Obesity in Thailand

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Obesity is emerging as a morbid disease in developing and Westernized countries. Because of its co-morbidity diseases, it is cost-effective to prevent and manage this disease earlier. In Thailand, this alarming disease has long been studied, but the prevalence is still higher than that in the past. Physicians should recognize it well and have a definite direction to face and combat this dangerous disease. The present paper demonstrates its definition, prevalence, health hazard, economic cost and strategies to deal with it in the present and future.

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Defining the problem

Obesity is often defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired[1]. The underlying is the undesirable positive energy balance and weight gain. However, obese individuals differ not only in the amount of excess fat that they store, but also in the regional distribution of that fat within the body. It is useful, therefore, to be able to distinguish between those at increased risk as a result of "abdominal fat distribution" or "android obesity" as it is often known, from those with the less serious "gynoid" fat distribution, in which fat is more evenly and peripherally distributed around the body.

Body Mass Index (BMI)

BMI is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2).

In Asians (Table 2), the cut-offs for overweight ($\geq$ 23.0 kg/m^2) and obesity ($\geq$ 25.0 kg/m^2) are lower than the WHO criteria. Some support for these cut-offs comes from data on Chinese living in Hong Kong[2]. Similar data have been published from the Chinese in Singapore[3] and in Indian Asians living in Mauritius, where there is a significantly increased risk of Type 2 diabetes and hypertension among those with a BMI between 23 to 24.9 kg/m^2 compared to those within the normal range.

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Waist Circumference

Over the past 10 years or so, it has become accepted that a high waist-hip-ratio (WHR > 1.0 in men and > 0.85 in women) indicates abdominal fat accumulation[4]. However, recent evidence suggests that waist circumference alone may provide a more practical correlate of abdominal fat distribution and associated ill health[5-8]. Furthermore, changes in waist circumference reflect changes in risk factors for cardiovascular disease[8,9] and other forms of chronic disease, even though the risks seem to vary in different populations.

Table 1. Classification of Weight by BMI in adult Europoids (WHO 1998)

Classification	BMI (kg/m^2)	Risk of co-morbidities
Underweight	< 18.5	Low (but increased risk of other clinical problems)
Normal range	18.5-24.9	Average
Overweight:	$\geq$ 25	
Pre-obese	25-29.9	Increased
Obese I	30-34.9	Moderate
Obese II	35-39.9	Severe
Obese III	$\geq$ 40	Very severe

Table 2. Co-morbidities risk associated with different levels of BMI and suggested waist circumference in adult Asians[10]

Classification	BMI (kg/m^2)	Risk of co-morbidities	
		Waist circumference	
		< 90 cm (men) < 80 cm (women)	≥ 90 cm (men) ≥ 80 cm (women)
Underweight	< 18.5	Low (but increased risk of other clinical problems)	Average
Normal range	18.5-22.9	Average	Increased
Overweight:	≥ 23		
At risk	23-24.9	Increased	Moderate
Obese I	25-29.9	Moderate	Severe
Obese II	≥ 30	Severe	Very severe

Epidemiology of obesity

Obesity prevalence is increasing worldwide at an alarming rate in both developed and developing countries.

The United States of America

According to self-reported measures of height and weight, the prevalence of overweight and obesity in the United States continues to steadily increase. From 1991 to 1998, obesity prevalence increased throughout the United States, for both sexes, and across all races/ethnicities, age groups, and educational levels[11]. Results from the 1999 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicated that approximately 61% of US adults were overweight, including the 26% who were classified as obese[12]. The incidence of obesity among adults has doubled since 1980 and overweight among adolescents has tripled in that time frame.

European Region

The prevalence of obesity has increased by about 10-40% in the majority of European countries in the past 10 years[13]. The most dramatic increase has been observed in England, where it has more than doubled during this period. The most recent data from individual national studies suggest that the prevalence of obesity in European countries is currently in the range 10-20% in men and 10-25% in women. In agreement with the WHO MONICA data, the prevalence of obesity is generally higher in women than in men[14].

South-East Asia Region

The Republic of Korea's National Nutrition Survey of 1995, found only 1.5% of the population had BMI > 30, and 20.5% had BMI 25-29.9. In China, in the National Nutrition Survey of 1992[15], < 2% of population had BMI > 30. In urban regions, (excluding Beijing, Shanghai and Tianjin), in the range of BMI 25-30, there were 12.3% of men and 14.4% of women (comparable figures for rural regions were 5.3% and 9.8%). In Japan, in the National Nutrition Survey of 1990-1994[16], less than 3% of the population had BMI ≥ 30, with approximately 24.3% of men and 20.2% of women being in the range of BMI 25-29.9. In the Second National Health and Morbidity Survey of Malaysia in 1996[17], 16.6% of the population (aged ≥ 18) had BMI 25-30, with 4.4% possessed BMI > 30. The above figures show the marked ethnic and cultural variations in the prevalence of obesity across the region.

Thailand

Data from three studies conducted by the same research center in Thailand do suggest that diet-related chronic diseases, including obesity, are increasing in affluent urban populations. The first study was conducted in 1985 among 35-54-year-old Thai officials of the Electricity Generating Authority of Thailand (EGAT); it was found that 2.2% of the 2703 men, and 3.0% of the 792 women, had a BMI ≥ 30, whereas BMI of 25-29.9 (grade I obesity) were higher (23.3% in men and 18.4% in women)[18]. The second study was conducted in 4,069 adults with dental diseases (ADDs), consisting of 1,247 men and 2,822 women, aged 19-87 years during September 1989-August 1990[19]. The results demonstrated that 1.7% of men and 2.4% of women were in grade II obesity, whereas 14.2% of men and 15.9% of women were in grade I obesity. The third study in 1991 was smaller (66 men and 453 women), and had a broader age range (19-61 years), but also assessed nutritional factors in affluent urban Thais (Ramathibodi Hospital staff, RHS). Results of this study showed that 3.0% of men

Table 3. Prevalence of overall obesity and abdominal obesity in affluent-urban Thais

Population	Sex	Obesity grade I (%)	Obesity grade II (%)	WHR (%)
EGAT[18] (1985)	Male (n = 2703)	23.3	2.2	19.6
	Female (n = 792)	18.4	3.0	94.6
	Total	22.2	2.3	38.0
ADDS[19] (1989-1990)	Male (n = 1247)	14.2	1.7	not determined
	Female (n = 2822)	15.9	2.4	not determined
	Total	15.4	2.2	not determined
RHS[20] (1991)	Male (n = 66)	15.2	3.0	1.5
	Female (n = 453)	23.2	3.8	54.5
	Total	22.2	3.7	47.4

WHR: waist-hip ratio > 1.0 in men; > 0.8 in women

Table 4. Percentage of BMI in Thai adults in 1997[22]

BMI	Male (%)	Female (%)	Total (%)
≥ 25	19.2	33.9	28.3
≥ 30	3.5	8.8	6.8

and 3.8% of women had a BMI ≥ 30. Prevalence figures for BMI 25-29.9 were considerably higher (15.2% in men and 23.2% in women)[20].

In 1991, the first report on National Health Examination Survey of Thailand[21] was conducted in 13,300 adults, aged ≥ 20 years. The results revealed that 12% of men and 19.5% of women (total 16.7%) had BMI 25-30, whereas 1.7% of men and 5.6% of women (total 4.0%) had BMI >30.

In 1997, the second report on National Health Examination Survey of Thailand[22] was conducted by the Ministry of Public Health as shown in Table 4.

Health Consequences of Obesity

General mortality and morbidity risk

The obese have an elevated risk from all-cause mortality, with elevated risks of 1.9 being reported among both men and women who were more than 40% of the average weight in a large-scale prospective study of 750,000 individuals[23]. Most evidence suggests a J-shaped relationship between BMI and mortality, with the obese having the highest risk. Increased mortality among the obese is evident for several life-threatening diseases including Type 2 diabetes, cardiovascular disease, gallbladder disease, and hormone-sensitive and gastrointestinal cancers. Risks are also higher for some non-fatal conditions such as back pain, arthritis, infertility and, in many Westernised countries, poor psychosocial functioning. Approximate relative risks among the obese for several health problems have recently been reported by WHO (Table 5).

Economic Costs (Table 6)

The costs of obesity to a community and individuals may be divided into the direct costs to the health system and the indirect or social costs to the individual and community (eg. sick days, individual expenditure on weight loss). The direct costs depend in the main part on the diseases caused by obesity and the cost of these diseases. Some diseases which have been included in the calculations are Type 2 diabetes, heart disease, hypertension, endometrial cancer, arthritis and colorectal cancer. Indirect costs also vary widely. One of the latest estimates in the United States for indirect costs was US$ 47.6 billion per year. Little data is yet available for the Asia-Pacific region.

Table 5. Health risks associated with obesity (WHO 1998)

Greatly increased (RR >>3)	Moderately increased (RR 2-3)	Mildly increased (RR 1-2)
Type 2 diabetes	Coronary heart disease	Cancer (breast cancer in postmenopausal women, endometrial cancer, colon cancer)
Gallbladder diseases	Hypertension	Reproductive hormone abnormalities
Dyslipidaemia	Osteoarthritis (knees and hips)	Polycystic ovary syndrome
Metabolic syndrome	Hyperuricemia and gout	Impaired fertility
Breathlessness		Low back pain
Sleep apnea		Increased anesthetic risk
		Fetal defects associated with maternal obesity

Table 6. Direct costs of obesity

Country	Year	Population (millions)	Cost (per year)
New Zealand	1996	3.6	NZ$ 135 million
Australia	1994	18.4	AUD$ 464 million
Netherlands	1995	15.7	NG 1 billion
France	1995	58.0	FF 12 billion
USA	1998	274.0	US$ 51.6 billion

Table 7. Long-term goals for obesity therapy

Criteria	Treatment success
Reduction of excess weight	5-6 kg or 10% of initial body weight
Blood pressure	any reduction
Blood glucose	any reduction
Glycemic control	any improvement
Other risk factors	any reduction

Goals for Obesity Therapy (Table 7)

The decision to lose weight must be made jointly between the clinician and patient. Patient involvement and investment is crucial to success. As an initial goal for weight loss, NIH[24] recommends the loss of 10 percent of baseline weight at a rate of 1 to 2 pounds per week and the establishment of an energy deficit of 500 to 1,000 kcal/day, providing a weight loss of about 0.5 pounds per week. Further weight loss can be considered after the initial goal is achieved and maintained for 6 months. The rationale for the initial 10-percent goal is that a moderate weight loss of this magnitude can significantly decrease the severity of obesity-associated risk factors.

Weight Maintenance at a Lower Weight

After 6 months of weight loss, the rate at which the weight is lost usually declines, and the plateaus. The primary care practitioner and patients should recognize that, at this point, weight maintenance, the second phase of the weight loss effort, should take priority. Successful weight maintenance is defined as a regain of weight that is less than 6.6 pounds (3 kg) in 2 years and a sustained reduction in waist circumference of at least 1.6 inches (4 cm).

Overall Approach to Treatment

The three major components of weight loss therapy are dietary therapy, increased physical activity, and behavior therapy. These lifestyle therapies should be attempted for at least 6 months before considering pharmacotherapy.

Two drugs approved for weight loss by the FDA for long-term use are sibutramine and orlistat. However, sibutramine should not be used in patients with a history of hypertension, CHD, congestive heart failure, arrhythmias, or stroke.

Prevention

Generally, there are three approaches to prevention. Universal prevention is based on a total population approach, whereas selective and targeted prevention strategies are directed at high risk groups. The latter two approaches therefore require screening of individuals in appropriate settings such as schools to identify subjects and subgroups at high risk.

The proposal by Egger and Swinburn[25] of an ecological model for understanding overweight and obesity was presented. It potentially represents an important new paradigm for understanding obesity as "normal physiology within a pathological environment" and signposts the directions for a wider public health approach to the obesity pandemic. They suggest that the increase in the prevalence of obesity is primarily due to the increasingly obesogenic environment rather than "pathology" in metabolic defects or genetic mutations within individuals. Thus, interventions aimed at creating environments that facilitate and promote behavioral changes in terms of diet and exercise are important in the prevention of obesity.

Thai Research in Obese Children

In 1992, Wong-arn R, et al[26] held a summer camp, involving 21 obese children, 8 males and 13 females, teaching about nutritional requirements, values and food exchange lists. After 3-weeks of instruction, the obese children were evaluated on these topics. Caloric values of fruits were easily remembered. Carbohydrate category ranked second after fruits. The meat category was the last to be remembered; however, eighty percent of the participants could pass the test in the meat category. The evaluation showed successful teaching about nutritional values of food to these children.

A summer camp for childhood obesity in Thailand[27] was also held at the Clinical Research Center, Department of Pediatrics, Faculty of Medicine, Siriraj Hospital, Mahidol University. A 4-week program was scheduled from March till April, 1992. Twenty-one children with moderate to severe obesity, aged between 8-13 years, joined the program. Dietary

restriction during the official hours and dietary self-control at home were implemented throughout the program. Exercise, swimming and group therapy were also implemented throughout the program. After the program, all participants had lost weight which was about 5 per cent of their initial weight. Most of the weight loss was due to loss of body fat but not lean body mass. A 4-week summer camp is then practical for initiating weight loss for obese children.

Kittidilokkul W[28], in 1993, proposed a thesis about factors influencing obesity in school children in Bangkok Metropolitan. A study was conducted in 521 school children of grade 1 to 6. The students were classified by weight for height into 2 groups: obese and normal weight. The results showed that overweight mothers tended to have a greater number of obese students (approximate 3 folds). Regarding consumption behavior of students and parents, obese students tended to prefer carbonated drink. Obese students tended to consume a high energy main dish. The families of obese students had significantly preferred high caloric fruits than those of normal students. Daily energy and fat intakes of obese students were significantly higher than those of normal students. The strong predictors for childhood obesity were characterized by body mass index of the mother and the fat intake of the student.

As a thesis of Rakvanich T, et al[29] in 1993, they found that age and health perception had influence on prediction of obesity status. Therefore, nurses and paramedical personnel should promote students and their families to perceive a healthy lifestyle including consumer habits as well as increased physical activity to prevent obesity.

In 1997, the National Health Examination Survey II was conducted in both Thai children and adults. Ruangdaraganon N, et al[30] had reported the association between television viewing and childhood obesity. The result showed that Thai school age children who watched television more than 3 hours per day were more likely to be obese with statistical significance.

The study by Yamborisut U, et al[31] in 1998, conducted on 139 primary school children, grades 4 to 6, with BMI between 24.4 and 24.9. Group 1, the pupils and parents received a weight control guideline booklet (WCGB). Group 2, the pupils received the same WCGB. Group 3 served as a control group and did not receive the WCGB. School visits and nutrition education were also provided for groups 1 and 2 every 2 weeks for 3 months. Results showed that energy, protein and fat intakes at week 12 in Group 1 had significantly decreased compared to those of week 1, whereas significant change in protein and cholesterol were observed in group 2. No change was seen in the main nutrients in group 3. Fat intake among the three groups at week 12 was relatively high when compared to dietary recommendations. However, nutrition education during the 12-week weight control programme did not affect changes in serum cholesterol of group 1 and 2. Lack of parents' participation seemed to be one determining factor leading to insufficient weight reduction in obese pupils.

Sanguanrungsirikul S, et al[32], reported in 2001 about the energy expenditure and physical activity in obese and non-obese children in Bangkok. They concluded that energy expenditure of obese children was higher than non-obese children because of greater body weight. Furthermore, the physical activity of both groups was lower than that recommended by WHO.

Thai Research in Obese Adolescents

In 1997, Tongtuntai N, et al[33] explored the relationship between perceived self-efficacy and practice in preventing obesity among 275 adolescent girls, aged between 15-18 years old who had normal weight in Chiang Mai province. The results of this study indicated that perceived self-efficacy in preventing obesity of adolescent girls was significantly positively related to their practice in preventing obesity.

In 1998, Pruksananonda C[34] reported about adolescent obesity in adolescent clinic, Chulalongkorn University. The author concluded that the number of obese patients in adolescent clinics was increasing. More than half of the patients were in the severe and morbid ranges of obesity and were accompanied with health consequences and were extremely difficult to treat.

Pattapong T[35] studied perceived benefits, perceived barriers, perceived self-efficacy, and promoting behaviors for body weight control among middle adolescents in Bangkok Metropolitan. The analysis demonstrated that perceived barriers, perceived self-efficacy and family income could predict promoting health behaviors for body weight control among middle adolescents at the percentage of 62.2. The suggestions were that adolescences should promote their self-efficacy and assess barriers for promoting body weight control.

Thai Research in Obese Adults

In 1993, Roongpisuthipong C[36], et al. reported a study involving behavior modification in the treatment of obesity. They demonstrated that seventy obese adults with BMI > 25 kg/m (forty-two completed the study)significantly decreased in weight, body fat and triceps skinfold thicknesses after 8 weeks under the program, including caloric intake as well as an increase in physical activity.

In 1994, Wongseelashote O[37] studied the energy balance in Thai women, compared between obese and normal. There was no statistically significant difference between the two groups in meal size and frequency, time spent in consuming food, as well as nutrient distribution and density. Activity records revealed a slightly less active lifestyle of the obese. The results seem to point towards inactivity as the culprit of mild obesity.

In 1995, Tanphaichitr V, et al[38] reported the efficacy of a reduced caloric diet supplying 1,000 kcal daily which consisted of 435 kcal of Suprederm, and 565 kcal of natural diets in 1 obese man and 3 obese women for 12 weeks. There were significant decreases in body weight, BMI, body fat, plasma total cholesterol and LDL-c without clinical adverse effects.

In 1995, Roongpisuthipong C, et al[39] reported a study involving behavior modification in the treatment of obesity, acceptability profiles. The study involved 70 obese subjects, aged 18-75 years with BMI more than 25 kg/m^2 for 8 weeks behavior intervention. The results showed that they had lost weight from fat tissue. There were significant decreases of percent body fat, biceps, subscapular and iliac skinfold thickness including systolic and diastolic blood pressure while maintaining arm muscle area.

The article of Tanphaichitr V[40] in 1996, disclosed that affluent urban Thais were faced with the threat of obesity. They should be motivated to control body weight by adopting appropriate dietary habits and by performing physical exercise.

A thesis of Kheawwan P[41] revealed the safety of the ingestion of 1,000 kcal diets and the efficacy in significant decreases of BMI, waist circumferences, and triceps skinfold thicknesses in 5 obese men and 15 obese women for 20 weeks, using 435 kcal of Suprederm, a very-low calorie diet and 565 kcal of natural diets. During the study, there were no significant changes in their serum total protein, albumin and transferrin levels.

In the same way, a thesis of Prakungpak J[42] demonstrated the efficacy in significant decreases of BMI, waist circumferences, and triceps skinfold thicknesses in 5 obese men and 15 obese women for 20 weeks, using 435 kcal of Suprederm, a very-low calorie diet and 565 kcal of natural diets. The results also showed the effects of reducing body weight on lipoprotein metabolism, significant decreases in plasma triglyceride, total cholesterol, LDL-c, serum apo B, serum L-, M-, and S- particle levels while consuming 1,000 kcal diets.

In 1998, Roongpisuthipong C, et al[43] studied involving the effect of Dexfenfluramine plus behavior modification in the treatment of obesity: double-blind placebo-controlled study. This was a double-blind placebo-controlled study which included 50 obese Thai patients, aged 18-75 years with BMI more than 25 kg/m^2. The patients were divided into 2 groups (group I n = 32, group II n = 18). Patients in group I were randomly stratified into 2 subgroups to receive either placebo (16 patients) or 15 mg. Dexfenfluramine b.i.d. for 3 months in a double-blind placebo-controlled manner. The Group II served as a control group without a drug. All subjects participated a behavioral program for 8 weeks. The results demonstrated that dexfenfluramine group had a significantly higher mean weight loss, significant decrease in mean triceps skinfold thickness compared with the placebo and control group.

In 2000, Mahanonda N, et al[44] reported obesity and risk factors of coronary heart disease in healthy Thais: a cross-sectional study. The authors studied the relationships between BMI and lipids, glucose and blood pressure levels in a healthy population of 3,615 employees of a company during a routine yearly health examination. There were 1,250 males aged 31.3 $\pm$ 6.6 and 2,365 females aged 29.3 $\pm$ 4.9 years old. The average BMI for males and females were 23.5 $\pm$ 3.6 and 20.1 $\pm$ 3.0 respectively. BMI has a significant positive relationship with the conventional risk factors for coronary artery disease (total cholesterol, LDL-cholesterol, triglyceride, fasting plasma glucose, including systolic and diastolic blood pressure) and a negative relationship with HDL-cholesterol.

Uengrungseesophon N[45] studied the relationship between depression, eating disorders and BMI. There was no statistical significance to show the relationship between depression, eating disorders and BMI.

In 2001, Duangsong R, et al[46] studied the effect of "take PRIDE" program on a weight control project in Nakhonphanom Municipality. The results showed that the pre-obese and the normal weight

group gained significantly more knowledge about obesity, self-observation, self-judgement, self-efficacy, self-reaction, appropriate eating habits, and physical activities than they had prior to participating in the program. The body weight, BMI, and skinfold thicknesses were significantly decreased as well. They recommended the modified "take PRIDE" program for other groups of Thai people who are pre-obese or overweight.

In 2004, Kantachuvessiri A[47] conducted a cross-sectional study to examine the relationship of socio-demographic characteristics, psychological factors, knowledge, attitude and behavior with obesity among the Metropolitan Waterworks Authority (MWWA) officers. Two hundred and eighty-eight obese [body mass index (BMI) $\geq$ 25 kg/m^2] and 106 non-obese persons, aged 20-60 years, were recruited as study subjects. The results demonstrated significant associations between older age group and obesity. Volunteers in age group of 40-49 and 50-59 years had significantly higher risk to be obese than age group of less than 40 years (adjusted OR = 3.4, 95%CI = 1.1-11.1 and adjusted OR = 10.4, 95%CI = 3.3-32.7, respectively). Volunteers with unhealthy behaviors were significantly at higher risk than those with healthy ones (adjusted OR = 10.3, 95%CI = 2.0-52.4) while persons with moderately healthy behaviors also had higher risk but in a less extent (adjusted OR = 4.5, 95%CI = 1.7-11.4). There were no associations between psychological factors and obesity in this group of volunteers. However, when the author focused on whether they consumed more food when they were stressed, it was found that the obese significantly consumed more food during stress (p-value = 0.003). Furthermore, watching television or VDO or playing computer continuously for more than 3 hours, were significantly associated with obesity. The author, therefore, conclude that although the obese had good knowledge and attitude about obesity, they still practised unhealthy behavior, sedentary lifestyle, and compensatory eating when they were stressed. Future research about behavioral modification should be implemented in both the levels of community and country.

Conclusion

As described above, researches about obesity in Thailand are in the early stage. There still have been a lot of spaces for further studies especially in the fields of long-term management and intervention with aiming to successful long-term goals for obesity therapy. Nevertheless, public awareness and prevention are still the best strategies to combat with this disease.

Future Research in Thailand

1. Updated study on National Health Examination Survey of Thailand should be conducted by the Ministry of Public Health to report the prevalence of obesity and its co-morbidities in Thai community in this millennium.

2. Factors predisposing to obesity in children, adolescents and adults should be described, determined and declared as the problem behaviour to face with and be solved.

3. The relationship of BMI and its morbidities and mortalities in Thailand should be demonstrated. The relationship between BMI and cardiovascular diseases, BMI and musculoskeletal diseases, BMI and metabolic syndrome, BMI and cancer, etc. should be tabulated.

4. Mass Media Health Campaign. Because obesity is now a problem disease of Thailand, launching a health education programme to the public via mass media should be operated. Obesity and its related co-morbidities should be made aware in Thai society. A health education programme should include a dietary programme, exercise and behavior counselling.

5. Predictors of successful weight loss and weight maintenance. For example, perceived self-efficacy, perceived benefits, perceived barriers, and perceived severity of obesity should be tested as predictors of successful weight loss and weight maintenance.

6. Interventions in long-term successful weight loss and weight maintenance. As is known, the longer the intervention applies, the higher the success rates of weight loss and weight maintenance are at the present time, there has remained no long-term intervention applied to the community has been reported.

7. Effective methods of weight loss and maintenance. Researchers should compare the success rate in long-term weight loss and maintenance in obese patients who obtained mailing health education system with those who intervened in focus group discussion in obesity management.

8. Hot-line social support for obese patients who want to consult about their eating behavior, dietary pattern and physical activity. Researchers could compare the success rate among those who have social support and those who do not.

9. Barriers or problems in unsuccessful patients should be described, determined and solved.

10. Healthy environment, healthy school and healthy office. Healthy dietary patterns and physical activity should be installed in the environment since childhood via mass media and health campaigns to prevent obesity in the young and follow the prevalence and incidence of obesity in each age group.

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ภาวะอ้วนในประเทศไทย

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ภาวะอ้วนกำลังเป็นโรคระบาดไร้พรมแดน แห่ง ศตวรรษ ที่ 21 อันเป็นผลมาจากภาวะโลกาภิวัตน์ โรคอ้วนยังนำมาซึ่งโรคของระบบต่างๆ เช่น โรคของระบบหัวใจและหลอดเลือด โรคเบาหวานและไขมันในเลือดสูง โรคของกระดูกและกล้ามเนื้อ โรคของระบบทางเดินหายใจ โรคของถุงน้ำดี และมะเร็ง เป็นต้น อัตราตาย ก็เพิ่มขึ้น รวมทั้ง ค่าใช้จ่ายในการรักษาพยาบาล ประเทศไทยก็กำลังประสบกับปัญหาการระบาด และโรคแทรกซ้อนจากภาวะนี้เช่นกัน เพื่อเป็นการตระหนักถึงความสำคัญของโรคนี้ บทความนี้ได้นำเสนอ คำจำกัดความ อุบัติการณ์ การสูญเสียทางเศรษฐกิจ การศึกษาวิจัยที่ได้ทำไปแล้ว และยุทธวิธีในการจัดการกับปัญหาเร่งด่วนนี้ต่อไปในอนาคต