

Body Mass Index (BMI) of Adults: Findings of the Malaysian Adult Nutrition Survey (MANS)

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ABSTRACT

The Malaysian Adults Nutrition Survey (MANS) was carried out between October 2002 and July 2003, involving 6,775 men and 3,441 women aged 18 – 59 years. Anthropometric assessment showed that the overall mean body weight and BMI were 62.65 kg (CI: 62.20, 63.09) and 24.37 kg/m² (CI: 24.21, 24.53) respectively. Based on the WHO (1998) classification of BMI, 12.15% (CI: 11.26, 13.10) were obese (BMI \geq 30 kg/m²), and 26.71% (CI: 25.50, 27.96) overweight (BMI \geq 25 - 29.9 kg/m²). Significantly, more women were obese [14.66% (CI: 13.37, 16.04)] while significantly more men were overweight [28.55% (CI: 26.77, 30.40)]. Ethnicity-wise, prevalence of obesity was highest among the Malays [15.28% (CI: 13.91, 16.77)] while overweight was highest for the Indians [31.01% (CI: 26.64, 35.76)]. Both obesity and overweight were highest among those aged 40 - 49 years. Obesity was highest for those whose household income was between RM1,500 - 3,500 while overweight was more prevalent for those whose household income exceeded RM3,500. The prevalence of overweight was highest for those with primary education [31.90% (CI: 29.21, 34.72)]. There was no significant urban-rural differential in both obesity and overweight. The study found 9.02% (CI: 8.82, 10.61) with chronic energy deficiency (CED) (BMI < 18.5 kg/m²). The prevalence of CED was relatively higher in the indigenous population (Orang Asli) [14.53% (CI: 5.14, 34.77)], subjects aged 18-19 years [26.24% (CI: 21.12, 32.09)], and with monthly household income of < RM1,500 [10.85% (CI: 9.63, 12.20)]. The prevalence of CED was not significantly different among the geographical zones and educational levels, and between urban/rural areas and sexes. The results call for priority action to address the serious problem of overweight and obesity among Malaysian adults as it poses a grave burden to the country's resources and development.

Keywords: Adults, BMI, findings from MANS

INTRODUCTION

Obesity is a complex condition that comes about as a result of dietary excesses and a sedentary lifestyle. Globally 300 million adults were reported to be obese in the year 2000. At the same time, another 1 billion adults were overweight (WHO, 1998). In both men and women, obesity is a major risk factor for diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. These can result in an increased risk of premature deaths or serious chronic conditions that impair the overall quality of human life.

On the other hand, adult chronic energy deficiency (CED) can lead to a decline in health status and productivity of workers, which could impede the country's economic development (James & Ralph, 1998). Among women, pregnancy and its outcome will be compromised by CED, impacting on the health and nutritional status of future generations.

Studies as early as in 1976 indicated that Malaysians have both spectrums of the weight problem (Jones, 1976). The problem affects both the poor rural adult village population (Chong, Tee & Ng, 1984) and urban executives (Teo, Chong & M Zaini, 1988). Over the years, the weight problem has been found to be higher among the Indians and the Malays. Ismail *et al.* (1995) reported high prevalence of overweight and obesity among Indian women (29.8% and 16.5% respectively) and among urban Malay men (23.9% and 5.6% respectively).

According to the Second National Health and Morbidity Survey (NHMSII), the overall prevalence of obesity among adults was 4.4% and that of overweight was 16.6% while the prevalence of CED was 25.2% (Fatimah *et al.*, 1997). Among adult men in rural villages and estates, 4.2% were obese, 19.8% were overweight and 13.2% were CED. Among women, 11.1% were obese, 28.0% were overweight and 12.4% were CED (Khor *et al.*, 1999).

The first comprehensive Malaysian Nutrition Survey on Adults (MANS) included assessment of dietary intakes, meal patterns, supplement intakes and physical activities. The present report focuses on the anthropometric assessment of Malaysian adults aged 18-59 years. The objectives of this report are to determine (i) the mean weight and mean BMI; and (ii) the prevalence of obesity, overweight and CED using WHO BMI classification according to socio-demographic characteristics.

METHODOLOGY

The Malaysian Adults Nutrition Survey (MANS) was carried out from October 2002 to July 2003 among 3,334 men and 3,441 women aged 18 - 59 years old divided into six geographical zones namely the North Zone (Perlis, Kedah and Pulau Pinang), Central Zone (Perak, Selangor and Wilayah Persekutuan Kuala Lumpur), South Zone (Negeri Sembilan, Melaka and Johor), East Coast Zone (Kelantan, Pahang and Terengganu), Sabah and Sarawak (MOH, 2008).

Weight and height of adults were taken by trained personnel working in pairs using standard procedures and standard digital weighing scales (Seca 880) and body meters (Seca 208) which were calibrated every morning. Subjects were measured in their homes. Women subjects included postnatal mothers but not those who were pregnant. Body weight was measured to the nearest 0.1 kg while height was measured to the nearest 0.1 cm. All readings were taken and recorded in triplicates.

The BMI was calculated by dividing weight in kilograms by height in meters squared (WHO, 1998). The calculation of the BMIs was carried out using SPSS version 13 with complex sampling module. Using the BMIs, subjects were assigned to various weight categories based on a modified WHO Classification (Table 1) where CED Class I, CED Class II, CED Class III and Obesity Class I, Obesity Class II and Obesity Class

Table 1. Classification of body weight in adults according to BMI (modified from WHO, 1998)

<i>Classification</i>	<i>BMI (kg/m²)</i>
CED Class III	< 16.0
CED Class II	16.0 – 16.9
CED Class I	17.0 – 18.4
Normal	18.5 – 24.9
Pre-obese	25.0 – 29.9
Obesity Class I	30.0 – 34.9
Obesity Class II	35.0 – 39.0
Obesity Class III	≥ 40.0

1. CED is Chronic Energy Deficiency. CED in the text refers to CED Class I + CED Class II + CED Class III
2. Overweight is pre-obese
3. Obesity in the text refers to Obesity Class I + Obesity Class II + Obesity Class III

III were respectively combined as CED and obesity.

Mean weight, mean BMIs and the prevalence of CED, overweight and obesity were analysed according to the nine socio-economic characteristics namely, zone, strata, ethnic, sex, age, household income, education and occupation. Additional analysis was also carried out for the men and women separately. Significance of differences was conducted between zone, urban-rural stratum, sex and age. Results are reported as means, confidence intervals (CI) and at 5% level of significance.

RESULTS

Mean body weight (Appendix 1)

The overall mean body weight and BMI of adult Malaysians aged 18 - 59 years were 62.65 kg (CI: 62.20, 63.09) and 24.37 kg/m² (CI: 24.21, 24.53) respectively. The mean body weight for those in the South [64.42 kg (CI: 63.46, 65.38)] and Central Zone [63.40 kg (CI: 62.56, 64.23)] was significantly higher than the mean body weight of adults in Sarawak [60.66 kg (CI: 59.43, 61.88)] and Sabah [58.93 kg (CI: 57.86, 60.01)]. Men [66.56 kg (CI: 65.91, 67.21)] had significantly higher mean body weight compared to women [58.44 kg (CI: 57.88, 59.00)] and were on average at

least 8 kg heavier than women. Urban men [67.85 kg (CI: 66.94, 68.76)] were heavier than rural men [64.66 kg (CI: 63.79, 65.53)] but urban women [58.46 kg (CI: 57.72, 59.20)] were not heavier than rural women [58.42 kg (CI: 57.55, 59.29)].

Overall, the mean body weight was highest among the Indians [63.78 kg (CI: 62.41, 65.15)], followed by Malays [(63.49 kg (CI: 62.84, 64.14)] and Chinese [62.58 kg CI: 61.77, 63.38]. Among the men, the Chinese were the heaviest [68.17 kg (CI: 67.09, 69.24)] while the Indians were the heaviest [60.28 kg (CI: 58.58, 61.99)] among the women. The mean body weight of adults peaked at 65.11 kg (CI: 64.35, 65.86) among those aged between 40 - 49 years old. Both men and women showed an increase in mean body weight with age (Figure 1).

The mean body weight was highest for those with a middle household income range of RM 1,500 - RM 3,500 [64.40 kg (CI: 63.66, 65.14)]. Among the men, the mean weight was highest among those with the highest household income of more than RM 3,500 [69.27 kg (CI: 67.85, 70.69)] while among the women, the mean weight did not differ much with household income. The mean body weight was highest among those adults with college or university education [64.36 kg (CI: 62.82, 65.90)]. Among men, the

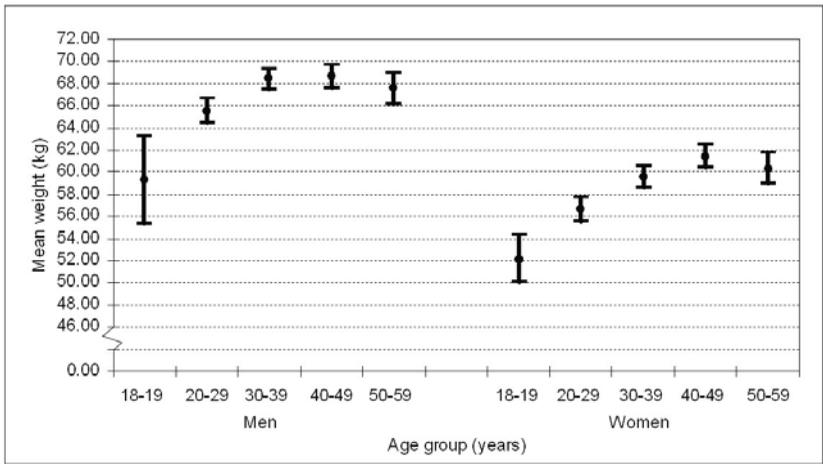


Figure 1. Mean body weight by age group and sex

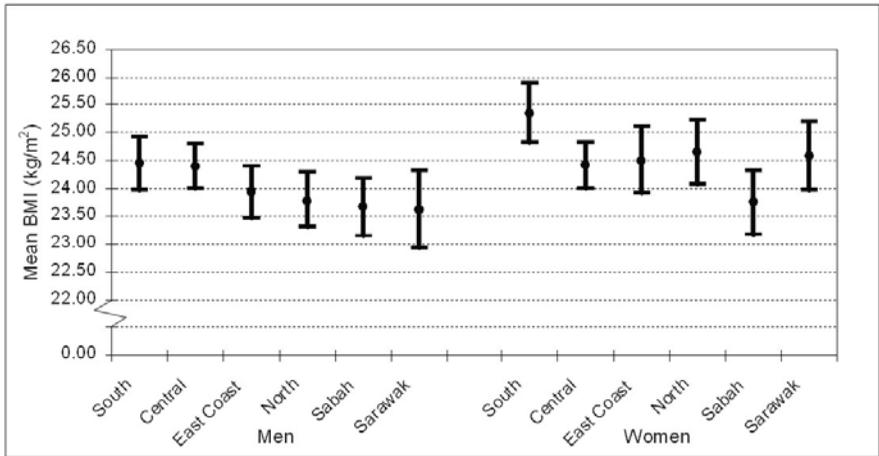


Figure 2. Mean BMI by zone and sex

mean body weight seemed to increase with educational level while it was almost the reverse for women.

Mean BMI (Appendix 2)

Comparing BMI across the geographical zones, the mean BMI was highest for adults in the South Zone [24.88 kg/m² (CI: 24.52, 25.25)] and was significantly higher than the mean BMI for Sabah [23.70 kg/m² (CI: 23.31, 24.09)] (Figure 2). The mean BMI of adult women [24.61 kg/m² (CI: 24.38, 24.84)] was significantly higher than the mean BMI of adult men [24.15 kg/m² (CI: 23.93, 24.37)].

The mean BMI of adults between the urban [24.37 kg/m² (CI: 24.15, 24.58)] and rural [24.38 kg/m² (CI: 24.16, 24.60)] population was not statistically different. However, mean BMI among men in the urban areas [24.39 kg/m² (CI: 24.08, 24.69)] was significantly higher than those from rural areas [23.80 kg/m² (CI: 23.51, 24.09)]. In contrast, among the women, mean BMI was significantly higher for those in the rural areas [25.00 kg/m² (CI: 24.66, 25.33)] than from urban areas [24.35 kg/m² (CI: 24.03, 24.66)] (Figure 3).

Malays [24.86 kg/m² (CI: 24.63, 25.09)] had the highest mean BMI followed by the

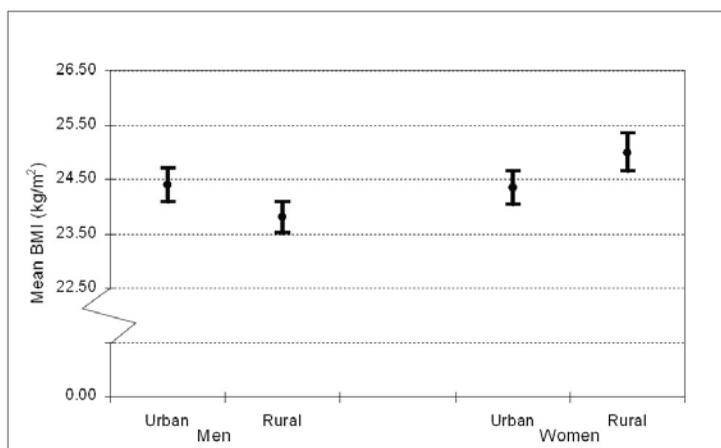


Figure 3. Mean BMI by strata and sex

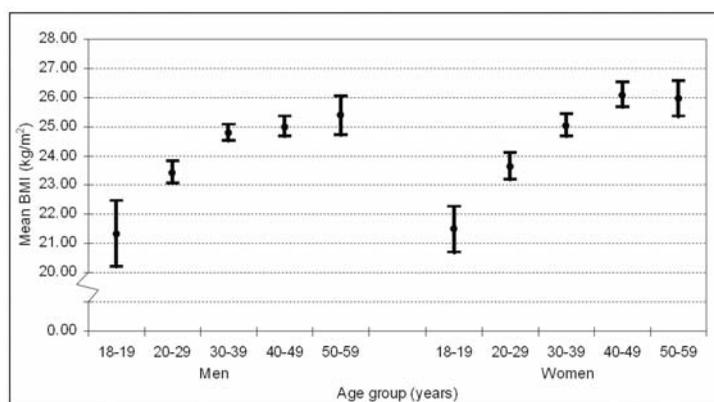


Figure 4. Mean BMI by age group and sex

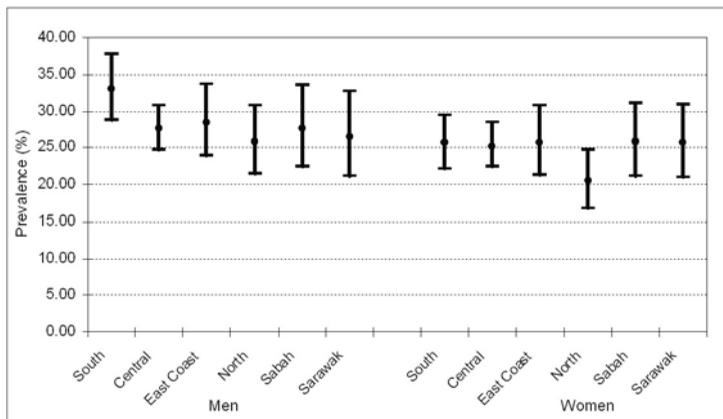
Indians [24.54 kg/m² (CI: 24.05, 25.03)]. The mean BMI of the Chinese was 23.60 kg/m² (CI: 23.31, 23.89), Bumiputra Sabah was 23.51 kg/m² (CI: 22.97, 24.04) and Bumiputra Sarawak was 23.82 kg/m² (CI: 23.28, 24.36). The Malays had the highest BMI among the men [24.39 kg/m² (CI: 24.07, 24.71)] and women [25.39 kg/m² (CI: 25.06, 25.71)]. The mean BMI rose to 25.53 kg/m² (CI: 25.26, 25.80) among those aged 40-49 years old. Mean BMI tapered off after the age of 30-39 years for men and after 40-49 years for women (Figure 4).

The mean BMI did not differ much with household income. This pattern was similar

for the men but among the women, the mean BMI was highest among those with the lowest household income of less than RM1,500 [24.87 kg/m² (CI: 24.56, 25.18)]. Mean BMI was highest among those with primary school education [25.27 kg/m² (CI: 24.92, 25.62)]. However, among men, the highest BMI was among those with a college or university education [24.49 kg/m² (CI: 23.82, 25.15)] while among the women, the mean BMI was highest among those with primary school education [26.37 kg/m² (CI: 25.83, 26.92)].

Table 2. Distribution of adults according to the BMI classification

BMI Category	Estimated Population	Prevalence	95% Confidence Interval	
			Lower	Upper
CED Class III	204,436	0.79	0.42	1.51
CED Class II	320,227	2.26	1.84	2.77
CED Class I	847,135	5.97	5.33	6.69
Normal	6,985,081	49.27	47.84	50.70
Pre Obese	3,786,835	26.71	25.50	27.96
Obese Class I	1,300,997	9.18	8.38	10.04
Obese Class II	288,516	2.03	1.69	2.45
Obese Class III	132,805	0.94	0.72	1.22

**Figure 5.** Prevalence of overweight by zone and sex

Overweight and obesity

Based on an estimated population of 13.87 millions adults in Malaysia, the prevalence of overweight was 26.71% (CI: 25.50, 27.96) ($BMI \geq 25 - 29.9 \text{ kg/m}^2$), while another 12.15% (CI: 11.26, 13.10) were obese ($BMI \geq 30 \text{ kg/m}^2$) (Table 2).

Prevalence of overweight (Appendix 3)

The prevalence of overweight was highest in the South Zone [29.44% (CI: 26.62, 32.43)] but the difference was only significantly higher than that in the North Zone [23.10% (CI: 20.17, 26.30)]. The prevalence of overweight among men [28.55% (CI: 26.77, 30.40)] was significantly higher than the

prevalence of overweight among women [24.80% (CI: 23.16, 26.51)] (Figure 5).

The prevalence of overweight among urban adults [26.87% (CI: 25.11, 26.71)] was not significantly different from that of rural adults [26.60% (CI: 24.96, 28.30)]. There was no significant difference in the prevalence of overweight between urban and rural adults for the men and women (Figure 6).

The prevalence of overweight was highest among the Indians [31.01% (CI: 26.64, 35.76)]. Among the men, the prevalence of overweight was highest for the Indians [29.33% (CI: 23.28, 36.21)] followed closely by Malays [29.26% (CI: 26.93, 31.71)] and Chinese [29.00% (CI: 25.21, 33.10)]. Among the women, the prevalence of

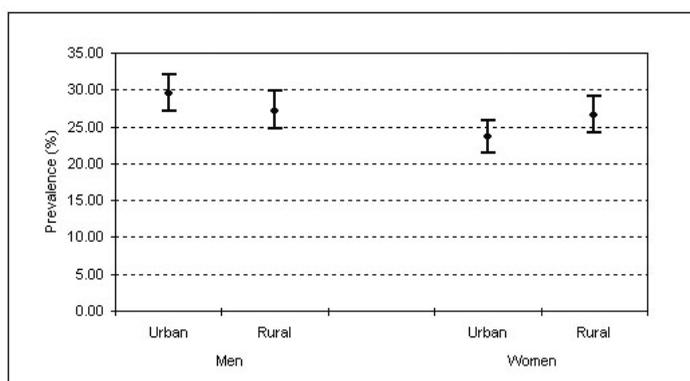


Figure 6. Prevalence of overweight by strata and sex

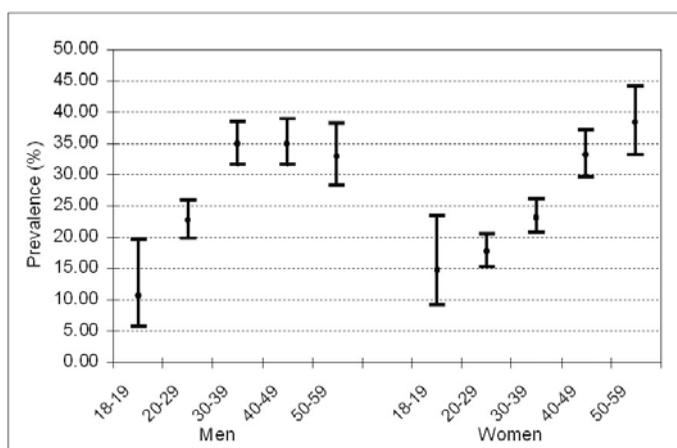


Figure 7. Prevalence of overweight by age group and sex

overweight was highest among the Indians [32.62% (CI: 26.49, 39.42)] followed by Bumiputera Sarawak [31.68% (CI: 24.67, 39.64)]. The prevalence of overweight was also highest for men aged 40-49 years [34.14% (CI: 31.60, 36.78)] and women aged 50-59 years [35.17% (CI: 32.06, 39.53)] (Figure 7).

The prevalence of overweight was highest for households with monthly income of more than RM 3,500 [28.70% (CI: 25.45, 32.20)]. Among the men, the prevalence of overweight was highest among those whose household income was more than RM 3,500. Among the women, the prevalence of overweight was highest among those whose households earned less than RM1,500. The

prevalence of overweight was also highest among those with primary education [31.90% (CI: 29.31, 34.72)].

Prevalence of obesity (Appendix 4)

The prevalence of obesity was highest in the South Zone [13.81% (CI: 11.79, 16.12)], but statistically, it was only significantly higher than that for Sabah [8.42% (CI: 6.59, 10.68)]. Among the men, the prevalence of obesity was highest for those in the Central Zone [11.69% (CI: 9.43, 14.40)], while for women, prevalence of obesity was highest for those in the South Zone [17.79% (CI: 14.74, 21.32)], North Zone [17.50% (CI: 14.25, 21.45)] and East Zone [16.20% (CI: 12.54, 20.68)] (Figure 8).

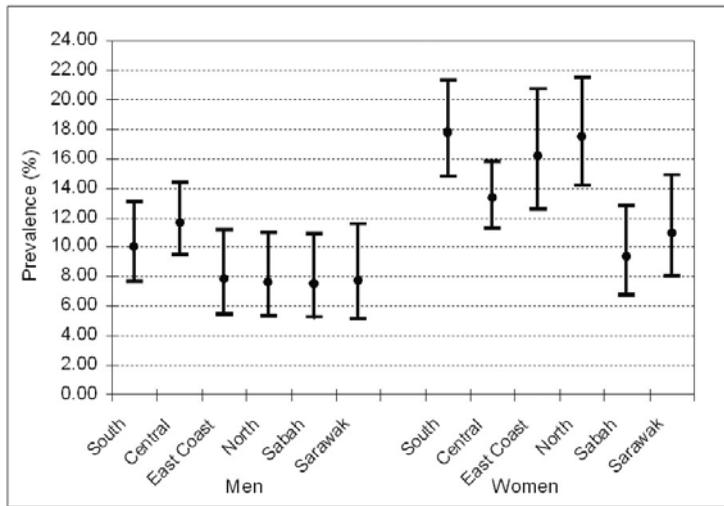


Figure 8. Prevalence of obesity by zone and sex

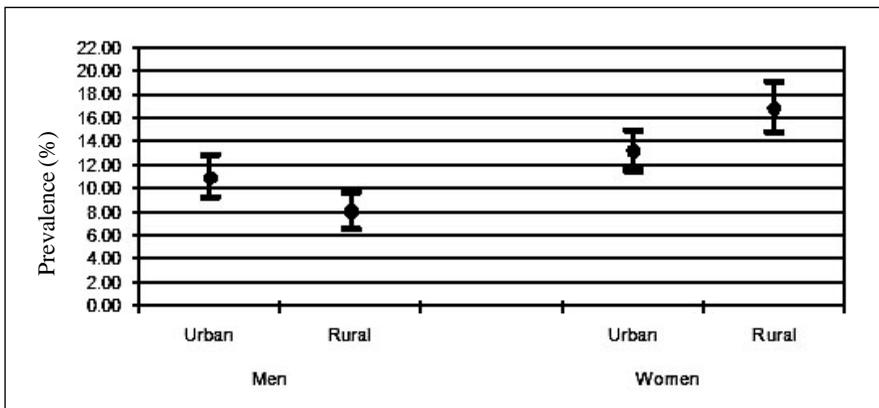


Figure 9. Prevalence of obesity by urban-rural strata and sex

The prevalence of obesity for those in the urban [12.01% (CI: 10.82, 13.32)] and rural areas [12.34%, (CI: 11.08, 13.73)] was not significantly different (Figure 9).

The prevalence of obesity was highest for the Malays [15.28% (CI: 13.91, 16.77)], followed by the Indians [12.66% (CI: 10.16, 15.67)] and Other Bumiputera [9.57% (CI: 5.6, 15.49)]. Among the men, obesity was highest for the Malays [11.25% (CI: 9.45, 13.33)]. Obesity was also highest for the Malays [19.58% (CI: 17.58, 21.75)] among the women.

The prevalence of obesity peaked for ages 40-49 years [15.12% (CI: 13.27, 17.19)] and 50-59 years [15.49% (CI: 12.89, 18.51)] (Figure 10). The prevalence of obesity for women aged 30 years and above was significantly higher than for those aged 18-19 years.

The overall prevalence of obesity was highest for household income between RM 1,500– RM 3,500 per month [13.13% (CI: 11.66, 14.76)]. It was highest among men whose monthly household income was between RM 1,500 - RM3,500 [12.59% (CI:

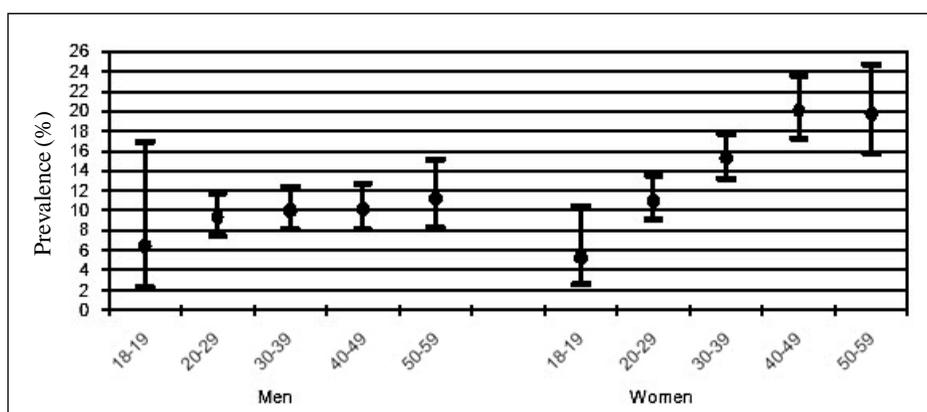


Figure 10. Prevalence of obesity by age group and sex

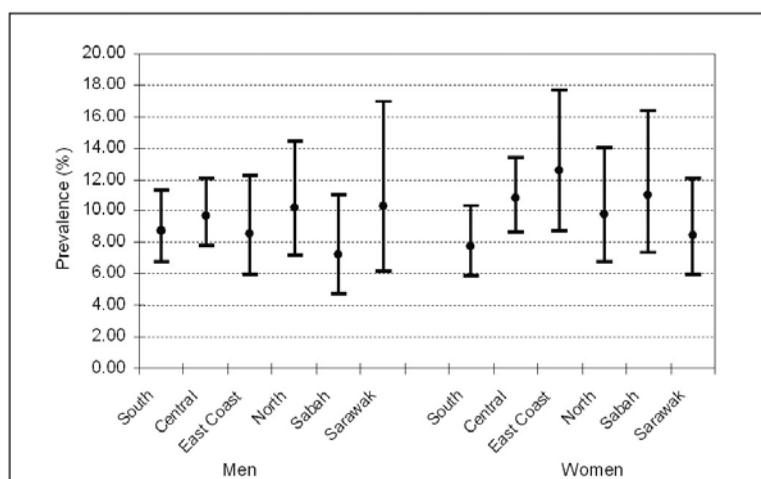


Figure 11. Prevalence of CED by zone and sex

11.01, 13.1] and among women whose households earned less than RM 1,500 [16.18% (CI: 14.40, 18.13)]. The prevalence of obesity was also highest among those with primary education [14.41% (CI: 12.44, 16.62)]. It was highest for men with tertiary education [11.12% (CI: 7.49, 16.19)] and for women with primary education [20.09% (CI: 17.05, 23.52)].

Prevalence of CED (Appendix 5)

Co-existing with overweight is the problem of underweight or chronic energy deficiency (CED) among Malaysian adults. As shown in Table 2, the study reported 9.02% (CI: 8.82,

10.61) had CED (BMI < 18.5 kg/m²). The prevalence of CED was not significantly different among the various zones (Figure 11).

There was also no significant difference in the prevalence of CED among the adults, irrespective of sex, in urban and rural areas (Figure 12).

The prevalence of CED was highest among the indigenous population (Orang Asli) of Peninsular Malaysia [14.53% (CI: 5.14, 34.77)]. The prevalence of CED among the Chinese was 9.70% (CI: 7.97, 11.75) and among the Malays, it was 9.11% (CI: 8.02, 10.34). Among the men, the prevalence of

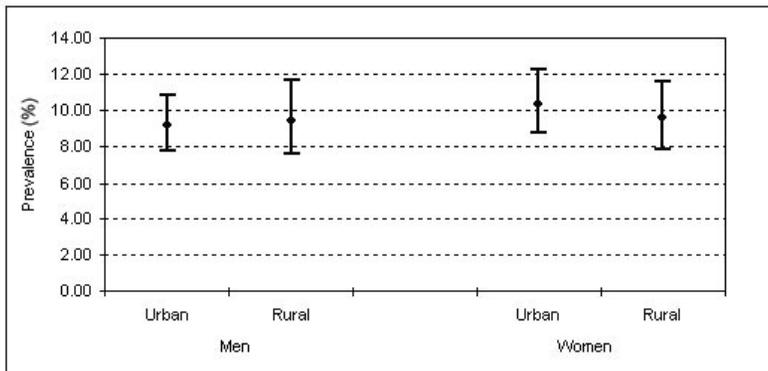


Figure 12. Prevalence of CED by strata and sex

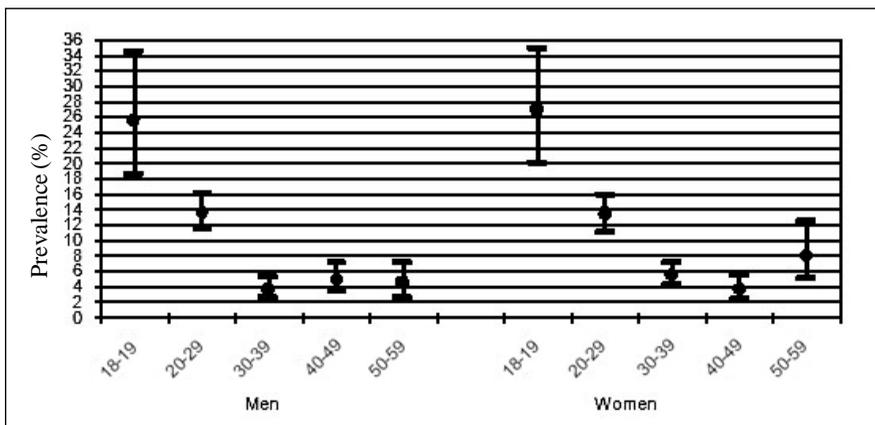


Figure 13. Prevalence of CED by age group and sex

CED was highest among the Indians [15.05% (CI: 10.27, 21.54)]. The prevalence of CED among men was 9.74% (CI: 8.18, 11.57) for the Malays and 6.49% (CI: 4.76, 8.78) for the Chinese. Among the women, the prevalence of CED was highest for the Orang Asli of Peninsular Malaysia [27.69% (CI: 10.43, 55.74)].

The prevalence of CED decreased significantly with age from 26.24% (CI: 21.12, 32.09) among those aged 18-19 years old to 4.66% (CI: 3.77, 5.74) among those aged 30-39 years old. The distribution of CED among the men and women followed almost the same pattern over the age groups (Figure 13).

The prevalence of CED seemed to decline with increasing household income and was highest among those whose household income was less than RM 1,500 [10.85% (CI: 9.63, 12.20)]. The distribution pattern of CED among men and women was not as clear but did not seem to be related to educational level.

DISCUSSION

The mean body weight for adult Malaysians aged 18-59 years (66.56 kg for men and 58.44 kg for women) found in this study is in sharp contrast to the mean weight of 55 kg for men and 50 kg for women reported in the 1970s (Teoh, 1975). The mean body height is also

higher than that used by the Technical Working Group on Dietary Guidelines (NCCFN, 2005) which was 59 - 64 kg for men and 52 - 57 kg for women.

Comparing the mean BMI reported in NHMS II (Fatimah *et al.*, 1997), the mean BMI for Malaysians aged 18 - 59 years has increased over the last six years from 22.26 kg/m² to 24.15 kg/m² for men and from 22.67 kg/m² to 24.61 kg/m² for women.

The prevalence of overweight among the Malaysian adults has increased almost twofold from 16.6% to 29.7%. Overweight was highest among the Indians (31.01%), and affects the minority ethnic groups too, e.g. 15.06% among the Orang Asli of Peninsular Malaysia, 28.07% in the Bumiputera Sarawak and 23.73% for the Bumiputera Sabah. In fact, the prevalence of overweight among the Bumiputera Sarawak women was high at 31.68%.

The overweight prevalence of 29.71% for the Malaysian adults aged 18 - 59 years indicates that the overweight problem in Malaysia is almost as serious as that for the developed countries reported in the 1999 - 2002 National Health and Nutrition Examination Survey (NHANES) and WHO (2006).

Overall, overweight increased with age and household income. This pattern of increase was also observed among the men. However, among the women, although overweight increased with age, the prevalence declined with household income. In relation to educational level, both overweight and obesity was highest among those with primary education.

Compared to the NHMS II, the prevalence of obesity among adults aged 18 - 59 years was higher, apparently increasing more than threefold from 4.4% to 12.42%. A matter of concern from the findings is that obesity was high in almost all the states in Malaysia (except for Sabah and Sarawak). This indicates that obesity is prevalent even in the less developed states in the peninsula. The present findings also confirm the earlier findings of NHMS II, where obesity was

found to have crossed the urban and rural divide irrespective of income and educational level.

As in the NHMS II, the prevalence of obesity was highest among the Malays and Indians. In fact, the prevalence had increased threefold from 5.1% to 15.28% for the Malays and more than twofold from 5.0% to 12.66% for the Indians. Even among the Chinese, the increase was more than twofold from 3.5% to 7.20%. It is also important to note that although the prevalence of obesity for the Bumiputera Sarawak (6.82%) was the lowest, it still exceeded the overall obesity prevalence reported by NHMS II.

Over the years, the prevalence of obesity for the women has remained higher than the men. However, obesity among men seems to be increasing at a faster rate. While the prevalence of obesity in women had increased 2.5 times from 5.7% to 14.66%, the increase in the prevalence of obesity in men had increased 3.3 times from 2.9% to 9.72%. Thus, although fewer men were obese, the gap between the sexes is closing.

The higher prevalence of obesity in women should be of concern since, in addition to the risk for chronic diseases, obesity may also affect women's reproductive functions. In this respect, greater attention should be focused on rural women and Indian women especially those in the lower income group and with primary education.

As in NHMS II, the prevalence of obesity was also found to increase with age until 40 - 49 years. The prevalence of obesity was lowest for those aged 18-19 years but it has increased almost twofold from 3.0% to 5.9% compared to the NHMS II. Among the 40-49 years, the prevalence had increased 2.5 times from 6.0% to 15.1%. These findings suggest that not only has the prevalence of obesity increased in all the age groups, the increase was more rapid among the older age group.

That obesity is not necessarily a problem affecting only the rich is reflected by the finding that the prevalence of obesity was high among those whose household income

was in the middle income group of between RM1,500 - RM3,500 (13.1%). Similarly, the fact that educational attainment was not a factor associated with obesity is clearly demonstrated by the finding that the prevalence of obesity was highest among those with just primary education (14.4%) and presumably with low knowledge in nutrition.

While obesity was more prevalent among the housewives and retirees, overweight was more prevalent among army personnel as well as the legislators, senior officials and managers. In contrast, both overweight and obesity were lowest among the students.

When compared with the obesity rates in the WHO (2006) report, the overall obesity rate for Malaysian adults aged 18-59 years was below those for the developed and industrialised countries, particularly the United States (29.50%) (Centre for Disease Control, 2006) and Australia (15.10%). However, the Malaysian figures were well above those for Asian countries like Singapore (6.90%) and China (2.9%).

This study reported a lower magnitude of CED among Malaysian adults, from 25.2% in 1996 to 9.02%. In comparison, CED was reported to be as high as 40% in India, 20% in China and 10% in Peru (WHO, 1995).

This report also shows that the problem of CED prevails in all zones with the exception of the South Zone, affecting both men and women from rural and urban areas. The relatively higher CED prevalence among the Orang Asli should be addressed as a socio-economic issue.

CONCLUSION

The survey findings provide strong evidence that obesity and particularly overweight among adults is approaching epidemic proportions in Malaysia while CED is still a public health concern despite being on the decline.

The obesity problem is most serious among the poor, rural Malay women aged above 30 years particularly those in the states of Johor, Negeri Sembilan and Melaka. Overweight, on the other hand, seems to be more serious among the Indian and Malay men particularly those who are more than 30 years old and with lower education in all the states irrespective of strata, household income and occupation. Meanwhile, CED continues to be a problem among the minority groups and the Indians.

These findings indicate that Malaysian adults aged 18-59 years have a serious and escalating weight problem that will impede the health of the nation. The nation's most economically productive population group is still experiencing the twin facets of malnutrition which could derail national progress as it spirals towards 2020 and its vision of attaining a developed nation status.

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Appendix 1. Mean weight by socio-demographic characteristics

Characteristics	Total						Men						Women					
	Mean Weight (kg)		95% CI		Total Sample	Estimated Population	Mean Weight (kg)		95% CI		Total Sample	Estimated Population	Mean Weight (kg)		95% CI		Total Sample	Estimated Population
	Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper		
Malaysia	62.65	62.20	63.09	67.75	13,876,456	66.56	65.91	67.21	3,334	7,186,441	58.44	57.88	59.00	3,441	6,690,015			
Zone																		
South	64.42	63.46	65.38	1,296	2,358,172	68.19	66.74	69.64	621	1,512,564	60.31	59.01	61.61	675	1,386,438			
Central	63.40	62.56	64.23	2,274	5,291,930	67.80	66.60	69.00	1,157	2,753,105	58.62	57.61	59.63	1,117	2,538,825			
East coast	60.91	59.77	62.05	918	1,580,841	64.39	62.76	66.02	450	824,479	57.12	55.60	58.64	468	756,362			
North	62.67	61.63	63.70	871	1,833,883	66.22	64.81	67.62	417	918,873	59.10	57.69	60.52	454	915,010			
Sabah	58.93	57.86	60.01	730	1,107,597	62.94	61.43	64.46	359	568,661	54.70	53.28	56.12	371	538,935			
Sarawak	60.66	59.43	61.88	686	1,163,204	63.73	61.74	65.72	330	608,759	57.29	55.87	58.71	356	554,445			
Strata																		
Urban	63.33	62.71	63.95	3,613	8,249,454	67.85	66.94	68.76	1,805	4,280,718	58.46	57.72	59.20	1,808	3,968,736			
Rural	61.64	61.02	62.26	3,162	5,627,002	64.66	63.79	65.53	1,529	2,905,723	58.42	57.55	59.29	1,633	2,721,279			
Ethnic Group																		
Malay	63.49	62.84	64.14	3,633	7,531,610	66.86	65.89	67.82	1,820	3,972,062	59.73	58.92	60.54	1,813	3,559,548			
Chinese	62.58	61.77	63.38	1,563	3,475,730	68.17	67.09	69.24	752	1,766,293	56.80	55.73	57.87	811	1,709,437			
Indian	63.78	62.41	65.15	620	1,347,232	67.32	65.25	69.40	298	668,697	60.28	58.58	61.99	322	678,535			
Orang Asli PM	48.95	45.90	52.00	28	67,897	51.92	46.28	57.56	11	36,866	45.42	41.62	49.23	17	31,032			
Bumiputera	57.42	55.92	58.91	394	574,739	62.26	60.26	64.25	187	275,841	52.95	51.12	54.79	207	298,898			
Sabah																		
Bumiputera	58.07	56.65	59.49	380	603,437	60.58	58.55	62.61	191	317,936	55.27	53.37	57.16	189	285,500			
Sarawak																		
Other Bumiputera	59.24	57.10	61.38	157	275,811	60.43	57.62	63.23	75	148,746	57.85	54.44	61.26	82	127,065			
Sex																		
Men	66.56	65.91	67.21	3,334	7,186,441													
Women	58.44	57.88	59.00	3,441	6,690,016													
Age group																		
18-19	55.82	53.46	58.18	421	1,436,378	59.31	55.33	63.28	208	734,969	52.17	50.07	54.27	213	701,409			
20-29	61.32	60.49	62.15	1,971	4,096,532	65.53	64.41	66.65	989	2,158,841	56.63	55.48	57.78	982	1,937,691			
30-39	64.19	63.51	64.87	1,933	3,551,798	68.44	67.54	69.33	918	1,848,244	59.58	58.63	60.53	1,015	1,703,554			
40-49	65.11	64.35	65.86	1,538	2,887,757	68.66	67.64	69.68	765	1,474,243	61.40	60.37	62.43	773	1,413,514			
50-59	64.03	63.00	65.05	912	1,903,991	67.57	66.15	68.99	454	970,143	60.35	58.97	61.73	458	933,848			

Appendix 1 Continued

Characteristics	Total				Men				Women					
	Mean Weight (kg)	95% CI Lower	95% CI Upper	Total Sample	Mean Weight (kg)	95% CI Lower	95% CI Upper	Total Sample	Mean Weight (kg)	95% CI Lower	95% CI Upper	Total Sample	Estimated Population	
Household Income														
Less than RM1500	61.00	60.35	61.65	3,539	63.79	62.78	64.81	1,643	3,451,552	58.29	57.50	59.08	1,896	3,564,702
RM1500 - RM3500	64.40	63.66	65.14	2,309	69.05	68.06	70.04	1,216	2,667,048	58.74	57.74	59.74	1,093	2,190,801
More than RM3500	64.16	63.14	65.17	927	69.27	67.85	70.69	475	1,067,841	58.31	57.05	59.57	452	934,513
Educational Level														
Primary school	62.38	61.52	63.24	1,416	63.85	62.80	64.89	623	1,208,258	61.15	59.84	62.47	793	1,448,724
Lower secondary school (PMR)	63.87	63.02	64.73	1,448	66.51	65.45	67.58	796	1,653,222	60.15	58.77	61.52	652	1,169,574
Upper secondary school (SPM)	62.50	61.76	63.24	2,236	66.99	65.94	68.04	1,131	2,510,776	57.49	56.56	58.42	1105	2,250,114
Matriculation/Form6	59.94	58.27	61.61	355	66.47	63.78	69.17	139	308,479	55.65	53.73	57.58	216	471,126
College/University	64.36	62.82	65.90	956	69.59	67.37	71.80	548	1,291,654	56.57	55.08	58.06	408	866,124
Others	57.01	55.38	58.64	356	58.58	55.01	62.16	95	208,473	56.31	54.51	58.11	261	468,629
Nutritional Status														
Normal	56.49	56.18	56.80	3,366	60.30	59.89	60.70	1,730	3,751,955	52.07	51.74	52.40	1,636	3,233,126
Pre-obese	70.08	69.63	70.53	1,907	75.02	74.53	75.51	976	2,058,755	64.20	63.72	64.68	931	1,728,080
Obese Class I	81.24	79.82	82.67	655	89.59	87.33	91.84	257	546,129	75.21	74.41	76.00	398	754,867
Obese Class II	91.70	89.72	93.68	138	98.42	94.71	102.13	48	116,812	87.13	85.37	88.89	90	171,703
Obese Class III	116.18	109.92	122.44	72	126.10	112.27	139.94	22	38,199	112.17	105.52	118.83	50	94,606

Appendix 2. Mean BMI by socio-demographic characteristics

Characteristics (kg/m ²)	Total						Men						Women					
	Mean BMI		95% CI		Total Sample	Estimated Population (kg/m ²)	Mean BMI		95% CI		Total Sample	Estimated Population (kg/m ²)	Mean BMI		95% CI		Total Sample	Estimated Population
	Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper		
Malaysia	24.37	24.21	24.53	24.53	6766	13,866,032	24.15	23.93	24.37	24.37	3,331	7182,461	24.61	24.38	24.84	24.84	3435	6,683,571
Zone																		
South	24.88	24.52	25.25	25.25	1296	2,899,002	24.45	23.96	24.93	24.93	621	1,512,564	25.36	24.83	25.89	25.89	675	1,386,438
Central	24.40	24.11	24.69	24.69	2273	5,290,993	24.39	23.99	24.80	24.80	1,156	2,752,167	24.41	23.99	24.83	24.83	1117	2,538,825
East Coast	24.21	23.83	24.59	24.59	910	1,571,354	23.93	23.46	24.40	24.40	448	821,436	24.51	23.90	25.12	25.12	462	749,918
North	24.22	23.84	24.60	24.60	871	1,833,883	23.79	23.29	24.28	24.28	417	918,873	24.65	24.07	25.22	25.22	454	915,010
Sabah	23.70	23.31	24.09	24.09	730	1,107,597	23.66	23.13	24.19	24.19	359	568,661	23.74	23.16	24.31	24.31	371	538,935
Sarawak	24.08	23.60	24.55	24.55	686	1,163,204	23.62	22.93	24.31	24.31	330	608,759	24.58	23.96	25.20	25.20	356	554,445
Strata																		
Urban	24.37	24.15	24.58	24.58	3613	8,249,454	24.39	24.08	24.69	24.69	1,805	4,280,718	24.35	24.03	24.66	24.66	1808	3,968,736
Rural	24.38	24.16	24.60	24.60	3153	5,616,578	23.80	23.51	24.09	24.09	1,526	2,901,743	25.00	24.66	25.33	25.33	1627	2,714,835
Ethnic Group																		
Malay	24.86	24.63	25.09	25.09	3625	7,523,023	24.39	24.07	24.71	24.71	1,817	3,968,082	25.39	25.06	25.71	25.71	1808	3,554,941
Chinese	23.60	23.31	23.89	23.89	1563	3,475,730	24.06	23.69	24.43	24.43	752	1,766,293	23.13	22.67	23.58	23.58	811	1,709,437
Indian	24.54	24.05	25.03	25.03	620	1,347,232	24.02	23.30	24.73	24.73	298	668,697	25.05	24.40	25.71	25.71	322	678,535
Orang Asli PM	21.83	20.71	22.95	22.95	28	67,897	22.54	21.23	23.85	23.85	11	36,866	20.99	19.30	22.68	22.68	17	31,032
Bumiputra	23.51	22.97	24.04	24.04	393	572,902	23.72	23.00	24.45	24.45	187	275,841	23.31	22.52	24.09	24.09	206	297,061
Sabah																		
Bumiputra	23.82	23.28	24.36	24.36	380	603,437	23.27	22.58	23.96	23.96	191	317,936	24.44	23.62	25.26	25.26	189	285,500
Sarawak																		
Other Bumiputera	23.52	22.57	24.47	24.47	157	275,811	22.41	21.44	23.38	23.38	75	148,746	24.82	23.42	26.22	26.22	82	127,065
Sex																		
Men	24.15	23.93	24.37	24.37	3331	7182,461												
Women	24.61	24.38	24.84	24.84	3435	6683,571												
Age Group																		
18-19	21.40	20.71	22.10	22.10	421	1,436,378	21.32	20.19	22.46	22.46	208	734,969	21.49	20.70	22.27	22.27	213	701,409
20-29	23.53	23.24	23.83	23.83	1969	4,093,992	23.44	23.07	23.82	23.82	989	2,158,841	23.63	23.17	24.10	24.10	980	1,935,151
30-39	24.91	24.70	25.14	25.14	1932	3,550,440	24.78	24.49	25.07	25.07	918	1,848,244	25.04	24.67	25.42	25.42	1014	1,702,196
40-49	25.53	25.26	25.80	25.80	1536	2,886,804	24.99	24.65	25.33	25.33	765	1,474,243	26.09	25.67	26.52	26.52	771	1,412,561
50-59	25.66	25.22	26.11	26.11	908	1,898,417	25.38	24.72	26.04	26.04	451	966,163	25.95	25.35	26.55	26.55	457	932,254

Appendix 2 Continued

Characteristics	Total						Men						Women						
	Mean BMI (kg/m ²)		95% CI		Total Sample	Estimated Population	Mean BMI (kg/m ²)		95% CI		Total Sample	Estimated Population	Mean BMI (kg/m ²)		95% CI		Total Sample	Estimated Population	
	Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			Lower	Upper	Lower	Upper			
Household Income																			
Less than RM1500	24.20	23.97	24.42	25.62	3531	7006766	23.50	23.19	23.81	24.31	1641	3,448,509	24.87	24.56	25.18	26.92	1,890	3,558,257	
RM1500 - RM3500	24.64	24.38	24.90	25.01	2308	4856912	24.79	24.46	25.11	24.64	1215	2,666,111	24.46	24.03	24.89	25.86	1,093	2,190,801	
More than RM3500	24.33	23.90	24.75	25.01	927	2002354	24.64	23.99	25.29	24.64	475	1,067,841	23.97	23.43	24.51	25.86	452	934,513	
Educational Level																			
Primary school	25.27	24.92	25.62	25.01	1412	2,651,863	23.95	23.58	24.31	24.31	621	1,205,216	26.37	25.83	26.92	29.12	791	1,446,647	
Lower secondary school	24.69	24.37	25.01	25.01	1446	2,820,968	24.27	23.89	24.64	24.64	796	1,653,222	25.29	24.72	25.86	29.12	650	1,167,746	
Upper secondary school	24.10	23.83	24.37	25.01	2235	4,760,188	24.18	23.79	24.56	24.56	1131	2,510,776	24.01	23.65	24.38	29.12	1104	2,249,412	
Matriculation/ Form 6	23.28	22.75	23.81	25.01	355	779,605	23.63	22.81	24.46	24.46	139	308,479	23.05	22.38	23.72	29.12	216	471,126	
College/University	23.85	23.38	24.31	25.01	955	2,155,941	24.49	23.82	25.15	25.15	548	1,291,654	22.89	22.32	23.47	29.12	407	864,287	
Others	24.22	23.55	24.88	25.01	355	676,164	22.61	21.36	23.86	23.86	94	207,536	24.93	24.22	25.63	29.12	261	468,629	
Nutritional Status																			
CED Class III	15.22	14.99	15.45	15.01	80	204,436	15.27	14.91	15.63	15.63	39	116,849	15.16	14.93	15.39	15.39	41	87,587	
CED Class II	16.53	16.47	16.59	16.59	150	320,227	16.49	16.38	16.60	16.60	60	122,110	16.55	16.49	16.62	16.62	90	198,117	
CED Class I	17.83	17.78	17.88	17.88	398	847,135	17.86	17.79	17.92	17.92	199	431,651	17.81	17.73	17.88	17.88	199	415,484	
Normal	21.86	21.79	21.94	21.94	3366	6,985,081	21.90	21.80	22.00	22.00	1730	3,751,955	21.82	21.71	21.93	21.93	1,636	3,233,126	
Pre-obese	27.18	27.11	27.25	27.25	1907	3,786,835	27.19	27.09	27.28	27.28	976	2,058,755	27.17	27.07	27.28	27.28	931	1,728,080	
Obese Class I	32.04	31.88	32.21	32.21	655	1,300,997	32.07	31.75	32.39	32.39	257	546,129	32.03	31.87	32.19	32.19	398	754,867	
Obese Class II	36.71	36.46	36.96	36.96	138	288,516	36.54	36.24	36.85	36.85	48	116,812	36.82	36.47	37.17	37.17	90	171,703	
Obese Class III	48.99	46.05	51.92	51.92	72	132,805	52.86	45.63	60.10	60.10	22	38,199	47.42	44.66	50.18	50.18	50	94,606	

Appendix 3. Prevalence of overweight by socio-demographic characteristics

Characteristics	Total			Men			Women		
	Prevalence (%)	95% CI		Prevalence (%)	95% CI		Prevalence (%)	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
		Total Sample	Estimated Population		Total Sample	Estimated Population		Total Sample	Estimated Population
Malaysia	26.71	27.96	3,786,835	28.55	30.40	2,058,755	24.80	26.51	1,728,080
Zone									
South	29.44	28.62	389	33.07	37.75	204	25.62	22.11	185
Central	26.47	24.41	640	27.60	30.67	338	25.28	22.37	302
East Coast	27.17	23.93	259	28.52	33.61	126	25.75	21.37	133
North	23.10	20.17	206	25.88	30.80	107	20.45	16.74	99
Sabah	26.76	23.28	216	27.69	33.53	106	25.80	21.19	110
Sarawak	26.05	22.40	197	26.47	32.67	95	25.61	20.92	102
Strata									
Urban	26.60	24.96	1,008	29.50	32.05	550	23.61	21.44	458
Rural	26.87	25.11	899	27.17	29.82	426	26.56	24.14	473
Ethnic Group									
Malay	27.16	25.54	1,040	29.26	31.71	541	24.92	22.72	499
Chinese	24.95	22.50	405	29.00	33.10	229	20.86	17.83	176
Indian	31.01	26.64	195	29.33	36.21	88	32.62	26.49	107
Orang Asli PM	15.05	5.64	7	15.99	49.95	4	13.89	4.26	3
Bumiputera	23.73	19.47	106	24.33	31.75	47	23.19	17.52	59
Sabah									
Bumiputera	28.07	23.24	112	24.64	32.12	47	31.68	24.67	65
Sarawak									
Other	21.52	15.04	42	20.30	33.35	20	22.91	14.88	22
Bumiputera									
Sex									
Men	28.55	26.77	976	10.74	19.63	21	14.84	9.07	26
Women	24.80	23.16	931	22.62	25.83	210	17.70	15.29	195
Age Group									
18-19	12.76	8.60	47	18.859	18.53	21	78.901	23.35	26
20-29	20.20	18.27	405	858.364	22.28	210	488.840	20.39	195
30-39	29.17	27.03	582	1,066.212	31.41	325	647.023	26.10	257
40-49	34.14	31.60	546	990.983	36.78	271	519.839	36.94	275
50-59	35.17	32.06	327	686.417	39.53	149	324.152	44.17	178

Appendix 4. Prevalence of obesity by socio-demographic characteristics

Characteristics	Total						Men			Women					
	Prevalence (%)	95% CI		Total Sample	Estimated Population	Prevalence (%)	95% CI		Total Sample	Estimated Population	95% CI				
		Lower	Upper				Lower	Upper			Lower	Upper			
Malaysia	12.15	11.26	13.10	865	1,722,318	9.72	8.54	11.06	327	701,141	14.66	13.37	16.04	538	1,021,177
Zone															
South	13.81	11.79	16.12	189	410,462	10.03	7.65	13.04	67	152,856	17.79	14.74	21.32	122	257,606
Central	12.50	10.94	14.26	298	673,838	11.69	9.43	14.40	134	322,247	13.36	11.29	15.74	164	351,591
East Coast	11.90	9.63	14.61	111	192,406	7.84	5.44	11.17	34	65,208	16.20	12.54	20.68	77	127,198
North	12.72	10.58	15.22	123	240,021	7.68	5.32	10.96	33	70,554	17.50	14.15	21.45	90	169,467
Sabah	8.42	6.59	10.68	74	94,403	7.54	5.19	10.83	32	42,871	9.32	6.76	12.72	42	51,532
Sarawak	9.33	7.25	11.93	70	111,188	7.78	5.17	11.54	27	47,405	10.96	7.99	14.86	43	63,782
Strata															
Urban	12.01	10.82	13.32	466	1,014,113	10.90	9.20	12.87	203	467,231	13.16	11.55	14.97	263	546,882
Rural	12.34	11.08	13.73	399	708,205	8.00	6.59	9.69	124	233,910	16.86	14.83	19.10	275	474,295
Ethnic Group															
Malay	15.28	13.91	16.77	562	1,178,999	11.25	9.45	13.33	195	447,419	19.58	17.58	21.75	367	731,580
Chinese	7.20	5.94	8.69	128	254,757	7.77	6.00	10.01	68	138,390	6.61	4.96	8.77	60	116,367
Indian	12.66	10.16	15.67	91	173,768	10.41	7.22	14.78	31	69,692	14.81	11.20	19.31	60	104,075
Orang Asli PM						0.00	0.00	0.00	0	0	0.00	0.00	0.00	0	0
Bumiputera Sabah	7.86	5.56	11.01	37	45,693	8.41	5.06	13.64	18	23,187	7.37	4.58	11.67	19	22,506
Bumiputera Sarawak	6.82	4.60	10.00	28	42,262	5.33	2.80	9.91	11	16,932	8.39	5.09	13.53	17	25,330
Other Bumiputera	9.57	5.76	15.49	19	26,839	3.71	1.30	10.15	4	5,521	16.19	9.46	26.33	15	21,318
Sex															
Men	9.72	8.54	11.06	327	701,141										
Women	14.66	13.37	16.04	538	1,021,177										
Age Group															
18-19	5.94	3.11	11.08	23	86,125	6.52	2.33	16.96	11	47,922	5.35	2.66	10.48	12	38,203
20-29	10.26	8.80	11.93	200	435,807	9.42	7.46	11.83	88	203,641	11.12	9.07	13.56	112	232,165
30-39	12.68	11.20	14.33	258	463,639	10.08	8.16	12.40	92	186,627	15.36	13.20	17.79	166	277,012
40-49	15.12	13.27	17.19	247	438,933	10.26	8.19	12.77	86	151,933	20.19	17.21	23.55	161	287,001
50-59	15.49	12.89	18.51	137	297,814	11.31	8.33	15.19	50	111,018	19.85	15.78	24.67	87	186,796

Appendix 4 Continued

Characteristics	Total						Men						Women					
	Prevalence (%)	95% CI		Total Sample	Estimated Population	Prevalence (%)	95% CI		Total Sample	Estimated Population	Prevalence (%)	95% CI		Total Sample	Estimated Population			
		Lower	Upper				Lower	Upper				Lower	Upper					
Household Income																		
Less than RM1500	12.29	11.01	13.71	451	880,181	8.15	6.40	10.31	128	282,013	16.18	14.40	18.13	323	598,167			
RM1500 - RM3500	13.13	11.66	14.76	316	651,759	12.59	10.66	14.80	157	336,225	13.77	11.61	16.26	159	315,534			
More than RM3500	9.26	7.43	11.49	98	190,378	7.70	5.58	10.55	42	82,902	10.98	8.13	14.66	56	107,476			
Educational Level																		
Primary school	14.41	12.44	16.62	200	388,618	7.50	5.52	10.10	47	91,294	20.09	17.05	23.52	153	297,324			
Lower (PMR)	13.65	11.77	15.77	205	393,134	10.64	8.41	13.38	82	176,055	17.70	14.67	21.21	123	217,079			
Secondary school																		
Upper (SPM)	11.69	10.31	13.22	290	572,726	10.21	8.43	12.32	125	256,723	13.24	11.21	15.56	165	316,002			
Secondary school																		
Matriculation/ Form 6	7.11	4.75	10.52	29	55,979	6.58	3.25	12.88	9	20,311	7.46	4.63	11.79	20	35,668			
College/ University	9.87	7.42	13.03	94	216,937	11.12	7.49	16.19	57	144,005	8.09	5.73	11.30	37	72,932			
Others	11.33	7.91	15.97	43	78,328	4.04	1.70	9.29	6	8,678	14.61	9.98	20.89	37	69,651			

Appendix 5. Prevalence of CED by socio-demographic characteristics

Characteristics	Total						Men			Women					
	Prevalence (%)	95% CI		Total Sample	Estimated Population	Prevalence (%)	95% CI		Total Sample	Estimated Population	Prevalence (%)	95% CI		Total Sample	Estimated Population
		Lower	Upper				Lower	Upper				Lower	Upper		
Malaysia	9.02	8.82	10.61	628	1371,798	9.30	8.14	10.60	298	670,610	10.06	8.84	11.43	330	701,188
Zone															
South	8.29	6.84	10.02	117	246,521	8.76	6.75	11.30	59	133,520	7.80	5.86	10.32	58	113,000
Central	10.24	8.76	11.94	226	551,994	9.71	7.76	12.08	109	267,630	10.81	8.69	13.36	117	284,364
East Coast	10.50	8.11	13.51	84	169,842	8.59	5.97	12.21	38	71,439	12.54	8.75	17.65	46	98,403
North	10.00	7.72	12.87	82	188,767	10.22	7.12	14.45	41	93,892	9.80	6.76	14.01	41	94,875
Sabah	9.12	6.74	12.24	58	102,332	7.26	4.70	11.04	25	41,261	11.04	7.30	16.36	33	61,071
Sarawak	9.43	6.76	13.01	61	112,343	10.31	6.09	16.93	26	62,869	8.50	5.93	12.05	35	49,474
Strata															
Urban	9.78	8.67	11.02	354	825,923	9.19	7.77	10.85	170	394,048	10.40	8.76	12.30	184	431,875
Rural	9.52	8.22	10.99	274	545,875	9.46	7.61	11.70	128	276,562	9.57	7.86	11.61	146	269,313
Ethnic Group															
Malay	9.11	8.02	10.34	322	703,048	9.74	8.18	11.57	172	387,662	8.44	7.01	10.14	150	315,386
Chinese	9.70	7.97	11.75	148	343,285	6.49	4.76	8.78	49	115,540	12.95	10.12	16.42	99	227,745
Indian	12.58	9.53	16.43	74	172,705	15.05	10.27	21.54	41	100,783	10.23	6.90	14.92	33	71,922
Orang Asli PM	14.53	5.14	34.77	5	10,052	3.83	0.44	26.55	1	1,461	27.69	10.43	55.74	4	8,591
Bumiputera	10.62	6.83	16.15	29	61,708	7.75	4.23	13.76	12	21,365	13.22	7.31	22.71	17	40,343
Sabah															
Bumiputera	9.19	6.40	13.01	34	56,930	9.25	5.41	15.36	15	29,404	9.12	5.61	14.49	19	27,526
Sarawak															
Other	8.58	4.90	14.60	16	24,069	9.68	4.24	20.61	8	14,394	7.35	3.42	15.07	8	9,675
Bumiputera															
Sex															
Men	9.30	8.14	10.60	298	670,610										
Women	10.06	8.84	11.43	330	701,188										
Age Group															
18-19	26.24	21.12	32.09	122	380,162	25.69	18.53	34.46	66	188,824	26.80	19.99	34.91	56	191,338
20-29	13.55	11.98	15.29	288	575,584	13.70	11.56	16.15	140	295,979	13.39	11.17	15.97	148	279,605
30-39	4.66	3.77	5.74	102	170,389	3.74	2.64	5.29	37	69,286	5.60	4.31	7.26	65	101,103
40-49	4.35	3.30	5.71	65	126,299	4.95	3.42	7.13	35	73,402	3.72	2.47	5.58	30	52,897
50-59	6.21	4.41	8.68	51	119,364	4.39	2.63	7.25	20	43,119	8.10	5.17	12.48	31	76,245

Appendix 5 Continued

Characteristics	Total						Men						Women						
	Prevalence (%)		95% CI		Total	Estimated Population	Prevalence (%)		95% CI		Total	Estimated Population	Prevalence (%)		95% CI		Total	Estimated Population	
	Lower	Upper	Lower	Upper	Sample	Population	Lower	Upper	Lower	Upper	Sample	Population	Lower	Upper	Lower	Upper	Sample	Population	
Household Income																			
Less than RM1500	10.85	9.63	12.20	353	776,602	11.40	9.64	13.43	170	394,588	10.33	8.72	12.19	183	382,014				
RM1500 - RM3500	8.72	7.33	10.33	199	432,568	7.30	5.62	9.44	90	195,030	10.37	8.24	12.96	109	237,537				
More than RM3500	7.91	5.98	10.39	76	162,628	7.52	5.12	10.92	38	80,992	8.34	5.55	12.36	38	81,637				
Educational Level																			
Primary school	5.64	4.40	7.20	81	152,110	8.26	6.01	11.25	47	100,546	3.48	2.38	5.08	34	51,564				
Lower Secondary school (PMR)	7.60	6.14	9.36	116	218,883	6.83	5.19	8.95	60	113,026	8.63	6.23	11.85	56	105,856				
Upper Secondary school (SPM)	11.19	9.60	13.00	235	548,268	10.07	7.97	12.64	108	253,113	12.36	10.08	15.07	127	295,154				
Matriculation/ College/ University	14.05	10.24	18.96	49	110,520	12.10	6.96	20.21	18	37,315	15.30	10.37	22.00	31	73,206				
Form 6	11.89	9.62	14.61	112	261,246	10.01	7.57	13.12	53	129,689	14.59	10.63	19.71	59	131,557				
Others	11.68	7.47	17.81	35	80,771	17.20	7.84	33.65	12	36,921	9.20	5.62	14.69	23	43,850				