Chapter 1

Introduction

Childhood obesity is an increasing health problem in developed countries, and is of growing concern in developing countries. An increase in childhood obesity has been reported in Asian countries, including Korea, Singapore, Malaysia, Indonesia and Thailand.

This thesis is concerned with investigating the prevalence of overweight and obesity and investigating factors affecting overweight and obesity among public high school students in Pattani province. Pattani is one of the three southern border provinces of Thailand, its region of greatest cultural and religious diversity. Moreover, we aim to compare distributions of body mass index (BMI) in students having different demographical, religious and geographical backgrounds. The data for 9393 students are based on the Education Information System program developed by the Ministry of Education.

1.1 Measurements

Obesity is defined as a condition where fat has accumulated to such an extent that health is adversely affected. Although several proxy measures for adiposity and obesity related risk exist, BMI is currently the measure of choice for defining childhood obesity. BMI is defined as weight in kilograms divided by the square of height in meters. It is cheap, easy to measure, reproducible and fairly well correlated with fatness. However, it is associated with more drawbacks in children than in adults, because, for example, age, sex, and maturation varies within and between populations (Neovius et al, 2004).

BMI is generally accepted as a valid indirect measure of adipose tissue in both children and adolescents. The use of BMI cut-off points of 25 and 30 to define adult overweight and obesity, respectively, has been recommended by the World Health Organization (WHO), but for children their BMI will normally change with age and vary by gender. Thus, age and gender-specific BMI cut-offs are needed in order to be able to classify overweight and obesity in children and adolescents. A number of different BMI-for-age reference charts have been developed, including the well known American National Center for Health Statistics (NCHS) reference, the UK reference, and the French reference. Currently, the two most widely used international references are those of the WHO/NCHS and the International Obesity Task Force (IOTF) (IASO, 2004).

In this study we classify overweight and obesity using Cole et al (2000), supported by the IOTF, where recently proposed cut-off points are based on the adult overweight and obesity BMI ranges using a reference data set obtained from several sources. The cut-off points were derived by spanning birth to 25 years using six large nationally representative cross-sectional surveys on growth from Brazil (1989), Great Britain (1979-1993), Hong Kong (1993), the Netherlands (1980), Singapore (1993), and the United States (1963-1980). For each of the surveys, BMI centile curves were drawn that at age 18 years passed through the cut off points of 25 and 30 defining overweight and obesity, respectively, for adults. The resulting curves were averaged to provide age and sex specific BMI cut-off points to define overweight and obesity from 2 to 18 years.

1.2 Rationale for Study

A great number of studies have investigated factors related to obesity but very few have been conducted in mix cultural background area. Findings in a big city studies may not be applicable to a largely non-metropolitan region like Pattani Province.

In this thesis we begin with a detailed study of the relationship between BMI and determinants among students in Pattani Province of Southern Thailand, and then focus on the prevalence of obesity in this population. The determinants of concern are demographic and environmental factors, and have been suggested in many studies related to BMI. Demographic factors including age and gender are considered because they are important factors in the study of growth in children. Moreover, we investigate the prevalence of overweight and obesity by subdistricts of Pattani province.

The analyses and graphical presentations in this study can be applied to any data, and were performed using web-based computer programs written in HTML and VBScript.

1.3 Literature Review

At present, BMI is generally accepted as a valid measure of adipose tissue in both children and adolescents (IASO, 2004). The BMI is currently a measure of choice for defining childhood obesity (Neovius et al, 2004).

A standard definition for child overweight and obesity worldwide: international survey used the international cut-off points for body mass index for overweight and obesity by sex between 2 and 18 years, estimated to have body mass index of 25 and 30 kg/m^2 at age 18, obtained by averaging data from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and the United States (Cole et al, 2000).

The prevalence of overweight and obesity in high school students in Bangkok, Thailand, aged 10-25 years is 10% (Ruangkanjanaset, 2004).

The prevalence of overweight of males in primary and secondary schools of Hat Yai municipality, southern Thailand is higher than those for females (Mo-suwan et al, 2000).

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The male students in Hat Yai, Thailand in 1997 had a higher percentage of overweight and obesity than females (Tongkumchum, 2002).

The transformation of right-skewed BMI distribution used the formula ln(BMI-8) to reduce the skewness coefficient (Mo-suwan et al, 2000).

1.4 Source of Data

The 17 high schools of Pattani Province have the data for all students using the EIS (Education Information System) program. The variables selected are weight, height, sex, age, religion, parent status, level/year, school, birth place, school district, relation of student and parents, father's salary, mother's salary, parent's salary, and BMI created from weight and height.

The 9393 high school students were aged 12 to 22 years in 2004, studying in Mattayom 1 to 6 for 17 schools and Vocation 1 to 3 for two schools, Wutichaiwittaya and Phokiriratsuksa.

1.5 Conceptual Model

The conceptual model is based on assumed relationships between the measurement variables. The variables may be divided into two groups. Outcome is BMI and determinants are demographic and socio-economic and environmental factors. The demographic factors are sex and age. The other factors comprise religion, parent status, level year, school, birth place, school district, relation of student and parents, father's salary, mother's salary and parent's salary. Figure 1.1 shows a conceptual model for the relations between the variables.
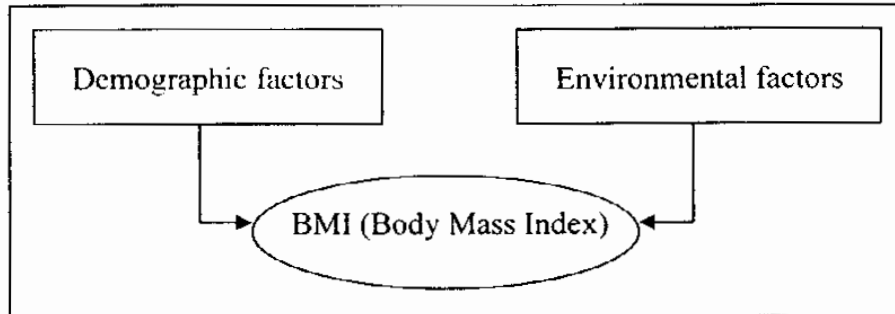
Figure 1.1: A conceptual model for the relations between variables