a key role in promoting healthy eating by: 1) Teaching students about nutrition and physical activity with age-appropriate knowledge and skills development; 2) Training teachers to teach nutrition and to use effective learning methods; 3) Involving parents in take-home learning activities, offering nutrition education in parent/school activities and mobilizing parents as advocates for policies and services; and 4) Adopting food and nutrition policies.

Schools are important in promoting health because: 1) All children and adolescents can be reached; 2) Majority of the students eat their lunch five times/week at school; 3) Eating is a socially learned behavior that is influenced by education, social support and services t school; 4) School-based instruction can improve the eating behaviors of youth; 5) Role models, like teachers, coaches and other significant persons have a powerful effect on children through the examples they set; 6) Preventive and other health services delivered at schools allow for early identification of problems, referrals and effective health services; and 8) All parents can be reached through schools.

There are a number of school health programs that have been generally successful in enhancing healthy eating among schoolchildren. Countries across Europe, North America and Australia have adopted the health promotion school approach. Although the concept is the same, particulars of implementation have been diverse.

As of 1997, there were 5,000 schools across 37 countries that were implementing health-promoting school. There are numerous health-promoting schools worldwide. However, the section below is based on health-promoting school programs geared at improving healthy eating habits among schoolchildren.

There are three perspectives to which the school setting is considered an effective place for health promotion. Three levels of analysis for conceptualizing school health promotion programs are then proposed and involve the school environment, student personality characteristics, and student behavior. The changes in each of the three levels become important to measure the accomplishment of the program. These form the basis for designing and evaluating strategies for effective school health promotion programs.

The health-promoting school approach provides an integrating and coordinating framework for action through which to build a stronger foundation of health literacy and skills, and effectively address key health issues at individual, community and population levels. There is a convincing weight of evidence to support the health-promoting school approach as a "best practice" framework for school health promotion, and for intersectoral collaboration for health in schools. The health-promoting school approach links health and education; is evidence-based; recognizes and builds on the social determinants of health; is cost effective; offers opportunities for coordinated and integrated responses; and recognizes schools as key agents of socialization and settings for health development. What usually makes a successful program is the involvement of those concerned in identifying problems and mobilizing action and resources for solving them (WHO/OMS, 1998).

Through school health advisory councils or through direct contact with community organizations, schools can engage community resources and services to respond to the needs of students (CDC, 1996).

Parents influence their children's eating and physical activity behaviors. Involving parents in school health program can enhance the behaviors of both the students and parents.

School health promotion program would have various components and multiple activities to effect lasting changes in students' eating and physical activity behaviors. Students are likely to receive a strong, consistent message when healthy eating and physical activity is promoted through a comprehensive school health program that is well coordinated. According to CDC (1996), each component of school health promotion program can contribute to integrated efforts that promote health eating. CDC comments that vigorous, coordinated and sustained support is necessary to ensure program success.

Positive impacts were shown in relation to the social and physical environment of the school, staff development, school lunch provision, exercise programs, aspects of health related behavior such as dietary intake, and aspects of health such as fitness. In the review of other school health promotion initiatives, the study concluded that "Overall, a multifaceted approach is likely to be most effective, combining a classroom program with changes to the school ethos and/or environment and/or with family community involvement. This is consistent with the health-promoting schools approach." The following school health promotion program components include:

1. School nutrition policy

Obtaining commitment by school authorities in program development and implementation are crucial element to program effectiveness. One recommendation to ensure program success is by adopting a school nutrition policy that promoted healthful

eating and physical activity through a coordinated school health promotion program (CDC, 1996). The policy should be brief and one that incorporates the contribution from all program players including school authorities, administrator, teachers, students, food service staff, and parents. The policy should cater to the needs of all (dietary practices, ethnic background and socioeconomic groups). The policy should be a part of the overall school policy and should provide a framework for implementing the components of the program. The policy on nutrition should publicly commit the school to providing nutrition education, providing a variety of activities and sports, and serving healthy snacks and lunch at school.

According to WHO (1996), a Health-Promoting School has six key features. One of these is the formulation and implementation of policies and practices. The policy should be one that is supported by school administration and management. It is important to review the existing policies of the school.

2. Nutrition education

In developing health education curriculum, according to Canadian Association of Principals and the Canadian Association for School Health (1997), the following should be taken into consideration: 1) Update health, family studies and physical education curricula and materials; ensure they are culturally appropriate; 2) Develop students' skills in decision making and food selection and preparation; 3) Offer in-services by nutritionists to teachers; 4) Involve parents in take-home learning activities; 5) Offer quality daily physical education programs; 6) Use the Food Guide to Healthy Eating and companion resources to promote healthy eating.

School health services should include: 1) Training guidance counselors and teachers to recognize disordered eating patterns and refer students; 2) Address disordered eating in peer helper programs; 3) Together with community organizations and parents, consider actions that support nutritionally vulnerable students (e.g., appropriate referrals, meal and snack programs, other community-based initiatives); 4) Publicize community sources of health information and 5) Involve nutritionists in school committees.

Wehling & McCarthy (2002) comment that the problem of overweight children is an increasing public health concern in the United States. Many children today consume diets that are high in fat, lack regular physical activity, and receive minimal amounts of nutrition education at school. School-based education about nutrition and healthy lifestyles provides an opportunity for intervention with all children. The researchers developed a program for students in grades 4 and 5. The program was designed to increase the student's knowledge about nutrition and healthy lifestyles. After implementation of the program, there was a significant increase in student knowledge of nutrition and healthy lifestyles as determined by a pretest and posttest evaluation. The results have implications because childhood behaviors have such a profound impact on future adult lifestyle choices.

A quasi-experimental study was used to determine the effects 14 hours of nutrition education on nutrition knowledge and food selection among high school students, ages 14-18. The four weeks long instruction used materials from Guide to Good Food. The nutrition knowledge test was taken from Largen's (1991) Guide to Good Food. This instrument was used as both pretest and posttest. The food analysis

chart scored samples on the foods they ate during 24-hour period. The chart required the samples to write the kind of foods eaten and the quantity of each food eaten.

The results of the study show that the experimental and control groups were similar. However, the groups' posttest results appear to differ. Multiple regression analysis indicated that students who received education in nutrition scored significantly higher on nutrition knowledge posttest than students who did not receive the instruction. However, the result showed not difference in food selection between the two groups. It was concluded that nutrition education does improve knowledge of nutrition but does not appear to influence food choices (Anderson, et. al., 2001). The research point out that knowledge by itself is inadequate to produce change in food choices. In the review of the literature, Anderson states that this finding concurs with current literature in the field. It is clear that there are other variables that contribute to produce change in food choices. Examples quoted were peer influence, and/or acceptance, convenience, taste, and accessibility either at school or in the community. Anderson suggests that nutrition education is imperative. However, it must include behavior-change techniques so that appropriate food selection happens. Further research is needed to seek effective ways to implement behavior change in adolescents' food selection.

Three recent major school health programs have been focused on the prevention or reduction of cardiovascular risk factors and have included obesity prevention as one among several cardiovascular risk factors. Each intervention was directed at a different age group. First involves exclusively classroom based, secondly was classroom based but involved the school food service and other activities, and the third involved modifications of the curriculum, school food service and physical education classes.

Results indicate that only one of the three methods showed significant changes in body weight or body mass index (BMI). BMI decreased among overweight adolescent girls and the rate of increase of BMI was lower among overweight adolescent boys enrolled in the intervention schools.

Another experiment that has focused on weight change as the primary outcome used a health curriculum that focused on increases in foods of low caloric density and reductions in television time. This has been the only school based study to focus on reducing inactivity rather than increasing activity. The results of the intervention show significant losses of weight among girls, but not among boys.

According to Dietz, the age of pre-adolescence characterizes the plausible target for interventions, because they are cognitively prepared to understand abstract concepts, responsive to health messages, and because behavioral changes in this age group may have a lasting influence on their behavior as adolescents and young adults. However, although school based interventions offer assuring opportunities for interventions that reach large numbers of children and adolescents, limited programs have been tried. Furthermore, school based interventions are unlikely to have a lasting impact without complementary shifts in parental and cultural attitudes and practices.

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Linking nutrition with other components of the comprehensive school health program such as physical activity is very important because physical inactivity is once major contributing factor of overweight. Nutrition education should emphasize the need of proper nutrition and regular physical activity. Likewise, physical education classes should include guidance in food selection as well as providing fun physical activities for adolescents. CDC (1996) recommends that nutrition can be integrated into the lesson plans of other school subjects to maximize classroom time. For example, math lessons could analyze nutrition intake or reading lessons can feature texts on nutrition.

Nutrition education should use behaviorally based education that encourages healthy eating behaviors such as increase intake of fruits and vegetables and reducing sugar and salt intakes. Several studies in the US using behavioral approach have shown significant changes in students' eating behavior and that current scientific knowledge indicates that a focus on behavior is a key determinant in the success of nutrition education programs (CDC, 1996).

In addition to curriculum development, adequate training of nutrition educators should be provided. Training in nutrition and health education can increase the extent to which teacher/health educators implement a curriculum (CDC).

Schools should discourage teachers from using food for disciplining or rewarding students (CDC). Strategies by which adolescents' behavior can be effectively changed include using role models. This means soliciting persons who adolescent can identify as leaders to model nutritious selection and eating habits. Family custom related to food selection and eating habits should be analyzed and healthy food selections and eating practices introduced. Other interventions that help students achieve personal goals should be explored. Most nutrition education programs have used teaching strategies based on social learning theory. Using important role models to demonstrate healthful habits is one technique of social learning.

3. Physical education

A study published in a recent issue of the American Journal of Preventive Medicine looked at physical activity and eating behaviors of middle school children. The researchers divided kids into a control and an intervention group where kids were offered physical education classes, supervised after-school activities and opportunities

to select healthier foods. The results showed that boys are more likely than girls to increase their levels of physical activity compared to girls. But neither boys nor girls significantly improved their eating habits. The study also shows the importance of community and school involvement, but parents still play the primary role in developing and modifying their children's eating behaviors.

Physical education is a planned curriculum promoting physical fitness, movement skills, sports skills and lifelong physical activity. Below are some examples of how physical activity can be attained successfully through PE:

- Encourage physical education teachers to attend professional development and in-service to promote high quality physical education instruction for all students using age appropriate teaching strategies based on best practices.
- Implement physical education curricula and instruction by certified physical education specialists that emphasizes enjoyable participation in a variety of age appropriate activities designed to foster the development of knowledge, attitudes, motor skills, behavioral skills and confidence needed to adopt and maintain a physically active lifestyle throughout the life cycle.
- Use assessment result and other programs and revise and update curriculum.
- Develop links between school and community programs to encourage physical activity outside the school day.
- Provide daily opportunities for physical activity for school students.

Sallis et. al. (2003) conducted environmental interventions for eating and physical activity. In a span of two years, physical activity interventions designed to increase physical activity in physical education classes. After intervention, the

researchers concluded that environmental and policy interventions were effective in increasing physical activity among boys but not girls.

4. School food service

Schools nutrition programs in the U.S. such as the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) have shown to improve the students' nutrient intake. But students' participation in these programs needs to be enhanced to improve their food choices throughout the total school environment. An experimental study found that improving milk variety such as upgrades in milk packaging, flavor variety, merchandising, increased students' milk intake and their participation in the school meal program. It is anticipated that if these school milk enhancements were adopted nationwide, the lifetime incidence of diet-related illnesses and related health care costs could be substantially reduced.

Where people eat influences their eating behavior. Health professionals need to help people make healthful food and beverage choices when eating both inside and outside the home. Participating in school meal programs improves students' nutrient intake. Many leading causes of health problems including cardiovascular disease, cancer, nutritional deficiencies, can be significantly reduced by preventing harmful behaviors, which are typically initiated during youth and fostered by social and political policies and conditions. Trends in the U.S. that may be associated to healthy weight among children include: 1) school breakfasts have shown improvements in relative fat and saturated fat contents; 2) children who participate in the National School Lunch program and School Breakfast program are more likely than non-participants to

consume vegetables, milk, and protein-rich foods at lunch and over 24 hours; and 3) children who participate in school meals consume less soda and/or fruit drink.

2.3 Summary

Chapter II provided a review of the literature in several topical areas including eating behaviors, physical activity/inactivity patterns, and overweight and obesity, and school-health promotion program and models.

Poor eating behavior and low physical activity are a threat to children's health. Morbidity and mortality are rooted in health risk behaviors that are usually initiated during childhood. Poor eating behavior has important lifelong consequences. However, these behaviors can be prevented or modified. Effective health promotion activities in school setting need to address these behavioral risks. Dietary patterns and inadequate physical activity are two of the six types of behavioral risks that lead to major health problems that are confronting the world today. Many school age children do not receive complete health care. Schools can play an important role in promoting the health and preventing disease among school age children. The school is a principal institution that could have a significant effect on the health of this age group. By providing health promotion activities, schools can become a cost-effective means of tackling important public health problems.