

ต้นฉบับ หน้าขาดหาย

7.2. Conclusions

This study has shown that overweight is a problem among students at ASB. Whilst the relationship between childhood nutrition and adult disease is not yet fully understood, there is some evidence that eating and physical activity patterns affect nutritional status. Studies show that high intake of energy density foods is positively associated with increased body fat (Nicklas et al, 2001). Overweight and obesity are blamed on large food intake. Lack of exercise and sedentary lifestyle due to increase time spent watching TV/video or playing computer games have also shown to contribute to this problem.

The results from this study indicated that $\geq 85^{\text{th}}$ BMI-for-age percentile among ASB students was 33 percent. Out of 33 percent, 22 percent of the students were at risk of overweight while 11.1 percent were overweight. These findings were comparable with prevalence of overweight and obesity in developed countries and in other parts of Asia. Eating behavior, physical activity and inactivity patterns have been defined as important factors of weight status.

Results from this study support the hypothesis that eating behavior and physical activity pattern are associated with nutritional status. A discussion of the results of this current study and study recommendations are outlined below.

7.2.1 Eating behavior

Across six food classifications, high food consumption was observed with starches (62.5%), protein (51.4%), dairy products (50%), and fats/oils/sweets (56.9%). Decrease fruit and vegetables were also observed with 58.3 percent of students consuming <2 servings of fruit per day and 41.7 percent consuming <3 servings of

vegetables per day. Overall diet revealed that out of 72 samples: 40 students (55.6%) had poor diet and 32 students (44.4%) had good diet.

Students in the study were found to have high consumption of restaurant/fast food as measured by number of meals eaten at home and type of food commonly consumed. The results reveal that increased dietary intake was higher among students who frequented restaurant food/fast food than those who ate home-cooked meals.

Gender, age, maternal education, maternal work status, and family income were socio-demographic factors that were considered in this study. Interestingly, none of these factors yielded significant associations with food consumption among ASB students.

Psychosocial factors that yielded significant associations with food consumption or diet were students' knowledge ($p = .020$), parental knowledge ($p < .001$), students' attitudes/beliefs ($p = .001$), parental attitudes/beliefs ($p < .001$) and students' eating self-efficacy ($p < .001$).

Parental influence was an environmental factor that was associated with students' food consumption or diet ($p < .001$).

7.2.2 Physical activity/Inactivity

Lack of exercise and sedentary lifestyle due to increase time spent watching TV/video or playing computer games have been shown to contribute to overweight and obesity. Ultimately, these habits place children at risk at risk of chronic diseases such as coronary heart disease, hypertension and some cancers, later in life.

About 46 percent of students in grade 4-6 were found to be involve in low level of physical activity whereas 54 percent were involved in moderate/high level of

physical activity. Please note that only one student was involved in high level of physical activity and to facilitate data analysis was included in the moderate/high category. A majority of the students perform vigorous physical activity only at school. Moderate amounts of daily physical activity are recommended for people of all ages.

Regarding inactivity level, 41.7 percent of the students had moderate inactivity level while 53.8% had high inactivity level. Inactivity levels among these students were relatively high.

Family income was the only socio-demographic factor that was found to be significantly associated with physical activity. No other socio-demographic factor was found linked with physical activity and inactivity.

Exercise self-efficacy was found to be strongly associated with physical activity ($p = .001$) and physical inactivity ($p = .021$).

Environmental factors that were significantly linked with physical activity were use of recreation facility and parental influence. Recreation facility use was also associated with physical inactivity.

7.2.3 Weight status

Nutritional screening conducted among grades 4-6 students at ASB revealed that high BMI ($\geq 85^{\text{th}}$ -BMI-for-age percentile) is prevalent among the students. Students who are overweight because of unhealthy eating and lack of physical activity are not able to achieve their full academic potential. They are also at higher risk of a number of chronic health problems.

High dietary intake and the lack of exercise demonstrate the importance of this study. The results suggest that poor food consumption or diet and inactivity patterns are

likely contributors to the increasing prevalence of overweight among adolescents in the study.

Diet showed a strong association with weight status ($p < .001$). Restaurant food/fast food consumption as measured by number of meals eaten at home and type of meals commonly eaten, also revealed a significant association with weight status ($p < .001$ and $p < .001$, respectively). Estimated frequency of restaurant/fast food meals was positively associated with increased weight status. At risk of overweight and overweight students consumed more restaurant/fast food than students with normal weight status.

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.

This current study did not yield significant association between socio-demographic factors and weight status.

Lack of physical activity is playing a significant role in obesity in children. The results from this study suggest that both physical activity and inactivity patterns are likely contributors to the increasing prevalence of overweight among adolescents in the study.

Time spent watching TV/video and computer game/internet use has also shown to be associated with overweight. Lower BMI was observed among students who watched television/video and use computer for ≤ 4 hours per day than among those who watched >4 hours per day.

Eating and exercise self-efficacy in relation to nutritional status were investigated in this study because of the role that self-efficacy plays in performing

healthful eating and physical activity. Eating self-efficacy and exercise self-efficacy were significantly associated with weight status ($p < .001$) and $p = .004$, respectively).

7.3 Shape-for-Health Program

7.3.1 Achievements of program components

Based on the project components defined in the plan of action, an excellent level of program outputs was achieved. This was accomplished despite time constraint faced by projects implementers. The implementers should be commended for the results brought about through the implementation of the program. Some highlights include the following:

- The introduction of the school health-promotion program was an intentional attempt to address the needs of the students.
- A school Health Team was established.
- Partnerships between the school and families were also fostered as a result of the program.
- The program enhanced healthful eating and physical activity through the program components and activities.
- A comprehensive school health-promotion program that was well coordinated contributed to the changes in behaviors.
- The program built capacity by training of canteen staff.
- The increase in variety of sports offered in the Friday Club has greatly improved students' morale and motivation for physical activity.



- There is considerable improvement in knowledge, skills, and motivation of the students especially in making healthy choices as a result of the education provided to them.
- The development of curriculum is a step in the right direction for sustaining the school health-promotion program at ASB.
- Bringing school and families together combined resources for school nutrition.

7.3.2 Program sustainability

The research took nine months to complete. Shape-for-health program implementation took only seven months. In addition, nutrition education was provided only for eight weeks. The prospects for sustaining the program activities depend upon the level of social mobilization and organization structure considered. Some benefits of the project including improvement in knowledge through education, physical activity enhancement, food service improvement, and weight/height monitoring, have been observed. However, because of the short project duration, the long-term impact of the program on weight status has yet to be measured.

Regardless the duration of the project, the project has achieved a number of positive results. Posttest results show that the school health program has been effective in improving modifiable determinants including knowledge, attitudes/beliefs, and self-efficacy and health eating and physical activity behaviors. Although minimal, the program was able to improve food consumption in all food components.

The knowledge transmitted to the students will continue beyond the end of the program. Further, ASB indicated that the program would continue [and probably] at a higher level of intensity.

The findings regarding the sustainability of the program call for an expansion of the program. The achievements brought forth by the program in improving eating and physical activity behaviors, will have a significant impact. These experiences can be used as foundation for which to build on future efforts. The challenge that needs to be addressed for future programming is institutional sustainability, considering the high turn over of staff at ASB.

7.3.3 Program concerns

There are a number of constraints that were observed about the program:

- The organizational structure of ASB is complicated. Being a new initiative, there was no one key person responsible for the program. This has made implementation of activities slower. Sometimes concerns brought up were not being addressed.
- The kitchen does not have an oven. This made preparation of healthy food difficult.
- The school canteen is too small to accommodate large number of students and school staff. At lunch time the area gets very crowded. Canteen staff have to work very faster to avoid congestion.
- The menu is sometimes changed without prior notice. This has been difficult especially for students with special diet.
- Few parents participate in the program.

- There were quite a bit of students who needed guidance and counseling. ASB has a school counselor who comes once a week and normally students with behavioral or learning problems are referred to her. The students saw her as only dealing with problematic children. Therefore, students do not feel comfortable going to her because of concerns regarding their weight.

7.4 Recommendations

Diet is a known risk factor for the development of chronic diseases. By improving eating habits, the incidence of overweight and obesity can be decreased. Increasing opportunities for healthy eating for students such as making fruits and vegetables available will enable them to eat better. In the review of the literature Anderson (2001) articulates that eating habits adopted in childhood may facilitate healthier eating habits later in life.

Since most hours are spent in school, students have at least one main meal and two-three snacks at school per day. By making available healthy selections will enable them to eat better. Unhealthful food such as fried-food, soda and other unhealthy snacks should not be sold at the school canteen.

Regular physical activity is important to keeping a healthy weight as well as weight loss. Reducing the time spent in inactivity such as television/video viewing and computer/internet use has been proven to be an effective intervention for preventing as well as treating obesity.

How healthful eating and physical activity can be enhanced through the school health promotion program, are discussed below with each component of the school health promotion program discussed in detail.

7.4.1 School Health Promotion Program

Schools play an important role in helping children learn how to make important and correct decisions. The school can promote a healthy lifestyle for children through education, making available healthy choices at school cafeteria, serving a balanced diet and making daily physical activity available. The school can help fight overweight and obesity by improving the quality and quantity of nutrition education as well as physical education. It should be the aims of the school to develop a comprehensive approach that will help students obtain knowledge they need to eat correctly and exercise regularly. Schools can help influence food choices and health behaviors, thus contributing to the health of children and youth. As part of community efforts, the school can play a key role in promoting healthy eating and physical activity.

This study targeted children aged 9-12 years. Children in the pre-adolescent period denote the rational 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 present promising prospects for interventions that reach large numbers of children and adolescents, few programs have been tried. Furthermore, school-based interventions can only have a lasting impact with family or parental involvement.

Policy

Adopt a coordinated school nutrition policy that facilitates healthy eating and physical activity through nutrition education in the classroom and a supportive school

food environment. Included in the policy are clear, attainable objectives and guidelines on how objectives can be met.

1. Make healthy and appealing foods available wherever and whenever food is available in the school or at school activities.
2. Discourage the sale of foods high in fat, sodium, and added sugars on school grounds and as part of fundraising activities.
3. Adopt school-wide rules to discourage teachers from using food for disciplining and rewarding students.
4. Give students adequate time to eat meals in a pleasant and safe environment.
5. Encourage students to participate in school food service programs and to select low-fat, low-sodium meals offered in the cafeteria.

Nutrition education

School-based nutrition education is becoming more important because findings from this study as well as other studies, children [because of lack of adult supervision] are often left on their own to decide what to eat. In Thailand, the increase in availability of fast foods has prompted most parents to change from home cooked food to restaurant or fast food. ASB is a part of the social environment of the students and therefore can play a vital role in shaping the students' eating behavior.

The school should implement behaviorally-based nutrition education throughout preschool, primary, and secondary school as part of a sequential, comprehensive school health education curriculum, featuring developmentally-appropriate, culturally relevant, enjoyable, participatory activities that involve social learning strategies. Because eating and physical activity habits developed in childhood have the potential to be carried over

the years, it is vital that children learn the benefits of good nutrition and physical activity. The following are recommended of health education:

1. Provide adequate time for nutrition education lessons.
2. Integrate nutrition education with other subjects to reinforce, but not replace, nutrition education lessons within the framework of a comprehensive school health education curriculum.
3. Allow students repeated opportunities to taste foods that are low in fat, sodium, and added sugars, and high in vitamins, minerals, and fiber.
4. Emphasize the positive aspects of adopting a healthy eating pattern, including short-term benefits that students might consider most important.
5. Use nutrition education to help young students: take personal responsibility for their health; learn practical food selection and preparation skills and increase their confidence in using those skills; recognize social support and incentives for healthy eating; gain skills in resisting social pressures, analyze their eating behaviors; set goals for behavior change, and develop strategies for overcoming obstacles to healthy eating. Nutrition education shall focus on students' eating behaviors, be based on theories and methods proven effective.

Research has shown that education alone is inadequate to prevent weight gain. It is necessary that attitudes and beliefs be investigated so that education program also aims at changing negative attitudes and beliefs. Education should be approached as a behavioral intervention to produce a significant outcome of weight maintenance or weight loss (if overweight).

Family is a huge influential factor among this age group. ASB should search for opportunities to educate the family as well. Health education should focus on healthy diet and an understanding of food labels, and how to make healthy choices when ordering or purchasing food outside the home (restaurant food or fast food).

Another area that needs attention is how parents [through the school] can be reached. Findings from this study reveal that determinants associated with poor diet, low physical activity and poor nutritional status were modifiable determinants. However, effective intervention strategies are efforts that foster close collaboration between the family/home and the school. It has been shown that effectiveness of weight control program is significantly improved when the intervention is directed at the parents as well as the child, rather than aimed only at the child.

Physical activity

Enhancing physical activity can be facilitated through nutrition education and physical education. Most importantly, students should be taught what activities to perform, for how long, and what the benefits of the activities are. Physical activity is one of the most important influences on health. Healthful eating coupled with physical activity will attain better results. Since the school offers two days of PE, other opportunities for physical activity such as participation in sports teams should be encouraged. Schools should also offer a variety of fun activities that require moderate to vigorous levels of physical activity.

The CDC of the U.S. provided guidelines to schools and community programs to promote physical activity habits among young people including:

1. Emphasizing enjoyable participation in physical activities that are easily done throughout life;
2. Offer a diverse range of non-competitive and competitive activities appropriate for various age groups and abilities.
3. Promote physical activity through all components of coordinated school health program and develop links between school and community programs.

As part of the education program, children should be made aware of what constitutes inactivity (TV/video viewing, computer/internet use) and the reasons for limiting such activities. Children should limit inactivity to two hours or less per day. Also discourage children from eating meals or snacks while watching TV. Research has shown that reducing time spent watching television may be an effective intervention for treating and preventing obesity and that by increasing physical activity [for overweight], reduces many diseases associated with obesity (CDC, 2003). By increasing physical activities that are fun for children will help more children be active. Physical activity on school campus during free time (before school, after lunch and after school) throughout the school day should be encouraged.

Weight monitoring (self monitoring) has become a motivating factor in maintaining weight as well as weight loss among the respondents. Students felt empowered to be responsible of what happens with their weight. According to Wing, Gorin and Tate (2001), self- monitoring is a key strategy in the behavioral treatment of obesity. Weight monitoring was done every month and has proven to be a strong motivating factor among the students to control and reduce weight. Self-monitoring can also be used in the type and amount of food eaten and minutes spent in physical activity. Students should be encouraged to expand self-monitoring for the food they eat

and physical activity they perform. This will help the students to become more aware of his/her eating and physical activity patterns.

School food service program

Students eat their lunch at school. The majority of the students get their lunch from the school cafeteria. It is vital for the school cafeteria to provide and make available foods that are healthy such as:

1. Making fruits and vegetables and healthy snacks available all the time.
2. Decrease or discontinue the sale of soft drinks and other high sugar beverages.
3. Reduce the serving of foods high in fat and sugar.
4. Emphasize the positive aspects of adopting a healthy eating pattern through simple messages around the canteen.
5. Link the school food service with other components of the school health program to reinforce consistency with healthful eating messages.
6. Students are provided adequate time and space to eat meals in a pleasant and safe environment.
7. School dining areas will be reviewed to ensure: tables and chairs are comfortable; not overcrowded; noise not too loud; rules for safe behavior are consistently enforced; tables and floors are cleaned between meal periods; appropriate supervision by teacher monitors is provided.

At regular intervals, evaluate the effectiveness of the school health promotion program's efforts to promote healthy eating and institute changes as appropriate to increase effectiveness. Continues feedback to students, school personnel and parents

regarding the activities that are implemented as well as success in improving nutritional status should be carried out.

7.4.2 Program management

Another factor seen as essential for the successful implementation of the program is structural capacity. Mobilization and participation is seen as key to the sustainability and success of school health-promotion program. The school and family play a major role in the development and implementation of program activities. This is an integrated effort by all school constituents. Future programming should include having a joint management of the program by a school staff and a parent.

ASB should create an institutional environment that fosters cooperation. ASB alone cannot effectively deal with overweight. Without coordinating mechanisms the planning and implementation of the program will be ineffective.

7.5 Implications for future research

The basis for the development of programs and services for overweight and obese children is a comprehensive effort in research. The accumulation of new knowledge through research is vital especially for the progress in childhood obesity prevention. Collection and dissemination of data about obesity in children is essential to be able to anticipate needs and develop appropriate interventions to prevent and ameliorate the problem. There is also a need to evaluate school curriculum to ensure the integration of health.

Since this is the first ever study conducted in an international school, other studies should be conducted among international school students to better understand

the factors contributing to obesity among these children. It should be done with a larger sample size and should be carried out for a longer duration to observe causes and effects of obesity among this group of respondents.

Future studies should identify gaps related to the impact of environment on food choices and eating patterns of school-age children. More studies are needed to better understand how specific environmental factors affect eating behavior, physical activity and nutritional status. In addition, cross-sectional and longitudinal methods must be utilized in any endeavor attempting to analyze relationships between eating behavior, physical activity and nutritional status, overweight/obesity, in particular.

This research investigated physical activity/inactivity among the students and determined their link [primarily] with obesity. Physical activity and its link with obesity have long been recognized. This current research attempted to seek some answers regarding the determinants of physical activity. However, more studies are needed to identify factors that influence children's participation in vigorous activity so that effective intervention strategies can be developed. Barriers to physical activity should also be explored. In one of the FGD sessions, a few students (mostly Japanese and Koreans) reported that too much home work and parents wanting them to stay home to study more were two barriers that were considered important. Future research should attempt to understand why kids do not use exercise/recreation facility and more importantly what type of data to collect to search for factors that are likely to impact inactivity.