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DETERMINING FACTORS OF FOOD CONSUMPTION BEHAVIOR AND NUTRITIONAL STATUS AMONG ADOLESCENTS IN BANGKOK METROPOLITAN

SAOVAROS MEEKUSOL

With compliments
of
บัณฑิตวิทยาลัย ม.มหิดล

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was submitted to the Faculty of Graduate Studies, Mahidol University
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KEY WORD : NUTRITION STATUS / FOOD CONSUMPTION BEHIVIOR / ADOLESCENTS

SAOVAROS MEEKUSOL : DETERMINING FACTORS OF CONSUMPTION BEHAVIOR AND NUTRITIONAL STATUS AMONG ADOLESCENTS IN BANGKOK METROPOLITAN. THESIS ADVISORS : SUPAWADEE LIMPANATORN M.N. (MATERNAL AND CHILD NURSING), KAIMOOK WICHIENCHAROEN, Ed.D. (CIRRICURUM RESEARCH AND DEVELOPMENT), KAIMOOK MALITHONG, M.P.H., 105 p. ISBN 974-662-948-4

Malnutrition is one of the major health problems in Thailand. The cause of this problem stems partly from food consumption behavior. The purposes of this study are to study nutritional status, food consumption behavior and the governing factors which can predict the food consumption behavior, and to compare food consumption behavior with nutritional status. The subjects for the study of nutritional status comprised 4,325 adolescent students studying in grades 7-12, who were selected by multi-stage sampling; the subjects for the study of food consumption behavior were 405 adolescents randomly selected from the first selected group. The assessment of nutritional status was based on weight for height. The data were analyzed by using percentage, mean, standard deviation, stepwise multiple regression, one-way analysis of variance (ANOVA) and multiple comparison with S-method.

The results reveal that 67.93 % of the sample exhibited normal nutritional status (normal-weight for height, P10-P90), 8.42 % showed under nutritional status (under-weight for height, <P3), and 12.16 % had over nutritional status (over-weight for height, >P97).The majority 54.6% of the subjects showed the moderately agreeable food consumption behavior, and some subjects exhibited less agreeable behavior like soft drink intake. The significant governing factors in predicting the food consumption behavior were food consumption attitude, family income, nutritional information and nutritional knowledge, which could predict the behavior at 61.7 %. Adolescents of different nutritional status also showed dissimilar food consumption behavior.

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คำสำคัญ : ภาวะโภชนาการ / พฤติกรรมการบริโภคอาหาร / วัยรุ่น

เสาวรส มีกุศล: ปัจจัยกำหนดพฤติกรรมการบริโภคอาหารและภาวะโภชนาการของวัยรุ่นในกรุงเทพมหานคร (DETERMINING FACTORS OF FOOD CONSUMPTION BEHAVIOR AND NUTRITIONAL STATUS AMONG ADOLESCENTS IN BANGKOK METROPOLITAN) คณะกรรมการควบคุมวิทยานิพนธ์ : สุภาวดี ลิมปนาทร M.N. (MATERNAL AND CHILD NURSING), ไข่มุกข์ วิเชียรเจริญ กศ.ด. (การวิจัยและพัฒนาหลักสูตร), ไข่มุกข์ มลิทอง M.P.H
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ปัญหาโภชนาการนับเป็นปัญหาที่สำคัญของประเทศ สาเหตุส่วนหนึ่งเกิดจากพฤติกรรมการบริโภคอาหาร การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อศึกษาภาวะโภชนาการและพฤติกรรมการบริโภคอาหารของวัยรุ่นในเขตกรุงเทพมหานคร โดยศึกษาปัจจัยที่สามารถทำนายพฤติกรรมการบริโภคอาหารและเปรียบเทียบพฤติกรรมการบริโภคอาหารของวัยรุ่นที่มีภาวะโภชนาการต่างกัน กลุ่มตัวอย่างเป็นนักเรียนชั้นมัธยมศึกษาปีที่ 1-6 จำนวน 4,325 คน เพื่อศึกษาภาวะโภชนาการและทำการสุ่มมา 405 คน เพื่อตอบแบบสอบถามพฤติกรรมการบริโภคอาหาร ประเมินภาวะโภชนาการโดยใช้น้ำหนักต่อส่วนสูง วิเคราะห์ข้อมูลด้วยสถิติร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน การวิเคราะห์ถดถอยพหุคูณแบบขั้นตอน วิเคราะห์ความแปรปรวนทางเดียว และเปรียบเทียบพหุคูณโดยใช้วิธีเอส

ผลการวิจัยพบว่า วัยรุ่นในเขตกรุงเทพมหานคร มีภาวะโภชนาการปกติ (น้ำหนักตามเกณฑ์ส่วนสูง,P10-P90) ภาวะโภชนาการต่ำกว่ามาตรฐาน (น้ำหนักต่ำกว่าเกณฑ์ส่วนสูง,<P3)และภาวะโภชนาการเกินมาตรฐาน (น้ำหนักเกินเกณฑ์ส่วนสูง,>P97) คิดเป็นร้อยละ 67.93,8.42 และ 12.16 ตามลำดับ ส่วนใหญ่มีพฤติกรรมถูกต้องปานกลาง คิดเป็นร้อยละ 54.6 และพบว่าบางส่วนมีพฤติกรรมการบริโภคอาหารที่ถูกต้องน้อย ได้แก่การบริโภคน้ำอัดลม ปัจจัยที่สามารถร่วมทำนายพฤติกรรมการบริโภคอาหารของวัยรุ่นได้อย่างมีนัยสำคัญทางสถิติ ได้แก่ ทัศนคติต่อการบริโภคอาหาร รายได้ของครอบครัว การได้รับข้อมูลข่าวสารเกี่ยวกับโภชนาการ และความรู้เรื่องโภชนาการ โดยปัจจัยดังกล่าวสามารถร่วมทำนายพฤติกรรมการบริโภคอาหารได้ร้อยละ 61.7 และวัยรุ่นที่มีภาวะโภชนาการต่างกัน มีพฤติกรรมการบริโภคอาหารที่แตกต่างกัน

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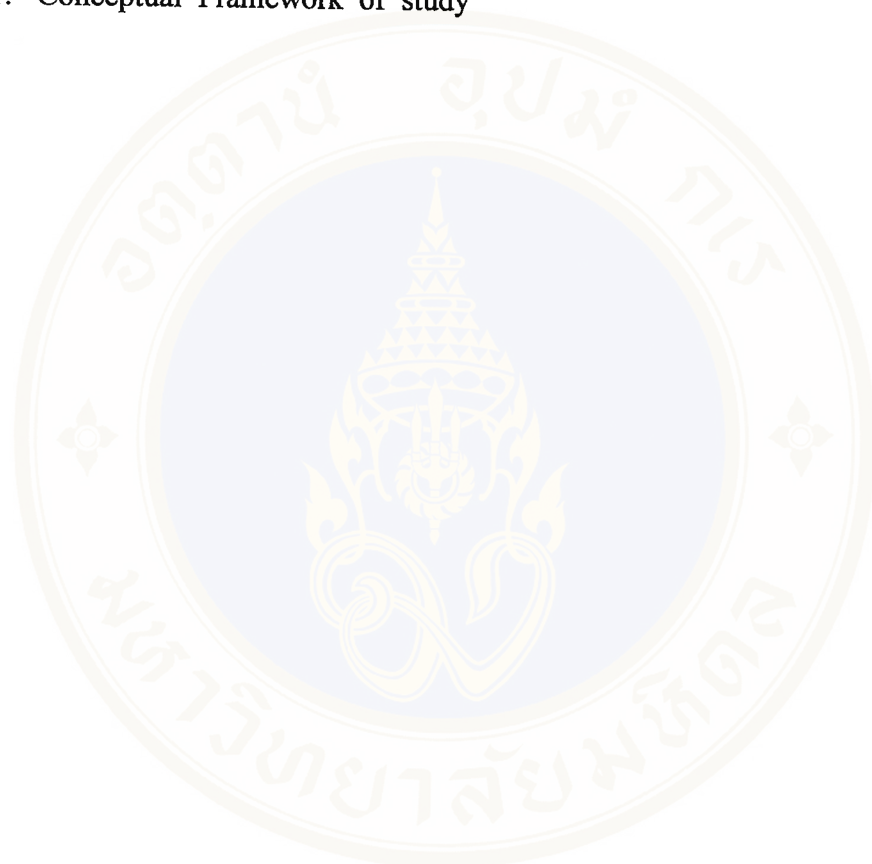

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CHAPTER I
INTRODUCTION

Background

Food is one of the basics and essential substance in sustaining life and growth for human beings. Food consumption conformed of proper dietary recommendation can promote good health. On the contrary, poor dietary consumption will affect the physical health of the population and quality of life , leading to the nutritional problem which is one of the major public health problem of the country. In the past two decades, Thailand had experienced the malnutritional disease problems particularly caused by the deficiency in protein and energy food consumption. The Government of Thailand initiated food and nutrition programs in the Fourth National Economic and Social Development Plan (B.E.2520-2524). Since then the national nutritional situation has gradually changed such that the malnutritional disease problems decrease (Nutrition Work Plan Committee, B.E.2535:1), but the overconsumption behavior and overweight problem tend to increase. This situation may reflect the onset development of new industrialized country, resulting in rapid growth of social and economic expansion which in turn affects the population lifestyles, and the household food consumption behaviors (Uruwan Yamborisuth, B.E.2536:760).

At present, the nutritional problem affect everyone in society including adolescents, the potentially vulnerable group, particularly those residing in large cities like Bangkok. In urbanized community, various types of social and economic accommodations as well as public services have been provided higher standard of living . Life is always full of hurry and competitive activities. In addition, foods and meals are the highly competitive service business to all levels of consumers in term of their diversities and accessibility. These attract attention of adolescents who are seeking new eating behavior. This in turn accounts for the high risk of nutritional problem to the adolescents, which is in the study finding of Chuleeporn Somsri (B.E.2541)

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revealing that the highschool students grades 10, 11, and 12 in Bangkok exhibited 69.6% of the high risk on food consumption behavior. This may be due to the fact that the adolescents are in the transitional period of physical, mental and emotional development from the childhood to adulthood. In fact, adolescents require variety of food with high nutritional values for their physical build-up and growth. They also feel free, and prefer to express their own eating behavior as the result of their whims, commodity advertisement with no concern of nutritional values . Adolescent girls, they are naturally fond of good shape, obesity-resistant. They try to skip meals, buremia habit or taking laxative for weight control which in turn leading to the malnutritional problem. In the study survey of Ku Kang Magazine on "Bangkokian's Food Consumption Behavior on Fast Food Stores". It was found that the age majority of the consumers was in the 15-20 years, accounted for 52.29% of the sample and 61.7% was the group of student (B.E. 2531 : 86-94).

Earlier studies on the students nutritional status, particularly that of the Division of Nutrition, Department of Health in B.E.2533 indicated that the survey of 7,437 students, grades 7-12 with 11-17 years of age, showed 13.5% of the sample were undernutritional status. In B.E. 2537, Sunetra Nimanant studied on the nutritional status of a highschool student group (grades 7-9) in Chiang Mai Metropolitan, revealing that 19.5% of male students and 22.5% of female students were reported in the undernutritional status. In addition, the two event survey result of highschool students, conducted in B.E.2538 by the Nutrition Section, Department of Health, Bangkok. It revealed that 7.8% and 6.8% of the total sampled students were in the undernutritional status. The nutrient intake deficit was protein, energy, iron and calcium (Department of Health, B.E. 2540 : 2). Without appropriate treatment, this undernutritional status may lead to as anemia, tuberculosis, etc (Valai Intrampan, B.E. 2530 : 84-86). Consequently, it would affect the family expense for those infected; the economic burden in public health service for the government, and eventually impeding the country development as a whole.

At present, we are facing not only the malnutritional problem in adolescents, but also the overconsumption and overweight condition which tends to increase particularly in urban community. Finding from the previously mentioned study of the Department of Health (B.E.2533) also indicated that 21.4% and 31.2% of a sample

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size of 7,437 male and female students were reported as overconsumption and overweight status respectively. Jariyavat Kompayak et al (B.E.2535) found in their study that the overconsumption status as high as 56.2% of the surveyed highschool students in Bangkok Noi, Bangkok was observed. It is now believed that obesity may cause various health problems such as coronary heart disease, infected respiratory tract, bone and joint arthritis, skin diseases and endocrine system diseases. In addition, obesity is a major risk factor of diabetes, high blood pressure, high cholesterol levels, coronary heart disease, gallbladder disease and some types of cancer (Chanthita Preuksananont, B.E. 2536 : 99-106). Obesity also affects adolescents'mental behavior leading to losing self image and self-confidence, peculiar attitude to companion, hostile relationship to outsiders, high anxiety and potentially suffering of stress disorder (Berrajo et al, 1980 : 45-48).

Findings from relevant research and study also showed that the food consumption behavior of adolescents, is an associated factor and directly affects their nutritional status both in term of dietary quantities and values, thereby creating under-nutritional status or overconsumption behavior.

As a community health nurse, the author is interested and has realized the importance of nutritional problem in adolescents. A survey program on nutritional status of 4,350 adolescent students, ages ranging 12-19 years, was then performed. The survey consists of the measurements of students' body weights and heights, then compares and assesses with the standard and an nutritional status. The indicator for a specific group of population aged 1 day – 19 years, as conducted by the Nutritional Research Institute, Mahidol University. In addition, Green and Kreuter's PRECEDE Framework concept is adopted in the study approach of adolescent eating behavior. This concept is divided into three types of associated factors on the individual health behavior, i.e. *predisposing factor, enabling factor* and *reinforcing factor.* Predisposing factor is a persuading factor for an individual to express behaviors such as knowledge, beliefs, attitude, and values; whereas the enabling factor involves the factor that facilitates one's behaviors, such as availability and accessibility to health services , and skills on health care. The reinforcing factor is a behavioral factor supported by friends, teachers, health care personnel.

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In this study, the researcher selected specific factors potentially related to food consumption behaviors of adolescents, particularly the predisposing factor comprises nutrition knowledge, eating attitudes and self-esteem. It is believed that adolescents, who lack in the dietary knowledge, can not assess the benefit of essential nutrients for growth, resulting in poor eating patterns as in overcomsumption and malnutritional status. Considering the benefit of possessing good attitude on food consumption, adolescents could inherently develop healthful eating habit which in turn attaining normal nutritional status. For self-esteem factor, it can help strengthen adolescents' confidence in undertaking the healthful eating behavior. With regard to the enabling factor, the household income is directly related to the food consumption behavior. For high-income families, they can afford to indulge in more dietary diversity than that of the low-income families, resulting in the overconsumption and overweight status. The low-income households will also be affected by the malnutritional status due to their budget constraint on food choices. For the reinforcing factor, the awareness of nutritional information, is believed to be associated in this study since it would direct and stimulate adolescents to undertake proper food consumption behaviors. In summary, the concept framework can be depicted as shown in Figure 1.

Objectives of Study

1. To study the nutritional status of adolescents in Bangkok.
2. To assess the food consumption behavior of adolescents in Bangkok.
3. To compare the food consumption behavior of adolescents to various nutritional status.
4. To predict the predisposing, enabling and reinforcing factors on food consumption behavior of adolescents in Bangkok.

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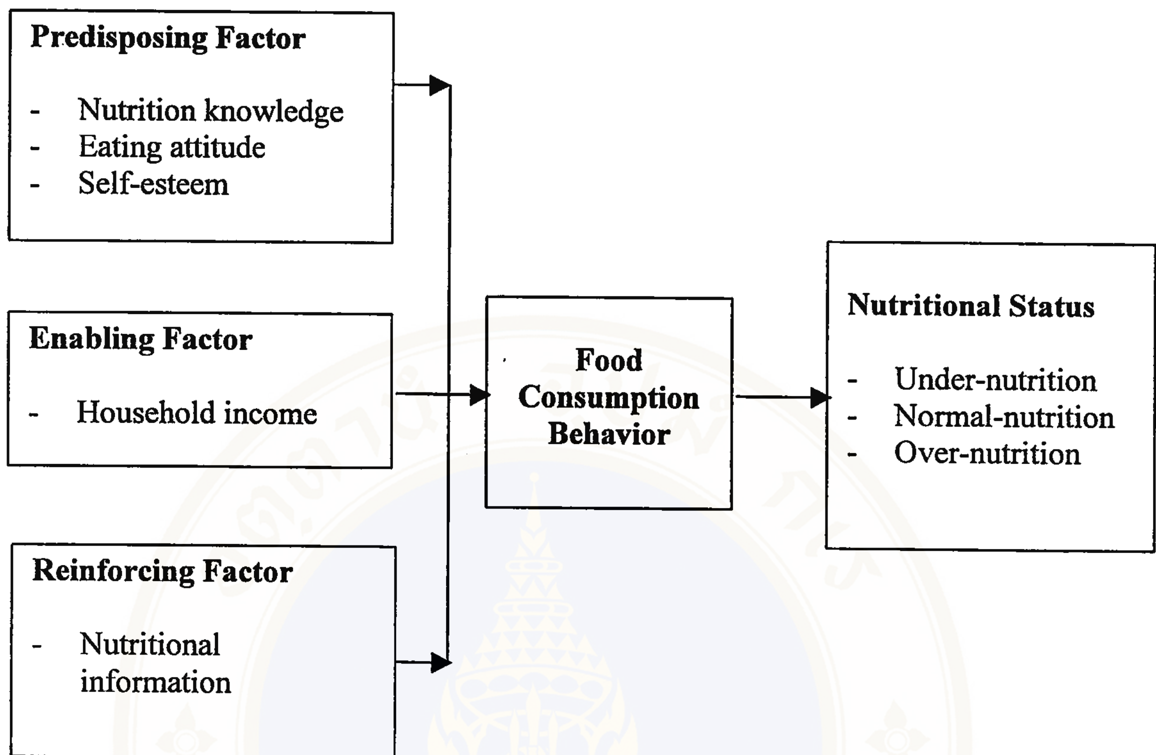

Figure 1 Conceptual Framework of Study

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Hypothesis

1. Adolescents with different nutritional status will undertake different eating behavior.

2. Nutritional knowledge, food consumption attitude, self-esteem, household income, and awareness of nutritional information can be used to predict adolescents'eating behavior.

Scopes of Study

This study focused on influencing factors associated with food consumption behavior and nutritional status of the 12-19 years adolescents, which are highschool students grades 7-12 in Bangkok and the school is under the Department of General Education, Ministry of Education, for the academic year B.E.2541.

Anticipated Consequences

1. To recognize Bangkok adolescents, the teacher association, parents, community health nurses (school health personnel), to realize on the influencing factors of food consumption behavior and nutritional status of the adolescents.

2. To provide basic information for the school health nurses, teachers and concerned professionals, in planning school health Program ; relevant activities for encouragement the abatement of nutritional problem in adolescents.

3. To prepare the necessary information for schools and relevant agencies to initiate and implement the health-promoting issues which emphasize on the promotion of the nutritional problem abatement program of student adolescents.

4. To set up a guideline on further aspects of study, investigation and research related to the nutritional status.

Definition of Variables

Nutritional Status means the body status assessed by measuring the body weight and height and compared with the graph of standard growth of male and female in the ages of 10-20 year,as prepared by Institute of Nutrition,Mahidol University,which utilized the relevant information of standard weights,heights and nutritional status indicators of the Thai population,ages 1 day-19 years,of the Department of Health, Ministry of Public Health, B.E. 2530.

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Nutrition status is divided into under-nutrition,normal-nutrition and over-nutrition.

Under-nutritional status means the adolescent whose body weight and height values fall below the percentile 3 .

Normal-nutritional status means the adolescent whose body weight and height values are within the percentile 10-90.

Over-nutritional status means the adolescent whose body weight and height values exceed the percentile 97.

Predisposing Factor means the basic instinct of individual which creates motivation or self-satisfaction in food consumption behavior either positively or negatively. For this study, the factor includes the adolescents' nutritional knowledge, food consumption attitude and self-esteem.

Adolescents' nutritional knowledge means the correct perception of adolescents on the amount of food consumption, healthful food selection, the beneficial and harmful effects of some nutrient intake.

Adolescents' food consumption behavior means adolescents' feeling, idea, tending on the eating behavior particularly the healthful food choice, refuse of unhealthful foods, hygienic consumption habit and selection of food.

Adolescents' self-esteem means the self-assessment of adolescents' feeling, opinion either positively on negatively, the feeling of one's own satisfaction, respect and confidence.

Enabling Factor means the adolescent's outside component that facilitates food consumption behavior. For this study it refers to the household income.

Household income means the average monthly salary of the adolescents' parents, which is divided into 2 levels adopted from the average monthly household income criteria of Bangkok in B.E.2539. Those incomes not exceeding 10,779 baht/month are rated low-income; while those exceeding 10,779 baht/month are referred as high-income.

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Reinforcing Factor means the contributing factor indicating the encouragement or discouragement of adolescents' food consumption behavior. For this study, it refers to awareness of nutritional information.

Nutritional information means the process of nutritional information awareness through listening, reading, informed, persuasion in the food consumption principles from various sources such as newspaper, radio, television, brochure, leaflet, magazine, journal as well as public health personnel, household member, relative and friends.

Food Consumption Behavior means the typical eating habit of adolescents which is divided into 4 aspects, i.e. five-essential-group food eating, high calorie food eating unhealthy – food eating and number of daily food servings.

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CHAPTER II
LITERATURE REVIEW

This study aims to examine the influencing factor of the food consumption behavior and nutritional status of the adolescents in Bangkok. The author has searched relevant information and collected several study findings . The scope and steps of study is as follows.

- Development in adolescence
- Nutritional requirement in adolescence
- Assessment of nutritional status
- Food consumption behavior and nutritional status
- Influencing factors on food consumption behavior according to PRECEDE framework concept

Development in Adolescence

Adolescence is derived from a Latin word *Adolescere,* meaning grow into maturity. The World Health Organization (WHO) defines the adolescence in 3 distinct characteristics (Jensen & Bebak 1985 : 1150) namely :

1. physical development starting from change of the reproductive organs to complete maturity.
2. psychological development starting from the childhood to adulthood.
3. social and economic changes especially from family-dependent to the self-dependent by seeking employment of one's own.

Adolescence is the transitional period between puberty and adulthood. The body is ready for growth as well as the reproductive system. The male organ begins to produce sperm while the ovulation and menstrual cycle starts in the female adolescents. According to Erickson's development theory; adolescence falls in the ages of 13-18 years; is in the process of developing self-reliance but also occupied with confusing emotion and lacking confidence due to the turning point to the adulthood.

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Different age ranges of adolescence are reported as follows :

WHO divides the period of 10-19 years

Sucha Chan-em (B.E.2529 : 3) classifies into 3 groups

1. Early adolescence, 13-15 years
2. Middle adolescence, 15-18 years
3. Late adolescence, 18-21 years

Arnold Gesell & Luella Cole, the development psychologists, who categorize the age period of adolescence as (Prayoonsri Manisorn, B.E. 2532 : 15) :

- Early adolescence,	female 11-16 years,
	male 13-15 years
- Middle adolescence,	female 13-17 years,
	male 15-19 years
- Late adolescence,	female 17-21 years,
	male 19-21 years

M.R. Channivat Kasemsan (B.E.2536 : 13) divides 3 different period of adolescence :

1. Early adolescence (10-14 years) representing high body growth and reproductive organ development.
2. Middle adolescence (female 13-16 years, male 14-17 years) representing an active mind of freedom, love new exciting activities, easily influenced by friends, showing frequent conflict with parents, and interested in opposite gender .
3. Late adolescence (17-21 years), characterized by growing to adulthood, being more conscientious, and less aggressive behavior.

In summary, it is difficult to set a definite age of adolescence since the development of human body is a continuing process with no distinct interruption. This study focuses on the adolescence age 12-19 years due to the starting period of remarkable body changes. The changes and development in adolescence are depicted as follows :

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1. Physical Development The body development of adolescence to maturation typically results in the physical growth of both external parts such as height, weight, face, body shape etc, Different characteristics of the body development between adolescent male and female is summarized as follows (Berger & Williams, 1992 : 305-306 ; Sriruern Kaeokangwan, B.E.2538 : 377-378) :

(1.1) Dissimilarity

Female

- Rapid growth of ovary, menstrual cycle begins.
- Breasts fully enlarge.
- Hips begin to enlarge and fat accumulates.

Male

- Slower growth rate than female about 2 years
- Hair grows on face, chest
- Larynx enlarges causing deep tone voice
- Shoulders are broaden

(1.2) Similarity

- Changes in facial skin, causing acne easily
- Skeletal muscle enlarged and strengthened
- Hair grows in armpits
- Sweat gland grows fully
- Hair appears at sex organs
- Full growth of secondary sex characters, becoming capable of reproduction
- Growth development of abdominal and limb skeleton

2. Intellectual Development This is the period of intellectual development of adolescence; being rational thinking, learning on trial-and-error , and lacking of prudent character. Early adolescence also possesses the subjective thinking as perceived but is deprived of a long-term planning. On the other hand, the middle adolescence is able to think objectively, cares for others and their feelings towards oneself. The late adolescence conforms closely to the adult thinking, being objective mind thought thoroughly, and be instilled with an efficient memory and analytical mind.

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3. Emotional and Social Development In general, adolescents always express intense and variable emotion ; requiring freedom and self-dependent. At times, they also feel disagreement with adults in various aspects ; tending to break regulations, and prefer to associate and build up their own unique group. Nevertheless, recognition from their group is an integral part of their existence, and they still need parental cares.

In summary, adolescence is in the transitional period of development from the childhood to adulthood by gradual changes and development in physical body, intellect, emotion and social environment. Adolescence still lacks adequate experiences and judgement in solving the social problems conclusively. Additionally, adolescence prefers to associate with their own groups, conforming to peers, pursuing its own uniqueness and freedom, as well as possessing an intense, changeable mind.

Nutrient Requirement in Adolescence

Adolescence is a life period of higher rates of physical growth and development resulting in heightened nutritional needs in order to offset the growth and other energy-dependent activities such as sports and schooling. Table 1. shows the recommended daily nutrient intake of adolescence as proposed by the Committee on Recommended Daily Dieatry Allowances for Health Thais, Department of Health, Ministry of Public Health, B.E. 2532.

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Table 1 Recommended Daily Nutrient Intake in Adolescence

Nutrient	Male Age (yr.)			Female Age (yr.)		
	10-12	13-15	16-19	10-12	13-15	16-19
Energy (Kcal)	1,850	2,300	2,400	1,700	2,000	1,850
Protein (g)	34	50	57	37	49	45
Vitamin :						
Vitamin A (ug RE)[c]	600	700	700	600	600	600
Vitamin D (ug)[d]	10	10	10	10	10	10
Vitamin E (mg α –TE)[e]	8	10	10	8	8	8
Vitamin C (mg)	50	60	60	50	60	60
Thiamin (mg)	1.4	1.4	1.4	1.1	1.1	1.1
Riboflavin (mg)	1.6	1.6	1.7	1.3	1.3	1.3
Niacin (mgNE)[f]	18	18	18	15	15	14
Vitamin B_6 (mg)	1.8	1.8	2.0	1.8	1.8	2.0
Folacin (ug)	90	130	165	95	135	145
Vitamin B_{12} (ug)	2.0	2.0	2.0	2.0	2.0	2.0
Minerals :						
Calcium (mg)	1,200	1,200	1,200	1,200	1,200	1,200
Phosphorus (mg)	1,200	1,200	1,200	1,200	1,200	1,200
Magnesium (mg)	350	350	400	350	350	400
Iron (mg)	12	12	10	15	15	15
Zinc (mg)	15	15	15	15	15	15
Iodine (ug)	150	150	150	150	150	150

Ref : The committee on Recommended Daily Dietary allowances Department of Health, Ministry of Public Health,1989.

Recommended Daily Dieatry Allowances for Healthy Thais[a]

[a] The allowances are intended for healthy Thais under usual conditions.

[c] Retinol equivalents. 1 retinol equivalent = 1 µq retinol or 6 µq β-carotene.

[d] As cholecalciferol . 10 µq cholecalciferol = 400 IU of vitamin D.

e_{α}- tocopherol equivalents. 1 mgD -α- tocopherol = 1 α-TE = 1.49 IU.

[f] 1 niacin equivalent = 1 mg of niacin or 60 mg of dietary tryptophan .

[g] Based on human milk.

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In addition, Valai Intrampan (B.E. 2530) summarized the adolescent dietary need from the recommended daily nutrient intake and dietary consumption guidances for Thai population by Nutrition Division, Department of Health, as follows :

1. Energy Requirement The need of energy food in adolescence depends on the growth rate, food metabolism and energy uptake in daily activities. The recommended daily energy intake is in the range of 2,200-3,000 calories from primary food sources of rices, flours, fats, eggs and dairy products.

2. Protein Requirement Adolescents normally require protein nutrient at higher rates than those of the adults, for the heightened physical growth and muscular strength. Inadequate protein consumption in adolescence may retard the growth. The recommended daily protein consumption is not less than 1 gram per 1 kilogram of body weight. Good quality protein sources should be two-thirds from meat, eggs, milk, and higher amounts of dry nut.

3. Minerals Requirement The physical growth and development of human body needs various minerals, some are deficient in adolescence, namely.

3.1 Calcium Needed for the body growth, strengthening the bones, teeth, and maintaining the function of the nervous system. Generally, higher amount of calcium is needed in adolescence than in childhood and adulthood. High food sources of calcium are diversified small fishes, green leafy vegetables, milk and milk products.

3.2 Iron This mineral is an indispensable nutrient for growth and development of blood and muscles. During the menstrual cycle, females always lose higher iron nutrient than in normal period. It is wise to consume at least 16 milligrams of calcium from selected food sources of livers, entrails, egg yolks and green leafy vegetables.

3.3 Iodine Iodine intake requirement is normally enhanced in adolescence due to the vigorous functioning of thyroid gland. Iodine deficiency in human may lead to the goiter disease which is prevalent in adolescents particularly dwelled in the north-eastern and northern regions of the country. Therefore, at least 1-2 sea food meals should be consumed weekly, and always utilizing an iodine-salt in everyday food preparation.

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4. ***Vitamins Requirement*** Adequately essential vitamins consumption should be prepared for adolescent physical growth and prevention of vitamin- deficientcy . Following are the vitamins mostly found short in adolescence :

4.1 Vitamin A Necessary in the body growth and maintaining the mucous membrane and clear sight. Adolescents should obtain vitamin A at least 2,500 I.U. daily from various food sources of livers, egg yolk, milk, cheese and butter, deep green leafy vegetables such as Chinese kale,water spinach,sesbania, and yellow vegetables such as pumpkin , sweet potato, yellow flower sesbania.

4.2 Vitamin B2 This vitamin acts as an enzyme in the matabolism of foods especially for protein. Lack of the vitamin B2 may result in cracking at mouth corners (cheilosis). Adolescents should consume vitamin B2 at 1.3-1.8 milligrams daily from various food sources such as entrails, dry nuts, soybean milk, eggs, and green leafy vegetables.

4.3 Vitamin C Necessary in the construction of collagen which forms part in various body tissues. Vitamin C deficiency may cause slow healing of wounds, and bleeding gums. Adolescents should consume Vitamin C about 30 milligrams daily from diversified foods such as fresh vegetables,oranges, papaya, guava, pineapple, etc.

5. ***Water*** Being one of the indispensable nutrients and the major composition in various cells as well as the functioning control unit of the body. Sufficient amount of water should be obtained especially over-sweating through sports and exercises. Adolescents should drink 6-8 glasses of water daily from pure water or fruit juices, milks, etc.

In everyday life, appropriate and sufficient amounts of food nutrients and energy should be obtained daily for adolescence as summarized by Valai Intrampan (B.E.2530) in the following recommendation :

1. **Milk** Typically high in protein and calcium contents as well as the inclusion of vitamins A and D which is beneficial for baby growth and development. Adolescents should drink daily 1-2 cups of cow milk .

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2. Eggs Chicken and duck eggs are high protein food sources and also enriched with iron and vitamin A. It is recommended to take one egg daily for adolescence.

3. Meats Variety of meats should be taken 150-180 grams daily , as well as the livers from pork, cow or chicken 1-2 meals in a week. Sea food should also be served 2-3 meals weekly.

4. Dry nuts Soybean, red bean and black bean are the high protein food sources and also enriched with vitamins and minerals.

5. Green and yellow leafy vegetables. Specifically high in carotene, vitamins and minerals contents. Recommended daily dietary intake is 1-1.5 cups or about ½ cup per meal.

6. Fresh fruits It is recommended to take 1-2 meals daily particularly oranges, pineapple, papaya, banana, guava, etc.

7. Cooked rice and its products Consisting of rice, noodles, Thai vermicelli which should be consumed about 5-6 cups daily.

8. Fats and oils The food sources of energy and promoting the absorption of the fat soluble vitamins. Daily dietary consumption is recommended 3-4 tablespoons especially in fried food preparation.

Proper and healthful dietary consumption in adolescence will normally give a normal nutritional status. On the contrary, unhealthful dietary and nutrient deficiency intake will create a significant nutritional problem which is classified as the under-nutrition and over-nutrition.

1. Under-Nutrition Problem

The problem of under-nutritional status in adolescence involves the inadequate dietary consumption particularly the energy and protein nutrients which are essential for body growth. The problem may stem from the adolescents'idea that their existence and status be recognized by their peers. Adolescents are more concerned on their body shapes. They do not like to be obese, and prefer to skip meals for weight control. The unconsumption of breakfast, which is the most essential meal of the day, may lead to the body and brain fatigue, resulting in impeding the work and study efficiencies (Boonsom Martin et al, B.E.2532 : 75). Skipping meals particularly at

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lunch time may significantly cause the disorders of energy and protein deficiency in schoolchildren. The lunch diet typically contains the protein and energy nutrient about one-third of the total daily need (Sukhotaithamathirat, B.E.2533). According to the study of nutritional status by Prasong Tienboon (B.E.2528 : 85), it was found that 56% of the male medical students and 53% of the female medical students were reported as the underweights. Paradee Temcharoen et al (B.E.2528) revealed that 22% of the schoolchildren were found to be under-nutritional status. The study was in accordance with the study of Bandopadhyay (1988) reporting that 42.3% of the surveyed schoolchildren were suffered from the underweight, 17% and 16.8% of the acute and chronic malnutritional status respectively as well as 56.9% of anemia. Earlier studies of Suchit Saleepan et al (B.E.2534) indicated that the surveyed of working aged 12-15 years was found to be at under-nutritional status of 14.6% and 10.7% as compared to the standard criteria of weight-age and weight-height respectively. Voranant Supapipat et al (B.E.2537) also found that 34.8% of the schoolchildren and 18.2% of the adolescents experienced protein and energy deficiencies.

2. Over-Nutrition Problem

This problem originates from the adolescent anatomical changes and development, causing more hungry and frequent snacking. High fat foods consumption coupled with the inadequate daily workout of adolescence result in the over-nutrition status. Based on the study of Calfa et al (1991)., it is found in Chile that the schoolgirls average ages of 9.6-13.6 years, and 11.6-16.6 years of schoolboys were reported as over-nutrition at 28.5% and 15% respectively. The Nutrition Division, Department of Health (B.E.2533) also conducted the nutritional status survey of adolescent students in Bangkok, it concludes that the study students of 11-17 years were found 21.4% of the over-nutrition and 31.2% of obesity. Penchit Kanmanee (B.E.2535) confirms the over-nutrition problem on her study and found that 22% of the surveyed schoolchildren were experienced with the over-nutrition problem. At present, it is quite obvious that adolescents in Bangkok like those in the industrialized countries are increasingly facing the over-nutrition problem which is associated with the causes of illness and mortality of the population. In fact, the over-nutrition

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adolescents are the risk group of obesity, and those adolescents who are obese now would become obese in adulthood about 80 % (Kanarek,R.B., 1991 : 243).
It is believed that obesity may cause a number of diseases such as coronary heart diseases, infected respiratory system , arthritis, skin disease, endocrine disease, as well as a major risk factor of diabetes, high blood pressure, high cholesterol levels, gallbladder disease and some types of cancer (Chanthita Preuksananont, B.E.2536 : 99-106).

It is apparent that the adolescent under-nutrition and over-nutrition problem is one of public health concerns for the government to speed up the remedial action. To reach the goal of the Eight National Economic and Social Development Plan (B.E.2540-2544), the target of 90% of the adolescent age 5-19 years with the standard body build up, and not exceeding 10% of the over-nutrition adolescents, is to be achieved (Department of Health, Ministry of Public Health, B.E.2540 : 3).

Assessment of Nutritional Status

The assessment involves the evaluation of the individual or community nutritional status by means of examination body status as a result of the food consumption, nutrient utilizing process, and the effect of digestive system. This assessment result will be useful in setting up guidelines for problem solving and planning of the national public health programs.

Nutritional Status Assessment (Praneet Pongpaeo, B.E. 2539 :95)

The assessment of nutritional status of an individual, groups in communities or clinical patients can be categorized in 4 methods as follows :

1) Anthropometric Assessment
2) Biochemical Assessment
3) Clinical Assessment
4) Dietary Assessment

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1. Anthropometric Assessment

The assessment generally consists of the measurement of body and its circumferences such as height, weight, head, arms, legs, hip, waist and other relevant measurement at specific parts like skinfold thickness at biceps, triceps, subscapular, and supra-iliac, etc (Praneet Pongpaeo, B.E.2539 : 271-272). In practice, the method, equipment used and the standard of reference for the obtained results, must be taken into account for the body measurement (Nithiya Ratanapanont, B.E.2537 : 221).

2. Biochemical Assessment

The assessment of this method comprises the quantitative analysis or biological functioning tests of nutrients in the blood, urine or feces samples, and interpretation of the results with the normal values of the parameters of interest. In the community, the biochemical examination normally involves the blood tests of various nutrients such as protein, albumin, hemoglobin, iron, vitamins, etc., and the analysis of specific nutrients in urine sample such as glucose, creatinine, urea, and others ; whereas the infecting worm test in the stool examination is occasionally conducted.

3. Clinical Assessment

The clinical assessment through the physical examination is typically a simple, economical, and convenient method for the assessment of community nutritional status. The method includes the hair examination for assessment of protein and energy deficiencies, the mouth and tongue examination for assessment of vitamin B2 deficiency, or the thyroid gland examination for assessment of iodine deficiency, etc (Praneet Pongpaeo, B.E.2539 : 33-34).

4. Dietary Assessment

This method involves the collection of pertinent information of the food consumption habit, pattern, nutritional food values, and other related factors in order to assess the individual nutritional status in conjunction with other assessment methods. Followings are the methods currently used for the individual dietary assessment :

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4.1 Record of food intake

The list of foods and its quantities consumed during a period of 1-7 days, preferably 3-day period will be recorded for the sample group. The quantities of dietary intake may be weighed or approximated by the locally available measuring containers which is appropriate especially for the literate sample group. Nevertheless. this method presents a good food consumption quantitative data.

4.2 List of dietary consumption in the past 24 hours

The sample group will be interviewed to recall of the list and amount of foods consumed in the past 24-hour period without prior notice. The collected data are appropriate to interpret qualitatively rather than quantitatively. In fact, this method saves both time and money to conduct. It can be applied to various sample groups, though may not be appropriate for the individual assessment. The apparent drawbacks are the 1-day collected data and the reliance of recall capacity of the respondents.

4.3 Frequency of dietary intake

This method also deals with the interview of the sample group on the frequency of food consumption for each food category in a day, week or month bases. The assessment on the dietary intake habit can be used to evaluate the associated nutritional status and emerging disease condition.

4.4 Laboratory analysis of nutrient intake values

This method involves the sampling of food specimen for laboratory analysis. It is always related to the research work since the laboratory analysis requires considerable expenses, proficient personnel, and a number of relevant equipment; therefore it is not appropriate to assess the food intake for the large group of population.

For the assessment of nutritional status of the sample group in community, it is unlikely to apply every method simultaneously, but selecting the appropriate one or the combination of some methods instead, depending on the assessment's objective, allocated budget and personnel. *In this study, the author has selected the method of weight-height measurement for the assessment of adolescent nutritional status.*

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Indicators for Nutritional Evaluation (Uraiporn Chittchang, B.E. 2540 : Somjai Vichaidit, B.E.2529 : 24)

1 Height for age

The height indicator implies the prolonged, chronic protein and caloris deficiencies in children, resulting in the impaired skeletal development and in shorter heights than the average children. Considerably short children in any community would reflect the prolonged nutritional problem in the community. As the body height extends slowly and without decreasing, it is not practical to use as a nutritional surveillance but an indicator of the body growth levels.

2. Weight for age

This indicator points out the state of protein and calorie deficiencies without distinct indication of chronic or acute state. Since a body weight is the total weight of muscles, fats, water and bones whose weight reduction can not be clearly identified from which parts of the body (Uraiporn Chittchang, B.E. 2540 : copies). In addition, the weight for age is not appropriate to evaluate the overweight status since the height is not taken into account , leading to an erroneous interpretation particularly the weight comparison of the two different heights (Himes, J.H., Dietz, W.H., 1994 : 307). However, there are not much incidences on the retarding growth rate infants (0-2 years) resulting from a chronic nutrient deficiency. Therefore the weight for age basis is considered permissible to indicate an acute nutrient deficiency. Additionally, the body weight measurement is a convenient method with simple equipment, and it is then widely used as a nutritional surveillance program and the follow-up program of the preschoolers (Uraiporn Chittchang, B.E.2540 : copies).

3. Weight for height

It is used to indicate the body status of acute protein and calorie deficiencies resulting from the full utilization of accumulated glucose and fats in the body showing the skinny figure. This indicator is appropriate to use as a follow-up and assessment of the short-period under-nutritional status as well as an indicator for the over-nutrition or the overweight status. Nevertheless, the weight on height indicator is not suitable for the nutritional evaluation of the prolonged nutrient deficiency case. Since the lack of nutrient at lengthy period can reduce the body height resulting the apparently proper weight height scale. This implies a misleading interpretation of normal nutritional state as the age is not known (Somjai Vichaidit, B.E.2529 : 54).

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It is quite obvious that the weight for height , as adopted by the author in this study, is an appropriate indicator for the evaluation of the short-term under-nutrition, over-nutrition and obesity of adolescence. The method is also in line with the guideline proposed by WHO and The National Center for Health Statistics on utilizing the weight on height indicator for the infancy and childhood (Onis, M.D., & Habicht, J.P., 1996 : 650).

Food Consumption Behavior and Nutritional Status

Individual lifestyle and personal behaviors in can directly reflect one's well-being and physical health. Those proper and desirable behaviors would promote good health, which in turn reduces the illness and prolonging one's life.The nutritional status of an individual is typically an indicator in reflecting one's physical health and quality of life. And the individual nutritional status is principally a consequence of one's food consumption behavior.

Food Consumption Behavior

Jariyavat Kompayak (B.E.2526 : 5) defined the meaning of the food consumption behavior as a routine eating as like or dislike of diet, number of daily servings, eating behavior and hygienic habit.

Varangkana Bootsri (B.E.2536 : 6) defined the meaning of the food consumption behavior as the favoring or familiar expression on food consumption or the rejected foods , food choices, number of daily servings.

Chantip Limtongkul (B.E.2538 : 6-7) defined the food consumption behavior as the overall expression of action, thought and feeling as associated with the food consumption.

Sudawan Kanthamit (B.E.2538 : 8) defined the meaning of food consumption behavior as the routine eating such as the favored or rejected foods, number of daily servings, dietary food choices.

Suitor & Crowley (1984 : 91) defined the meaning of food consumption behavior as an individual's activities in selecting and preparing foods for consumption and maintaining good health, including food choices, food preparation and food consumption.

In summary, the food consumption behavior may be defined as an individual's routine expressions of action, thought and feeling on the food consumption such as food choices, food preparation, food consumption and hygienic habit.

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Nutritional Status

Green & Harry (1987 : 157) mentioned that the nutritional status was the body condition resulted from the utilization of nutrients from the digested consumed foods, and influenced an individual's health level. Good nutritional status normally originates from the selection of complete essential nutrient intake. On the contrary, the undesirable nutritional status is apparently a consequence of nutrient-deficient consumption resulting in malnutritional state. That is in accordance with the idea of Santana Suchadarat (B.E.2529 : 13) stated that the nutritional status was the condition of body and mind resulted from the dietary intake and the utilization of nutrients for the body development. Saowanee Chakpitak (B.E.2535 : 130) said that the nutritional status was the body condition resulted from the food consumption. Somjai Vichaidit (B.E.2531, 1021) described the nutritional status as the body and mental condition resulted from the dietary intake and the utilization process of nutrients for highest benefit. Lewis (1984 : 117) explained that the nutritional status was an individual's health condition influenced by the food consumption and the body capacity to make use of the consumed nutrients. In addition, Uthai Pisanyabutra (B.E.2528 : 6) stated that the nutritional status was an indicator of human health which was associated with the food consumption.

In summary, the nutritional status means an individual's body condition resulted from the food consumption. Since one's eating behavior is directly associated with the nutritional status, then the individual possessed with appropriate food consumption behavior, would reflect in the good or desirable nutritional status. On the other hand, the improper eating behavior, such as the overconsumption, underconsumption or the imbalance consumption, would give the problems of over-nutrition and under-nutrition.

Influencing Factors on Food Consumption Behavior The PRECEDE Framework.

The public health problem at present and in the future, seemingly stems from an associated factor on an individual's health behavior. Therefore the mitigation measure of the problem should stress on the cultivation of individual's or community's health behaviors to the proper direction. Behaviorists tried to explain the cause of individual behavior.There are 3 concepts explaining the cause of behaviors or the influencing factors on behaviors as follows (Boonyiam Trakoonvong, B.E.2530 :69-71) :

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Intrinsic factors : This concept derives from the primary assumption that the influencing factors on behavior originate inherently from individual components, such as knowledge, attitude, belief, social values, incentive, behavior determination, etc.

Extrinsic factors : This concept derives from the primary assumption that the influencing factors on behavior originate externally from individual components. These factors of interest by the behaviorists comprise the environment factor, and social structure system such as political economic system, population component, social support, geographic features, etc.

Multiple factors : This concept derives from the primary assumption that the influencing factors on behavior originate from the combination of intrinsic and extrinsic factors.

From the preceding 3 concepts, it is obvious that the health behavior may originate from one or more factors, and it may say that an individual behavior is seemingly an open system which is associated with the intrinsic and extrinsic factors. Any changes in either factors would affect one's behavior (Joseph, 1980 cited in Ubon Asampinsap, B.E.2540 : 3). Therefore in the study of health behavior, the analysis of the causes or related factors of the health behavior problem prior to defining the problem solving approach, should be performed. For this study, the author adopts the PRECEDE-PROCEED Model as a framework to explain the nutritional problem or food consumption behaviors which are susceptible to the nutritional problem, originate from several factors at both internal and external origins, requiring various approaches and tactics in solving the nutritional problem.

PRECEDE (Green & Kreuter, 1991) is a concept framework in diagnosis of various factors which are associated with individual health behaviors, or the analysis to identify the causes of behaviors related to the public health problem, in planning the changes of behaviors with the principal concept that the individual behavior stems from multiple factors. PRECEDE is the abbreviation of Predisposing, Reinforcing and Enabling Cause in Educational Diagnosis and Evaluation. It means the utilization process of predisposing factor, reinforcing factor and enabling factor for diagnosis and evaluation of the individual behaviors. Steps of implementation of the process are as follows :

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Step 1, Social Diagnosis

This diagnosis involves the evaluation of the arising problems affecting on the quality of life of individual, sample group and the health condition, such as the problems of unemployment, criminal, density population and slum area. The objectives of social diagnosis are as follows :

1. To examine the associated elements which define the quality of life of the target population.

2. To analyze the associated elements of the quality of life as typically existed in the society.

3. To set up the social problems related to the human health.

4. To find out the detailed justification in pointing out the significance of the analyzed problem.

5. To find out sufficient justification for remediation the mentioned social problems.

6. To find out the explicit justification as a basis for the project economic evaluation.

Step 2, Epidemiological Diagnosis

This is the analysis of the significant health problems belonging to the study group or population, which are in part of the social problem. The required data comprise the birth - death record, medical and epidemiological data. In this diagnosis, the health problem can be specifically identified in terms of the distribution characteristics of the problem and its risk factor, in order to set priority of the problems of which the significant problem is selected for further analysis and planning purpose.

Step 3, Behavioral and Environmental Diagnosis

This step involves the setting up of the environmental and behavioral components related to the health problem formerly selected in the step 2. These components exist externally of the individual and are uncontrollable, but they can encourage or adjust the individual health behavior and the quality of life. Followings are the 5-step sequence of behavioral diagnosis :

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1. Group the health problems by separating the behavior-caused problems out of the non-behavior-caused problems.

2. Analyze the causes of problem and related behaviors of which the objectives and targeted behaviors for remedy are set up.

3. Set priority of behaviors by taking into account the abundance rate/frequency of behavior and the high risk behavior.

4. Set the order of behaviors according to their changes by analyzing the degree of difficulty, from the previous research result and culture of the target group.

5. Select the target behavior from the steps 3 and 4 which will be the significant and easily to be implemented.

Step 4, Educational and Organizational Diagnosis

This diagnosis aims to evaluate the causes of behavior in order to look into the influencing factors on the health behavior which are divided as predisposing factor, reinforcing factor and enabling factor.

1. Predisposing factors : mean the basic instinct of individual which may support or restrain in expressing behavior particularly the influence of motivation on changing behavior. This factors include knowledge, attitude, values, belief, individual awareness, and population characteristics.

2. Enabling factors : mean the supporting component of health behavior and an essential resource in expressing individual and community behaviors. Some examples of this factor are health care center, personnel, school, household income, service charge, convenience and accessibility of service, transportation, etc.

3. *Reinforcing factors :* mean the supporting component of individual behavior reflecting from other influencing group such as family, teacher, friend etc. Most of the enabling factors are in the type of motivation, imitation, spirit encouragement, etc.

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Step 5, Administrative and Policy Diagnosis

This step involves the evaluation of the organization's capability, administration and resources to be planned and implement conformed to the analysis of influencing factor in the step 4.

Step 6, Implementation

This step deals with the implementation as planned.

Step 7, 8, 9, Evaluation

According to Green's concept, the evaluation is performed in 3 aspects as follows :

1. *Process evaluation* To identify the problems arised during the project implementation, and to evaluate the project progress for monitoring and control of activities according to the proposed plan.

2. *Impact evaluation* This evaluation presents the anticipated impacts either positive or negative, which are not specified in the project objective.

3. *Outcome evaluation* This is the direct evaluation of project implementation regarding its effectiveness, efficiency and adequacy.

The evaluation of individual behaviors according to the above-mentioned steps, requires the following areas of sciences :

- Epidemiology
- Administration
- Sociology/Behavioral Sciences
- Education

The implementation process and sequence of the PRECEDE Framework is illustrated in Figure 2.

In this study, the author has adopted the PRECEDE Framework concept as a guideline, and selected specific variables related to the food consumption behavior of adolescence. The sample students of grades 7-12 from the schools under the Department of General Education, Ministry of Education in Bangkok were selected for this study. In addition, the study emphasizes on the evaluation steps 3 and 4 in order to diagnose the associated factors on the food consumption behavior in terms of the predisposing, reinforcing and enabling factors.

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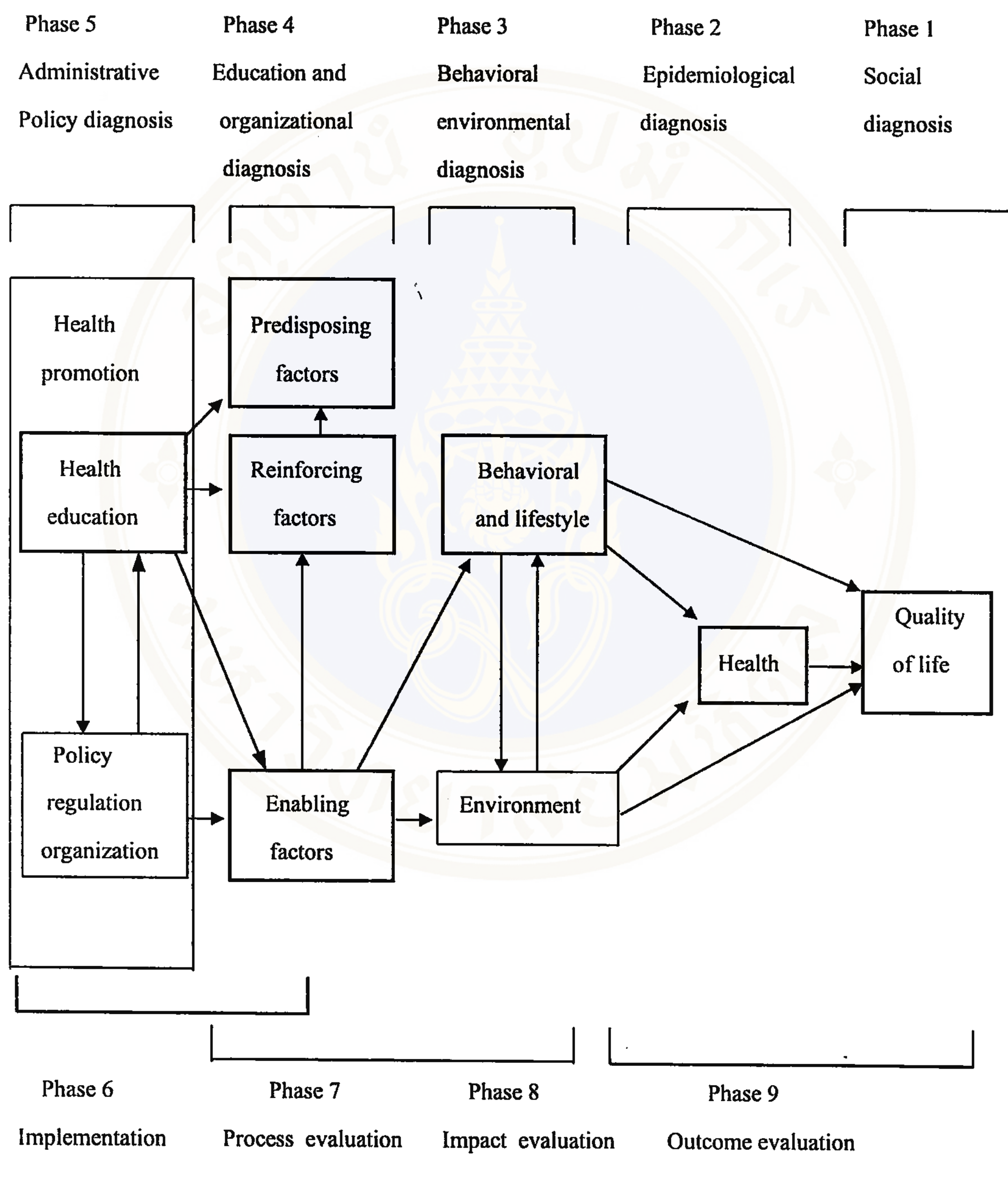

Figure 2 The PRECEDE – PROCEED Model for Health Promotion Planning and Evaluation (Green and Kreuter 1991:24)

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Predisposing Factors

These are the basic factors of inherent motivation, or self-satisfaction in individual behaviors. These factors exists in individual under specific circumstances of knowledge, attitude, belief, values which are related to the incentive within individual or the population group, leading to either supporting or withholding effect on the individual behavioral . The predisposing factor associated with the food consumption behavior for this study includes the nutritional knowledge, food consumption attitude, and self-esteem.

Nutritional Knowledge

Knowledge is an influencing component of individual in understanding, expressing any of behaviors and accumulating the capacity to conduct various activities. Inadequate knowledge particularly of nutrition, will lead to the improper conduct of food consumption, such as the purchase of foods contained inadequate essential nutrients, the unconcern of beneficial or harmful effect on food choices. Additionally, lack of the nutritional knowledge causes an individual disregards the importance of food consumption which is the heart of health. Therefore the knowledge in an influencing factor of the food consumption (Gore, S.A.,1995 : 423) which is in accordance with the research finding of Sunetra Nimanant (B.E.2537) and Kalaya Srimahant (B.E.2541) concluded that the nutritional knowledge has relationship with the food consumption behaviors of the schoolchildren.

Food Consumption Attitude

Attitude is the combination of individual's mental condition or feeling and opinion resulted from the instilled knowledge and experiences which act toward a person or thing. The response of each individual is naturally expressed in various forms of behaviors including the food consumption behavior. The behavioral reactions are typically expressed in 2 opposite directions i.e. satisfaction and dissatisfaction. In this regard, any individual who is pleased or shows a positive attitude toward an object, would be inclined to react one's behavior in the same direction, and vice versa. Therefore it can be said that the individual attitude is associated with behavior, conformed to the concept of Green & Kreuter, mentioning

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that the attitude is associated with individual incentive which set one's behavior. Chantana Limnirandkul (B.E.2532) and Sunetra Nimanant (B.E.2537) also confirm this conclusion that the individual attitude is associated positively with one's food consumption behavior.

Self-Esteem

The personal character of self-esteem is the significant factor in adjusting the individual's mental disposition and learning, particularly in adolescence which is in the period of pursuing one's own uniqueness. Naturally, those who possess the high self-esteem character could deal with the confronted obstacle by their self-confidence, hopeful and unyielding effort, leading to a happily successful life. This in turn induces the individual incentive to react the appropriate behaviors including the health and food consumption aspects. It can be stated that the individual self-esteem is seemingly associated with the food consumption behavior which is in accordance with the study result of Tores, Fernandes & Macsiera (1995) saying that the self- esteem is positively associated with the general health behavior of the adolescent students of 12-17 years, in Lacoruna City, Spain. Kuzatis & Sennon (1996) also found that the self-esteem character shows influences on the adolescent food consumption behavior of the highschool students in U.S.A.

Enabling Factors

These factors are skill, resources or any changes of behaviors of an individual or community ~~as well as~~ the capability of making use of resource, service, equipment and any associated facilities enhancing the individual behavior. In this study, it is assumed that the enabling factor related to the food consumption behavior of adolescence is the household income.

Household Income

The household income is an indicator of economic status of each family. Indeed the higher-income family has a higher purchasing power and selection in dietary diversity than that of the low-income family. The well-to-do families are also overfed of the high fat and sugar foods resulting in the overconsumption problem.

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On the other hand, the low-income families suffer from the inadequate food supply problem and essential nutrient deficiency due to the low purchasing power, leading to the imbalance food consumption both in qualitative and quantitative consideration (Dusanee Suthapriyasri et al, B.E.2532 : cited in Sirivat Aryuvat, B.E.2539 : 13). Therefore, it can be said that the household income is influential on the individual food consumption behavior which is in line with the study findings of Somsri Kirdchoke (B.E.2531), Sunetra Nimanant (B.E.2537) and Kalaya Srimahant (B.E.2541) concluding that the household income is associated with the food consumption behavior. However, though the household income affects the individual eating behavior and the high purchasing power for foods, it is believed that the overspent or wasteful habit of the high-income family may reflect in the inadequate food consumption.

Reinforcing Factors

These factors indicates how the human behavior is or supported. Most of the reinforcing factor is in the form of motivation, imitation, encouragement, etc, which is delivered from influencing parties like relatives, friends or mass media. In this study, the author has selected the nutritional information as an renforcing factor.

Nutritional Information

The cognition of nutritional information is an reinforcing thrust for an individual to find appropriate selection of exertion on various food consumption behaviors, leading to the more desirable actions on food consumption behavior. According to the study of Sunetra Nimanant (B.E.2537), it is found that the recommendations on food consumption from the parents are associated with the food consumption of the sample students in the high school in the Chiangmai metropolitan area. The study is also in line with that of Kalaya Srimahant (B.E.2541) stating that the recommendation of food consumption is associated with the food consumption behavior of the schoolchildren.

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CHAPTER III
METHODOLOGY

This study aims to examine the determining factors on the food consumption behavior and the nutritional status of adolescents in Bangkok. The study approach is the descriptive research.

Population and Sample Selection

Population

The population of this study totals 268,321 students, consisting of the adolescents of 12-19 years, studied in the grades 7-12 of 121 highschools in Bangkok which are under the Department of General Education, Ministry of Education, for the academic year 2541.

Sample Group

The sample group for this study is the above-mentioned adolescent students from the highschools located in Bangkok. Procedural sampling steps in obtaining the required sample size are follows:

1. Set the sample size for comparison the food consumption behavior with the associated factors according to the criterion of Kerlinger & Pedhazur, 1973 (cited in Thawatchai Vorapongsathorn, B.E.2532 : 60) which set the sample size for the stepwise multiple regression analysis of thirty times the number of independent variables:

$$\boxed{n = 30k}$$

where n = number of sample group

k = number of independent variables

In this study, there are 6 independent variables ,

then, $n > 30(6)$

$n > 180$ samples

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According to the above calculation, the sample size should be at least 180. For this study, a sample size of 400 is selected plus an additional 5% of the sample to compensate for the anticipated uncomplete responses. Therefore the total sample size of 420 students is further divided into 3 groups each of 140 students according to the different nutritional status.

2. In conducting the nutritional status survey, an approximation of the sample size at 1% of the population of 268,321 students is made (Petchnoi Singchangchai, B.E.2532 : 155). Hence the number of group sample is at least 2,700 students.

3. The multiple random sampling technique is used for the sample group of highschool students grades 7-12, with the following steps:

The highschools, under Department of General Education in Bangkok are categorized into 8 groups totaling 121 schools according to their geographical areas and proximities (Department of Educational Policy and Planning, Office of Permanent Secretary, Ministry of Education, B.E.2541). The categorized groups and number of corresponding schools are as follows:

Group	Number of School
1	15
2	13
3	14
4	13
5	23
6	15
7	15
8	13
Total	121

Therefore the ratios of school numbers among each group are 1.2 : 1 : 1.1 : 1 : 1.8 : 1.2 : 1.2 : 1

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3.1 At school group level, the stratified random sampling method is employed for the 8 school groups to obtain the sample schools in each group (based on the school ratio). The number of schools in each group is 1, 1, 1, 1, 2, 1, 1, 1 totaling 9 schools.

3.2 In each of the schools sampled in 3.1 consisting the class grades of 7-12, a simple random sampling by a lot-drawing of each class to obtain 2 representative classes is performed. Therefore the total number of the sampled classed in each highschools is 12.

3.3 Perform the weight and height measurements of the sampled students as stated in 3.2 for all 9 sampling highschools with the following procedure:

The sample size of nutritional status survey is 4,325

Weight Measurement

A spring balance scale with the dial and pointer showing at least scale divisions of 0.5-1.0 kilogram, is used in the weight measurement.

Operational steps in weight measurement

(1) Balance the weighing machine prior to measurement, by applying the standard 40-kilogram weight on the machine. Check the pointer whether it indicates the correct weight or adjust it accordingly. Repeat balance as appropriate before each set of measurement.

(2) Let a student on the weighing machine with an upright standing and looking forward position.

(3) The weight recorder takes a vertical weight reading from the dial in a careful manner and without slanting position readings.

(4) The weight recorder informs an assistant to record the measured weight reading.

(5) The assistant then repeats verbally the weight reading to the weight recorder and perform the complete recording prior the student off from the machine.

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Height Measurement

A standard Stanlay Microtoise (measuring tape) of 2 meters long with 0.1-centimeter scale reading accuracy is utilized in the height measurement.

Operational steps in height measurement

(1) Overlay and press the measuring tape over the flat wall perpendicular to an even floor.

(2) Let a student stand upright in front of the measuring tape whose length is in the middle stretch of student's body. The student should stand bare-feet, touching heels, contiguous to the bottom of measuring tape ; straight knees ; buttocks, back, shoulders and head touching the wall ; looking foreward horizontally with the eye corners at the same level of the upper part of ears level ; any decoration on the head should be removed.

(3) The height recorder adjusts vertically the height indicator to touch the upper part of student's head, take the height reading as accurate as possible in one decimal point.

(4) A recorder's assistant repeats verbally the height reading, and perform the complete recording prior to the leaving of student from the measurement.

4. Method of selection the students grade 7-12 categorized in different nutritional status for the study of food consumption behavior is as follows:

(4.1) The quota sampling method is employed for the sample groups of over-nutrition status(over-weight for height,>P97) and under-nutrition status(under-weight for height,<P3). In each sample group, a sample of 16 students with equal number of male and female students, from each highschool is selected. In case the number of quota students within the 2 classrooms falls short of the categorized nutritional status, additional sample students from one more classroom is required to cover the quota as well as the height and wieght measurements.

(4.2) In the sample group of normal-nutritional status(normal weight for height,P10-90), a purposive sampling technique is used for 16 students of each highschool with the following conditions:

1. The body height of students are in the normal range according to ages criteria.
2. The weight and height values are within the percentile 10-90.

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The above conditions in 1 and 2 are compared with the graph of standard growth of male and female in the ages of 10-20 years, as prepared by Institute of Nutrition, Mahidol University, which utilized the relevant information of standard weights, heights and nutritional status indicators of the Thai population, ages 1 day-19 years, of the Department of Health, Ministry of Public Health, B.E.2530.

Study Tools

In the course of study, the following tools are used in the collection of pertinent data :

1. ***Questionnaire of Personal Data***

Including in the questionnaires are the related data of sex, body weight and height, current study class, average household income, adolescent personal daily expense, awareness of nutritional information, number of daily meals , family eat-together meals, food preparation, list of unhealthy foods.

2. ***Questionnaire of Food Consumption Behavior***

The questionnaire contains 27 items whose responses on frequency of practices on the behaviors consisting of 5 varying scales starting from never done, done at 1-3 days a month, done at 1-2 days a week, done at 3-4 days a week, and done at 5-7 days a week.

Meanings of Scales

Never done means the respondent has never done on the relevant food consumption behaviors

Done at 1-3 days/month means the respondent has ever done on the relevant food consumption behaviors at 1-3 days in a month.

Done at 1-2 days/week means the respondent has ever done on the relevant food consumption behaviors at 1-2 days in a week

Done at 3-4 days/week means the respondent has ever done on the relevant food consumption behaviors at 3-4 days in a week.

Done at 5-7 days/week means the respondent has ever done on the relevant food consumption behaviors at 5-7 days in a week.

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The contents of questionnaire on the food consumption behaviors are divided into four aspects, i.e. five essential groups food consumption (items 1-10), high calorie food consumption (items 11-14), unhealthy foods consumption (items 15-20), number of daily food surving (items 21-27).

The questions may be of a positive or negative type.

Scoring Criteria

1. Positive question means the question implies that the behavior should be done, comprising the items 1-10, 21-27, with the following assigned scores :

done at 5-7 days/week	5	points
done at 3-4 days/week	4	points
done at 1-2 days/week	3	points
done at 1-3 days/month	2	points
never done	1	points

2. Negative question means the question implies that the behavior should not be done, comprising the items 11-20, with the following assigned scores :

done at 5-7 days/week	1	point
done at 3-4 days/week	2	point
done at 1-2 days/week	3	point
done at 1-3 days/month	4	point
never done	5	point

Interpretation of scores.

The obtained scores of the food consumption behaviors in the questionnaire are categorized into 3 different scales, i.e. highly desirable behavior, desirable behavior, and less desirable behavior, with following total scores criteria used in the interpretation (Best , 1977 : 174)

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description of data	range of scores	interpretation
Overall food consumption behavior	27.00-63.00	less desirable behavior
	63.01-99.00	desirable behavior
	99.01-135.0	highly desirable behavior
Specific food consumption behaviors		
five essential groups food consumption (items 1-10)	10.00-23.30	less desirable behavior
	23.31-36.30	desirable behavior
	36.31-50.00	highly desirable behavior
high calorie food consumption (items 11-14)	4.00-9.30	less desirable behavior
	9.31-14.60	desirable behavior
	14.61-20.00	highly desirable behavior
refused food consumption (items 15-20)	6.00-14.00	less desirable behavior
	14.01-22.00	desirable behavior
	22.01-30.00	highly desirable behavior
numbers of daily food serving (items 21-27)	7.00-16.30	less desirable behavior
	16.31-25.60	desirable behavior
	25.61-35.00	highly desirable behavior
Itemized food consumption behaviors	1.00-2.30	less desirable behavior
	2.31-3.60	desirable behavior
	3.61-5.00	highly desirable behavior

3. Questionnaires of Food Consumption Attitudes

The attitude questionnaires are designed and grouped in 17 items, with anticipated responses of 4 varying scales comprising absolutely agreeable, agreeable, disagreeable, and absolutely disagreeable.

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The meanings of the corresponding scales are as follows:

absolutely agreeable means the relevant statement conforms fully to the respondent's feeling and thinking

agreeable means the relevant statement conforms considerably to the respondent's feeling and thinking

disagreeable means the relevant statement conforms slightly to the respondent's feeling and thinking

absolutely disagreeable means the relevant statement does not conform at all to the respondent's feeling and thinking

The statements in the questionnaires have both positive and negative meanings. The positive statements are listed in 8 items of the number 2, 3, 5, 7, 9, 11,15, 17, and other 9 items in the numbers 1, 4, 6, 8, 10, 12, 13, 14, 16 are arranged for the negative statements with the following score criteria.

	Positive	***Negative***
absolutely agreeable	4	1
agreeable	3	2
disagreeable	2	3
absolutely disagreeable	1	4

Interpretation scores.

The obtained scores of the attitude questionnaires in this study are further divided into 3 different levels of attitude toward the food consumption as less appropriate, appropriate and highly appropriate according to the following total scoring criteria (Best, 1977 ; 174)

total scores	meanings of respondent's attitude
17-33	less appropriate
34-50	appropriate
51-68	highly appropriate

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4. Questionnaires on Self-Esteem Character

The self-esteem questionnaires used in this study is adapted from the self-esteem test designed by Rosenberg, 1965 (Carpenter, 1996 : 183), comprising the statements of 10 items, and each item is equipped with 4 different responses choice as follows:

responses	meanings
most agreeable	the relevant statement conforms wholly to the respondent's feeling
strongly agreeable	the relevant statement conforms considerably to the respondent's feeling
less agreeable	the relevant statement conforms slightly to the respondent's feeling
disagreeable	the relevant statement does not conform at all to the respondent's feeling

The relevant statements are also implied either in positive or negative meanings. The positive statements consist of 5 items of the numbers 1, 3, 5, 7, 9, while the negative statements also contain 5 items of the numbers 2, 4, 6, 8 and 10, with the following score criteria:

	Positive	***Negative***
most agreeable	4	1
strongly agreeable	3	2
less agreeable	2	3
disagreeable	1	4

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Interpretation of scores.

The obtained scores of the self-esteem questionnaires in this study are further categorized into 3 different scales of self-esteem quality, i.e. low, moderate and high, with the following total score criteria :

Total scores of 10-20	mean the respondent's self-esteem is at low level or showing some displeasure of oneself.
Total scores of 21-30	mean the respondent's self-esteem is at moderate level or showing reasonable satisfaction of oneself.
Total scores of 31-40	mean the respondent's self-esteem is at high level or showing high satisfaction of oneself.

5. Questionnaires on Nutritional Knowledge

The questionnaires comprise the following nutritional knowledges:

- amount of food intake in the items 8, 9, 17.
- selection of beneficial food consumption in the items 1, 2, 3, 4, 5, 6, 7, 10, 14, 16.
- effects of essential nutrient deficiency in the items 11, 12, 13, 15.

Each question is prepared with a 4-choice response of a, b, c and d totaling 17 question items.

Score criteria

correct response	1	point
incorrect response	0	point

Interpretation of scores.

The obtained scores of the nutritional knowledge questionnaires in this study are further categorized into 3 different scales, i.e. high level, moderate level and low level, with the following total score criteria (Best, 1977 ; 174)

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total scores of 0-5 mean low level

total scores of 6-11 mean moderate level

total scores of 12-17 mean high level

6. Tools for Assessing Nutritional Status

- Spring balance scale with a standard weight of 40 kilograms.
- Standard measuring tape (Stanley microtoise)
- Standard growth graphs of males and females ages 10-20 years, conducted by Institute of Nutrition, Mahidol University, which utilized the related data of the standard weights, heights and nutritional indicators of the Thai population of 1 day-19 years,of the Department of Health, Ministry of Public Health (MOPH.), B.E.2530.

Validity of Study Tool

The assessment tools particularly the questionnaires are initially submitted, for testing their validities of the contents and language, to the following 4 experts :

- one nutritionist
- one nurse expert in childhood and adolescence
- one nurse expert in adolescent psychiatry
- one highschool instructor

Recommendations from the experts are then collected and used to revise and upgrade the study tool accordingly. Finally the study tool is tested for its reliability.

Reliability of Study Tool

The developed questionnaires of *Determining Factors on Food Consumption Behavior* and *Nutritional Status of Adolescents in Bangkok* are initially tested with 30 adolescents of the same characteristics in the selected population. Thereafter the questionnaires are calculated for their reliability by utilizing Alpha coefficient or Cronbach coefficient and Kuder-Richardson formula in following steps:

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1. Apply Alpha coefficient in the calculation of the questionnaires of food consumption attitudes, self-esteem character and food consumption behavior.

$$\alpha = \frac{n}{n-1}\left[1 - \frac{\Sigma Si^2}{St^2}\right]$$

When α = coefficient of consistency
n = number of items in the tool
ΣSi^2 = summation of scores in each item.
St^2 = total variation of scores in the questionnaire

2. Use Kuder-Richardson formula (KR20) for the questionnaire of nutritional knowledge

$$r_{tt} = \frac{n}{n-1}\left[1 - \frac{\Sigma qp}{St^2}\right]$$

When r_{tt} = coefficient of precision
n = number of items in the tool
p = portion of correct responses in each item
q = portion of incorrect responses in each item
St^2 = total variation of scores in the questionnaire

The obtained results of calculated reliability for the questionnaires are as follows:

Food consumption attitude questionnaire	=	0.69
Self-esteem questionnaire	=	0.78
Food consumption behavior questionnaire	=	0.84
Nutritional knowledge questionnaire	=	0.67

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Data Collection

In collecting the pertinent data in this study, the researcher was assisted by two research students who were studying in a master degree's nursing course particularly in the field of community health nurse. The research assistants were well-trained and familiarized with the nutritional status evaluation through the weight and height measurements with the researcher prior to the data collection.

Steps of Data Collection

- Introductory letters are prepared by the Graduation College, Mahidol University, and delivered to the Director General of Department of General Education Ministry of Education and principals of the targeted highschools, informing the study background and requesting the cooperation on the relevant data collection.
- After the request is approved through official channels, the researcher introduces oneself to the targeted personnel for this study including the classroom chiefs, guiding teachers, infirmary nurses for the students grades 7-12, or the appointed staff from the highschool principals. Details of the planned data collection and schedules are also informed. Steps of data collection are as follows:

(1) Nutritional status evaluation is carried out through the measurements of body weights and heights of the sample students. The researcher is responsible in the weight measuring, while the other two assistants take care of the height measuring and record keeping of the measured weight and height values on the previously appointed times and dates of each highscool.

(2) After the evaluation, the nutritional status of the sample group is categorized into 3 different groups, i.e. normal-nutrition status, under-nutrition status and over-nutrition status. A sample of 16 students from each highschool is selected for each nutritional status group in order to study the food consumption behavior.

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(3) Collect the pertinent data from the sample students consisting of 140 students from each group of nutritional status, totaling 420 students, through the questionnaire *Determining Factors on Food Consumption Behavior and Nutritional Status of Adolescents in Bangkok* with the following steps:

- Introduce oneself and address the study objective, details, available time spent in responding the questionnaire of the sample group.
- Prioritize distribution the questionnaires comprising 5 parts as follows:
  1. Adolescent personal data questionnaire
  2. Adolescent food consumption behavior questionnaire
  3. Adolescent food consumption attitude questionnaire
  4. Adolescent self-esteem questionnaire
  5. Adolescent nutritional knowledge questionnaire

In disseminating each set of questionnaire, the position of each sample student is kept consistently in obtaining all questionnaire so that the completeness of responses can be easily verified.

- Check the completeness for each set of questionnaire by the 2 research assistants. In case any incomplete response exists, cooperation of additional responses from the concerned student group will be sought after obtaining all questionnaires.

- Express gratitude to the sample group for the cooperation in responding the questionnaires.

In addition, during the fill-out process of the sample students, the researcher is available to clarify and explain any query in the questionnaire. Furthermore, the evaluation of nutritional status and the dissemination of questionnaire on the study of food consumption behavior for each classroom will be performed within the same day.

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Data Analysis

A computer software package SPSS/Windows (Statistic Package for the Social Science/Windows) is used in the analysis of obtained data in this study, with a significant level of 0.05 according to the following steps:

1. Compute the frequency distribution, percentage, mean and standard deviation of the student personal data obtained from the sample group.

2. Analyze a multiple correlation coefficient between the predisposing factor, enabling factor , reinforcing factor and the food consumption behavior. Tests of significance are performed, for the calculated multiple correlation coefficient by the overall F-test, for the regression coefficient (b) of the predisposing factor, enabling factor, reinforcing factor by the t-test. The analysis to examine a predictor using a stepwise multiple regression technique is also performed.

3. Perform the comparative analysis of the adolescent food consumption behavior categorized according to the nutritional status, by using the analysis of variance (ANOVA) with the statistical F-test, and the multiple comparison by S-method.

Since the proposed assumption in calculating the multiple correlation coefficient requires that the variables to be used must be at least in the interval scale, therefore appropriate adjustments of the measured variables in the nominal scale and series scale to the variables in interval scale must be made (Suchart Prasitratasint and Laddawan Rodmanee, B.E.2527 : 27).

Adjust the measured variable in the nominal scale to the dummy variable as follows:

Nutritional information, define

ever	1
never	0

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CHAPTER IV
STUDY RESULTS

This study focuses on the nutritional status and food consumption behaviors of adolescents in Bangkok. The subjects consist of 12-19 years students grades 7-12 from the selected high schools under the Department of General Education Minister of Education. The sample size of 4,325 students was sampled from the selected 9 schools namely Satree Wat Rakang School, Wat Bovornnives School, Wat Sraket School, Triam Udomseuksa Nomklao School, Bang Pakok Vidhayakom School, Wat Pradu Naisoangtham School, Makkasan Pitaya School, Surasak Montri School, and Sesthaboot Bampen School. Random sampling was conducted to obtain 420 students , which were assessed and categorized into 3 groups of nutritional status, i.e.normal-nutrition, under-nutrition and over-nutrition. Howerver, due to the incomplete collected data of questionaires from the respondents, the complete questionaires data from 405 students were then selected for this study with the sample size each group of 135 students. Findings of the study are presented in tabulations and result interpretation in the following parts :

Part 1	Adolescent Characteristics
Part 2	Adolescent Nutritional Status
Part 3	Adolescent Food Consumption Behavior
Part 4	Comparison of Adolescent Food Consumption Behaviors Among Different Nutritional Status
Part 5	Relationship between Predictor and Adolescent Food Consumption Behavior
Part 6	Predictive Power of Adolescent Food Consumption Behavior

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Part 1 Adolescent Characteristics

Table 2 Adolescent Data on Gender, Age and Grade Class

Adolescent characters	Number	%
Gender		
Male	*209*	*51.6*
Female	196	48.4
Total	*405*	*100*
Age (years)		
12-15	200	49.3
16-19	205	50.7
Total	*405*	*100*
Grade Class		
7-9	199	49.2
10-12	206	50.8
Total	*405*	*100*

From Table 2, it is found that male adolescents represent 51.6% and female students account for 48.4%. The ages of the sampled adolescents are in the range of 12-15 years representing 49.3%; while the adolescents of 16-19 years stand for 50.7%. For study class, the adolescent students in grades 7-9 show 49.2% while grades 10-12 students represent 50.8%.

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Table 3 Adolescent Data on Average Household Income

Adolescent character	Number	%
Average household income		
low-income (< 10,779 baht/month)	160	39.5
high-income (>10,779 baht/month)	245	60.5
Total	*405*	*100*

From Table 3, it is found that most of the sampled adolescents representing 60.5% lives in the high-income family.

Table 4 Adolescent Data on Suggestion Ability of Family Food Menu

Adolescent character	Number	%
Suggesting ability		
able	402	99.3
not able	3	0.7
Total	*405*	*100*

From Table 4, it shows that almost every surveyed adolescents representing 99.3% is able to provide the suggestion on the family food menu.

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Table 5 Adolescent Data on Self-Purchase and Choice of Food Purchasing

Adolescent character	Number	%
Self-purchase of food		
never	1	0.2
ever	404	99.8
Total	*405*	*100*
Choice of food purchasing (n = 405) more than 1 choice is accepted.		
food taste and presentation	*392*	*96.8*
benefit of food nutrients	*306*	*95.3*
food cleanliness	*349*	*86.2*
food price	*284*	*70.12*
food available	*124*	*30.6*

From Table 5, it indicates that the majority of the surveyed adolescents representing 99.8% experiences self-purchase. Major consideration in food purchase comprises food taste and presentation accounting for 96.8%, while the benefit of food nutrients shows 95.3%.

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Table 6 Adolescent Data on Nutritional Information

Adolescent character	Number	%
Nutritional information		
never	30	7.4
ever	375	92.6
Total	*405*	*100*

It is found from Table 6 that the majority of adolescents has ever obtained the nutritional information at 92.6%.

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Table 7 Sources of Distributed Nutritional Information and Related Recommendation According to Popularity Rankings

Information sources	First rank		Second rank		Third rank	
	Number	%	Number	%	Number	%
Sources of information and Related recommendation						
Teacher	134	33.1	91	22.5	41	10.1
Parent	103	25.4	85	21.0	43	10.6
Television	82	20.2	89	22.0	96	23.7
Newspaper	14	3.5	36	8.9	53	13.1
Public health personnel	13	3.2	15	3.7	45	11.1
Journal	12	3.0	19	4.7	35	8.6
Radio	9	2.2	22	5.4	27	6.7
Companion	8	2.0	17	4.2	33	8.1
Computer	0	0	0	0	2	0.5
Poster	0	0	1	0.2	0	0
Never obtained information	30	7.4	30	7.4	30	7.4
Total	*405*	*100*	*405*	*100*	*405*	*100*

From Table 7, it is found that the majority of the sampled adolescents obtained the nutritional information and related recommendation from their teachers at the first and second ranks which are equivalent to 33.1% and 22.5% respectively, while the information source at the third rank is the television with its popularity of 23.7 %.

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Table 8 Adolescent Data on Number of Daily Food Servings, Eating-Together and Number of Meals in a Day, and Family Food Preparation

Adolescent character		Number	%
Number of daily servings			
1	meal	3	0.7
2	meals	76	18.8
3	meals	304	75.1
>3	meals	22	5.4
	Total	*405*	*100*
Eating-together			
never		19	4.7
ever		386	95.3
1	meal	307	75.8
2	meals	67	16.5
3	meals	11	2.7
>3	meals	1	0.3
	Total	*405*	*100*
Food preparation			
at home		264	65.2
ready-made food		141	34.8
	Total	*405*	*100*

From Table 8, it reveals that the majority of the surveyed adolescents of 75.1% takes 3 meals in a day; has ever joined in eating-together as high as 95.3% preferably one meal in a day at 75.8% ; and the food preparation at home is preferred at 65.2%.

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Table 9 Adolescent Data on Nutritional Knowledge

Adolescent character	Number	%
Nutritional knowledge		
low	14	3.4
moderate	157	38.8
good	234	57.8
Total	*405*	*100*

From Table 9, it is found that most of the sampled adolescents representing 57.8% possesses a good level of nutritional knowledge.

Table 10 Adolescent Data on Food Consumption Attitude

Adolescent character	Number	%
Attitude on food consumption		
less appropriate direction	0	0
appropriate direction	54	13.3
more appropriate direction	351	86.7
Total	*405*	*100*

From Table 10, it is found that the majority of the sampled adolescents representing 86.7 % expresses the eating attitude in a more appropriate direction.

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Table 11 Adolescent Data on Self - Esteem Character

Adolescent character	Number	%
Self-esteem character		
low	4	0.99
moderate	75	18.52
high	326	80.49
Total	*405*	*100*

From Table 11, it is found that most of the sampled adolescents representing 80.49% shows a high level of self-esteem character, while only 0.99% of the adolescents expresses a low level self-esteem character.

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Part 2 Adolescent Nutritional Status

Table 12 Adolescent Data on Gender ,Grade Class and Nutritional Status

Nutritional Status	Grade Class 7-9						Grade Class 10-12						*Total*	
	Female		Male		Total		Female		Male		Total			
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	*Number*	*%*
Normal	723	66.57	692	60.12	1,415	63.25	864	82.60	659	63.24	1,523	72.94	*2,938*	*67.93*
slightly under	77	7.09	89	7.73	166	7.42	47	4.49	74	7.10	121	5.80	*287*	*6.64*
Under	128	11.79	119	10.34	247	11.04	53	5.07	64	6.14	117	5.60	*364*	*8.42*
slightly over	47	4.33	62	5.39	109	4.87	20	1.91	81	7.77	101	4.84	*210*	*4.86*
Over	111	10.22	189	16.42	300	13.41	62	5.93	164	15.74	226	10.82	*526*	*12.16*
Total	*1,086*	*100*	*1,151*	*100*	*2,237*	*100*	*1,046*	*100*	*1,042*	*100*	*2,088*	*100*	*4,325*	*100*

From table 12, when taking the class levels into account, it is indicated that the over-nutrition (over-weight for height, >P97) and under nutrition (under-weight for height, <P3) are found in the junior classes at higher proportion than in the senior classes, while the normal nutrition (normal-weight for height, P10-90) is mostly found in the senior classes much more than in the junior classes.

From the table , it reveals that the majority of the adolescents representing 67.93 % is in normal nutrition (normal-weight for height, P10-P90), while the adolescents of 12.16% and 8.42% show the over-nutrition (over-weight for height, >P97) and under-nutrition (under-weight for height, <P3) respectively.

In addition, the minority groups of adolescents representing 6.64 % and 4.86 % are found to be the slightly under-nutrition (weight for height, P3-P10) and slightly over-nutrition (weight for height, P10-P97) respectively. Though these two groups do not presently posed the nutritional problem, but the surveillance program to protect the under-nutrition and over-nutrition problem should be conducted

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Part 3 Adolescent Food Consumption Behavior

Table 13 Adolescent Data on Nutritional Status Categorized Under Overall Food Consumption Behavior (n = 405 students)

Nutritional status	Overall food consumption behavior							
	more correct		correct		less correct		Total	
	Number	%	Number	%	Number	%	Number	%
Normal-weight for height (P10-P90)	84	62.2	51	37.8	0	0	135	100
Under-weight for height (<P3)	36	26.7	99	73.3	0	0	135	100
Over-weight for height (>P97)	64	47.4	71	52.6	0	0	135	100
Total	*184*	*45.5*	*221*	*54.6*	*0*	*0*	*405*	*100*

From Table 13, it is found that the majority of sampled adolescents with normal-weight for height (P10-P90). the more correct overall food consumption behavior of 62.2 % ; whereas most of the adolescents with under-weight for height (<P3)and over-weight for height (>P97) exhibits the correct overall eating behavior of 73.3 % and 52.6 % respectively.

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Table 14 Mean and Standard Deviation Values of Adolescent Food Consumption Behavior Scores Categorized in Overall and Specific Aspects

Food consumption behavior	No. of items	$\overline{x}$	SD	Food consumption behavior interpretation
overall	27	97.47	9.14	correct
specific				
five-essential- group food eating	10	36.68	4.66	more correct
high caloric food eating	4	12.81	2.42	correct
unhealthy-food eating	6	20.72	3.32	correct
numbers of daily food servings	7	27.26	4.14	more correct

From Table 14, it is found that the overall adolescent food consumption behavior is correct, and when considering in specific aspect, it reveals that the sampled adolescents show more correct food consumption behavior on the five-essential-group food consumption and the number of meal consumed daily. For other behaviors on the high caloric food consumption and the unhealthy-food consumption , the sampled adolescents indicate correct behavior.

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Table 15 Mean and Standard Deviation Values of Adolescent Food Consumption Behavior Scores Categorized by Items

Food consumption behavior (items)	$\overline{x}$	SD	Food consumption behavior interpretation
lunch eating	4.74	0.66	more correct
dinner eating	4.74	0.65	more correct
ricegroups eating	4.62	0.58	more correct
liquor beverage	4.57	0.83	more correct
uncooked eating	4.44	0.84	more correct
3-meals eating	4.33	0.98	more correct
meat eating	4.29	0.91	more correct
breakfast eating	4.24	1.10	more correct
vegetable eating	4.01	1.11	more correct
dairy food eating	3.88	1.11	more correct
fresh fruit eating	3.80	0.95	more correct
pickled fruit eating	3.75	0.97	more correct
egg-product eating	3.73	0.93	more correct
fast food eating	3.47	0.82	correct
cake, cookie eating	3.30	0.94	correct
sea foods eating	3.27	0.92	correct
noodle eating	3.26	0.85	correct
spicy food eating	3.19	1.17	correct
healthful supper eating	3.14	1.36	correct
healthful snack between lunch and dinner	3.13	1.27	correct
ice cream eating	3.09	0.91	correct
soybean milk	3.02	1.05	currect

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Table 15 (cont.) Mean and Standard Deviation Values of Adolescent Food Consumption Behavior Scores Categorized by Items

Food consumption behavior	$\overline{x}$	SD	Food consumption behavior interpretation
healthful snack between breakfast and lunch	2.95	1.30	correct
deep-fried food eating	2.94	0.87	correct
legume eating	2.80	0.89	correct
sweet eating	2.62	1.06	correct
soft drink consumption	2.14	1.16	less correct

From Table 15, it is found that the food consumption behaviors of the sampled adolescents are more correct in 13 items, where the first three items comprise the lunch eating, dinner eating, and ricegroups eating. There is only one item of less correct behavior from the soft drink consumption, while the remaining items of food consumption behavior are correct.

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Part 4 Comparison of Adolescent, Food Consumption Behaviors Among Different Nutritional Status

Table 16 Comparison of Average Scores of Adolescent Overall and Specific Food Consumption Behaviors Categorized on Nutritional Status

Food consumption Behavior	Normal-Nutrition $\bar{X}$	under-nutrition $\bar{X}$	over-nutrition $\bar{X}$	F
Overall food consumption behaviors	100.38	93.87	98.29	19.124***
Specific food consumption behaviors				
five-essential-group food eating (item 1-10)	*37.09*	*35.39*	*37.56*	*8.356****
high caloric food eating (item 11-14)	*13.44*	*12.29*	*12.84*	*7.081***
unhealthy-food eating (item 15-20)	*21.65*	*20.07*	*20.43*	*8.758****
number of daily food servings (item21-27)	*28.20*	*26.13*	*27.47*	*9.077****

** = $p < .01$, *** = $p < .001$

From Table 16, it is found that the scores of overall food consumption behavior for the adolescent group with normal nutrition (normal-weight for height, P10-P90) are assessed as more correct ($\bar{x}$ = 100.38), while the adolescent groups with under-nutrition (under-weight for height, <P3) and over-nutrition (over-weight for height, >P97) show the eating behavior scores of correct scale ($\bar{x}$ = 93.87 and $\bar{x}$ = 98.29). When taking into account the evaluation of nutritional status differences in the scores, it reveals that the 3 adolescent groups exhibit different overall food consumption behaviors at statistically significant level of 0.001 (F = 19.124).

As for the scores of food consumption behavior with the five-essential-group food eating for the adolescent group of normal nutrition(normal-weight for height, P10-P90) and over-nutrition(over-weight for height, >P97) indicate more correct scale ($\bar{x}$ = 37.09 and $\bar{x}$ = 37.56 respectively) ; while the adolescent group of under-nutrition (under-weight for height, <P3) show the food consumption behavior in this aspect of correct scale ($\bar{x}$ = 35.39). When evaluating the nutritional status differences in the scores, it is found that the 3 adolescent groups show different food consumption behaviors in the five-essential-group food eating at statistically significant level of 0.001 (F = 8.356)

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Considering the scores of food consumption behavior on the high caloric food eating of the three different nutritional status, it reveals that the normal-nutrition (normal-weight for height, P10-P90), under-nutrition (under-weight for height, <P3) and over-nutrition (over-weight for height,>P97) similarly show at correct scale ($\bar{x}$ = 13.44, $\bar{x}$ = 12.29 and $\bar{x}$ = 12.84 respectively). As for the evaluation of nutritional status differences in the scores, it is found that the three adolescent groups exhibit different food consumption behaviors on the high caloric food eating at statistically significant level of 0.01 (F = 7.081).

For the behavioral scores on the aspect of unhealthy-food eating for the three different nutritional status, it is found that the normal-nutrition(normal-weight for height, P10-P90), under-nutrition nutrition (under-weight for height, <P3) and over-nutrition(over-weight for height,>P97) are assessed as moderately correct ($\bar{x}$ = 21.65, $\bar{x}$ = 20.07 and $\bar{x}$ = 20.43 respectively). As for the evaluation of nutritional status differences in the scores, it indicates that the three groups show different eating behaviors on the unhealthy-food eating habit at statistically significant level of 0.001 (F = 8.758).

In the eating behavioral scores on the aspect of the number of daily servings for three groups with different nutritional status, it reveals that the groups of normal-nutrition(normal-weight for height, P10-P90), under-nutrition(under-weight for height, <P3) and over-nutrition (over-weight for height,>P97) show the more correct scale ($\bar{x}$ = 28.20, $\bar{x}$ = 26.13, and $\bar{x}$ = 27.47 respectively). As for the evaluation of nutritional status differences in the scores, it is found that the three adolescent groups exhibit the different food consumption behaviors on the number of daily servings at statistically significant level of 0.001 (F = 9.077).

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Table 17 Pairwise Differences Comparison of Average Scores of Adolescent Overall Food Consumption Behaviors for Different Nutritional Status by Scheffe Test

Nutritional status group		normal	under	over (obesity)
normal	($\bar{x}$ = 100.38)	-		
under	($\bar{x}$ = 93.87)	6.50***	-	
over	($\bar{x}$ = 98.29)	2.09^{ns}	4.41***	-

*** = p < .001, ns = statistically insignificant

From Table 17, it is found that the adolescent group of under-nutrition (under-weight for height, <P3) shows the different overall food consumption behavior from that of the other two groups of normal-nutrition (normal-weight for height, P10-P90) and over-nutrition (over-weight for height,>P97) ; whereas the adolescent group of over-nutrition (over-weight for height,>P97) indicates no difference in the overall food consumption behavior from that of normal-nutrition (normal-weight for height, P10-P90) group.

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Table 18 Pairwise Difference Comparison of Average Scores of Adolescent Specific Food Consumption Behaviors for Nutritional Status by Scheffe Test

Nutritional status group		normal	under	over
5-esscatial group food eating (item 1-10)				
normal	($\bar{x}$ = 37.09)	-		
under	($\bar{x}$ = 35.39)	1.70**	-	
over	($\bar{x}$ = 37.56)	.47^{ns}	2.16***	-
high caloric food eating (item 11-14)				
normal	($\bar{x}$ = 13.44)	-		
under	($\bar{x}$ = 12.29)	1.15***	-	
over	($\bar{x}$ = 12.84)	.60^{ns}	.55^{ns}	-
unhealthy-food eating (item 15-20)				
normal	($\bar{x}$ = 21.65)	-		
under	($\bar{x}$ = 20.07)	1.59***	-	
over	($\bar{x}$ = 20.43)	1.22***	0.36^{ns}	-
number of daily food servings (item 21-27)				
normal	($\bar{x}$ = 28.20)	-		
under	($\bar{x}$ = 26.13)	2.07***	-	
over	($\bar{x}$ = 27.47)	.73^{ns}	1.34*	-

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, ns = statistically insignificant

From Table 18, it reveals that the adolescent group with under-nutrition (under-weight for height, <P3) shows different food consumption behavior from that of the normal-nutrition(normal-weight for height, P10-P90) group in the aspects of the five-essential-group food eating, high caloric food eating, unhealthy-food eating, and number of daily food servings; and also exhibits different eating behavior from the over-nutrition (over-weight for height, >P97) group in specific aspects of the five-essential-group food eating and the number of daily food servings.

It is also found that the adolescent group with over-nutrition (over-weight for height,>P97) indicates no different eating behaviors from the normal nutrition (normal-weight for height, P10-P90) group except in the particular aspect of the unhealthy-food eating which shows significant difference ($p < 0.01$).

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Part 5 Relationship between Predictor and Adolescent Food Consumption Behavior

Table 19 Correlation Coefficients among Predictors and between Predictors and Criteria showed in Correlation Matrix

Variables	1	2	3	4	5	6
1. Nutritional knowledge	1.000					
2. Food consumption attitude	.285**	1.000				
3. Self-esteem	.202**	.296**	1.000			
4. Household income	.185**	.576**	.174**	1.000		
5. Nutritional information	.265**	.279**	.213**	.228**	1.000	
6. Food consumption behavior	.318**	.714**	.269**	.265**	.333**	1.000

** = p < .05, ** = p < .01, *** = p < .001

From Table 19. it reveals that the nutritional knowledge, food consumption attitude, self-esteem, household income, and nutritional information exhibit a positive relationship with the food consumption behavior at a statistically significant level of 0.01 (r = 0.318, r = 0.714, r = 0.269, r = 0.652, and r = 0.333 respectively).

In addition, each predictor shows a relationship with every other predictor as follows :

The nutritional knowledge shows a positive relationship with the food consumption attitude, self-esteem, household income, and nutritional information at a statistically significant level of 0.01 (r = 0.285, r = 0.202, r = 0.185, and r = 0.265 respectively).

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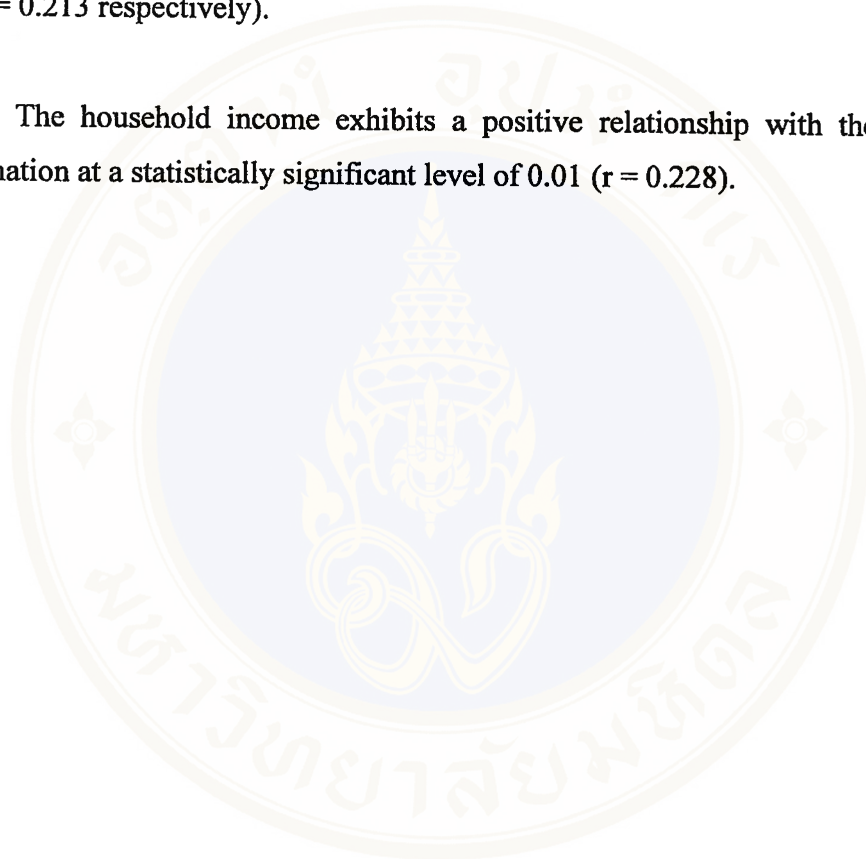
The food consumption attitude indicates a positive relationship with the self-esteem, household income, and nutritional information at a statistically significant level of 0.01 ($r = 0.296$, $r = 0.576$, and $r = 0.279$ respectively).

The self-esteem variable also shows a positive relationship with the household income and nutritional information at a statistically significant level of 0.01 ($r = 0.174$ and $r = 0.213$ respectively).

The household income exhibits a positive relationship with the nutritional information at a statistically significant level of 0.01 ($r = 0.228$).



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Part 6 Predictive Power of Adolescent Food Consumption Behavior

Table 20 Multiple Correlation Coefficients between Predictors and Adolescent Food Consumption Behavior by Enter Multiple Regression Analysis

Predictors	B	Beta	SE	t
Nutritional knowledge	.301	.094	.107	2.821**
Food consumption attitude	.687	.448	.061	11.194***
Self-esteem	.07	.035	.074	1.053^{ns}
Household income	.0002	.349	.000	9.172***
Nutritional information	3.376	.096	1.168	2.890**
Constant (a) = 48.309				
$R = .786$; $R^2 = .617$; R^2 adj = .613 ; SE = 5.73 ; F = 80.647				

** = p < .01, *** = p < .001, ns = statistically insignificant

From Table 20, it is found that all predictors including the nutritional knowledge, food consumption behavior, self-esteem, household income, and awareness of nutritional information, can jointly predict the adolescent food consumption behavior at 61.7%. The predictors, which show a significant relationship with the adolescent food consumption behavior, are the nutritional knowledge, food consumption attitude, household income, and awareness of nutritional information.

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Table 21 Multiple Correlation Coefficients between Predictors and Adolescent Food Consumption Behavior by Stepwise Multiple Regression Analysis

Steps	Variables	Multiple R	R^2	F	b	SE	Beta	T
1	Food consumption Attitude	.713	.508	415.236***	1.093	.054	.713	20.377***
2	Food consumption Attitude				.773	.060	.505	12.988***
	Household income	.772	.595	295.127**	.0002	.000	.362	9.306***
3	Food consumption Attitude				.732	.060	.478	12.265***
	Household income				.0002	.000	.350	9.106***
	Nutritional information	.780	.609	207.340**	4.207	1.147	.120	3.667
4	Food consumption Attitude				.699	.060	.456	11.608***
	Household income				.0002	.000	.349	9.164***
	Nutritional information				3.526	1.160	.101	3.040**
	Nutritional knowledge	.785	.617	160.667**	.312	.106	.097	2.948**
	Constant (a) = 49.767	SE = 2.822						
	Overall F = 128.791							

* = p < .05 ; ** = p < .01 ; *** = p < .001

From Table 21 ,it is obvious that in the step 1 of the stepwise multiple regression analysis , the first selected predictor is the food consumption attitude due to its greate of relationship with the food consumption behavior to which a prediction of 50.8 % at a statistically significant level of 0.001. can be obtained

In step 2 , the household income is the second selected predictor which can predict the food consumption behavior up to 59.5 % at a statistically significant level of 0.001 .

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The selected predictor in step 3 is the nutritional information which can increasingly predict the food consumption behavior up to 60.9 % at a statistically significant level of 0.01 . It is also found that when the nutritional knowledge is added as the selected predictor to the step 4 , the prediction of food consumption behavior is increased to 61.7 % at a statistically significant level of 0.01 .However , when adding other predictors in further steps of the analysis , it is found that the predictions differ insignificantly ,i-e. the self-esteem variable can not predict the adolescent food consumption behavior. The analysis is then terminated in step 4.

It is obvious in the analysis that the selected predictors on the adolescent food consumption behavior with statistical significance comprise the food consumption attitude, household income, nutritional information and nutritional knowledge. These four variables can jointly explain the variation of food consumption behavior of 61.7 % at a statistically significant level of 0.01.

In deriving prediction equations from the analysis result in Table 21, it is of the selected predictors in step 1-4 which consist of the food consumption attitude (ATT), household income (INC), nutritional information (INF) and nutritional knowledge (KNO), exhibits a statistically significant level of 0.01, and a constant (a) = 49.767. From the multiple correlation and regression analysis in the final step (step 4) , the best fitted line from the regression equation is achieved to predict the adolescent food consumption behavior (BEH).

Therefore the equation to predict behaviors (Y) in the from of raw scores is derived as follows :

$$Y\ (BEH) = 49.767+0.699\ (ATT)+0.0002\ (INC)+3.526\ (INF)+0.312\ (KNO)$$

The best multiple regression equation in the form of standard score is as follow :

$$Z\ (BEH) = 0.456Z\ (ATT)+0.349Z\ (INC)+0.101Z\ (INF)+0.097Z\ (KNO)$$

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CHAPTER V
DISCUSSION

The findings from the study of the *Determining Factors on Food Consumption Behaviors and Nutritional Status of Adolescents in Bangkok* can be discussed in the following aspects.

1. Adolescent Nutritional Status

The study indicated that the majority of adolescents at 67.93% exhibited the normal-nutrition, while the other groups of 12.16% and 8.42% represented the over-nutrition (obesity) and under-nutrition respectively (Table 12).

It is obvious from the study that most of the adolescents is in the normal-nutritional status due to its appropriate food consumption behavior as explicitly evidenced that 75.1% of the adolescents took 3 meals a day (Table 8). This helps in supplying adequately essential nutrients for the bodies (Orawin Toraki, B.E.2537 : 171). In addition, most adolescent show more correct food consumption behavior on the five-essential food groups (Table 14) such as meat, milk, eggs, vegetables and fruits. About 62.2% of the adolescents was reported the reject of half-cooked food consumption whose habit will protect them from the risk of disease infections and nutrient deficiencies. It is also found that 57.8% of the adolescents showed a good level of nutritional knowledge (Table 9) which accounted for better understandings of healthful diet leading to the desirable food consumption behavior and eventually the normal-nutritional status. This explanation is in accordance with the concept of Green (Green, L.W.et al, 1980 : 72) saying that knowledge is a necessary factor for an individual in changing one's health behavior.

When considering the nutritional target of the Eighth National Food and Nutrition Plan (B.E.2540-2544) which set up the ceiling figures of 10% of the over-nutrition (obesity) and 7% of the under-nutrition for the schooling adolescents of 5-19 years of ages (Subcommittee on Nutrition Work Plan, B.E.2540 : 32), it is apparent that the national nutritional goal has not been achieved particularly for the adolescents in Bangkok. The cause of the over-nutrition (obesity) problem partly originates from

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the household economic factor as evidenced in 60.5% of the adolescents in Bangkok was the high-income family (Table 3). The high-income family always possesses the high purchasing power of various dietary choices resulting the nutrient oversupply. And eventually the over-nutritional status which is in line with the study finding of Dusanee Suthapriyasri (B.E.2532 : 18) indicating that the overweight population in Thailand are those well-being people residing in urban areas of large cities. They are furnished with high chances and purchasing power of various services for their indulgence. In addition, the over-nutritional status may stem from the high calorie dietary intake such as fast foods ($\bar{x} = 3.44$), cakes, cookies, chocolates($\bar{x} = 3.54$), fried foods ($\bar{x} = 3.11$), Results from the interviewed adolescents also show that most of the adolescents spent routine physical exercise only in the schools classes.This happening may be partly due to the adolescent's inadequate available time caused by the urban congested traffic conditions during the daily commuting. Resulting in fatigue and consequently they prefer to take a rest instead of a routine workout. Both habitual factors of the high calorie food intake and the lack of routine workout will bring about the accumulation of excessive fats on other parts of the body leading to the over-nutrition (obesity) problem.(Pipap Jirapinyo, B.E.2538 : 259-260).

The under-nutrition adolescents is another group of the malnutrition problems. Since the adolescents are in the period and state of being recognized by their compatible groups. They are more concerned on their beauty and body shapes, The physiological changes in adolescents' bodies may give mental stress, moody emotion, and being uninterested in healthful food consumption resulting in the potentially essential nutrient deficiency (Sunetra Nimanant, B.E.2537 : 89). The under-nutritional status may stem partly from the inappropriate eating behavior as it is found in the study that about 7.9% of the adolescents preferred strong tastety food everyday. The routine consumption of hot foods normally causes irritation to the gastro-intestinal tract membranes resulting in inefficient stomach digestion or in flatulent state. While in routine salty food consumption it may impair the kidney functioning. Hence the strong tastety food will in turn bring about the imbalance of nutrient absorption, lack of adequately essential nutrients, which is considered as a cause of nutrient deficiency (Boonsom Martin et al, B.E 2533 : 75-76) and the under-nutritional status.

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2. Adolescent Food Consumption Behavior

The study reveals that the majority of the adolescents in Bangkok representing 59.6% showed the overall food consumption behavior at correct level, and 45.5% exhibited more correct level, whereas there was no any adolescent displaying the less correct behavior. This incidence may be due to the fact that the adolescents' specific aspect and itemized eating behaviors are mainly displayed at the correct and more correct levels (Tables 14 and 15), except the soft drink intake representing the less desirable eating behavior ($\bar{x}$ = 2.14, S.D. = 1.16). As a result, the overall eating behavior of adolescents turns up at correct and more correct levels, which corresponds to the study finding of Ampawan Visavathiranont (B.E.2541 : 137) indicating that the majority of the adolescent students in Bangkok representing 57.7% exhibited the correct overall eating behavior, while the remaining adolescents of 21.3 % and 20.9 % showed the more and less correct eating behaviors respectively.

Findings from the study of specific aspect on food consumption behavior can be depicted as follows:

Five-Essential-Group Food Consumption

It is found from the study that the adolescent eating behavior on the five-essential-group food consumption was at the more correct level which can be explained that most of adolescents representing 92.6% received information and recommendations of nutrition (Table 6) with its most popular information source being their teachers. Consequently, the nutritional knowledge such as the necessity and beneficial effects of five-essential-group foods can be easily accessed. Additionally, a physical education course featuring related information of five-essential-group foods is presently included in junior school classes (Division of Education Policy and Planning, Department of General Education, B.E. 2541).

High Calorie Food Intake

Finding from the study indicates that the food consumption behavior on the aspect of high calorie food intake particularly fast foods, ice cream, cakes, cookies, chocolates, and fried foods, was at the correct level (Table 15), and mostly consumed 1-2 days/week. Besides the deep fried foods was the most preferred food choice,

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which is in line with the study finding of the food consumption behavior of Thai population by Ministry of Public Health in B.E.2529. They reveals that fried foods was the most favorite food choice (Uruwan Yamborisuth, B.E.2536 : 759). The adolescents'popularity in fried food intake may be due to its accessibility, inexpensiveness, attractive appearance and taste, and commercial advertisement. The survey result also reveals that the adolescents preferred to buy fried foods for snacks. In addition, it is found that ice cream is another favorite food choice of adolescents particularly the tasty, foreign-formulated ice creams. However, it is reported that the ice cream was typically composed of sugar as a main ingredient and a low level of protein content (Kraisit Tantisirin, B.E.2540 : 13). At present, it is anticipated that the popularity of high calorie food consumption of adolescents is likely to increase, and the overindulging of high calorie foods will eventually lead to an increase in the over-nutritional status, The finding is also in harmony with this study revealing that the adolescent group with over-nutritional status show less correct in fast food eating ($\bar{x}$ = 3.44), cake cooking chocolatec ($\bar{x}$ = 3.54), deep-fried food eating ($\bar{x}$ = 3.11) than other groups.

Unhealthy Food Consumption

According to the study result, it is found that the adolescent eating behavior on the aspect of unhealthy food intake was at the correct level. The soft drink consumption was the most frequent food choice among adolescents representing 41% , and the intake of confectioneries accounting 17% (Table 15). In addition, the adolescent group exposed to the over-nutritional status did show more frequent intakes of soft drinks than other groups. Which is in accordance with the study finding of Jarassri Usaha (B.E.2539 : 30) concluding that the surveyed schoolchildren grouped as over-nutrition status showed the highest degree of soft drink consumption. Jariyawat Kompayak et al (B.E.2535 : a-b) also reveal from their survey that the number of schoolchildren and adolescent students of the schools in Ket Bangkok Noi, Bangkok preferring the soft drink intake accounted for 32.4%. With regard to the adolescents'fondness of soft drink and confectionery intakes, this habit may original partly from the influences of various commercial advertisement competition.

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Particularly the soft drinks representing the new generation's symbol. This explanation conforms to the interview finding of this study indicating that the adolescents preferred buying soft drinks and confectioneries because of their tastiness and for the sake of enjoyment.

Considering the aspect of nutritional values, soft drinks are typically composed of sugar as a major ingredient ; if consuming everyday, the body will be overfed with sugar than normally needed leading to an overweight state. While the confectioneries are mainly composed of wheat flour, oil, butter, sugar, with added monosodium glutamate and salt as flavor seasoning (Kraisit Tantisirin, B.E.2540 : 11). In fact , the infrequent consumption of soft drinks and confectioneries may not pose a definite nutritional problem to adolescents, but the daily consumption habit of this high calorie foods may cause the problems of under-nutrition and over-nutrition.

Number of Daily Food Serving

It is found that lunch was the most frequent and essential meal of the day for the adolescents, followed by dinner . It is interested to learn that only 59% of the adolescents had their daily breakfasts, and about 3.5% had never consumed their breakfasts. The importance of lunch than other meals may be due to the lunch are accessible in schools for adolescents coupled with the hunger resulted from both the unconsumption of breakfast and earlier school activities prior to the lunch time (Roongnapa Pongkiatchai, B.E.2542 : 60). On the other hand, the explanation of the breakfast being the least frequent meal of adolescents is that they could not allocate available time for breakfast eating due to the early morning get-up and heading to schools ; coupled with the interview data confirming that the breakfast was not prepared at home, as well as they did not feel hungry in the morning. In fact, the breakfast is considered as one of the essential meals of the day since the body has not been fed for a straight period of about 12 hours. Therefore the breakfast eating in a new day will bring forth the refreshing mind and vigorous body which can enhance the learning efficiency (Juthamas Charoenpon, B.E.2540 : 87). Based on the survey data of this aspect in the U.S.A, it is found that the children which lack of routine breakfast eating presumably showed laziness and more frequent absence in classes than those consumed their breakfasts (Sulaya Knogsomboom, B.E.2539 : 38).

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3. Predictive Power of Predisposing Factor, Enabling Factor and Reinforcing Factor on Food Consumption Behavior of Adolescents in Bangkok

Finding from the study indicates that the determining factors comprising the food consumption attitude, household income, nutritional information and nutritional knowledge could predict the food consumption behavior of adolescents in Bangkok at 61.7% ($p < 0.01$). When taking each predictor into account as selected in the predicting equations, it can be depicted as follows :

Food Consumption Attitude

The study finding reveals that the food consumption attitude exhibited the greatest relationship with the food consumption behavior ($r = 0.714$, $p < 0.01$) for which a prediction of 50.8% ($p < 0.001$) could be obtained. In this regard, it can be explained that attitude is an individual's feeling, opinion, and mind which is associated with one's incentive (Green & Kreuter, 1991 : 156). While the individual's incentive is a significant component in developing one's readiness and self-care (Joseph, 1980 : 132), the readiness will in turn promote the individual's learning for changing various behavioral reactions permanently (Kamolrat Lahsuwong, B.E. 2524 : 23-24). Therefore the adolescents whose attitude toward the food consumption is in a desirable direction, will be incited to conduct the food consumption behavior in the same desirable direction and vice versa. This explanation is in line with the study finding of Dianne, N.S.et al, (1996 : 198) stating that the attitude was positively associated with the nutritional status of the junior school's schoolgirls in Jerusalem, Israel.

Household Income

It is found from the study that the household income was associated with the food consumption behavior of adolescents ($r = 0.652$, $p < 0.01$), and was selected for the predicting equation in step 2, which could predict the food consumption behavior up to 59.5% ($p < 0.001$).

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The household income related to the food consumption behavior of adolescents can be explained that the household income is an important factor dictating the family's purchasing power and selection of dietary diversity (Kuar Wongboonsin, B.E.2532 : cited in Sirivat Aryuvat, B.E.2539 : 13). The variety of selected foods also directly affects the amount and quality of dietary intake which in turn promoting and affecting the food consumption behavior. This explanation is in accordance with the concept of Green & Kreuter (Green & Kreuter, 1991 : 29) concluding that the enabling factor is a component which promotes the health behavioral action; it is also an essential resource and capability in making use of resource for developing individual's behavior. The factor includes the household income, service accessibility, service fee, transportation, etc. The finding of this study also corresponds to the study result of Kalaya Srimahant (B.E. 2541 : 81) showing that the household income was associated with the food consumption behavior of the surveyed schoolchildren in Amphoe Muang, Ratchaburi.

Nutritional Information

Finding from the study shows that the nutritional information was associated with the food consumption behavior of adolescents ($r = 0.333$, $p < 0.01$), and was selected for the predicting equation in step 3, which could predict the food consumption behavior up to 60.9% (p , 0.01).

It can be explained in this aspect that the degree of correct level for adolescents' food consumption behavior is associated with the awareness of nutritional information since the obtained information is a significant component in conducting an individual's health behavior (Prapaporn Suvaratchai, B.E.2539 : 34). The nutritional information also provides guidance and reinforcement for the adolescents in making decision on various alternatives of eating behavior particularly leading to the more correct behavior. This explanation is in line with the concept of Green & Kreuter (Green & Kreuter, 1991 : 29) stating that the reinforcing factor is the consequences of behavioral actions from influencing parties which an individual will obtain or expects to obtain. In addition, the study finding is also in accordance with the study conducted by Sunetra Nimanant (B.E.2537 : 85) concluding that the awareness of food consumption recommendation was associated with the food consumption behavior of the surveyed junior school's students in the urban area of Chiangmai Province.

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Nutritional Knowledge

It is found from the study that the nutritional knowledge was associated with the food consumption behavior of adolescents ($r = 0.318$, $p < 0.01$), and was selected for the predicting equation in step 4, which could predict the food consumption behavior up to 61.7% ($p < 0.01$).

For this aspect, it can be explained that the range of level of adolescents eating behavior is related to the nutritional knowledge. Since the knowledge will give way to understand,to conduct, and to make decision in conducting of various activities leading to a correct health behavior (Prapapen Suwan and Sawing Suwan, B.E.2534 : 196).

This explanation corresponds to the concept of Green & Kreuter (Green & Kreuter, 1991 : 28) saying that knowledge is an essential factor which promotes changes of an individual's health behavior. This study finding conforms to the study result conducted by Sunetra Nimanant (B.E.2537 : 74) revealing that food and nutritional knowledges were associated with the food consumption behavior of the junior school's students in the urban area of Chiangmai. Besides, the finding is also in line with the study result of Prisadang Chanboonreung (B.E.2536 : 82) stating that the nutritional knowledge was positively associated with the nutritional self-conduct of the surveyed population in Loi Province.

In this study, the self-esteem variable is not selected for the predicting equation since the self-esteem was positively associated with the food consumption behavior of adolescents at a low significant level ($r = 0.269$, $p < 0.01$), hence it was not selected for the prediction of adolescents'eating behavior. It can be explained that the subjects are the adolescent students developed within the same atmosphere and culture. Besides, adolescence needs to develop one's self-esteem at higher degree than in other groups (Erikson, 1968 : 128-135; Goebal & Brown, 1981 : 811). As a result, the obtained score of the subject's self-esteem was mainly in the high scale of 80.49% (Table 11).

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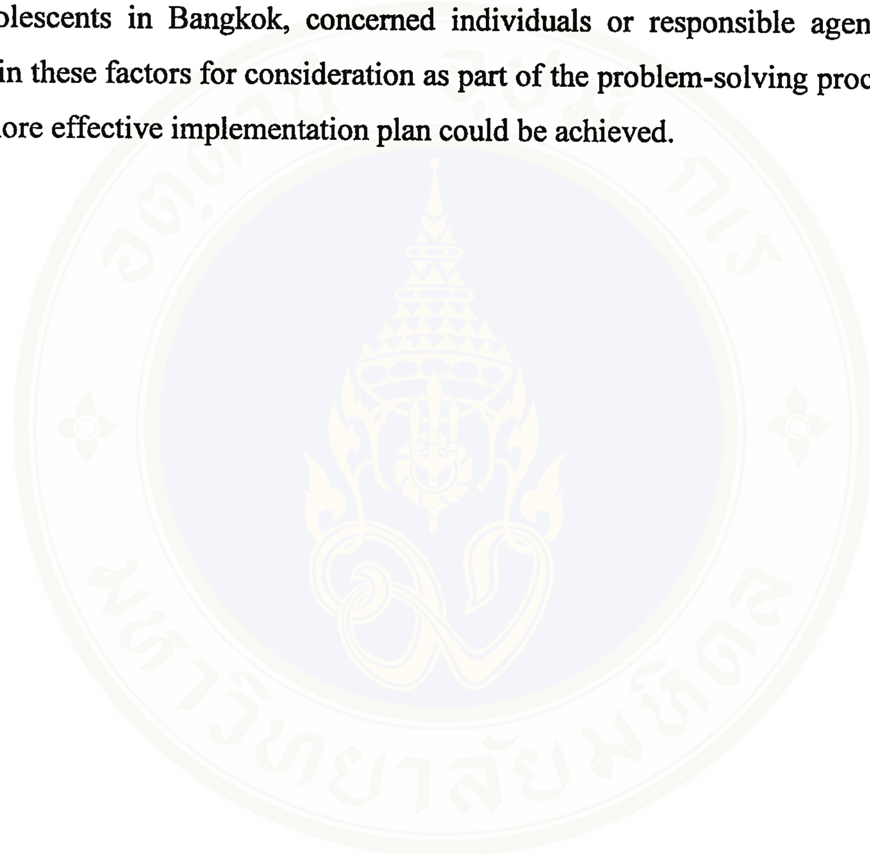
It can be concluded from this study that most of the predisposing, enabling and reinforcing factors can jointly predict the food consumption behavior of adolescents. According to the underlying assumption and is in line with the concept of Green & Kreuter (Green & Kreuter, 1991 : 28-29) state that the behavioral action or conduct of an individual is a consequence of influences on the predisposing, enabling and reinforcing factors. Therefore in solving the problem of food consumption behavior of adolescents in Bangkok, concerned individuals or responsible agencies should bring in these factors for consideration as part of the problem-solving process in order that more effective implementation plan could be achieved.



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CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS

Conclusion of Study

This study is a descriptive research , to examine the determining factor on the nutritional status and food consumption behavior of adolescents in Bangkok. Emphases are placed on the study of factors in predicting the adolescent food consumption behavior, and the comparison of food consumption behavior among different nutritional status.

The subjects in this study comprise the 4,325 adolescent students, 12-19 years of ages , currently studying in the grades 7-12 of the schools under the Department of General Education, Ministry of Education in Bangkok. The weight for height basis as an indicator is utilized in the evaluation of adolescent nutritional status categorized in 3 different groups of under-nutrition, normal-nutrition and over-nutrition. Sample of 135 students for each group is selected, totaling 405 students, for the study of the food consumption behavior. The study tools for this study consist of the questionnaires "*Determining Factors of Food Consumption Behavior and Nutritional Status of Adolescents*" , spring balance scale, measuring tape (Stanley microtoise) , and standard growth graphs of males and females of 10-20 years. These graphs was prepared by the Nutrition Research Institute, Mahidol University, which utilized the relevant data of standard weights, heights and nutritional indicators of the Thai population of 1 day-19 years , The Department of Health , Ministry of Public Health, B.E. 2530. For the analysis of the obtained data, a computer software package SPSS for Windows is used as follows :

1. Compute frequency distributions and percentages of the adolescents' personal data, nutritional status data, and food consumption behavior data.

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2. Perform a comparative analysis of the adolescent food consumption behavior categorized in different nutritional status, by means of the analysis of variance with the statistical F-test, and the multiple comparison by the S-method

3. Analyze the predictive power of the predisposing factor, enabling factor, and reinforcing factor on the adolescent food consumption behavior by the stepwise multiple regression technique.

Findings of the study can be summarized as follows :

1. General Characteristics of Adolescents

The subjects consisted of 51.6 % of male students and 48.4 % of female students. Their average household incomes were at the high level income (exceeding 10,779 baht / month) representing 60.5 % of the sample group. The majority of the sample adolescents 92.6 % had received nutritional information, primarily through the guidance of their teachers at 33.1 % . Three daily food servings of 75.1 % of the subjects is reported and 75.8 % prepared foods at their homes. In addition,the sample students primarily showed a highly agreeable food consumption attitude at 86.7 %, and indicated a strongly agreeable self-esteem at 57.8 %.

2. Adolescent Nutritional Status

Result from the study on the adolescent nutritional status indicate that 67.93 % of the sample showed the normal-nutrition(normal-weight for height,P10-90), while the remaining 8.42 % and 12.16 % represented the under-nutrition (under-weight for height,<P3) and over-nutrition(over-weight for height,>P97). When taking the gender into account, it is found that the male students exhibited the over-nutrition status at higher degrees than the female students, whereas the normal-nutrition and under-nutrition status were mainly evidenced in the female students

3. Adolescent Food Consumption Behavior

It is found from the study that the overall food consumption behavior of the sample adolescents was in the desirable level ($\bar{x}$ = 97.47, S.D. = 9.14). When taking the nutrition status into account, it reveals that the normal-nutrition adolescent group showed the highly desirable overall food consumption behavior at 73.3 % , and

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it is also indicated that no any other adolescent showing the less desirable overall food consumption behavior was observed. Considering the specific food consumption behavior, the results show that the five essential groups food consumption behavior ($\overline{x}$ = 36.68 , S.D. =4.66) and the number of daily food serving behavior ($\overline{x}$ = 27.26 , S.D. = 4.14) were in the highly desirable level ; while the other behavior on the high calorie food intake ($\overline{x}$ = 12.81 , S.D. = 2.42) and the unhealthy-foods consumption ($\overline{x}$ = 20.72 , S.D. = 3.32) were reported as desirable behaviors. As for the itemized eating behavior , it is found that the sample adolescent showed the highly desirable eating behavior at the first three items , i.e. the lunch eating ($\overline{x}$ = 4.74 , S.D. = 0.66) , the dinner eating ($\overline{x}$ = 4.47, S.D.= 0.65), and the rice groups eating ($\overline{x}$ = 4.62, S.D. = 0.58),whereas the less desirable food consumption behavior was reported only in one item of the soft drink consumption ($\overline{x}$ = 2.14 , S.D. = 1.16).

4. Predictive Power of Predisposing Factor , Enabling Factor , and Reinforcing Factor on Adolescent Food Consumption Behavior

The findings reveal that the predisposing factor consisting of the nutritional knowledge and food consumption attitude ; the enabling factor of the average household income ; and the reinforcing factor of the awareness of nutritional information , could jointly predict the adolescent food consumption behavior at 61.7 %

5. Consumption of Adolescent Food Consumption Behavior at Different Nutrition Status

The study result shows that the sample adolescents with different nutritional status exhibited the different eating behaviors in both the overall and specific aspects.

Recommendations

It is obvious from this study that the nutritional status , food consumption behaviors and the predicting factors on the food consumption behavior of adolescent in Bangkok are well documented. Followings are the proposed recommendations resulted from this study.

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On utilizing study results

1. A nutritional surveillance program for the adolescents should be established 2-3 times a year , either initiated by the adolescents ,household members , or school teachers . Provision should be made on trainings aimed at strengthening sufficient knowledge and correct procedures in the nutritional follow-ups by using the simple indicating tools like the weights for heights , heights for ages , and weight for ages.

2. The school health nurses involved in the surveillance program should select the adolescent group currently facing the nutritional problem and divide into 2 separate groups of over-nutrition(over-weight for height,>P97) and under-nutrition(under-weight for height,<P3). Initiate a program like " *Friend-Helps - Friend on Nutrition* " or apply a group process strategy by allowing each adolescent group and other groups to make acquaintance , exchanging and sharing their knowledges , experiences , mutual encouragement , and stimulating the group members to find their own ways in solving the nutritional problem. In this regard , the school health nurse will provide appropriate guidances.

3. Launch a promotion campaign on the rejected soft-drink consumption by seeking mutual cooperation among schools and adolescents' parents through disseminating essential information of the soft drinks like nutrition facts and their effects , restricted selling of soft drinks in schools , and cultivating new social values of soft drink reject behavior as a pacemaker for adolescents to follow.

For further studies

1. Other promisingly predicting factors on the food consumption behavior of adolescents such as the familial food consumption pattern , influences of peer groups and mass media , leisure time spending exercise , etc. should be explored.

2. In the evaluation aspect of adolescents' consumed foods , quantitative and qualitative data acquisition efforts other than the inquiry approach on the frequency of dietary intake , should be performed , e.g. the food record , weighed inventory and 24-hour recall.

3. An experiment – oriented study , in order to develop appropriate means and strategy to alter the less desirable eating behavior particularly the soft drink consumption , should be pursued.

4. At present , the problem of *obese adolescents* tends to increase significantly , both in the group which is prone to the obesity status , and the current obesity group. An experiment-oriented research to find means and strategy to solve this problem should also be conducted.

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APPENDICES

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APPENDIX A

List of Experts

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APPENDIX A

List of Experts

In the study of “Determining Factors on Food Consumption Behavior and Nutritional Status of Adolescents in Bangkok , the involved study tools were tested for their validities.

Following is the list of experts :

1. Dr. Kalaya Kittboonchu
   Associate Professor Level 9, Department of Nutritional. Physiology
   Nutrition Research Institute, Mahidol University
2. Dr.Yajai sitthimongkol
   Assistant Professor Level 8,Department of Mental Health Nursing
   and Psychiatry
   Faculty of Nursing ,Mahidol University
3. Aroonrasami Boonnak
   Instructor Level 7 , Department of Pediatric Nursing
   Faculty of Nursing , Mahidol University
4. Kanya Lekakam
   Instructor 2, Level 7, Chief of Health Section ,
   Satree Wat Rakang School.
   Department of General Education.
   Ministry of Education.

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APPENDIX B

Growth Chart for Thai Adolescent

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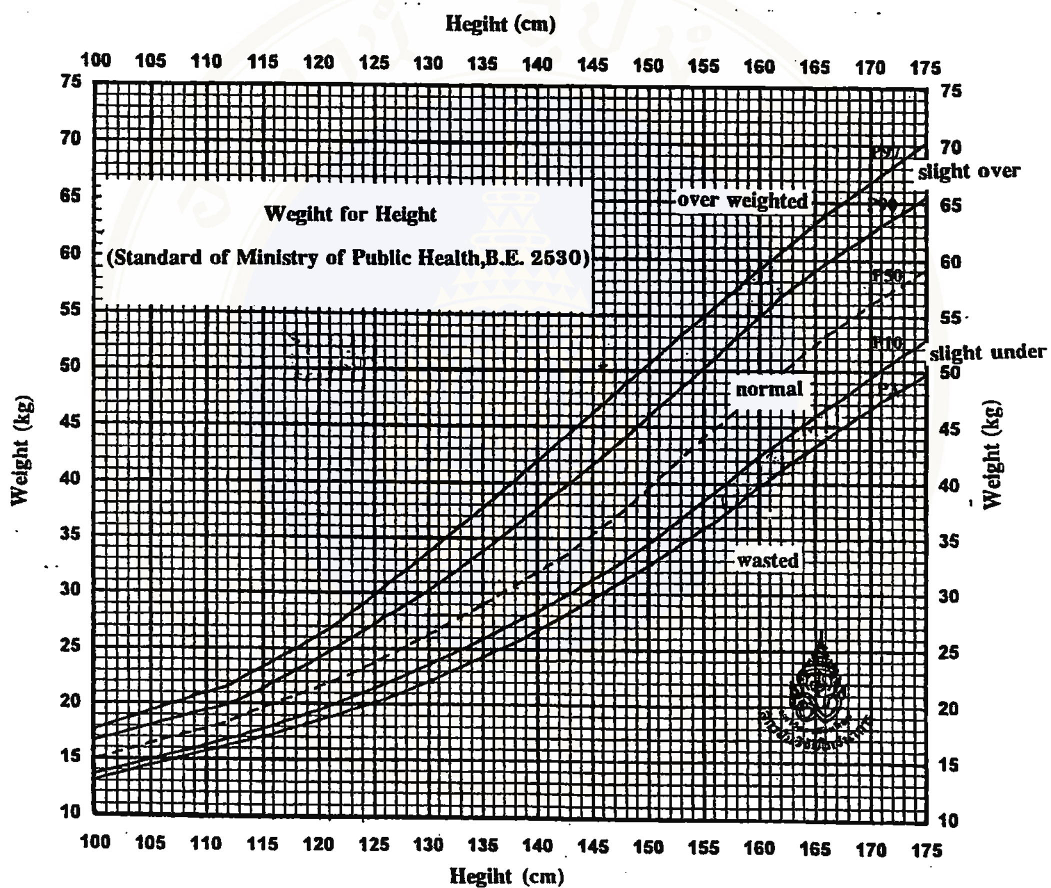
Graph of Standard Growth Development of Male in the Ages of 10-20 Years

Graph 1. Weight for Height



Ref. : Department of Health, Ministry of Public Health, B.E. 2530 standard of Weights Heights and nutritional status indicator of Thai population ages 1 day -19 years

Design by : Institute of Nutritional, Mahidol University Phuttamonthon 4 Salaya Phuttamonthon Nakornphathom Provicen. 73170 Tel. 889-2168

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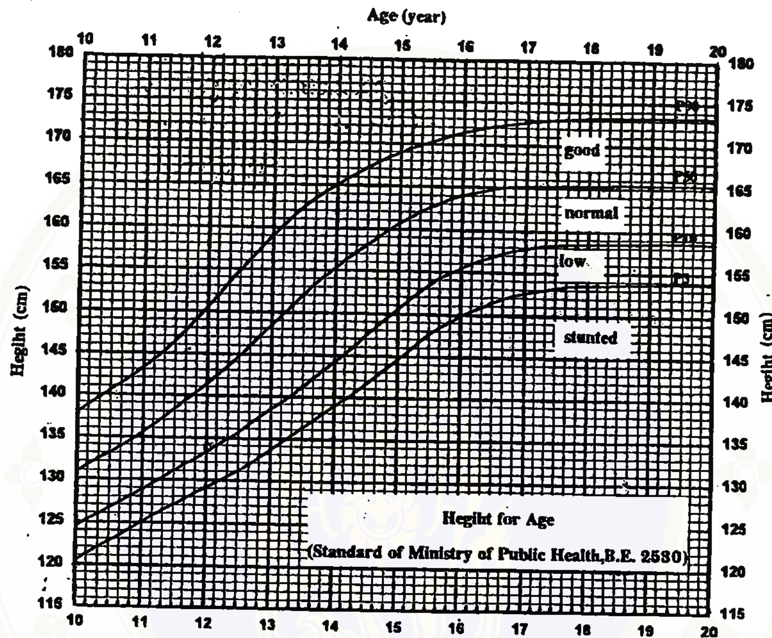
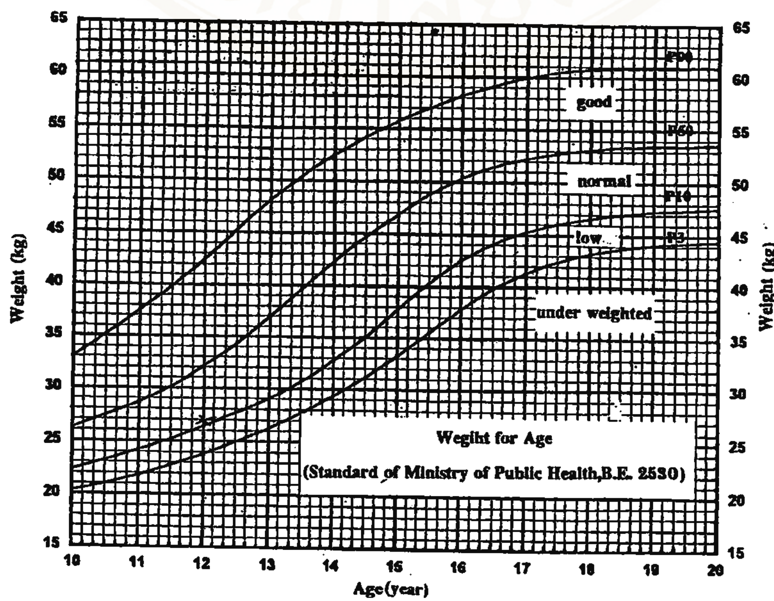
Graph of Standard Growth Development of Male
in the Ages of 10-20 Years

Graph 2. Height for Age



Graph 3. Weight for Age



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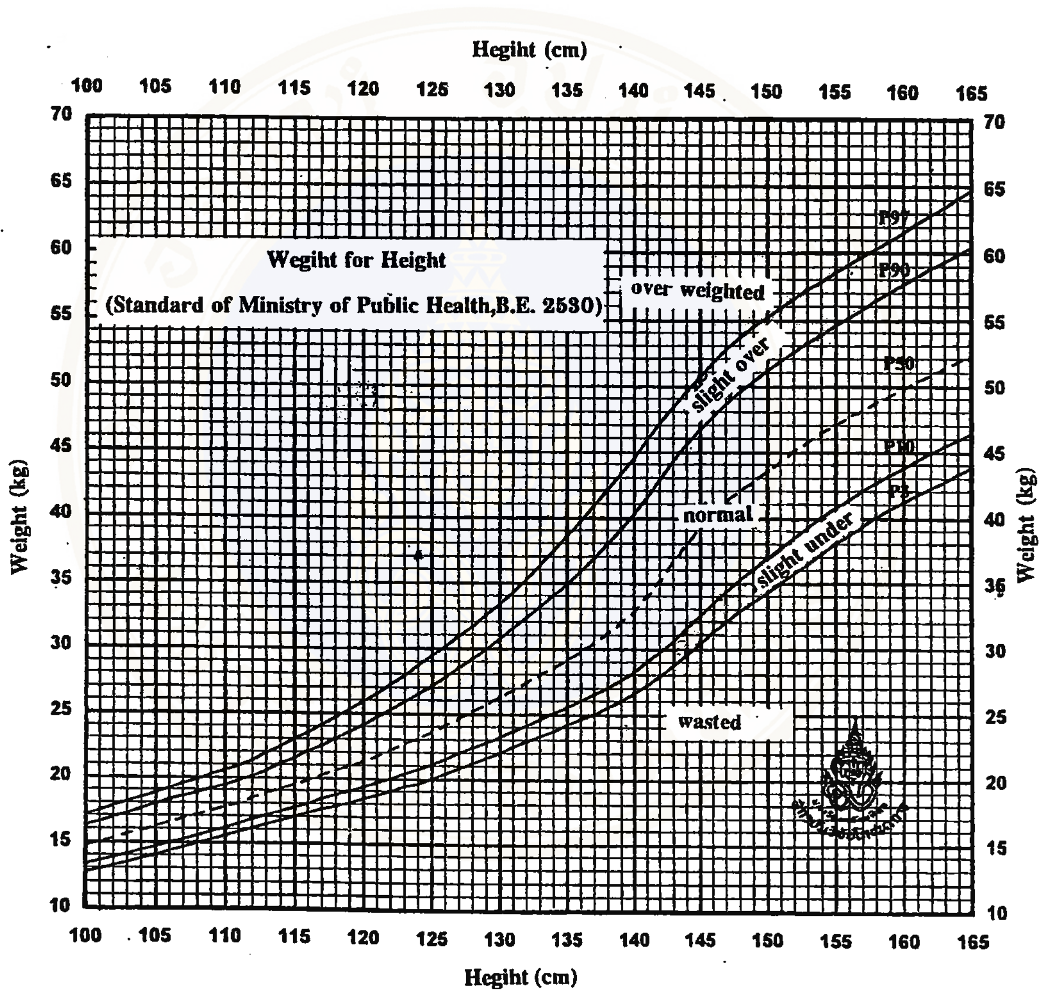
Graph of Standard Growth Development of Female in the Ages of 10-20 Years

Graph 4. Weight for Height



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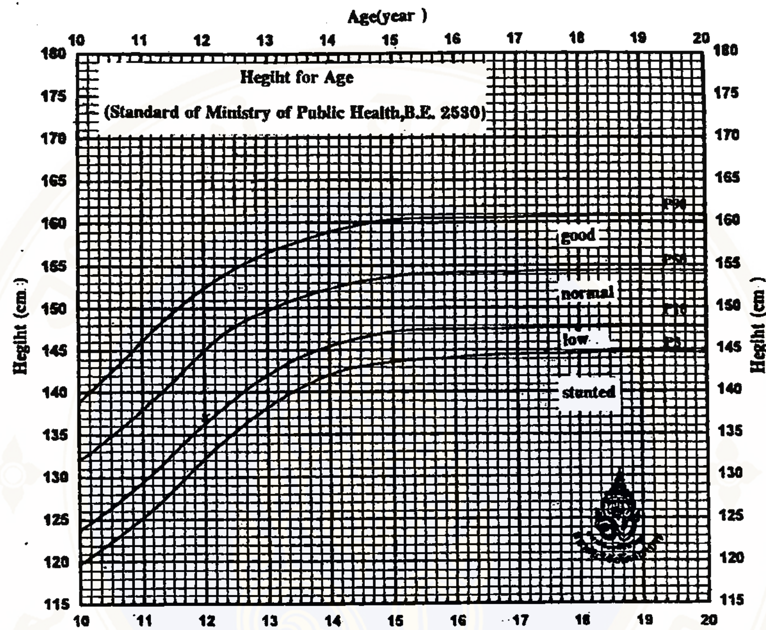
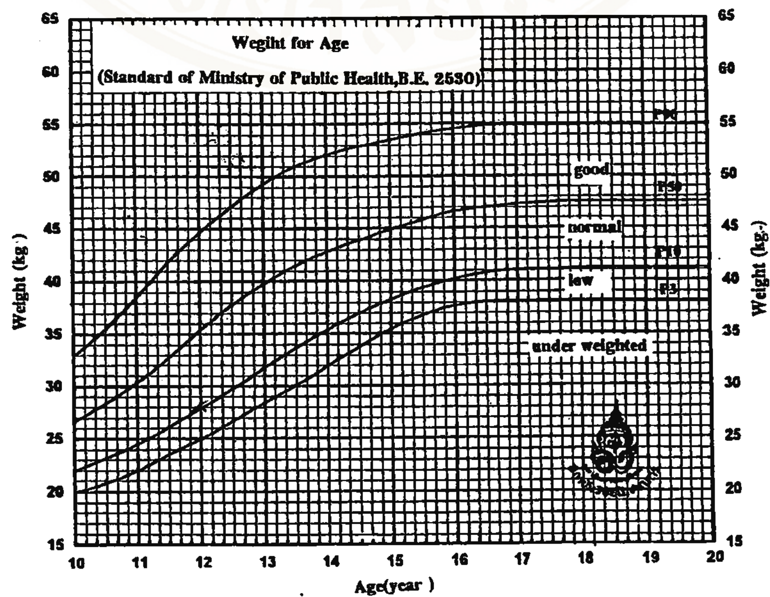
Graph of Standard Growth Development of Female in the Ages of 10-20 Years

Graph 5. Height for Age



Graph 6. Weight for Age



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APPENDIX C

Comparison of Different Nutritional Status Groups of Adolescents on Food Consumption Behavior for Each Type of Foods

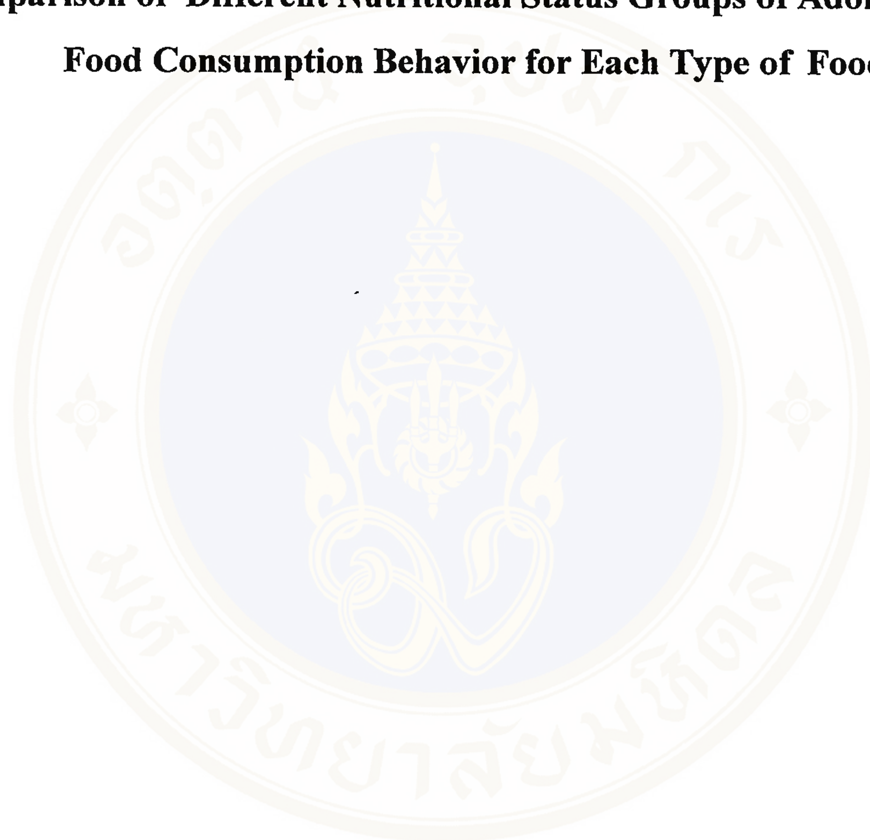

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Table showing percents Mean and Standard Deviation of adolescents at different nutritional groups categorized according to frequency of eating behavior conduct for each type of food

Type of food / Nutritional group	Frequency of eating behavior conduct (%)					x	S.D.
	never done	ever done 1-3 day/month	ever done 1-2 day/week	Ever done 3-4 day/week	ever done 5-7 day/week		
1 Rice-cooked food eating							
Normal	0.00	0.00	2.22	32.59	65.19	4.65	.53
Over	0.00	0.74	4.44	31.11	63.70	4.65	.59
Under	0.00	0.74	3.70	25.19	70.37	4.58	.62
2 Noodle foods eating							
Normal	0.00	10.37	57.04	29.63	2.96	3.25	.68
Over	0.74	15.56	40.00	29.63	14.07	3.11	.89
Under	0.74	23.70	47.41	20.00	8.15	3.41	.94
3 Meat food eating							
Normal	0.74	3.70	6.67	32.59	56.30	4.40	.83
Over	0.00	5.19	11.85	26.67	56.30	4.13	.98
Under	1.48	6.67	13.33	34.07	44.44	4.34	.88
4 Sea foods eating							
Normal	0.74	14.81	48.89	31.85	3.70	3.23	.77
Over	3.70	20.00	31.11	29.63	17.78	3.16	.90
Under	1.48	15.56	48.15	25.93	6.67	3.42	1.05
5 Egg-product food eating							
Normal	0.00	7.41	25.93	43.70	22.96	3.82	.87
Over	0.74	10.37	26.67	34.81	27.41	3.58	.92
Under	0.74	9.63	38.52	33.33	17.78	3.78	.99

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Type of food / Nutritional group	Frequency of eating behavior conduct (%)					X	S.D.
	never done	ever done 1-3 day/month	Ever done 1-2 day/week	Ever done 3-4 day/week	ever done 5-7 day/week		
6 Dairy food eating							
Normal	2.22	6.67	23.70	27.41	40.00	3.96	1.05
Over	1.48	11.85	19.26	25.93	41.48	3.74	1.16
Under	2.22	14.07	27.41	20.00	36.30	2.94	1.10
7 Soybean milk							
Normal	4.44	25.93	37.04	23.70	8.89	3.07	1.02
Over	5.19	22.96	40.00	20.00	11.85	3.90	1.09
Under	10.37	24.44	39.26	17.04	8.89	3.10	1.05
8 Vegetable food eating							
Normal	2.22	5.93	19.26	26.67	45.93	4.08	1.04
Over	2.96	8.15	13.33	26.67	37.78	3.86	1.17
Under	5.19	8.15	20.00	28.89	48.89	4.10	1.10
9 Fresh fruit eating							
Normal	1.48	8.89	28.89	35.56	25.19	3.74	.98
Over	0.74	3.70	23.70	39.26	32.59	3.66	.94
Under	0.74	8.89	35.56	33.33	21.48	3.99	.99
10 Bean-product food eating							
Normal	5.93	25.19	43.70	22.96	2.22	2.90	.90
Over	5.93	25.19	46.67	18.52	3.70	2.60	.84
Under	8.89	34.81	45.19	9.63	1.48	2.89	.90
11 Fast food eating							
Normal	4.44	59.26	32.59	2.22	1.48	3.13	.68
Over	7.41	45.19	34.07	11.11	2.22	3.34	.87
Under	5.19	42.22	37.04	12.59	2.96	3.44	.87

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Type of food / Nutritional group	Frequency of eating behavior conduct (%)					X	S.D.
	never done	ever done 1-3 day/month	ever done 1-2 day/week	ever done 3-4 day/week	ever done 5-7 day/week		
12 Ice cream eating							
Normal	2.96	34.81	42.96	16.30	2.96	3.19	.85
Over	5.19	32.59	40.00	17.78	4.44	2.93	.94
Under	2.96	25.93	38.52	26.67	5.93	3.16	.93
13 Cake, cookie foodeating							
Normal	8.15	43.70	41.48	4.44	2.22	3.32	.57
Over	7.41	40.74	33.33	13.33	5.19	3.07	.99
Under	5.19	30.37	37.04	20.74	6.67	3.53	.80
14 Deep-fried food eating							
Normal	2.96	31.11	43.70	18.52	3.70	2.91	.87
Over	1.48	21.48	48.15	24.44	4.44	2.81	.87
Under	1.48	20.00	42.96	28.89	6.67	3.11	.83
15 Uncooked eating							
Normal	62.22	27.41	7.41	2.96	0.00	4.49	.86
Over	57.04	25.19	13.33	3.70	0.74	4.50	.85
Under	67.41	19.26	10.37	1.48	1.48	4.34	.90
16 Pickled fruit eating							
Normal	25.93	41.48	28.15	3.70	0.74	3.88	.86
Over	28.15	34.07	25.93	9.63	2.22	3.61	.98
Under	18.52	38.52	31.85	8.15	2.96	3.76	1.04
17 Spicy food eating							
Normal	16.30	28.15	33.33	18.52	3.70	3.35	1.07
Over	14.07	21.48	28.89	23.70	11.85	3.19	1.18
Under	17.04	20.74	34.07	20.00	8.15	3.02	1.02

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Type of food / Nutritional group	Frequency of eating behavior conduct (%)					x	S.D.
	never done	ever done 1-3 day/month	ever done 1-2 day/week	ever done 3-4 day/week	ever done 5-7 day/week		
18 soft drink consumption							
normal	2.22	21.48	27.41	28.15	20.74	3.56	1.11
over	0.74	8.89	12.59	14.07	63.70	1.69	1.05
under	0.74	18.52	16.30	25.93	38.52	2.17	1.16
19 liquor beverage							
normal	70.37	20.00	7.41	2.22	0.00	4.59	.73
over	72.59	14.07	5.93	4.44	2.96	4.64	.73
under	75.56	16.30	5.93	1.48	0.74	4.49	1.00
20 sweet foods eating							
normal	2.96	22.22	34.81	30.37	9.63	2.79	1.00
over	3.70	17.78	35.56	25.19	17.78	2.40	.07
under	2.22	14.07	32.59	27.41	23.70	2.64	1.08
21 3-meal eating							
normal	0.00	2.22	8.15	13.33	76.30	4.39	.84
over	1.48	1.48	7.41	12.59	77.04	4.41	.89
under	3.70	2.96	6.67	11.11	75.56	4.20	1.66
22 breakfast eating							
normal	2.22	4.44	17.78	17.78	57.78	4.24	1.04
over	5.19	5.19	11.85	17.78	60.00	4.24	1.10
under	2.96	6.67	12.59	18.52	59.26	4.22	1.16
23 lunch eating							
normal	0.00	1.48	5.19	12.59	80.74	4.73	.63
over	0.74	0.00	5.93	8.15	85.19	4.71	.72
under	0.74	2.22	4.44	10.37	82.22	4.77	.62

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Type of food / nutritional group	Frequency of eating behavior conduct (%)					x	S.D
	never done	ever done 1-3 day/month	ever done 1-2 day/week	Ever done 3-4 day/week	ever done 5-7 day/week		
24 Dinner eating							
Normal	0.00	0.74	3.70	14.81	80.74	4.76	.55
Over	1.48	3.70	4.44	14.81	75.56	4.86	.46
Under	0.00	0.74	2.22	7.41	89.63	4.59	.86
25 Healthfulsnake between Breakfastand lunch							
Normal	8.89	163.70	31.11	34.81	9.63	3.21	1.10
Over	14.07	16.30	25.93	20.74	22.96	2.42	1.38
Under	32.59	22.96	20.74	17.04	6.67	3.32	1.35
26 Healthful snake between Lunch and dinner							
Normal	6.67	10.37	34.81	28.89	19.26	3.44	1.26
Over	11.85	18.52	22.96	25.93	20.74	2.76	1.49
Under	21.48	24.44	26.67	16.30	11.11	3.21	1.23
27 Healthful supper eating							
Normal	8.89	14.81	23.70	28.15	24.44	3.25	1.30
Over	9.63	20.00	28.89	22.96	18.52	2.71	.28
Under	27.41	21.48	20.00	9.63	21.48	3.41	1.43

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BIOGRAPHY

NAME	Miss Saovaros Meekusol .
DATE OF BIRTH	6 November 1972
PLACE OF BIRTH	Nakornpathom , Thailand
INSTITUTIONS ATTENDED	Mahidol University , 1990-1993
	Bachelor of Nursing Science
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