

CAUSAL FACTORS OF OBESITY PREVENTION BEHAVIORS AND BMI IN FOURTH GRADE SCHOOL CHILDREN IN DEMONSTRATION SCHOOL, BANGKOK

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Introduction

Childhood obesity is already an epidemic in some areas and on the rise in others. An estimated 17.6 million children under five are overweight worldwide (WHO, 2003). In the National Health and Nutrition Examination Surveys (NHANES) from 1999-2002, obesity rates were 16 percent for children age 6-11. (Turell, 2005). Not only are developed countries faced with the increasing problem of childhood obesity but also developing countries (Langendijk et al, 2003). In Thailand, national surveys of overweight prevalence among school children from 2000 to 2005, done by Department of Health, showed that the prevalence of overweight among the school children were 13.6%, 12.3%, 12.9%, 13.4%, 12.8% and 9.7% respectively (Nutrition Division, Department of Health, Ministry of Public Health, 2006). However, the prevalence of overweight children shown above were the average. The childhood obesity prevalence rates ranging from 8% to 28% have been reported in regions of Thailand. Differences in the school types and areas made the prevalence rates of overweight and obesity among school children vary. The problem of obesity was more evident in students from Bangkok than those from other regions (Suprasongsin, 2004). A survey in 2,885 primary school children in Bangkok from 1992 to 1994, done by the Nutrition Division

of the Ministry of Public Health, indicated that the prevalence of overweight and obesity in demonstration schools, private schools, government schools and Bangkok Metropolitan schools were 25.9%, 25.7%, 23.3% and 11.2% respectively. After three years of follow-up, the prevalence of overweight and obesity increased to 31.5%, 28.1%, 27.4% and 14.6% respectively (Nutrition Division, Department of Health, Ministry of Public Health, 2006). Jirapinyo et al. (2005) conducted a retrospective study of weights and height of 437 school children in public primary schools from Bangkok. Results showed that prevalence of obesity at grade 1 were 16%. When these children were in grade 6, the prevalence of obesity increased to 31%. A recent survey conducted in 884 school children in Bangkok aged between 6 to 14 years found that prevalence of overweight and obesity was 19.9% (Nutrition Division, Department of Health, Ministry of Public Health, 2005).

Obesity is a multifactorial chronic disease stemming from complex interactions between genes and environment characterized by positive energy imbalance due to sedentary lifestyle and ready access to abundance of palatable food (Story et al, 2003). There have been a great number of negative healths, social and economic consequences from obesity. Overweight and obesity are major risk factors for chronic diseases, including type 2 diabetes, cardiovascular disease, hypertension and stroke, joint diseases and some cancers. Some children may develop sleep apnea, mature early, have increased LDL cholesterol and run the risk of liver and gall bladder diseases (WHO, 2003; Strauss, 1999; Sidik & Ahmad, 2004; Loke, 2002; Story et al, 2003; Turell, 2005; The Center for Health and Health Care in Schools, 2005). Furthermore, if children have been obese after 6 years of age, the probability that obesity will persist into adulthood exceeds 50%, and 70% to 80% of obese adolescents will remain so as adults (Sidik & Ahmad, 2004 cited Segal & Sanchez, 2001). Because of the difficulty in successfully treating obesity in children and in adults, prevention of childhood obesity is an important goal. Specific modifiable behaviors are associated with obesity, especially, physical inactivity, overconsumption of energy and consumption of a high-fat diet. Thus, obesity reduction efforts should be focused on increasing

the level of physical activity to increase energy expenditure, decreasing physical inactivity and establishing more healthy eating behaviors (Story et al, 2003 cited WHO, 1997; WHO, 2003; Sothorn, 2004; Kirk et al, 2005). Identification of the factors predicting children's obesity prevention behaviors, physical activity and healthy eating behavior, is essential to develop effective intervention strategies aimed at the prevention of obesity.

There have been several studies on the determinants of obesity prevention behaviors among children using one theory of behaviors or variables from several theories. A theoretical model that has proved useful in explaining or predicting a variety of health-related behaviors is the Theory of Planned Behavior (TPB) (Ajzen, 1991). The TPB proposes that the likelihood of someone engaging in a particular behavior can be predicted by their intention to perform that behavior. Intention, in turn, is predicted by 3 independent variables named attitude, subjective norm, and perceived behavioral control (PBC). Attitude refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question. Subjective norm refers to the perceived social pressure to perform or not to perform the behavior. Finally, Perceived behavioral control refers to the perceived ease or difficulty of performing the behavior and may have both direct and indirect effects on behavior (Ajzen, 1991). The TPB has been applied in obesity prevention behaviors both dietary and physical activity. Godin and Kok (Courneya et al, 2000 cited Godin and Kok, 1996) summarized 18 studies that have tests the TPB in the exercise domain. Their results indicated that intention and PBC together explained approximately 36% of the variance in exercise behavior. Intention was a significant determinant of behavior in all studies whereas PBC was a significant determinant in about half of the studies. Moreover, attitude, subjective norm and PBC together explained about 42% of the variance in intention to exercise. Hagger et al.'s (2002) meta-analysis of 72 studies applying the TPB in the domain of exercise confirmed this pattern of findings and reported substantial correlations between each of the key components and with behaviors. The TPB has also been used in the domain



of dietary behavior (Brug et al, 1995; Masalu, 2001; Backman et al, 2002; Conner et al, 2002; Baker et al, 2003; Brogers et al, 2004; Nejad et al, 2004). These studies have reported 31%-77% of the variance in intention and 9%-46% of the variance in behavior. Thus, the overall utility of the TPB has been strongly supported in both dietary and physical activity domain.

In Thailand, the prevalence rate of overweight and obesity was higher among school children in Bangkok than other regions, especially in demonstration schools, with 25% to 28% of students being overweight (Suprasongsin, 2004). There have been few studies focused on psychosocial determinants of obesity prevention behaviors among children and adolescents based on behavioral theories (Moohummud, 2001; Suttana, 2004; Sukawadee, 2005). However, studies applied the TPB to predict obesity prevention behaviors in demonstration schools have not been reported. The purpose of this study, therefore, is to determine causal factors of the obesity prevention behaviors; physical activity and healthy eating behavior, among these students applying the TPB. The causal factors of body mass index (BMI) are also investigated. Knowledge of factors predicting the obesity prevention behaviors and BMI will contribute to a better understanding of these behaviors and be further useful for the design of effective interventions to prevent childhood obesity.

Objectives

Objectives of this study are:

1. to determine causal factors of obesity prevention behaviors; physical activity and healthy eating behavior,
2. to examine the effects of healthy eating behavior, physical activity, breastfeeding and parental obesity on body mass index (BMI).

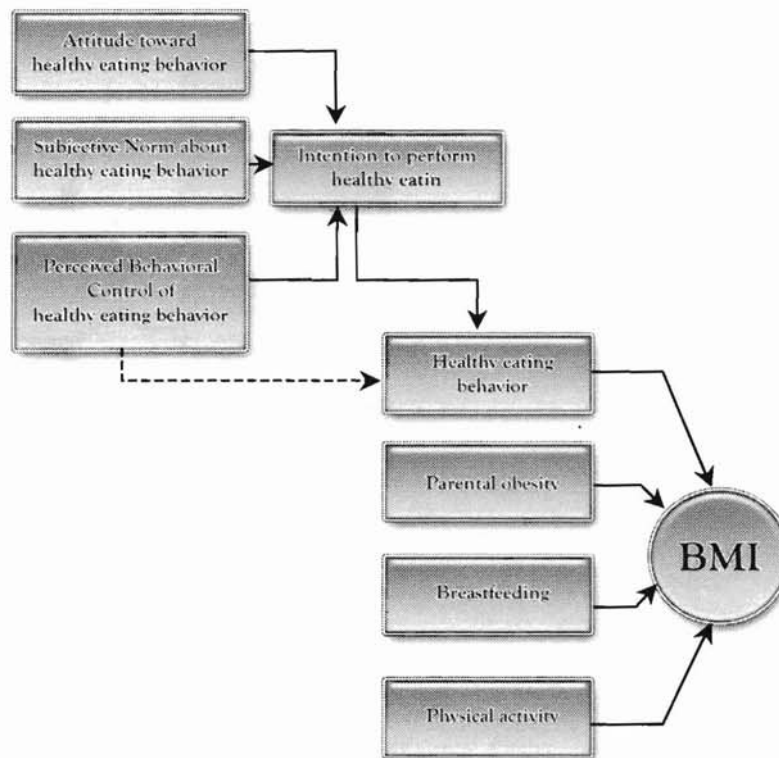
Conceptual framework

The conceptual framework of this study based on TPB variables including attitude, subjective norm, perceived behavioral

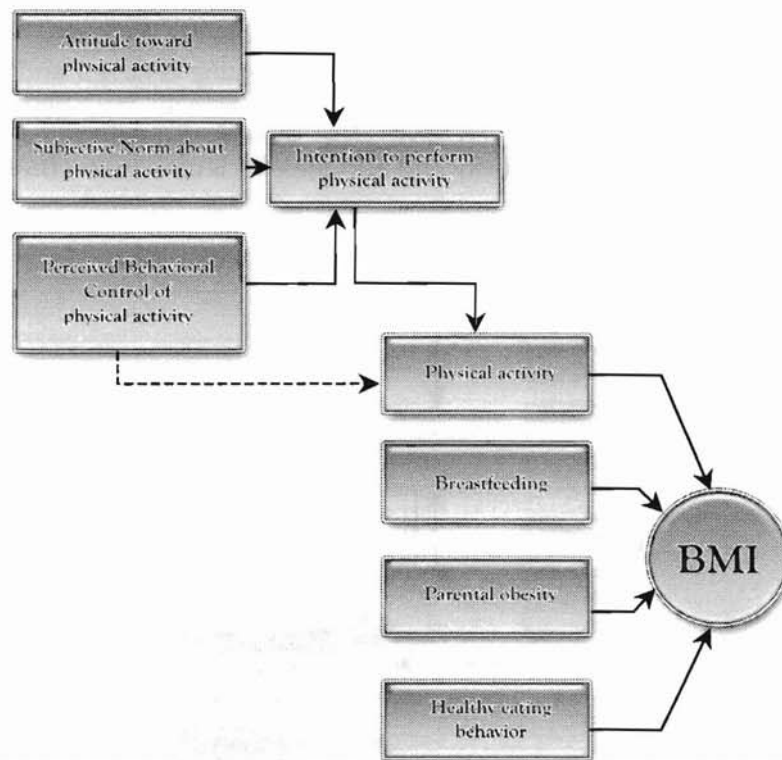
control, intention, and behavior. Variables outside the TPB; BMI, breastfeeding, parental obesity, applied from literature review are also included.

There are two conceptual frameworks for this study. The first determines causal factors of healthy eating behavior and the effects of healthy eating behavior, physical activity, breastfeeding and parental obesity on BMI. The second determines causal factors of physical activity and also the effects of those on BMI.

Conceptual framework 1



Conceptual framework 2



Definition of obesity prevention behaviors

For this study, the obesity prevention behaviors are activities that were done by students before, during and after school. These activities are 1) physical activity and 2) healthy eating behavior.

1. Physical activity includes

- daily exercise after school for at least 30 minutes such as climbing, biking, swimming, football, badminton, and walking
- in-school physical education programs or gym time
- any activities done in a holiday or during recess such as household activities, play, cooking, dancing, and sports

2. Healthy eating behavior includes

- eating a lot of fruits and vegetables
- not eating too much junk food, energy-dense fatty and sugary foods, packaged snacks
- not eating too much sugars-sweetened soft drinks

Research hypotheses

1. A combination of attitude, subjective norm and perceived behavioral control of physical activity predict intention to perform physical activity.
2. Intention and perceived behavioral control of physical activity together predict physical activity.
3. A combination of attitude, subjective norm and perceived behavioral control of healthy eating behavior predict intention to perform healthy eating behavior.
4. Intention and perceived behavioral control of healthy eating behavior together predict healthy eating behavior.
5. A combination of healthy eating behavior, physical activity, breastfeeding and parental obesity predict BMI.

Methods*Population*

The population of the study is 1,015 4th grade students in demonstration schools located in Bangkok, Thailand.

Sample

As determined by statistical power analysis (Cohen, 1988), the sample is 320 4th grade students in demonstration schools located in Bangkok, Thailand.

Measures

The study questionnaire contains the variables based on the Theory of Planned Behavior. All questions relating to the direct measures of the theory are developed in a manner consistent with the recommendations of Ajzen and Fishbein (1980), Ajzen (2002) and Francis et al. (2004). According to this instrument, the following variables will be measured; attitude towards physical activity, subjective norm about physical activity, perceived behavioral control of physical activity, intent to perform physical activity, physical activity, attitude towards healthy eating behavior, subjective norm about healthy eating behavior, perceived behavioral control of healthy eating behavior, intent to perform healthy eating behavior, and healthy eating behavior. Variables outside the theory including BMI of the student samples, duration of breastfeeding and parental obesity have also been measured.

Quality testing of the questionnaire

The questionnaires will be sent to experts to obtain content validity. Then, the pilot test in 100 students from the same population will be conducted to ensure clarity and ease of comprehension and also determine reliability of the instrument.

Measurement procedure

The study sample will be divided into two groups. The first will be asked to respond to items measuring variables based on the Theory of Planned Behavior; attitude, subjective norm, perceived behavioral control, and intention, for determining causal factors of physical activity. Another group will be asked to respond to items measuring variables for determining causal factors of healthy eating behavior. The measures of physical activity, healthy eating behavior, duration of breastfeeding and parental obesity will be conducted in both two groups to examine the effect of these variables on BMI in school children.

Data analysis

Data analysis will be performed using SPSS for Windows. The statistical tests include:

1. descriptive statistics (frequency, means, standard deviations) for characteristics of sample and all variables,
2. multiple regression analysis to test the hypotheses number 1-5,

An alpha level of .05 will be used for all statistical tests.

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