

Food availability and the rising obesity prevalence in Malaysia

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Abstract: It is estimated that more than 1.1 billion adults and 115 million children worldwide are overweight. In Malaysia, the second and third National Health and Morbidity Surveys in 1996 and 2006 respectively reported a three-fold increase in obesity prevalence among adults, surging from 4.4% to 14% over the 10-year period. Evidence of rising childhood obesity has also emerged. The aim of this article is to gather evidence from food availability data for an insight into population shifts in dietary patterns that may help explain the rising obesity in this country. The nutrition transition was delineated in conjunction with the epidemiologic transition in order to explain the convergence of dietary practices, and the high prevalence of obesity and diet-related non-communicable diseases worldwide. The Food Balance Sheets for Malaysia from 1967 to 2007 were used to provide estimates and trends for the availability of foods and calories. Evidence is generated that indicate at least two major upward shifts in the dietary patterns in Malaysia in the past 4 decades. These shifts have led to the rising availability of calories from animal products, and from sugar and sweeteners. These major dietary shifts, together with increased sedentariness, constitute core public health challenges faced in addressing the country's obesity and non-communicable diseases (NCD) conundrum.

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Introduction

Much has been written on the escalating prevalence of obesity in both developed and developing countries.¹ It is estimated that more than 1.1 billion adults worldwide are overweight, and 312 million of them are obese. Also, at least 155 million children worldwide are overweight or obese.² In the United States alone, over 78 million adults and about 12.5 million children and adolescents were obese in 2009-2010.³

Countries in Asia are not spared of this scourge. A multi-country review showed the prevalence of overweight (body mass index $\geq 25\text{kg/m}^2$) for men and women ranged from 13.2% in Indonesia to 32.5% in Singapore.⁴ Singapore also ranked highest for adult obesity (BMI $\geq 30\text{kg/m}^2$) at 6.9%, compared to 2.4% in the Republic of Korea and Indonesia.

As for Malaysia, the national surveys in recent decades have highlighted the rapid rise of obesity, especially among adults. The second and third National Health and Morbidity Surveys in 1996 and 2006 respectively, reported a three-fold increase in obesity prevalence among adults, surging from 4.4% to 14% over the 10-year period.⁵ Likewise, the proportion of overweight adults has increased from 16.6% to 29.1% over the same period. Obesity among Malaysian children (aged below 18 years) is also on the rise. The 2011 survey of the Institute of Public Health showed obesity (BMI-for-age $\geq 2\text{SD}$) prevalence of 6.7%, 6.3% and 4.9% for the age groups of 5.0-9.9, 10.0-14.9 and 15.0-17.9 years respectively (unpublished IPH, MOH).

The risk of obesity among Malaysian adults is higher among women, and those with lower formal schooling and family history of illnesses (hypertension, diabetes, and cardiovascular disease), based on the Malaysian Non-Communicable Disease Surveillance.⁶ A national survey among Malaysians aged 15 years and above also showed obesity prevalence was significantly higher in the females, and among the Malays and Indians compared to the Chinese.⁷

It is patent that the growing trend of obesity in the Malaysian population is steadily becoming a public health challenge. Serious concerns arise as obesity is a core risk factor for the development of several diet-related chronic diseases.

Health implications

Globally, obesity is recognized as the 6th most important risk factor contributing to the overall burden of disease.² Concomitant with the rapid rise of obesity is the

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mounting prevalence of type 2 diabetes, hypertension and cardiovascular disease worldwide. The global diabetes epidemic is a case in point. Diabetes affects at least 285 million people, and that number is expected to reach 438 million by the year 2030, with two-thirds of all diabetes cases occurring in low- to middle-income countries, according to the International Diabetes Federation.⁸ The number of adults with impaired glucose tolerance is projected to rise from 344 million in 2010 to an estimated 472 million by 2030. Its increasing prevalence and associated health complications threaten to reverse economic gains in developing countries.⁹

Obesity or more specifically excess abdominal fat, especially intra-abdominal or visceral adipose tissue is the “villain” implicated in insulin resistance and the metabolic syndrome.¹⁰ In Asian populations, increased risk of diabetes starts at a lower body mass index than in Europeans.¹¹ Thus, a tendency toward greater abdominal obesity and less muscle mass among Asians results in an increased propensity for insulin resistance compared with Western populations. This “metabolically obese” phenotype among normal-weight individuals may explain the increased predisposition for diabetes in countries like India, which has a relatively low prevalence of obesity as indicated by body mass index.⁹

Malaysia is no exception to the alarming rising trend in diabetes mellitus. According to the past three NHMS, diabetes prevalence among adults (aged ≥ 30 years) rose from 6.3% in 1986 to 8.3% in 1996, and escalated to 14.9% in 2006.¹² In terms of numbers, there were 1.5 million adults aged 18 years and above living with type 2 diabetes mellitus in 2006, and this number has increased substantially to 3.4 million. Many attribute this upsurge of diabetes to the unhealthy dietary habits and lifestyles of Malaysians.

The aim of this article is to gather evidence from food availability data for Malaysia, spanning a 40-year period from 1967-2007, for an insight into population shifts in dietary patterns that may offer a better understanding of the rising obesity in this country. The nutrition

transition will be delineated in conjunction with the epidemiologic transition in order to provide the background for explaining the convergence of dietary practices, and the high prevalence of obesity and diet-related non-communicable diseases worldwide.

Nutrition transition

Over the past 3 centuries mankind have made major shifts in dietary intake and physical activity habits resulting in changes in body composition, nutritional status and disease outcome.¹³ This phenomenon termed ‘nutrition transition’ is hypothesized to have occurred in tandem with the epidemiologic transition. Briefly, the epidemiologic transition, as originally posited by Omran¹⁴ characterizes mortality patterns over time in three major successive stages. These are (i) the age of pestilence and famine (where mortality is high and fluctuating), (ii) the age of receding pandemics (where mortality progressively declines), and (iii) the age of degenerative and man-made diseases (where mortality continues to decline and eventually approaches stability at a relatively low level). In the first two stages occurring in the mid-seventeenth century, nearly three-fourths of all deaths were attributed to infectious diseases, malnutrition and maternity complications. Thus, malnutrition was recognized as a major factor associated with the high prevalence of infectious and deficiency diseases at the onset of the epidemiologic transition.

Omran¹⁴ also attributed the transition from infectious to degenerative disease predominance to three crucial categories of disease determinants. One of these was socioeconomic, political and cultural determinants such as standards of living, health habits and hygiene and nutrition. “Hygiene and nutrition are included here, rather than under medical determinants because their improvement in western countries was a byproduct of social change rather than a result of medical design”.¹⁴

Occurring in parallel with the epidemiologic transition were major shifts in dietary and physical activity patterns as expounded by the nutrition transition

theory.¹³ The subsistence pattern of the hunter-gatherers with a reliance on plant and low-fat wild animal diet was accompanied by a high level of physical activity (so-called pattern 1: collecting food). This was followed by early agricultural practices involving labour-intensive planting and animal husbandry, a predominantly cereal-based diet, and the emergence of deficiency diseases (pattern 2: famine). Further developments in agriculture led to increased food production (animal protein, more varieties of fruits and vegetables), increased female participation in the labour force, and decrease in deficiency disease (pattern 3: receding famine). The ensuing Industrial Revolution that led to increased mechanization in the agricultural and manufacturing sectors resulted in fewer jobs that demand heavy physical activity. This is the era of expanding use of mechanization and technologic changes at work, leisure and home. Amidst rapid economic growth, societies have converged on a diet high in fats, sugar and sweeteners, energy-dense and processed foods while low in fiber, resulting in obesity and diet-related chronic diseases (pattern 4: degenerative disease).

During the period of intense economic globalization, from the early 1980s to the present, many rapidly developing countries, including Malaysia, have landed at the stage of pattern 4 characterized by a dominance of degenerative disease. Why the concern? The shift from the receding famine pattern (pattern 3) to one dominated by nutrition-related non-communicable diseases (pattern 4) has been very rapid in several low- and middle-income economies in recent decades. These countries such as Mexico, Egypt, and South Africa have been experiencing a greater proportional increase in dietary energy supply available from fat than in high income countries (WHO, 2011). One consequence is that middle-income countries have equally high levels of obesity among women as high income countries. Moreover, many low- and middle-income countries, including several in Asia like Thailand, China, Indonesia and Malaysia, are experiencing increase rates in overweight and obesity exceeding 1% per year. Few developed countries,

except for the United Kingdom, Australia and United States have such high rates.¹⁵

In low income households, the predominant source of calories tend to be dominated by foods that are high in simple carbohydrates, as they are generally less costly than foods rich in protein. Studies have shown that high consumption of carbohydrates increased the risk of obesity and diabetes type 2 especially among women.¹⁶ Women who had high glycemic index diets and who ate more food staples such as bread, noodles and rice also had an increased risk. A meta-analysis of prospective cohort studies showed that higher consumption of white rice is associated with a significantly increased risk of type 2 diabetes, especially in Asian (Chinese and Japanese) populations.¹⁷

Food availability in Malaysia

Food availability is closely linked to the concept of food security, which has evolved since the 1970s. The latest definition of food security was provided by the State of Food Security in 2001: "Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".¹⁸ This broad concept of food security refers to the nation's net food supply, which is estimated in response to the question of: is there enough food or calories available? An estimation of the availability of food then becomes a major indicator of a nation's food security.

The ensuing sections pursue in greater detail the food availability situation in Malaysia, specifically, the availability of calories for every person on a daily basis over the past four decades. To what extent do the historical trends of available calories offer an explanation for the rising obesity prevalence in this country?

Food availability of a country is derived from its Food Balance Sheets, which present a comprehensive picture of the country's food supply during a specified reference period. Food availability is an estimate

of the “disappearance” of food within the country. The assumption is that all the food produced or imported and not stored or exported is consumed. Since the 1960s, the Food and Agriculture Organization (FAO) has been the focal source for national food availability estimates on virtually every country (www.faostat.fao.org/foodbalance).

Figure 1 portrays the availability of total calories and calories from animal and plant products in Malaysia between 1967-2007. Total availability of calories (per capita per day) increased from 2,447 in 1967 to 2,923 in 2007, indicating an increase of 19.5% over the 40-year period. In comparison, the availability of total calories for USA and Japan increased by 25.6% and 5.3% respectively over the same period. Thus, the rate of increase of available calories for Malaysia leans more closely to that of USA, and both are noticeably higher than that of Japan. One might have expected this increase for Malaysia to be more considerable in light of the rapid escalation of the country's Gross National Income (GNI) per capita over the same period (Fig. 1). The GNI has been almost doubling every decade, except for the immediate past period of 1997-2007, which experienced a more modest increase of 1.4-fold. The GNI per capita rose from US\$360 per capita in 1967 to US\$6,310 per capita in 2007. The rapid rate of increase in GNI per capita is not matched by a proportionate increase in food availability, indicating perhaps that Malaysians are spending proportionately more on other goods and services with increases in income.

Indeed, the Report on Household Expenditure Survey 2009-2010¹⁹ showed that the proportion spent by Malaysians on foods and non-alcoholic beverages has somewhat declined from 23.8% of total household expenditures in 1992-1994 to 20.3% in 2009-2010. This trend has occurred despite an almost doubling of the total monthly household expenditures on goods and services, rising on average from RM1,161 in 1993-1994 to RM2,190 in 2009-2010. Incidentally, the most noticeable increase in household expenditures

in recent years has been for communications (e.g. phones, computers).

Based on the Food Balance Sheets from 1967-2007, Malaysia has been experiencing an upward trend in terms of the availability of calories from animal products (Fig. 2). Calories from animal products (per capita per day) rose from 267 calories in 1967 to 485 calories by 2007, a leap of about 82% (Fig. 2). A drop was noticeable in the last decade, but whether this decline is sustainable cannot be ascertained yet. Japan also showed an increase of about 61%, rising from 362 calories to 584 calories during the same period. The USA however has more or less stabilized its quantum of available calories from animal products, albeit at a relatively higher level of about 1,000 calories since 1967. In comparison, the USA is having increasingly more calories from plant products (Fig. 2).

Whilst previously we noted that the rate of increase in total available calories has not been remarkable, that is, 19.5% over 4 decades, it is seen here however, that the increase in calories available from animal products has been relatively more substantial at 82% during the same period. In other words, Malaysians are having proportionately more calories from meat, fish and other sea food, as well as animal by-products such as eggs, milk, and cream. This is a qualitative shift in the dietary patterns of Malaysians toward increasingly higher consumption of meat and other animal products. There is copious evidence implicating high intake of animal products and their associated cholesterol and saturated fats contents with cardiovascular and other metabolic risks.

Another major deleterious dietary pattern occurring in Malaysia is the continued escalation of the availability of sugar and sweeteners. The Food Balance Sheets clearly showed in Figure 3 that the amount of available sugar and sweeteners (kg per capita per year) has risen from 28.8kg to 48.7kg, or almost 70% between 1967 and 2007. At this level, Malaysia ranks among the topmost countries for the availability of sugar and sweeteners

(Table 1). The USA tops with 67.6 kg per capita per year while Malaysia (48.7kg) and Australia (48.2 kg) are a few rungs below. Increased consumption of soft drinks, fruit juices and other sugar-sweetened beverages in the United States has been linked with obesity in children and adults,²⁰ and with metabolic disturbances and type 2 diabetes.²¹ The Singapore Chinese Health Study reported a significant increased risk of type 2 diabetes in men and women with higher relative consumption of soft drinks and juices.²²

The global price for sugar has skyrocketed in recent years and Malaysia imports almost all its sugar from countries such as Brazil, Australia and Thailand. However, the price of sugar in Malaysia has remained RM2.30 per kg, owing to the hefty subsidy borne by the federal government, amounting to RM567 million in 2012, compared to RM262.4 million in 2011.²³

The availability of total vegetable oils comprising mainly palm oil and palm kernel oil was also examined for possible major upward trends in recent decades. The interest here is like sugar, there is a cooking oil subsidy, which is being funded by a windfall profit levy imposed on oil palm estates bigger than 40 hectares. The Malaysian Estate Owners Association (MEOA) estimated that, from May 2007 to September 2011, oil palm estates had paid more than RM4 billion to subsidize the price of cooking oil, which is capped at RM2.50/kg against the open market price of more than RM4.70/kg in Thailand, Singapore and the Philippines.²⁴

The availability of vegetable oils has risen from 9.5 to 14 kg per capita per year or approximately 47% between 1967 -2007. The increase in the availability of vegetable oils is noted to be about two-thirds that for sugar and sweeteners over the same period. The appeal by the

MEOA for the government to review the cooking oil subsidy, which is benefitting restaurant operators and traders more than the poor, merits supports from a nutrition perspective.

Concluding remarks

This article presents the broad perspectives on the problem of obesity and its associated diet-related non-communicable diseases (NCD) globally and in Malaysia. The nutrition transition was briefly delineated in conjunction with the epidemiologic transition to provide the backdrop for the global convergence of dietary practices, and the high prevalence of obesity and NCD. Data from the Food Balance Sheets indicated that, between 1967-2007, there have been at least two major upward shifts in the dietary patterns in Malaysia namely, mounting availability of calories from animal products, and from sugar and sweeteners. These dietary shifts together with increased sedentariness are among the central public health challenges faced in addressing the country's obesity and NCD conundrum.

Limitations of the review

It is important to recognize that the estimates in the Food Balance Sheets relate simply to the quantities of food available for the general population. Food Balance Sheets do not take into account food distribution and hence do not indicate the differences that may exist in the diet consumed by different population groups in different ecologic areas. Ideally, one should compare data from Food Balance Sheets with food consumption data, but the caveat here is that in many developing countries including Malaysia, data is lacking from national dietary intake surveys.

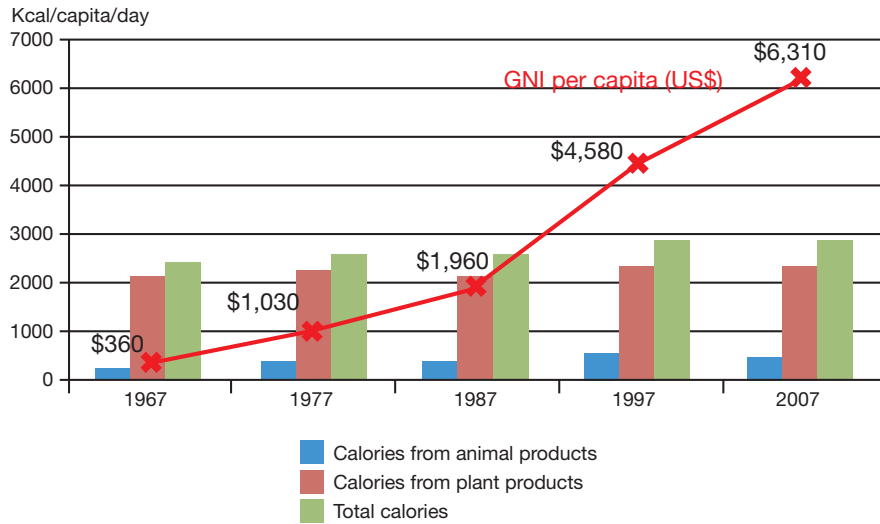


Fig 1: Availability of Calories per capita per day against GNI per capita (current US\$) between 1967-2007

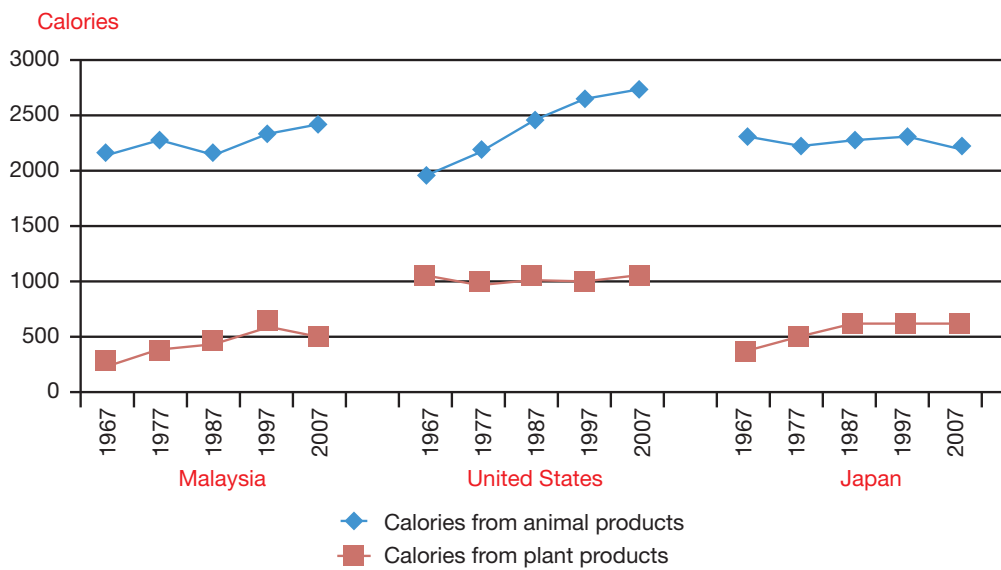


Fig 2: Available calories from plant and animal products (per capita per day) for Malaysia, USA and Japan between 1967-2007

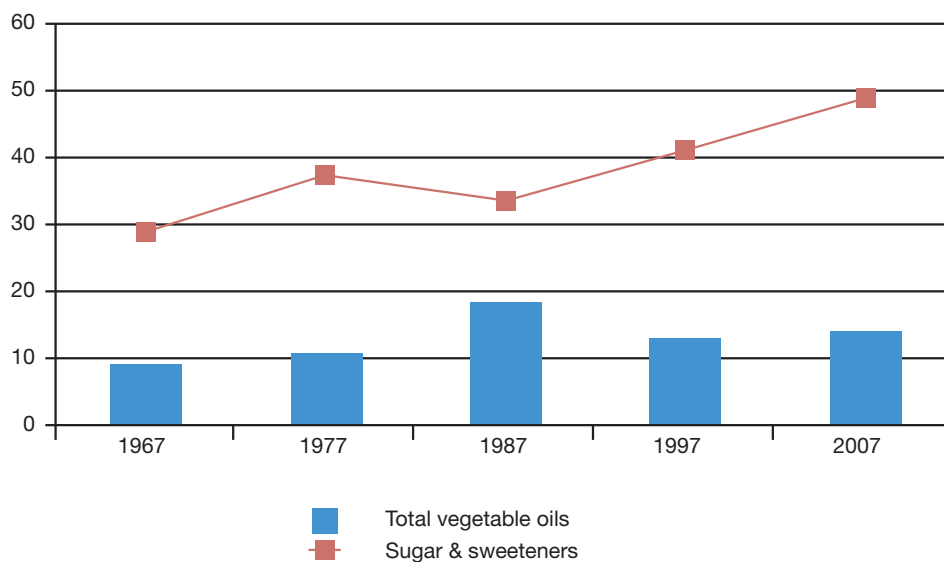


Fig 3: Availability of sugar & sweeteners, and total vegetable oils (kg per capita per year), 1967-2007

Table 1: Comparison of availability of sugar and sweeteners in 2007 (kg per capita per year)

Country	Availability of sugar & sweeteners
United States	67.6
Malaysia	48.7
Australia	48.2
Thailand	37.6
United Kingdom	36.2
Japan	30.1
Philippines	23.3
Indonesia	14.7
Vietnam	12.9

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