

UNIT NO. 1

OBESITY IN SINGAPORE, PREVENTION AND CONTROL

A/Prof Goh Lee Gan, Dr Jonathan Pang

ABSTRACT

Obesity is increasing in prevalence in Singapore. This is part of a worldwide phenomenon. Action is being taken in Singapore to prevent and control obesity. Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility. The basic strategy of obesity prevention and control however is quite straightforward and lies in achieving the caloric balance which is to reduce calorie intake and increase physical activity. To be effective however, obesity prevention and control requires multiple prevention and control interventions across the lifespan. There is a need for Health Promotion Board (HPB) to engage and mobilise various partners and stakeholders.

Policies and programs have been customised in Singapore for different segments of the population and conducted at various settings – in schools, workplaces, healthcare institutions, and communities. The current efforts to prevent and control obesity in Singapore can be grouped into 5 areas: (1) Health promotion policies; (2) Promoting supportive environments through social programmes; (3) HPB collaborating with partners to promote healthy behaviour; (4) Empowering partners and individuals; and (5) Raising awareness through health education and communication.

Keywords: Health Promotion Board, health promotion policies, obesity prevention, obesity control, raising awareness

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OBESITY IN SINGAPORE

Obesity is increasing in prevalence in Singapore. This is part of a worldwide phenomenon. Action is being taken in Singapore to prevent and control obesity however. The need for obesity prevention and control has been recognised since the 1990s, and the country launched a National Healthy Lifestyle Program in 1992. The program spearheaded national strategies with the goal of controlling obesity through public education campaigns that focussed on physical activity and healthy eating.

Over the years, these efforts expanded to include strategies that promote supportive environments, restrict the availability of energy-dense foods to children, and increase access to exercise and fitness facilities – making “healthier choices for Singaporeans easier choices” (Soon et al, 2009)¹.

GOH LEE GAN, Professorial Fellow, Division of Family Medicine, University Medicine Cluster, National University Health System.

JONATHAN PANG, Executive Director, College of Family Physicians Singapore

Definition of obesity

The WHO international classification of weight status is used to define obesity in the National Health Surveys, which is defined as BMI equal or more than 30 kg/m². Abdominal fatness is defined as waist hip ratio (WHR) of more than 1.0 for males and more than 0.85 for females. (NHS, 2010)².

For interpretation of health risks for Asian populations including Singaporeans, lower BMI cut offs are used namely: Low risk BMI (kg/m²) = 18.5 to 22.9; Moderate risk BMI (kg/m²) = 23.5 to 27.4; High risk BMI (kg/m²) = equal or more than 27.5.

Key points on obesity in Singapore

From the National Health Survey (NHS) 2010, the key points on obesity are:

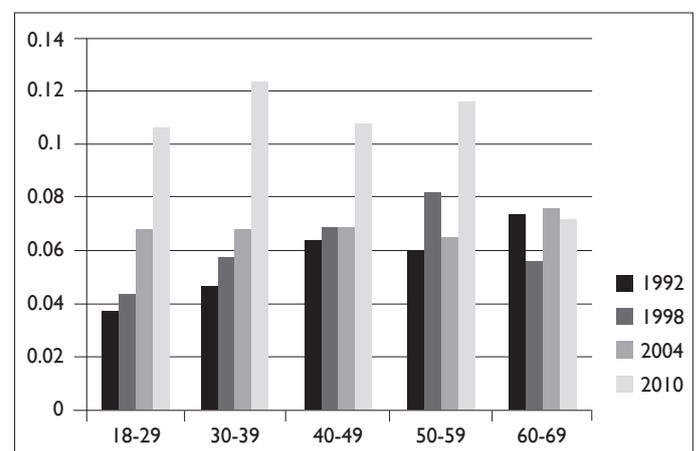
- One in nine (10.8%) Singapore residents aged 18 to 69 years was obese (BMI equal or more than 30 kg/m²).
- By gender, 12.1% males and 9.5% females were obese.
- By ethnic group, 24.0% Malays, 16.9% Indians and 7.9% Chinese were obese.
- By BMI risk category, 23.0% were in the high risk Asian BMI category (BMI 27.5 kg/m² or greater).

Prevalence of obesity in the resident population

Figure 1 shows the prevalence of resident population 18 to 69 years who are obese. There is an increasing trend over the years for each of the age groups except for the group 60-69 years. Not the trend of increase between 2004 and 2010 is steep. More prevention and control of obesity is needed.

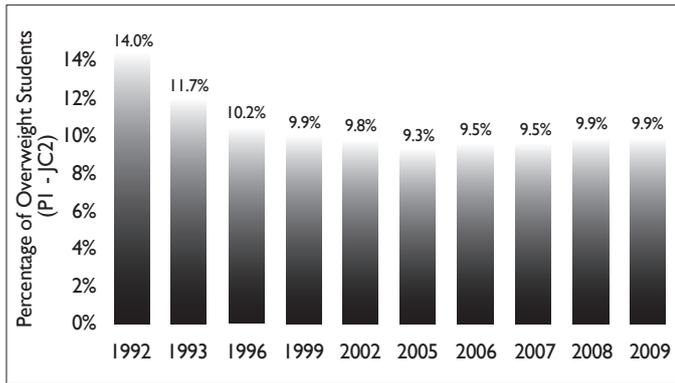
Fig 2 shows the overweight prevalence among the young in Singapore from 1992 to 2009. There is a drop from 14.0% in 1992 to 9.9% in 1999. The prevalence has remained around this figure since then.

Fig 1: Prevalence of population who are obese (BMI equal or more than 30 kg/m²) by age-group and year of NHS survey



Source: NHS 2010

Fig 2. Overweight Prevalence Among The Young in Singapore (1992 - 2009)



Source: MOH

Tables 1 and 2 shows the prevalence of obesity over the years by gender and ethnic group by BMI and abdominal fatness (truncal obesity) respectively. The salient demographic features have been summarised in the key points above.

Table 3 shows the prevalence of diabetes mellitus, hypertension, high total cholesterol, and obesity in the Singapore resident population as recorded in the national health surveys. Note that there is increasing prevalence of obesity and the prevalence of diabetes is climbing too, whereas the hypertension prevalence, and high cholesterol prevalence are stable.

CAUSES AND THE IMPORTANCE OF OBESITY

Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility. Abdominal fatness (truncal obesity) is of particular concern as it is associated with elevated risks to health in comparison to more peripheral fat distribution.

From the morbidity and mortality points of view, obesity is one component of a risk factor constellation that consists of insulin resistance (an/or hyperinsulinemia), hypertension, and a dyslipidemia characterised by a low HDL cholesterol level and high triglyceride levels. This risk factor constellation, which conveys enhanced risk for cardiovascular disease, is sometimes referred to as the “insulin resistance syndrome”, “syndrome x”, or the “metabolic” syndrome (Landberg, 1996)³; Kaplan 1996)⁴. The original mention of these four conditions as a syndrome goes back to the late sixties by Hanefeld and Leonhardt and by Kaplan (Kaplan, 1989)⁵ who also called the syndrome the “deadly quartet” to emphasise its high atherogenic potential (Hauner, 2002)⁶.

Elements of this “deadly quartet” as a syndrome are common and interrelated (Nambi et al, 2002)⁷. For example:

- At least 10% of patients with coronary artery disease have three of the four risk factors.
- One third of adults in United States are estimated to be overweight or obese (with a body mass higher than 25 (Grundy, 1999)⁸. People who are obese are at least twice as likely to have hypertension, hypertriglycerimiamia, or type 2 diabetes mellitus than people who are not obese.
- People with hypertension have a twofold higher prevalence of diabetes and obesity compared to normotensive people (Kaplan, 1989)⁵, and half are insulin resistant (Reaven et al., 1996)⁹
- Syndrome factors are also common in polycystic ovarian disease, a condition with a high incidence of atherosclerosis.

Obesity is also associated with osteoarthritis, and breast and colon cancer.

Table 1. Prevalence of respondents who were obese (BMI equal or more than 30 kg/m²) by gender, ethnic group and year of survey

Gender/ Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	5.1	6.0	6.9	10.8	5.5 (4.7, 6.2)	6.3 (5.6, 7.0)	6.8 (6.0, 7.5)	10.8 (9.8, 11.8)
Gender								
Males	4.1	5.3	6.4	12.1	4.0 (3.1, 4.9)	5.4 (4.5, 6.3)	6.3 (5.2, 7.4)	12.1 (10.6, 13.6)
Females	6.1	6.7	7.3	9.5	6.9 (5.7, 8.1)	7.1 (6.1, 8.1)	7.2 (6.1, 8.4)	9.5 (8.2, 10.8)
Ethnic Group								
Chinese	3.5	3.8	4.2	7.9	3.7 (3.0, 4.4)	4.0 (3.4, 4.6)	4.2 (3.5, 4.9)	7.9 (6.5, 9.3)
Malay	11.1	16.2	19.1	24.0	13.4 (10.3, 16.5)	18.0 (14.9, 21.1)	20.0 (16.6, 23.5)	24.0 (21.9, 26.1)
Indian	11.2	12.2	13.4	16.9	11.5 (7.6, 15.4)	12.6 (9.5, 16.1)	13.2 (9.5, 16.8)	16.9 (14.3, 19.5)

Source: NHS 2010, MOH

Table 2. Prevalence of respondents who had abdominal fatness (truncal obesity) by gender, ethnic group and year of survey

Gender/ Ethnic Group	Crude prevalence				Age-standardise prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	2.6	8.1	11.9	16.9	3.4 (2.8,4.0)	9.9 (9.1,10.8)	13.1 (12.0,14.1)	16.9 (15.7,18.1)
Gender								
Males	0.6	1.8	3.0	5.6	0.7 (0.3,1.1)	2.3 (1.7,3.0)	3.5 (2.7,4.3)	5.6 (4.5,6.7)
Females	4.6	14.4	20.7	28.0	6.1 (5.0,7.2)	17.4 (15.9,19.0)	22.5 (20.7,24.3)	28.0 (26.0,30.0)
Ethnic Group								
Chinese	2.1	7.4	11.1	15.5	2.9 (2.2,3.5)	9.0 (8.1,10.0)	11.9 (10.8,13.0)	15.5 (13.6,17.4)
Malay	3.8	9.5	12.5	18.9	5.2 (3.2,7.2)	12.4 (9.7,15.0)	14.3 (11.3,17.3)	18.9 (16.9,20.9)
Indian	5.6	12.9	18.7	26.1	6.4 (3.4,9.4)	13.5 (9.9,17.1)	19.0 (14.7,23.2)	26.1 (23.0,29.2)

Source:NHS 2010, MOH

Table 3. Prevalence of diabetes mellitus, hypertension, high total cholesterol, and obesity in resident Singapore population recorded in national health surveys

Year of survey	1992	1998	2004	2010
Risk factor				
Diabetes mellitus	8.6	9.0	8.2	11.3
Hypertension	12.2	27.3	24.9	23.5
High total cholesterol	19.4	25.4	18.7	17.4
Obesity	5.1	6.0	6.9	10.8

FACTORS PROMOTING OBESITY

Economic growth. The most important factor promoting obesity is economic growth. Obesity is the metamorphic canary in the coal mine that has given the alert for epidemic of lifestyle-related chronic diseases. The speed with which the obesity epidemic has occurred precludes a primary generic cause, with most analysts now accepting an etiology within the modern environment. The increased availability of cheap, energy-dense foods and drinks and wide access to energy-saving technologies (e.g., cars, machines, and the Internet) are the hallmarks of a developing economy, while coincidentally constituting the ingredients for expanding waistlines and accompanying chronic disease. (Egger, 2009)¹⁰.

Obesity is the natural response to an unnatural environment. Put simply, it is the unintended but unavoidable consequence of economic progress or, has also been described as the collateral damage in the battle for modernity (Egger, 2009)¹⁰.

It is also interesting to note in the same paper these observations: In a range of economies from the US to Japan

and Mexico, health indices are affected negatively by economic upturns and affected positively by downturns. (Egger, 2009)¹⁰.

Maternal obesity. There is evidence that the offspring of obese mothers and those who gain excess gestational weight are also more likely to gain more weight in childhood into early adulthood. (Mamun et al, 2009)¹¹ Moreira et al, 2007)¹² Tsoi et al, 2010)¹³.

Lower income families. The traditional view of obesity as a consequence of affluence is increasingly being challenged, particularly in developed countries. In a study of 11 OECD countries including the United States, large and persistent social inequities in obesity by education level or socio-economic status exist (Devaux and Sassi, 2011)¹⁴; MOH, 2011)². According to the 2009 Korea National Health and Nutrition Examination Survey, the proportion of low income South Koreans who became obese between 1998 and 2009 rose three times faster when compared to their more affluent counterparts.

In Singapore, this phenomenon has been observed too in the results of the 2010 National Health Survey: The highest prevalence of obese individuals (BMI more or equal to 30.0kg/m²) occurred in household earning less than SGD 2,000 per month (14.3%), compared to those earning SGD 6000 or more per month (8.8%). Based on education level, a higher proportion of obese individuals were observed among those with PSLE education or below (11.6%) when compared to those who had GCE 'A' Level education and above (9.7%).

The development of obesity among low income families in developed countries is a reflection of limited choices. To stretch their dollar, these families are more likely to consume excess of

nutritionally-depleted, cheap calories from processed foods or junk foods, or sweetened drinks. The nature of their work may allow them fewer opportunities for physical activity, and lead them to regularly use fast food outlets rather than cook their own food.

DO SINGAPOREANS WANT TO LOSE WEIGHT?

A Singapore population survey done in 2008 by AC Nielsen showed the following results:

- One in two Singaporeans are dissatisfied with their weight and are trying to lose weight.
- On actions to take to lose weight 75% chose modifying their diet, compared to 56% who chose doing physical exercise.
- Only one in two (50%) exercise at least once or twice a week.

APPROACH TO OBESITY PREVENTION AND CONTROL IN SINGAPORE

Basic strategy

The basic strategy of obesity prevention and control however is quite straightforward and lies in achieving the caloric balance which is to reduce calorie intake and increase physical activity.

Reduce calorie intake. One reduces calorie intake by 500kcal a day and aim to lose 5-15% of current body weight (no more than 1 kg per week) if one’s BMI is above 23.

Increase physical activity. One increases physical activity to 150-250 minutes of moderate intensity aerobic activity a week or 75-125 minutes of vigorous activity each week.

Tackling obesity across the lifespan

To be effective however, obesity prevention and control requires multiple prevention and control interventions across the lifespan.

There is a need for Health Promotion Board (HPB) to engage and mobilise various partners and stakeholders.

Policies and programs have been customised in Singapore for different segments of the population and conducted at various settings – in schools, workplaces, healthcare institutions, and communities (Soon et al, 2008). See Figure 3.

The current efforts to prevent and control obesity in Singapore can be grouped into 5 areas:

1. Health promotion policies.
2. Promoting supportive environments through social programmes.
3. HPB collaborating with partners to promote healthy behaviour.
4. Empowering partners and individuals.
5. Raising awareness through health education and communication.

1. Health promotion policies

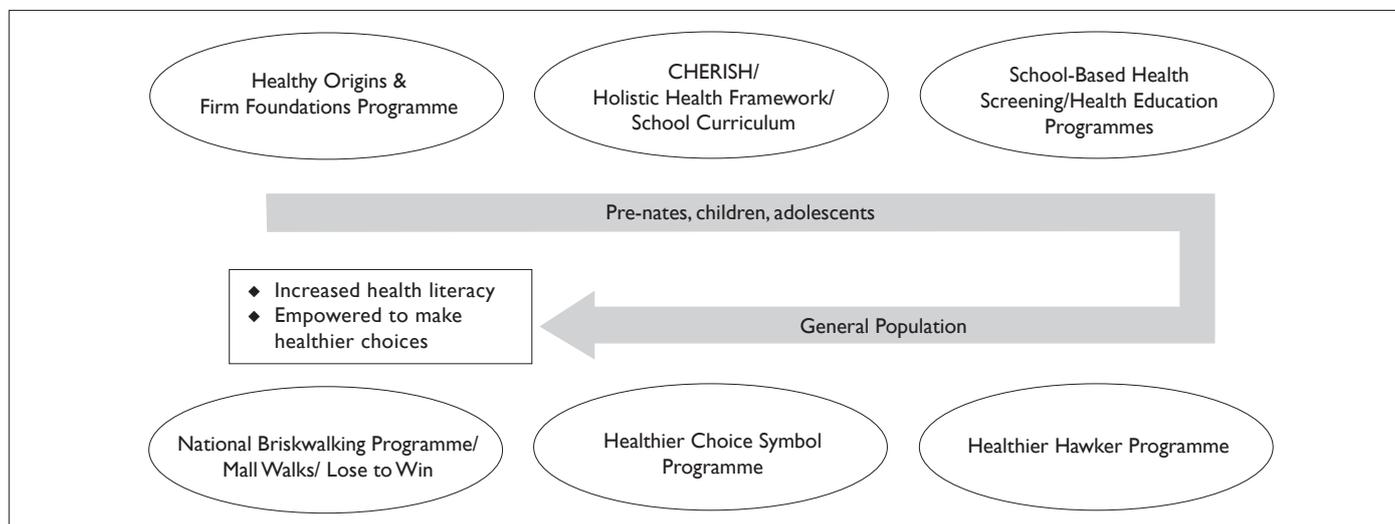
Dietary and physical activity guidelines

HPB has developed official dietary guidelines for Singapore’s population, with separate guidelines for adults and children. It has also developed complementary, evidence-based dietary and physical activity guidelines that now form the basis of Singapore’s health promotion programmes relating to nutrition, physical activity, and general health.

National awards and funding schemes

CHERISH Award for Schools. HPB introduced the CHERISH (Championing Efforts Resulting in Improved School Health) Award for primary and secondary schools, junior colleges, and centralised academic institutions in 2000. This award recognises schools with comprehensive health promotion programmes for staff and students. To-date, approximately 80% of schools in Singapore have received the CHERISH Award. To complement the CHERISH Award, HPB also offers participating schools a health promotion grant, which encourages schools to sustain their health promotion efforts for students and staff.

Fig 3. Tackling Obesity Across the Lifespan



Singapore Workplace Health Promotion Programs.

Almost 60% of Singaporeans over the age of fifteen years participate in the workforce in some way. This makes the workplace a natural and effective setting in which to promote the health and well being of both employees and management. To incentivise companies and organisations to start and sustain Workplace Health Promotion (WHP) programs, HPB introduced WHP grants in 2001. The grants may be used to fund activities such as training for staff to conduct workplace health promotion programs, health risk assessment for employees, and health education activities. Grants may also support the purchase of related equipment and facilities or incentives that increase participation and motivate behaviour change.

HEALTH Award for Companies. To recognise the achievements of companies with commendable WHP programs, the Singapore HEALTH (Helping Employees Achieve Lifetime Health) Award was introduced in 1999.

2. Promoting supportive environments through social programs

Programs in Schools

Model School Tuck-Shop Program. HPB introduced the Model School Tuck-shop Program (MSTP) in 2003 to increase access to healthier food choices in schools. Schools are provided with a set of healthier food service guidelines that aim to limit students' exposure to fat, salt, and sugars in food typically consumed in the tuck-shops, as well as increase their consumption of fruits and vegetables.

Trim and Fit Program (TAF). This was aimed to improve the physical fitness of the school population and to reduce the overall prevalence of overweight students. It was introduced in 1992 by the Ministry of Education. The overall percentage of overweight students decreased from 11.7 percent in 1993 to 9.5 percent in 2006. The overall percentage of students who passed the physical fitness test rose from 61.5 in 1993 to 80.8 in 2006. Following the review of this program in 2005, the program evolved into a Holistic Health Framework (HHF), which was formally established in 2007. The HHF seeks to broaden health promotion in schools beyond obesity prevention and fitness management by embracing a broader concept of students' general well-being and developing their intrinsic motivation to lead a healthy lifestyle.

Programs in the Workplace

Healthier Canteen Certification Program. This program was introduced in 2006 to help employers encourage their employees to adopt healthier dietary practices. Appointed health facilitators and canteen vendors (or certified healthier caterers) work closely together with HPB nutritionists to help implement and drive the program. Half of the organisations in this program are HEALTH Award winners.

Community-wide Programs

Healthier Hawker Program. Launched in 2006, this program encourages hawker centres to prepare their signature dishes with healthier ingredients. Participating stalls display the "Healthier Choice Symbol" on their Food Hygiene Certificate.

Healthier Dining Program. This program was introduced in 2003 to increase the availability of healthier dishes in restaurants. HPB works with participating restaurants to modify existing dishes so that they contain less oil, salt, and sugar – and include more fruit and vegetables – as well as to introduce healthier new dishes.

Community Initiatives Promoting Physical Activity. To encourage Singaporeans to incorporate physical activity into their daily life, HPB collaborates with the People's Association, Singapore Sports Council and various sporting companies to organise physical activities like brisk-walking, running, aerobic workouts, and Tai Chi in public places.

Lose to win. The objective of Lose to Win is to inspire and motivate groups of individuals to lose weight the healthy way through the provision of an effective structured program and evidence-based tools. See Figure 4.

3. Collaborating with partners to promote healthy behaviour

HPB collaborates with Government agencies, business community and food industry, unions, community partners, and non-governmental organisations to implement national health education and disease prevention efforts.

4. Empowering partners and individuals

HPB provides training to healthcare professionals, WHP facilitators, community leaders, educators, parents, domestic helpers and caregivers by leveraging on existing social and institutional networks. One such program is the "Wok the Talk" to train WHP ambassadors with healthy eating tips and food preparation skills. These ambassadors, in turn, share these messages and skills with families and friends through cooking sessions.

5. Raising awareness through health education and communication

HPB engages ongoing efforts to educate the general public via media campaigns and road shows that focus on how to make healthier lifestyle choices which feature specific themes such as eating a balanced diet, healthier food preparation, lowering fat intake, reading food labels, and tips in achieving weight loss. These campaigns also encourage physical activity.

Fig 4. Lose To Win

Component	Schedule	No. of Sessions
Measurements, Weight, Height, BMI & Non-exercise Fitness Test	<ul style="list-style-type: none"> Weeks 0 and 12 	2
Group exercise sessions (low to medium intensity)	Weekdays / Weekends <ul style="list-style-type: none"> About 1 to 1.5 hour per session 2x a week for first 4 weeks & 1x a week subsequently 	16
Nutrition workshops: interactive classroom-based session, supermarket tour & counselling sessions	<ul style="list-style-type: none"> Weekdays / Weekends About 1 to 1.5 hour per session 	3
Mental well-being workshops (topics: goal setting, emotional intelligence, self-esteem & problem-solving)	<ul style="list-style-type: none"> Weekends About 1.5 to 2 hours per session 	4
Follow-up activities	<ul style="list-style-type: none"> Telephone: 3 & 9 months after the programme Measurements: 6 and 12 months after the programme 	4

WHAT CAN HEALTHCARE PROVIDERS DO?

Healthcare providers including family physicians and allied health professionals can help to promote obesity prevention and control through the following ways:

- Proactively engage patients in conversations about their weight.
- Provide advice on lifestyle behaviour changes to promote healthy weight.
- Refer patients to community-based healthy life programmes.

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LEARNING POINTS

- **Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility.**
- **The basic strategy of obesity prevention and control however is quite straightforward and lies in achieving the caloric balance which is to reduce calorie intake and increase physical activity.**
- **To be effective however, obesity prevention and control requires multiple prevention and control interventions across the lifespan.**
- **Policies and programs have been customised in Singapore for different segments of the population and conducted at various settings – in schools, workplaces, healthcare institutions, and communities.**
- **The current efforts to prevent and control obesity in Singapore can be grouped into 5 areas: (1) Health promotion policies; (2) Promoting supportive environments through social programmes; (3) HPB collaborating with partners to promote healthy behaviour; (4) Empowering partners and individuals; and (5) Raising awareness through health education and communication.**