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2015

NON-COMMUNICABLE DISEASES, RISK FACTORS & OTHER HEALTH PROBLEMS

VOLUME II

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VOLUME II   :

Non-Communicable Diseases, Risk Factors & Other Health Problems

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Volumes in this series

The report comprises of several volumes, as follows:

  i.   Volume I   : Methodology and General Findings
  ii. Volume II   : Non-Communicable Diseases, Risk Factors &
                      Other Health Problems
  iii. Volume III : Health Care Demands
  iv. Volume IV : Traditional & Complementary Medicine

Disclaimer
The views expressed in this report are those of the authors alone and do not necessarily represent the opinions of the other investigators participating in the survey, nor the views or policy of the Ministry of Health Malaysia.

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TOPIC 1

CARDIOVASCULAR DISEASES

1. CARDIOVASCULAR DISEASES

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Background

Non-Communicable Diseases (NCDs) now contribute to an estimated 73% of total deaths in Malaysia, with the biggest contributor being cardiovascular diseases that include heart attacks and strokes. An estimated 35% of deaths occur in individuals aged less than 60 years, which are mainly our working population. The Second Burden of Disease Study for Malaysia, published by the Institute for Public Health in 2012, ranked hypertension, smoking, diabetes, high cholesterol and high BMI as the biggest contributors to both disability adjusted life-years (DALY) and deaths.

Data from the previous National Health and Morbidity Surveys (NHMS) showed an increasing trend for all NCD risk factors. An analysis of NHMS 2011 showed that at least 63% of adults aged 18 years and above had at least one NCD risk factor (either overweight/obesity, high blood pressure, high blood sugar or high blood cholesterol). In short, Malaysia now has a "sick" or "at risk" population. More alarmingly, our children are just as vulnerable to the risk of NCDs right from foetal development and increase further during childhood with the exposure to unhealthy diets, lack of exercise as well as smoking and excessive alcohol consumption.

Our healthcare delivery systems are facing with increasing pressure to provide quality care to patients with NCDs and their various complications. Chronic diseases place a substantial economic burden on society. Estimates by the United States place the costs of chronic illness at around three-quarters of the total national health expenditure. Some individual chronic diseases, such as diabetes, account for between 2% and 15% of national health expenditure in some European countries. Our NHMS data also showed a high proportion of Malaysians with undiagnosed NCD risk factors. This contributes to late diagnosis, with complications and much more difficult and costly to manage, further contributing to the increasing burden of NCDs in the country.

1.1 DIABETES MELLITUS

1.1.1 Objectives

1.1.1.1   General Objective
To determine the prevalence of diabetes in Malaysia.

1.1.1.2   Specific Objectives
a.   To determine the prevalence of overall diabetes by socio-demographic sub-groups;
b.   To determine the prevalence of known diabetes by socio-demographic sub-groups; and
c.   To determine the prevalence of undiagnosed diabetes by socio-demographic subgroups.

1.1.2 Findings

1.1.2.1   Overall Diabetes Prevalence

The diabetes survey was carried out on all respondents 18 years old and above by questionnaire and measurement of finger-pricked fasting blood glucose using the CardioChek portable blood test system. A total of 19,935 respondents responded to the diabetes questionnaire and 16,361 out of 17,809 (91.9%) respondents who claimed that they were not diabetic consented for the finger-prick test.

The overall prevalence of diabetes mellitus (known and undiagnosed) among adults of 18 years and above in this survey was 17.5% (95% CI: 16.6, 18.3). There was a general increasing trend in prevalence with age, from 5.5% (95% CI: 3.9, 7.7) in the 18-19 years age group, reaching a peak of 39.1% (95% CI: 33.6, 44.9) among the 70-74 years age group.

The prevalence was slightly higher in the urban areas at 17.7% (95% CI: 16.7, 18.8) compared to rural at 16.7% (95% CI: 15.4, 18.1) but the difference was not statistically significant. There was a large variation between states, with the highest prevalence in Kedah at 25.4% (95%CI: 21.0, 30.3), followed by Perlis at 20.6% (95% CI: 18.0, 23.5) and Johor at 19.8% (95% CI: 16.8, 23.3); while the lowest being Sabah & Wilayah Persekutuan Labuan at 14.2% (95% CI: 12.2, 16.4), Sarawak at 14.8% (95% CI: 12.1, 18.2) and Pahang at 14.8% (95% CI: 12.4, 17.6).

The prevalence was higher in females at 18.3% (95% CI: 17.2, 19.4) compared to males at 16.7% (95% CI: 15.7, 17.8) but the difference was not statistically significant. In terms of the main ethnic groups, the differences were statistically significant. The Indians had the highest prevalence at 22.1% (95% CI: 19.2, 25.3), followed by the Malays at 14.6% (95% CI: 13.8, 15.5), the Chinese at 12.0% (95% CI: 10.7, 13.5), and lastly, Other Bumiputras at 10.7% (95% CI: 8.8, 13.0).

1.1.2.2   Prevalence of Known Diabetes

For this survey, "known diabetes" was defined as self-reported of being told to have diabetes by a doctor or assistant medical officer (AMO).

The prevalence of individuals with known diabetes was at 8.3% (95% CI: 7.8, 8.8). There was also a general increasing trend with age, starting from 0.7% (95% CI: 0.3, 1.5) within the age group of 20-24 years old, reaching a peak of 27.9% (95% CI: 22.7, 33.9) at age group 70-74 years.

The prevalence was higher in the urban areas at 8.7% (95% CI: 8.0, 9.3) compared to rural at 7.2% (95% CI: 6.6, 7.9) and the difference was statistically significant. Again, there was a large variation between states; the highest prevalence being in Perak at 11.9% (95% CI: 9.9, 14.3), followed by Perlis at 10.9% (95% CI: 9.3, 12.7) and Negeri Sembilan at 10.5% (95% CI: 8.5, 12.9); while the lowest being WP Putrajaya at 5.3% (95% CI: 3.3, 8.5) and Sabah and Wilayah Persekutuan Labuan at 5.9% (95% CI: 4.7, 7.4).

The prevalence was higher in females at 9.1% (95% CI: 8.4, 9.8) compared to males at 7.6% (95% CI: 7.0, 8.3) and the difference was statistically significant. In terms of the main ethnic groups, the differences were statistically significant. The Indians had the highest prevalence at 16.0% (95% CI: 13.7, 18.6), followed by the Malays at 9.0% (95% CI: 8.4, 9.7), Chinese at 7.7% (95% CI: 6.7, 8.9) and Other Bumiputras at 6.8% (95% CI: 5.3, 8.8).

Among the known diabetics, 25.1% claimed that they were on insulin therapy, 79.1% claimed to be on oral anti-diabetic drugs within the past 2 weeks, 82.3% had received specific diabetes diet advice from a healthcare personnel, 69.6% claimed to have been advised by healthcare personnel to lose weight and 76.8% have been advised to be more physically active or start exercising. With regards to their usual place of treatment, majority sought treatment at MOH health clinics (59.3%), followed by MOH hospitals (20.0%), private clinics (15.1%) and private hospitals (3.6%). About 1.5% self-medicated by purchasing medications directly from pharmacies and 0.5% opted for traditional and complementary medicine as their main mode of treatment.

1.1.2.3   Prevalence of Undiagnosed Diabetes

For this survey, a respondent was classified as having "undiagnosed diabetes" when the respondent was not known to have diabetes and had a fasting capillary blood glucose (FBG) of 6.1 mmol/L or more (or non-fasting blood glucose of more than 11.1 mmol/L).

The prevalence of undiagnosed diabetes was 9.2% (95% CI: 8.5, 9.9). There was also a general increasing trend with age, starting from 5.5% (95% CI: 3.9, 7.7) at age group 18-19 years, reaching a peak of 13.6% (95% CI: 10.7, 17.1) at age group 65-69 year olds.

The prevalence was higher in the rural compared to the urban areas, however the difference was not statistically significant. Again, there was a large variation between states; the highest prevalence being in Kedah at 16.1% (95% CI: 12.3, 20.7), followed by WP Putrajaya at 13.9% (95% CI: 11.1, 17.4) and Kelantan at 11.3% (95% CI: 9.2, 13.9), while the lowest being Sarawak at 6.6% (95% CI: 5.1, 8.5), Perak at 7.4% (95% CI: 6.2, 8.9) and Selangor at 7.7% (95% CI: 6.4, 9.3).

The prevalence was slightly higher in females at 9.2% (95% CI: 8.4, 10.1) compared to males at 9.1% (95% CI: 8.3, 10.0), but the difference was not statistically significant. The Indians had the highest prevalence at 11.9% (95% CI: 9.5, 14.9), followed by the Malays at 9.8% (95% CI: 9.1, 10.6), Others at 8.6% (95% CI: 6.7, 11.1), Other Bumiputras at 8.1% (95% CI: 6.6, 9.8) and Chinese at 7.7% (95% CI: 6.4, 9.4).

1.1.2.4   *Prevalence of Impaired Fasting Glucose*

For this survey, a respondent was classified as having "impaired fasting glucose" or IFG when the respondent was not known to have diabetes and had a fasting capillary blood glucose (FBG) of between 5.6 and less than 6.1 mmol/L.

The prevalence of IFG was 4.7% (95% CI: 4.3, 5.2). The differences by age groups were not statistically significant, hovering between 3.6% and 6.0%.

There was no significant difference in prevalence between urban and rural areas. There was variation between states; the highest prevalence being in Johor at 7.2% (95% CI: 6.0, 8.6), while the lowest being in Sarawak at 2.9% (95% CI: 1.8, 4.8).

No significant difference in gender was observed. By ethnicity, the Indians had the highest prevalence at 7.7% (95% CI: 5.6, 10.6), followed by the Malays at 5.2% (95% CI: 4.7, 5.8), Others at 4.3% (95% CI: 3.0, 6.3), and lastly the Chinese at 3.8% (95% CI: 2.9, 4.9).

1.2 HYPERTENSION

1.2.1 Objectives

1.2.1.1   General Objective
To determine the prevalence of hypertension in Malaysia.

1.2.1.2   Specific Objectives
a. To determine the prevalence of overall hypertension by socio-demographic sub-groups;
b. To determine the prevalence of known hypertension by socio-demographic sub-groups; and
c. To determine the prevalence of undiagnosed hypertension by socio-demographic subgroups.

1.2.2 Findings

1.2.2.1   Overall Hypertension Prevalence

The hypertension survey was carried out on all respondents 18 years old and above by questionnaire and measurement of their blood pressure using the Omron Digital Automatic Blood Pressure Monitor Model HEM-907. A total of 19,936 respondents responded to the hypertension questionnaire and 16,017 out of 16,681 (96.0%) respondents who claimed that they were not hypertensive consented for the blood pressure measurement.

The overall prevalence of hypertension (known and undiagnosed) among adults of 18 years and above in this survey was 30.3% (95% CI: 29.3, 31.2). There was a general increasing trend in prevalence with age, from 6.7% (95% CI: 4.7, 9.4) in the 18-19 years age group, reaching a peak of 75.4% (95% CI: 70.5, 79.7) among the 70-74 years age group.

The prevalence was significantly higher in the rural areas at 33.5% (95% CI: 31.6, 35.4) compared to urban areas at 29.3% (95% CI: 28.2, 30.4). There was a large variation between states, with the highest prevalence in Kedah at 37.5% (95% CI: 33.5, 41.6), followed by Sarawak at 37.3% (95% CI: 33.7, 41.1) and Perak at 36.4% (95% CI: 33.2, 39.8), while the lowest was Wilayah Persekutuan Putrajaya at 24.1% (95% CI: 19.0, 30.0).

No significant difference between genders was observed with the prevalence in males being 30.8 %(95% CI 29.5, 32.2) and females at 29.7% (95% CI 28.5, 30.9). In terms of the main ethnic groups, the Other Bumiputras had the highest prevalence at 33.4% (95% CI: 30.6, 36.3), followed by the Indians at 32.4% (95% CI: 29.3, 35.6), Malay at 31.1% (95% CI: 29.9, 32.4), and lastly the Chinese at 30.8% (95% CI: 28.7, 33.0).

1.2.2.2   Prevalence of Known Hypertension

For this survey, "known hypertension" was defined as self-reported of being told to have hypertension by a doctor or assistant medical officer (AMO).

The prevalence of individuals with known hypertension was 13.1% (95% CI: 12.4, 13.8). There was a general increasing trend in the prevalence with age, from 0.7% (95% CI: 0.2, 1.8) in the 18-19 year age group, reaching a peak of 50.4% (95% CI: 44.7, 56.1) among the 70 to 74 years age group.

The prevalence of known hypertension was higher in the urban areas at 13.2% (95% CI: 12.4, 14.0) compared to rural areas at 12.8% (95% CI: 11.7, 13.9), however the difference was not significant. There was a large variation between states; the highest prevalence being in Perak at 17.3% (95% CI: 14.8, 20.1), followed by Sarawak at 16.5% (95% CI: 14.1, 19.3) and Negeri Sembilan at 16.1% (95% CI: 12.8, 20.2), while the lowest being Wilayah Persekutuan Putrajaya at 10.0% (95% CI: 6.8, 14.3).

No significant difference between genders was observed, with females having a prevalence of 14.0% (95% CI 13.2, 14.9) and the males with 12.2% (95% CI 11.3, 13.1). By ethnicity, the Indians had the highest prevalence at 17.0% (95% CI: 14.7, 19.5), followed by Other Bumiputras at 15.7% (95% CI: 13.7, 18.0), Chinese at 15.2% (95% CI: 13.7, 16.8), and lastly the Malays at 12.5% (95% CI: 11.7, 13.4).

Among the known hypertensives, 81.2% claimed to be on oral anti-hypertensive drugs within the past 2 weeks, 85.9% had received specific diet advice from healthcare personnel, 69.8% claimed to have been advised by healthcare personnel to lose weight and 80.4% had been advised to be more physically active or start exercising. With regards to their usual place of treatment, more than half of them sought treatment at MOH health clinics (58.3%), followed by private clinics (19.0%), MOH hospitals (17.7%), and private hospitals (2.7%). About 2.0% self-medicated by purchasing medications directly from pharmacies and 0.3% opted for traditional and complementary medicine as their main mode of treatment.

1.2.2.3   Prevalence of Undiagnosed Hypertension

For this survey, a respondent was classified as having "undiagnosed hypertension" when the respondent was not known to have hypertension and had a systolic blood pressure of 140 mmHg or more and/or diastolic blood pressure of 90 mmHg or more.

The prevalence of undiagnosed hypertension was 17.2% (95% CI: 16.4, 18.0). There was a general increasing trend in prevalence with age, from 6.0% (95% CI: 4.1, 8.7) in the 18-19 years age group, reaching a peak of 28.7% (95% CI: 25.1, 32.6) among the 65-69 years age group.

The prevalence was significantly higher in the rural areas at 20.7% (95% CI: 19.3, 22.2) compared to urban areas at 16.1% (95% CI: 15.2, 17.0). There was a large variation between states; the highest prevalence of 23.2% were in the 2 states; Kedah (95% CI9.7, 27.1) and Kelantan (95% CI 20.1, 26.6), followed by WP Kuala Lumpur at 22.6% (95% CI: 19.0, 26.7), while the lowest was Melaka at 12.7% (95% CI: 9.6, 16.5).

The prevalence of undiagnosed hypertension was significantly higher in males at 18.6% (95% CI: 17.5, 19.8) compared to females at 15.6 (95% CI: 14.7, 16.6). By ethnicity, Malays had the highest prevalence at 18.6% (95% CI: 17.6, 19.6), followed by Other Bumiputras at 17.6% (95% CI: 15.4, 20.1), Chinese at 15.6% (95% CI: 14.0, 17.3), and lastly Indians at 15.4% (95% CI: 12.9, 18.2).

1.3 HYPERCHOLESTEROLEMIA

1.3.1   Objectives

1.3.1.1   General Objective
To determine the prevalence of hypercholesterolemia in Malaysia.

1.3.1.2   Specific Objectives
a. To determine the prevalence of overall hypercholesterolemia by socio-demographic sub-groups;
b. To determine the prevalence of known hypercholesterolemia by socio-demographic sub-groups; and
c. To determine the prevalence of undiagnosed hypercholesterolemia by socio-demographic subgroups.

1.3.2   Findings

1.3.2.1   Overall Hypercholesterolemia Prevalence

The hypercholesterolemia survey was carried out on all respondents aged 18 years old and above by questionnaire and measurement of finger-pricked total cholesterol using the CardioChek portable blood test system. A total of 19,935 respondents responded to the hypercholesterolemia questionnaire, and 16,225 out of 17,712 (91.6%) respondents who claimed that they were not having high cholesterol consented for the finger-prick test.

The overall prevalence of hypercholesterolemia (known and undiagnosed) among adults of 18 years and above in this survey was 47.7% (95% CI: 46.5, 48.9). There was a general increasing trend in the prevalence of hypercholesterolemia with age, from 22.0% (95% CI: 18.8, 25.7) in the 18-19 years age group, reaching a peak of 68.8% (95% CI: 65.9, 71.5) among the 55-59 years age group.

The prevalence of hypercholesterolemia was comparable among respondents in the rural 47.7% (95% CI urban: 46.3, 49.2) and urban areas (95% CI rural: 45.6, 49.7). There was a large variation between states, with the highest prevalence in Pahang at 56.2% (95% CI: 52.2, 60.3), followed by Kedah at 53.5% (95% CI: 48.5, 58.4) and WP Kuala Lumpur at 52.9% (95% CI: 47.7, 58.1), while the lowest was Sabah and WP Labuan at 40.9 % (95% CI: 36.9, 45.0).

The prevalence was significantly higher among females at 52.2% (95% CI: 50.7, 53.7) compared to males at 43.5% (95% CI: 42.0, 45.1). In terms of the main ethnic groups, the Malays and Indians had the highest prevalence at both Malays and Indians had the same prevalence of 50.1% (95% CI: 48.7, 51.5) for Malays, (95% CI: 46.2, 53.9) for Indians, and lastly the Chinese at 47.5% (95% CI: 44.7, 50.3).

1.3.2.2   Prevalence of Known Hypercholesterolemia

For this survey, "known hypercholesterolemia" was defined as self-reported of being told to have hypercholesterolemia by a doctor or assistant medical officer (AMO).

The prevalence of individuals with known hypercholesterolemia was 9.1% (95% CI: 8.6, 9.7). There was also a general increasing trend with age, starting from 0.2% (95% CI: 0.04, 0.7) within the age group of 18-19 years, reaching a peak of 25.2% (95% CI: 22.1, 28.7) in the 60-64 years age group.

The prevalence was significantly higher in the urban areas at 9.7% (95% CI: 9.0, 10.5) compared to rural areas at 7.1% (95% CI: 6.4, 8.0). Again, there was a large variation between states, the highest prevalence being in Perlis at 13.8% (95% CI: 11.7, 16.3), followed by Sarawak at 12.6% (95% CI: 10.0, 15.6) and Penang at 12.2% (95% CI: 9.5, 15.4), while the lowest was in Kelantan at 5.3% (95% CI: 4.0, 6.9).

No significant difference between genders was observed. By ethnicity, the Indians had the highest prevalence at 12.3% (95% CI: 10.1, 14.8), followed by the Other Bumiputras at 11.2% (95% CI: 9.2, 13.6), Chinese at 11.0% (95% CI: 9.7, 12.4), and lastly the Malays at 8.7% (95% CI: 8.0, 9.5).

Among the known hypercholesterolemia, 66.8% claimed to be on oral drugs within the past 2 weeks, 84.4% had received specific diet advice from healthcare personnel, 70.3% claimed to have been advised by healthcare personnel to lose weight and 81.3% have been advised to be more physically active or start exercising. With regards to their usual place of treatment, half of them seek treatment at MOH health clinics (50.0%), followed by private clinics (23.7%), MOH hospitals (19.1%), and private hospitals (4.6%). About 2.3% self-medicate by purchasing medications directly from pharmacies and 0.3% opted for traditional and complementary medicine as their main mode of treatment.

1.3.2.3   *Prevalence of Undiagnosed Hypercholesterolemia*

For this survey, a respondent was classified as having "undiagnosed hypercholesterolemia" when the respondent was not known to have hypercholesterolemia and had a total blood cholesterol of 5.2 mmol/L or more.

The prevalence of undiagnosed hypercholesterolemia was 38.6% (95% CI: 37.4, 39.8). There was also a general increasing trend with age starting from 21.9% (95% CI: 18.6, 25.6) at age group of 18-19 years, reaching a peak of 48.5% (95% CI: 45.3, 51.8) at the age group of 55-59 years.

The prevalence was significantly higher in the rural areas at 40.5% (95% CI: 38.5, 42.6) compared to urban areas at 38.0% (95% CI: 36.6, 39.4). Again there was a large variation between states; the highest prevalence was recorded in Pahang at 50.2% (95% CI: 46.5, 53.8), followed by Kelantan at 46.5% (95% CI: 42.4, 50.6) and Kedah at 46.1% (95% CI: 41.1, 51.1), while the lowest prevalence was found in Sabah and WP Labuan at 32.6% (95% CI: 28.7, 36.8).

The prevalence of undiagnosed hypercholesterolemia was much higher in females at 42.4% (95% CI: 41.0, 43.9) compared to males at 35.0% (95% CI: 33.6, 36.5). By ethnicity, Malays had the highest prevalence at 41.4% (95% CI: 40.0, 42.8), followed by the Indians at 37.8% (95% CI: 33.8, 42.0), and lastly the Chinese at 36.5% (95% CI: 33.7, 39.3).

1.4 IMPLICATIONS

The overall prevalence of three major Non-Communicable Disease (NCD) risk factors remained high; i.e. high blood sugar (diabetes) and high blood cholesterol (hypercholesterolemia) continues to increase in Malaysia, while high blood pressure (hypertension) showed a decrease.

The prevalence of diabetes in Malaysia had increased a relative of 15%, from 15.2% (2011) to the current 17.5%, compared to the relative increase of 31.0% between 2006 (prevalence: 11.6%) and 2011. This increase was mostly contributed by the increased proportion of "undiagnosed diabetes", similar to 2011. Almost similar to 2011, current data shows that "undiagnosed diabetes remains at 9.2% i.e. for every one "diagnosed diabetes", there is one "undiagnosed diabetes" (a ratio of 1:1).

The prevalence of "impaired fasting glucose" had remained somewhat constant, from 4.2% (2006), 4.9% (2011) to the current 4.7%.

The prevalence of diabetes in Sabah, WP Labuan and Sarawak are currently on par with several other states in the Peninsular as compared to before year 2006 when the prevalences was much lower in these states.

The prevalence of hypertension in Malaysia had decreased, from 32.7% (2011) to the current 30.3%, as compared to the slight increase between 2006 (prevalence: 32.2%) and 2011. However, similar to 2011, the proportion of "undiagnosed hypertension" remains high at 17.2% i.e. for every two "diagnosed hypertension", there are three "undiagnosed hypertension" (a ratio of 2:3). This ratio is similar to 2011.

The prevalence of hypercholesterolemia in Malaysia continued to increase from 32.6% in 2011 to 47.7%, a relative increase of 46%, compared to the relative increase of 58% between 2006 (prevalence: 20.7%) and 2011. The increase was mostly contributed to "undiagnosed". The proportion of "undiagnosed hypercholesterolemia" has increased to 38.6% from 26.6% (2011). For every one "diagnosed hypercholesterolemia", there were four "undiagnosed hypercholesterolemia" (a ratio of 1:4), similar to 2011.

1.5 CONCLUSION

The overall increasing or high prevalence of these three major NCD risk factors will increase the burden of disease of NCDs in Malaysia. NCD is already the main cause of death in Malaysia and the biggest contributor in terms of disability life-years (DALY) [1]. The number of patients diagnose with NCDs will continue to rise and they will seek treatment at all levels of care. With the increasing economic pressure Malaysia is facing currently, it is expected that many more will turn to the public healthcare sector for treatment.

By nature, NCDs are silent diseases, and therefore the high proportions of individuals with undiagnosed NCD risk factors are particularly worrying. Low detection results in individuals presenting later in the course of their disease, at an advanced stage where the risk of complications is already high or presenting already with disease-related complications particularly cardiovascular events such as heart attack and stroke. These patients are much more difficult and costly to manage. Specific for diabetes, a study had shown that up to 73% of diabetes-related healthcare costs result from hospitalization and ambulatory care, as a result of complications due to poor blood sugar control[2]. With the increasing burden of NCDs, it will only be a matter of time when our highly subsidized public healthcare system reaches its breaking point.

1.6 RECOMMENDATIONS

At the 65th World Health Assembly in May 2013, the Assembly adopted the Global Action Plan for the Prevention and Control of Non-Communicable Diseases (GAP-NCD) 2013-2020[3]. At the same meeting, the Assembly also adopted the Global Monitoring Framework for NCD (GMF-NCD) with 25 indicators and nine voluntary global targets[4].

Malaysia has already set the national targets for NCDs based on the voluntary global targets for year 2025 against the baseline in 2010. The indicators relevant to this section are:

- Diabetes: Prevalence of not more than 15.0%
- Hypertension: Reducing the prevalence to less than 24.0%

The National Strategic Plan for Non-Communicable Diseases (NSP-NCD) 2010-2014 was developed to strengthen Malaysia's response to NCD prevention and control. Based on the latest findings, it is obvious that there are many gaps in implementation that needs to be addressed. The post-2015 Strategic Plan is currently being developed must critically examine Malaysia's response thus far to this NCD epidemic, if we are ever to achieve the ambitious global targets.

Current scientific evidence shows that increasing knowledge and awareness by themselves are inadequate to change behaviours. Our own experiences from the various national healthy lifestyle campaigns from early 1990s attest to this fact. We need to adopt a more aggressive approach, combining both soft and hard policies. An effective response requires that individuals and societies take more responsibility for their own health, while at the same time governments must take strong action to reduce the exposure of its population to NCD risk factors through hard policies.

There are many lessons that we can learn from the various hard policies currently implemented in many countries and the scientific base of effectiveness of these interventions are rapidly expanding. The creation of health-promoting environments requires strong political will and the healthcare sector must continue to be strong advocates in championing hard policies for the country.

Starting in October 2013, the Ministry of Health had embarked on an aggressive and intensified community-based intervention, called the "Komuniti Sihat, Perkasa Negara" ("KOSPEN" or Strengthening communities, empowering the Nation) initiative. Through a blue ocean strategy, the MOH has collaborated with other government ministries and agencies with existing programs and activities at the grass-root levels such as the Department of Community Development (KEMAS) and the Community Watch (Rukun Tetangga or RT) under the Department of National Unity and Integration (JPNIN) by establishing KOSPEN-KEMAS and KOSPEN-RT respectively. The five main scopes of KOSPEN are healthy eating, active living, weight management, smoke-free (or not smoking) and screening for NCD risk factors, MOH must ensure adequate resources are allocated for KOSPEN to ensure its success.

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Table 1.1.1: Prevalence of overall diabetes by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	4,229	3,529,804	17.5	16.6	18.3
State					
Johor	421	472,454	19.8	16.8	23.3
Kedah	336	334,370	25.4	21.0	30.3
Kelantan	256	185,828	18.5	15.9	21.3
Melaka	251	95,518	16.7	13.5	20.6
Negeri Sembilan	306	131,288	19.3	16.6	22.4
Pahang	219	147,676	14.8	12.4	17.6
Penang	288	218,925	18.1	14.0	23.2
Perak	323	320,042	19.4	17.1	21.9
Perlis	370	33,090	20.6	18.0	23.5
Selangor	483	649,586	15.5	13.8	17.4
Terengganu	257	127,439	18.6	16.1	21.3
Sabah & WP Labuan	272	326,590	14.2	12.2	16.4
Sarawak	216	260,126	14.8	12.1	18.2
WP Kuala Lumpur	136	217,512	17.4	14.3	21.1
WP Putrajaya	95	9,362	19.2	15.8	23.3
Location					
Urban	2,368	2,728,211	17.7	16.7	18.8
Rural	1,861	801,593	16.7	15.4	18.1
Sex					
Male	1,908	1,741,166	16.7	15.7	17.8
Female	2,321	1,788,638	18.3	17.2	19.4
Age Group					
18-19	47	52,477	5.5	3.9	7.7
20-24	129	167,775	5.9	4.7	7.3
25-29	202	247,025	8.9	7.5	10.5
30-34	218	278,454	10.6	8.9	12.6
35-39	252	267,966	12.9	11.1	15.0
40-44	340	331,893	17.9	15.5	20.6
45-49	438	367,890	22.0	19.6	24.6
50-54	564	407,145	27.0	24.4	29.7
55-59	576	416,832	32.9	30.1	35.9
60-64	514	358,827	38.3	34.8	41.9
65-69	403	263,755	38.0	33.7	42.4
70-74	276	158,149	39.1	33.6	44.9
75+	270	211,617	37.0	32.6	41.7

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	2,191	1,450,762	14.6	13.8	15.5
Chinese	455	569,688	12.0	10.7	13.5
Indians	350	303,228	22.1	19.2	25.3
Other Bumiputras	203	232,054	10.7	8.8	13.0
Others	123	149,589	7.4	5.9	9.4
Marital Status					
Single	380	447,041	7.9	6.9	9.1
Married	3,187	2,667,950	20.3	19.3	21.3
Widow/widower/divorcee	662	414,814	29.5	27.0	32.3
Education Level					
No formal education	436	328,535	27.9	24.4	31.6
Primary education	1,409	1,018,619	24.8	22.9	26.9
Secondary education	1,736	1,517,874	16.2	15.2	17.4
Tertiary education	609	633,703	12.0	10.7	13.4
Unclassified education	36	28,993	10.4	6.4	16.6
Occupation					
Government/semi government employee	390	332,575	17.3	15.2	19.6
Private employee	836	970,047	12.1	11.0	13.3
Self employed	791	603,557	17.7	16.1	19.5
Unpaid worker/home maker	853	643,467	22.3	20.5	24.2
Retiree	317	232,880	38.2	34.0	42.6
Household Income Group					
Less than RM 1000	865	603,884	22.1	20.0	24.3
RM 1000 - RM 1999	838	615,880	18.5	16.9	20.3
RM 2000 - RM 2999	707	593,166	18.1	16.3	20.1
RM 3000 - RM 3999	544	453,604	17.4	15.5	19.6
RM 4000 - RM 4999	330	331,025	16.7	14.4	19.3
RM 5000 - RM 5999	263	240,802	15.1	12.9	17.7
RM 6000 - RM 6999	171	163,310	15.5	12.6	19.1
RM 7000 - RM 7999	143	127,326	15.6	12.3	19.6
RM 8000 - RM 8999	102	101,960	14.9	11.8	18.5
RM 9000 - RM 9999	57	69,078	19.4	14.2	26.0
RM 10000 & above	209	229,769	12.9	10.8	15.3
Quintile Household Income Group					
Quintile 1	758	519,581	22.1	19.9	24.5
Quintile 2	862	645,310	18.8	17.2	20.5
Quintile 3	907	762,122	18.3	16.7	20.0
Quintile 4	811	731,878	16.6	15.1	18.2
Quintile 5	891	870,914	14.9	13.6	16.4

Table 1.1.2: Prevalence of known diabetes by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,126	1,678,680	8.3	7.8	8.8
State					
Johor	198	210,510	8.8	7.3	10.7
Kedah	142	122,462	9.3	7.8	11.1
Kelantan	112	71,799	7.1	6.1	8.4
Melaka	140	47,535	8.3	6.7	10.4
Negeri Sembilan	174	71,451	10.5	8.5	12.9
Pahang	98	62,338	6.3	4.9	7.9
Penang	141	109,040	9.0	7.3	11.1
Perak	192	197,158	11.9	9.9	14.3
Perlis	206	17,555	10.9	9.3	12.7
Selangor	266	325,876	7.8	6.6	9.1
Terengganu	127	59,422	8.7	7.0	10.7
Sabah & WP Labuan	122	134,998	5.9	4.7	7.4
Sarawak	117	144,868	8.3	6.3	10.8
WP Kuala Lumpur	67	101,090	8.1	6.1	10.7
WP Putrajaya	24	2,578	5.3	3.3	8.5
Location					
Urban	1,209	1,332,094	8.7	8.0	9.3
Rural	917	346,586	7.2	6.6	7.9
Sex					
Male	905	792,152	7.6	7.0	8.3
Female	1,221	886,529	9.1	8.4	9.8
Age Group					
18-19	1	240	0.0	0.0	0.2
20-24	12	19,282	0.7	0.3	1.5
25-29	31	40,024	1.4	1.0	2.2
30-34	50	89,377	3.4	2.4	4.8
35-39	71	71,473	3.4	2.6	4.5
40-44	133	128,803	6.9	5.6	8.6
45-49	199	175,193	10.5	8.9	12.2
50-54	301	223,644	14.8	12.8	17.1
55-59	351	260,301	20.6	18.2	23.2
60-64	337	248,462	26.5	23.3	30.0
65-69	268	169,304	24.4	21.0	28.1
70-74	194	113,024	27.9	22.7	33.9
75+	178	139,554	24.4	20.5	28.8

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,395	894,514	9.0	8.4	9.7
Chinese	300	365,693	7.7	6.7	8.9
Indians	254	219,258	16.0	13.7	18.6
Other Bumiputras	130	148,051	6.8	5.3	8.8
Others	47	51,166	2.5	1.7	3.8
Marital Status					
Single	76	83,482	1.5	1.1	2.0
Married	1,648	1,349,204	10.3	9.6	11.0
Widow/widower/divorcee	402	245,995	17.5	15.4	19.9
Education Level					
No formal education	243	176,741	15.0	12.3	18.2
Primary education	812	562,459	13.7	12.4	15.1
Secondary education	798	674,946	7.2	6.6	7.9
Tertiary education	258	256,784	4.9	4.1	5.7
Unclassified education	14	7,451	2.7	1.4	5.2
Occupation					
Government/semi government employee	190	174,927	9.1	7.7	10.7
Private employee	300	322,970	4.0	3.5	4.7
Self employed	312	231,767	6.8	5.9	7.8
Unpaid worker/home maker	468	347,288	12.0	10.7	13.5
Retiree	211	160,214	26.3	22.7	30.2
Household Income Group					
Less than RM 1000	507	335,251	12.2	10.7	14.0
RM 1000 - RM 1999	433	291,589	8.8	7.7	10.0
RM 2000 - RM 2999	322	253,006	7.7	6.6	9.1
RM 3000 - RM 3999	263	205,409	7.9	6.7	9.3
RM 4000 - RM 4999	156	145,819	7.4	6.0	9.0
RM 5000 - RM 5999	118	110,983	7.0	5.5	8.8
RM 6000 - RM 6999	79	78,004	7.4	5.7	9.7
RM 7000 - RM 7999	59	59,090	7.2	5.3	9.7
RM 8000 - RM 8999	51	56,336	8.2	6.0	11.3
RM 9000 - RM 9999	22	24,765	7.0	4.4	10.9
RM 10000 & above	116	118,429	6.6	5.2	8.3
Quintile Household Income Group					
Quintile 1	454	295,594	12.6	10.9	14.4
Quintile 2	444	304,309	8.9	7.8	10.1
Quintile 3	420	334,861	8.0	7.0	9.2
Quintile 4	387	320,390	7.3	6.4	8.2
Quintile 5	421	423,527	7.3	6.4	8.2

Table 1.1.3: Prevalence of undiagnosed diabetes by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,103	1,851,124	9.2	8.5	9.9
State					
Johor	223	261,944	11.0	8.8	13.7
Kedah	194	211,908	16.1	12.3	20.7
Kelantan	144	114,029	11.3	9.2	13.9
Melaka	111	47,982	8.4	6.0	11.7
Negeri Sembilan	132	59,837	8.8	7.2	10.8
Pahang	121	85,338	8.6	6.4	11.3
Penang	147	109,885	9.1	5.9	13.9
Perak	131	122,884	7.4	6.2	8.9
Perlis	164	15,535	9.7	7.8	11.9
Selangor	217	323,710	7.7	6.4	9.3
Terengganu	130	68,017	9.9	7.6	12.9
Sabah & WP Labuan	150	191,592	8.3	6.7	10.3
Sarawak	99	115,258	6.6	5.1	8.5
WP Kuala Lumpur	69	116,422	9.3	6.9	12.5
WP Putrajaya	71	6,784	13.9	11.1	17.4
Location					
Urban	1,159	1,396,116	9.1	8.3	9.9
Rural	944	455,007	9.5	8.5	10.6
Sex					
Male	1,003	949,015	9.1	8.3	10.0
Female	1,100	902,109	9.2	8.4	10.1
Age Group					
18-19	46	52,237	5.5	3.9	7.7
20-24	117	148,493	5.2	4.1	6.5
25-29	171	207,001	7.4	6.1	9.0
30-34	168	189,077	7.2	5.8	8.9
35-39	181	196,494	9.5	7.9	11.3
40-44	207	203,091	11.0	8.9	13.5
45-49	239	192,697	11.5	9.7	13.6
50-54	263	183,500	12.2	10.4	14.2
55-59	225	156,531	12.4	10.5	14.5
60-64	177	110,365	11.8	9.7	14.2
65-69	135	94,451	13.6	10.7	17.1
70-74	82	45,126	11.2	8.3	14.8
75+	92	72,063	12.6	10.1	15.7

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,353	972,628	9.8	9.1	10.6
Chinese	278	367,393	7.7	6.4	9.4
Indians	180	163,889	11.9	9.5	14.9
Other Bumiputras	160	174,327	8.1	6.6	9.8
Others	132	172,887	8.6	6.7	11.1
Marital Status					
Single	304	363,559	6.4	5.5	7.6
Married	1,539	1,318,746	10.0	9.2	10.9
Widow/widower/divorcee	260	168,819	12.0	10.2	14.2
Education Level					
No formal education	193	151,794	12.9	10.5	15.7
Primary education	597	456,160	11.1	9.8	12.5
Secondary education	938	842,928	9.0	8.2	10.0
Tertiary education	351	376,919	7.1	6.2	8.3
Unclassified education	22	21,542	7.8	4.3	13.7
Occupation					
Government/semi government employee	200	157,647	8.2	6.8	9.8
Private employee	536	647,077	8.1	7.2	9.1
Self employed	479	371,790	10.9	9.6	12.4
Unpaid worker/home maker	385	296,180	10.3	9.0	11.8
Retiree	106	72,666	11.9	9.3	15.1
Household Income Group					
Less than RM 1000	358	268,633	9.8	8.5	11.3
RM 1000 - RM 1999	405	324,291	9.8	8.5	11.2
RM 2000 - RM 2999	385	340,160	10.4	9.1	11.9
RM 3000 - RM 3999	281	248,195	9.5	8.0	11.3
RM 4000 - RM 4999	174	185,205	9.4	7.4	11.8
RM 5000 - RM 5999	145	129,819	8.2	6.5	10.2
RM 6000 - RM 6999	92	85,307	8.1	5.9	11.1
RM 7000 - RM 7999	84	68,236	8.4	6.1	11.3
RM 8000 - RM 8999	51	45,624	6.7	4.8	9.1
RM 9000 - RM 9999	35	44,313	12.5	7.9	19.2
RM 10000 & above	93	111,340	6.2	4.6	8.4
Quintile Household Income Group					
Quintile 1	304	223,987	9.5	8.2	11.1
Quintile 2	418	341,001	9.9	8.7	11.3
Quintile 3	487	427,261	10.3	9.0	11.6
Quintile 4	424	411,488	9.3	8.0	10.8
Quintile 5	470	447,387	7.7	6.6	8.8

Table 1.1.4: Prevalence of impaired fasting glucose by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,052	955,789	4.7	4.3	5.2
State					
Johor	140	171,417	7.2	6.0	8.6
Kedah	84	83,995	6.4	4.9	8.2
Kelantan	88	66,748	6.6	6.6	8.6
Melaka	44	19,769	3.5	2.2	5.3
Negeri Sembilan	93	43,817	6.4	4.9	8.4
Pahang	62	42,607	4.3	3.0	6.0
Penang	91	50,288	4.2	2.1	7.9
Perak	76	88,374	5.3	3.8	7.4
Perlis	57	6,356	4.0	2.8	5.6
Selangor	116	181,169	4.3	3.1	5.9
Terengganu	43	23,857	3.5	2.3	5.3
Sabah & WP Labuan	64	75,658	3.3	2.3	4.7
Sarawak	38	51,199	2.9	1.8	4.8
WP Kuala Lumpur	23	47,353	3.8	2.4	6.0
WP Putrajaya	33	3,182	6.5	4.3	9.8
Location					
Urban	572	716,203	4.7	4.1	5.3
Rural	480	239,586	5.0	4.3	5.8
Sex					
Male	506	491,888	4.7	4.1	5.4
Female	546	463,901	4.7	4.2	5.3
Age Group					
18-19	28	34,029	3.6	2.3	5.5
20-24	77	102,531	3.6	2.7	4.8
25-29	94	107,249	3.9	2.9	5.1
30-34	92	103,571	3.9	2.9	5.3
35-39	87	95,568	4.6	3.5	6.1
40-44	117	111,185	6.0	4.7	7.6
45-49	117	97,740	5.8	4.7	7.3
50-54	117	87,558	5.8	4.6	7.3
55-59	105	75,252	5.9	4.7	7.5
60-64	76	51,219	5.5	4.1	7.3
65-69	56	33,589	4.8	3.3	7.1
70-74	37	21,781	5.4	3.6	8.1
75+	49	34,519	6.0	4.2	8.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	668	516,338	5.2	4.7	5.8
Chinese	146	179,350	3.8	2.9	4.9
Indians	93	105,799	7.7	5.6	10.6
Other Bumiputras	71	67,624	3.1	2.1	4.6
Others	74	86,679	4.3	3.0	6.3
Marital Status					
Single	163	213,541	3.8	3.0	4.7
Married	754	648,626	4.9	4.4	5.5
Widow/widower/divorcee	135	93,623	6.7	5.3	8.3
Education Level					
No formal education	81	58,456	5.0	3.5	7.0
Primary education	309	239,474	5.8	5.0	6.9
Secondary education	457	434,803	4.7	4.1	5.3
Tertiary education	194	205,886	3.9	3.2	4.7
Unclassified education	10	17,071	6.1	2.6	14.0
Occupation					
Government/semi government employee	122	107,001	5.6	4.4	6.9
Private employee	308	341,262	4.3	3.5	5.1
Self employed	209	179,295	5.3	4.3	6.5
Unpaid worker/home maker	197	154,057	5.3	4.4	6.5
Retiree	39	28,942	4.7	3.2	7.0
Household Income Group					
Less than RM 1000	163	110,511	4.0	3.3	5.0
RM 1000 - RM 1999	189	155,192	4.7	3.8	5.7
RM 2000 - RM 2999	178	154,882	4.7	3.9	5.8
RM 3000 - RM 3999	130	116,597	4.5	3.5	5.8
RM 4000 - RM 4999	93	101,329	5.1	3.9	6.7
RM 5000 - RM 5999	75	78,370	4.9	3.3	7.2
RM 6000 - RM 6999	41	39,673	3.8	2.5	5.7
RM 7000 - RM 7999	44	34,240	4.2	2.8	6.1
RM 8000 - RM 8999	36	33,719	4.9	2.7	8.8
RM 9000 - RM 9999	15	19,995	5.6	3.1	10.0
RM 10000 & above	88	111,283	6.2	4.7	8.3
Quintile Household Income Group					
Quintile 1	147	104,215	4.4	3.6	5.5
Quintile 2	192	151,120	4.4	3.6	5.4
Quintile 3	208	180,951	4.3	3.6	5.2
Quintile 4	223	217,188	4.9	4.0	6.0
Quintile 5	282	302,316	5.2	4.3	6.3

Table 1.2.1 Prevalence of overall hypertension by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	7,225	6,114,113	30.3	29.3	31.2
State					
Johor	592	653,917	27.4	24.6	30.4
Kedah	547	494,177	37.5	33.5	41.6
Kelantan	480	340,387	33.8	30.1	37.7
Melaka	388	147,020	25.8	21.8	30.2
Negeri Sembilan	493	221,205	32.5	28.2	37.2
Pahang	426	284,288	28.5	25.2	32.1
Penang	503	360,082	29.8	26.0	33.9
Perak	610	601,255	36.4	33.2	39.8
Perlis	591	56,859	35.4	31.9	38.9
Selangor	789	1,065,750	25.5	23.4	27.7
Terengganu	380	184,419	26.9	23.7	30.3
Sabah & WP Labuan	556	617,197	26.8	23.8	30.0
Sarawak	502	653,885	37.3	33.7	41.1
WP Kuala Lumpur	248	421,947	33.8	29.7	38.2
WP Putrajaya	120	11,724	24.1	19.0	30.0
Location					
Urban	3,833	4,505,574	29.3	28.2	30.4
Rural	3,392	1,608,540	33.5	31.6	35.4
Sex					
Male	3,323	3,213,932	30.8	29.5	32.2
Female	3,902	2,900,181	29.7	28.5	30.9
Age Group					
18-19	54	63,732	6.7	4.7	9.4
20-24	186	268,463	9.4	7.8	11.3
25-29	269	367,953	13.2	11.4	15.3
30-34	325	417,736	15.9	13.9	18.2
35-39	473	496,833	23.9	21.7	26.3
40-44	595	596,853	32.2	29.4	35.1
45-49	757	650,697	38.8	36.1	41.7
50-54	965	744,734	49.3	46.3	52.4
55-59	972	702,392	55.5	52.6	58.4
60-64	865	609,317	65.0	61.4	68.4
65-69	714	471,292	67.8	63.7	71.7
70-74	514	304,943	75.4	70.5	79.7
75+	536	419,168	73.4	68.9	77.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	4,629	3,084,090	31.1	29.9	32.4
Chinese	1,132	1,461,085	30.8	28.7	33.0
Indians	501	444,065	32.4	29.3	35.6
Other Bumiputras	652	722,216	33.4	30.6	36.3
Others	311	402,657	20.0	17.1	23.4
Marital Status					
Single	624	811,443	14.4	13.0	16.0
Married	5,427	4,514,947	34.3	33.2	35.5
Widow/widower/divorcee	1,174	787,723	56.1	53.0	59.2
Education Level					
No formal education	786	579,557	49.1	44.7	53.6
Primary education	2,540	1,872,285	45.6	43.2	48.1
Secondary education	2,836	2,511,008	26.9	25.6	28.2
Tertiary education	1,001	1,083,447	20.5	18.9	22.2
Unclassified education	56	63,197	22.7	15.7	31.7
Occupation					
Government/semi government employee	679	571,997	29.7	27.3	32.3
Private employee	1,439	1,719,098	21.5	20.1	22.9
Self employed	1,394	1,073,039	31.5	29.5	33.6
Unpaid worker/home maker	1,429	1,038,738	36.0	33.9	38.2
Retiree	502	393,479	64.6	60.1	68.8
Household Income Group					
Less than RM 1000	1,615	1,164,812	42.6	39.8	45.3
RM 1000 - RM 1999	1,489	1,151,899	34.6	32.5	36.9
RM 2000 - RM 2999	1,203	987,738	30.2	28.2	32.4
RM 3000 - RM 3999	804	706,394	27.2	24.9	29.5
RM 4000 - RM 4999	554	513,716	25.9	23.5	28.6
RM 5000 - RM 5999	421	419,522	26.4	23.3	29.6
RM 6000 - RM 6999	289	285,465	27.2	23.7	31.0
RM 7000 - RM 7999	217	210,208	25.7	21.8	30.1
RM 8000 - RM 8999	158	163,343	23.8	20.1	28.0
RM 9000 - RM 9999	82	74,789	21.0	15.8	27.5
RM 10000 & above	393	436,228	24.4	21.6	27.5
Quintile Household Income Group					
Quintile 1	1,421	1,032,140	43.9	41.1	46.8
Quintile 2	1,541	1,184,823	34.5	32.4	36.8
Quintile 3	1,530	1,275,036	30.6	28.7	32.6
Quintile 4	1,287	1,165,097	26.4	24.6	28.2
Quintile 5	1,446	1,457,017	25.0	23.4	26.6

Table 1.2.2: Prevalence of known hypertension by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	3,255	2,642,628	13.1	12.4	13.8
State					
Johor	253	268,154	11.2	9.6	13.2
Kedah	204	188,525	14.3	11.7	17.3
Kelantan	165	106,753	10.6	8.7	12.8
Melaka	209	74,672	13.1	10.7	15.9
Negeri Sembilan	239	109,757	16.1	12.8	20.2
Pahang	168	106,969	10.7	8.5	13.4
Penang	232	151,684	12.6	9.9	15.8
Perak	274	285,468	17.3	14.8	20.1
Perlis	280	22,876	14.2	11.9	16.9
Selangor	398	517,517	12.4	11.1	13.8
Terengganu	173	79,147	11.5	9.4	14.1
Sabah & WP Labuan	286	296,594	12.9	11.0	15.1
Sarawak	237	289,551	16.5	14.1	19.3
WP Kuala Lumpur	90	140,115	11.2	8.8	14.2
WP Putrajaya	47	4,847	10.0	6.8	14.3
Location					
Urban	1,780	2,028,909	13.2	12.4	14.0
Rural	1,475	613,719	12.8	11.7	13.9
Sex					
Male	1,371	1,271,271	12.2	11.3	13.1
Female	1,884	1,371,357	14.0	13.2	14.9
Age Group					
18-19	5	6,327	0.7	0.2	1.8
20-24	31	55,123	1.9	1.3	2.9
25-29	57	78,776	2.8	2.1	3.8
30-34	72	101,890	3.9	2.8	5.3
35-39	119	121,144	5.8	4.7	7.3
40-44	193	221,442	11.9	10.1	14.0
45-49	295	251,104	15.0	13.2	17.0
50-54	442	349,282	23.1	20.7	25.8
55-59	507	371,004	29.3	26.6	32.2
60-64	479	347,488	37.1	33.5	40.8
65-69	400	271,970	39.1	35.3	43.1
70-74	328	203,824	50.4	44.7	56.1
75+	327	263,254	46.1	41.5	50.8

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	1,994	1,242,490	12.5	11.7	13.4
Chinese	580	722,456	15.2	13.7	16.8
Indians	268	233,226	17.0	14.7	19.5
Other Bumiputras	320	340,420	15.7	13.7	18.0
Others	93	104,036	5.2	3.9	6.8
Marital Status					
Single	142	165,735	2.9	2.4	3.6
Married	2,481	2,049,826	15.6	14.7	16.5
Widow/widower/divorcee	632	427,068	30.4	27.8	33.2
Education Level					
No formal education	408	297,311	25.2	22.2	28.5
Primary education	1,262	900,165	21.9	20.2	23.8
Secondary education	1,168	999,035	10.7	9.9	11.6
Tertiary education	391	423,826	8.0	7.0	9.2
Unclassified education	21	17,719	6.4	3.2	12.4
Occupation					
Government/semi government employee	268	229,679	11.9	10.2	14.0
Private employee	493	599,162	7.5	6.7	8.3
Self employed	479	343,776	10.1	9.0	11.3
Unpaid worker/home maker	724	517,970	18.0	16.4	19.6
Retiree	305	236,476	38.8	34.4	43.4
Household Income Group					
Less than RM 1000	807	563,149	20.6	18.7	22.6
RM 1000 - RM 1999	651	452,536	13.6	12.2	15.1
RM 2000 - RM 2999	493	394,776	12.1	10.7	13.6
RM 3000 - RM 3999	357	303,108	11.6	10.1	13.5
RM 4000 - RM 4999	234	216,191	10.9	9.3	12.8
RM 5000 - RM 5999	192	167,029	10.5	8.8	12.5
RM 6000 - RM 6999	133	127,554	12.1	9.9	14.8
RM 7000 - RM 7999	89	92,664	11.3	8.8	14.5
RM 8000 - RM 8999	80	89,732	13.1	10.4	16.4
RM 9000 - RM 9999	33	30,180	8.5	5.5	12.8
RM 10000 & above	186	205,709	11.5	9.5	13.9
Quintile Household Income Group					
Quintile 1	722	502,952	21.4	19.4	23.6
Quintile 2	675	469,415	13.7	12.3	15.2
Quintile 3	647	526,621	12.6	11.3	14.1
Quintile 4	556	491,698	11.1	10.0	12.4
Quintile 5	655	651,942	11.2	10.1	12.3

Table 1.2.3: Prevalence of undiagnosed hypertension by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	3,970	3,471,485	17.2	16.4	18.0
State					
Johor	339	385,762	16.2	14.2	18.3
Kedah	343	305,652	23.2	19.7	27.1
Kelantan	315	233,634	23.2	20.1	26.6
Melaka	179	72,348	12.7	9.6	16.5
Negeri Sembilan	254	111,448	16.4	13.8	19.3
Pahang	258	177,320	17.8	15.4	20.4
Penang	271	208,398	17.2	14.0	21.1
Perak	336	315,786	19.1	16.6	22.0
Perlis	311	33,983	21.1	18.6	23.9
Selangor	391	548,233	13.1	11.4	15.0
Terengganu	207	105,273	15.3	13.0	18.1
Sabah & WP Labuan	270	320,603	13.9	11.8	16.3
Sarawak	265	364,334	20.8	17.8	24.2
WP Kuala Lumpur	158	281,832	22.6	19.0	26.7
WP Putrajaya	73	6,878	14.1	10.4	18.9
Location					
Urban	2,053	2,476,665	16.1	15.2	17.0
Rural	1,917	994,820	20.7	19.3	22.2
Sex					
Male	1,952	1,942,662	18.6	17.5	19.8
Female	2,018	1,528,824	15.6	14.7	16.6
Age Group					
15-19	49	57,405	6.0	4.1	8.7
20-24	155	213,340	7.5	6.1	9.1
25-29	212	289,178	10.4	8.7	12.3
30-34	253	315,846	12.0	10.2	14.1
35-39	354	375,689	18.1	16.0	20.4
40-44	402	375,412	20.3	18.1	22.6
45-49	462	399,592	23.8	21.5	26.3
50-54	523	395,453	26.2	23.6	29.0
55-59	465	331,388	26.2	23.9	28.7
60-64	386	261,829	27.9	24.9	31.2
65-69	314	199,321	28.7	25.1	32.6
70-74	186	101,119	25.0	21.0	29.5
75+	209	155,913	27.3	23.6	31.3

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,635	1,841,600	18.6	17.6	19.6
Chinese	552	738,629	15.6	14.0	17.3
Indians	233	210,839	15.4	12.9	18.2
Other Bumiputras	332	381,796	17.6	15.4	20.1
Others	218	298,621	14.9	12.2	18.0
Marital Status					
Single	482	645,709	11.4	10.2	12.9
Married	2,946	2,465,121	18.7	17.8	19.7
Widow/widower/divorcee	542	360,655	25.7	23.1	28.5
Education Level					
No formal education	378	282,245	23.9	20.9	27.3
Primary education	1,278	972,121	23.7	22.0	25.5
Secondary education	1,668	1,511,972	16.2	15.2	17.3
Tertiary education	610	659,621	12.5	11.3	13.9
Unclassified education	35	45,478	16.4	10.3	25.0
Occupation					
Government/semi government employee	411	342,318	17.8	15.8	19.9
Private employee	946	1,119,935	14.0	12.8	15.3
Self employed	915	729,263	21.4	19.7	23.3
Unpaid worker/home maker	705	520,768	18.1	16.5	19.7
Retiree	197	157,002	25.8	21.9	30.0
Household Income Group					
Less than RM 1000	808	601,663	22.0	19.8	24.4
RM 1000 - RM 1999	838	699,363	21.0	19.3	22.9
RM 2000 - RM 2999	710	592,963	18.1	16.5	19.9
RM 3000 - RM 3999	447	403,286	15.5	13.7	17.5
RM 4000 - RM 4999	320	297,525	15.0	13.1	17.2
RM 5000 - RM 5999	229	252,493	15.9	13.3	18.8
RM 6000 - RM 6999	156	157,910	15.0	12.2	18.3
RM 7000 - RM 7999	128	117,544	14.4	11.8	17.5
RM 8000 - RM 8999	78	73,611	10.7	8.0	14.2
RM 9000 - RM 9999	49	44,609	12.5	8.7	17.8
RM 10000 & above	207	230,519	12.9	10.6	15.7
Quintile Household Income Group					
Quintile 1	699	529,188	22.5	20.1	25.1
Quintile 2	866	715,408	20.8	19.1	22.7
Quintile 3	883	748,415	18.0	16.5	19.6
Quintile 4	731	673,399	15.2	13.8	16.8
Quintile 5	791	805,075	13.8	12.6	15.1

Table 1.3.1: Prevalence of overall hypercholesterolemia by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	10,514	9,641,343	47.7	46.5	48.9
State					
Johor	910	1,091,941	45.8	42.1	49.5
Kedah	717	705,235	53.5	48.5	58.4
Kelantan	676	520,761	51.7	47.8	55.7
Melaka	619	265,922	46.6	41.1	52.2
Negeri Sembilan	716	336,687	49.5	45.0	54.1
Pahang	720	560,480	56.2	52.2	60.3
Penang	799	631,103	52.2	47.4	57.0
Perak	758	798,247	48.3	44.9	51.7
Perlis	718	75,533	47.0	41.3	52.7
Selangor	1,244	1,820,676	43.5	40.5	46.6
Terengganu	655	357,821	52.1	47.6	56.6
Sabah & WP Labuan	723	942,277	40.9	36.9	45.0
Sarawak	657	851,642	48.6	44.8	52.4
WP Kuala Lumpur	378	660,428	52.9	47.7	58.1
WP Putrajaya	224	22,590	46.4	40.2	52.7
Location					
Urban	5,943	7,350,547	47.7	46.3	49.2
Rural	4,571	2,290,796	47.7	45.6	49.7
Sex					
Male	4,518	4,539,770	43.5	42.0	45.1
Female	5,996	5,101,573	52.2	50.7	53.7
Age Group					
18-19	175	210,467	22.0	18.8	25.7
20-24	527	754,047	26.5	24.1	29.0
25-29	756	937,153	33.7	31.2	36.3
30-34	946	1,155,728	44.0	41.2	46.8
35-39	983	1,031,248	49.7	46.7	52.6
40-44	1,069	1,060,619	57.2	53.7	60.6
45-49	1,157	1,006,778	60.1	57.0	63.1
50-54	1,275	988,530	65.5	62.4	68.5
55-59	1,160	869,987	68.8	65.9	71.5
60-64	909	611,599	65.3	61.7	68.7
65-69	665	428,277	61.6	57.4	65.8
70-74	438	253,677	62.7	57.2	67.9
75+	454	333,233	58.3	53.2	63.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	6,761	4,968,155	50.1	48.7	51.5
Chinese	1,663	2,253,647	47.5	44.7	50.3
Indians	739	686,913	50.1	46.2	53.9
Other Bumiputras	833	982,394	45.4	42.0	48.8
Others	518	750,235	37.4	33.5	41.3
Marital Status					
Single	1,434	1,843,685	32.7	30.6	34.8
Married	7,823	6,921,153	52.6	51.2	54.0
Widow/widower/divorcee	1,257	876,505	62.4	59.3	65.4
Education Level					
No formal education	790	605,184	51.3	47.1	55.5
Primary education	2,930	2,274,784	55.5	53.3	57.6
Secondary education	4,635	4,338,763	46.4	44.9	48.0
Tertiary education	2,076	2,332,771	44.2	42.1	46.3
Unclassified education	79	88,302	31.8	24.1	40.6
Occupation					
Government/semi government employee	1,213	1,047,877	54.4	51.2	57.6
Private employee	2,804	3,409,258	42.6	40.8	44.4
Self employed	2,083	1,691,493	49.7	47.4	52.0
Unpaid worker/home maker	2,030	1,622,134	56.3	54.0	58.6
Retiree	483	364,969	59.9	55.2	64.4
Household Income Group					
Less than RM 1000	1,848	1,406,474	51.4	48.7	54.1
RM 1000 - RM 1999	1,957	1,597,238	48.0	45.5	50.5
RM 2000 - RM 2999	1,747	1,506,895	46.1	43.6	48.7
RM 3000 - RM 3999	1,282	1,204,227	46.3	43.4	49.2
RM 4000 - RM 4999	929	984,570	49.7	46.3	53.1
RM 5000 - RM 5999	728	724,318	45.5	41.4	49.7
RM 6000 - RM 6999	512	517,380	49.2	44.3	54.2
RM 7000 - RM 7999	396	388,825	47.6	42.6	52.7
RM 8000 - RM 8999	296	314,253	45.8	40.3	51.6
RM 9000 - RM 9999	160	172,023	48.4	41.2	55.6
RM 10000 & above	659	825,141	46.2	42.5	49.9
Quintile Household Income Group					
Quintile 1	1,604	1,226,492	52.2	49.4	54.9
Quintile 2	2,013	1,642,098	47.8	45.4	50.3
Quintile 3	2,217	1,914,405	46.0	43.6	48.3
Quintile 4	2,106	2,113,057	47.9	45.6	50.1
Quintile 5	2,574	2,745,290	47.0	44.9	49.1

Table 1.3.2: Prevalence of known hypercholesterolemia by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,223	1,839,960	9.1	8.6	9.7
State					
Johor	152	167,178	7.0	5.7	8.6
Kedah	119	97,794	7.4	5.7	9.6
Kelantan	77	52,942	5.3	4.0	6.9
Melaka	132	48,196	8.4	6.4	11.0
Negeri Sembilan	173	75,903	11.2	9.0	13.7
Pahang	96	60,703	6.1	4.4	8.4
Penang	206	146,852	12.2	9.5	15.4
Perak	179	195,432	11.8	9.7	14.4
Perlis	249	22,275	13.8	11.7	16.3
Selangor	301	398,926	9.5	8.3	11.0
Terengganu	103	52,851	7.7	6.0	9.9
Sabah & WP Labuan	175	190,635	8.3	6.8	10.0
Sarawak	161	220,108	12.6	10.0	15.6
WP Kuala Lumpur	67	106,711	8.6	6.7	10.9
WP Putrajaya	33	3,452	7.1	4.3	11.5
Location					
Urban	1,316	1,497,821	9.7	9.0	10.5
Rural	907	342,139	7.1	6.4	8.0
Sex					
Male	949	885,356	8.5	7.7	9.3
Female	1,274	954,604	9.8	9.0	10.6
Age Group					
18-19	3	1,517	0.2	0.0	0.7
20-24	16	24,040	0.8	0.5	1.5
25-29	47	62,293	2.2	1.6	3.2
30-34	75	109,239	4.2	3.2	5.4
35-39	100	112,983	5.4	4.2	7.0
40-44	171	181,856	9.8	8.2	11.8
45-49	220	203,818	12.2	10.3	14.4
50-54	334	262,835	17.4	15.2	19.8
55-59	343	255,914	20.2	17.8	22.9
60-64	335	236,465	25.2	22.1	28.7
65-69	248	163,334	23.5	19.8	27.6
70-74	168	98,376	24.3	20.2	29.0
75+	163	127,291	22.3	18.5	26.7

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,369	863,535	8.7	8.0	9.5
Chinese	428	522,382	11.0	9.7	12.4
Indians	195	168,214	12.3	10.1	14.8
Other Bumiputras	193	242,087	11.2	9.2	13.6
Others	38	43,742	2.2	1.4	3.4
Marital Status					
Single	124	146,968	2.6	2.1	3.2
Married	1,719	1,450,478	11.0	10.3	11.8
Widow/widower/divorcee	380	242,514	17.3	15.0	19.8
Education Level					
No formal education	202	151,284	12.8	10.2	16.0
Primary education	780	553,958	13.5	12.2	14.9
Secondary education	836	676,829	7.2	6.6	8.0
Tertiary education	395	452,494	8.6	7.5	9.7
Unclassified education	8	5,246	1.9	0.8	4.7
Occupation					
Government/semi government employee	253	235,786	12.3	10.4	14.4
Private employee	394	475,009	5.9	5.2	6.7
Self employed	359	270,356	7.9	6.9	9.2
Unpaid worker/home maker	466	336,368	11.7	10.3	13.2
Retiree	201	155,726	25.6	21.8	29.8
Household Income Group					
Less than RM 1000	475	328,053	12.0	10.5	13.6
RM 1000 - RM 1999	389	266,759	8.0	7.0	9.2
RM 2000 - RM 2999	329	230,038	7.0	6.1	8.1
RM 3000 - RM 3999	232	190,437	7.3	6.1	8.8
RM 4000 - RM 4999	185	181,744	9.2	7.6	11.0
RM 5000 - RM 5999	147	128,589	8.1	6.6	9.9
RM 6000 - RM 6999	105	101,724	9.7	7.6	12.3
RM 7000 - RM 7999	83	89,782	11.0	8.4	14.2
RM 8000 - RM 8999	58	62,804	9.2	6.5	12.7
RM 9000 - RM 9999	33	35,820	10.1	6.7	15.0
RM 10000 & above	187	224,211	12.5	10.3	15.3
Quintile Household Income Group					
Quintile 1	437	309,624	13.2	11.6	15.0
Quintile 2	388	262,782	7.7	6.6	8.8
Quintile 3	428	304,835	7.3	6.4	8.4
Quintile 4	393	358,800	8.1	7.1	9.2
Quintile 5	577	603,919	10.3	9.3	11.6

Table 1.3.3: Prevalence of undiagnosed hypercholesterolemia by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	8,291	7,801,383	38.6	37.4	39.8
State					
Johor	758	924,763	38.8	35.5	42.2
Kedah	598	607,441	46.1	41.1	51.1
Kelantan	599	467,819	46.5	42.4	50.6
Melaka	487	217,726	38.1	32.6	44.0
Negeri Sembilan	543	260,784	38.4	34.2	42.7
Pahang	624	499,776	50.2	46.5	53.8
Penang	593	484,252	40.1	36.0	44.3
Perak	579	602,815	36.5	33.0	40.1
Perlis	469	53,258	33.1	28.5	38.1
Selangor	943	1,421,750	34.0	30.9	37.2
Terengganu	552	304,970	44.4	40.0	48.9
Sabah & WP Labuan	548	751,641	32.6	28.7	36.8
Sarawak	496	631,533	36.1	32.5	39.8
WP Kuala Lumpur	311	553,717	44.4	39.7	49.2
WP Putrajaya	191	19,138	39.3	34.0	44.9
Location					
Urban	4,627	5,852,726	38.0	36.6	39.4
Rural	3,664	1,948,657	40.5	38.5	42.6
Sex					
Male	3,569	3,654,414	35.0	33.6	36.5
Female	4,722	4,146,969	42.4	41.0	43.9
Age Group					
18-19	172	208,950	21.9	18.6	25.6
20-24	511	730,008	25.6	23.3	28.1
25-29	709	874,860	31.4	28.9	34.0
30-34	871	1,046,489	39.8	37.1	42.7
35-39	883	918,264	44.2	41.3	47.2
40-44	898	878,763	47.4	44.1	50.8
45-49	937	802,961	47.9	44.9	51.0
50-54	941	725,694	48.1	45.1	51.1
55-59	817	614,073	48.5	45.3	51.8
60-64	574	375,134	40.0	36.5	43.7
65-69	417	264,943	38.1	34.1	42.3
70-74	270	155,301	38.4	33.2	43.9
75+	291	205,942	36.0	31.7	40.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	5,392	4,104,620	41.4	40.0	42.8
Chinese	1,235	1,731,264	36.5	33.7	39.3
Indians	544	518,699	37.8	33.8	42.0
Other Bumiputras	640	740,307	34.2	31.0	37.6
Others	480	706,493	35.2	31.5	39.0
Marital Status					
Single	1,310	1,696,716	30.1	28.1	32.2
Married	6,104	5,470,676	41.6	40.2	42.9
Widow/widower/divorcee	877	633,991	45.2	42.3	48.0
Education Level					
No formal education	588	453,900	38.5	34.7	42.5
Primary education	2,150	1,720,826	42.0	39.9	44.0
Secondary education	3,799	3,661,934	39.2	37.7	40.7
Tertiary education	1,681	1,880,276	35.6	33.6	37.7
Unclassified education	71	83,056	29.9	22.6	38.3
Occupation					
Government/semi government employee	960	812,092	42.2	39.3	45.1
Private employee	2,410	2,934,249	36.6	34.9	38.4
Self employed	1,724	1,421,137	41.8	39.6	44.0
Unpaid worker/home maker	1,564	1,285,766	44.6	42.4	46.9
Retiree	282	209,243	34.3	29.8	39.2
Household Income Group					
Less than RM 1000	1,373	1,078,421	39.4	36.9	41.9
RM 1000 - RM 1999	1,568	1,330,479	40.0	37.6	42.4
RM 2000 - RM 2999	1,418	1,276,857	39.1	36.7	41.5
RM 3000 - RM 3999	1,050	1,013,790	39.0	36.1	41.9
RM 4000 - RM 4999	744	802,825	40.5	37.3	43.9
RM 5000 - RM 5999	581	595,730	37.4	33.5	41.5
RM 6000 - RM 6999	407	415,656	39.5	35.0	44.3
RM 7000 - RM 7999	313	299,043	36.6	32.0	41.5
RM 8000 - RM 8999	238	251,449	36.7	31.5	42.2
RM 9000 - RM 9999	127	136,203	38.3	32.5	44.5
RM 10000 & above	472	600,930	33.6	30.0	37.4
Quintile Household Income Group					
Quintile 1	1,167	916,868	39.0	36.4	41.7
Quintile 2	1,625	1,379,317	40.2	37.8	42.6
Quintile 3	1,789	1,609,570	38.6	36.4	40.9
Quintile 4	1,713	1,754,257	39.7	37.5	42.0
Quintile 5	1,997	2,141,371	36.7	34.7	38.7

TOPIC 2

2. NUTRITIONAL STATUS

2.1 NUTRITIONAL STATUS OF MALAYSIAN ADULT (AGE ≥ 18 YEARS OLD)

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2.1.1   Background

Nutritional status is an essential element of the health of the population. Body Mass Index, waist and calf circumference are important and universally acceptable anthropometric measurements among adults aged more than 18 years old. These are non-invasive methods that can assess size, proportion and composition of the human body. The nutritional assessments are not only limited to individuals but also reflect the health status, social and economic circumstances of population groups.

2.1.2 Objectives

2.1.2.1 General Objective
To determine the body mass index, waist circumference and calf circumference status among Malaysians aged 18 years old and above.

2.1.2.2 Specific objectives

a. To determine the prevalence of underweight, normal, overweight and obesity among Malaysian adults
b. To determine the prevalence of underweight, normal, overweight and obesity among Malaysian adults by socio-demography subgroups.
c. To determine the prevalence of abdominal obesity among Malaysian adults
d. To determine the prevalence of abdominal obesity among Malaysian adult by socio-demography subgroups
e. To determine the prevalence of muscle wasting among adults aged more than 60 years old

2.1.3   Target Population, Study Instrument And Definitions

Anthropometric measurements namely body weight, height and waist circumference were taken from eligible respondents aged 18 years and above by trained nurses.

Weight was measured using Tanita Digital Weighing Scale (Tanita HD319, Japan) to the nearest 0.1 kilogram. The standing height was measured without shoes using SECA Portable Stadiometer (SECA 213 Germany) to the nearest 0.1 centimetre. Waist circumference was measured by SECA measuring tape (SECA 201, Germany). All measurements were taken twice and the average value was used for data entry.

For the purpose of analysis, Body Mass Index (BMI) was classified using two guidelines; the Malaysian Clinical Practice Guidelines of Obesity (2004) and World Health Organization (1998). Based on the classification from the Malaysian Clinical Practice Guidelines of Obesity (2004), BMI was classified into 6 categories; underweight (<18.50 kg/m2), normal (18.50 - 22.99 kg/m2), overweight (23.00 - 27.49 kg/m2), obese I (27.50 - 34.99 kg/m2), obese II (35.00 - 39.99) and obese III (>40 kg/m2). The World Health Organization (1998) classified body mass Index (BMI) into 6 categories; underweight (<18.5 kg/m2), normal (18.5-24.99 kg/m2), overweight (25.0-29.99 kg/m2), obese I (30.34-34.99 kg/m2), obese II (35.39-39.99) and obese III (>40 kg/m2).

For assessing central abdominal obesity, waist circumference (WC) cut off values based on the International Diabetes Institute/ Western Pacific World Health Organization/ International Association for the study of Obesity/ International Obesity Task Force (WHO/IASO/IOTF, 2000) (>90 cm for men and > 80 cm for women) was used in this study.

2.1.4   Findings

According to the classification of Malaysian Clinical Practice Guidelines (CPG) on Management of Obesity (2004) and World Health Organization's classifications (WHO, 2008), the prevalence of underweight among adults was 6.7% (95% CI: 6.2, 7.3). Kelantan [8.4% (95% CI: 6.5, 10.8)] was the state with the highest prevalence of underweight as compared to other states. The results revealed that higher prevalence of underweight were observed among those from rural areas [7.1% (95% CI: 6.3, 8.1)], females [7.3% (95% CI: 6.5, 8.2)], aged 18 -19 years old [18.7% (95% CI: 15.5 , 22.3)], Chinese [8.3% (95% CI : 6.9, 10.0)], singles [13.0% (95% CI: 11.6, 14.5], secondary education attainers [7.6% (95% CI: 6.7, 8.5)], and private sector employees [6.6% (95% CI : 5.8, 7.5)].

According to the CPG classifications, the overall prevalence of normal weight among adults was 29.3% (95% CI: 28.2, 30.4). By state, Sabah & Wilayah Persekutuan Labuan had the highest prevalence of normal weight [33.4% (95% CI: 29.7, 37.3)]. Besides, there was a significant difference in the prevalence of normal weight between residents in urban [28.3% (95% CI: 27.1, 29.5)] and rural areas [32.2% (95% CI: 30.1, 34.5)]. The results revealed that the prevalence of normal weight was higher among males [30.2% (95% CI: 28.7, 31.8)], adults aged 20-24 years old [40.9% (95% CI: 38.1 -43.7)], other ethnicity [42.2% (95% CI: 37.9, 46.7)], unmarried adults [38.5% (95% CI: 36.6, 40.5)], unclassified education [40.1% (95% CI : 31.4, 49.5)], and private employees [33.1% (95% CI: 31.3, 35.0)].

Based on WHO classification, the prevalence of normal weight among Malaysian adults was 45.6% (95% CI: 44.5, 46.7)]. By state, Sabah & Wilayah Persekutuan Labuan had the highest prevalence of normal weight [52.6% (95% CI: 49.1, 56.0)]. While, normal weight prevalence was higher among those living in rural areas [47.3% (95% CI: 45.1, 49.5)], males [47.3% (95% CI: 45.7, 48.8)], and elderly aged 75 years old and above [55.9% (95% CI: 50.7, 61.0)].

Based on the Malaysian Clinical Practice Guidelines of Obesity (2004) classifications, the national prevalence of overweight was 33.4% (95% CI: 32.5, 34.4). There was a significant difference in the prevalence of overweight between urban [34.1% (95% CI: 33.0, 35.3)] and rural area residents [31.3% (95% CI: 29.6, 32.9)]. The prevalence of overweight was significantly higher among males [35.8% (95% CI: 34.5, 37.1)] compared to females [30.9% (95% CI: 29.6, 32.1]. The highest prevalence of overweight were among adults aged 50 - 54 years [41.1% (95% CI: 38.2, 44.2)], Other Bumiputras [35.8% (95% CI: 33.2, 38.6)], married adults [36.8% (95% CI: 35.7, 37.9), those with primary education [36.0% (95% CI: 34.1, 38.0)] and retirees [36.8% (95% CI: 32.8, 41.1)].

Based on the World Health Organisation (1998) classifications, the national prevalence of overweight was 30.0% (95% CI: 29.1, 31.0). By state, WP Putrajaya had the highest prevalence of overweight [37.0% (95% CI: 31.8, 42.5)]. There was no significant difference in overweight between urban [30.7% (95% CI: 29.6, 31.8) and rural residents [28.1% (95% CI: 26.4, 29.9)]. The highest prevalence of overweight were among males [31.6% (95% CI: 30.2, 32.9)], adults aged 50 - 54 years [39.3% (95% CI: 36.5, 42.3)], Indians [35.0% (95% CI: 31.5, 38.7)], married adults [33.8% (95% CI: 32.7, 34.9)], primary education attainers [31.3% (95% CI:29.3, 33.3)] and government/ semi government employees [36.2% (95% CI: 33.5, 38.9)].

Based on the Malaysian Clinical Practice Guidelines of Obesity (2004) classification, the national prevalence of obesity was 30.6% (95% CI: 29.5, 31.6). By state, WP Putrajaya had the highest prevalence of obesity [43.0% (95% CI: 37.8, 48.4)] followed by Malacca [36.0% (95% CI: 30.8, 41.5)] and Perlis [36.0% (95% CI: 32.8, 39.5)]. In contrast, Sabah & WP Labuan had the lowest prevalence of obesity [23.9% (95% CI: 20.7, 27.3)]. There was no significant difference in the prevalence of obesity urban [31.0% (95% CI: 29.7, 32.2)] and rural area residents [29.4% (95% CI: 27.5, 31.3)]. The prevalence of obesity was significantly higher in females [33.6% (95% CI: 32.2, 35.0)] compared to males [27.8% (95% CI: 26.6, 29.2]. The highest prevalence of obesity were among Indians [43.5% (95% CI: 39.4, 47.7)], married adults [33.8% (95% CI: 32.6, 35.1)], secondary education attainers [32.1% (95% CI: 30.7, 33.4)] and government/ semi government employees [40.3% (95% CI: 37.4, 43.2)].

Based on the World Health Organization (1998) classifications, the prevalence of obesity was 17.7% (95% CI: 16.9, 18.5). By state, WP Putrajaya had the highest prevalence of obesity [25.8% (95% CI: 21.7, 30.2)], followed by Negeri Sembilan [23.5% (95% CI: 20.1, 27.3)] and Perlis [22.3% (95% CI: 19.5, 25.5)]. Sabah & WP Labuan showed the lowest prevalence of obesity [13.4% (95% CI: 11.3, 15.7)]. There was no significant difference in obesity between urban [17.7% (95% CI: 16.7, 18.7)] and rural residents [17.5% (95% CI: 16.2, 18.9)]. The prevalence of obesity was significantly higher among females [20.6% (95% CI: 19.5, 21.8)] compared to males [15.0% (95% CI: 13.9, 16.1]. The highest prevalence of obesity was among adults aged 55 – 59 years [22.3% (95% CI: 19.8, 25.2)], Indians [27.1% (95% CI: 23.5, 31.1)], widow/widower/divorcee [20.2% (95% CI: 17.7, 23.0)], secondary education attainers [19.1% (95% CI: 188.0, 20.2)] and unpaid workers/ home makers [23.7% (95% CI: 21.9, 25.7)].

In assessing central obesity or abdominal obesity, the International Diabetes Institute/Western Pacific World Health Organization/ International association for the study of Obesity/International Obesity Task Force (WHO/IASO/IOTF, 2000) has recommended the use of waist circumference (WC) cut-off values of > 90 cm for men and > 80 cm for women. The national prevalence of abdominal obesity was 48.6% (95% CI: 47.4, 49.9). By state, WP Putrajaya [61.3% (95% CI: 57.2, 65.3] had the highest prevalence of abdominal obesity followed by Penang [56.8% (95% CI: 51.1, 62.3)] and Malacca [54.2% (95% CI: 49.1, 59.2)]. The prevalence of abdominal obesity was slightly higher in the urban areas [49.4% (95% CI: 47.9, 51.0)] as compared to the rural areas [46.2% (95% CI: 44.0, 48.4)] but this difference was not statistically significant. Females showed a significantly higher prevalence of abdominal obesity [60.2% (95% CI: 58.5, 61.8)] than males [38.2% (95% CI: 36.6, 39.9)]. Adults aged 60 - 64 years old [66.4% (95% CI: 62.7 , 69.9)], Indians [66.2% (95% CI: 61.6, 70.6)], widow/widower/divorcee [63.3% (95% CI: 60.2, 66.3)], primary education attainers [53.3% (95% CI: 50.9, 55.6)], unpaid workers/ home makers [67.3% (95% CI : 64.8, 69.6)], and those earned between RM 9000 – RM 9999 [56.7% (95% CI: 48.4, 64.6)] had the highest prevalence of abdominal obesity.

The cut-off values for abdominal obesity were also classified based on recommendation by WHO Expert Consultation on Obesity (2000a). In this classification, waist circumference of > 102 cm for men and > 88 cm for women are the cut-off values for metabolic complication risk. According to this classification, the national prevalence of abdominal obesity was 23.0% (95% CI: 23.0, 24) and the prevalence was found to be lower than the prevalence classified by WHO/IASO/IOTF. Prevalence of abdominal obesity were found to be the highest in Perlis [27.7% (95% CI: 23.8, 31.9)], urban residents [23.2% (95% CI: 22.0, 24.4)], females [35.4% (95% CI: 33.8, 36.9)], Indians [37.2% (95% CI: 33.4, 41.1)], primary education attainers [27.0% (95% CI: 25.1, 29.0)], and unpaid workers [42.0 % (95% CI: 39.5, 44.5)].

Calf circumference was used to identify individuals aged 60 years and above who were at risk of malnutrition or peripheral muscle wasting (<30.1 cm for men and <27.3 cm for women) (Sakinah et al., 2004). The overall prevalence of peripheral muscle wasting in this study was 20.0% (95% CI: 17.8, 22.5). By state, Negeri Sembilan had the highest prevalence of peripheral muscle wasting [40.7% (95% CI: 29.5, 53.0)] followed by Sarawak [29.6 (95% (21.6, 39.1)]. In contrast, Penang had the lowest prevalence of peripheral muscle wasting [3.5% (95% CI: 1.9, 6.6)]. Older persons from rural areas had significantly increased risk of malnutrition [24.7% (95% CI: 21.5, 28.2)] compared to those living in urban areas [18.2% (95% CI: 15.4, 21.4)]. Males showed a significantly higher risk of peripheral muscle wasting [23.3% (95% CI: 20.2, 26.7)] than females 16.9% (95% CI: 14.5, 19.7)].

2.1.5   Conclusion

The NHMS 2015 showed that the national prevalence of overweight, obesity and abdominal obesity had increased by 0.6%, 2.6% and 2.0% respectively as compared to the previous findings of NHMS 2011. Currently, the prevalence of obesity in Malaysia is also higher than the world prevalence of 13.0% in 2014 (www.who.int). As the number of people with obesity increases, the nation now is facing an upward surge of non-communicable diseases such as diabetes and cardiovascular diseases. The alarming trend of the obesity epidemic in Malaysia does not only require immediate revision of public health policies, but to provide supportive environment and communities for Malaysians to work towards practising healthier lifestyle.

Meanwhile, the slight increment of older individuals who were at risk for malnutrition compared to NHMS 2011 survey should alert the healthcare and related agencies to prepare and provide the necessary environments for a healthier aging in the country

Table 2.1.1: Prevalence of underweight BMI among adults (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	CPG 2004 (BMI <18.5 kg/m^2) & WHO 1998 (BMI <18.5 kg/m^2)				
	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,107	1,259,017	6.7	6.2	7.3
State					
Johor	88	131,205	6.0	4.7	7.7
Kedah	78	101,024	8.2	5.9	11.4
Kelantan	81	80,629	8.4	6.5	10.8
Melaka	52	20,566	4.3	2.7	6.8
Negeri Sembilan	63	48,414	8.1	4.8	13.2
Pahang	68	67,195	7.1	5.5	9.2
Penang	78	79,623	7.0	4.8	10.2
Perak	75	98,475	6.3	4.6	8.7
Perlis	76	11,289	7.5	5.3	10.4
Selangor	149	248,160	6.6	5.3	8.2
Terengganu	91	53,938	8.3	6.7	10.2
Sabah & WP Labuan	77	129,598	5.9	4.4	7.8
Sarawak	82	121,450	7.2	5.8	8.9
WP Kuala Lumpur	36	66,070	5.7	4.0	8.0
WP Putrajaya	13	1,382	3.0	1.6	5.6
Location					
Urban	605	935,621	6.6	5.9	7.3
Rural	502	323,396	7.1	6.3	8.1
Sex					
Male	545	609,227	6.2	5.5	6.9
Female	562	649,791	7.3	6.5	8.2
Age Group					
18-19	153	172,409	18.7	15.5	22.3
20-24	248	369,720	14.0	12.0	16.2
25-29	176	221,212	8.7	7.3	10.4
30-34	95	117,244	4.9	3.8	6.3
35-39	64	68,748	3.6	2.6	4.8
40-44	60	78,331	4.4	3.2	6.2
45-49	49	45,490	2.8	2.1	3.9
50-54	40	35,935	2.5	1.7	3.7
55-59	31	20,192	1.7	1.1	2.6
60-64	40	32,553	3.7	2.4	5.5
65-69	37	26,269	4.1	2.8	6.2
70-74	43	21,055	5.8	3.6	9.0
75+	71	49,860	10.9	8.1	14.4

Sociodemographic Characteristics	CPG 2004 (BMI <18.5 kg/m^2) & WHO 1998 (BMI <18.5 kg/m^2)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity					
Malays	693	612,622	6.7	6.0	7.4
Chinese	198	356,224	8.3	6.9	10.0
Indians	66	59,317	4.6	3.1	6.8
Other Bumiputras	87	127,230	6.1	4.9	7.7
Others	63	103,624	5.4	3.8	7.6
Marital Status					
Single	524	691,871	13.0	11.6	14.5
Married	485	500,361	4.1	3.6	4.7
Widow/widower/divorcee	98	66,786	5.3	4.0	6.9
Education Level					
No formal education	89	78,352	7.4	5.7	9.7
Primary education	209	187,375	4.9	4.0	5.9
Secondary education	560	662,558	7.6	6.7	8.5
Tertiary education	229	309,841	6.4	5.4	7.5
Unclassified education	19	19,157	7.4	4.3	12.3
Occupation					
Government/semi government employee	79	73,524	4.1	3.0	5.5
Private employee	369	494,531	6.6	5.8	7.5
Self employed	181	175,854	5.4	4.5	6.5
Unpaid worker/home maker	111	138,087	5.2	4.0	6.7
Retiree	23	18,804	3.3	2.0	5.5
Income Group					
Less than RM 1000	212	203,522	8.1	6.7	9.7
RM 1000 - RM 1999	221	223,237	7.2	6.1	8.5
RM 2000 - RM 2999	178	192,587	6.3	5.2	7.7
RM 3000 - RM 3999	117	139,642	5.8	4.5	7.4
RM 4000 - RM 4999	121	151,052	8.2	6.2	10.8
RM 5000 - RM 5999	80	118,959	8.0	6.1	10.6
RM 6000 - RM 6999	50	52,052	5.4	3.9	7.6
RM 7000 - RM 7999	41	56,093	7.4	4.9	11.0
RM 8000 - RM 8999	25	33,609	5.3	3.2	8.8
RM 9000 - RM 9999	12	17,509	5.2	2.8	9.6
RM 10000 & above	50	70,756	4.3	3.2	5.7
Quintile Income Group					
Quintile 1	187	173,233	8.0	6.6	9.7
Quintile 2	214	223,575	7.0	5.9	8.3
Quintile 3	229	252,544	6.5	5.4	7.9
Quintile 4	240	298,927	7.3	6.1	8.7
Quintile 5	237	310,738	5.7	4.9	6.8

Table 2.1.2: Prevalence of normal BMI among adults (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	CPG 2004 (BMI 18.5 - 22.9 kg/m²)					WHO 1998 (BMI 18.5 - 24.9 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	4,849	5,489,899	29.3	28.2	30.4	7,796	8,553,027	45.6	44.5	46.7
State										
Johor	446	670,631	30.7	27.7	33.9	687	980,488	44.9	41.7	48.2
Kedah	301	322,848	26.2	23.1	29.6	478	507,713	41.2	37.4	45.1
Kelantan	343	308,171	32.1	29.4	34.9	495	433,709	45.1	41.5	48.8
Melaka	220	125,964	26.1	21.4	31.5	379	202,540	42.0	37.2	47.0
Negeri Sembilan	253	155,860	26.0	22.1	30.3	436	244,573	40.7	37.2	44.4
Pahang	305	273,183	28.9	23.8	34.6	500	439,803	46.5	41.4	51.7
Penang	320	316,205	27.9	23.4	32.8	545	551,388	48.6	43.4	53.8
Perak	344	458,405	29.5	26.1	33.1	563	720,569	46.4	43.3	49.4
Perlis	290	38,990	25.8	22.3	29.6	477	60,509	40.0	35.9	44.2
Selangor	651	1,025,348	27.3	24.8	30.0	1,064	1,663,213	44.3	41.4	47.4
Terengganu	321	192,193	29.5	26.4	32.8	491	288,806	44.3	40.7	47.9
Sabah & WP Labuan	449	737,006	33.4	29.7	37.3	726	1,160,142	52.6	49.1	56.0
Sarawak	344	499,011	29.5	25.9	33.4	526	749,335	44.3	40.7	48.0
WP Kuala Lumpur	182	357,226	30.6	26.5	35.0	280	534,747	45.7	40.8	50.8
WP Putrajaya	80	8,858	19.6	15.4	24.5	149	15,493	34.2	29.6	39.2
Location										
Urban	2,748	4,028,849	28.3	27.1	29.6	4,509	6,408,027	45.0	43.7	46.3
Rural	2,101	1,461,050	32.2	30.1	34.5	3,287	2,145,000	47.3	45.1	49.5
Sex										
Male	2,537	2,972,326	30.2	28.7	31.8	4,034	4,653,373	47.3	45.7	48.8
Female	2,312	2,517,573	28.2	26.9	29.6	3,762	3,899,653	43.7	42.3	45.2

Sociodemographic Characteristics	CPG 2004 (BMI 18.5 - 22.9 kg/m²)					WHO 1998 (BMI 18.5 - 24.9 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group										
18-19	316	371,283	40.3	35.9	44.8	410	488,563	53.0	48.1	57.9
20-24	708	1,079,472	40.9	38.1	43.7	949	1,432,809	54.3	51.4	57.1
25-29	657	948,922	37.3	34.2	40.5	928	1,291,741	50.8	47.7	53.9
30-34	536	725,569	30.4	27.7	33.2	848	1,156,385	48.4	45.6	51.3
35-39	398	477,217	24.8	22.1	27.7	678	824,233	42.8	39.7	46.0
40-44	345	388,352	22.0	19.4	24.9	611	682,328	38.6	35.6	41.8
45-49	353	347,726	21.7	19.2	24.4	659	629,028	39.2	36.3	42.2
50-54	332	283,839	19.8	17.4	22.4	643	535,129	37.3	34.4	40.3
55-59	309	252,034	21.1	18.5	23.9	569	455,028	38.1	35.0	41.3
60-64	263	190,700	21.5	18.5	24.8	488	358,019	40.4	36.6	44.3
65-69	220	150,318	23.7	20.3	27.5	398	278,698	44.0	39.8	48.3
70-74	185	105,903	29.0	24.1	34.4	281	164,709	45.1	39.5	50.8
75+	227	168,565	36.8	31.9	41.9	334	256,357	55.9	50.7	61.0
Ethnicity										
Malays	2,739	2,391,125	26.0	25.0	27.1	4,451	3,782,799	41.2	40.0	42.4
Chinese	942	1,477,299	34.4	32.1	36.7	1,473	2,228,955	51.9	49.5	54.3
Indians	259	240,691	18.7	15.9	22.0	458	426,486	33.2	29.6	37.0
Other Bumiputras	450	566,356	27.3	24.4	30.4	734	926,786	44.7	41.5	47.8
Others	459	814,429	42.2	37.9	46.7	680	1,188,000	61.6	57.5	65.6
Marital Status										
Single	1,468	2,055,182	38.5	36.6	40.5	1,994	2,750,507	51.6	49.5	53.7
Married	2,926	3,076,604	25.3	24.1	26.5	5,077	5,245,567	43.1	41.8	44.5
Widow/widower/divorcee	455	358,114	28.2	25.3	31.3	725	556,953	43.9	40.6	47.2
Education Level										
No formal education	400	363,403	34.5	30.4	39.0	594	540,967	51.4	47.4	55.5
Primary education	1,149	1,124,995	29.4	27.3	31.6	1,898	1,801,631	47.0	44.8	49.3
Secondary education	2,162	2,446,740	27.9	26.6	29.3	3,458	3,810,321	43.5	42.0	45.1
Tertiary education	1,059	1,449,298	29.8	27.9	31.9	1,740	2,261,196	46.6	44.5	48.7
Unclassified education	77	104,071	40.1	31.4	49.5	103	135,919	52.3	43.3	61.2

Sociodemographic Characteristics	CPG 2004 (BMI 18.5 - 22.9 kg/m²)					WHO 1998 (BMI 18.5 - 24.9 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation										
Government/semi government employee	401	375,224	20.8	18.2	23.6	717	670,088	37.1	34.1	40.2
Private employee	1,688	2,477,624	33.1	31.3	34.9	2,668	3,729,287	49.8	47.9	51.6
Self employed	978	914,739	28.0	26.0	30.2	1,579	1,466,905	45.0	42.7	47.2
Unpaid worker/home maker	632	630,257	23.8	21.7	25.9	1,070	1,029,256	38.8	36.6	41.1
Retiree	157	127,731	22.3	18.6	26.4	284	235,533	41.1	36.5	45.8
Income Group										
Less than RM 1000	815	740,836	29.4	27.1	31.9	1,278	1,166,154	46.3	43.9	48.7
RM 1000 - RM 1999	943	954,901	30.8	28.5	33.2	1,444	1,430,799	46.1	43.7	48.6
RM 2000 - RM 2999	826	915,174	30.0	27.7	32.3	1,333	1,391,094	45.5	43.1	47.9
RM 3000 - RM 3999	604	708,310	29.4	26.8	32.0	970	1,090,829	45.2	42.5	48.0
RM 4000 - RM 4999	412	505,339	27.4	24.4	30.6	697	825,133	44.7	41.3	48.2
RM 5000 - RM 5999	317	425,865	28.7	25.1	32.7	531	675,328	45.6	41.7	49.6
RM 6000 - RM 6999	231	276,159	28.8	24.4	33.7	380	439,404	45.9	41.2	50.7
RM 7000 - RM 7999	165	193,808	25.5	20.6	31.3	283	331,675	43.7	38.3	49.3
RM 8000 - RM 8999	151	194,470	30.7	25.2	36.8	240	296,568	46.8	40.3	53.4
RM 9000 - RM 9999	60	69,375	20.8	15.5	27.2	116	128,153	38.3	31.1	46.2
RM 10000 & above	325	505,663	30.4	26.9	34.2	524	777,888	46.8	43.1	50.5
Quintile Income Group										
Quintile 1	697	628,087	29.1	26.7	31.5	1,097	992,557	46.0	43.4	48.6
Quintile 2	974	993,642	31.1	28.9	33.4	1,492	1,498,444	46.9	44.5	49.4
Quintile 3	1,035	1,138,025	29.3	27.4	31.4	1,668	1,733,024	44.6	42.5	46.8
Quintile 4	981	1,189,937	28.9	26.9	31.0	1,619	1,885,973	45.8	43.6	48.0
Quintile 5	1,162	1,540,208	28.5	26.4	30.6	1,920	2,443,030	45.1	42.9	47.4

Table 2.1.3: Prevalence of overweight among adults (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	CPG 2004 (BMI 23.0 - 27.5 kg/m^2)					WHO 1998 (BMI 25.0 - 30.0 kg/m^2)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	6,258	6,275,528	33.4	32.5	34.4	5,950	5,636,492	30.0	29.1	31.0
State										
Johor	568	731,923	33.5	30.9	36.2	548	677,417	31.0	28.4	33.8
Kedah	400	398,972	32.4	29.0	36.0	386	371,039	30.1	26.9	33.5
Kelantan	359	294,945	30.7	27.7	33.8	357	291,144	30.3	26.8	34.0
Melaka	340	162,076	33.6	28.4	39.2	350	153,349	31.8	28.2	35.7
Negeri Sembilan	375	182,620	30.4	26.0	35.2	352	166,015	27.7	25.1	30.4
Pahang	370	297,326	31.5	28.0	35.2	346	254,693	26.9	23.8	30.4
Penang	454	423,987	37.3	34.6	40.2	414	347,899	30.6	27.2	34.3
Perak	446	538,687	34.7	31.2	38.3	401	462,786	29.8	26.6	33.2
Perlis	413	46,420	30.7	28.4	33.1	403	45,650	30.2	27.5	33.1
Selangor	825	1,251,728	33.4	31.1	35.7	787	1,136,524	30.3	28.1	32.6
Terengganu	351	193,979	29.7	27.2	32.4	348	188,256	28.9	25.6	32.4
Sabah & WP Labuan	589	813,885	36.9	33.9	40.0	493	622,254	28.2	25.4	31.2
Sarawak	391	523,935	31.0	27.5	34.7	367	508,623	30.1	26.9	33.5
WP Kuala Lumpur	219	399,484	34.2	30.6	37.9	226	394,085	33.7	29.1	38.7
WP Putrajaya	158	15,563	34.4	28.6	40.6	172	16,761	37.0	31.8	42.5
Location										
Urban	3,717	4,858,193	34.1	33.0	35.3	3,481	4,363,317	30.7	29.6	31.8
Rural	2,541	1,417,335	31.3	29.7	32.9	2,469	1,273,176	28.1	26.4	29.9
Sex										
Male	3,200	3,523,111	35.8	34.5	37.1	2,952	3,110,010	31.6	30.3	32.9
Female	3,058	2,752,417	30.9	29.6	32.1	2,998	2,526,483	28.3	27.1	29.6

Sociodemographic Characteristics	CPG 2004 (BMI 23.0 - 27.5 kg/m²)					WHO 1998 (BMI 25.0 - 30.0 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group										
18-19	153	192,161	20.8	17.5	24.6	110	153,459	16.6	13.4	20.5
20-24	434	641,155	24.3	22.0	26.7	347	518,738	19.6	17.4	22.1
25-29	546	707,994	27.8	25.4	30.5	453	565,411	22.2	19.9	24.7
30-34	621	815,964	34.2	31.5	37.0	580	703,096	29.4	27.0	32.0
35-39	615	693,690	36.0	33.3	38.8	613	635,258	33.0	30.2	35.9
40-44	603	652,625	36.9	34.1	39.9	644	633,087	35.8	33.1	38.7
45-49	674	616,457	38.4	35.8	41.2	699	622,338	38.8	36.1	41.6
50-54	706	589,494	41.1	38.2	44.2	701	563,953	39.3	36.5	42.3
55-59	626	474,953	39.7	36.8	42.8	629	453,077	37.9	34.8	41.2
60-64	490	336,200	37.9	34.5	41.5	463	314,031	35.4	32.0	39.0
65-69	359	240,403	37.9	33.8	42.3	347	219,293	34.6	30.6	38.9
70-74	224	143,488	39.2	33.6	45.2	209	130,425	35.7	29.9	41.9
75+	207	170,943	37.3	32.5	42.3	155	124,325	27.1	23.0	31.7
Ethnicity										
Malays	3,719	2,927,726	31.9	30.8	33.1	3,749	2,843,281	31.0	29.9	32.1
Chinese	1,076	1,519,794	35.4	33.2	37.7	888	1,208,446	28.1	26.1	30.3
Indians	443	425,252	33.1	29.7	36.7	453	449,880	35.0	31.5	38.7
Other Bumiputras	608	743,591	35.8	33.2	38.6	535	646,909	31.2	28.4	34.1
Others	412	659,165	34.2	30.6	37.9	325	487,976	25.3	21.8	29.1
Marital Status										
Single	1,002	1,373,793	25.8	24.1	27.5	830	1,140,439	21.4	19.7	23.2
Married	4,665	4,470,338	36.8	35.7	37.9	4,547	4,107,334	33.8	32.7	34.9
Widow/widower/divorcee	591	431,397	34.0	31.0	37.1	573	388,720	30.6	28.0	33.4
Education Level										
No formal education	418	367,738	35.0	31.3	38.8	368	310,564	29.5	26.2	33.0
Primary education	1,618	1,381,163	36.0	34.1	38.0	1,537	1,197,973	31.3	29.3	33.3
Secondary education	2,788	2,839,889	32.4	31.2	33.7	2,715	2,615,006	29.9	28.5	31.2
Tertiary education	1,374	1,612,411	33.2	31.4	35.1	1,268	1,443,666	29.7	28.0	31.6
Unclassified education	57	71,731	27.6	20.6	35.9	58	67,455	26.0	18.4	35.4

Sociodemographic Characteristics	CPG 2004 (BMI 23.0 - 27.5 kg/m²)					WHO 1998 (BMI 25.0 - 30.0 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation										
Government/semi government employee	715	629,837	34.9	32.2	37.7	771	653,051	36.2	33.5	38.9
Private employee	1,987	2,529,399	33.8	32.2	35.3	1,695	2,096,978	28.0	26.6	29.5
Self employed	1,307	1,166,967	35.8	33.7	37.9	1,242	1,063,395	32.6	30.6	34.7
Unpaid worker/home maker	984	825,195	31.1	28.9	33.4	1,083	854,683	32.2	30.2	34.4
Retiree	274	211,201	36.8	32.7	41.1	273	193,385	33.7	29.8	37.8
Income Group										
Less than RM 1000	1,001	846,548	33.6	31.1	36.2	963	732,089	29.1	26.8	31.4
RM 1000 - RM 1999	1,111	1,013,640	32.7	30.6	34.9	1,093	933,565	30.1	28.0	32.3
RM 2000 - RM 2999	1,042	963,177	31.5	29.5	33.7	1,003	949,041	31.1	29.0	33.2
RM 3000 - RM 3999	795	813,399	33.7	31.1	36.4	761	740,464	30.7	28.4	33.1
RM 4000 - RM 4999	572	641,096	34.7	31.6	38.0	505	526,661	28.5	25.5	31.8
RM 5000 - RM 5999	435	491,061	33.2	29.6	36.9	409	421,783	28.5	25.4	31.8
RM 6000 - RM 6999	311	330,396	34.5	30.3	39.0	281	290,200	30.3	26.0	35.0
RM 7000 - RM 7999	243	260,947	34.4	29.7	39.4	230	216,096	28.5	24.1	33.2
RM 8000 - RM 8999	176	200,836	31.7	27.0	36.8	160	172,860	27.3	22.1	33.1
RM 9000 - RM 9999	119	126,617	37.9	30.5	45.8	109	114,270	34.2	28.1	40.8
RM 10000 & above	453	587,810	35.3	32.0	38.9	436	539,464	32.4	29.5	35.5
Quintile Income Group										
Quintile 1	870	729,981	33.8	31.3	36.4	835	636,057	29.4	27.1	32.0
Quintile 2	1,119	1,046,451	32.8	30.7	34.9	1,106	949,328	29.7	27.7	31.9
Quintile 3	1,348	1,250,717	32.2	30.3	34.2	1,305	1,228,568	31.7	29.8	33.6
Quintile 4	1,312	1,389,650	33.8	31.8	35.8	1,181	1,179,234	28.7	26.8	30.6
Quintile 5	1,609	1,858,729	34.3	32.5	36.3	1,523	1,643,306	30.4	28.6	32.2

Table 2.1.4: Prevalence of obesity among adults (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	CPG 2004 (BMI ≥ 27.5 kg/m²)					WHO 1998 (BMI ≥ 30.0 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	6,285	5,737,636	30.6	29.5	31.6	3,646	3,313,544	17.7	16.9	18.5
State										
Johor	548	650,431	29.8	26.5	33.3	327	395,080	18.1	15.6	20.9
Kedah	411	409,468	33.2	29.3	37.4	248	252,536	20.5	17.3	24.1
Kelantan	340	276,962	28.8	25.9	32.0	190	155,226	16.2	13.6	19.1
Melaka	390	173,527	36.0	30.8	41.5	221	105,679	21.9	18.0	26.5
Negeri Sembilan	445	213,492	35.6	31.2	40.2	285	141,384	23.5	20.1	27.3
Pahang	416	307,687	32.5	28.3	37.1	245	183,700	19.4	16.1	23.3
Penang	403	315,477	27.8	23.1	33.0	218	156,383	13.8	10.6	17.8
Perak	431	459,009	29.5	26.5	32.8	257	272,745	17.5	14.9	20.5
Perlis	438	54,499	36.0	32.8	39.5	261	33,750	22.3	19.5	25.5
Selangor	874	1,225,915	32.7	30.0	35.5	499	703,254	18.7	16.7	21.0
Terengganu	374	212,215	32.5	29.8	35.4	207	121,326	18.6	16.1	21.4
Sabah & WP Labuan	418	526,463	23.9	20.7	27.3	237	294,959	13.4	11.3	15.7
Sarawak	385	546,659	32.3	29.0	35.8	227	311,647	18.4	15.8	21.4
WP Kuala Lumpur	211	346,333	29.6	26.0	33.6	106	174,210	14.9	12.0	18.4
WP Putrajaya	201	19,498	43.0	37.8	48.4	118	11,665	25.8	21.7	30.2
Location										
Urban	3,571	4,405,202	31.0	29.7	32.2	2,046	2,520,901	17.7	16.7	18.7
Rural	2,714	1,332,434	29.4	27.5	31.3	1,600	792,643	17.5	16.2	18.9
Sex										
Male	2,636	2,741,203	27.8	26.6	29.2	1,387	1,473,258	15.0	13.9	16.1
Female	3,649	2,996,433	33.6	32.2	35.0	2,259	1,840,286	20.6	19.5	21.8

Sociodemographic Characteristics	CPG 2004 (BMI ≥ 27.5 kg/m²)					WHO 1998 (BMI ≥ 30.0 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group										
18-19	150	186,254	20.2	16.5	24.4	99	107,676	11.7	9.4	14.4
20-24	397	550,473	20.8	18.7	23.2	243	319,554	12.1	10.4	14.0
25-29	569	664,863	26.1	23.6	28.8	391	464,627	18.3	16.2	20.5
30-34	649	729,425	30.5	28.0	33.2	378	411,477	17.2	15.1	19.5
35-39	688	685,748	35.6	32.8	38.6	410	397,164	20.6	18.3	23.2
40-44	707	646,941	36.6	33.7	39.7	400	372,503	21.1	18.7	23.7
45-49	717	593,614	37.0	34.2	40.0	386	306,431	19.1	17.0	21.4
50-54	735	524,320	36.6	33.6	39.6	429	298,571	20.8	18.4	23.5
55-59	633	448,094	37.5	34.5	40.6	370	266,976	22.3	19.8	25.2
60-64	469	327,057	36.9	33.3	40.6	271	181,907	20.5	17.8	23.6
65-69	320	216,569	34.2	30.2	38.5	154	109,298	17.3	14.0	21.1
70-74	161	95,149	26.0	21.5	31.1	80	49,406	13.5	10.1	17.9
75+	90	69,129	15.1	11.7	19.2	35	27,956	6.1	4.1	9.0
Ethnicity										
Malays	4,289	3,248,693	35.4	34.2	36.6	2547	1,941,463	21.1	20.1	22.3
Chinese	685	941,050	21.9	20.1	23.8	342	500,742	11.7	10.2	13.3
Indians	546	558,678	43.5	39.4	47.7	337	348,255	27.1	23.5	31.1
Other Bumiputras	517	638,124	30.7	28.0	33.6	306	374,376	18.0	15.8	20.6
Others	248	351,091	18.2	15.2	21.6	114	148,708	7.7	6.0	9.8
Marital Status										
Single	960	1,213,477	22.7	21.1	24.5	606	751,506	14.1	12.8	15.5
Married	4,716	4,111,270	33.8	32.6	35.1	2683	2,305,311	19.0	18.0	20.0
Widow/widower/divorcee	609	412,889	32.5	29.5	35.8	357	256,727	20.2	17.7	23.0
Education Level										
No formal education	308	242,333	23.0	19.6	26.8	164	121,943	11.6	9.5	14.1
Primary education	1,496	1,138,134	29.7	27.8	31.7	828	644,688	16.8	15.3	18.5
Secondary education	3,039	2,806,923	32.1	30.7	33.4	1816	1,668,225	19.1	18.0	20.2
Tertiary education	1,389	1,483,928	30.6	28.8	32.4	814	840,775	17.3	15.9	18.8
Unclassified education	49	64,685	24.9	18.4	32.8	22	37,113	14.3	8.8	22.3

Sociodemographic Characteristics	CPG 2004 (BMI ≥ 27.5 kg/m²)					WHO 1998 (BMI ≥ 30.0 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation										
Government/semi government employee	864	727,916	40.3	37.4	43.2	492	409,838	22.7	20.2	25.3
Private employee	1,678	1,992,607	26.6	25.1	28.2	990	1,173,365	15.7	14.4	17.0
Self employed	1,214	1,004,776	30.8	28.9	32.8	678	556,182	17.0	15.5	18.7
Unpaid worker/home maker	1,355	1,057,506	39.9	37.5	42.3	818	629,019	23.7	21.9	25.7
Retiree	286	215,921	37.6	33.1	42.4	160	125,935	22.0	18.2	26.3
Income Group										
Less than RM 1000	937	727,587	28.9	26.7	31.2	512	416,728	16.5	14.8	18.4
RM 1000 - RM 1999	1,109	908,988	29.3	27.1	31.7	626	513,165	16.5	14.9	18.3
RM 2000 - RM 2999	1,091	984,409	32.2	29.9	34.6	623	522,625	17.1	15.4	19.0
RM 3000 - RM 3999	830	751,627	31.1	28.6	33.8	498	442,041	18.3	16.2	20.6
RM 4000 - RM 4999	560	547,668	29.7	26.5	33.1	342	342,309	18.6	16.0	21.5
RM 5000 - RM 5999	465	445,398	30.1	26.6	33.8	277	265,212	17.9	15.3	20.9
RM 6000 - RM 6999	286	299,422	31.3	27.1	35.7	167	176,373	18.4	15.1	22.3
RM 7000 - RM 7999	267	248,281	32.7	27.4	38.5	162	155,266	20.5	16.3	25.3
RM 8000 - RM 8999	199	204,699	32.3	26.9	38.2	126	130,577	20.6	16.4	25.6
RM 9000 - RM 9999	101	120,682	36.1	28.4	44.6	55	74,251	22.2	16.2	29.7
RM 10000 & above	440	498,875	30.0	26.3	33.9	258	274,996	16.5	13.7	19.8
Quintile Income Group										
Quintile 1	800	628,513	29.1	26.7	31.6	435	357,967	16.6	14.7	18.7
Quintile 2	1,149	928,619	29.1	26.9	31.4	644	520,939	16.3	14.7	18.1
Quintile 3	1,383	1,240,176	32.0	29.9	34.0	793	667,327	17.2	15.6	18.9
Quintile 4	1,289	1,237,441	30.1	28.0	32.3	782	751,821	18.3	16.6	20.1
Quintile 5	1,664	1,702,888	31.5	29.4	33.6	992	1,015,490	18.8	17.1	20.5

Table 2.1.5: Prevalence of obesity I to III (WHO 1998) among adults (aged ≥18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Obese I (BMI 30.0 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,557	2,325,483	12.4	11.7	13.1	777	731,401	3.9	3.5	4.3	312	256,661	1.4	1.2	1.6
State															
Johor	224	266,834	12.2	10.3	14.4	73	92,319	4.2	3.2	5.5	30	35,928	1.6	1.1	2.5
Kedah	182	176,942	14.4	11.9	17.3	51	61,652	5.0	3.4	7.3	15	13,943	1.1	0.7	1.9
Kelantan	138	108,815	11.3	9.4	13.7	39	34,494	3.6	2.5	5.2	13	11,917	1.2	0.7	2.2
Melaka	151	67,574	14.0	10.9	17.9	48	23,555	4.9	2.8	8.3	22	14,551	3.0	1.8	5.0
Negeri Sembilan	190	100,455	16.7	13.9	20.0	64	25,924	4.3	3.2	5.8	31	15,005	2.5	1.6	3.9
Pahang	155	111,966	11.8	9.7	14.4	62	48,937	5.2	3.7	7.3	28	22,797	2.4	1.7	3.5
Penang	164	131,486	11.6	8.6	15.4	31	16,981	1.5	0.8	2.8	23	7,916	0.7	0.3	1.5
Perak	176	190,778	12.3	10.1	14.9	55	60,010	3.9	2.7	5.6	26	21,957	1.4	0.8	2.4
Perlis	193	23,727	15.7	13.2	18.5	46	5,612	3.7	2.4	5.7	22	4,411	2.9	1.6	5.2
Selangor	345	488,574	13.0	11.5	14.7	110	165,269	4.4	3.6	5.4	44	49,411	1.3	0.9	2.0
Terengganu	155	87,795	13.5	11.2	16.0	42	27,047	4.1	3.0	5.7	10	6,484	1.0	0.5	2.0
Sabah & WP Labuan	46	221,236	10.0	8.3	12.1	46	58,891	2.7	1.9	3.8	12	14,832	0.7	0.4	1.2
Sarawak	169	225,372	13.3	10.8	16.3	44	61,984	3.7	2.6	5.1	14	24,291	1.4	0.8	2.5
WP Kuala Lumpur	68	117,191	10.0	7.6	13.1	30	45,447	3.9	2.7	5.7	8	11,572	1.0	0.5	2.1
WP Putrajaya	68	6,739	14.9	10.8	20.1	36	3,279	7.2	5.3	9.8	14	1,647	3.6	2.0	6.6
Location															
Urban	1,422	1,767,328	12.4	11.6	13.3	459	566,644	4.0	3.6	4.5	165	186,929	1.3	1.1	1.6
Rural	1,135	558,154	12.3	11.3	13.4	318	164,757	3.6	3.1	4.3	147	69,732	1.5	1.2	1.9
Sex															
Male	1,042	1,096,279	11.1	10.3	12.1	255	290,327	2.9	2.5	3.5	90	86,652	0.9	0.7	1.2
Female	1,515	1,229,204	13.8	12.9	14.8	522	441,073	4.9	4.4	5.5	222	170,009	1.9	1.6	2.3

Sociodemographic Characteristics	Obese I (BMI 30.0 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
18-19	63	73,115	7.9	6.0	10.5	20	21,724	2.4	1.5	3.8	16	12,837	1.4	0.8	2.5
20-24	154	201,945	7.6	6.3	9.2	63	90,371	3.4	2.6	4.5	26	27,237	1.0	0.7	1.6
25-29	256	306,759	12.1	10.4	14.0	91	115,160	4.5	3.5	5.8	44	42,708	1.7	1.2	2.4
30-34	245	277,250	11.6	9.8	13.7	82	81,127	3.4	2.6	4.4	51	53,100	2.2	1.6	3.2
35-39	266	258,907	13.4	11.4	15.8	96	100,889	5.2	4.0	6.8	48	37,367	1.9	1.4	2.8
40-44	294	284,824	16.1	14.1	18.4	77	66,988	3.8	2.9	5.0	29	20,690	1.2	0.8	1.8
45-49	277	209,252	13.1	11.4	14.9	77	72,661	4.5	3.4	5.9	32	24,518	1.5	1.0	2.4
50-54	310	214,515	15.0	13.0	17.2	92	68,126	4.8	3.5	6.4	27	15,930	1.1	0.7	1.8
55-59	281	208,319	17.4	15.1	20.1	73	47,941	4.0	3.0	5.3	16	10,715	0.9	0.5	1.6
60-64	205	140,959	15.9	13.5	18.7	51	33,727	3.8	2.7	5.4	15	7,220	0.8	0.5	1.5
65-69	115	87,533	13.8	10.8	17.5	35	20,556	3.2	2.1	5.0	4	1,209	0.2	0.1	0.6
70-74	63	39,280	10.7	7.6	15.0	14	7,591	2.1	1.1	3.8	3	2,535	0.7	0.2	2.2
75+	28	22,823	5.0	3.1	7.8	6	4,540	1.0	0.4	2.3	1	593	0.1	0.0	0.9
Ethnicity															
Malays	1,744	1,311,595	14.3	13.4	15.2	558	445,643	4.9	4.4	5.4	245	184,225	2.0	1.7	2.4
Chinese	263	385,475	9.0	7.8	10.4	64	100,928	2.4	1.7	3.2	15	14,339	0.3	0.2	0.6
Indians	243	258,260	20.1	16.9	23.7	69	73,687	5.7	4.3	7.7	25	16,309	1.3	0.7	2.2
Other Bumiputras	223	272,279	13.1	11.1	15.5	63	72,678	3.5	2.6	4.7	20	29,419	1.4	0.9	2.3
Others	84	97,874	5.1	3.7	6.9	23	38,466	2.0	1.2	3.3	7	12,368	0.6	0.3	1.4
Marital Status															
Single	390	500,881	9.4	8.3	10.6	139	183,255	3.4	2.8	4.2	77	67,371	1.3	1.0	1.7
Married	1,917	1,637,812	13.5	12.7	14.3	556	494,265	4.1	3.7	4.5	210	173,234	1.4	1.2	1.7
Widow/widower /divorcee	250	186,790	14.7	12.5	17.3	82	53,881	4.2	3.2	5.7	25	16,056	1.3	0.8	2.0
Education Level															
No formal education	137	99,141	9.4	7.6	11.6	23	19,441	1.8	1.0	3.3	4	3,361	0.3	0.1	1.0
Primary education	584	455,666	11.9	10.7	13.3	180	141,309	3.7	3.0	4.6	64	47,713	1.2	0.9	1.7
Secondary education	1,269	1,162,352	13.3	12.4	14.3	375	366,659	4.2	3.7	4.8	172	139,214	1.6	1.3	1.9
Tertiary education	552	581,040	12.0	10.8	13.3	192	194,570	4.0	3.4	4.8	70	65,165	1.3	1.0	1.8
Unclassified education	13	26,484	10.2	5.4	18.5	7	9,422	3.6	1.4	8.8	2	1,207	0.5	0.1	2.3

Sociodemographic Characteristics	Obese I (BMI 30.0 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation															
Government/semi government employee	340	282,125	15.6	13.5	18.0	108	90,411	5.0	3.9	6.4	44	37,301	2.1	1.4	3.0
Private employee	695	831,914	11.1	10.1	12.2	215	268,419	3.6	3.0	4.2	80	73,033	1.0	0.7	1.3
Self employed	483	391,222	12.0	10.7	13.4	139	118,771	3.6	2.9	4.5	56	46,189	1.4	1.0	1.9
Unpaid worker/home maker	558	423,650	16.0	14.4	17.7	182	143,441	5.4	4.5	6.5	78	61,928	2.3	1.7	3.1
Retiree	123	100,494	17.5	14.2	21.4	32	23,421	4.1	2.6	6.4	5	2,020	0.4	0.1	0.9
Income Group															
Less than RM 1000	364	301,006	12.0	10.5	13.6	112	91,358	3.6	2.8	4.7	36	24,363	1.0	0.6	1.5
RM 1000 - RM 1999	449	367,495	11.9	10.5	13.4	126	101,840	3.3	2.7	4.1	51	43,830	1.4	1.0	2.0
RM 2000 - RM 2999	428	353,841	11.6	10.1	13.2	125	108,991	3.6	2.9	4.4	70	59,793	2.0	1.4	2.7
RM 3000 - RM 3999	354	315,800	13.1	11.3	15.1	104	94,686	3.9	3.1	5.0	40	31,555	1.3	0.9	2.0
RM 4000 - RM 4999	225	220,939	12.0	10.1	14.2	83	95,969	5.2	3.9	6.9	34	25,402	1.4	0.9	2.0
RM 5000 - RM 5999	194	181,778	12.3	10.2	14.7	60	61,458	4.1	3.0	5.7	23	21,976	1.5	0.9	2.5
RM 6000 - RM 6999	109	119,634	12.5	9.8	15.8	34	37,224	3.9	2.5	6.0	24	19,514	2.0	1.2	3.6
RM 7000 - RM 7999	123	114,231	15.0	11.8	18.9	27	31,343	4.1	2.5	6.8	12	9,691	1.3	0.6	2.8
RM 8000 - RM 8999	87	91,363	14.4	11.1	18.6	28	27,247	4.3	2.7	6.7	11	11,968	1.9	1.0	3.7
RM 9000 - RM 9999	35	49,664	14.9	9.9	21.8	18	22,358	6.7	3.5	12.4	2	2,229	0.7	0.2	2.8
RM 10000 & above	189	209,732	12.6	10.3	15.3	60	58,926	3.5	2.5	5.0	9	6,339	0.4	0.2	1.0
Quintile Income Group															
Quintile 1	306	253,826	11.8	10.2	13.5	99	83,814	3.9	2.9	5.2	30	20,327	0.9	0.6	1.6
Quintile 2	468	383,613	12.0	10.7	13.5	126	95,934	3.0	2.4	3.7	50	41,393	1.3	0.9	1.8
Quintile 3	549	452,378	11.7	10.4	13.1	163	147,604	3.8	3.1	4.6	81	67,345	1.7	1.3	2.3
Quintile 4	538	514,175	12.5	11.2	13.9	171	177,503	4.3	3.5	5.3	73	60,144	1.5	1.1	2.0
Quintile 5	696	721,490	13.3	12.0	14.7	218	226,547	4.2	3.5	5.0	78	67,452	1.2	0.9	1.7

Table 2.1.6: Prevalence of obesity I to III (CPG 2004) among adults (aged ≥18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Obese I (BMI 27.5 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	5,196	4,749,574	25.3	24.4	26.3	777	731,401	3.9	3.5	4.3	312	256,661	1.4	1.2	1.6
State															
Johor	445	522,185	23.9	21.1	27.0	73	92,319	4.2	3.2	5.5	30	35,928	1.6	1.1	2.5
Kedah	345	333,873	27.1	23.7	30.7	51	61,652	5.0	3.4	7.3	15	13,943	1.1	0.7	1.9
Kelantan	288	230,551	24.0	21.5	26.7	39	34,494	3.6	2.5	5.2	13	11,917	1.2	0.7	2.2
Melaka	320	135,422	28.1	24.2	32.4	48	23,555	4.9	2.8	8.3	22	14,551	3.0	1.8	5.0
Negeri Sembilan	350	172,563	28.7	24.9	32.9	64	25,924	4.3	3.2	5.8	31	15,005	2.5	1.6	3.9
Pahang	326	235,953	25.0	21.7	28.6	62	48,937	5.2	3.7	7.3	28	22,797	2.4	1.7	3.5
Penang	349	290,581	25.6	21.0	30.8	31	16,981	1.5	0.8	2.8	23	7,916	0.7	0.3	1.5
Perak	350	377,042	24.3	21.4	27.3	55	60,010	3.9	2.7	5.6	26	21,957	1.4	0.8	2.4
Perlis	370	44,476	29.4	26.4	32.6	46	5,612	3.7	2.4	5.7	22	4,411	2.9	1.6	5.2
Selangor	720	1,011,236	27.0	24.8	29.2	110	165,269	4.4	3.6	5.4	44	49,411	1.3	0.9	2.0
Terengganu	322	178,684	27.4	24.6	30.3	42	27,047	4.1	3.0	5.7	10	6,484	1.0	0.5	2.0
Sabah & WP Labuan	360	452,740	20.5	17.6	23.8	46	58,891	2.7	1.9	3.8	12	14,832	0.7	0.4	1.2
Sarawak	327	460,384	27.2	24.0	30.8	44	61,984	3.7	2.6	5.1	14	24,291	1.4	0.8	2.5
WP Kuala Lumpur	173	289,314	24.7	21.3	28.6	30	45,447	3.9	2.7	5.7	8	11,572	1.0	0.5	2.1
WP Putrajaya	151	14,572	32.2	27.1	37.7	36	3,279	7.2	5.3	9.8	14	1,647	3.6	2.0	6.6
Location															
Urban	2,947	3,651,629	25.7	24.6	26.8	459	566,644	4.0	3.6	4.5	165	186,929	1.3	1.1	1.6
Rural	2,249	1,097,945	24.2	22.6	25.9	318	164,757	3.6	3.1	4.3	147	69,732	1.5	1.2	1.9
Sex															
Male	2,291	2,364,224	24.0	22.8	25.2	255	290,327	2.9	2.5	3.5	90	86,652	0.9	0.7	1.2
Female	2,905	2,385,350	26.8	25.5	28.1	522	441,073	4.9	4.4	5.5	222	170,009	1.9	1.6	2.3

Sociodemographic Characteristics	Obese I (BMI 27.5 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group															
18-19	114	151,693	16.5	13.13	20.41	20	21,724	2.4	1.47	3.75	16	12,837	1.4	0.77	2.49
20-24	308	432,865	16.4	14.49	18.48	63	90,371	3.4	2.57	4.54	26	27,237	1.0	0.66	1.62
25-29	434	506,996	19.9	17.61	22.49	91	115,160	4.5	3.52	5.80	44	42,708	1.7	1.17	2.40
30-34	516	595,198	24.9	22.52	27.49	82	81,127	3.4	2.63	4.38	51	53,100	2.2	1.56	3.17
35-39	544	547,492	28.4	25.84	31.18	96	100,889	5.2	4.02	6.80	48	37,367	1.9	1.35	2.79
40-44	601	559,262	31.7	28.97	34.48	77	66,988	3.8	2.87	5.00	29	20,690	1.2	0.76	1.81
45-49	608	496,434	31.0	28.38	33.67	77	72,661	4.5	3.44	5.94	32	24,518	1.5	0.96	2.42
50-54	616	440,264	30.7	28.08	33.47	92	68,126	4.8	3.53	6.36	27	15,930	1.1	0.69	1.78
55-59	544	389,437	32.6	29.76	35.54	73	47,941	4.0	3.02	5.31	16	10,715	0.9	0.50	1.60
60-64	403	286,110	32.3	28.85	35.90	51	33,727	3.8	2.65	5.43	15	7,220	0.8	0.45	1.47
65-69	281	194,804	30.7	26.75	35.06	35	20,556	3.2	2.08	5.02	4	1,209	0.2	0.06	0.60
70-74	144	85,024	23.3	18.91	28.26	14	7,591	2.1	1.12	3.81	3	2,535	0.7	0.22	2.15
75+	83	63,996	14.0	10.67	18.06	6	4,540	1.0	0.42	2.29	1	593	0.1	0.02	0.92
Ethnicity															
Malays	3,486	2,618,825	28.5	27.43	29.65	558	445,643	4.9	4.37	5.39	245	184,225	2.0	1.70	2.37
Chinese	606	825,783	19.2	17.55	21.03	64	100,928	2.4	1.71	3.22	15	14,339	0.3	0.19	0.59
Indians	452	468,683	36.5	32.63	40.56	69	73,687	5.7	4.27	7.67	25	16,309	1.3	0.73	2.21
Other Bumiputras	434	536,027	25.8	23.18	28.67	63	72,678	3.5	2.63	4.65	20	29,419	1.4	0.88	2.27
Others	218	300,257	15.6	12.77	18.85	23	38,466	2.0	1.19	3.33	7	12,368	0.6	0.30	1.36
Marital Status															
Single	744	962,851	18.1	16.49	19.72	139	183,255	3.4	2.80	4.21	77	67,371	1.3	0.95	1.68
Married	3,950	3,443,771	28.3	27.21	29.46	556	494,265	4.1	3.66	4.51	210	173,234	1.4	1.19	1.71
Widow/widower /divorcee	502	342,952	27.0	24.16	30.09	82	53,881	4.2	3.16	5.67	25	16,056	1.3	0.78	2.04
Education Level															
No formal education	281	219,531	20.9	17.65	24.51	23	19,441	1.8	1.04	3.27	4	3,361	0.3	0.10	0.97
Primary education	1,252	949,111	24.8	22.96	26.67	180	141,309	3.7	2.96	4.59	64	47,713	1.2	0.92	1.68
Secondary education	2,492	2,301,050	26.3	25.07	27.52	375	366,659	4.2	3.68	4.76	172	139,214	1.6	1.30	1.94
Tertiary education	1,127	1,224,193	25.2	23.62	26.88	192	194,570	4.0	3.36	4.77	70	65,165	1.3	0.99	1.82
Unclassified education	40	54,056	20.8	14.58	28.83	7	9,422	3.6	1.44	8.83	2	1,207	0.5	0.09	2.33

Sociodemographic Characteristics	Obese I (BMI 27.5 - 34.9 kg/m²)					Obese II (BMI 35.0 - 39.9 kg/m²)					Obese III (BMI ≥ 40 kg/m²)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation															
Government/semi government employee	712	600,203	33.2	30.6	36.0	108	90,411	5.0	3.9	6.4	44	37,301	2.1	1.4	3.0
Private employee	1,383	1,651,156	22.0	20.6	23.5	215	268,419	3.6	3.0	4.2	80	73,033	1.0	0.7	1.3
Self employed	1,019	839,816	25.7	24.0	27.6	139	118,771	3.6	2.9	4.5	56	46,189	1.4	1.0	1.9
Unpaid worker/home maker	1,095	852,137	32.1	29.9	34.5	182	143,441	5.4	4.5	6.5	78	61,928	2.3	1.7	3.1
Retiree	249	190,480	33.2	29.1	37.6	32	23,421	4.1	2.6	6.4	5	2,020	0.4	0.1	0.9
Income Group															
Less than RM 1000	789	611,865	24.3	22.2	26.5	112	91,358	3.6	2.8	4.7	36	24,363	1.0	0.6	1.5
RM 1000 - RM 1999	932	763,319	24.6	22.5	26.8	126	101,840	3.3	2.7	4.1	51	43,830	1.4	1.0	2.0
RM 2000 - RM 2999	896	815,624	26.7	24.6	28.9	125	108,991	3.6	2.9	4.4	70	59,793	2.0	1.4	2.7
RM 3000 - RM 3999	686	625,385	25.9	23.6	28.4	104	94,686	3.9	3.1	5.0	40	31,555	1.3	0.9	2.0
RM 4000 - RM 4999	443	426,298	23.1	20.4	26.1	83	95,969	5.2	3.9	6.9	34	25,402	1.4	0.9	2.0
RM 5000 - RM 5999	382	361,964	24.4	21.4	27.7	60	61,458	4.1	3.0	5.7	23	21,976	1.5	0.9	2.5
RM 6000 - RM 6999	228	242,683	25.3	21.6	29.5	34	37,224	3.9	2.5	6.0	24	19,514	2.0	1.2	3.6
RM 7000 - RM 7999	228	207,247	27.3	22.7	32.5	27	31,343	4.1	2.5	6.8	12	9,691	1.3	0.6	2.8
RM 8000 - RM 8999	160	165,484	26.1	21.5	31.4	28	27,247	4.3	2.7	6.7	11	11,968	1.9	1.0	3.7
RM 9000 - RM 9999	81	96,095	28.8	21.8	36.9	18	22,358	6.7	3.5	12.4	2	2,229	0.7	0.2	2.8
RM 10000 & above	371	433,610	26.1	22.9	29.6	60	58,926	3.5	2.5	5.0	9	6,339	0.4	0.2	1.0
Quintile Income Group															
Quintile 1	671	524,372	24.3	22.0	26.7	99	83,814	3.9	2.9	5.2	30	20,327	0.9	0.6	1.6
Quintile 2	973	791,292	24.8	22.8	26.9	126	95,934	3.0	2.4	3.7	50	41,393	1.3	0.9	1.8
Quintile 3	1,139	1,025,227	26.4	24.6	28.4	163	147,604	3.8	3.1	4.6	81	67,345	1.7	1.3	2.3
Quintile 4	1,045	999,794	24.3	22.4	26.3	171	177,503	4.3	3.5	5.3	73	60,144	1.5	1.1	2.0
Quintile 5	1,368	1,408,889	26.0	24.3	27.8	218	226,547	4.2	3.5	5.0	78	67,452	1.2	0.9	1.7

Table 2.1.7: Prevalence of abdominal obesity (WHO 1998) among adults (aged ≥18 years old) by socio-demographic characteristic

Sociodemographic Characteristics	WHO 1998 (Men >102, Women >88)				
	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	4,973	4,286,910	23.0	22.0	24.0
State					
Johor	489	562,419	25.9	23.0	29.1
Kedah	298	283,308	23.0	19.3	27.1
Kelantan	220	166,482	17.4	14.9	20.2
Melaka	291	120,297	25.4	21.9	29.3
Negeri Sembilan	306	125,027	21.1	17.9	24.7
Pahang	322	235,082	25.0	21.9	28.4
Penang	380	275,268	24.3	20.0	29.3
Perak	389	389,584	25.1	21.9	28.5
Perlis	370	41,857	27.7	23.8	31.9
Selangor	615	812,432	21.9	19.2	25.0
Terengganu	293	152,640	23.3	20.7	26.3
Sabah & WP Labuan	371	433,066	19.7	17.2	22.5
Sarawak	319	389,799	23.0	19.7	26.8
WP Kuala Lumpur	186	287,107	24.7	21.1	28.7
WP Putrajaya	124	12,543	27.5	23.0	32.5
Location					
Urban	2,778	3,275,076	23.2	22.0	24.4
Rural	2,195	1,011,834	22.4	20.9	24.0
Sex					
Male	1,109	1,154,892	11.8	10.8	12.8
Female	3,864	3,132,019	35.4	33.8	36.9
Age Group					
18-19	84	98,285	10.8	8.5	13.8
20-24	218	310,060	11.8	10.1	13.9
25-29	366	429,738	16.9	15.0	19.1
30-34	430	495,356	20.8	18.5	23.4
35-39	481	451,229	23.7	21.2	26.3
40-44	516	469,032	26.7	24.1	29.5
45-49	525	428,798	26.8	24.2	29.6
50-54	619	440,265	31.0	28.4	33.6
55-59	604	417,116	34.9	32.0	38.0
60-64	460	300,684	34.0	30.5	37.6
65-69	323	203,672	32.1	28.0	36.5
70-74	201	122,750	34.0	28.5	40.1
75+	146	119,927	26.0	21.6	30.8

Sociodemographic Characteristics	WHO 1998 (Men >102, Women >88)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity					
Malays	3,269	2,317,691	25.3	24.2	26.6
Chinese	590	767,649	18.1	16.3	20.0
Indians	485	474,841	37.2	33.4	41.1
Other Bumiputras	426	472,445	22.8	20.2	25.6
Others	203	254,285	13.2	10.9	16.0
Marital Status					
Single	575	710,021	13.4	12.1	14.8
Married	3,676	3,100,100	25.6	24.4	26.8
Widow/widower/divorcee	722	476,790	37.6	34.5	40.8
Education Level					
No formal education	391	284,885	27.0	23.9	30.4
Primary education	1,407	1,034,876	27.0	25.1	29.0
Secondary education	2,267	2,012,482	23.1	21.9	24.4
Tertiary education	872	912,506	18.9	17.4	20.6
Unclassified education	34	41,362	16.2	10.2	24.9
Occupation					
Government/semi government employee	548	445,431	24.8	22.3	27.5
Private employee	1,093	1,259,488	16.9	15.6	18.4
Self employed	802	618,640	19.0	17.4	20.8
Unpaid worker/home maker	1,405	1,108,082	42.0	39.5	44.5
Retiree	211	161,070	28.0	23.9	32.4
Income Group					
Less than RM 1000	918	675,273	26.9	24.6	29.3
RM 1000 - RM 1999	900	700,386	22.7	20.8	24.8
RM 2000 - RM 2999	832	694,183	22.8	20.7	25.1
RM 3000 - RM 3999	620	526,351	21.9	19.7	24.4
RM 4000 - RM 4999	430	408,149	22.3	19.6	25.2
RM 5000 - RM 5999	348	313,938	21.3	18.4	24.5
RM 6000 - RM 6999	215	219,317	22.8	19.2	26.8
RM 7000 - RM 7999	197	192,022	25.4	21.0	30.5
RM 8000 - RM 8999	139	146,286	23.2	18.7	28.4
RM 9000 - RM 9999	81	88,448	26.4	21.0	32.6
RM 10000 & above	293	322,558	19.8	16.8	23.1
Quintile Income Group					
Quintile 1	796	600,325	27.9	25.5	30.6
Quintile 2	933	703,792	22.1	20.3	24.1
Quintile 3	1,075	895,765	23.2	21.3	25.2
Quintile 4	968	886,675	21.7	19.9	23.6
Quintile 5	1,201	1,200,353	22.3	20.5	24.2

Table 2.1.8: Prevalence of abdominal obesity (WHO 2000) among adults (aged ≥18 years old) by socio-demographic characteristic

Sociodemographic Characteristics	WHO 2000 (Men >90, Women >80)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	9,930	9,077,326	48.6	47.4	49.9
State					
Johor	957	1,145,259	52.8	48.6	57.0
Kedah	611	583,813	47.4	42.4	52.4
Kelantan	486	373,974	39.0	35.2	43.0
Melaka	574	256,710	54.2	49.1	59.2
Negeri Sembilan	621	270,998	45.7	41.3	50.2
Pahang	621	459,739	48.8	44.6	53.1
Penang	763	642,243	56.8	51.1	62.3
Perak	709	754,682	48.6	44.7	52.5
Perlis	677	78,105	51.6	47.9	55.4
Selangor	1,272	1,746,818	47.2	43.9	50.5
Terengganu	575	304,112	46.5	42.9	50.1
Sabah & WP Labuan	791	1,018,826	46.4	42.6	50.2
Sarawak	631	811,382	48.0	43.3	52.6
WP Kuala Lumpur	362	602,705	51.8	46.3	57.2
WP Putrajaya	280	27,962	61.3	57.2	65.3
Location					
Urban	5,711	6,988,879	49.4	47.9	51.0
Rural	4,219	2,088,447	46.2	44.0	48.4
Sex					
Male	3,679	3,748,754	38.2	36.6	39.9
Female	6,251	5,328,572	60.2	58.5	61.8
Age Group					
18-19	173	206,111	22.7	19.3	26.6
20-24	518	741,768	28.3	25.8	31.1
25-29	819	1,004,419	39.6	36.7	42.5
30-34	938	1,120,011	47.1	44.2	50.1
35-39	956	960,333	50.3	47.1	53.6
40-44	1,032	979,329	55.8	52.3	59.3
45-49	1,073	907,007	56.7	53.5	59.9
50-54	1,207	901,404	63.4	60.3	66.4
55-59	1,075	781,294	65.4	61.9	68.8
60-64	846	588,212	66.4	62.7	69.9
65-69	606	407,442	64.2	59.8	68.4
70-74	364	218,746	60.6	55.0	66.1
75+	323	261,250	56.6	51.6	61.5

Sociodemographic Characteristics	WHO 2000 (Men >90, Women >80)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity					
Malays	6,281	4,637,954	50.7	49.3	52.1
Chinese	1,438	1,898,775	44.7	41.9	47.6
Indians	871	846,106	66.2	61.6	70.6
Other Bumiputras	871	1,035,262	49.9	46.4	53.5
Others	469	659,228	34.3	30.5	38.4
Marital Status					
Single	1,296	1,663,553	31.5	29.5	33.5
Married	7,470	6,610,949	54.6	53.1	56.1
Widow/widower/divorcee	1,164	802,824	63.3	60.2	66.3
Education Level					
No formal education	685	548,434	52.0	48.0	56.1
Primary education	2,636	2,037,951	53.3	50.9	55.6
Secondary education	4,487	4,163,105	47.8	46.2	49.5
Tertiary education	2,042	2,231,666	46.3	44.1	48.6
Unclassified education	75	92,380	36.3	27.9	45.5
Occupation					
Government/semi government employee	1,203	994,603	55.4	52.2	58.5
Private employee	2,578	3,051,178	41.0	39.1	42.9
Self employed	1,820	1,514,600	46.6	44.4	48.8
Unpaid worker/home maker	2,186	1,774,349	67.3	64.8	69.6
Retiree	471	362,244	62.9	58.0	67.6
Income Group					
Less than RM 1000	1,697	1,334,015	53.2	50.4	55.9
RM 1000 - RM 1999	1,742	1,430,721	46.4	43.7	49.0
RM 2000 - RM 2999	1,641	1,458,552	47.9	45.4	50.4
RM 3000 - RM 3999	1,280	1,172,391	48.9	46.0	51.8
RM 4000 - RM 4999	875	876,920	47.9	44.3	51.4
RM 5000 - RM 5999	698	672,548	45.6	41.6	49.7
RM 6000 - RM 6999	460	468,488	48.7	44.0	53.5
RM 7000 - RM 7999	408	401,200	53.1	46.7	59.5
RM 8000 - RM 8999	283	299,463	47.6	41.6	53.6
RM 9000 - RM 9999	170	190,298	56.7	48.4	64.6
RM 10000 & above	676	772,729	47.4	42.9	51.9
Quintile Income Group					
Quintile 1	1,487	1,188,012	55.3	52.3	58.2
Quintile 2	1,792	1,458,387	45.9	43.3	48.4
Quintile 3	2,108	1,864,807	48.2	46.0	50.4
Quintile 4	2,010	1,941,839	47.5	45.1	50.0
Quintile 5	2,533	2,624,281	48.8	46.5	51.2

Table 2.1.9: Prevalence of muscle wasting among elderly (aged 60 years and above) by socio-demographics

Sociodemographic Characteristics	Normal					Wasting				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	2,633	1,826,941	80.0	77.5	82.2	684	457,513	20.0	17.8	22.5
State										
Johor	231	215,071	82.8	76.4	87.8	42	44,549	17.2	12.2	23.6
Kedah	171	147,613	77.9	68.3	85.2	49	41,932	22.1	14.8	31.7
Kelantan	193	107,474	76.2	70.3	81.3	58	33,574	23.8	18.7	29.7
Melaka	171	59,064	82.5	70.6	90.2	37	12,557	17.5	9.8	29.4
Negeri Sembilan	172	59,713	59.3	47.0	70.5	80	41,067	40.7	29.5	53.0
Pahang	182	97,104	79.1	69.4	86.3	36	25,722	20.9	13.7	30.6
Penang	227	157,717	96.5	93.4	98.1	18	5,775	3.5	1.9	6.6
Perak	226	232,987	82.0	75.6	87.1	61	50,991	18.0	12.9	24.4
Perlis	262	17,587	76.1	69.1	81.9	87	5,535	23.9	18.1	30.9
Selangor	218	264,057	77.2	66.7	85.1	66	78,141	22.8	14.9	33.3
Terengganu	154	64,911	78.5	70.4	84.9	44	17,777	21.5	15.1	29.6
Sabah & WP Labuan	188	141,759	90.9	85.3	94.5	22	14,222	9.1	5.5	14.7
Sarawak	151	150,815	70.4	60.9	78.4	66	63,506	29.6	21.6	39.1
WP Kuala Lumpur	76	109,851	83.2	71.6	90.7	18	22,166	16.8	9.3	28.4
WP Putrajaya	11	1,218	100.0	100.0	100.0	0	0	0.0	0.0	0.0
Location										
Urban	1,307	1,339,492	81.8	78.7	84.6	300	297,857	18.2	15.4	21.4
Rural	1,326	487,449	75.3	71.9	78.5	384	159,656	24.7	21.5	28.2
Sex										
Male	1,179	862,487	76.7	73.3	79.8	381	261,377	23.3	20.2	26.7
Female	1,454	964,454	83.1	80.4	85.5	303	196,136	16.9	14.5	19.7

Sociodemographic Characteristics	Normal					Wasting				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group										
60-64	1,038	730,065	86.1	82.7	88.9	169	118,205	13.9	11.1	17.3
65-69	756	515,190	83.8	80.1	86.8	153	99,961	16.2	13.2	19.9
70-74	456	275,931	76.5	71.4	80.9	149	84,695	23.5	19.1	28.6
75+	383	305,755	66.4	61.0	71.4	213	154,652	33.6	28.6	39.0
Ethnicity										
Malays	1,674	867,739	79.3	76.3	82.0	451	226,796	20.7	18.1	23.7
Chinese	580	642,611	80.2	74.9	84.6	131	159,016	19.8	15.4	25.2
Indians	152	125,903	82.7	75.2	88.3	51	26,375	17.3	11.7	24.8
Other Bumiputras	189	166,284	79.6	71.7	85.7	43	42,692	20.4	14.3	28.3
Others	38	24,404	90.3	74.6	96.7	8	2,633	9.7	3.3	25.4
Marital Status										
Single	47	34,126	57.3	40.8	72.3	26	25,454	42.7	27.7	59.2
Married	1,857	1,309,964	82.7	80.1	85.1	416	273,672	17.3	15.0	19.9
Widow/widower/divorce	729	482,851	75.3	71.4	78.8	242	158,387	24.7	21.2	28.6
Education Level										
No formal education	466	337,820	74.9	70.2	79.1	178	113,106	25.1	20.9	29.8
Primary education	1,373	868,561	79.2	76.1	82.1	360	227,471	20.8	17.9	23.9
Secondary education	617	461,587	82.2	77.2	86.3	125	100,090	17.8	13.7	22.8
Tertiary education	156	142,174	92.0	85.7	95.7	14	12,403	8.0	4.3	14.4
Unclassified education	21	16,800	88.1	70.0	95.9	4	2,271	11.9	4.1	30.0

Sociodemographic Characteristics	Normal					Wasting				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation										
Government/semi government employee	30	21,552	83.7	58.5	94.9	5	4,194	16.3	5.1	41.5
Private employee	153	136,968	84.9	76.6	90.6	31	24,426	15.1	9.4	23.4
Self employed	480	282,592	83.1	78.5	86.9	111	57,470	16.9	13.1	21.6
Unpaid worker/home maker	462	307,132	87.9	83.6	91.2	60	42,189	12.1	8.8	16.4
Retiree	423	323,173	82.9	77.7	87.1	82	66,851	17.1	13.0	22.3
Income Group										
Less than RM 1000	930	621,618	79.1	75.6	82.2	265	164,567	20.9	17.8	24.4
RM 1000 - RM 1999	542	338,320	75.6	70.9	79.7	171	109,352	24.4	20.3	29.1
RM 2000 - RM 2999	370	232,348	79.3	72.6	84.8	90	60,486	20.7	15.2	27.4
RM 3000 - RM 3999	229	156,907	83.2	76.6	88.3	51	31,613	16.8	11.7	23.4
RM 4000 - RM 4999	162	128,191	87.0	77.7	92.7	26	19,200	13.0	7.3	22.3
RM 5000 - RM 5999	108	93,734	82.0	68.4	90.5	23	20,637	18.0	9.5	31.6
RM 6000 - RM 6999	69	59,982	80.5	68.3	88.7	17	14,549	19.5	11.3	31.7
RM 7000 - RM 7999	63	48,045	81.2	63.7	91.4	11	11,136	18.8	8.6	36.3
RM 8000 - RM 8999	35	35,783	80.4	63.1	90.8	11	8,738	19.6	9.3	36.9
RM 9000 - RM 9999	31	27,607	97.6	89.8	99.5	2	690	2.4	0.6	10.2
RM 10000 & above	94	84,407	83.6	73.4	90.4	17	16,545	16.4	9.6	26.6
Quintile Income Group										
Quintile 1	836	572,716	79.2	75.5	82.4	244	150,518	20.8	17.6	24.5
Quintile 2	599	362,850	76.3	71.5	80.5	174	112,959	23.7	19.5	28.5
Quintile 3	459	295,132	77.7	72.0	82.5	126	84,609	22.3	17.5	28.0
Quintile 4	378	290,713	86.3	79.2	91.3	65	45,995	13.7	8.7	20.8
Quintile 5	361	305,531	82.8	77.3	87.2	75	63,432	17.2	12.8	22.7

2.2 NUTRITIONAL STATUS OF CHILDREN (AGE < 18 YEARS OLD)

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2.2.1 Background

Nutritional status contributes to a healthy development of children. Anthropometric measurements are part of nutritional status components to assess body size, composition and reflect adequate, inadequate or excessive food intake. It also reflects individual activity level and disease. They demonstrate that deprivation and excess may coexist, not only across but also take places in the household, community or the country. Performing simple body measurements also permit the selection of individual, family or the community for intervention that can improve not only nutrition but also their health as a whole.

2.2.2 Objectives

2.2.2.1 General Objective
   To determine the nutritional status among Malaysian children aged below 18 years old.

2.2.2.2 Specific objectives

   a. To determine the prevalence of underweight, normal weight, overweight, obesity, stunting and wasting among Malaysian children below 18 years old.
   b. To determine the prevalence of underweight, normal weight, overweight, obesity, stunting and wasting among Malaysian children by socio-demography subgroups.

2.2.3 Target Population, Study Instrument And Definitions

Nutritional status for children below 18 years old was calculated based on the Centre of Disease Control Growth Chart (CDC Growth Chart, 200). Four indices were used to reflect the nutritional status for children: height for age z-score (HAZ), Body Mass Index (BMI) for age, weight for age and weight for height. These measurements were taken based on standard procedures from the protocol of World Health Organization (WHO, 1995).

Weight was measured using Tanita Digital Weighing Scale (Tanita 1583, Japan) to the nearest 0.1 kilogram. The standing height was measured without shoes using SECA Portable Stadiometer (SECA 213 Germany) to the nearest 0.1 centimetre. Measuring mat (SECA 210) was used to measure children below 2 years old which were not able to stand steadily. All measurements were taken twice and the average value was used for data entry.

Classification of Z score and BMI cut off point for nutritional status (WHO, 2006):

<-2SD	Low weight for age	Underweight
	Low height for age	Stunting
	Low weight for height	Wasting
	BMI	Thinness
>+2SD	Weight for age	Overweight
	BMI, 0-5 years old	Overweight
	BMI, 5-19 years old	Obesity

2.2.4 Findings

2.2.4.1 Prevalence of thinness (BMI for age <-2SD)

The findings of the survey showed that the national prevalence of thinness (BMI for age <-2SD), was 7.8% (95% CI: 7.1, 8.6). By state, Kedah had the highest prevalence of thinness [10.1% (95% CI: 7.9, 12.8)] and the lowest in Negeri Sembilan at 4.5% (95% CI: 3.1, 6.4). The prevalence of thinness was higher among residents in the urban [8.0% (95% CI: 7.1, 9.1) than in rural areas [7.2% (95 CI: 6.2, 8.4)]. The survey found a higher prevalence among boys 8.7% (95% CI: 7.6, 9.9) compared to girls [6.9% (95% CI: 6.0, 7.9). By age groups, the highest prevalence was noted among children aged 5 to 9 years [9.0% (95% CI: 7.2, 11.1)] and lowest among children aged 10 - 14 years old [6.9% (95% CI: 5.8, 8.2)]. According to the ethnic groups, Indians had the highest prevalence of thinness [11.3% (95% CI: 7.8, 16.0)], followed by Others [9.7% (95% CI: 6.2, 15.0)], while the lowest prevalence was found among Other Bumiputra ethnicity [6.1% (95% CI: 6.1, 4.6)].

2.2.4.2 Prevalence of normal nutritional status (BMI for age >-2SD - ≤+2SD)

Overall, the survey found 80.3% (95% CI: 79.1, 81.5) of the children with normal BMI. The state of Sabah & WP Labuan had the highest prevalence of children with normal BMI for age [85.0% (95% CI: 81.0, 88.4)] and the lowest prevalence was in WP Kuala Lumpur [72.8% (95% CI: 62.5, 81.2)]. Children from rural areas showed a high prevalence of normal BMI for age [81.6% (95% CI: 80.0, 83.2)] than their counterparts in urban areas [79.8% (95% CI: 78.3, 81.3)]. Higher prevalence of normal BMI for age was shown among girls [83.1% (95% CI: 81.7, 84.5)] compared to the boys [77.7% (95% CI: 75.9, 79.4)]. By age group, the highest prevalence of children with normal BMI for age was found among children below 5 years old [84.2% (95% CI: 82.1, 86.2)] and the lowest among children aged 5 - 9 years at 76.2% [(95% CI: 73.8, 78.5)].

2.2.4.3 Prevalence of obesity (BMI for age >+2SD)

National prevalence of obesity (BMI for age >+2SD) was 11.9% (95% CI: 10.9, 12.9). By state, Perak had the highest prevalence of obesity [14.1% (95% CI: 10.3, 19.0)] and the lowest in Sabah & WP Labuan [8.0% (95% CI: 6.0, 10.5)]. The prevalence of obesity was slightly higher among children in the urban areas [12.1% (95% CI: 10.9, 13.5)] than in the rural areas 11.2% [(95% CI: 9.9, 12.6)] and significant among boys [13.6% (95% CI: 12.2, 15.2)] compared to girls [10.0% (95% CI: 8.9, 11.3)]. By age group, the highest prevalence was noted among children aged 5-9 years [14.8% (95% CI: 13.0, 16.7)] followed by children aged 10-14 years [14.4% (95% CI: 12.6, 16.4)]. Among ethnic groups, Chinese had the highest prevalence of obesity [13.0% (95% CI: 10.0, 16.8)], followed by Indians and Malays at [12.6% (95% CI: 8.7, 17.9)] and [11.8 % (95% CI: 10.7, 13.1)] respectively.

2.2.4.4 Prevalence of underweight (weight for age <-2SD)

The national prevalence of underweight (weight for age<-2SD) was 13.0% (95% CI: 11.7, 14.5). By state, Pahang had the highest prevalence of underweight [17.1% (95% CI: 13.4, 21.6)] followed by Sabah & WP Labuan [16.7% (95% CI: 12.1, 22.5)]. In contrast, Penang had the lowest prevalence of underweight at 5.6% (95% CI: 2.7, 11.1). Children from rural areas had higher prevalence of underweight [14.9% (95% CI: 13.0, 17.0) compared to children from urban areas [12.3% (95%CI: 10.7, 14.1)]. The prevalence of underweight was lower among girls [12.2% (95% CI: 10.7, 13.9)] than boys [13.8% (95% CI: 11.9, 15.9)]. By age group, the highest prevalence was noted among children aged 5 to 9 years [13.6% (95% CI: 11.7, 15.8)] and lowest prevalence was among children below 5 years old [12.4 % (95% CI: 10.9, 14.1)].

2.2.4.5 Prevalence of stunting (height for age <-2SD)

The national prevalence of stunting (height for age <-2SD) among children was 13.4% (95% CI: 12.4, 14.5). By state, Kelantan, Pahang and Terengganu showed similar prevalence of stunting [18.2% (95% CI: 14.9, 22.0)], [18.2% (95% CI: 13.9, 23.4)], [18.1% (95% CI: 15.1, 21.5)] respectively. Children from rural areas showed significantly higher prevalence of stunting [16.8% (95% CI: 15.2, 18.5)] than children from urban areas [12.1% (95% CI: 10.9, 13.5). Girls showed a higher prevalence of stunting [14.1% (95% CI: 12.8, 15.6)] than boys [12.7% (95% CI: 11.5, 14.1)]. By age group, the highest prevalence of stunting was noted among children below 5 years old at 17.7% (95% CI: 15.7, 19.8) and the lowest was among children aged 10-14 years [11.0% (95% CI: 9.5, 12.7)].

2.2.4.6 Prevalence of wasting (weight for height <-2SD)

The national prevalence of wasting (weight for height <-2SD) among children was 7.9% (95% CI: 6.7, 9.4). By state, Selangor [10.9% (95% CI: 7.5, 15.5)] had the highest prevalence of wasting followed by Kelantan [10.2% (95% CI: 6.3, 15.9)] and Perak [9.3% (95% CI: 5.0, 16.6)]. Children from urban areas showed a higher prevalence of wasting [8.2% (95% CI: 6.7, 10.1)] than children from rural areas [7.2% (95% CI: 5.6, 9.2)]. Boys showed a higher prevalence of wasting [9.2% (95% CI: 7.3, 11.5)] than girls [6.6% (95% CI: 5.1, 8.5)]. By age group, the highest prevalence of wasting was noted among children below 5 years old at 8.0% (95% CI: 6.8, 9.5) and the lowest among children aged 5 - 9 years at 0.5% (95% CI: 0.1, 3.8).

2.2.5 Conclusion

The overall prevalence of thinness among children aged less than 18 years old was quite low. Thinness problem was highest in Kedah, among boys, children aged 5 to 9 years old, and Indians. Meanwhile, the prevalence of obesity was highest in Perak, and among boys, children aged 5 to 9 years old and 10 to 14 years old. Underweight was most prevalent in Pahang, Sabah / Labuan, rural areas and among boys. Stunting was significantly higher in the rural areas, among girls and children less than 5 years old. Stunting was also prevalent in Kelantan, Pahang and Terengganu. On the other hand, wasting was significantly prevalent in the urban areas, among boys and children aged less than 5 years old.

Table 2.2.1: Prevalence of Body Mass Index (BMI) for age status based on WHO 2006 among children (aged <18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Thinness (BMI for age < -2SD)					Normal (BMI for age -2SD - ≤ +2SD)					Obesity (BMI for age > +2SD)				
	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper
MALAYSIA	681	661,655	7.8	7.1	8.6	7,164	6,812,135	80.3	79.1	81.5	1,004	1,006,078	11.9	10.9	12.9
State															
Johor	60	76,359	8.4	6.5	10.8	557	737,903	81.2	78.2	83.9	72	94,660	10.4	8.3	13.0
Kedah	64	62,733	10.1	7.9	12.8	463	495,987	79.6	75.0	83.5	61	64,651	10.4	6.9	15.4
Kelantan	58	49,874	8.2	6.1	10.8	553	498,659	81.8	78.8	84.4	72	61,265	10.0	7.8	12.8
Melaka	37	19,048	8.6	4.8	15.2	413	176,532	80.1	75.1	84.3	50	24,804	11.3	8.4	14.9
Negeri Sembilan	27	13,074	4.5	3.1	6.4	441	242,526	83.0	79.5	86.0	67	36,505	12.5	9.7	16.0
Pahang	40	40,250	7.8	5.4	11.3	454	408,200	79.4	75.4	82.9	71	65,838	12.8	9.8	16.6
Penang	38	28,296	6.9	4.5	10.5	397	325,980	79.8	71.8	86.0	58	54,149	13.3	8.2	20.7
Perak	50	50,029	7.8	5.1	11.7	438	499,707	78.1	73.4	82.1	68	90,274	14.1	10.3	19.0
Perlis	32	4,222	6.1	4.1	8.9	390	57,602	82.6	78.6	85.9	60	7,953	11.4	8.9	14.4
Selangor	93	125,278	8.6	6.8	10.9	950	1,141,404	78.4	75.3	81.2	151	188,501	13.0	10.5	15.9
Terengganu	53	31,423	7.8	5.8	10.4	524	329,722	81.6	77.7	85.0	62	42,820	10.6	8.0	13.9
Sabah & WP Labuan	58	78,782	7.0	4.7	10.4	823	958,196	85.0	81.0	88.4	81	89,651	8.0	6.0	10.5
Sarawak	36	48,050	6.3	4.5	8.8	376	612,255	80.3	75.4	84.4	67	102,382	13.4	10.0	17.8
WP Kuala Lumpur	13	31,751	7.8	3.9	14.9	141	298,304	72.8	62.5	81.2	38	79,607	19.4	12.0	30.0
WP Putrajaya	22	2,486	7.2	4.5	11.2	244	29,158	84.1	80.2	87.4	26	3,016	8.7	6.2	12.1
Location															
Urban	398	493,022	8.0	7.1	9.1	3,999	4,903,213	79.8	78.3	81.3	568	744,872	12.1	10.9	13.5
Rural	283	168,632	7.2	6.2	8.4	3,165	1,908,922	81.6	80.0	83.2	436	261,206	11.2	9.9	12.6
Sex															
Male	381	376,801	8.7	7.6	9.9	3,433	3,374,777	77.7	75.9	79.4	569	592,052	13.6	12.2	15.2
Female	300	284,853	6.9	6.0	7.9	3,731	3,437,358	83.1	81.7	84.5	435	414,025	10.0	8.9	11.3
Age Group															
0-4	184	178,284	8.1	6.9	9.5	2,023	1,852,527	84.2	82.1	86.2	170	168,219	7.6	6.1	9.5
5-9	219	204,335	9.0	7.2	11.1	1,989	1,732,872	76.2	73.8	78.5	348	335,413	14.8	13.0	16.7
10-14	181	168,050	6.9	5.8	8.2	1,976	1,908,530	78.7	76.6	80.6	352	349,888	14.4	12.6	16.4
15-17	97	110,985	7.0	5.6	8.8	1,176	1,318,205	83.3	80.9	85.5	134	152,558	9.6	8.0	11.7
Ethnicity															
Malays	452	391,479	7.7	6.8	8.8	4,905	4,076,627	80.4	79.0	81.8	688	600,008	11.8	10.7	13.1
Chinese	76	114,134	8.0	6.0	10.6	787	1,125,766	79.0	74.9	82.5	119	185,828	13.0	10.0	16.8
Indians	62	57,277	11.3	7.8	16.0	424	387,538	76.1	70.9	80.7	66	64,227	12.6	8.7	17.9
Other Bumiputras	61	74,873	6.1	4.6	8.0	773	1,012,092	82.2	79.0	85.1	108	143,887	11.7	9.1	14.9
Others	30	23,892	9.7	6.2	15.0	275	210,113	85.4	79.2	90.0	23	12,128	4.9	2.7	8.8
Marital Status															
Single	157	163,522	6.6	5.5	7.9	1,966	2,076,816	83.5	81.7	85.2	235	246,802	9.9	8.5	11.5
Married	1	1,625	3.2	0.4	20.0	40	47,539	93.1	78.8	98.0	2	1,903	3.7	0.9	14.9

Table 2.2.2: Prevalence of weight for age status based on WHO 2006 among children (aged <18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Underweight (weight for age < -2SD)					Normal (weight for age -2SD - ≤ 2SD)					Obese (weight for age > +2SD)				
	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper
MALAYSIA	683	607,932	13.0	11.7	14.5	4,091	3,723,252	79.7	78.2	81.3	356	337,944	7.2	6.3	8.3
State															
Johor	44	48,546	9.7	6.9	13.5	329	426,925	85.6	81.4	89.0	19	23,118	4.6	2.9	7.5
Kedah	51	45,517	13.9	9.9	19.3	263	258,754	79.1	72.1	84.8	23	22,720	6.9	4.4	10.8
Kelantan	57	51,413	15.8	11.8	20.8	283	264,585	81.3	76.6	85.3	11	9,431	2.9	1.5	5.7
Melaka	48	19,876	16.1	10.5	23.8	240	94,169	76.0	68.3	82.4	18	9,786	7.9	4.5	13.5
Negeri Sembilan	32	14,909	9.3	5.8	14.4	255	129,883	80.7	74.5	85.8	31	16,088	10.0	6.3	15.6
Pahang	54	49,074	17.1	13.4	21.6	244	214,428	74.7	68.8	79.9	26	23,423	8.2	5.4	12.2
Penang	28	12,379	5.6	2.7	11.1	226	182,399	82.7	75.1	88.3	22	25,906	11.7	6.2	21.1
Perak	47	46,632	14.7	8.8	23.6	228	240,424	75.7	68.4	81.7	25	30,683	9.7	5.9	15.4
Perlis	29	4,432	11.2	7.6	16.1	225	32,003	80.5	74.4	85.5	25	3,305	8.3	5.1	13.2
Selangor	83	94,909	11.4	8.8	14.7	549	662,829	79.9	75.6	83.5	58	72,325	8.7	6.0	12.4
Terengganu	44	26,477	11.8	8.8	15.6	304	188,243	83.9	80.0	87.2	14	9,575	4.3	2.4	7.5
Sabah & WP Labuan	98	105,504	16.7	12.1	22.5	452	499,218	78.8	73.1	83.6	28	28,866	4.6	2.9	7.2
Sarawak	40	55,004	12.8	9.4	17.2	236	338,430	78.7	74.0	82.8	28	36,550	8.5	6.0	11.9
WP Kuala Lumpur	13	31,612	14.0	7.0	26.2	66	169,220	75.1	64.3	83.5	13	24,380	10.8	6.5	17.5
WP Putrajaya	15	1,649	6.5	4.5	9.5	191	21,742	86.4	80.9	90.5	15	1,787	7.1	4.5	11.1
Location															
Urban	350	417,150	12.3	10.7	14.1	2,293	2,715,330	80.1	78.1	82.0	212	256,260	7.6	6.4	9.0
Rural	333	190,782	14.9	13.0	17.0	1,798	1,007,923	78.7	76.5	80.8	144	81,684	6.4	5.2	7.8
Sex															0.0
Male	361	330,467	13.8	11.9	15.9	2,003	1,842,817	77.1	74.7	79.3	220	217,735	9.1	7.6	10.9
Female	322	277,465	12.2	10.7	13.9	2,088	1,880,435	82.5	80.5	84.4	136	120,209	5.3	4.3	6.5
Age Group															
0-4	327	286,362	12.4	10.9	14.1	2,066	1,923,779	83.6	81.6	85.4	93	91,500	4.0	2.9	5.4
5-9	347	313,813	13.6	11.7	15.8	1,981	1,752,663	75.9	73.5	78.2	260	242,140	10.5	9.1	12.1
10-14	9	7,756	13.2	6.4	25.3	44	46,810	79.5	64.0	89.5	3	4,304	7.3	1.8	25.6
Ethnicity															
Malays	482	404,552	14.2	12.5	16.1	2,827	2,261,595	79.3	77.2	81.2	228	187,272	6.6	5.6	7.7
Chinese	31	44,806	6.2	4.0	9.5	444	617,036	86.0	82.1	89.2	42	55,607	7.8	5.5	10.8
Indians	15	19,562	7.3	3.0	16.7	232	206,140	77.3	67.0	85.1	36	40,855	15.3	9.0	24.9
Other Bumiputras	94	106,504	15.2	12.3	18.7	434	544,219	77.8	73.9	81.3	40	48,969	7.0	5.0	9.7
Others	61	32,509	24.6	17.8	33.0	154	94,262	71.4	63.5	78.2	10	5,241	4.0	1.7	8.9

Table 2.2.3: Prevalence of height for age status based on WHO 2006 among children (aged <18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Stunting (height for age < -2SD)					Normal (height for age -2SD - ≤ +2SD)					Tall (height for age > +2SD)				
	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper	Count	Estimated Population	% (Prevalence)	95% CI Lower	Upper
MALAYSIA	1,292	1,144,162	13.4	12.4	14.5	7,413	7,204,919	84.4	83.4	85.5	188	182,531	2.1	1.7	2.6
State															
Johor	73	84,208	9.2	6.7	12.5	609	812,195	88.6	85.2	91.3	15	20,334	2.2	1.3	3.9
Kedah	86	84,803	13.5	10.8	16.9	491	526,582	84.1	80.6	87.0	14	15,046	2.4	1.4	4.1
Kelantan	121	110,169	18.2	14.9	22.0	554	490,644	81.0	77.2	84.3	5	5,249	0.9	0.4	2.0
Melaka	72	34,405	15.6	11.3	21.0	420	184,854	83.6	77.7	88.2	8	1,859	0.8	0.3	2.6
Negeri Sembilan	74	34,757	11.8	9.0	15.4	453	254,141	86.2	82.6	89.1	12	5,986	2.0	1.1	3.8
Pahang	102	93,702	18.2	13.9	23.4	457	412,933	80.1	75.2	84.3	10	8,945	1.7	1.0	3.2
Penang	43	26,081	6.4	3.5	11.2	438	375,129	91.8	87.1	94.9	11	7,268	1.8	0.6	5.1
Perak	79	80,583	12.5	9.0	17.1	474	556,244	86.3	81.9	89.9	9	7,473	1.2	0.5	2.7
Perlis	68	10,682	15.2	11.7	19.4	401	57,496	81.6	76.7	85.6	19	2,284	3.2	1.8	5.7
Selangor	166	189,520	12.9	10.3	16.0	988	1,219,791	82.9	79.6	85.8	44	61,539	4.2	2.7	6.4
Terengganu	116	73,228	18.1	15.1	21.5	515	325,110	80.2	77.0	83.1	11	7,014	1.7	0.9	3.2
Sabah & WP Labuan	180	185,459	16.5	13.4	20.3	766	923,697	82.3	78.6	85.5	12	13,116	1.2	0.6	2.3
Sarawak	59	88,406	11.4	8.6	15.0	421	675,373	87.2	84.1	89.7	6	10,949	1.4	0.6	3.6
WP Kuala Lumpur	22	44,542	10.6	6.7	16.4	169	360,036	85.8	79.3	90.5	7	14,991	3.6	1.5	8.2
WP Putrajaya	31	3,615	10.4	7.6	14.0	257	30,693	88.2	84.4	91.2	5	479	1.4	0.5	3.8
Location															
Urban	668	750,417	12.1	10.9	13.5	4,213	5,287,753	85.5	84.1	86.8	110	146,395	2.4	1.8	3.0
Rural	624	393,745	16.8	15.2	18.5	3,200	1,917,166	81.7	80.0	83.3	78	36,136	1.5	1.1	2.1
Sex															
Male	642	558,100	12.7	11.5	14.1	3,670	3,714,889	84.9	83.4	86.2	102	105,007	2.4	1.8	3.2
Female	650	586,062	14.1	12.8	15.6	3,743	3,490,030	84.0	82.5	85.4	86	77,524	1.9	1.4	2.5
Age Group															
0-4	460	392,973	17.7	15.7	19.8	1,846	1,732,798	78.0	75.7	80.1	89	96,100	4.3	3.3	5.7
5-9	337	283,551	12.3	10.7	14.1	2,178	1,964,114	85.2	83.3	86.8	74	58,887	2.6	1.9	3.5
10-14	305	266,443	11.0	9.5	12.7	2,173	2,128,087	88.0	86.3	89.5	22	24,213	1.0	0.6	1.6
15-17	190	201,195	12.7	10.8	14.9	1,216	1,379,920	87.1	84.9	89.0	3	3,332	0.2	0.1	0.9
Ethnicity															
Malays	923	744,709	14.6	13.4	15.9	5,040	4,264,953	83.7	82.4	84.9	115	88,438	1.7	1.4	2.2
Chinese	69	92,829	6.5	4.7	9.0	886	1,296,115	90.8	88.1	92.9	28	39,102	2.7	1.7	4.4
Indians	49	45,077	8.6	5.7	12.9	487	447,366	85.8	81.3	89.4	23	28,909	5.5	3.0	9.9
Other Bumiputras	168	205,555	16.6	13.7	20.0	767	1,015,371	82.0	78.9	84.8	10	16,809	1.4	0.6	3.0
Others	83	55,991	22.7	15.7	31.7	233	181,113	73.5	64.6	80.8	12	9,272	3.8	1.5	9.2
Marital Status															
Single	290	284,170	11.4	9.9	13.1	2,064	2,199,645	88.4	86.7	90.0	4	3,657	0.1	0.0	0.6
Married	7	8,377	16.4	6.0	37.6	36	42,689	83.6	62.4	94.0	1	100	100.0	0.0	100.0

Table 2.2.4: Prevalence of weight for height status based on WHO 2006 among children (aged <6 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Wasting (weight for height < -2SD)					Normal (weight for height -2SD - ≤ +2SD)					Obese (weight for height > +2SD)				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	183	175,466	7.9	6.7	9.4	2,045	1,875,772	84.9	82.9	86.7	164	157,975	7.2	5.8	8.8
State															
Johor	16	19,417	8.4	5.2	13.4	143	194,030	84.0	78.9	88.1	13	17,563	7.6	4.7	12.0
Kedah	11	12,970	7.8	4.6	13.0	136	146,493	88.0	81.4	92.4	6	7,090	4.3	1.7	10.1
Kelantan	16	16,128	10.2	6.4	15.9	138	134,964	85.2	79.3	89.7	7	7,325	4.6	2.3	9.1
Melaka	3	952	1.6	0.3	8.3	138	54,632	92.1	82.8	96.6	12	3,745	6.3	2.2	16.6
Negeri Sembilan	7	3,794	5.1	2.6	9.6	129	66,155	88.1	82.6	92.0	9	5,126	6.8	3.5	13.0
Pahang	8	9,294	6.5	3.1	13.1	124	119,779	84.2	76.6	89.7	16	13,147	9.2	5.8	14.4
Penang	10	4,890	4.7	1.9	11.2	119	99,146	94.8	88.8	97.7	5	518	0.5	0.2	1.5
Perak	14	13,838	9.3	5.0	16.6	111	129,668	87.2	76.4	93.5	5	5,126	3.4	0.9	11.9
Perlis	13	1,797	9.1	5.4	14.8	98	16,429	83.0	74.5	89.1	9	1,568	7.9	4.0	15.0
Selangor	30	39,978	10.9	7.5	15.5	255	283,829	77.2	70.8	82.5	34	44,033	12.0	7.8	17.9
Terengganu	16	9,144	8.5	5.1	13.8	140	88,214	82.0	72.7	88.6	15	10,272	9.5	5.1	17.1
Sabah & WP Labuan	18	19,295	6.2	3.7	10.1	247	284,778	91.1	86.6	94.2	8	8,633	2.8	1.1	6.5
Sarawak	10	13,335	6.8	3.9	11.9	127	168,301	86.3	81.2	90.2	12	13,301	6.8	3.8	11.9
WP Kuala Lumpur	4	9,906	9.2	2.9	25.6	23	77,576	72.2	50.2	87.1	7	19,914	18.5	6.8	41.4
WP Putrajaya	7	728	5.5	2.5	12.0	117	11,780	89.8	81.5	94.6	6	614	4.7	2.0	10.6
Location															
Urban	105	130,436	8.2	6.7	10.1	1,141	1,333,840	84.2	81.6	86.5	98	120,272	7.6	5.9	9.8
Rural	78	45,031	7.2	5.6	9.2	904	541,933	86.8	84.1	89.0	66	37,703	6.0	4.6	7.9
Sex															
Male	105	103,122	9.2	7.4	11.5	1,016	927,284	82.9	80.0	85.5	82	87,573	7.8	5.9	10.4
Female	78	72,344	6.6	5.1	8.5	1,029	948,489	86.9	84.3	89.2	82	70,402	6.5	4.8	8.6
Age Group															
0-4	182	175,338	8.0	6.8	9.5	2,020	1,854,605	84.9	82.9	86.7	162	154,988	7.1	5.7	8.7
5-9	1	128	0.5	0.1	3.8	25	21,167	87.2	62.6	96.5	2	2,987	12.3	3.2	37.5
Ethnicity															
Malays	129	109,099	8.0	6.6	9.6	1,414	1,169,317	85.4	83.2	87.3	113	90,812	6.6	5.2	8.4
Chinese	18	26,329	8.2	5.1	13.0	187	262,938	82.1	73.5	88.3	19	30,961	9.7	5.1	17.7
Indians	5	8,427	7.0	2.1	20.8	107	101,044	83.7	70.0	91.9	8	11,215	9.3	3.7	21.6
Other Bumiputras	17	23,462	6.9	4.4	10.7	236	295,025	87.4	82.6	91.0	15	19,187	5.7	3.1	10.4
Others	14	8,149	13.3	5.9	27.2	101	47,449	77.3	64.1	86.6	9	5,800	9.4	3.8	21.9

TOPIC 3

TOBACCO USE

3. TOBACCO USE

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3.1 Background

Smoking-related diseases such as cancer and cardiovascular diseases are the main causes of premature death in Malaysia for the past three decades. Smoking kills 20,000 Malaysians every year and will increase to 30,000 by the year 2020 if the pattern of smoking does not change[1]. Studies on the burden of diseases in 2003 and 2011 revealed that one-fifth of disability adjusted life years (DALYs) and one-third of years of life lost (YLL) for Malaysians were due to smoking-related diseases[2]. The current pattern of morbidity and mortality will continue in the future in view of almost half of adult males are current smokers and a third of adolescents aged 13-15 years old also practice the similar behavior[3]. In addition, Malaysia spends as much as RM 2.92 billion per year treating chronic obstructive pulmonary disease, ischemic heart disease and lung cancer[4]. Malaysia needs to reduce the smoking prevalence to 15% by the year 2025, if we are to achieve the World Health Organization Non Communicable Diseases Global Target.

3.2 Objectives

3.2.1 General Objective
To determine the prevalence of current smokers by social demographic characteristic among adults aged 15 years and above in Malaysia.

3.2.2 Specific objectives
a. To determine the prevalence of current smokers and passive smokers by socio-demographic characteristics.
b. To establish smoking patterns among current smokers by socio-demographic characteristics.
c. To identify cessation behaviour of current smokers by socio-demographic characteristics.
d. To determine awareness of anti-smoking campaign among respondents.
e. To determine awareness of health warning on cigarette packages by current smokers.
f. To determine awareness of cigarette promotion and advertising among respondents.

3.3 Target Population, Study Instrument And Definitions

The target population consisted of non-institution respondents aged 15 years and above in Malaysia. The study used the short version of Global Adult Tobacco Surveillance questionnaire, which had been translated, pre-tested and validated among selected respondents in Bangsar, Wilayah Persekutuan Kuala Lumpur. The questionnaire consisted of 20 items which measured the proportion of daily and occasional smokers among participants aged 15 years and above; types and quantities of tobacco products smoked; exposure to secondhand smoke at home and work place among smokers and non-smokers; smoking cessation behaviour among current smokers; awareness of anti-smoking campaign, cigarette advertising and promotion.

Definitions:
Current smoker - Smoker who daily or occasionally smokes any tobacco product.

Current smokeless tobacco user – Smoker who daily or occasionally use any smokeless tobacco product

Tobacco product – Consist of:
Smoked tobacco: which included manufactured cigarettes, hand-rolled cigarettes, kreteks, others smoked tobacco such as pipe, curut, cigar, cigarillos, water pipes/sisha hookah, bidis and others.

Smokeless tobacco: snuff by keeping in mouth, nose, chewing tobacco, betel quid with tobacco, electronic cigarettes, and others.

3.4 Findings

A total of 21,410 adults aged 15 years and above responded to this module.

3.4.1   Smoking prevalence

3.4.1.1 Prevalence of current tobacco smoker

Overall, the prevalence of current smoker was 22.8% (95%CI: 21.9, 23.8). There was a slight reduction from 23.1% reported in Global Adult Tobacco Survey (GATS) 2011. It was estimated that nearly five million Malaysians aged 15 years and above smoked. The prevalence was highest in Sabah and WP Labuan (28.4%, 95%CI: 25.2, 31.9), followed by Kedah (26.5%, 95%CI: 23.1, 30.2) and Pahang (25.5%, 95%CI: 21.8, 29.6); while the lowest prevalence was in WP Putrajaya (12.4%, 95%CI: 9.8, 15.7). All three states (Malacca, Johor and Penang) with Smoke-free City projects consistently had lower smoking prevalence than the national level. The proportion of current smokers was 30 times higher among males compared to females (43.0%, 95%CI: 41.4, 44.6 vs 1.4%, 95%CI: 1.1, 1.8). It was also observed that the prevalence of male smokers had reduced slightly from 43.9% in 2011 to 43.0% in the current survey. Nonetheless, the prevalence among females had increased from 1.0% in 2011 to 1.4% in 2015.

Significantly higher prevalence of tobacco use was observed among respondents in rural areas (27.9%, 95%CI: 26.3, 29.6), as compared to respondents in urban areas (21.2%, 95%CI: 20.1, 22.4). Lower proportion of current smokers was observed among the 15-19 years old age group at 13.2% (95%CI: 11.5,15.2) and peaked at 35-39 years old age group at 17.4% (95%CI: 15.3,19.7). The lowest prevalence was reported among 75+ age group with prevalence at 9.2% (95%CI: 7.0, 12.1).

Approximately a quarter of Malays (24.7%, 95%CI: 23.6, 25.9) and other Bumiputras (25.8%, 95%CI: 23.4, 28.4) were current smokers and their prevalence were remarkably higher than Chinese (14.2%, 95%CI: 12.7, 15.9) and Indians (16.5%, 95%CI: 14.0, 19.4). There was considerable difference of smoking prevalence among those with different education background. Respondents with tertiary education had the lowest prevalence at 14.9% (95%CI: 13.6, 16.3) when compared to respondents with secondary education (25.2%, 95%CI: 23.3, 27.2) and primary education attainment (25.8%, 95%CI: 24.5, 27.1). The study also revealed that the proportion of

current smokers was notably lower among participants with Q1 income level (16.5%, 95%CI: 14.6, 18.6) and Q5 income level (19.3%, 95%CI: 17.7, 21.1) as compared to their counterparts from Q2 (26.8%, 95%CI: 24.8, 28.8), Q3 (25.1%, 95%CI: 23.4, 26.9) and Q4 (25.5%, 95%CI: 23.7, 27.4) income levels.

One fifth (23.1%, 95%CI: 20.6, 25.8) of government/semi government employees were current smokers. This proportion was lower compared to the private sector employees (31.7%, 95%CI: 29.9, 33.6) and the self-employed (35.4%, 95%CI: 33.2, 37.6). As for marital status, widow/widower/divorcee were reported to have the lowest proportion of being current smokers (9.7%, 95%CI: 8.0, 11.8) compared to married (23.8%, 95%CI: 22.8, 24.9) and single respondents (23.6%, 95%CI: 21.9, 25.3).

3.4.1.2 Prevalence of smoked tobacco use

Approximately one fifth of the respondents (20.1%, 95%CI: 19.2, 21.0) smoked manufactured cigarettes. The prevalence was remarkably higher among male current smokers (37.9%, 95%CI: 36.4, 39.4) as compared to female current smokers (1.1%, 95%CI: 0.8, 1.5). Smoked tobacco use was also considerably higher among those in rural areas (23.1%, 95%CI: 21.8, 24.6) compared to those in urban areas (19.1%, 95%CI: 18.0, 20.2). The study also showed that the respondents with no formal education (15.5%, 95%CI: 12.1, 19.6) and those with tertiary education attainment (13.8%, 95%CI: 12.6, 15.2) had lower prevalence of consuming manufactured cigarettes compared to those with primary (20.7%, 95%CI: 18.8, 22.6) and secondary education attainment (23.4%, 95%CI: 22.2, 24.6).

Only a small proportion (2.3%, 95%CI: 2.0, 2.6) of current smokers consumed hand-rolled cigarettes. Hand-rolled cigarette consumption rates in Kedah (9.7%, 95%CI: 7.9, 11.8), Perlis (7.4%, 95%CI: 5.8, 9.4) and Kelantan (6.0%, 95%CI: 4.6, 7.8) were 3-4 times higher than the national prevalence. Hand-rolled cigarettes were more popular among older age groups (i.e. 50 years old and above). As for the ethnic groups, Malays were reported to have the highest proportion of hand-rolled cigarettes consumption (3.5%, 95%CI: 3.1, 4.0), followed by Other Bumiputras (2.2%, 95%CI: 1.5, 3.2), Chinese (0.4%, 95%CI: 0.2, 0.9) and Indians (0.4%, 95%CI: 0.1, 1.2).

The prevalence of kretek consumption was 2.6% (95%CI: 2.2, 3.1). Sabah was reported to have the highest prevalence of kretek consumption at 6.6% (95%CI: 4.9, 8.8), followed by Pahang (4.3%, 95%CI: 2.2, 8.0), Johor (4.2%, 95%CI: 2.8, 6.2), Perlis (0.4%, 95%CI: 0.1, 1.2) and the lowest in Penang (0.3%, 95%CI: 0.1, 0.9). Kretek consumption was more than twice higher in the rural compared to urban areas (4.7%, 95%CI: 3.7, 6.0 vs 2.0%, 95%CI: 1.6, 2.4). The usage of kretek was highest among other Bumiputras (3.6%, 95%CI: 2.6, 5.0) followed by Malays (2.6%, 95%CI: 2.2, 3.1), Chinese (0.5%, 95%CI: 0.3, 1.0) and Indians (0.4%, 95%CI: 0.2, 0.9).

Approximately a quarter (24.2%, 95%CI: 22.4, 26.1) of daily smokers consumed 15-24 sticks of cigarette per day; the highest prevalence was in Negeri Sembilan (41.3%, 95%CI: 31.4, 52.0), followed by Terengganu (35.7%, 95%CI: 28.4, 43.9) and Perlis (28.5%, 95%CI: 21.1, 37.3), while the lowest was in WP Putrajaya (13.3%, 95%CI: 6.8, 24.4). One quarter of males (24.2%, 95%CI: 22.6, 26.3) consumed 15-24 cigarette sticks per day which was much higher compared to females (17.1%, 95%CI: 8.9, 30.1).

3.4.1.3 Prevalence of smokeless tobacco use

The prevalence of smokeless tobacco use among Malaysian population aged 15 years and above was 10.9% (95%CI: 10.1, 11.7). There was a significant increase from 0.7% reported in GATS 2011. The proportion of smokeless tobacco use in Kelantan (17.6%, 95%CI: 15.0, 20.5), Kedah (17.5%, 95%CI: 14.7, 20.8) and Pahang (15.3%, 95%CI: 12.0, 19.3) were significantly higher than the national prevalence. The lowest proportion was in Penang (4.3%, 95%CI: 2.0, 9.1). The use of smokeless tobacco among male current smokers were almost 25 times higher than females (20.4%, 95%CI: 18.9, 21.9 vs 0.8%, 95%CI: 0.6, 1.2) and significantly higher among respondents in rural areas (13.7%, 95%CI: 12.2, 15.3) compared to residents from urban areas (10.0%, 95%CI: 9.1, 11.0). Malays (12.6%, 95%CI: 11.6, 13.7) and other Bumiputras (11.0 %, 95%CI: 9.2, 14.1) consumed more smokeless tobacco compared to Chinese (6.4%, 95%CI: 5.3, 7.7) and Indians (7.9%, 95%CI: 6.0, 10.2) and the difference were statistically significant. Participants with tertiary education attainment reported significantly lower proportion (7.3%, 95%CI: 6.3, 8.4) of smokeless tobacco consumption compared to those with primary (11.1%, 95%CI: 9.9, 13.1) and secondary education attainment (12.8%, 95%CI: 11.7, 13.9).

The proportion of smokeless tobacco consumption was highest among the 25-29 age group (14.1%, 95%CI: 12.2, 16.2), followed by the 30-34 age group (13.5%, 95%CI: 11.6, 15, 7) and the 40-44 age group (13.4%, 95%CI: 11.4, 15.8). The proportion of smokeless tobacco use was lower among respondents with the highest (Q5) (7.8%, 95%CI: 6.5, 9.2) and lowest income levels (Q1) (8.7%, 95%CI: 7.6, 10.0) compared to those with Q2 (13.4%, 95%CI: 11.7, 15.2), Q3 (12.6%, 95%CI: 11.2, 14.1) and Q4 (11.9%, 95%CI: 10.5, 13.5) income levels.

3.4.2   Exposure to secondhand smoke

3.4.2.1 Exposure to secondhand smoke at home

The prevalence of exposure to secondhand smoke at home by all respondents (smokers and non-smokers) was 37.1% (95%CI: 35.6, 38.6). Rural residents had much higher exposure to secondhand smoke at 48.8% (95%CI: 46.6, 51.1) compared to those living in urban areas at 33.3% (95%CI: 31.5, 35.2). More than half of the participants in Kelantan (53.0%, 95%CI: 47.6, 58.3), Kedah (51.2%, 95%CI: 46.0, 56.3) and Terengganu (50.1%, 95%CI: 44.72, 55.49) reported exposure to secondhand smoke at home. In addition, exposure to secondhand smoke was considerably higher among Malays (42.5%, 95%CI: 40.7, 44.3) and other Bumiputras (43.9%, 95%CI: 40.0, 47.9) compared to Chinese (20.8%, 95%CI: 18.4, 23.4) and Indians (25.1%, 95%CI: 21.0, 29.7). By education attainment, respondents with tertiary education (24.9%, 95%CI: 23.0, 26.9) were less exposed to secondhand smoke compared to those without formal education (43.9%, 95%CI: 39.7, 48.3), those with primary education (41.26%, 95%CI: 39.3, 43.8) and secondary education attainment of (40.4%, 95%CI: 38.6, 42.3).

More than a quarter (25.9%, 95%CI: 24.6, 27.2) of non-smokers reported exposure to secondhand smoke at home. The prevalence was much higher in rural areas (36.0%, 95%CI: 33.9, 38.3) and among females at 31.3% (95%CI: 29.8, 32.8) compared to respondents in urban areas (22.9%, 95%CI: 21.47, 24.47) and among males (17.1%, 95%CI: 15.6, 18.8). For non-smokers, there was much higher exposure to secondhand smoke among other Bumiputras (33.9%, 95%CI: 30.2, 37.8)

and Malays (31.0%, 95%CI: 29.1, 32.7) compared to Chinese (13.2%, 95%CI: 11.4, 15.4) and Indians (17.7%, 95%CI: 14.3, 21.7).

3.4.2.2 Exposure to secondhand smoke at work

More than one third (37.3%, 95%CI: 35.3, 39.2) of the respondents were exposed to secondhand smoke at work. The proportion of males exposed to secondhand smoke was almost two times higher than females (48.1%, 95%CI: 45.4, 50.9 vs 24.2%, 95%CI: 22.2, 26.4), whilst no significant differences were observed between respondents with different marital status, ethnic groups and residency.

There was an inverse relationship between the exposure to secondhand smoke at work and educational attainment, whereby approximately a quarter (25.4%, 95%CI: 23.1, 27.8) of the respondents with tertiary education and almost half (43.9%; 95%CI: 31.3, 57.3) of the respondents with no formal education were exposed to secondhand smoke at work.

3.4.3   Smoking cessation behaviour

3.4.3.1 Quit Attempt

More than half (52.3%, 95%CI: 49.9, 54.8) of the current smokers made an attempt to quit smoking in the past 12 months. Similar proportions were observed among current smokers from urban (52.8%, 95%CI: 49.7, 55.9) and rural areas (51.2%, 95%CI: 47.3, 55.1). The proportion of cessation attempt was higher among female current smokers at 59.2% (95%CI: 48.3, 69.3) compared to males at 52.1% (95%CI: 47.3, 55.1) with no significant difference. A comparison across the age groups showed that the percentage of quit attempt was highest among current smokers in 25-29 years age group, at 56.8% (95%CI: 51.2, 62.1) and lowest among 75 years and above (33.1%, 95%CI: 20.8, 48.3). Linear relationship of proportion of quit attempt and education levels were observed among current smokers.

3.4.3.2 Current smokers who visited healthcare provider in the past 12 months

Less than 10% (9.7%, 95%CI: 8.4, 11.1) of current smokers visited a healthcare provider in the past 12 months. The prevalence were higher in Kelantan (18.5%, 95%CI: 12.9, 25.9) followed by Melaka (15.2%, 95%CI: 10.1, 22.3) and Penang (14.4%, 95%CI: 8.8, 22.7). The prevalence of female current smokers who visited the healthcare provider in the past one year was almost 1.5 times higher compare to male current smokers (15.8%, 95%CI: 8.9, 26.5 vs 9.5%, 95%CI: 8.2, 10.9) with no significant difference. A comparison across income levels did not show any significant difference although the proportion was lower among those from Quintiles 4 income group (7.9%, 95%CI: 5.8, 10.8). The study also revealed that current smokers from younger age groups and those who were not married were less likely to visit a healthcare provider in the past one year (i.e. 2.9% , 95%CI: 1.2, 7.1 for 15-19 year old,; compared to 19.9%, 95%CI: 14.3, 27.0 for 55-59 years old); No significant difference was observed among respondents who were not married (95%CI: 4.8, 8.2) or married (95%CI: 9.6, 13.2) regarding visits to health care providers in the past 12 months.

3.4.3.3 Current smokers advised to quit smoking by healthcare provider

Approximately three quarter (75.4%, 95%CI: 68.6, 81.1) of current smokers who visited healthcare services in the past 12 months had been advised to quit smoking by healthcare providers. The proportion was higher in the rural setting (78.3%, 95%CI: 68.0, 86.0) as compared to the urban settings (73.9%, 95%CI: 64.8, 81.3) with no significant difference. Male current smokers had higher proportion of being advised by healthcare providers (76.1%, 95%CI: 69.2, 81.9) compared to female current smokers (60.3%, 95%CI: 29.4, 84.8). By age group, the young smokers aged 18-19 year old had the highest proportion of being advised to quit (90.2%, 95%CI: 50.5, 98.8). By state, the highest prevalence of current smokers advised to quit was reported in Terengganu (92.9%, 95%CI: 58.8, 99.2), followed by Negeri Sembilan at 89.4% (95%CI: 69.1, 97.0) and Perak [88.4%, 95%CI: 60.3, 97.5].

3.4.4 Awareness of anti-smoking campaign

3.4.4.1 Noticing anti-cigarette smoking information during the last 30 days in newspaper or magazine

Almost 70% (69.6%, 95%CI: 68.2, 71.0) of respondents had noticed anti-smoking information in newspapers or magazines during the last 30 days. The prevalence was almost similar in urban (70.3%; 95%CI: 68.6, 71.9) and rural areas (67.4%; 95%CI: 64.8, 69.8). More than two thirds of male (70.6%, 95%CI: 68.8, 72.3) and female respondents (68.5% 95%CI: 66.8, 70.1) were aware of the anti-smoking information in newspaper or magazines. The 40-44 years old age group had the highest prevalence (74.3%; 95%CI: 71.3, 77.0) of awareness in the anti-smoking information from the newspapers or magazines and was significantly higher compared to those from older age group [70-74 years, 56.3%, 95%CI: 49.89, 62.56; 75+years, 47.5%, 95%CI: 42.0, 53.1]. The study also revealed a positive linear relationship between awareness of anti-smoking information in printed media and education attainment.

3.4.4.2 Noticing anti-cigarette smoking information during the last 30 days on television

The prevalence of the respondents noticing anti-smoking information on television during the last one month was 76.3% (95%CI: 75.0, 78.0). The prevalence was similar between respondents from urban (76.0%, 95%CI: 74.4, 77.6) and rural areas (77.2%, 95%CI: 75.2, 78.9). Comparable prevalence for the male and female respondents were (75.9%, 95%CI: 74.2, 77.4) and 76.8%, 95%CI: 75.2, 78.2) respectively. By age group, the prevalence were lower among older age group [70-74 years old, 63.0%, 95%CI: 56.4, 69.2] compared to those aged 15-19 years [76.9%, 95%CI: 74.4, 79.3] and 20-24 years [76.1%, 95%CI: 73.0, 78.8]. Respondents with higher education attainment and government employees were reported to have higher awareness of anti-smoking information on television.

3.4.4.3 Current smokers who noticed health warning on cigarette package during the last 30 days

Majority (86.0%, 95%CI: 84.3, 87.6) of current smokers reported noticed health warning messages on cigarette packages during the last 30 days. The proportion was slightly higher among respondents from urban areas compared to those from rural areas (87.2%; 95%CI: 85.2, 88.8 vs 83.1%; 95%CI: 79.7, 85.9) with no significant difference. By state, more than 90% of current smokers from Melaka (92.8%, 95%CI: 85.5, 96.6), Sarawak (92.2%, 95%CI: 87.9, 95.1) and Kelantan (90.5%, 95%CI: 84.6, 94.3) had noticed health warnings on cigarette packages. Linear increment of awareness of health warning on cigarette packages was observed in this study, whereby 76.5% (95%CI: 68.9, 82.7) of current smokers without formal education noticed health warning on cigarettes package compared to 88.9% (95%CI: 85.8, 91.5) among those with tertiary education.

3.4.4.4 Current smokers who considered quitting because of health warnings

Among the current smokers, 59.5% (CI: 57.0, 61.8) had contemplated quitting smoking because of the warning messages on cigarette packages during the last 30 days. The prevalence of considering quitting smoking was slightly lower among urban areas at 57.6% (95%CI: 54.5, 60.5) compared to their counterparts from rural areas (64.3%, 95%CI: 60.5, 67.8). More than two thirds (70.3%, 95%CI: 62.4, 77.1) of current smokers from Kelantan who noticed health warnings considered quitting smoking, followed by those current smokers from Sabah and WP Labuan (69.1%, 95%CI: 62.2, 75.2) and Sarawak (64.2%, 95%CI: 55.2, 72.3). The lowest was reported in Negeri Sembilan (32.8%, 95%CI: 265.4, 41.2). The significant difference in proportion of current smokers who considered quitting smoking was also observed among ethnicity, in which other Bumiputras (69.7%, 95%CI: 63.6, 75.2) reported considered quitting smoking compared to Malays (59.9%, 95%CI: 57.0, 62.6) and Chinese (47.4, 95%CI: 40.9, 54.0). In addition, higher prevalence of government (62.6%, 95%CI: 56.2, 68.7) and private employees (60.6%, 95%CI: 56.9, 64.2) who were current smokers also expressed consideration to quit smoking after noticing of health warnings on cigarette packages compared to self-employed (56.8%, 95%CI: 53.1, 60.5) and unpaid worker/home maker (51.8%, 95%CI: 35.8, 67.5) with no significant differences.

3.4.5   Awareness of cigarette advertising and promotion

3.4.5.1 Noticing cigarette advertising during the last 30 days in stores

About 30% [29.6% (95% CI : 27.9, 31.3)] of Malaysians aged 15 years and above noticed cigarettes advertising in stores during the last 30 days, the prevalence was highest in Johor at 40.5% (95% CI 33.1, 48.4) followed by Kelantan at 37.7% (95%CI: 31.0, 44.9). The lowest prevalence was in Negeri Sembilan (5.2%, 95%CI: 3.6, 7.5).By strata, similar prevalence were observed from urban and rural areas (29.6%, 95% CI: 27.5, 31.7 vs 29.6%, 95%CI: 26.7, 32.6). By ethnicity, higher prevalence was observed for other Bumiputras, 37.6% (95%CI: 34.2, 41.1) as compared to Malays, 26.4% (95%CI: 24.9, 32.3) and Chinese 25.8% (95%CI: 21.2, 31.0). By education level, the highest proportion of noticing cigarettes advertising during the last 30 days was among respondents with tertiary education at 31.2% (95%CI: 28.7, 32.3), followed by those with secondary school attainment at 30.6% (95%CI: 28.5, 32.8). The highest prevalence of noticing cigarette advertising was found among those who were not married at 30.4% (95%CI: 28.2, 32.7) and government employees at 34.4% (95%CI: 31.1, 37.6).

3.4.5.2 Noticing cigarette promotion during the last 30 days

Small and insignificant prevalence of noticing cigarette promotion by various approaches were as follows:-

i.	Free sample	1.6% (95%CI: 1.3 - 1.9)
ii.	Sales price	1.4% (95%CI: 1.2 - 1.6)
iii.	Coupon	0.4% (95%CI: 0.3 - 0.5)
iv	Free gift/discounts on other product	0.5% (95%CI: 0.4 - 0.7)
v.	Clothing/items with brand name or logo	3.6% (95%CI: 3.1 - 4.2)
vii	Promotion on cigarettes through mail	0.5% (95%CI: 0.3 - 0.6)

3.5 Conclusion

The overall prevalence of current smokers aged 15 years and above had reduced slightly from 23.1% in 2011 to 22.8% in 2015. It was also observed that the prevalence of male current smokers had also reduced slightly from 43.9% in 2011 to 43.0% in the current survey. Nonetheless, the prevalence among females had increased from 1.0% in 2011 to 1.4% in 2015. It was noticed that all three states (Malacca, Johore and Penang) with Smokefree City projects consistently had lower smoking prevalence than the national level. The prevalence of smokeless tobacco product use had increased sharply from 0.7% to 10.9% in 2015. This might be due to the rise in popularity of electronic cigarettes. It is essential that tobacco control activities in Malaysia be strengthen if we are to achieve the target for WHO Global NCD Target by 2025.

3.6 Recommendations

The National Strategic Plan on Tobacco Control 2015-2020 has been approved recently. Several key areas have been recognised as the main foci activities based on MPOWER strategies. Prevention programmes should improve the target towards youths and females. Smoking cessation services must be strengthened by enhancing access to smoking cessation services and pharmacotherapy. A centralised national quit line would be beneficial to increase the efficacy of cessation programme. The prevalence of noticing cigarette products at point of sale is getting higher; therefore a policy towards tobacco product display ban at point of sale would be ideal. The current survey showed that states with Smokefree City Projects had lower smoking prevalence; hence, this programme should be expanded to many cities and states. With focused tobacco control strategies, the smoking prevalence can be reduced further to achieve a true smokefree Malaysia.

3.7 References

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Table 3.1.1: Prevalence of current tobacco smoker by socio-demographic characteristics

\	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	4,477	4,991,458	22.8	21.9	23.8
State					
Johor	398	568,564	22.2	19.7	24.9
Kedah	372	387,009	26.5	23.1	30.2
Kelantan	300	277,239	24.6	21.5	28.0
Melaka	219	105,392	16.9	13.4	20.9
Negeri Sembilan	276	154,271	20.9	17.9	24.3
Pahang	309	280,754	25.5	21.8	29.6
Penang	263	247,268	19.2	14.7	24.6
Perak	285	377,070	21.0	17.8	24.5
Perlis	291	38,869	22.2	19.1	25.7
Selangor	593	928,163	20.9	18.7	23.3
Terengganu	281	170,088	22.2	19.4	25.3
Sabah & WP Labuan	412	720,933	28.4	25.2	31.9
Sarawak	283	476,672	25.4	21.9	29.2
WP Kuala Lumpur	128	252,646	19.1	15.6	23.2
WP Putrajaya	67	6,520	12.4	9.8	15.7
Location					
Urban	2,373	3,515,923	21.2	20.1	22.4
Rural	2,104	1,475,534	27.9	26.3	29.6
Sex					
Male	4,351	4,847,892	43.0	41.4	44.6
Female	126	143,566	1.4	1.1	1.8
Age Group					
18-19	293	348,771	13.2	11.5	15.2
20-24	500	720,131	25.3	22.8	28.0
25-29	552	771,403	27.7	25.3	30.2
30-34	567	770,177	29.3	26.8	32.0
35-39	481	616,993	29.7	27.1	32.4
40-44	425	488,095	26.3	23.8	29.0
45-49	424	399,155	23.8	21.7	26.2
50-54	385	333,147	22.1	19.7	24.7
55-59	302	220,189	17.4	15.3	19.7
60-64	214	132,518	14.2	11.9	16.7
65-69	165	93,369	13.5	11.0	16.5
70-74	88	44,940	11.2	8.2	15.0
75+	81	52,569	9.2	7.0	12.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,970	2,686,374	24.7	23.6	25.9
Chinese	460	719,222	14.2	12.7	15.9
Indians	220	244,131	16.5	14.0	19.4
Other Bumiputras	451	613,564	25.8	23.4	28.4
Others	376	728,167	35.0	31.3	38.9
Marital Status					
Single	1,276	1,713,143	23.6	21.9	25.3
Married	3,022	3,141,651	23.8	22.8	24.9
Widow/widower/divorcee	179	136,663	9.7	8.0	11.8
Education Level					
No formal education	216	258,514	21.5	17.7	26.0
Primary education	1,066	1,099,148	25.2	23.3	27.2
Secondary education	2,475	2,740,922	25.8	24.5	27.1
Tertiary education	637	785,981	14.9	13.6	16.3
Unclassified education	76	99,362	26.6	20.1	34.2
Occupation					
Government/semi government employee	431	445,344	23.1	20.6	25.8
Private employee	1,898	2,574,645	31.7	29.9	33.6
Self employed	1,348	1,220,582	35.4	33.2	37.6
Unpaid worker/home maker	68	61,011	2.1	1.5	2.9
Retiree	168	117,467	19.3	16.0	23.2
Household Income Group					
Less than RM 1000	575	542,681	18.2	16.4	20.2
RM 1000 - RM 1999	912	956,186	26.5	24.5	28.6
RM 2000 - RM 2999	876	918,660	25.7	23.8	27.7
RM 3000 - RM 3999	616	702,684	25.1	22.9	27.4
RM 4000 - RM 4999	452	563,975	26.2	23.5	29.2
RM 5000 - RM 5999	314	388,204	22.3	19.2	25.8
RM 6000 - RM 6999	203	229,195	20.4	17.3	23.9
RM 7000 - RM 7999	175	210,751	23.8	19.6	28.7
RM 8000 - RM 8999	100	128,288	17.5	14.0	21.7
RM 9000 - RM 9999	41	40,432	10.9	7.5	15.5
RM 10000 & above	213	310,402	16.3	13.3	19.7
Quintile Household Income Group					
Quintile 1	456	420,633	16.5	14.6	18.5
Quintile 2	941	999,915	26.8	24.8	28.9
Quintile 3	1,091	1,138,031	25.1	23.4	26.9
Quintile 4	1,017	1,221,198	25.5	23.7	27.4
Quintile 5	972	1,211,681	19.3	17.7	21.1

Table 3.1.2: Current smokers of any smoked tobacco product by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	4,418	4,935,109	22.6	21.6	23.5
State					
Johor	392	562,050	21.9	19.4	24.6
Kedah	363	377,232	25.8	22.7	29.3
Kelantan	300	277,239	24.6	21.5	28.0
Melaka	210	101,038	16.2	12.7	20.3
Negeri Sembilan	271	152,013	20.6	17.6	23.9
Pahang	307	279,034	25.4	21.7	29.4
Penang	258	240,162	18.6	14.6	23.4
Perak	284	375,743	20.9	17.8	24.4
Perlis	286	37,976	21.7	18.8	25.0
Selangor	588	923,381	20.8	18.6	23.2
Terengganu	281	170,088	22.2	19.4	25.3
Sabah & WP Labuan	406	714,348	28.1	25.0	31.5
Sarawak	278	465,723	24.8	21.3	28.7
WP Kuala Lumpur	128	252,646	19.1	15.6	23.2
WP Putrajaya	66	6,438	12.3	9.7	15.5
Location					
Urban	2,340	3,470,309	20.9	19.8	22.1
Rural	2,078	1,464,800	27.7	26.1	29.4
Sex					
Male	4,298	4,799,768	42.5	41.0	44.1
Female	120	135,341	1.3	1.0	1.7
Age Group					
18-19	286	343,814	13.1	11.3	15.0
20-24	494	711,101	25.0	22.5	27.7
25-29	546	760,790	27.3	25.0	29.8
30-34	560	763,547	29.1	26.5	31.7
35-39	476	609,679	29.4	26.8	32.0
40-44	420	484,490	26.1	23.6	28.8
45-49	419	396,523	23.7	21.5	26.0
50-54	383	331,385	22.0	19.5	24.6
55-59	298	217,035	17.2	15.1	19.4
60-64	212	130,977	14.0	11.8	16.6
65-69	161	90,483	13.1	10.6	16.0
70-74	84	42,979	10.7	7.7	14.5
75+	79	52,307	9.2	6.9	12.0

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,934	2,656,110	24.4	23.4	25.6
Chinese	449	706,603	13.9	12.4	15.6
Indians	216	240,842	16.3	13.7	19.2
Other Bumiputras	447	608,505	25.6	23.2	28.2
Others	372	723,049	34.8	31.0	38.7
Marital Status					
Single	1,254	1,690,361	23.2	21.6	25.0
Married	2,987	3,108,361	23.6	22.5	24.6
Widow/widower/divorcee	177	136,387	9.7	8.0	11.8
Education Level					
No formal education	214	255,267	21.3	17.6	25.5
Primary education	1,050	1,088,704	25.0	23.1	27.0
Secondary education	2,442	2,708,125	25.5	24.3	26.7
Tertiary education	630	776,281	14.7	13.4	16.1
Unclassified education	75	99,202	26.5	20.1	34.2
Occupation					
Government/semi government employee	339	338,560	20.7	18.3	23.3
Semi Government	88	97,272	33.5	27.1	40.7
Private employee	1,876	2,555,805	31.4	29.6	33.3
Self employed	1,335	1,210,493	35.1	33.0	37.3
Unpaid worker/home maker	6	7,293	23.0	10.2	44.0
Retiree	167	115,992	23.0	10.2	44.0
Homemaker	57	47,292	19.0	15.7	22.9
Student	137	164,571	8.2	6.5	10.4
Household Income Group					
Less than RM 1000	559	532,447	17.9	16.1	19.8
RM 1000 - RM 1999	901	947,187	26.3	24.3	28.4
RM 2000 - RM 2999	867	906,643	25.4	23.5	27.3
RM 3000 - RM 3999	608	693,165	24.8	22.6	27.1
RM 4000 - RM 4999	446	557,976	26.0	23.3	28.9
RM 5000 - RM 5999	310	381,640	21.9	18.8	25.3
RM 6000 - RM 6999	201	226,893	20.1	17.1	23.6
RM 7000 - RM 7999	174	210,715	23.8	19.6	28.7
RM 8000 - RM 8999	99	127,692	17.4	13.9	21.6
RM 9000 - RM 9999	41	40,432	10.9	7.5	15.5
RM 10000 & above	212	310,319	16.3	13.3	19.7
Quintile Household Income Group					
Quintile 1	443	414,278	16.2	14.4	18.3
Quintile 2	928	988,638	26.5	24.5	28.6
Quintile 3	1,077	1,118,316	24.7	23.0	26.5
Quintile 4	1,006	1,208,178	25.2	23.4	27.1
Quintile 5	964	1,205,700	19.2	17.6	21.0

Table 3.1.3: Current smokers of any cigarette by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	4,399	4,918,429	22.5	21.6	23.5
State					
Johor	389	557,930	21.8	19.3	24.5
Kedah	361	375,397	25.7	22.6	29.1
Kelantan	299	276,634	24.5	21.4	27.9
Melaka	209	100,512	16.1	12.7	20.2
Negeri Sembilan	270	151,769	20.6	17.6	23.9
Pahang	306	278,262	25.3	21.6	29.4
Penang	258	240,162	18.6	14.6	23.4
Perak	283	374,963	20.8	17.7	24.3
Perlis	286	37,976	21.7	18.8	25.0
Selangor	585	919,070	20.7	18.5	23.1
Terengganu	280	169,312	22.1	19.3	25.3
Sabah & WP Labuan	402	711,719	28.0	24.9	31.4
Sarawak	278	465,723	24.8	21.3	28.7
WP Kuala Lumpur	128	252,646	19.1	15.6	23.2
WP Putrajaya	65	6,354	12.1	9.5	15.4
Location					
Urban	2,328	3,457,593	20.8	19.7	22.0
Rural	2,071	1,460,835	27.6	26.0	29.3
Sex					
Male	4,283	4,786,117	42.4	40.9	44.0
Female	116	132,312	1.2	1.0	1.6
Age Group					
18-19	285	342,289	13.0	11.3	15.0
20-24	494	711,101	25.0	22.5	27.7
25-29	546	760,790	27.3	25.0	29.8
30-34	559	761,761	29.0	26.5	31.7
35-39	474	606,653	29.2	26.7	31.9
40-44	420	484,490	26.1	23.6	28.8
45-49	417	395,172	23.6	21.4	25.9
50-54	381	330,687	21.9	19.5	24.5
55-59	296	215,228	17.0	15.0	19.3
60-64	209	129,166	13.8	11.6	16.4
65-69	159	89,239	12.9	10.4	15.8
70-74	82	41,389	10.3	7.4	14.1
75+	77	50,463	8.8	6.6	11.7

ociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	2,922	2,646,368	24.4	23.3	25.5
Chinese	448	705,324	13.9	12.4	15.6
Indians	214	237,812	16.1	13.6	18.9
Other Bumiputras	443	605,876	25.5	23.1	28.1
Others	372	723,049	34.8	31.0	38.7
Marital Status					
Single	1,253	1,688,836	23.2	21.6	24.9
Married	2,971	3,095,040	23.5	22.4	24.5
Widow/widower/divorcee	175	134,552	9.6	7.9	11.7
Education Level					
No formal education	210	252,344	21.0	17.3	25.3
Primary education	1,046	1,085,096	24.9	23.0	26.9
Secondary education	2,435	2,701,448	25.4	24.2	26.7
Tertiary education	626	772,807	14.6	13.3	16.0
Unclassified education	75	99,202	26.5	20.1	34.2
Occupation					
Government/semi government employee	427	435,832	22.6	20.2	25.3
Private employee	1,869	2,549,296	31.4	29.6	33.2
Self employed	1,329	1,205,052	34.9	32.8	37.2
Unpaid worker/home maker	61	53,479	1.8	1.3	2.6
Retiree	166	114,992	18.9	15.6	22.7
Household Income Group					
Less than RM 1000	554	528,940	17.8	16.0	19.7
RM 1000 - RM 1999	898	943,700	26.2	24.2	28.3
RM 2000 - RM 2999	862	903,072	25.3	23.4	27.3
RM 3000 - RM 3999	606	691,412	24.7	22.5	27.0
RM 4000 - RM 4999	444	555,483	25.9	23.1	28.8
RM 5000 - RM 5999	310	381,640	21.9	18.8	25.3
RM 6000 - RM 6999	201	226,893	20.1	17.1	23.6
RM 7000 - RM 7999	173	208,929	23.6	19.4	28.5
RM 8000 - RM 8999	99	127,692	17.4	13.9	21.6
RM 9000 - RM 9999	41	40,432	10.9	7.5	15.5
RM 10000 & above	211	310,236	16.2	13.3	19.7
Quintile Household Income Group					
Quintile 1	439	411,546	16.1	14.3	18.2
Quintile 2	924	984,375	26.4	24.4	28.4
Quintile 3	1,070	1,112,992	24.6	22.9	26.3
Quintile 4	1,004	1,205,684	25.2	23.4	27.1
Quintile 5	962	1,203,831	19.2	17.6	21.0

Table 3.1.4: Current smokers of manufactured cigarette by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	3,779	4,387,541	20.1	19.2	21.0
State					
Johor	341	495,031	19.3	17.1	21.7
Kedah	247	274,714	18.8	16.1	21.8
Kelantan	249	240,374	21.3	18.3	24.7
Melaka	185	86,639	13.9	10.9	17.5
Negeri Sembilan	258	148,069	20.1	17.1	23.5
Pahang	256	232,740	21.1	19.0	23.5
Penang	215	211,202	16.4	12.6	20.9
Perak	253	348,925	19.4	16.3	22.9
Perlis	195	29,367	16.8	13.9	20.2
Selangor	532	843,945	19.0	16.9	21.3
Terengganu	252	155,924	20.4	17.5	23.5
Sabah & WP Labuan	339	611,592	24.1	21.0	27.5
Sarawak	272	460,666	24.6	21.0	28.5
WP Kuala Lumpur	122	242,309	18.3	14.8	22.5
WP Putrajaya	63	6,042	11.5	8.9	14.8
Location					
Urban	2,108	3,163,984	19.1	18.0	20.2
Rural	1,671	1,223,557	23.1	21.8	24.6
Sex					
Male	3,682	4,271,088	37.9	36.4	39.4
Female	97	116,453	1.1	0.8	1.5
Age Group					
18-19	268	321,768	12.2	10.6	14.1
20-24	466	674,461	23.7	21.3	26.3
25-29	493	693,204	24.9	22.6	27.4
30-34	509	700,626	26.7	24.2	29.4
35-39	424	540,239	26.0	23.6	28.6
40-44	365	415,220	22.4	20.0	25.0
45-49	360	352,161	21.0	18.9	23.3
50-54	305	280,999	18.6	16.3	21.2
55-59	242	179,553	14.2	12.4	16.2
60-64	147	96,017	10.2	8.4	12.5
65-69	115	72,552	10.5	8.2	13.2
70-74	46	28,211	7.0	4.5	10.7
75+	39	32,529	5.7	3.9	8.3

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,446	2,320,829	21.4	20.3	22.5
Chinese	428	676,166	13.3	11.9	15.0
Indians	205	227,943	15.4	13.0	18.2
Other Bumiputras	396	554,223	23.3	20.9	25.9
Others	304	608,379	29.3	25.6	33.2
Marital Status					
Single	1,158	1,575,543	21.7	20.1	23.3
Married	2,484	2,700,846	20.5	19.5	21.5
Widow/widower/divorcee	137	111,152	7.9	6.3	9.9
Education Level					
No formal education	141	185,704	15.5	12.1	19.6
Primary education	795	900,984	20.7	18.8	22.6
Secondary education	2,193	2,484,223	23.4	22.2	24.6
Tertiary education	587	730,518	13.8	12.6	15.2
Unclassified education	56	78,581	21.0	15.5	27.9
Occupation					
Government/semi government employee	393	403,617	21.0	18.6	23.6
Private employee	1,684	2,324,003	28.6	26.9	30.4
Self employed	1,084	1,036,730	30.1	28.0	32.2
Unpaid worker/home maker	44	42,736	1.5	1.0	2.2
Retiree	140	98,941	16.2	13.2	19.9
Household Income Group					
Less than RM 1000	414	431,048	14.5	12.8	16.4
RM 1000 - RM 1999	749	816,164	22.6	20.7	24.6
RM 2000 - RM 2999	732	794,060	22.2	20.4	24.2
RM 3000 - RM 3999	531	613,493	21.9	19.9	24.1
RM 4000 - RM 4999	392	509,891	23.7	21.0	26.7
RM 5000 - RM 5999	287	357,500	20.5	17.5	23.9
RM 6000 - RM 6999	189	217,899	19.4	16.3	22.9
RM 7000 - RM 7999	157	194,465	22.0	17.9	26.8
RM 8000 - RM 8999	94	121,469	16.6	13.3	20.5
RM 9000 - RM 9999	38	38,398	10.3	7.0	15.1
RM 10000 & above	196	293,154	15.4	12.4	18.8
Quintile Household Income Group					
Quintile 1	325	332,064	13.0	11.3	14.9
Quintile 2	767	852,601	22.9	21.0	24.8
Quintile 3	912	984,431	21.7	20.1	23.5
Quintile 4	886	1,087,453	22.7	21.0	24.6
Quintile 5	889	1,130,991	18.0	16.4	19.8

Table 3.1.5: Current smokers of hand-rolled cigarette by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	684	503,862	2.3	2.0	2.6
State					
Johor	13	20,616	0.8	0.4	1.6
Kedah	154	141,305	9.7	7.9	11.8
Kelantan	87	67,603	6.0	4.6	7.8
Melaka	7	2,734	0.4	0.1	2.5
Negeri Sembilan	9	3,398	0.5	0.2	0.9
Pahang	36	27,399	2.5	1.6	3.9
Penang	59	39,544	3.1	1.5	6.3
Perak	34	31,218	1.7	0.9	3.3
Perlis	123	12,969	7.4	5.8	9.4
Selangor	54	57,435	1.3	0.9	2.0
Terengganu	39	22,241	2.9	2.0	4.2
Sabah & WP Labuan	48	56,541	2.2	1.5	3.3
Sarawak	13	13,853	0.7	0.4	1.3
WP Kuala Lumpur	2	6,480	0.5	0.1	2.0
WP Putrajaya	6	525	1.0	0.5	2.1
Location					
Urban	225	258,650	1.6	1.3	1.9
Rural	459	245,212	4.6	4.0	5.4
Sex					
Male	658	485,472	4.3	3.8	4.9
Female	26	18,390	0.2	0.1	0.3
Age Group					
18-19	26	20,784	0.8	0.5	1.2
20-24	48	66,550	2.3	1.6	3.5
25-29	49	48,222	1.7	1.2	2.5
30-34	59	50,016	1.9	1.3	2.7
35-39	42	44,601	2.1	1.4	3.4
40-44	54	49,778	2.7	1.9	3.7
45-49	60	39,059	2.3	1.7	3.2
50-54	72	47,554	3.2	2.2	4.4
55-59	66	40,267	3.2	2.3	4.4
60-64	71	38,711	4.1	3.0	5.7
65-69	51	22,246	3.2	2.2	4.7
70-74	41	13,194	3.3	2.2	4.9
75+	45	22,880	4.0	2.7	6.0

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	576	380,294	3.5	3.1	4.0
Chinese	16	21,010	0.4	0.2	0.9
Indians	4	5,578	0.4	0.1	1.2
Other Bumiputras	55	51,499	2.2	1.5	3.2
Others	33	45,481	2.2	1.3	3.7
Marital Status					
Single	122	140,235	1.9	1.5	2.5
Married	516	339,562	2.6	2.2	3.0
Widow/widower/divorcee	46	24,065	1.7	1.2	2.4
Education Level					
No formal education	62	39,082	3.3	2.3	4.7
Primary education	262	168,811	3.9	3.2	4.7
Secondary education	306	237,683	2.2	1.9	2.7
Tertiary education	46	49,182	0.9	0.6	1.4
Unclassified education	7	9,056	2.4	1.0	6.0
Occupation					
Government/semi government employee	54	37,522	1.9	1.3	2.9
Private employee	157	147,153	1.8	1.5	2.3
Self employed	292	192,684	5.6	4.6	6.7
Unpaid worker/home maker	17	10,730	0.4	0.2	0.6
Retiree	29	15,686	2.6	1.5	4.4
Household Income Group					
Less than RM 1000	150	97,453	3.3	2.5	4.2
RM 1000 - RM 1999	173	130,586	3.6	2.9	4.5
RM 2000 - RM 2999	162	120,944	3.4	2.7	4.3
RM 3000 - RM 3999	61	43,107	1.5	1.1	2.2
RM 4000 - RM 4999	47	31,996	1.5	1.0	2.3
RM 5000 - RM 5999	32	24,505	1.4	0.9	2.3
RM 6000 - RM 6999	16	13,492	1.2	0.6	2.5
RM 7000 - RM 7999	17	12,703	1.4	0.7	2.9
RM 8000 - RM 8999	8	12,056	1.6	0.7	3.7
RM 9000 - RM 9999	5	4,011	1.1	0.4	2.8
RM 10000 & above	13	13,010	0.7	0.3	1.4
Quintile Household Income Group					
Quintile 1	127	85,069	3.3	2.5	4.4
Quintile 2	178	131,045	3.5	2.9	4.3
Quintile 3	190	138,825	3.1	2.4	3.9
Quintile 4	102	71,952	1.5	1.1	2.0
Quintile 5	87	76,971	1.2	0.9	1.7

Table 3.1.6: Current smokers of kretek by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	471	574,024	2.6	2.2	3.1
State					
Johor	86	106,680	4.2	2.8	6.2
Kedah	33	35,471	2.4	1.5	4.0
Kelantan	29	29,249	2.6	1.5	4.3
Melaka	30	17,518	2.8	1.3	6.0
Negeri Sembilan	18	8,494	1.2	0.7	2.0
Pahang	44	46,818	4.3	2.2	8.0
Penang	14	4,361	0.3	0.1	0.9
Perak	31	33,498	1.9	1.0	3.6
Perlis	3	690	0.4	0.1	1.2
Selangor	47	76,216	1.7	1.2	2.6
Terengganu	23	17,514	2.3	1.0	5.3
Sabah & WP Labuan	88	167,333	6.6	4.9	8.8
Sarawak	6	11,319	0.6	0.2	1.5
WP Kuala Lumpur	9	17,856	1.4	0.6	3.2
WP Putrajaya	10	1,007	1.9	1.0	3.7
Location					
Urban	212	323,641	2.0	1.6	2.4
Rural	259	250,383	4.7	3.7	6.0
Sex					
Male	461	561,484	5.0	4.3	5.8
Female	10	12,539	0.12	0.1	0.3
Age Group					
18-19	36	39,195	1.5	1.0	2.3
20-24	61	83,434	2.9	2.2	4.0
25-29	61	86,606	3.1	2.2	4.4
30-34	69	109,034	4.2	3.0	5.7
35-39	57	79,296	3.8	2.8	5.2
40-44	40	56,414	3.0	2.1	4.4
45-49	38	35,158	2.1	1.4	3.1
50-54	39	38,164	2.5	1.7	3.9
55-59	25	20,282	1.6	1.0	2.5
60-64	18	12,248	1.3	0.8	2.2
65-69	15	7,302	1.1	0.6	1.9
70-74	7	4,213	1.0	0.5	2.4
75+	5	2,678	0.5	0.2	1.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	302	279,456	2.6	2.2	3.1
Chinese	16	26,767	0.5	0.3	1.0
Indians	10	6,083	0.4	0.2	0.9
Other Bumiputras	62	85,943	3.6	2.6	5.0
Others	81	175,775	8.5	6.2	11.4
Marital Status					
Single	147	173,418	2.4	1.8	3.1
Married	311	386,439	2.9	2.4	3.5
Widow/widower/divorcee	13	14,166	1.0	0.5	2.1
Education Level					
No formal education	39	53,345	4.4	3.0	6.5
Primary education	128	170,486	3.9	3.1	5.0
Secondary education	230	265,937	2.5	2.1	3.0
Tertiary education	56	62,577	1.2	0.8	1.7
Unclassified education	18	21,679	5.8	2.3	13.7
Occupation					
Government/semi government employee	44	44,255	2.3	1.4	3.7
Private employee	220	312,366	3.8	3.1	4.8
Self employed	136	146,037	4.2	3.4	5.4
Unpaid worker/home maker	4	2,714	0.09	0.0	0.3
Retiree	8	7,378	1.2	0.6	2.5
Household Income Group					
Less than RM 1000	58	70,557	2.4	1.7	3.4
RM 1000 - RM 1999	105	129,943	3.6	2.8	4.7
RM 2000 - RM 2999	92	112,332	3.1	2.4	4.1
RM 3000 - RM 3999	80	101,266	3.6	2.5	5.2
RM 4000 - RM 4999	44	56,200	2.6	1.8	3.8
RM 5000 - RM 5999	26	37,072	2.1	1.3	3.6
RM 6000 - RM 6999	19	16,758	1.5	0.8	2.8
RM 7000 - RM 7999	21	23,064	2.6	1.4	4.9
RM 8000 - RM 8999	9	7,285	1.0	0.4	2.4
RM 9000 - RM 9999	3	2,514	0.7	0.2	2.5
RM 10000 & above	14	17,032	0.9	0.5	1.6
Quintile Household Income Group					
Quintile 1	48	59,759	2.3	1.6	3.4
Quintile 2	102	128,127	3.4	2.6	4.5
Quintile 3	117	141,757	3.1	2.5	4.0
Quintile 4	116	146,944	3.1	2.3	4.1
Quintile 5	88	97,436	1.6	1.1	2.1

Table 3.1.7: Current smokers of other tobacco product by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	49	51,482	0.2	0.2	0.3
State					
Johor	6	7,116	0.3	0.1	0.7
Kedah	6	4,983	0.3	0.1	1.2
Kelantan	1	606	0.05	0.0	0.4
Melaka	3	1,309	0.2	0.1	0.8
Negeri Sembilan	4	1,732	0.23	0.1	0.7
Pahang	2	1,351	0.12	0.0	0.5
Penang					
Perak	3	2,998	0.2	0.1	0.6
Perlis	2	710	0.4	0.1	1.9
Selangor	5	7,963	0.2	0.1	0.4
Terengganu	2	1,552	0.2	0.1	0.8
Sabah & WP Labuan	9	10,257	0.4	0.2	1.0
Sarawak	3	3,092	0.16	0.1	0.6
WP Kuala Lumpur	2	7,729	0.6	0.1	2.3
WP Putrajaya	1	83	0.16	0.0	1.1
Location					
Urban	30	41,049	0.2	0.2	0.4
Rural	19	10,433	0.2	0.1	0.4
Sex					
Male	42	43,420	0.4	0.3	0.6
Female	7	8,062	0.08	0.0	0.2
Age Group					
18-19	2	1,880	0.07	0.0	0.4
20-24	2	2,150	0.08	0.0	0.4
25-29	4	10,880	0.4	0.1	1.1
30-34	2	2,426	0.1	0.0	0.4
35-39	5	6,464	0.3	0.1	0.8
40-44	1	1,843	0.10	0.0	0.7
45-49	4	3,524	0.2	0.1	0.6
50-54	8	8,438	0.6	0.2	1.5
55-59	7	4,190	0.3	0.1	0.8
60-64	5	2,743	0.3	0.1	0.8
65-69	2	1,244	0.18	0.0	0.8
70-74	5	3,856	1.0	0.4	2.3
75+	2	1,845	0.3	0.1	1.5

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	27	22,478	0.2	0.1	0.3
Chinese	5	9,235	0.2	0.1	0.5
Indians	3	3,263	0.2	0.1	0.9
Other Bumiputras	11	8,822	0.4	0.2	0.8
Others	3	7,683	0.4	0.1	1.4
Marital Status					
Single	7	12,276	0.2	0.1	0.4
Married	39	35,772	0.3	0.2	0.4
Widow/widower/divorcee	3	3,435	0.24	0.0	1.4
Education Level					
No formal education	5	3,664	0.3	0.1	0.9
Primary education	13	9,742	0.2	0.1	0.4
Secondary education	23	21,495	0.2	0.1	0.3
Tertiary education	7	13,013	0.2	0.1	0.6
Unclassified education	1	3,567	1.0	0.1	6.4
Occupation					
Government/semi government employee	3	2,471	0.13	0.0	0.5
Private employee	14	17,777	0.2	0.1	0.4
Self employed	18	14,686	0.4	0.2	0.8
Unpaid worker/home maker	4	3,189	0.11	0.0	0.3
Retiree	3	2,525	0.4	0.1	1.3
Household Income Group					
Less than RM 1000	7	8,112	0.3	0.1	0.8
RM 1000 - RM 1999	12	9,772	0.3	0.1	0.6
RM 2000 - RM 2999	9	8,883	0.2	0.1	0.6
RM 3000 - RM 3999	5	3,535	0.13	0.1	0.3
RM 4000 - RM 4999	7	10,402	0.5	0.2	1.2
RM 5000 - RM 5999	1	883	0.05	0.0	0.4
RM 6000 - RM 6999	1	1,600	0.14	0.0	1.0
RM 7000 - RM 7999	3	5,196	0.6	0.2	1.8
RM 8000 - RM 8999					
RM 9000 - RM 9999	1	776	0.21	0.0	1.4
RM 10000 & above	3	2,324	0.12	0.0	0.5
Quintile Household Income Group					
Quintile 1	6	7,336	0.3	0.1	0.9
Quintile 2	11	9,592	0.3	0.1	0.5
Quintile 3	14	12,376	0.3	0.1	0.6
Quintile 4	9	11,399	0.2	0.1	0.6
Quintile 5	9	10,778	0.2	0.1	0.4

Table 3.1.8: Cigarette smoked per day among daily cigarette smokers by socio-demographic characteristics

Sociodemographic Characteristics	Less than 5					5 to 9					10 to 14				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	218	262,495	5.9	5.0	7.0	592	729,522	16.4	14.8	18.2	759	822,555	18.5	16.9	20.3
State															
Johor	12	24,022	4.7	2.3	9.6	44	70,662	13.9	10.0	19.0	64	91,452	18.0	13.9	23.0
Kedah	29	36,053	10.5	6.9	15.7	64	62,112	18.1	13.9	23.3	73	79,638	23.2	17.9	29.6
Kelantan	17	16,589	6.5	3.9	10.4	41	37,900	14.7	10.5	20.3	58	55,558	21.6	16.8	27.4
Melaka	10	6,986	7.7	3.9	14.6	23	9,059	10.0	5.9	16.5	18	11,285	12.4	7.2	20.6
Negeri Sembilan	14	6,268	4.8	2.6	8.6	30	17,522	13.4	7.7	22.3	72	34,349	26.4	20.0	33.9
Pahang	9	7,819	3.0	1.5	5.8	27	28,329	10.8	7.4	15.6	41	35,898	13.7	10.1	18.2
Penang	19	23,806	10.7	6.4	17.4	45	45,422	20.5	13.8	29.3	53	59,203	26.7	18.9	36.2
Perak	18	28,226	8.2	4.8	13.9	42	58,904	17.2	12.7	22.9	25	36,716	10.7	7.0	16.0
Perlis	12	1,690	4.9	2.6	9.1	32	4,325	12.5	8.6	18.0	76	9,379	27.2	20.7	34.8
Selangor	37	57,338	7.0	4.9	9.9	97	159,664	19.4	15.3	24.3	94	151,140	18.4	14.7	22.8
Terengganu	7	4,480	2.8	1.0	7.4	21	12,779	7.9	4.7	13.2	49	27,912	17.3	13.3	22.3
Sabah & WP Labuan	13	18,030	2.9	1.4	5.8	53	84,206	13.6	9.6	18.8	54	97,250	15.7	11.8	20.6
Sarawak	14	23,896	5.8	3.1	10.6	38	84,113	20.5	14.2	28.8	45	75,121	18.3	12.4	26.3
WP Kuala Lumpur	4	7,000	3.1	1.3	7.0	26	53,535	23.3	14.3	35.7	31	57,047	24.9	15.7	37.0
WP Putrajaya	3	294	5.6	1.7	17.0	9	991	18.9	9.0	35.2	6	608	11.6	4.9	25.0
Location															
Urban	133	200,656	6.4	5.3	7.8	316	516,064	16.5	14.6	18.7	409	600,182	19.2	17.2	21.5
Rural	85	61,839	4.7	3.4	6.4	276	213,458	16.2	13.7	19.2	350	222,373	16.9	14.8	19.3
Sex															
Male	206	249,634	5.8	4.8	6.9	575	706,522	16.3	14.7	18.1	743	806,649	18.6	17.0	20.4
Female	12	12,862	12.2	6.6	21.6	17	23,000	21.8	12.7	35.0	16	15,906	15.1	9.1	24.0

Sociodemographic Characteristics	15 to 24					25 & above				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	1,023	1,073,446	24.2	22.4	26.1	1,409	1,549,598	34.9	32.5	37.5
State										
Johor	101	136,643	26.9	21.5	33.1	137	185,412	36.5	28.5	45.4
Kedah	69	77,630	22.7	17.2	29.2	92	87,130	25.4	19.2	33.0
Kelantan	67	61,609	24.0	18.5	30.5	97	85,524	33.3	23.0	45.4
Melaka	44	16,145	17.8	10.8	27.8	90	47,334	52.1	42.7	61.4
Negeri Sembilan	99	53,841	41.3	31.4	52.0	30	18,365	14.1	8.7	22.0
Pahang	61	45,457	17.3	13.4	22.1	152	144,774	55.2	47.5	62.7
Penang	56	51,679	23.3	15.5	33.4	63	41,728	18.8	10.2	32.1
Perak	43	51,679	15.1	10.5	21.1	128	167,268	48.8	40.5	57.2
Perlis	71	9,834	28.5	21.1	37.3	75	9,247	26.8	19.2	36.2
Selangor	121	174,138	21.2	17.5	25.4	176	280,272	34.1	29.1	39.5
Terengganu	91	57,580	35.7	28.4	43.9	98	58,335	36.2	27.3	46.2
Sabah & WP Labuan	85	164,682	26.6	20.8	33.3	144	255,128	41.2	33.0	50.0
Sarawak	73	109,475	26.7	21.9	32.1	75	117,003	28.6	22.0	36.2
WP Kuala Lumpur	34	62,355	27.2	18.7	37.7	23	49,414	21.5	11.5	36.6
WP Putrajaya	8	699	13.3	6.8	24.4	29	2,665	50.7	35.1	66.2
Location										
Urban	516	739,627	23.7	21.5	26.1	740	1,065,398	34.1	31.1	37.3
Rural	507	333,819	25.4	22.6	28.3	669	484,200	36.8	32.9	40.9
Sex										
Male	1,008	1,055,480	24.4	22.6	26.3	1,376	1,513,964	34.9	32.5	37.5
Female	15	17,967	17.1	8.9	30.1	33	35,634	33.8	21.8	48.3

Sociodemographic Characteristics	Less than 5					5 to 9					10 to 14				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
18-19	29	38,371	13.7	9.1	20.0	54	69,048	24.6	18.0	32.7	47	51,965	18.5	13.4	25.1
20-24	27	36,463	5.8	3.8	8.8	79	127,010	20.2	16.0	25.1	83	125,418	19.9	15.7	24.9
25-29	41	64,480	9.4	6.5	13.5	66	113,815	16.6	12.3	22.1	101	128,868	18.8	15.0	23.4
30-34	24	29,774	4.4	2.7	7.1	70	97,837	14.5	10.9	18.9	97	134,110	19.8	15.8	24.5
35-39	15	19,506	3.4	1.9	6.2	78	98,687	17.4	13.5	22.0	79	104,675	18.4	14.4	23.2
40-44	15	20,543	4.5	2.4	8.2	44	64,511	14.2	10.3	19.2	69	76,795	16.9	12.7	22.2
45-49	13	11,972	3.3	1.8	6.1	51	52,861	14.5	10.6	19.6	73	66,173	18.2	14.2	23.0
50-54	10	9,481	3.1	1.5	6.5	40	39,440	13.0	9.0	18.4	61	45,854	15.1	11.1	20.1
55-59	9	7,118	3.6	1.7	7.5	37	23,983	12.0	8.0	17.6	45	30,476	15.3	10.5	21.7
60-64	12	8,091	6.5	3.3	12.7	26	14,307	11.6	6.7	19.2	45	29,230	23.6	16.7	32.3
65-69	11	8,698	12.1	6.4	21.6	22	13,790	19.2	10.9	31.6	28	11,328	15.7	9.8	24.3
70-74	6	2,997	7.6	1.9	26.3	13	7,353	18.6	9.0	34.6	17	10,106	25.6	12.6	45.1
75+	6	5,001	12.6	5.2	27.5	12	6,880	17.4	8.9	31.2	14	7,556	19.1	10.1	33.0
Ethnicity															
Malays	147	157,356	6.4	5.2	7.9	382	361,172	14.8	13.1	16.6	530	490,298	20.0	18.0	22.3
Chinese	14	24,820	4.1	2.3	7.3	56	92,635	15.2	11.1	20.5	82	123,179	20.2	15.5	26.0
Indians	18	18,348	8.5	5.1	13.9	39	61,552	28.6	20.3	38.7	28	23,071	10.7	6.8	16.4
Other Bumiputras	19	23,515	4.5	2.5	8.0	65	100,093	19.3	15.0	24.4	62	84,602	16.3	12.3	21.3
Others	20	38,456	5.9	3.4	10.1	50	114,072	17.6	12.7	23.9	57	101,406	15.6	11.5	21.0
Marital Status															
Single	80	102,874	6.9	5.3	9.1	181	284,359	19.2	16.1	22.7	203	273,320	18.4	15.7	21.5
Married	127	154,263	5.4	4.4	6.7	391	427,579	15.1	13.3	17.0	534	534,223	18.8	17.0	20.9
Widow/widower /divorcee	11	5,359	4.5	2.0	9.6	20	17,584	14.7	8.9	23.2	22	15,012	12.5	7.2	20.9
Education Level															
No formal education	12	12,271	5.8	2.7	11.9	25	31,373	14.9	8.0	26.1	33	28,105	13.3	8.3	20.8
Primary education	44	47,834	4.9	3.4	7.0	120	144,516	14.7	11.5	18.5	179	168,794	17.1	14.2	20.5
Secondary education	125	151,818	6.2	4.9	7.7	331	390,645	15.9	13.8	18.1	426	468,787	19.0	16.9	21.4
Tertiary education	32	47,328	7.0	4.7	10.2	104	148,931	21.9	17.9	26.5	102	132,093	19.4	15.9	23.5
Undassified education	4	3,144	3.5	1.3	8.9	11	13,525	15.0	8.0	26.2	18	22,260	24.6	13.5	40.5

Sociodemographic Characteristics	15 to 24					25 & above				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group										
18-19	43	50,849	18.1	12.6	25.3	61	70,498	25.1	18.9	32.5
20-24	93	112,447	17.8	14.0	22.5	160	228,839	36.3	30.8	42.2
25-29	122	167,291	24.4	20.0	29.6	166	209,913	30.7	25.6	36.2
30-34	122	149,273	22.1	17.7	27.1	197	265,790	39.3	33.5	45.3
35-39	111	149,444	26.3	21.2	32.1	156	196,399	34.5	29.1	40.4
40-44	121	136,622	30.1	25.0	35.7	145	155,606	34.3	28.6	40.5
45-49	111	101,140	27.8	22.9	33.3	138	131,565	36.2	30.3	42.5
50-54	103	94,493	31.0	25.2	37.6	134	115,199	37.8	30.8	45.5
55-59	80	53,048	26.5	20.8	33.2	102	85,202	42.6	35.1	50.5
60-64	52	30,062	24.3	17.5	32.7	65	41,921	33.9	25.2	43.9
65-69	35	15,112	21.0	14.1	30.2	40	23,059	32.0	23.1	42.6
70-74	18	9,077	23.0	11.7	40.1	22	9,990	25.3	14.9	39.5
75+	12	4,589	11.6	6.0	21.2	23	15,616	39.4	24.9	56.1
Ethnicity										
Malays	680	570,721	23.3	21.2	25.6	951	866,582	35.4	32.5	38.5
Chinese	112	167,717	27.6	22.1	33.7	135	200,391	32.9	26.7	39.8
Indians	57	56,035	26.0	19.0	34.6	48	56,321	26.2	17.9	36.6
Other Bumiputras	97	132,930	25.6	20.8	31.0	140	177,977	34.3	28.4	40.7
Others	77	146,043	22.5	17.6	28.3	135	248,327	38.3	31.1	46.1
Marital Status										
Single	265	336,617	22.7	19.4	26.3	377	486,291	32.8	28.9	36.9
Married	719	706,596	24.9	22.9	27.1	966	1,011,682	35.7	32.8	38.7
Widow/widower/divorcee	39	30,233	25.2	16.3	37.0	66	51,625	43.1	32.0	55.0
Education Level										
No formal education	50	57,651	27.3	19.6	36.7	60	81,502	38.6	27.1	51.6
Primary education	268	259,387	26.3	22.6	30.4	347	364,668	37.0	32.7	41.5
Secondary education	563	587,085	23.8	21.6	26.2	792	865,952	35.1	32.1	38.4
Tertiary education	128	148,477	21.9	17.8	26.6	187	202,442	29.8	25.4	34.6
Unclassified education	13	18,947	21.0	10.8	36.8	20	32,553	36.0	21.7	53.3

Sociodemographic Characteristics	Less than 5					5 to 9					10 to 14				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation															
Government/semi government employee	13	13,099	3.3	1.4	7.2	56	53,110	13.2	9.8	17.6	63	73,225	18.2	13.6	23.9
Private employee	91	124,132	5.4	4.1	6.9	245	378,436	16.3	14.0	19.0	321	429,284	18.5	16.2	21.1
Self employed	54	66,984	6.0	4.3	8.5	158	168,655	15.2	12.5	18.2	262	220,407	19.8	16.8	23.2
Unpaid worker/home maker	5	3,189	8.6	3.1	21.7	9	7,236	19.4	8.9	37.4	8	6,006	16.1	7.4	31.6
Retiree	7	4,916	4.7	1.8	11.6	24	16,247	15.5	9.2	25.0	26	17,788	17.0	9.9	27.5
Household Income Group															
Less than RM 1000	42	32,542	7.2	4.9	10.6	80	82,352	18.3	14.1	23.5	92	82,646	18.4	14.0	23.7
RM 1000 - RM 1999	47	59,970	7.1	5.2	9.7	116	138,569	16.4	13.0	20.4	165	152,381	18.0	14.8	21.8
RM 2000 - RM 2999	36	41,190	5.0	3.2	7.6	118	137,903	16.6	13.2	20.8	150	153,155	18.5	15.2	22.3
RM 3000 - RM 3999	28	36,967	5.8	3.8	8.8	71	86,180	13.5	10.5	17.1	96	111,619	17.4	13.9	21.6
RM 4000 - RM 4999	14	17,300	3.4	1.8	6.1	76	93,274	18.2	14.0	23.4	75	104,739	20.4	15.3	26.8
RM 5000 - RM 5999	16	22,245	6.4	3.2	12.3	41	58,653	16.9	11.1	24.9	57	61,506	17.7	12.9	23.9
RM 6000 - RM 6999	6	7,486	3.7	1.2	10.7	18	25,024	12.3	6.9	21.2	31	38,355	18.9	12.3	27.9
RM 7000 - RM 7999	13	20,580	10.8	5.9	19.1	31	42,176	22.1	15.4	30.8	23	24,836	13.0	8.3	19.9
RM 8000 - RM 8999	5	7,537	6.3	2.5	15.2	6	8,424	7.1	3.0	15.6	18	23,271	19.5	11.4	31.3
RM 9000 - RM 9999	2	3,226	8.6	2.1	29.1	4	7,102	18.9	5.9	46.4	6	5,095	13.5	5.2	30.9
RM 10000 & above	9	13,453	5.1	2.3	11.1	31	49,865	18.9	12.9	26.8	46	64,953	24.6	18.0	32.8
Quintile Household Income Group															
Quintile 1	30	23,835	6.9	4.3	10.9	62	67,748	19.6	14.5	25.8	68	57,019	16.5	12.1	22.1
Quintile 2	55	64,222	7.2	5.4	9.7	121	142,824	16.1	12.8	20.1	176	167,070	18.8	15.6	22.5
Quintile 3	45	52,151	5.1	3.5	7.3	147	170,695	16.7	13.7	20.3	179	177,836	17.4	14.5	20.7
Quintile 4	40	50,231	4.5	3.1	6.5	139	173,355	15.6	13.0	18.6	174	224,189	20.2	17.0	23.8
Quintile 5	48	72,057	6.7	4.8	9.4	123	174,900	16.3	13.2	20.0	162	196,441	18.3	15.3	21.9

Sociodemographic Characteristics	15 to 24					25 & above				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation										
Government/semi government employee	99	100,794	25.0	19.6	31.4	157	162,509	40.4	33.5	47.6
Private employee	426	562,981	24.3	21.8	27.0	636	821,290	35.5	32.2	38.9
Self employed	340	274,425	24.7	21.8	27.7	422	382,679	34.4	30.3	38.7
Unpaid worker/home maker	14	8,729	23.4	12.9	38.7	11	12,084	32.4	18.2	50.8
Retiree	45	27,380	26.1	18.3	35.9	51	38,459	36.7	27.3	47.2
Household Income Group										
Less than RM 1000	109	95,184	21.2	16.2	27.2	161	156,852	34.9	28.7	41.7
RM 1000 - RM 1999	204	189,960	22.5	18.8	26.6	288	304,191	36.0	31.4	40.8
RM 2000 - RM 2999	204	207,643	25.0	20.9	29.7	285	289,094	34.9	30.2	39.8
RM 3000 - RM 3999	166	185,979	29.1	24.4	34.3	209	219,371	34.3	29.4	39.5
RM 4000 - RM 4999	96	113,508	22.1	17.4	27.7	143	183,927	35.9	29.4	42.9
RM 5000 - RM 5999	79	87,206	25.2	19.4	31.9	87	117,104	33.8	27.1	41.1
RM 6000 - RM 6999	48	46,365	22.8	16.6	30.5	77	85,978	42.3	33.0	52.2
RM 7000 - RM 7999	39	47,932	25.1	17.2	35.2	51	55,155	28.9	21.6	37.5
RM 8000 - RM 8999	29	33,894	28.4	19.1	40.1	34	46,086	38.7	26.9	51.9
RM 9000 - RM 9999	8	6,898	18.3	7.8	37.2	17	15,331	40.7	22.5	61.9
RM 10000 & above	41	58,877	22.3	15.8	30.6	57	76,510	29.0	20.7	39.0
Quintile Household Income Group										
Quintile 1	89	79,256	22.9	17.1	29.9	132	118,487	34.2	28.0	41.1
Quintile 2	209	194,281	21.9	18.2	26.1	284	318,761	35.9	31.2	40.9
Quintile 3	256	257,988	25.3	21.7	29.2	360	362,610	35.5	31.3	39.9
Quintile 4	240	275,414	24.8	21.3	28.6	335	388,128	34.9	30.6	39.5
Quintile 5	229	266,507	24.9	21.4	28.7	298	361,612	33.7	29.5	38.3

Table 3.1.9: Prevalence of smokeless tobacco used by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,166	2,383,112	10.9	10.1	11.7
State					
Johor	187	265,430	10.4	8.7	12.4
Kedah	249	255,656	17.5	14.7	20.8
Kelantan	216	197,601	17.6	15.0	20.5
Melaka	96	45,120	7.2	5.1	10.2
Negeri Sembilan	91	50,781	6.9	5.1	9.2
Pahang	184	167,794	15.3	12.0	19.3
Penang	96	55,888	4.3	2.0	9.1
Perak	119	163,541	9.1	6.5	12.5
Perlis	149	19,301	11.1	8.4	14.5
Selangor	269	429,136	9.7	8.0	11.7
Terengganu	113	66,415	8.7	6.8	11.1
Sabah & WP Labuan	196	330,954	13.0	10.2	16.5
Sarawak	113	206,474	11.0	8.5	14.2
WP Kuala Lumpur	60	126,106	9.5	6.6	13.6
WP Putrajaya	28	2,913	5.6	3.5	8.7
Location					
Urban	1,116	1,661,883	10.0	9.1	11.0
Rural	1,050	721,229	13.7	12.2	15.3
Sex					
Male	2,079	2,293,469	20.4	18.9	21.9
Female	87	89,643	0.8	0.6	1.2
Age Group					
18-19	146	160,899	6.1	5.0	7.5
20-24	236	350,296	12.3	10.5	14.4
25-29	271	390,909	14.1	12.2	16.2
30-34	258	354,519	13.5	11.6	15.7
35-39	213	256,225	12.4	10.6	14.4
40-44	218	248,787	13.4	11.4	15.8
45-49	189	173,065	10.3	8.8	12.2
50-54	183	157,318	10.4	8.7	12.4
55-59	163	122,008	9.7	8.1	11.5
60-64	100	60,412	6.5	4.9	8.4
65-69	91	51,265	7.4	5.6	9.8
70-74	48	24,074	6.0	3.9	9.1
75+	50	33,335	5.8	4.1	8.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	1,504	1,372,573	12.6	11.6	13.7
Chinese	202	323,318	6.4	5.3	7.7
Indians	94	116,332	7.9	6.0	10.2
Other Bumiputras	206	271,599	11.4	9.2	14.1
Others	160	299,290	14.4	11.4	18.2
Marital Status					
Single	616	823,156	11.3	10.2	12.6
Married	1,457	1,489,558	11.3	10.4	12.3
Widow/widower/divorcee	93	70,398	5.0	3.7	6.8
Education Level					
No formal education	108	103,681	8.6	6.7	11.1
Primary education	496	495,732	11.4	9.9	13.1
Secondary education	1,237	1,358,933	12.8	11.7	13.9
Tertiary education	292	385,564	7.3	6.3	8.4
Unclassified education	29	34,987	9.4	6.0	14.4
Occupation					
Government/semi government employee	209	241,716	12.6	10.4	15.1
Private employee	892	1,168,122	14.4	13.0	15.9
Self employed	654	596,801	17.3	15.5	19.3
Unpaid worker/home maker	42	31,644	1.1	0.8	1.5
Retiree	90	66,600	10.9	8.3	14.3
Household Income Group					
Less than RM 1000	280	267,051	9.0	7.7	10.5
RM 1000 - RM 1999	449	469,301	13.0	11.4	14.9
RM 2000 - RM 2999	453	457,995	12.8	11.3	14.6
RM 3000 - RM 3999	304	344,632	12.3	10.7	14.2
RM 4000 - RM 4999	211	250,192	11.7	9.8	13.8
RM 5000 - RM 5999	149	180,690	10.4	8.0	13.4
RM 6000 - RM 6999	89	106,264	9.4	7.4	12.0
RM 7000 - RM 7999	78	94,470	10.7	8.1	14.0
RM 8000 - RM 8999	49	60,828	8.3	5.8	11.8
RM 9000 - RM 9999	16	14,153	3.8	2.0	7.1
RM 10000 & above	88	137,535	7.2	5.4	9.6
Quintile Household Income Group					
Quintile 1	215	197,854	7.8	6.5	9.2
Quintile 2	468	498,778	13.4	11.7	15.2
Quintile 3	563	569,576	12.6	11.2	14.1
Quintile 4	487	570,982	11.9	10.5	13.5
Quintile 5	433	545,922	8.7	7.6	10.0

Table 3.1.10: Exposure to second-hand smoke at home among all respondents by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	8,164	8,095,569	37.1	35.6	38.6
State					
Johor	642	839,477	32.8	29.2	36.6
Kedah	712	745,476	51.2	46.0	56.3
Kelantan	675	594,655	53.0	47.6	58.3
Melaka	498	218,064	34.9	27.2	43.5
Negeri Sembilan	438	220,108	29.9	25.3	34.9
Pahang	551	473,026	43.2	37.1	49.5
Penang	468	416,998	32.3	23.0	43.4
Perak	469	525,871	29.2	24.2	34.9
Perlis	617	82,912	47.5	41.4	53.6
Selangor	930	1,349,038	30.4	27.2	33.9
Terengganu	652	383,486	50.1	44.7	55.5
Sabah & WP Labuan	737	1,096,147	43.2	39.3	47.2
Sarawak	488	720,643	38.5	33.6	43.8
WP Kuala Lumpur	227	423,339	32.1	26.1	38.7
WP Putrajaya	60	6,328	12.1	8.1	17.7
Location					
Urban	4,091	5,520,270	33.3	31.5	35.2
Rural	4,073	2,575,299	48.8	46.6	51.1
Sex					
Male	4,350	4,713,964	41.9	40.0	43.8
Female	3,814	3,381,605	32.0	30.5	33.5
Age Group					
18-19	915	988,493	37.6	34.8	40.5
20-24	887	1,230,753	43.3	40.2	46.4
25-29	935	1,159,728	41.8	38.9	44.7
30-34	859	1,086,865	41.5	38.2	44.8
35-39	745	793,577	38.3	35.1	41.7
40-44	672	661,763	35.8	32.6	39.1
45-49	694	573,441	34.3	31.6	37.1
50-54	673	477,826	31.7	28.9	34.7
55-59	620	420,737	33.3	30.3	36.4
60-64	448	266,487	28.5	25.1	32.1
65-69	330	186,041	26.9	23.0	31.2
70-74	191	114,799	28.5	23.1	34.5
75+	195	135,061	23.6	19.8	28.0

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	5,601	4,607,386	42.5	40.7	44.3
Chinese	725	1,052,020	20.8	18.4	23.4
Indians	361	370,178	25.1	21.0	29.7
Other Bumiputras	845	1,041,801	43.9	40.0	47.9
Others	632	1,024,185	49.4	44.4	54.3
Marital Status					
Single	2,320	2,859,207	39.3	37.2	41.5
Married	5,298	4,831,553	36.7	35.1	38.3
Widow/widower/divorcee	546	404,809	28.9	25.9	32.1
Education Level					
No formal education	570	525,079	43.9	39.7	48.2
Primary education	2,054	1,807,751	41.6	39.3	43.8
Secondary education	4,291	4,293,008	40.4	38.6	42.3
Tertiary education	1,111	1,314,443	24.9	23.0	26.9
Unclassified education	133	151,877	40.6	33.2	48.5
Occupation					
Government/semi government employee	595	558,678	29.1	26.2	32.2
Private employee	2,521	3,176,659	39.2	36.9	41.5
Self employed	1,787	1,520,067	44.2	41.6	46.7
Unpaid worker/home maker	1,332	1,073,381	37.0	34.7	39.4
Retiree	219	146,218	24.0	20.3	28.3
Household Income Group					
Less than RM 1000	1,176	1,017,418	34.2	31.4	37.1
RM 1000 - RM 1999	1,697	1,539,846	42.8	40.0	45.7
RM 2000 - RM 2999	1,589	1,465,349	41.1	38.2	44.1
RM 3000 - RM 3999	1,117	1,129,910	40.4	36.9	44.0
RM 4000 - RM 4999	781	881,654	41.1	37.0	45.3
RM 5000 - RM 5999	551	611,604	35.3	30.6	40.2
RM 6000 - RM 6999	382	399,246	35.4	30.0	41.1
RM 7000 - RM 7999	291	312,970	35.5	29.6	41.8
RM 8000 - RM 8999	178	201,683	27.6	21.8	34.2
RM 9000 - RM 9999	58	64,783	17.4	11.3	25.9
RM 10000 & above	344	471,108	24.7	20.3	29.7
Quintile Household Income Group					
Quintile 1	939	811,639	31.8	28.8	35.0
Quintile 2	1,750	1,614,125	43.4	40.7	46.1
Quintile 3	1,977	1,805,040	39.9	37.3	42.6
Quintile 4	1,801	1,935,934	40.5	37.6	43.6
Quintile 5	1,697	1,928,832	30.8	28.2	33.5

Table 3.1.11: Exposure to second-hand smoke at home among non-smokers by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	4,731	4,365,163	25.9	24.6	27.2
State					
Johor	335	415,856	20.9	18.0	24.0
Kedah	395	418,852	39.1	33.9	44.6
Kelantan	408	349,717	41.2	35.9	46.8
Melaka	323	136,099	26.2	19.3	34.5
Negeri Sembilan	230	112,366	19.3	15.6	23.6
Pahang	294	247,060	30.3	24.8	36.4
Penang	284	241,695	23.2	15.8	32.7
Perak	247	251,292	17.7	14.3	21.8
Perlis	391	52,942	38.9	32.7	45.5
Selangor	544	744,222	21.2	18.7	24.1
Terengganu	414	239,100	40.2	34.9	45.7
Sabah & WP Labuan	425	560,878	30.9	27.6	34.4
Sarawak	284	378,121	27.1	22.6	32.1
WP Kuala Lumpur	125	213,293	20.0	15.6	25.2
WP Putrajaya	32	3,668	8.0	4.6	13.5
Location					
Urban	2,367	2,993,044	22.9	21.5	24.5
Rural	2,364	1,372,119	36.0	33.9	38.3
Sex					
Male	1,019	1,099,831	17.1	15.6	18.8
Female	3,712	3,265,332	31.3	29.8	32.8
Age Group					
18-19	688	740,571	32.5	29.7	35.3
20-24	484	654,763	30.8	27.8	34.0
25-29	511	574,426	28.6	25.9	31.5
30-34	441	519,835	28.0	25.0	31.3
35-39	397	355,942	24.5	21.5	27.7
40-44	358	298,759	21.9	19.3	24.8
45-49	373	283,602	22.3	19.7	25.1
50-54	389	249,065	21.2	18.6	24.0
55-59	373	242,936	23.3	20.6	26.1
60-64	269	156,982	19.6	16.7	22.8
65-69	196	116,471	19.5	15.7	23.9
70-74	120	78,381	22.0	16.6	28.5
75+	132	93,428	18.0	14.5	22.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	3,273	2,532,768	31.0	29.3	32.7
Chinese	416	575,076	13.2	11.4	15.4
Indians	214	218,389	17.7	14.3	21.7
Other Bumiputras	503	597,248	33.9	30.2	37.8
Others	325	441,683	32.7	28.3	37.5
Marital Status					
Single	1,291	1,500,228	27.0	25.1	29.1
Married	3,044	2,571,861	25.6	24.3	27.0
Widow/widower/divorcee	396	293,074	23.2	20.3	26.3
Education Level					
No formal education	387	307,133	32.7	28.8	36.9
Primary education	1,197	945,122	29.0	27.0	31.1
Secondary education	2,385	2,248,599	28.5	26.8	30.3
Tertiary education	691	791,798	17.6	15.9	19.5
Unclassified education	70	72,463	26.4	20.0	34.0
Occupation					
Government/semi government employee	298	248,012	16.8	14.4	19.5
Private employee	1,096	1,288,740	23.3	21.4	25.3
Self employed	695	562,906	25.3	23.0	27.8
Unpaid worker/home maker	1,282	1,033,222	36.3	34.0	38.7
Retiree	97	63,919	13.0	10.1	16.6
Household Income Group					
Less than RM 1000	716	579,326	23.8	21.4	26.4
RM 1000 - RM 1999	960	783,935	29.6	27.0	32.4
RM 2000 - RM 2999	893	765,654	28.9	26.2	31.9
RM 3000 - RM 3999	655	631,009	30.1	26.7	33.8
RM 4000 - RM 4999	451	476,027	30.1	26.3	34.2
RM 5000 - RM 5999	323	339,566	25.1	21.1	29.6
RM 6000 - RM 6999	224	214,378	23.9	19.6	28.9
RM 7000 - RM 7999	168	168,541	25.1	19.8	31.2
RM 8000 - RM 8999	103	108,795	18.0	13.6	23.5
RM 9000 - RM 9999	35	38,966	11.7	6.9	19.3
RM 10000 & above	203	258,967	16.2	13.1	19.9
Quintile Household Income Group					
Quintile 1	580	476,981	22.4	19.9	25.2
Quintile 2	987	815,263	29.9	27.4	32.5
Quintile 3	1,114	947,559	28.0	25.6	30.6
Quintile 4	1,050	1,068,635	30.0	27.2	32.9
Quintile 5	1,000	1,056,725	20.9	18.9	23.1

Table 3.1.12: Exposure to second-hand smoke at work among all respondents by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,452	2,835,139	37.3	35.3	39.2
State					
Johor	247	359,913	36.4	31.5	41.6
Kedah	74	86,871	32.1	24.3	40.9
Kelantan	160	156,814	50.2	44.0	56.5
Melaka	135	82,160	36.7	27.9	46.5
Negeri Sembilan	129	86,179	28.4	21.8	36.1
Pahang	91	85,726	22.5	17.0	29.2
Penang	193	154,748	30.3	23.9	37.5
Perak	96	149,165	29.8	23.0	37.7
Perlis	115	17,518	37.7	29.4	46.8
Selangor	455	747,864	39.8	35.6	44.2
Terengganu	165	98,015	45.3	37.8	53.0
Sabah & WP Labuan	186	303,860	41.6	35.6	47.9
Sarawak	132	231,802	43.5	33.5	54.1
WP Kuala Lumpur	134	261,397	38.8	32.8	45.2
WP Putrajaya	140	13,106	33.0	25.5	41.5
Location					
Urban	1,670	2,391,889	36.5	34.3	38.7
Rural	782	443,249	42.3	38.3	46.4
Sex					
Male	1,644	1,997,173	48.1	45.4	50.9
Female	808	837,966	24.2	22.2	26.4
Age Group					
18-19	112	141,653	46.3	39.3	53.4
20-24	315	429,433	37.4	32.9	42.0
25-29	381	512,101	37.1	33.1	41.2
30-34	375	466,352	36.0	32.0	40.3
35-39	316	361,199	36.2	32.2	40.4
40-44	244	285,510	37.3	32.6	42.3
45-49	264	255,881	37.5	33.2	42.0
50-54	217	185,891	35.3	30.6	40.4
55-59	147	142,830	43.7	37.5	50.1
60-64	42	30,316	29.7	20.8	40.5
65-69	24	15,231	29.1	17.9	43.5
70-74	12	7,651	41.7	20.2	66.8
75+	3	1,092	13.2	3.0	42.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	1,538	1,430,327	37.8	35.5	40.2
Chinese	406	680,772	32.9	29.6	36.4
Indians	161	173,874	35.5	29.5	42.1
Other Bumiputras	189	262,292	40.9	33.4	48.7
Others	158	287,874	46.0	37.8	54.4
Marital Status					
Single	688	995,920	38.4	35.4	41.6
Married	1,667	1,751,885	36.8	34.7	39.0
Widow/widower/divorcee	97	87,334	33.7	27.5	40.5
Education Level					
No formal education	48	65,045	52.7	39.2	65.9
Primary education	333	417,057	53.2	48.3	58.1
Secondary education	1,263	1,392,075	40.9	38.1	43.7
Tertiary education	785	925,411	28.8	26.6	31.2
Unclassified education	23	35,551	43.8	27.4	61.8
Occupation					
Government/semi government employee	488	426,037	29.3	26.2	32.7
Private employee	1,433	1,875,295	37.7	35.3	40.1
Self employed	495	491,427	46.4	42.3	50.6
Unpaid worker/home maker	9	10,066	27.1	12.9	48.2
Retiree	3	2,233	21.7	6.0	54.4
Household Income Group					
Less than RM 1000	105	124,732	40.3	32.7	48.4
RM 1000 - RM 1999	329	334,379	39.1	34.8	43.5
RM 2000 - RM 2999	430	469,741	42.7	38.7	46.9
RM 3000 - RM 3999	340	394,037	38.1	33.8	42.6
RM 4000 - RM 4999	286	346,250	39.8	35.0	44.8
RM 5000 - RM 5999	237	281,580	35.1	29.8	40.9
RM 6000 - RM 6999	162	187,634	34.7	28.9	41.0
RM 7000 - RM 7999	139	149,428	35.6	29.4	42.3
RM 8000 - RM 8999	111	122,180	33.6	27.6	40.2
RM 9000 - RM 9999	51	47,201	23.1	15.9	32.2
RM 10000 & above	262	377,977	34.0	29.8	38.4
Quintile Household Income Group					
Quintile 1	62	72,822	35.0	26.9	44.2
Quintile 2	325	347,181	39.8	35.4	44.4
Quintile 3	536	588,960	41.5	38.0	45.0
Quintile 4	620	740,488	39.5	36.0	43.1
Quintile 5	909	1,085,688	33.6	31.1	36.2

Table 3.1.13: Exposure to second-hand smoke at home among non-smokers by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,591	1,782,610	30.4	28.5	32.4
State					
Johor	147	213,854	28.9	24.5	33.6
Kedah	36	40,445	20.7	14.5	28.8
Kelantan	90	87,554	39.4	33.4	45.7
Melaka	94	58,982	31.8	23.8	41.1
Negeri Sembilan	80	60,085	24.3	17.6	32.4
Pahang	54	51,901	18.2	12.6	25.6
Penang	139	108,766	26.3	19.4	34.6
Perak	57	90,843	23.1	17.1	30.4
Perlis	75	10,954	30.2	22.3	39.4
Selangor	313	504,635	33.7	29.3	38.4
Terengganu	118	67,199	38.4	30.9	46.4
Sabah & WP Labuan	120	175,077	34.3	28.7	40.5
Sarawak	74	117,927	30.9	22.1	41.2
WP Kuala Lumpur	94	185,091	34.2	27.9	41.2
WP Putrajaya	100	9,299	27.3	20.1	36.0
Location					
Urban	1,082	1,520,438	29.8	27.7	32.1
Rural	509	262,172	34.2	30.6	38.1
Sex					
Male	804	971,967	39.7	36.5	43.0
Female	787	810,643	23.7	21.7	25.9
Age Group					
18-19	73	95,771	39.4	31.9	47.5
20-24	208	270,565	30.4	25.7	35.6
25-29	247	323,384	31.0	26.8	35.5
30-34	239	290,942	30.0	25.8	34.6
35-39	191	193,956	26.8	22.8	31.1
40-44	157	176,440	29.7	25.0	34.9
45-49	171	167,415	31.1	26.5	36.2
50-54	144	119,888	28.1	23.1	33.8
55-59	106	105,608	38.5	31.9	45.6
60-64	28	21,218	25.1	15.8	37.4
65-69	19	11,724	24.0	13.7	38.7
70-74	7	5,131	32.5	12.4	62.1
75+	1	567	7.3	0.9	41.7

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	965	853,412	30.6	28.2	33.0
Chinese	289	487,640	27.5	24.2	31.0
Indians	114	118,773	29.3	23.0	36.5
Other Bumiputras	119	152,444	32.5	26.1	39.6
Others	104	170,341	40.5	32.7	48.7
Marital Status					
Single	438	634,634	31.5	28.3	34.9
Married	1,073	1,079,623	29.9	27.7	32.1
Widow/widower/divorcee	80	68,353	29.7	23.7	36.5
Education Level					
No formal education	34	37,204	43.9	31.3	57.3
Primary education	202	228,173	43.0	37.4	48.8
Secondary education	748	810,864	33.1	30.2	36.1
Tertiary education	597	695,686	25.4	23.1	27.8
Unclassified education	10	10,682	22.6	10.6	41.8
Occupation					
Government/semi government employee	348	299,021	25.5	22.4	28.9
Private employee	929	1,190,307	31.1	28.7	33.5
Self employed	288	260,101	34.4	30.2	38.9
Unpaid worker/home maker	7	7,742	22.7	9.5	45.0
Retiree					
Household Income Group					
Less than RM 1000	70	75,252	32.1	24.8	40.5
RM 1000 - RM 1999	195	191,863	31.0	26.3	36.2
RM 2000 - RM 2999	275	290,731	36.0	31.6	40.6
RM 3000 - RM 3999	215	242,286	30.6	26.1	35.5
RM 4000 - RM 4999	166	179,470	29.2	24.5	34.3
RM 5000 - RM 5999	158	177,016	28.1	22.9	34.0
RM 6000 - RM 6999	105	126,240	29.1	23.5	35.4
RM 7000 - RM 7999	94	93,762	29.4	22.6	37.2
RM 8000 - RM 8999	83	90,150	29.6	23.2	36.8
RM 9000 - RM 9999	40	36,898	20.4	13.3	30.0
RM 10000 & above	190	278,944	30.2	25.8	35.0
Quintile Household Income Group					
Quintile 1	45	50,957	30.7	22.6	40.3
Quintile 2	189	191,943	30.8	25.9	36.1
Quintile 3	342	361,679	34.7	30.8	38.8
Quintile 4	380	429,912	30.7	27.1	34.5
Quintile 5	635	748,119	28.5	25.9	31.2

Table 3.1.14: Current smokers who made a quit attempt in the past 12 months by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,203	2,607,235	52.3	49.9	54.8
State					
Johor	208	287,328	50.6	41.9	59.3
Kedah	130	135,554	35.3	28.7	42.5
Kelantan	158	149,010	53.7	46.1	61.2
Melaka	88	36,251	34.9	24.5	47.1
Negeri Sembilan	131	74,107	48.0	37.7	58.6
Pahang	148	127,474	45.4	37.0	54.0
Penang	121	104,926	42.4	27.3	59.2
Perak	126	174,026	46.7	39.0	54.5
Perlis	81	11,386	29.4	19.9	41.1
Selangor	344	535,968	57.7	52.1	63.2
Terengganu	144	89,884	52.8	43.5	62.0
Sabah & WP Labuan	249	422,249	58.6	51.4	65.4
Sarawak	171	297,514	62.4	53.7	70.4
WP Kuala Lumpur	78	158,723	62.8	53.8	71.1
WP Putrajaya	26	2,836	43.5	30.7	57.2
Location					
Urban	1,195	1,852,774	52.8	49.7	55.9
Rural	1,008	754,460	51.2	47.3	55.1
Sex					
Male	2,135	2,522,235	52.1	49.6	54.6
Female	68	84,999	59.2	48.3	69.3
Age Group					
18-19	164	194,192	55.7	48.9	62.3
20-24	274	397,925	55.5	49.5	61.4
25-29	294	437,269	56.8	51.2	62.1
30-34	262	392,343	51.0	45.6	56.4
35-39	221	297,554	48.2	42.2	54.3
40-44	210	249,638	51.1	45.1	57.2
45-49	209	211,041	52.9	47.2	58.5
50-54	196	181,635	54.8	48.3	61.2
55-59	147	108,384	49.2	42.1	56.4
60-64	83	52,195	40.1	31.9	48.9
65-69	80	48,827	52.3	41.5	62.9
70-74	33	18,827	41.9	28.3	56.9
75+	30	17,406	33.1	20.8	48.3

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,448	1,396,133	52.1	49.2	55.0
Chinese	209	334,829	46.8	40.5	53.3
Indians	112	148,284	60.7	50.9	69.8
Other Bumiputras	276	394,958	64.4	57.6	70.6
Others	158	333,031	45.7	38.3	53.4
Marital Status					
Single	677	917,153	53.6	49.6	57.6
Married	1,444	1,616,976	51.6	48.8	54.4
Widow/widower/divorcee	82	73,106	53.5	44.0	62.8
Education Level					
No formal education	90	105,636	41.2	31.3	52.0
Primary education	472	508,826	46.4	42.2	50.7
Secondary education	1,246	1,465,702	53.6	50.6	56.5
Tertiary education	369	487,237	62.0	57.0	66.8
Unclassified education	25	39,735	40.0	25.4	56.6
Occupation					
Government/semi government employee	232	263,544	59.2	52.8	65.2
Private employee	973	1,380,081	53.7	50.2	57.2
Self employed	606	596,194	48.9	45.0	52.8
Unpaid worker/home maker	37	35,391	58.0	43.5	71.3
Retiree	73	49,155	42.7	33.4	52.5
Household Income Group					
Less than RM 1000	268	260,244	48.1	42.0	54.3
RM 1000 - RM 1999	414	462,176	48.6	43.8	53.4
RM 2000 - RM 2999	438	495,436	53.9	49.0	58.8
RM 3000 - RM 3999	317	390,762	55.6	50.3	60.8
RM 4000 - RM 4999	225	287,521	51.0	44.4	57.6
RM 5000 - RM 5999	156	206,236	53.3	45.9	60.6
RM 6000 - RM 6999	104	128,206	55.9	46.8	64.7
RM 7000 - RM 7999	86	109,232	51.8	41.1	62.4
RM 8000 - RM 8999	54	75,750	59.0	47.6	69.6
RM 9000 - RM 9999	23	22,689	56.1	37.5	73.1
RM 10000 & above	118	168,982	54.6	42.7	66.0
Quintile Household Income Group					
Quintile 1	215	194,959	46.6	40.2	53.0
Quintile 2	420	477,944	48.0	43.3	52.8
Quintile 3	546	623,486	54.8	50.3	59.2
Quintile 4	515	655,732	53.7	49.4	58.0
Quintile 5	507	655,114	54.2	49.6	58.7

Table 3.1.15: Current smokers who visited a healthcare provider in the past 12 months by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	443	481,659	9.7	8.4	11.1
State					
Johor	49	62,829	11.1	8.2	14.9
Kedah	24	27,598	7.2	4.3	11.7
Kelantan	65	51,325	18.5	12.9	25.9
Melaka	34	16,065	15.2	10.1	22.3
Negeri Sembilan	22	8,481	5.5	3.2	9.2
Pahang	17	14,826	5.3	3.3	8.4
Penang	37	35,683	14.4	8.8	22.7
Perak	23	27,924	7.4	3.6	14.6
Perlis	11	1,278	3.3	1.7	6.4
Selangor	50	79,557	8.6	5.9	12.3
Terengganu	17	12,266	7.2	3.4	14.8
Sabah & WP Labuan	53	89,597	12.4	8.1	18.5
Sarawak	24	37,933	8.0	5.3	11.9
WP Kuala Lumpur	9	15,508	6.1	3.1	11.8
WP Putrajaya	8	790	12.1	5.8	23.5
Location					
Urban	226	320,534	9.1	7.7	10.8
Rural	217	161,126	10.9	8.7	13.7
Sex					
Male	425	458,935	9.5	8.2	10.9
Female	18	22,724	15.8	8.9	26.5
Age Group					
18-19	9	10,172	2.9	1.2	7.1
20-24	29	45,129	6.3	4.2	9.3
25-29	39	61,908	8.0	5.5	11.7
30-34	51	83,796	10.9	7.7	15.2
35-39	46	59,016	9.6	6.7	13.5
40-44	37	39,006	8.0	5.6	11.4
45-49	50	42,921	10.8	7.5	15.2
50-54	55	50,736	15.3	10.9	21.1
55-59	51	43,860	19.9	14.3	27.0
60-64	29	17,192	13.0	8.1	20.1
65-69	23	15,830	17.0	9.9	27.5
70-74	12	4,340	9.7	4.4	19.7
75+	12	7,752	14.7	7.9	25.8
Sociodemographic	**Count**	**Estimated**	**Prevalence**	**95% CI**	

Characteristics	Population		(%)	Lower	Upper
Ethnicity					
Malays	299	250,696	9.4	8.0	10.9
Chinese	39	64,367	9.0	6.2	12.9
Indians	18	26,956	11.0	5.7	20.3
Other Bumiputras	49	58,095	9.5	6.9	12.8
Others	38	81,545	11.2	7.1	17.2
Marital Status					
Single	77	107,606	6.3	4.8	8.2
Married	344	352,397	11.2	9.6	13.2
Widow/widower/divorcee	22	21,657	15.8	9.3	25.7
Education Level					
No formal education	27	32,049	12.4	7.2	20.5
Primary education	126	136,311	12.4	9.6	15.9
Secondary education	214	221,659	8.1	6.8	9.7
Tertiary education	73	88,846	11.3	8.6	14.7
Unclassified education	3	2,795	2.8	0.8	9.6
Occupation					
Government/semi government employee	53	58,491	13.1	9.7	17.6
Private employee	162	213,342	8.3	6.6	10.4
Self employed	125	120,434	9.9	7.8	12.5
Unpaid worker/home maker	13	12,620	20.7	11.1	35.3
Retiree	24	14,243	12.1	7.6	18.9
Household Income Group					
Less than RM 1000	65	55,539	10.3	7.5	13.9
RM 1000 - RM 1999	102	109,451	11.5	8.9	14.6
RM 2000 - RM 2999	79	85,821	9.3	6.9	12.6
RM 3000 - RM 3999	50	53,458	7.6	5.5	10.5
RM 4000 - RM 4999	38	44,509	7.9	5.2	11.9
RM 5000 - RM 5999	38	44,458	11.5	7.5	17.3
RM 6000 - RM 6999	21	28,294	12.4	7.7	19.5
RM 7000 - RM 7999	13	14,267	6.8	3.8	11.9
RM 8000 - RM 8999	13	16,249	12.7	7.1	21.6
RM 9000 - RM 9999	1	1,200	3.0	0.4	17.7
RM 10000 & above	23	28,412	9.2	5.6	14.6
Quintile Household Income Group					
Quintile 1	55	48,061	11.5	8.2	15.9
Quintile 2	100	104,960	10.5	8.1	13.5
Quintile 3	101	109,879	9.7	7.5	12.4
Quintile 4	85	96,489	7.9	5.8	10.8
Quintile 5	102	122,270	10.1	8.0	12.7

Table 3.1.16: Current smokers who advised to quit smoking by a healthcare provider in the past 12 months by socio-demographic characteristics

ociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	346	363,105	75.4	68.6	81.1
State					
Johor	37	44,721	71.2	55.5	83.0
Kedah	18	18,501	67.0	39.0	86.6
Kelantan	53	40,605	79.1	65.5	88.3
Melaka	20	11,151	69.4	44.3	86.6
Negeri Sembilan	18	7,587	89.5	69.1	97.0
Pahang	14	12,569	84.8	59.0	95.6
Penang	28	20,157	56.5	24.0	84.2
Perak	21	24,694	88.4	60.3	97.5
Perlis	9	899	70.3	31.9	92.3
Selangor	44	67,986	85.5	65.1	94.9
Terengganu	16	11,391	92.9	58.8	99.2
Sabah & WP Labuan	39	66,419	74.1	54.9	87.1
Sarawak	18	25,660	67.6	38.7	87.4
WP Kuala Lumpur	6	10,232	66.0	32.3	88.8
WP Putrajaya	5	533	67.5	28.6	91.5
Location					
Urban	175	236,935	73.9	64.8	81.3
Rural	171	126,169	78.3	68.0	86.0
Sex					
Male	334	349,395	76.1	69.2	81.9
Female	12	13,710	60.3	29.4	84.8
Age Group					
18-19	8	9,180	90.2	50.5	98.8
20-24	19	26,671	59.1	36.9	78.2
25-29	24	38,307	61.9	44.1	77.0
30-34	37	61,038	72.8	54.5	85.7
35-39	34	42,976	72.8	53.2	86.3
40-44	29	29,197	74.9	55.3	87.8
45-49	40	36,008	83.9	68.1	92.7
50-54	47	44,414	87.5	73.3	94.7
55-59	46	37,673	85.9	62.0	95.8
60-64	24	14,713	85.6	59.6	96.0
65-69	20	14,133	89.3	65.2	97.4
70-74	8	2,662	61.3	24.6	88.5
75+	10	6,134	79.1	42.8	95.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	237	191,421	76.4	67.5	83.4
Chinese	25	43,217	67.1	46.6	82.7
Indians	16	25,156	93.3	73.5	98.6
Other Bumiputras	37	42,217	72.7	55.4	85.0
Others	31	61,094	74.9	51.6	89.3
Marital Status					
Single	54	71,911	66.8	52.4	78.7
Married	277	278,641	79.1	70.8	85.5
Widow/widower/divorcee	15	12,553	58.0	28.5	82.7
Education Level					
No formal education	22	23,187	72.4	43.0	90.1
Primary education	102	110,835	81.3	69.2	89.4
Secondary education	164	156,285	70.5	60.9	78.6
Tertiary education	55	70,002	78.8	65.5	87.9
Unclassified education	3	2,795	100.0	-	-
Occupation					
Government/semi government employee	44	48,030	82.1	65.0	91.9
Private employee	119	155,277	72.8	62.0	81.4
Self employed	99	90,561	75.2	61.9	85.0
Unpaid worker/home maker	5	4,184	33.2	11.0	66.6
Retiree	24	14,243	100.0	-	-
Household Income Group					
Less than RM 1000	53	44,472	80.1	62.1	90.8
RM 1000 - RM 1999	85	91,625	83.7	72.9	90.7
RM 2000 - RM 2999	60	62,372	72.7	57.1	84.2
RM 3000 - RM 3999	34	39,023	73.0	54.2	86.1
RM 4000 - RM 4999	30	33,812	76.0	54.8	89.2
RM 5000 - RM 5999	27	23,375	52.6	30.1	74.1
RM 6000 - RM 6999	17	23,096	81.6	56.9	93.7
RM 7000 - RM 7999	13	14,267	100.0	-	-
RM 8000 - RM 8999	10	12,767	78.6	44.7	94.3
RM 9000 - RM 9999	1	1,200	100.0	-	-
RM 10000 & above	16	17,095	60.2	39.5	77.8
Quintile Household Income Group					
Quintile 1	44	37,691	78.4	58.3	90.4
Quintile 2	82	86,437	82.4	71.3	89.8
Quintile 3	79	84,285	76.7	63.9	86.0
Quintile 4	62	66,729	69.2	52.5	82.0
Quintile 5	79	87,961	71.9	59.1	82.0

Table 3.1.17: Noticing anti-cigarette smoking information during the last 30 days in newspapers or magazine by socio-demographic characteristics

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	13,066	13,649,297	69.6	68.2	71.0	3,188	3,552,770	73.2	70.9	75.4	9,878	10,096,527	68.5	66.9	70.0
State															
Johor	1,227	1,634,559	70.9	65.1	76.0	301	419,788	75.3	67.4	81.8	925	1,212,587	69.4	63.4	74.9
Kedah	681	725,181	56.5	49.7	63.1	212	235,287	62.9	54.7	70.4	469	489,894	53.9	46.3	61.3
Kelantan	952	840,213	80.9	76.6	84.6	230	218,416	79.5	72.3	85.3	722	621,797	81.4	76.8	85.2
Melaka	945	467,844	79.6	74.4	84.1	164	79,485	75.5	63.5	84.5	781	388,359	80.5	74.7	85.3
Negeri Sembilan	649	372,546	61.9	55.5	67.9	189	102,101	66.4	55.8	75.7	460	270,445	60.3	53.9	66.4
Pahang	694	575,068	60.2	54.4	65.8	213	188,743	67.6	56.6	77.0	481	386,325	57.2	51.2	62.9
Penang	1,015	885,290	73.2	67.3	78.5	210	194,913	78.8	62.7	89.2	804	690,262	71.8	65.8	77.1
Perak	949	1,300,918	82.7	78.7	86.1	234	306,581	85.3	78.4	90.3	715	994,337	82.0	77.4	85.9
Perlis	731	97,863	59.0	48.5	68.7	165	23,416	61.0	49.7	71.1	566	74,447	58.4	47.6	68.4
Selangor	2,038	3,033,587	71.2	68.3	73.9	452	698,077	76.5	71.8	80.5	1,586	2,335,510	69.8	66.7	72.7
Terengganu	663	402,091	58.7	50.4	66.6	193	118,493	69.7	60.5	77.5	470	283,597	55.1	46.5	63.5
Sabah & WP Labuan	1,058	1,542,505	71.2	67.7	74.5	278	463,473	69.9	63.4	75.6	780	1,079,032	71.8	67.8	75.6
Sarawak	849	1,241,353	73.2	68.9	77.1	215	357,767	75.5	65.0	83.6	634	883,585	72.3	68.0	76.2
WP Kuala Lumpur	262	496,658	48.3	39.8	56.9	70	140,226	58.9	46.0	70.6	192	356,432	45.1	36.6	53.9
WP Putrajaya	355	35,921	73.7	69.3	77.6	62	6,004	92.1	83.1	96.5	293	29,917	70.8	66.6	74.7
Location															
Urban	7,730	10,569,449	70.3	68.6	72.0	1,751	2,615,941	76.0	73.4	78.4	5,978	7,951,324	68.6	66.8	70.4
Rural	5,338	3,082,148	67.4	64.8	69.9	1,437	936,829	66.3	61.7	70.7	3,900	2,145,203	67.9	65.3	70.4
Sex															
Male	6,540	7,273,027	70.6	68.9	72.4	3,114	3,462,996	73.3	71.0	75.5	3,424	3,807,732	68.4	66.2	70.4
Female	6,528	6,378,569	68.5	66.8	70.2	74	89,773	68.2	55.7	78.6	6,454	6,288,796	68.5	66.8	70.2

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
18-19	1,376	1,595,156	68.1	65.4	70.7	207	249,885	72.4	65.6	78.4	1,168	1,345,155	67.4	64.4	70.2
20-24	1,205	1,827,466	70.7	67.9	73.4	347	507,273	72.9	67.5	77.7	857	1,318,009	69.9	66.5	73.1
25-29	1,401	1,771,933	69.9	66.8	72.7	383	511,985	68.8	63.0	74.1	1,018	1,259,948	70.3	66.8	73.6
30-34	1,372	1,685,249	69.8	66.5	73.0	407	536,292	71.4	66.1	76.2	965	1,148,958	69.1	65.2	72.8
35-39	1,243	1,388,349	72.6	69.6	75.4	343	459,391	75.6	70.4	80.1	900	928,957	71.2	67.7	74.5
40-44	1,187	1,257,207	74.3	71.3	77.1	315	364,367	76.0	70.5	80.7	872	892,839	73.6	70.3	76.7
45-49	1,200	1,090,603	71.4	68.2	74.4	312	295,533	74.8	69.3	79.6	888	795,070	70.2	66.6	73.6
50-54	1,195	954,668	71.4	68.5	74.2	293	244,093	77.7	71.0	83.3	902	710,575	69.5	66.2	72.6
55-59	1,007	776,732	69.3	66.0	72.4	210	154,467	72.1	65.4	78.0	797	622,265	68.6	65.0	72.0
60-64	759	530,115	66.4	62.3	70.2	149	94,438	76.3	66.9	83.6	610	435,677	64.6	60.1	68.8
65-69	548	384,901	66.1	61.4	70.6	125	76,423	84.4	76.9	89.7	423	308,478	62.8	57.4	67.8
70-74	316	184,723	56.3	49.9	62.6	52	30,545	69.4	54.7	81.0	264	154,178	54.3	47.4	61.1
75+	259	204,495	47.5	42.0	53.1	45	28,077	56.4	40.8	70.7	214	176,418	46.4	40.6	52.3
Ethnicity															
Malays	8,347	7,059,681	71.5	69.7	73.3	2,184	2,026,596	76.3	73.7	78.7	6,162	5,032,969	69.8	67.8	71.7
Chinese	2,024	3,078,649	68.3	65.1	71.3	323	512,472	74.7	68.8	79.8	1,700	2,563,993	67.1	63.8	70.3
Indians	907	937,805	71.4	67.6	74.9	164	189,633	80.0	73.8	85.1	743	748,172	69.5	65.3	73.4
Other Bumiputras	1,173	1,532,779	72.8	69.6	75.9	329	455,541	75.8	69.7	81.1	844	1,077,238	71.6	67.9	75.1
Others	617	1,042,682	57.6	52.5	62.6	188	368,527	54.7	46.5	62.6	429	674,155	59.4	54.0	64.5
Marital Status															
Single	3,470	4,558,927	69.4	67.4	71.3	896	1,198,662	71.7	67.7	75.3	2,572	3,357,966	68.6	66.4	70.8
Married	8,694	8,392,419	70.5	68.9	72.2	2,185	2,266,457	74.3	71.7	76.8	6,509	6,125,963	69.2	67.4	71.0
Widow/widower /divorcee	904	700,249	61.5	57.8	65.1	107	87,651	66.4	56.0	75.3	797	612,599	60.9	56.9	64.7
Education Level															
No formal education	517	446,962	48.3	44.1	52.4	108	128,631	57.0	46.8	66.5	409	318,331	45.5	41.5	49.5
Primary education	2,740	2,468,611	64.7	62.3	67.0	701	705,290	67.1	62.3	71.5	2,039	1,763,321	63.8	61.1	66.4
Secondary education	6,648	6,965,524	71.7	69.9	73.4	1,861	2,072,008	76.5	73.7	79.1	4,785	4,891,217	69.8	67.8	71.7
Tertiary education	3,009	3,589,537	74.5	72.5	76.5	475	588,326	76.3	72.2	79.9	2,534	3,001,211	74.2	71.9	76.3
Unclassified education	148	176,042	55.7	47.0	64.0	40	54,834	57.9	41.8	72.5	108	121,208	54.7	45.2	63.9

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation															
Government/semi government employee	1,584	1,399,330	78.1	75.3	80.6	354	356,441	80.8	76.0	84.9	1,230	1,042,889	77.2	74.0	80.1
Private employee	4,031	5,283,181	70.8	68.7	72.8	1,345	1,785,924	71.8	68.4	75.1	2,685	3,495,073	70.3	67.9	72.5
Self employed	2,428	2,192,126	70.0	67.6	72.4	947	871,924	72.8	69.1	76.2	1,481	1,320,202	68.3	65.4	71.1
Unpaid worker/home maker	1,984	1,772,396	69.2	66.6	71.7	44	44,601	74.9	61.0	85.1	1,940	1,727,795	69.1	66.4	71.6
Retiree	489	382,287	71.7	67.0	75.9	131	93,766	83.6	75.4	89.5	358	288,521	68.5	63.1	73.4
Household Income Group															
Less than RM 1000	1,831	1,588,399	63.6	60.8	66.4	385	379,295	74.2	68.5	79.2	1,446	1,209,104	60.9	58.0	63.8
RM 1000 - RM 1999	2,233	2,115,125	66.4	63.8	68.9	615	630,025	68.7	63.7	73.2	1,617	1,484,985	65.4	62.6	68.2
RM 2000 - RM 2999	2,301	2,329,445	72.3	69.9	74.7	633	674,730	75.3	71.0	79.2	1,668	1,654,715	71.2	68.6	73.8
RM 3000 - RM 3999	1,735	1,824,190	70.8	68.1	73.4	437	479,425	69.4	64.0	74.3	1,298	1,344,765	71.4	68.4	74.1
RM 4000 - RM 4999	1,277	1,485,210	74.9	71.7	77.9	354	442,419	79.6	74.0	84.2	923	1,042,792	73.1	69.4	76.6
RM 5000 - RM 5999	941	1,068,914	69.0	65.0	72.8	225	277,157	73.6	65.8	80.1	716	791,757	67.5	63.0	71.7
RM 6000 - RM 6999	648	725,292	70.0	65.6	74.2	144	156,074	70.1	61.4	77.6	503	567,035	70.0	65.2	74.3
RM 7000 - RM 7999	562	607,833	73.1	68.4	77.3	134	159,709	75.8	65.9	83.6	428	448,123	72.2	67.0	76.8
RM 8000 - RM 8999	420	500,069	73.6	67.1	79.2	76	96,134	76.0	62.6	85.8	344	403,935	73.0	66.4	78.8
RM 9000 - RM 9999	218	241,152	70.4	62.8	77.1	31	30,046	74.3	52.8	88.2	187	211,106	69.9	61.9	76.9
RM 10000 & above	902	1,165,967	68.3	64.1	72.2	154	227,756	74.4	66.0	81.3	748	938,210	67.0	62.4	71.3
Quintile Household Income Group															
Quintile 1	1,542	1,318,731	62.8	59.8	65.6	304	290,514	74.6	67.8	80.3	1,238	1,028,218	60.1	56.9	63.1
Quintile 2	2,299	2,209,202	66.7	64.1	69.1	633	665,176	69.1	64.4	73.5	1,665	1,543,910	65.7	62.8	68.4
Quintile 3	2,902	2,933,694	72.1	69.9	74.2	787	835,325	75.3	71.4	78.9	2,115	2,098,369	70.9	68.6	73.2
Quintile 4	2,867	3,164,626	71.6	69.3	73.7	756	883,675	73.4	69.4	77.2	2,111	2,280,951	70.8	68.3	73.2
Quintile 5	3,458	4,025,344	70.7	68.4	72.9	708	878,080	73.7	69.5	77.6	2,749	3,145,080	69.8	67.4	72.2

Table 3.1.18: Noticing anti-cigarette smoking information during the last 30 days on television by socio-demographic characteristics

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	14,483	15,200,365	76.3	0.8	0.8	3,413	3,856,051	78.4	76.5	80.2	11,070	11,344,314	75.6	74.2	77.0
State															
Johor	1,364	1,818,018	77.9	73.1	82.0	334	469,973	84.0	77.4	89.0	1,029	1,345,861	75.9	70.6	80.5
Kedah	844	899,614	69.6	64.0	74.7	239	256,242	67.9	59.1	75.6	605	643,372	70.3	64.0	75.9
Kelantan	1,006	891,532	85.1	81.4	88.2	254	239,627	87.0	80.4	91.6	752	651,905	84.4	80.2	87.9
Melaka	972	478,169	81.1	75.7	85.5	160	77,749	73.8	62.5	82.7	812	400,420	82.7	76.7	87.4
Negeri Sembilan	684	398,599	65.7	59.8	71.2	200	106,644	69.1	57.2	79.0	484	291,955	64.6	59.4	69.4
Pahang	774	647,180	66.8	61.3	71.8	218	195,246	69.9	60.9	77.7	556	451,934	65.5	60.0	70.5
Penang	1,137	983,572	81.0	74.7	86.0	225	203,423	82.3	70.2	90.2	911	780,033	80.7	74.1	85.9
Perak	1,060	1,389,642	87.6	83.3	90.9	249	324,724	89.3	83.4	93.3	811	1,064,918	87.1	81.9	91.0
Perlis	820	107,956	64.9	56.8	72.2	185	25,867	67.3	58.1	75.4	635	82,089	64.2	55.6	71.9
Selangor	2,185	3,250,896	75.7	72.4	78.8	458	706,766	76.6	71.8	80.8	1,727	2,544,130	75.5	72.0	78.7
Terengganu	700	427,771	62.1	54.8	68.9	184	115,283	67.8	58.1	76.2	516	312,488	60.3	52.8	67.3
Sabah & WP Labuan	1,312	1,913,894	82.7	80.0	85.1	335	574,706	81.6	77.0	85.4	977	1,339,188	83.2	79.9	86.0
Sarawak	978	1,421,664	82.8	79.2	85.9	237	403,998	85.2	79.3	89.7	741	1,017,666	81.9	78.0	85.2
WP Kuala Lumpur	287	537,562	51.1	43.6	58.5	77	150,118	62.6	52.5	71.8	210	387,444	47.7	39.8	55.6
WP Putrajaya	362	36,595	74.7	70.4	78.5	58	5,684	87.2	78.4	92.7	304	30,911	72.8	68.4	76.8
Location															
Urban	8,458	11,567,460	76.0	74.4	77.6	1,838	2,747,140	79.2	76.8	81.4	6,619	8,818,136	75.1	73.3	76.8
Rural	6,027	3,635,204	77.2	75.2	79.0	1,575	1,108,911	76.5	73.3	79.4	4,451	2,526,177	77.5	75.4	79.4
Sex															
Male	7,055	7,910,766	75.9	74.2	77.5	3,323	3,746,354	78.3	76.4	80.2	3,730	4,162,113	73.8	71.7	75.8
Female	7,430	7,291,898	76.8	75.2	78.3	90	109,697	80.6	71.2	87.5	7,340	7,182,201	76.7	75.1	78.3

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
18-19	1,561	1,833,115	76.9	74.4	79.3	233	280,013	80.3	74.2	85.3	1,327	1,552,986	76.4	73.7	78.9
20-24	1,308	2,002,312	76.1	73.1	78.8	368	539,216	76.5	70.9	81.3	939	1,460,912	75.9	72.6	78.9
25-29	1,538	1,997,356	77.8	75.1	80.4	413	586,184	77.9	73.1	82.1	1,125	1,411,172	77.8	74.4	80.9
30-34	1,495	1,858,974	75.8	72.9	78.5	432	579,295	75.7	70.5	80.2	1,063	1,279,679	75.9	72.4	79.0
35-39	1,361	1,521,385	78.9	76.1	81.4	370	494,672	80.6	75.7	84.6	991	1,026,714	78.1	74.8	81.1
40-44	1,307	1,365,058	79.6	76.9	82.2	329	389,735	80.8	75.9	84.9	978	975,322	79.2	76.0	82.0
45-49	1,304	1,184,696	76.4	73.6	79.1	331	319,096	80.3	75.4	84.4	973	865,600	75.1	71.9	78.1
50-54	1,303	1,044,400	76.4	73.5	79.1	313	260,415	80.2	73.5	85.5	990	783,985	75.3	72.0	78.2
55-59	1,109	858,166	75.7	72.7	78.5	223	161,735	74.7	68.1	80.3	886	696,431	76.0	72.8	78.9
60-64	871	621,339	75.9	72.3	79.1	155	98,431	79.5	71.7	85.6	716	522,908	75.2	71.3	78.9
65-69	628	441,184	73.4	68.9	77.6	129	78,668	84.3	76.4	89.9	499	362,516	71.4	66.3	76.1
70-74	376	213,431	63.0	56.4	69.3	62	32,483	73.2	55.7	85.5	314	180,948	61.5	54.4	68.2
75+	324	261,248	59.6	54.4	64.6	55	36,107	71.8	57.5	82.7	269	225,141	58.0	52.4	63.4
Ethnicity															
Malays	9,112	7,706,212	77.4	75.7	78.9	2,309	2,147,429	80.5	78.1	82.6	6,802	5,558,667	76.2	74.4	78.0
Chinese	2,198	3,303,239	72.5	69.4	75.4	333	518,588	74.3	68.5	79.4	1,864	2,782,467	72.2	68.9	75.2
Indians	1,007	1,039,163	78.7	75.3	81.6	173	193,467	81.7	74.6	87.1	834	845,696	78.0	74.4	81.3
Other Bumiputras	1,414	1,837,302	84.6	82.0	86.9	376	525,402	86.3	82.1	89.6	1,038	1,311,901	83.9	80.9	86.6
Others	754	1,316,748	68.9	63.9	73.4	222	471,166	66.7	59.8	73.0	532	845,582	70.1	64.7	75.0
Marital Status															
Single	3,833	5,069,402	76.0	74.1	77.8	965	1,291,384	76.3	72.9	79.5	2,866	3,775,719	75.9	73.8	77.9
Married	9,574	9,308,494	77.1	75.6	78.5	2,326	2,462,829	79.7	77.4	81.7	7,248	6,845,666	76.2	74.5	77.8
Widow/widower /divorcee	1,078	824,767	70.2	66.7	73.6	122	101,838	75.7	66.8	82.8	956	722,929	69.5	65.8	72.9
Education Level															
No formal education	692	621,473	61.8	57.6	65.8	129	160,734	66.6	58.3	74.1	563	460,739	60.2	55.9	64.4
Primary education	3,132	2,893,573	73.7	71.5	75.9	765	798,347	73.8	69.7	77.5	2,367	2,095,226	73.7	71.3	76.1
Secondary education	7,274	7,652,743	78.0	76.4	79.5	1,963	2,209,546	81.1	78.8	83.3	5,309	5,440,899	76.8	75.0	78.5
Tertiary education	3,199	3,823,406	78.8	76.9	80.7	506	621,366	80.6	76.6	84.1	2,693	3,202,039	78.5	76.4	80.5
Unclassified education	179	204,674	64.0	55.5	71.7	46	61,843	64.2	49.1	76.9	133	142,830	63.9	54.3	72.6

Sociodemographic Characteristics	Overall					Smokers					Non-smokers				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation															
Government/semi government employee	1,666	1,487,484	82.6	0.8	0.9	367	376,599	85.2	80.4	89.1	1,299	1,110,885	81.7	78.8	84.3
Private employee	4,355	5,750,016	76.0	0.7	0.8	1,416	1,917,102	75.8	73.0	78.5	2,938	3,830,731	76.0	73.8	78.1
Self employed	2,662	2,430,275	76.4	0.7	0.8	1,020	963,071	79.6	76.3	82.5	1,642	1,467,205	74.5	71.8	77.1
Unpaid worker/home maker	2,291	2,058,863	78.4	0.8	0.8	51	51,133	84.5	72.8	91.7	2,240	2,007,730	78.2	75.8	80.5
Retiree	535	421,609	78.1	0.7	0.8	142	101,137	90.2	84.2	94.1	393	320,472	75.0	69.7	79.7
Household Income Group															
Less than RM 1000	2,150	1,897,273	73.7	71.2	76.0	434	424,932	80.8	76.0	84.8	1,716	1,472,341	71.9	69.1	74.5
RM 1000 - RM 1999	2,544	2,469,636	75.6	73.4	77.8	675	724,922	77.0	72.7	80.7	1,868	1,744,598	75.1	72.7	77.4
RM 2000 - RM 2999	2,524	2,586,728	79.0	76.7	81.1	669	734,898	81.0	77.3	84.2	1,855	1,851,830	78.2	75.5	80.7
RM 3000 - RM 3999	1,893	1,984,503	76.3	73.5	78.8	460	514,519	74.1	69.2	78.5	1,433	1,469,984	77.1	74.1	79.8
RM 4000 - RM 4999	1,382	1,606,080	80.6	77.7	83.1	372	466,067	83.9	79.4	87.5	1,010	1,140,012	79.3	76.0	82.3
RM 5000 - RM 5999	1,045	1,185,283	75.4	71.4	79.1	246	302,056	78.8	72.0	84.2	799	883,227	74.3	69.7	78.5
RM 6000 - RM 6999	710	801,713	76.5	72.3	80.1	154	166,239	73.9	65.5	80.8	555	633,291	77.1	72.8	80.9
RM 7000 - RM 7999	598	650,715	78.3	73.8	82.2	136	161,127	76.5	67.0	83.9	462	489,588	78.9	73.8	83.3
RM 8000 - RM 8999	457	543,766	78.6	72.6	83.6	80	102,760	81.3	68.3	89.8	377	441,005	78.0	72.0	83.1
RM 9000 - RM 9999	244	265,148	77.1	69.8	83.1	35	33,486	82.8	57.7	94.5	209	231,661	76.4	68.7	82.6
RM 10000 & above	938	1,211,820	70.2	65.8	74.3	152	225,045	73.4	64.8	80.5	786	985,775	69.5	64.9	73.8
Quintile Household Income Group															
Quintile 1	1,817	1,585,420	72.8	70.2	75.3	344	326,872	80.9	75.0	85.7	1,473	1,258,549	71.0	68.1	73.7
Quintile 2	2,615	2,566,114	75.7	73.5	77.8	698	763,741	77.4	73.3	81.0	1,916	1,802,256	75.0	72.6	77.3
Quintile 3	3,192	3,258,610	78.7	76.6	80.6	827	902,795	80.4	77.1	83.3	2,365	2,355,815	78.1	75.6	80.4
Quintile 4	3,132	3,452,375	77.5	75.5	79.4	800	947,148	78.7	75.3	81.8	2,332	2,505,226	77.1	74.7	79.3
Quintile 5	3,729	4,340,146	75.4	73.1	77.5	744	915,495	76.3	72.1	80.0	2,984	3,422,468	75.1	72.7	77.4

Table 3.1.19: Current smokers who noticed health warning on cigarette package during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	3,734	4,269,838	86.0	84.3	87.5
State					
Johor	354	502,650	88.6	83.3	92.3
Kedah	226	251,662	65.6	56.3	73.9
Kelantan	265	249,792	90.5	84.6	94.2
Melaka	194	97,718	92.8	85.5	96.6
Negeri Sembilan	234	127,614	82.7	71.8	90.0
Pahang	259	238,114	84.8	78.6	89.5
Penang	230	217,512	88.0	82.3	92.0
Perak	242	320,341	87.0	80.0	91.8
Perlis	205	29,428	76.3	70.9	80.9
Selangor	503	797,277	86.1	82.5	89.1
Terengganu	229	140,309	82.5	74.6	88.3
Sabah & WP Labuan	366	636,712	88.4	82.3	92.5
Sarawak	258	439,641	92.2	87.9	95.1
WP Kuala Lumpur	111	215,361	87.7	79.1	93.1
WP Putrajaya	58	5,707	87.5	71.4	95.2
Location					
Urban	2,035	3,047,971	87.2	85.3	88.9
Rural	1,699	1,221,867	83.1	79.8	85.9
Sex					
Male	3,641	4,151,047	86.0	84.4	87.5
Female	93	118,791	84.9	75.7	91.0
Age Group					
18-19	252	307,865	88.3	82.7	92.3
20-24	429	619,562	87.2	82.5	90.7
25-29	471	666,916	86.5	82.6	89.7
30-34	483	663,511	86.3	82.0	89.7
35-39	414	543,693	88.1	84.2	91.2
40-44	361	418,969	86.7	82.4	90.0
45-49	357	339,867	85.2	80.5	88.9
50-54	328	278,944	84.3	78.1	89.0
55-59	243	185,545	84.5	78.9	88.8
60-64	161	98,789	76.1	67.0	83.4
65-69	132	79,347	86.8	79.7	91.7
70-74	57	34,332	76.5	64.3	85.4
75+	46	32,498	62.5	47.4	75.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,475	2,298,203	85.8	83.8	87.5
Chinese	391	624,689	88.0	83.7	91.2
Indians	189	215,541	91.0	85.9	94.3
Other Bumiputras	399	554,849	90.4	86.7	93.2
Others	280	576,557	79.4	72.3	85.0
Marital Status					
Single	1,099	1,497,046	87.8	85.4	89.8
Married	2,500	2,662,294	85.2	83.2	87.0
Widow/widower/divorcee	135	110,498	81.2	72.7	87.4
Education Level					
No formal education	147	194,108	76.5	68.9	82.7
Primary education	820	890,001	81.3	77.3	84.7
Secondary education	2,147	2,409,794	88.1	86.3	89.8
Tertiary education	562	692,495	88.9	85.8	91.5
Unclassified education	54	77,242	78.8	66.8	87.3
Occupation					
Government/semi government employee	387	401,746	90.2	86.1	93.3
Private employee	1,602	2,195,661	85.7	83.2	87.9
Self employed	1,115	1,036,248	85.3	82.3	87.8
Unpaid worker/home maker	49	48,366	79.9	66.9	88.7
Retiree	143	102,223	88.7	79.9	94.0
Household Income Group					
Less than RM 1000	447	455,376	85.5	81.5	88.8
RM 1000 - RM 1999	733	789,006	83.2	79.5	86.4
RM 2000 - RM 2999	723	772,407	84.1	80.3	87.3
RM 3000 - RM 3999	522	599,935	85.4	80.9	89.0
RM 4000 - RM 4999	395	504,416	89.4	85.6	92.4
RM 5000 - RM 5999	278	344,376	89.1	83.5	93.0
RM 6000 - RM 6999	176	198,554	88.3	80.8	93.1
RM 7000 - RM 7999	151	186,494	88.5	82.0	92.9
RM 8000 - RM 8999	89	112,088	87.4	73.7	94.5
RM 9000 - RM 9999	38	38,239	94.6	82.1	98.5
RM 10000 & above	182	268,948	86.6	80.7	91.0
Quintile Household Income Group					
Quintile 1	353	350,281	85.3	80.6	89.1
Quintile 2	759	831,293	83.8	80.3	86.8
Quintile 3	898	962,094	84.6	81.3	87.3
Quintile 4	876	1,063,588	87.1	84.1	89.6
Quintile 5	848	1,062,583	88.1	85.1	90.6

Table 3.1.20: Current smokers who considered quitting because of the warnings during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,118	2,539,209	59.5	57.1	61.9
State					
Johor	207	291,268	57.9	49.8	65.7
Kedah	116	120,949	48.1	40.1	56.2
Kelantan	182	175,551	70.3	62.4	77.1
Melaka	112	54,301	55.6	45.5	65.3
Negeri Sembilan	81	41,842	32.8	25.4	41.2
Pahang	168	148,377	62.3	54.7	69.4
Penang	130	113,556	52.2	40.9	63.3
Perak	109	171,575	53.6	44.3	62.8
Perlis	75	10,006	34.0	25.1	44.2
Selangor	316	494,452	62.0	56.2	67.5
Terengganu	115	70,177	50.0	40.5	59.6
Sabah & WP Labuan	254	439,206	69.1	62.2	75.2
Sarawak	154	282,233	64.2	55.2	72.3
WP Kuala Lumpur	59	121,883	56.6	44.9	67.6
WP Putrajaya	40	3,832	67.1	50.3	80.5
Location					
Urban	1,128	1,754,199	57.6	54.5	60.5
Rural	990	785,010	64.3	60.6	67.9
Sex					
Male	2,063	2,465,074	59.4	56.9	61.8
Female	55	74,134	62.4	50.0	73.4
Age Group					
18-19	159	199,146	64.7	57.2	71.5
20-24	237	377,279	60.9	55.2	66.3
25-29	261	383,906	57.6	52.1	62.9
30-34	287	418,759	63.1	57.0	68.9
35-39	245	332,141	61.2	55.4	66.7
40-44	193	228,392	54.5	48.0	60.9
45-49	188	186,121	54.8	48.4	60.9
50-54	186	161,454	57.9	50.9	64.6
55-59	139	109,959	59.4	51.4	67.0
60-64	100	64,198	65.1	55.4	73.7
65-69	75	47,450	59.8	48.1	70.5
70-74	29	18,305	53.3	34.5	71.2
75+	19	12,099	37.2	20.9	57.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,409	1,375,510	59.9	57.0	62.6
Chinese	178	296,052	47.4	40.9	54.0
Indians	102	131,485	61.1	52.0	69.4
Other Bumiputras	269	385,849	69.7	63.6	75.2
Others	160	350,312	60.8	52.1	68.8
Marital Status					
Single	627	893,035	59.7	55.5	63.8
Married	1,425	1,588,801	59.7	56.9	62.4
Widow/widower/divorcee	66	57,373	51.9	41.4	62.3
Education Level					
No formal education	78	112,828	58.1	45.4	69.9
Primary education	464	523,862	58.9	54.2	63.4
Secondary education	1,222	1,436,435	59.6	56.5	62.7
Tertiary education	323	420,430	60.7	55.7	65.5
Unclassified education	31	45,654	59.1	40.9	75.1
Occupation					
Government/semi government employee	236	251,309	62.6	56.2	68.7
Private employee	925	1,331,274	60.6	56.9	64.2
Self employed	588	589,041	56.8	53.1	60.5
Unpaid worker/home maker	27	25,059	51.8	35.8	67.5
Retiree	78	52,837	51.8	41.2	62.2
Household Income Group					
Less than RM 1000	260	278,395	61.3	54.9	67.2
RM 1000 - RM 1999	442	523,595	66.4	61.9	70.6
RM 2000 - RM 2999	411	465,469	60.3	55.6	64.8
RM 3000 - RM 3999	286	337,227	56.2	50.8	61.5
RM 4000 - RM 4999	229	300,007	59.5	52.0	66.7
RM 5000 - RM 5999	152	203,039	59.0	50.3	67.1
RM 6000 - RM 6999	90	111,487	56.1	46.5	65.4
RM 7000 - RM 7999	83	97,220	52.1	40.4	63.7
RM 8000 - RM 8999	51	60,607	54.1	42.6	65.1
RM 9000 - RM 9999	20	19,166	50.1	32.4	67.9
RM 10000 & above	94	142,997	53.2	42.6	63.4
Quintile Household Income Group					
Quintile 1	203	205,185	58.7	51.9	65.3
Quintile 2	453	549,515	66.1	61.7	70.2
Quintile 3	512	584,352	60.7	56.4	64.9
Quintile 4	490	608,617	57.2	52.6	61.8
Quintile 5	460	591,540	55.7	50.8	60.5

Table 3.1.21: Noticing cigarette advertising during the last 30 days in stores by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	5,119	5,727,775	29.6	27.9	31.3
State					
Johor	693	933,977	40.5	33.1	48.4
Kedah	165	170,324	13.6	9.9	18.3
Kelantan	422	384,303	37.7	31.0	44.9
Melaka	443	210,449	36.7	27.7	46.7
Negeri Sembilan	67	28,646	5.2	3.6	7.5
Pahang	240	205,488	22.6	18.2	27.6
Penang	345	360,384	30.9	24.6	38.0
Perak	230	360,757	23.8	18.6	30.0
Perlis	183	26,206	16.1	12.7	20.1
Selangor	835	1,226,393	28.8	25.1	32.9
Terengganu	226	139,436	20.4	15.7	26.1
Sabah & WP Labuan	572	795,522	35.4	31.6	39.5
Sarawak	429	638,717	38.4	32.3	44.9
WP Kuala Lumpur	131	233,924	22.9	16.4	31.0
WP Putrajaya	138	13,249	27.7	21.2	35.3
Location					
Urban	3,084	4,385,233	29.6	27.5	31.7
Rural	2,035	1,342,543	29.6	26.7	32.6
Sex					
Male	2,508	2,931,180	28.8	26.9	30.8
Female	2,611	2,796,595	30.4	28.4	32.5
Age Group					
18-19	553	681,922	29.6	26.6	32.7
20-24	503	765,748	29.9	26.7	33.3
25-29	591	843,334	33.5	30.3	36.8
30-34	575	761,871	31.8	28.7	35.1
35-39	481	551,588	29.3	26.3	32.5
40-44	454	483,481	29.0	25.6	32.6
45-49	457	428,858	28.4	25.4	31.6
50-54	440	384,912	29.0	25.6	32.8
55-59	385	319,055	29.2	25.5	33.1
60-64	271	211,850	27.0	23.4	30.9
65-69	191	135,321	23.5	19.7	27.7
70-74	112	68,097	20.8	16.4	26.1
75+	106	91,739	21.6	16.8	27.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	3,101	2,820,518	29.1	27.0	31.2
Chinese	844	1,260,588	28.4	24.9	32.3
Indians	283	327,631	25.8	21.2	31.0
Other Bumiputras	609	789,274	37.6	34.1	41.1
Others	282	529,764	28.3	24.3	32.8
Marital Status					
Single	1,428	1,970,386	30.4	28.2	32.7
Married	3,355	3,456,205	29.4	27.5	31.4
Widow/widower/divorcee	336	301,184	26.4	23.2	29.9
Education Level					
No formal education	232	217,931	22.9	19.4	26.9
Primary education	1,053	1,050,210	27.5	25.3	29.9
Secondary education	2,606	2,929,624	30.6	28.5	32.8
Tertiary education	1,179	1,473,945	31.2	28.7	33.8
Unclassified education	48	56,016	18.2	12.7	25.3
Occupation					
Government/semi government employee	640	604,678	34.4	31.1	37.8
Private employee	1,593	2,214,913	30.0	27.7	32.3
Self employed	920	904,316	29.1	26.6	31.8
Unpaid worker/home maker	797	782,256	30.7	27.9	33.7
Retiree	170	150,218	29.0	24.4	34.1
Household Income Group					
Less than RM 1000	731	679,677	27.2	24.5	30.1
RM 1000 - RM 1999	893	933,672	29.5	26.8	32.4
RM 2000 - RM 2999	862	951,381	30.0	27.5	32.7
RM 3000 - RM 3999	665	779,351	30.9	27.9	34.0
RM 4000 - RM 4999	503	591,274	30.4	27.0	34.1
RM 5000 - RM 5999	371	413,507	27.1	23.4	31.1
RM 6000 - RM 6999	270	329,081	31.8	27.5	36.6
RM 7000 - RM 7999	193	220,730	27.0	22.3	32.3
RM 8000 - RM 8999	184	225,225	33.3	28.0	39.1
RM 9000 - RM 9999	72	87,185	27.0	19.8	35.5
RM 10000 & above	375	516,692	30.5	26.4	34.8
Quintile Household Income Group					
Quintile 1	620	564,086	26.7	24.0	29.7
Quintile 2	909	980,020	29.8	27.0	32.7
Quintile 3	1,087	1,178,208	29.3	27.0	31.7
Quintile 4	1,135	1,340,855	31.0	28.4	33.7
Quintile 5	1,368	1,664,607	29.6	27.0	32.3

Table 3.1.22: Noticing cigarette promotion (free sample) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	277	341,860	1.6	1.3	1.9
State					
Johor	55	72,171	2.8	1.8	4.5
Kedah	4	5,421	0.4	0.2	1.0
Kelantan	29	29,329	2.6	1.6	4.2
Melaka	10	2,748	0.4	0.2	1.1
Negeri Sembilan	3	1,164	0.2	0.1	0.5
Pahang	23	20,177	1.9	1.0	3.5
Penang	26	40,743	3.2	1.9	5.3
Perak	7	8,620	0.5	0.2	1.1
Perlis	5	772	0.4	0.1	1.7
Selangor	40	57,545	1.3	0.9	1.9
Terengganu	3	1,714	0.2	0.1	0.7
Sabah & WP Labuan	30	44,613	1.8	1.1	3.0
Sarawak	30	46,607	2.5	1.6	3.9
WP Kuala Lumpur	8	9,954	0.8	0.3	2.0
WP Putrajaya	4	279	0.5	0.2	1.6
Location					
Urban	178	265,257	1.6	1.3	2.0
Rural	99	76,603	1.5	1.1	2.0
Sex					
Male	184	231,169	2.1	1.7	2.5
Female	93	110,690	1.1	0.8	1.4
Age Group					
18-19	27	34,371	1.3	0.9	2.0
20-24	41	66,995	2.4	1.6	3.5
25-29	40	58,393	2.1	1.5	3.0
30-34	28	37,517	1.4	0.9	2.3
35-39	22	24,270	1.2	0.7	2.0
40-44	19	22,136	1.2	0.7	2.0
45-49	18	21,773	1.3	0.8	2.2
50-54	32	27,471	1.8	1.2	2.7
55-59	19	23,081	1.8	0.9	3.6
60-64	13	5,651	0.6	0.3	1.2
65-69	7	6,740	1.0	0.4	2.7
70-74	5	4,569	1.2	0.3	4.9
75+	6	8,892	1.6	0.7	3.8

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	155	166,706	1.5	1.2	1.9
Chinese	50	74,565	1.5	1.0	2.1
Indians	15	15,746	1.1	0.6	2.0
Other Bumiputras	42	54,242	2.3	1.6	3.4
Others	15	30,601	1.5	0.8	2.8
Marital Status					
Single	91	128,103	1.8	1.4	2.3
Married	165	195,931	1.5	1.2	1.9
Widow/widower/divorcee	21	17,826	1.3	0.7	2.4
Education Level					
No formal education	9	7,791	0.7	0.3	1.4
Primary education	60	59,776	1.4	1.0	2.0
Secondary education	153	200,453	1.9	1.5	2.3
Tertiary education	55	73,841	1.4	1.0	1.9
Unclassified education					
Occupation					
Government/semi government employee	26	29,800	1.6	1.0	2.4
Private employee	105	140,533	1.7	1.4	2.2
Self employed	57	60,398	1.8	1.3	2.4
Unpaid worker/home maker	21	24,216	0.8	0.5	1.4
Retiree	11	9,566	1.6	0.7	3.7
Household Income Group					
Less than RM 1000	34	31,981	1.1	0.7	1.7
RM 1000 - RM 1999	40	49,723	1.4	1.0	2.0
RM 2000 - RM 2999	50	55,739	1.6	1.1	2.2
RM 3000 - RM 3999	45	60,788	2.2	1.5	3.2
RM 4000 - RM 4999	30	38,068	1.8	1.1	2.8
RM 5000 - RM 5999	27	40,547	2.4	1.5	3.6
RM 6000 - RM 6999	10	11,613	1.0	0.5	2.1
RM 7000 - RM 7999	9	9,600	1.1	0.5	2.6
RM 8000 - RM 8999	8	10,691	1.5	0.7	3.1
RM 9000 - RM 9999	3	3,631	1.0	0.3	3.5
RM 10000 & above	21	29,480	1.6	0.9	2.7
Quintile Household Income Group					
Quintile 1	27	24,367	1.0	0.6	1.5
Quintile 2	43	51,848	1.4	1.0	2.0
Quintile 3	62	70,357	1.6	1.2	2.1
Quintile 4	75	101,797	2.1	1.6	2.9
Quintile 5	70	93,491	1.5	1.1	2.1

Table 3.1.23: Noticing cigarette promotion (cigarette at sales prices) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	232	299,205	1.4	1.2	1.6
State					
Johor	49	64,136	2.5	1.7	3.8
Kedah	7	7,137	0.5	0.2	1.2
Kelantan	14	12,617	1.1	0.6	2.0
Melaka	8	1,946	0.3	0.1	1.0
Negeri Sembilan	7	4,396	0.6	0.2	1.6
Pahang	3	1,720	0.2	0.1	0.5
Penang	14	20,423	1.6	0.8	3.0
Perak	8	7,834	0.4	0.2	1.0
Perlis	5	822	0.5	0.1	1.7
Selangor	33	49,127	1.1	0.8	1.7
Terengganu	2	1,853	0.2	0.1	1.0
Sabah & WP Labuan	36	61,601	2.5	1.6	3.7
Sarawak	32	49,484	2.7	1.8	4.0
WP Kuala Lumpur	10	15,751	1.2	0.5	3.0
WP Putrajaya	4	360	0.7	0.2	2.0
Location					
Urban	132	206,357	1.3	1.0	1.6
Rural	100	92,848	1.8	1.3	2.4
Sex					
Male	149	207,830	1.9	1.5	2.3
Female	83	91,375	0.9	0.7	1.1
Age Group					
18-19	25	30,142	1.2	0.7	1.8
20-24	34	59,322	2.1	1.4	3.1
25-29	33	49,634	1.8	1.2	2.7
30-34	25	38,021	1.5	0.9	2.4
35-39	14	14,857	0.7	0.4	1.3
40-44	20	28,340	1.5	0.9	2.6
45-49	15	18,009	1.1	0.6	1.9
50-54	25	24,558	1.6	0.9	2.9
55-59	19	17,842	1.4	0.8	2.5
60-64	9	6,393	0.7	0.3	1.6
65-69	8	5,834	0.9	0.3	2.3
70-74	1	319	0.1	0.0	0.6
75+	4	5,933	1.1	0.3	3.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	112	113,878	1.1	0.8	1.3
Chinese	41	72,339	1.4	1.0	2.1
Indians	15	16,675	1.1	0.6	2.2
Other Bumiputras	47	57,830	2.5	1.7	3.5
Others	17	38,483	1.9	1.1	3.2
Marital Status					
Single	83	127,859	1.8	1.4	2.3
Married	131	156,587	1.2	1.0	1.5
Widow/widower/divorcee	18	14,759	1.1	0.6	2.0
Education Level					
No formal education	13	14,081	1.2	0.5	2.7
Primary education	53	67,415	1.6	1.1	2.3
Secondary education	120	167,539	1.6	1.3	2.0
Tertiary education	45	49,590	0.9	0.7	1.3
Unclassified education	1	580	0.2	0.0	1.1
Occupation					
Government/semi government employee	18	19,777	1.0	0.6	1.8
Private employee	92	139,260	1.7	1.3	2.3
Self employed	49	58,986	1.7	1.3	2.4
Unpaid worker/home maker	23	25,227	0.9	0.5	1.4
Retiree	5	4,428	0.7	0.3	2.0
Household Income Group					
Less than RM 1000	33	32,844	1.1	0.7	1.7
RM 1000 - RM 1999	34	39,782	1.1	0.7	1.8
RM 2000 - RM 2999	48	62,306	1.8	1.2	2.6
RM 3000 - RM 3999	25	34,979	1.3	0.8	2.0
RM 4000 - RM 4999	26	45,375	2.1	1.4	3.4
RM 5000 - RM 5999	23	32,693	1.9	1.2	3.0
RM 6000 - RM 6999	10	12,414	1.1	0.6	2.2
RM 7000 - RM 7999	9	9,472	1.1	0.5	2.3
RM 8000 - RM 8999	9	13,979	1.9	1.0	3.8
RM 9000 - RM 9999	2	1,940	0.5	0.1	2.8
RM 10000 & above	13	13,421	0.7	0.4	1.3
Quintile Household Income Group					
Quintile 1	30	28,731	1.1	0.8	1.7
Quintile 2	31	40,573	1.1	0.7	1.8
Quintile 3	61	74,749	1.7	1.2	2.3
Quintile 4	47	78,153	1.6	1.2	2.3
Quintile 5	63	76,999	1.2	0.9	1.6

Table 3.1.24: Noticing cigarette promotion (coupons for cigarette) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	71	75,956	0.4	0.3	0.5
State					
Johor	14	16,197	0.6	0.4	1.2
Kedah	2	2,591	0.2	0.1	0.7
Kelantan	4	4,252	0.4	0.1	1.0
Melaka	7	2,521	0.4	0.2	1.1
Negeri Sembilan	1	578	0.1	0.0	0.5
Pahang	1	819	0.1	0.0	0.5
Penang	4	8,238	0.6	0.2	2.3
Perak	2	785	0.0	0.0	0.2
Perlis	4	717	0.4	0.1	1.7
Selangor	8	11,294	0.3	0.1	0.6
Terengganu	2	1,853	0.2	0.1	1.0
Sabah & WP Labuan	12	13,900	0.6	0.3	1.1
Sarawak	6	9,758	0.5	0.2	1.3
WP Kuala Lumpur	2	2,250	0.2	0.0	0.7
WP Putrajaya	2	203	0.4	0.1	1.5
Location					
Urban	41	57,901	0.4	0.2	0.5
Rural	30	18,055	0.3	0.2	0.5
Sex					
Male	41	41,044	0.4	0.3	0.5
Female	30	34,912	0.3	0.2	0.5
Age Group					
18-19	8	11,355	0.4	0.2	0.9
20-24	6	10,457	0.4	0.2	0.9
25-29	10	10,874	0.4	0.2	0.8
30-34	4	8,600	0.3	0.1	1.0
35-39	7	5,532	0.3	0.1	0.6
40-44	6	5,779	0.3	0.1	0.8
45-49	6	3,356	0.2	0.1	0.6
50-54	9	7,154	0.5	0.2	1.1
55-59	6	7,401	0.6	0.2	1.8
60-64	4	1,888	0.2	0.1	0.7
65-69	3	2,907	0.4	0.1	1.6
70-74	1	319	0.1	0.0	0.6
75+	1	333	0.1	0.0	0.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	44	41,711	0.4	0.3	0.6
Chinese	7	7,260	0.1	0.0	0.5
Indians	2	1,500	0.1	0.0	0.4
Other Bumiputras	15	19,779	0.8	0.5	1.4
Others	3	5,706	0.3	0.1	0.9
Marital Status					
Single	15	17,688	0.2	0.1	0.5
Married	48	52,287	0.4	0.3	0.6
Widow/widower/divorcee	8	5,981	0.4	0.2	1.0
Education Level					
No formal education	2	1,333	0.1	0.0	0.5
Primary education	13	11,984	0.3	0.1	0.5
Secondary education	48	57,991	0.5	0.4	0.8
Tertiary education	8	4,648	0.1	0.0	0.2
Unclassified education	298	365,581	100.0	-	-
Occupation					
Government/semi government employee	8	5,009	0.3	0.1	0.6
Private employee	27	29,009	0.4	0.2	0.6
Self employed	12	14,406	0.4	0.2	0.9
Unpaid worker/home maker	7	8,763	0.3	0.1	0.9
Retiree	5	4,279	0.7	0.3	2.0
Household Income Group					
Less than RM 1000	10	8,893	0.3	0.1	0.7
RM 1000 - RM 1999	9	6,984	0.2	0.1	0.4
RM 2000 - RM 2999	20	23,270	0.7	0.4	1.1
RM 3000 - RM 3999	5	6,160	0.2	0.1	0.6
RM 4000 - RM 4999	8	13,363	0.6	0.3	1.4
RM 5000 - RM 5999	5	9,358	0.5	0.2	1.4
RM 6000 - RM 6999	2	985	0.1	0.0	0.4
RM 7000 - RM 7999	1	63	0.0	0.0	0.1
RM 8000 - RM 8999	4	2,053	0.3	0.1	1.0
RM 9000 - RM 9999	1	286	0.1	0.0	0.6
RM 10000 & above	6	4,543	0.2	0.1	0.6
Quintile Household Income Group					
Quintile 1	9	6,084	0.2	0.1	0.5
Quintile 2	9	9,102	0.2	0.1	0.6
Quintile 3	22	24,895	0.6	0.3	0.9
Quintile 4	13	20,655	0.4	0.2	0.9
Quintile 5	18	15,220	0.2	0.1	0.5

Table 3.1.25: Noticing cigarette promotion (free gifts/discount on other products) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	96	113,620	0.5	0.4	0.7
State					
Johor	26	36,334	1.4	0.8	2.4
Kedah	4	3,756	0.3	0.1	1.1
Kelantan	1	1,128	0.10	0.0	0.7
Melaka	5	859	0.14	0.0	0.5
Negeri Sembilan	4	3,818	0.5	0.2	1.6
Pahang	2	1,707	0.16	0.0	0.7
Penang	7	10,006	0.8	0.3	2.3
Perak	4	3,315	0.2	0.1	0.7
Perlis	5	822	0.5	0.1	1.7
Selangor	13	18,968	0.4	0.2	0.8
Terengganu	1	776	0.10	0.0	0.7
Sabah & WP Labuan	11	15,707	0.6	0.3	1.2
Sarawak	7	9,577	0.5	0.2	1.2
WP Kuala Lumpur	3	6,563	0.5	0.1	2.7
WP Putrajaya	3	285	0.5	0.2	1.6
Location					
Urban	60	90,862	0.6	0.4	0.8
Rural	36	22,758	0.4	0.3	0.7
Sex					
Male	63	75,661	0.7	0.5	0.9
Female	33	37,959	0.4	0.2	0.6
Age Group					
18-19	11	11,350	0.4	0.2	0.9
20-24	7	13,110	0.5	0.2	1.0
25-29	16	22,967	0.8	0.5	1.5
30-34	10	17,080	0.7	0.3	1.4
35-39	12	11,127	0.5	0.3	1.0
40-44	10	13,135	0.7	0.3	1.5
45-49	7	5,342	0.3	0.1	0.8
50-54	13	10,242	0.7	0.3	1.4
55-59	4	6,133	0.5	0.1	1.8
60-64	3	1,358	0.15	0.0	0.6
65-69	2	1,445	0.21	0.0	1.4
70-74	0	0	-	-	-
75+	1	333	0.06	0.0	0.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	54	51,365	0.5	0.3	0.7
Chinese	17	25,670	0.5	0.3	1.0
Indians	4	6,686	0.5	0.1	1.6
Other Bumiputras	16	21,707	0.9	0.6	1.5
Others	5	8,192	0.4	0.2	1.1
Marital Status					
Single	31	42,474	0.6	0.4	1.0
Married	60	67,859	0.5	0.4	0.7
Widow/widower/divorcee	5	3,287	0.2	0.1	0.6
Education Level					
No formal education	3	2,325	0.2	0.1	0.7
Primary education	15	13,064	0.3	0.2	0.6
Secondary education	56	73,286	0.7	0.5	1.0
Tertiary education	22	24,946	0.5	0.3	0.9
Unclassified education					
Occupation					
Government/semi government employee	9	5,282	0.3	0.1	0.7
Private employee	35	47,279	0.6	0.4	0.9
Self employed	23	28,465	0.8	0.5	1.4
Unpaid worker/home maker	7	8,873	0.3	0.1	0.9
Retiree	3	2,286	0.4	0.1	1.5
Household Income Group					
Less than RM 1000	13	13,607	0.5	0.2	0.9
RM 1000 - RM 1999	13	10,862	0.3	0.2	0.6
RM 2000 - RM 2999	18	21,380	0.6	0.3	1.1
RM 3000 - RM 3999	8	9,989	0.4	0.2	0.9
RM 4000 - RM 4999	13	20,438	1.0	0.5	1.9
RM 5000 - RM 5999	8	13,943	0.8	0.4	1.8
RM 6000 - RM 6999	6	4,310	0.4	0.1	1.1
RM 7000 - RM 7999	4	1,336	0.15	0.0	0.5
RM 8000 - RM 8999	4	4,677	0.6	0.2	2.1
RM 9000 - RM 9999	2	4,148	1.1	0.2	6.6
RM 10000 & above	7	8,928	0.5	0.2	1.0
Quintile Household Income Group					
Quintile 1	12	10,798	0.4	0.2	0.8
Quintile 2	11	12,749	0.3	0.2	0.7
Quintile 3	25	29,121	0.7	0.4	1.1
Quintile 4	18	25,675	0.5	0.3	1.0
Quintile 5	30	35,277	0.6	0.3	0.9

Table 3.1.26: Noticing cigarette promotion (clothing/item with brand name or logo) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	719	784,708	3.6	3.1	4.2
State					
Johor	99	142,574	5.6	3.4	9.3
Kedah	14	14,229	1.0	0.3	2.8
Kelantan	20	20,343	1.8	1.0	3.5
Melaka	88	37,466	6.0	3.6	10.1
Negeri Sembilan	5	3,432	0.5	0.2	1.2
Pahang	28	22,592	2.1	1.0	4.2
Penang	29	28,101	2.2	1.0	4.7
Perak	25	35,511	2.0	1.1	3.6
Perlis	52	8,595	5.0	3.0	8.1
Selangor	66	94,823	2.1	1.5	3.1
Terengganu	49	33,341	4.4	2.5	7.6
Sabah & WP Labuan	126	191,222	7.6	5.6	10.2
Sarawak	97	136,221	7.3	5.2	10.2
WP Kuala Lumpur	9	15,274	1.2	0.5	2.7
WP Putrajaya	12	987	1.9	0.8	4.2
Location					
Urban	394	549,255	3.3	2.7	4.1
Rural	325	235,454	4.5	3.6	5.6
Sex					
Male	453	490,217	4.4	3.7	5.2
Female	266	294,492	2.8	2.3	3.4
Age Group					
18-19	86	105,154	4.0	3.1	5.3
20-24	100	154,853	5.5	4.2	7.2
25-29	90	115,865	4.2	3.2	5.5
30-34	85	98,372	3.8	2.8	5.0
35-39	58	53,011	2.6	1.9	3.5
40-44	65	61,820	3.4	2.5	4.6
45-49	46	46,117	2.8	1.9	4.0
50-54	61	50,177	3.4	2.4	4.6
55-59	46	36,042	2.9	1.9	4.3
60-64	29	22,584	2.4	1.5	3.9
65-69	27	22,578	3.3	2.0	5.4
70-74	12	10,012	2.5	1.1	5.7
75+	14	8,124	1.5	0.7	3.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	414	358,841	3.3	2.7	4.1
Chinese	93	129,470	2.6	1.9	3.5
Indians	28	32,780	2.3	1.4	3.6
Other Bumiputras	158	214,445	9.1	7.1	11.7
Others	26	49,173	2.4	1.5	3.9
Marital Status					
Single	231	302,582	4.2	3.4	5.1
Married	460	459,374	3.5	3.0	4.2
Widow/widower/divorcee	28	22,752	1.7	1.0	2.7
Education Level					
No formal education	27	26,103	2.2	1.4	3.7
Primary education	125	115,258	2.7	2.1	3.5
Secondary education	386	435,975	4.1	3.4	5.0
Tertiary education	178	202,252	3.9	3.1	4.8
Unclassified education	3	5,121	1.4	0.5	4.2
Occupation					
Government/semi government employee	98	91,727	4.8	3.7	6.2
Private employee	219	279,704	3.5	2.8	4.3
Self employed	143	140,550	4.1	3.1	5.4
Unpaid worker/home maker	81	81,670	2.8	2.1	3.8
Retiree	27	16,335	2.7	1.4	5.1
Household Income Group					
Less than RM 1000	98	104,244	3.6	2.6	4.8
RM 1000 - RM 1999	130	138,578	3.9	3.0	5.0
RM 2000 - RM 2999	135	119,618	3.4	2.6	4.3
RM 3000 - RM 3999	82	105,596	3.8	2.8	5.2
RM 4000 - RM 4999	66	73,509	3.4	2.5	4.8
RM 5000 - RM 5999	61	63,439	3.7	2.6	5.2
RM 6000 - RM 6999	31	46,168	4.1	2.6	6.5
RM 7000 - RM 7999	27	28,714	3.3	2.0	5.4
RM 8000 - RM 8999	28	31,556	4.3	2.6	7.2
RM 9000 - RM 9999	11	14,593	4.0	1.8	8.7
RM 10000 & above	50	58,694	3.1	2.1	4.5
Quintile Household Income Group					
Quintile 1	81	76,734	3.1	2.3	4.1
Quintile 2	131	151,154	4.1	3.2	5.3
Quintile 3	166	150,825	3.4	2.7	4.3
Quintile 4	145	176,316	3.7	2.9	4.8
Quintile 5	196	229,680	3.7	2.9	4.7

Table 3.1.27: Noticing cigarette promotion (mail promoting cigarette) during the last 30 days by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	77	100,019	0.5	0.3	0.6
State					
Johor	13	15,904	0.6	0.3	1.2
Kedah	5	6,794	0.5	0.1	2.0
Kelantan	2	2,848	0.3	0.1	1.0
Melaka	6	3,881	0.6	0.2	1.7
Negeri Sembilan	1	578	0.08	0.0	0.5
Pahang	4	2,139	0.20	0.1	0.9
Penang	2	7,995	0.6	0.2	2.3
Perak	4	6,461	0.4	0.1	1.0
Perlis	5	908	0.5	0.2	1.7
Selangor	11	17,322	0.4	0.2	0.9
Terengganu	2	2,656	0.3	0.1	1.5
Sabah & WP Labuan	7	11,077	0.4	0.2	1.0
Sarawak	7	13,639	0.7	0.3	1.6
WP Kuala Lumpur	5	7,606	0.6	0.2	1.7
WP Putrajaya	3	210	0.4	0.1	1.3
Location					
Urban	54	84,544	0.5	0.4	0.7
Rural	23	15,475	0.3	0.2	0.5
Sex					
Male	49	59,710	0.5	0.4	0.8
Female	28	40,309	0.4	0.3	0.6
Age Group					
18-19	5	7,014	0.3	0.1	0.7
20-24	11	20,746	0.7	0.4	1.4
25-29	9	14,148	0.5	0.2	1.1
30-34	8	14,755	0.6	0.3	1.3
35-39	10	9,693	0.5	0.2	1.1
40-44	7	7,726	0.4	0.2	1.0
45-49	2	1,693	0.10	0.0	0.4
50-54	6	8,183	0.5	0.2	1.3
55-59	10	10,068	0.8	0.3	1.9
60-64	4	1,806	0.2	0.1	0.7
65-69	4	2,314	0.3	0.1	1.4
70-74					
75+	1	1,875	0.34	0.1	2.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	46	51,875	0.5	0.3	0.7
Chinese	14	23,724	0.5	0.2	0.9
Indians	3	2,978	0.2	0.1	0.7
Other Bumiputras	10	14,741	0.6	0.3	1.2
Others	4	6,702	0.3	0.1	1.3
Marital Status					
Single	21	37,385	0.5	0.3	0.8
Married	50	57,033	0.4	0.3	0.6
Widow/widower/divorcee	6	5,601	0.4	0.2	1.0
Education Level					
No formal education	3	2,226	0.2	0.1	0.6
Primary education	12	9,533	0.2	0.1	0.5
Secondary education	38	56,869	0.5	0.4	0.8
Tertiary education	22	28,776	0.5	0.3	0.9
Unclassified education	2	2,616	0.7	0.1	4.9
Occupation					
Government/semi government employee	14	18,515	1.0	0.4	2.1
Private employee	26	36,974	0.5	0.3	0.7
Self employed	12	15,954	0.5	0.2	1.0
Unpaid worker/home maker	6	8,064	0.3	0.1	0.8
Retiree	6	2,791	0.5	0.1	1.7
Household Income Group					
Less than RM 1000	11	11,732	0.4	0.2	0.8
RM 1000 - RM 1999	12	14,203	0.4	0.2	0.8
RM 2000 - RM 2999	13	17,823	0.5	0.2	1.0
RM 3000 - RM 3999	6	10,427	0.4	0.2	0.9
RM 4000 - RM 4999	8	12,031	0.6	0.2	1.4
RM 5000 - RM 5999	8	13,002	0.8	0.3	1.6
RM 6000 - RM 6999	5	7,011	0.6	0.2	2.1
RM 7000 - RM 7999	1	133	0.015	0.0	0.1
RM 8000 - RM 8999	4	6,659	0.9	0.3	2.4
RM 9000 - RM 9999	2	1,178	0.3	0.1	1.5
RM 10000 & above	7	5,819	0.3	0.1	0.9
Quintile Household Income Group					
Quintile 1	9	8,351	0.3	0.2	0.7
Quintile 2	12	16,367	0.4	0.2	0.9
Quintile 3	16	19,975	0.4	0.2	0.9
Quintile 4	16	25,941	0.5	0.3	1.0
Quintile 5	24	29,385	0.5	0.3	0.8

TOPIC 4

4. ALCOHOL CONSUMPTION

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4.1 Background

Globally, harmful use of alcohol causes approximately 3.3 million deaths every year and 5.1% of the global burden of diseases attributable to alcohol use[1]. The public health objective on alcohol of the World Health Organization (WHO) is to reduce the health burden caused by the harmful use of alcohol and thereby to save lives, reduce disease and prevent injuries[1]. The negative health outcomes of alcohol use include morbidity, mortality and disability. This does not only affect the individual, but the society and nation as a whole.

The prevalence of alcohol use in Malaysia was still lower than other countries in the Western Pacific Region. There was no significant change to the pattern of drinking except for a slight increase in the prevalence of current drinker from 11.1% in 2006 to 11.6% in 2011[2,3]. Though the prevalence was considered low, the National Health and Morbidity Survey 2011 noted among the current drinkers, the proportion who reported engaging in binge drinking was 50.2 %[3].

WHO Global Action Plan for the Prevention and Control of NCDs, 2013-2020 represents a global commitment to reduce modifiable risk factors for NCDs[4]. Harmful use of alcohol is one of the NCDs risk factors and has been identified as an indicator for progress monitoring. Along with the Global Action Plan 2013-2020, Malaysia aims to achieve a 10% relative reduction in the harmful use of alcohol by 2020. In this context, one of the indicators set by WHO to monitor the harmful use of alcohol is the prevalence of heavy episodic drinking (HED) among adolescents and adults as appropriate within the national context. HED is defined as consumption of at least 60 gram (6 standard drinks) or more of pure alcohol on at least one occasion weekly. The prevalence of HED for 18 years old and above in NHMS 2011 was 1.2%.

4.2 Objectives

4.2.1 General objective
To determine the prevalence of alcohol consumption in Malaysia amongst 13 years old and above

4.2.2 Specific Objectives
a. To determine the national prevalence of :
  i. Lifetime abstainers
  ii. Ex-drinkers

b. To determine the national prevalence of alcohol use by socio-demographic subgroups.
  i. Ever drinker
  ii. Current drinker (past 12 months)

c. To identify the proportion of binge drinking among the current drinkers (≥18 years old) by gender, ethnicity and location

d. To identify the proportion of heavy episodic drinking among the current drinkers (≥18 years old)

e. To determine types of drinkers (≥18 years old) by their risk to alcohol-related harm (low risk, risky and probable dependence)

4.3 Target Population, Study Instrument And Definitions

Data on alcohol was obtained from adult respondent 13 years and above through validated self-administered Alcohol Use Disorder Identification Test (AUDIT) questionnaires. A screening question was asked to all respondents to determine those who have ever consumed alcohol. AUDIT, a bi-lingual 10 items scale questionnaire with an additional 2 questions, will then be given to the respondent who answered 'yes' to have ever consumed alcohol in their lifetime.

Alcohol drink in this context encompassed any drink containing ethanol irrespective of concentration and inclusive of those consumed for medical purposes such as alcoholic tonic. For the purposed of analysis in this survey, the respondents were categorised into several categories. Lifetime abstainers were defined as those respondents who had never consumed alcohol in their lifetime while respondents who had history of consuming alcohol were defined as ever drinkers. Current drinkers were respondents who still consumed alcohol for the past twelve (12) months prior to the survey. Additionally, ex-drinkers were respondents who had claimed did not drink alcohol for the past twelve (12) months.

Binge drinking was defined as consumption of 6 and more of standard drink per-sitting and heavy episodic drinking was defined as consumption of 6 and more standard drink per-sitting on at least one occasion weekly. Low risk drinker was a respondent who consumed alcohol according to AUDIT cut-off point set by WHO and with AUDIT score of between 0 and 7. Risky drinker on the other hand was a respondent who consumed alcohol in excess of low risk guideline and with AUDIT score of between 8 and 19. Probable Alcohol Dependence was a respondent who consumed alcohol beyond the low risk guideline and with AUDIT score of 20 or more.

4.4 Findings

4.4.1 Prevalence of Alcohol Consumption (13 years old and above)

The response rate for this module was 99.8% (n=22,452). A total of 65.2% (n=1368) ever drinkers responded to the AUDIT questionnaire. The prevalence of lifetime abstainer was 86.5% (95% CI: 85.1, 87.8), past year abstinence was 88.0% (95% CI: 86.7, 89.2) and ever consume alcohol was 13.5% (95% CI: 12.2, 14.9). Meanwhile the prevalence of current drinker among the 13 years old and above was 7.7% (95% CI: 6.8, 8.7) and ex- drinker was 1.5% (95% CI: 1.2, 1.8).

Among the current drinkers , the consumption prevalence was highest among urban residents (8.3%, 95% CI: 7.2,9.5), males (11.1%, 95% CI: 9.9,12.4), other Bumiputras (19.9%, 95% CI: 16.4,23.9), those between 25-29 years old (10.9%, 95% CI: 8.7, 13.6), singles (9.3%, 95% CI: 7.8,10.9), those with tertiary education (10.9%, 95% CI: 9.1,13.1), those working in private sectors (11.8%, 95% CI: 10.2,13.6), those with household incomes of RM6000- 6999 (12.0%, 95% CI: 8.5,16.6) and RM 7000-7999 (12.0%, 95% CI: 8.7,16.5) and quintile income group Q5 (10.3%, 95% CI: 8.5,12.4)(Table 4.1.1).

4.4.2   Prevalence of Alcohol Consumption among Adolescents (below 18 years)

The prevalence of ever consumed alcohol and current drinker among adolescents were 5.5% (95% CI: 4.2, 7.1) and 3.0% (95% CI: 2.1, 4.1) respectively. Among those ever consumed alcohol, the highest prevalence was among males (6.3%) and rural dwellers (7.3%). The proportion of binge drinking among current drinkers was 54.4% (95% CI: 40.3, 67.8). Further analysis cannot be done due to the small sample size of this age group.

4.4.3   Prevalence of Alcohol Consumption (18 years and above)

The prevalence of lifetime abstainer was 85.5% (95% CI: 83.9, 86.9), past year abstinence was 87.0% (95 % CI: 85.6, 88.3) and ever consume alcohol was 14.5% (95% CI: 13.1, 16.1). The prevalence of current drinker among 18 years and above was 8.4% (95% CI: 7.4, 9.5) and ex-drinker was 1.5% (95% CI: 1.2, 1.9).

Among the current drinkers, the consumption prevalence was highest in urban areas (9.0%, 95% CI: 7.8,10.3), males (12.1%, 95% CI: 10.8, 13.7), other Bumiputras (21.6%, 95% CI: 17.6, 26.3), age group between 25-29 years old (10.9%, 95% CI: 8.7, 13.6), singles (12.2%, 95% CI: 10.2, 14.4), those with tertiary education (10.9%, 95% CI: 9.1, 13.1), those working in private sector (11.8%, 95% CI: 10.2, 13.6), those with household income of RM7000 - 7999 (13.1%, 95% CI: 9.3, 18.1) and quintile income group Q5 (11.2%, 95% CI: 9.3, 13.4)(Table 4.1.2).

4.4.4   Prevalence of Binge Drinker (18 years and above)

The prevalence of binge drinking for 18 years and above was 5.0%, (95% CI: 4.3, 5.8) and its proportion among the current drinkers was 59.4%, (95% CI: 54.8, 63.8). While the prevalence of heavy episodic drinking for 18 years old and above was (0.9%, 95% CI: 0.7, 1.2), its proportion among the current drinkers was 10.8%, (95% CI: 8.4, 13.7). Current drinkers aged 18 years old and above who practiced binge drinking were more common in rural areas (69.6%, 95% CI: 59.4, 78.1), higher among males (64.0%, 95% CI: 58.9, 68.7), Malays (87.0%, 95% CI: 66.9, 95.7) and those between 20-24 years old (65.4%, 95% CI: 54.7, 74.7) and 25-29 years old (65.4%, 95% CI: 54.4, 74.9)(Table 4.1.3).

4.4.5   Risk related to pattern of drinking

Most of the current drinkers aged 18 years and above were low risk drinkers (69.8%, 95% CI: 65.3, 73.9), followed by risky drinkers (28.4%, 95% CI: 24.4, 32.8) and probable dependence (1.8%, 95% CI: 1.1, 3.0)(Table 4.1.4).

4.5 Conclusion

Findings from NHMS 2015 showed a reduction in the prevalence of current drinkers in Malaysia as compared to findings from NHMS 2011. However the prevalence of both binge drinking and heavy episodic drinking were increased among the current drinkers. Identifying the groups at risk is an essential step towards enabling intervention and education for the targeted groups. Health education should continue to stress on the harms of binge drinking and harmful use of alcohol. Collaboration with multiple agencies and support from the various ministries, the private sectors, non-governmental bodies and community is necessary towards reversing this alarming trend and safeguarding for the Malaysian society as a whole from the harms of alcohol.

4.6 References

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Table 4.1.1: Prevalence of current drinker (≥13 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,117	1,769,772	7.7	6.8	8.7
Location					
Urban	762	1,436,910	8.3	7.2	9.5
Rural	355	332,862	6.0	4.7	7.6
Sex					
Male	822	1,305,672	11.1	9.9	12.4
Female	295	464,099	4.2	3.5	5.1
Age Group					
13-14*	10	12,831	1.3	0.6	2.5
15-19	92	152,519	5.8	4.4	7.6
20-24	137	296,087	10.4	8.4	12.8
25-29	134	303,490	10.9	8.7	13.6
30-34	145	243,632	9.3	7.5	11.4
35-39	134	199,359	9.6	7.6	12.0
40-44	95	148,312	8.0	6.1	10.5
45-49	89	114,437	6.8	5.3	8.9
50-54	108	134,926	9.0	7.0	11.4
55-59	68	66,350	5.2	3.9	7.1
60-64	51	48,287	5.2	3.6	7.3
65-69*	28	23,655	3.4	2.0	5.9
70-74*	11	11,709	2.9	1.4	6.0
75+*	15	14,175	2.5	1.3	4.6
Ethnicity					
Malays	26	39,265	0.3	0.2	0.6
Chinese	567	947,586	18.0	15.6	20.8
Indians	146	159,082	10.2	8.1	12.7
Other Bumiputras	320	499,881	19.9	16.4	23.9
Others	58	123,957	5.9	4.3	8.1
Marital Status					
Single	380	766,593	9.3	7.8	10.9
Married	692	952,064	7.2	6.3	8.2
Widow/widower/divorcee	45	51,114	3.6	2.6	5.2
Education Level					
No formal education*	17	16,959	1.4	0.8	2.5
Primary education	210	272,016	5.2	4.4	6.2
Secondary education	592	883,715	8.3	7.2	9.6
Tertiary education	284	576,768	10.9	9.1	13.1
Unclassified education*	13	20,214	4.5	2.3	8.6

*Note: * Data need to be interpret with caution*

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation					
Government/semi government employee	61	95,247	4.9	3.5	7.0
Private employee	515	955,604	11.8	10.2	13.6
Self employed	265	312,054	9.0	7.5	10.9
Unpaid worker/home maker	79	100,264	3.5	2.5	4.7
Retiree	33	35,800	5.9	3.9	8.9
Income Group					
Less than RM 1000	129	173,448	5.6	4.4	7.1
RM 1000 - RM 1999	150	227,470	6.0	4.9	7.4
RM 2000 - RM 2999	153	216,632	5.8	4.2	7.8
RM 3000 - RM 3999	152	253,041	8.6	6.7	11.0
RM 4000 - RM 4999	103	150,366	6.6	4.8	9.1
RM 5000 - RM 5999	91	184,768	10.2	7.6	13.7
RM 6000 - RM 6999	77	139,314	12.0	8.5	16.6
RM 7000 - RM 7999	74	111,478	12.0	8.7	16.5
RM 8000 - RM 8999*	33	47,150	6.1	3.5	10.6
RM 9000 - RM 9999*	18	31,921	8.3	4.5	14.6
RM 10000 & above	137	234,184	11.7	8.8	15.5
Quintile Income Group					
Quintile 1	112	151,369	5.7	4.4	7.4
Quintile 2	161	241,711	6.2	5.0	7.7
Quintile 3	209	319,731	6.7	5.2	8.6
Quintile 4	243	384,700	7.6	6.2	9.4
Quintile 5	392	672,260	10.3	8.5	12.4

*Note: * Data need to be interpret with caution*

Table 4.1.2: Prevalence of current drinker (≥18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,065	1,690,178	8.4	7.4	9.5
Location					
Urban	730	1,381,871	9.0	7.8	10.3
Rural	335	308,308	6.4	5.0	8.2
Sex					
Male	795	1,266,275	12.1	10.8	13.7
Female	270	423,903	4.3	3.6	5.3
Age Group					
15-19	50	85,757	9.0	6.2	12.9
20-24	137	296,087	10.4	8.4	12.8
25-29	134	303,490	10.9	8.7	13.6
30-34	145	243,632	9.3	7.5	11.4
35-39	134	199,359	9.6	7.6	12.0
40-44	95	148,312	8.0	6.1	10.5
45-49	89	114,437	6.8	5.3	8.9
50-54	108	134,926	9.0	7.0	11.4
55-59	68	66,350	5.2	3.9	7.1
60-64	51	48,287	5.2	3.6	7.3
65-69*	28	23,655	3.4	2.0	5.9
70-74*	11	11,709	2.9	1.4	6.0
75+*	15	14,175	2.5	1.3	4.6
Ethnicity					
Malays*	26	39,265	0.4	0.2	0.7
Chinese	542	908,907	19.2	16.6	22.1
Indians	142	154,190	11.2	9.0	14.0
Other Bumiputras	299	467,234	21.6	17.6	26.3
Others	56	120,582	6.0	4.3	8.3
Marital Status					
Single	328	687,000	12.2	10.2	14.4
Married	692	952,064	7.2	6.4	8.3
Widow/widower/divorcee	45	51,114	3.6	2.6	5.2
Education Level					
No formal education*	16	14,033	1.2	0.7	2.2
Primary education	197	254,447	6.2	5.2	7.4
Secondary education	554	824,616	8.8	7.6	10.2
Tertiary education	284	576,768	10.9	9.1	13.1
Unclassified education*	13	20,214	7.3	3.7	13.9

*Note: * Data need to be interpret with caution*

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Occupation					
Government/semi government employee	61	95,247	5.0	3.5	7.0
Private employee	511	947,964	11.8	10.2	13.7
Self employed	264	310,401	9.1	7.6	12.0
Unpaid worker/home maker	77	97,504	3.4	2.5	4.6
Retiree	33	35,800	5.9	3.9	8.9
Income Group					
Less than RM 1000	119	159,596	5.8	4.6	7.5
RM 1000 - RM 1999	139	208,077	6.3	5.0	7.8
RM 2000 - RM 2999	143	205,870	6.3	4.6	8.7
RM 3000 - RM 3999	145	240,463	9.2	7.2	11.9
RM 4000 - RM 4999	102	148,590	7.5	5.4	10.2
RM 5000 - RM 5999	89	182,801	11.5	8.5	15.4
RM 6000 - RM 6999	75	134,619	12.8	9.1	17.9
RM 7000 - RM 7999	71	106,886	13.1	9.3	18.1
RM 8000 - RM 8999*	32	45,496	6.6	3.8	11.4
RM 9000 - RM 9999*	18	31,921	9.0	4.9	15.8
RM 10000 & above	132	225,861	12.6	9.6	16.4
Quintile Income Group					
Quintile 1	105	142,294	6.1	4.6	7.9
Quintile 2	147	217,541	6.3	5.1	7.9
Quintile 3	198	306,331	7.4	5.7	9.5
Quintile 4	235	371,999	8.4	6.8	10.4
Quintile 5	380	652,013	11.2	9.3	13.4

Note: * Data need to be interpret with caution

4.1.3 Prevalence of binge drinker among current drinker (≥18 years old) by socio-demographic characteristic

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	604	1,003,582	59.4	54.8	63.8
Location					
Urban	393	789,091	57.1	52.0	62.1
Rural	211	214,490	69.6	59.4	78.1
Sex					
Male	486	809,835	64.0	58.9	68.7
Female	118	193,746	45.7	38.2	53.4
Age Group					
18-19*	33	54,020	63.0	44.0	78.7
20-24	91	193,670	65.4	54.7	74.8
25-29	88	198,430	65.4	54.4	75.0
30-34	88	158,198	64.9	54.2	74.4
35-39	73	119,343	59.9	50.2	68.8
40-44	62	89,430	60.3	48.1	71.3
45-49	48	61,617	53.8	40.9	66.3
50-54	46	58,432	43.3	32.2	55.2
55-59	34	33,189	50.0	36.0	64.1
60-64	19	18,120	37.5	21.8	56.4
65-69*	12	8,145	34.4	15.9	59.4
70-74*	5	5,450	46.5	15.9	80.0
75+*	5	5,538	39.1	19.9	62.4
Ethnicity					
Malays	20	34,173	87.0	66.9	95.7
Chinese	244	451,491	49.7	43.5	55.9
Indians	89	96,416	62.5	50.9	72.9
Other Bumiputras	220	348,596	74.6	67.4	80.7
Others	31	72,906	60.5	45.7	73.6

*Note: * Data need to be interpret with caution*

4.1.4 Risk related to pattern of drinking (≥ 18 years old)

Types of Current Drinker	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Low risk	647	1,061,111	69.8	65.3	73.9
Risky	278	432,326	28.4	24.4	32.8
Probable dependence	29	27,843	1.8	1.1	3.0

TOPIC 5

PHYSICAL ACTIVITY

5. PHYSICAL ACTIVITY

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5.1 Background

The World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. This includes activities undertaken while working, playing, carrying out household chores, travelling and engaging in recreational pursuits.

Physical inactivity has been identified as the fourth leading risk factor for global mortality (6% of deaths globally), after high blood pressure (13%), tobacco use (9%) and high blood glucose (6%). Insufficient physical activity is on the rise in many countries, adding to the burden of non-communicable diseases (NCDs) and affecting general health worldwide. People who are insufficiently active have a 20% to 30% increased risk of death compared to people who are sufficiently active.

5.2 Objectives

5.2.1 General Objective
- To determine the prevalence of physical activity in Malaysian adults.

5.2.2 Specific Objectives
- To determine the prevalence of overall physical activity by socio-demographic characteristics.
- To determine the prevalence of different levels of physical activity ['HEPA active' (health-enhancing physical activity; a highly active category), 'minimally active' and 'inactive'] by socio-demographic characteristics.

5.3 Target Population, Study Instrument And Definitions

Data on physical activity was obtained from adult respondents aged 16 years and above through face-to-face interviews by trained research assistants using the short version of International Physical Activity Questionnaire (IPAQ). The IPAQ short form asks about three specific types of activity which include walking, moderate-intensity activities and vigorous intensity activities; frequency (measured in days per week) and duration (time per day) are collected separately for each specific type of activity.

Computation of physical activity level requires summation of the duration (in minutes) and frequency (days) of walking, moderate-intensity and vigorous-intensity activities. Another measure of volume of activity can be computed by weighting each type of activity by its energy requirements defined in METS (METs are multiples of the resting metabolic rate) to yield a score in MET-minutes.

There are three levels of physical activity which are categorised as:

5.3.1   Inactive (CATEGORY 1)
This is the lowest level of physical activity. Those individuals who do not meet criteria for Categories 2 or 3 are considered 'insufficiently active'.

5.3.2   Minimally Active (CATEGORY 2)
The minimum pattern of activity to be classified as 'sufficiently active' is any one of the following 3 criteria:
 a) 3 or more days of vigorous activity of at least 20 minutes per day **OR**
 b) 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day **OR**
 c) 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week.

5.3.3   HEPA active (CATEGORY 3)
A separate category labelled 'HEPA' level, which is a more active category can be computed for people who exceed the minimum public health physical activity recommendations. The two criteria for classification as 'HEPA active' are:
 a) vigorous-intensity activity on at least 3 days achieving a minimum of at least 1500 MET-minutes/week **OR**
 b) 7 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week

5.4 Findings

The overall prevalence of physically active adults was 66.5% (95% CI: 65.6, 67.6). Males [71.1% (95% CI: 69.7, 72.4] were significantly more active than females [61.7 (95% CI: 60.3, 63.2]. The level of physical activity increased in adults from the age group of 16-19 years to 40-44 years, whereby the latter was the most physically active group among all age groups. However, the level of physical activity gradually decreased with increasing age and this was most apparent in the elderly. The rural population [71.3% (95% CI: 69.6, 73.0)] reported a significantly higher level of physical activity compared to the urban population [65.0% (95% CI: 63.7, 66.3)]. The highest prevalence of physical activity was observed among 'Other ethnics group' [76.5% (95% CI: 73.2, 79.5)], followed by Other Bumiputras [69.0% (95% CI: 65.8, 72.1)], Malays [66.8% (95% CI: 65.5, 68.1)], Indians [66.7% (95% CI: 63.1, 70.1)] and Chinese [60.7% (95% CI: 58.3, 63.1)]. Single [65.9% (95% CI: 64.0, 67.7)] or married [68.2% (95% CI: 66.9, 69.5)] adults were significantly more active compared to widow/ widower/ divorcee [53.7% (95% CI: 50.5, 56.8)]. With regards to the level of education, adults with primary [67.3% (95% CI: 65.4, 69.2)], secondary [68.5% (95% CI: 67.0, 69.9)] or tertiary education [64.5% (95% CI: 62.6, 66.4)] were found to be more physically active than those with no formal education [58.3% (95% CI: 54.4, 62.1)]. Self-employed adults [76.9% (95% CI: 74.9, 78.9)] displayed a significantly higher level of physical activity compared to those from other occupational categories. The state of Penang [74.5% (95% CI: 70.3, 78.3)] reported the highest prevalence of physical activity, followed by Kelantan [74.2% (95% CI: 70.6, 77.6)] and Pahang [74.0% (95% CI: 70.6, 77.1)] (Table 5.1.1).

Out of 66.5% of physically active adults, 25.4% were HEPA active and 41.1% were minimally active. Among the HEPA active adults, those who were males, from the rural population, of 'Others' ethnic group and self-employed were significantly more active than their respective counterparts (Table 5.1.2).

5.5 Conclusion

The prevalence of physical activity among Malaysian adults was relatively high, with a slight increase from NHMS 2011. However, a majority of adults were only minimally active. Programmes to promote a better understanding of HEPA that benefits health and functional capacity without undue harm or risk are recommended, especially among females and those from the urban population.

Table 5.1.1: Prevalence of physically active by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	13,872	13,992,650	66.5	65.5	67.6
State					
Johor	1,222	1,638,675	67.1	64.3	69.8
Kedah	869	934,896	66.4	62.4	70.2
Kelantan	918	788,083	74.2	70.6	77.6
Melaka	754	369,265	62.2	56.0	68.0
Negeri Sembilan	858	473,601	66.3	62.8	69.7
Pahang	960	792,966	74.0	70.6	77.1
Penang	1,013	911,657	74.5	70.3	78.3
Perak	1,035	1,244,131	71.9	66.9	76.4
Perlis	923	120,465	72.2	67.7	76.4
Selangor	1,722	2,607,624	60.1	57.6	62.5
Terengganu	878	509,922	69.3	63.7	74.4
Sabah & WP Labuan	1,181	1,688,571	69.9	66.9	72.9
Sarawak	750	1,056,728	59.2	54.7	63.6
WP Kuala Lumpur	446	821,029	63.6	58.3	68.5
WP Putrajaya	343	35,036	67.5	59.8	74.4
Location					
Urban	7,766	10,400,386	65.0	63.7	66.3
Rural	6,106	3,592,264	71.3	69.6	73.0
Sex					
Male	7,015	7,685,647	71.1	69.7	72.4
Female	6,857	6,307,003	61.7	60.3	63.2
Age Group					
18-19	1,084	1,232,221	61.0	58.1	63.9
20-24	1,300	1,891,506	67.9	65.1	70.5
25-29	1,483	1,879,345	68.1	65.4	70.6
30-34	1,457	1,803,479	69.3	66.7	71.8
35-39	1,380	1,451,548	70.8	68.1	73.4
40-44	1,342	1,340,796	73.4	70.6	76.1
45-49	1,383	1,199,260	72.4	69.6	75.1
50-54	1,368	1,080,950	72.3	69.4	74.9
55-59	1,096	792,736	63.3	60.1	66.3
60-64	841	565,941	60.9	57.0	64.6
65-69	591	393,183	57.4	53.0	61.7
70-74	328	192,114	48.1	42.4	53.9
75+	219	169,571	30.0	25.9	34.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	8,726	6,977,028	66.8	65.5	68.1
Chinese	1,975	2,960,337	60.7	58.3	63.1
Indians	949	954,675	66.7	63.1	70.1
Other Bumiputras	1,273	1,560,426	69.0	65.8	72.1
Others	949	1,540,183	76.5	73.2	79.5
Marital Status					
Single	3,361	4,336,782	65.9	64.0	67.7
Married	9,480	8,909,613	68.2	66.9	69.5
Widow/widower/divorcee	1,031	746,254	53.7	50.5	56.8
Education Level					
No formal education	749	682,098	58.3	54.4	62.1
Primary education	3,119	2,748,703	67.3	65.4	69.2
Secondary education	6,937	6,980,712	68.5	67.0	69.9
Tertiary education	2,902	3,376,766	64.5	62.6	66.4
Unclassified education	161	201,199	60.3	52.4	67.7
Occupation					
Government/semi government employee	1,493	1,264,173	66.1	63.3	68.8
Private employee	4,397	5,632,793	70.4	68.7	72.0
Self employed	2,999	2,604,475	76.9	74.9	78.9
Unpaid worker/home maker	2,276	1,924,719	66.8	64.4	69.1
Retiree	480	374,633	62.2	57.6	66.7
Household Income Group					
Less than RM 1000	2,058	1,799,797	63.0	60.7	65.3
RM 1000 - RM 1999	2,612	2,368,485	69.0	66.7	71.1
RM 2000 - RM 2999	2,415	2,302,130	67.2	64.9	69.5
RM 3000 - RM 3999	1,816	1,871,914	68.8	66.3	71.2
RM 4000 - RM 4999	1,258	1,384,800	67.4	64.3	70.4
RM 5000 - RM 5999	1,002	1,101,435	65.9	62.4	69.3
RM 6000 - RM 6999	668	754,275	69.2	65.5	72.7
RM 7000 - RM 7999	510	525,349	61.5	56.2	66.6
RM 8000 - RM 8999	410	468,426	66.4	60.8	71.5
RM 9000 - RM 9999	221	240,596	66.1	58.6	72.8
RM 10000 & above	902	1,175,443	63.3	60.3	66.2
Quintile Household Income Group					
Quintile 1	1,729	1,505,893	61.7	59.2	64.2
Quintile 2	2,666	2,462,693	69.1	66.9	71.3
Quintile 3	3,070	2,916,789	67.1	65.0	69.1
Quintile 4	2,944	3,121,048	67.7	65.7	69.6
Quintile 5	3,463	3,986,226	65.7	63.9	67.5

Table 5.1.2: Level of physical activity by socio demographic characteristics

Sociodemographic Characteristics	Highly Active (HEPA)					Minimally Active					Inactive				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	5,440	5,341,258	25.4	24.3	26.5	8,432	8,651,391	41.1	40.1	42.2	6,804	7,037,049	33.5	32.4	34.5
State															
Johor	468	639,609	26.2	22.8	29.9	754	999,066	40.9	37.7	44.2	620	803,318	32.9	30.2	35.7
Kedah	356	358,887	25.5	21.3	30.2	513	576,010	40.9	36.6	45.4	459	473,076	33.6	29.9	37.6
Kelantan	429	376,405	35.4	31.4	39.7	489	411,678	38.8	35.5	42.1	321	273,734	25.8	22.5	29.4
Melaka	249	111,226	18.7	14.0	24.7	505	258,040	43.5	38.9	48.2	437	224,474	37.8	32.0	44.0
Negeri Sembilan	383	213,814	30.0	26.4	33.8	475	259,787	36.4	32.7	40.2	447	240,225	33.7	30.3	37.2
Pahang	430	346,855	32.3	27.7	37.4	530	446,111	41.6	37.7	45.7	341	279,310	26.0	23.0	29.4
Penang	367	287,721	23.5	20.1	27.3	646	623,936	51.0	46.2	55.8	363	312,390	25.5	21.7	29.7
Perak	391	422,351	24.4	20.7	28.5	644	821,780	47.5	43.5	51.5	406	486,456	28.1	23.6	33.1
Perlis	407	51,325	30.8	25.4	36.7	516	69,141	41.5	37.4	45.7	413	46,315	27.8	23.6	32.3
Selangor	580	876,832	20.2	17.8	22.9	1,142	1,730,793	39.9	37.6	42.2	1,169	1,731,347	39.9	37.5	42.4
Terengganu	394	228,255	31.0	26.7	35.8	484	281,667	38.3	34.6	42.1	391	225,711	30.7	25.6	36.3
Sabah & WP Labuan	504	750,280	31.1	28.1	34.3	677	938,291	38.9	36.1	41.8	498	725,514	30.1	27.1	33.1
Sarawak	303	438,451	24.6	20.6	29.1	447	618,276	34.6	30.9	38.6	512	728,035	40.8	36.4	45.4
WP Kuala Lumpur	128	233,503	18.1	14.5	22.4	318	587,525	45.5	39.6	51.5	270	470,269	36.4	31.5	41.7
WP Putrajaya	51	5,746	11.1	8.4	14.4	292	29,290	56.4	48.8	63.8	157	16,875	32.5	25.7	40.2
Location															
Urban	2,621	3,564,282	22.3	21.1	23.6	5,145	6,836,104	42.7	41.5	44.0	4,182	5,592,361	35.0	33.7	36.3
Rural	2,819	1,776,977	35.3	33.2	37.4	3,287	1,815,287	36.0	34.3	37.8	2,622	1,444,688	28.7	27.0	30.4
Sex															
Male	3,542	3,687,135	34.1	32.5	35.7	3,473	3,998,512	37.0	35.6	38.4	2,803	3,128,709	28.9	27.6	30.3
Female	1,898	1,654,124	16.2	15.1	17.3	4,959	4,652,879	45.5	44.1	47.0	4,001	3,908,340	38.3	36.8	39.7

Sociodemographic Characteristics	Highly Active (HEPA)					Minimally Active					Inactive				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
18-19	376	405,186	20.1	17.7	22.6	708	827,035	41.0	38.3	43.7	688	786,394	39.0	36.1	41.9
20-24	510	720,710	25.9	23.3	28.6	790	1,170,796	42.0	39.2	44.9	587	895,788	32.1	29.5	34.9
25-29	614	812,021	29.4	27.0	32.0	869	1,067,324	38.7	36.2	41.2	670	881,794	31.9	29.4	34.6
30-34	578	702,222	27.0	24.3	29.9	879	1,101,256	42.3	39.6	45.1	612	799,175	30.7	28.2	33.3
35-39	552	595,846	29.1	26.3	32.0	828	855,702	41.8	38.9	44.7	504	597,515	29.2	26.6	31.9
40-44	548	504,080	27.6	24.9	30.4	794	836,716	45.8	42.7	48.9	431	486,149	26.6	24.0	29.5
45-49	537	447,698	27.0	24.6	29.6	846	751,562	45.4	42.6	48.2	463	456,901	27.6	24.9	30.4
50-54	552	415,499	27.8	25.0	30.8	816	665,451	44.5	41.6	47.4	507	414,661	27.7	25.1	30.6
55-59	432	290,065	23.2	20.6	25.9	664	502,671	40.1	37.1	43.2	568	459,696	36.7	33.7	39.9
60-64	337	210,746	22.7	19.8	25.9	504	355,194	38.2	34.7	41.9	491	363,834	39.1	35.4	43.0
65-69	222	126,615	18.5	15.7	21.6	369	266,568	38.9	34.7	43.4	410	291,779	42.6	38.3	47.0
70-74	116	65,038	16.3	12.7	20.6	212	127,076	31.8	26.7	37.5	347	206,923	51.9	46.1	57.6
75+	66	45,531	8.0	6.0	10.8	153	124,040	21.9	18.3	26.0	526	396,440	70.0	65.6	74.2
Ethnicity															
Malays	3,390	2,592,148	24.8	23.5	26.1	5,336	4,384,880	42.0	40.8	43.2	4,169	3,470,366	33.2	31.9	34.5
Chinese	627	914,245	18.8	16.9	20.8	1,348	2,046,092	42.0	39.4	44.6	1,288	1,915,513	39.3	36.9	41.7
Indians	360	338,146	23.6	20.8	26.7	589	616,529	43.1	39.8	46.4	520	477,145	33.3	29.9	37.0
Other Bumiputras	562	690,074	30.5	27.7	33.5	711	870,353	38.5	35.5	41.6	533	701,220	31.0	28.0	34.2
Others	501	806,646	40.1	35.7	44.6	448	733,537	36.4	32.9	40.2	294	472,805	23.5	20.5	26.8
Marital Status															
Single	1,334	1,655,951	25.2	23.5	26.9	2,027	2,680,831	40.7	38.9	42.6	1,710	2,245,599	34.1	32.3	36.0
Married	3,746	3,438,101	26.3	25.0	27.7	5,734	5,471,512	41.9	40.6	43.2	4,199	4,147,047	31.8	30.5	33.1
Widow/widower /divorcee	360	247,207	17.8	15.6	20.2	671	499,048	35.9	33.1	38.8	895	644,402	46.3	43.2	49.5
Education Level															
No formal education	329	330,174	28.2	24.5	32.2	420	351,923	30.1	26.7	33.6	605	487,987	41.7	37.9	45.6
Primary education	1,416	1,275,093	31.2	29.2	33.4	1,703	1,473,610	36.1	34.2	38.1	1,644	1,333,738	32.7	30.8	34.6
Secondary education	2,750	2,642,731	25.9	24.6	27.3	4,187	4,337,981	42.6	41.1	44.0	2,970	3,211,190	31.5	30.1	33.0
Tertiary education	865	995,839	19.0	17.5	20.7	2,037	2,380,927	45.5	43.6	47.4	1,459	1,858,201	35.5	33.6	37.5
Unclassified education	79	96,564	29.0	22.1	37.0	82	104,634	31.4	24.5	39.1	110	132,293	39.7	32.3	47.6

Sociodemographic Characteristics	Highly Active (HEPA)					Minimally Active					Inactive				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Occupation															
Government/semi government employee	432	380,106	19.9	17.7	22.3	1,061	884,067	46.2	43.8	48.7	687	647,731	33.9	31.2	36.7
Private employee	1,969	2,436,128	30.4	28.5	32.4	2,428	3,196,665	39.9	38.1	41.8	1,706	2,373,144	29.6	28.0	31.4
Self employed	1,607	1,282,529	37.9	35.4	40.4	1,392	1,321,946	39.1	36.8	41.3	815	780,662	23.1	21.1	25.1
Unpaid worker/home maker	603	475,678	16.5	14.9	18.3	1,673	1,449,041	50.3	47.9	52.6	1,043	957,761	33.2	30.9	35.6
Retiree	167	114,306	19.0	15.6	22.9	313	260,327	43.2	38.7	47.9	299	227,346	37.8	33.3	42.4
Household Income Group															
Less than RM 1000	779	680,080	23.8	21.9	25.9	1,279	1,119,717	39.2	37.0	41.5	1,278	1,055,220	37.0	34.7	39.3
RM 1000 - RM 1999	1,135	1,019,291	29.7	27.6	31.8	1,477	1,349,194	39.3	37.2	41.4	1,138	1,066,253	31.0	28.9	33.3
RM 2000 - RM 2999	998	902,413	26.4	24.3	28.6	1,417	1,399,717	40.9	38.4	43.4	1,104	1,121,989	32.8	30.5	35.1
RM 3000 - RM 3999	774	784,798	28.8	26.4	31.4	1,042	1,087,116	40.0	37.3	42.7	815	848,404	31.2	28.8	33.7
RM 4000 - RM 4999	459	484,062	23.6	20.9	26.5	799	900,738	43.9	40.6	47.2	601	668,814	32.6	29.6	35.7
RM 5000 - RM 5999	379	417,128	25.0	21.6	28.8	623	684,307	41.0	37.3	44.8	468	568,705	34.1	30.7	37.6
RM 6000 - RM 6999	239	259,968	23.8	20.0	28.2	429	494,307	45.3	41.0	49.7	316	335,979	30.8	27.4	34.5
RM 7000 - RM 7999	195	197,606	23.1	18.9	28.0	315	327,742	38.4	33.7	43.3	283	328,946	38.5	33.5	43.8
RM 8000 - RM 8999	128	148,089	21.0	16.9	25.8	282	320,337	45.4	40.1	50.8	196	237,294	33.6	28.5	39.2
RM 9000 - RM 9999	66	65,963	18.1	13.3	24.1	155	174,634	48.0	41.1	54.9	98	123,525	33.9	27.2	41.4
RM 10000 & above	288	381,860	20.6	17.4	24.1	614	793,583	42.7	39.5	46.1	507	681,920	36.7	33.8	39.8
Quintile Household Income Group															
Quintile 1	641	556,455	22.8	20.7	25.1	1,088	949,438	38.9	36.5	41.4	1,134	934,764	38.3	35.8	40.9
Quintile 2	1,139	1,046,889	29.4	27.2	31.6	1,527	1,415,804	39.8	37.7	41.9	1,183	1,098,876	30.9	28.7	33.1
Quintile 3	1,287	1,149,107	26.4	24.6	28.4	1,783	1,767,683	40.7	38.5	42.9	1,404	1,430,454	32.9	30.9	35.0
Quintile 4	1,168	1,212,256	26.3	24.4	28.3	1,776	1,908,791	41.4	39.3	43.5	1,341	1,490,669	32.3	30.4	34.4
Quintile 5	1,205	1,376,551	22.7	20.9	24.6	2,258	2,609,676	43.0	41.1	44.9	1,742	2,082,286	34.3	32.5	36.2

DIETARY PRACTICE

6. DIETARY PRACTICE

Contributors to this section: Nor Azian Mohd Zaki, Fatimah Othman, Nur Shahida Abd Aziz, Cheong Siew Man, Azli Baharudin, Mohamad Hasnan Ahmad, Rashidah Ambak, Noor Safiza Mohd Nor, Rusidah Selamat, Norlida Zulkafly

6.1 Background

Adequate intake of fruit and vegetable is essential for a good health. The various components of nutrients, antioxidants and plant bioactive compounds have shown to lower the incidence of diabetes, cardiovascular diseases and obesity.

Previous NHMS 2011 findings had shown that only 7.5% of Malaysian adult consumed adequate five servings of fruits and/or vegetables daily based on the World Health Organization (WHO) recommendation. It is recommended to consume plain water adequately as it is the core chemical constituent in the human body. Finding from Malaysian Adult Nutrition Survey (MANS, 2003) had shown that the average consumption of plain water by Malaysian adult was 1.5 liters or 6 glasses per day. Based on those findings, Malaysian adults were still at risk for inadequate fruits and vegetables as well as plain water intake. Therefore, there is a need to monitor the trend of fruits, vegetables and plain water intake to raise the public's awareness of healthy dietary practices in preventing chronic diseases.

6.2 Objectives

6.2.1 General Objective
To determine the adequacy of fruit, vegetable and plain water intake among Malaysian adults

6.2.2 Specific objectives
a.   To determine adequacy of fruit intake among Malaysian adults
b.   To determine adequacy of vegetable intake among Malaysian adults
c.   To determine adequacy of plain water intake among Malaysian adults

6.3 Target Population, Study Instrument And Definitions

Data on dietary practice was gathered from Malaysian adult respondents aged 18 years and above. Respondents were asked on the quantity of fruit and vegetable they consumed in the previous week. They were also asked on the daily consumption of plain water in glass unit using validated questionnaires.

Adequate intake was defined as consuming at least 5 servings of fruits and vegetables per day, with at least 2 servings of fruits per day, ≥ 3 servings of vegetable per day and ≥ 6 glasses of plain water per day (WHO, 2003 & Malaysian Dietary Guidelines, 2010).

6.4 Findings

World Health Organisation (WHO) has recommended daily intake of five servings of fruits and/or vegetables daily as a prevention of chronic diseases. However, our findings showed that 94.0% (95% CI: 93.3, 94.7) of Malaysian adults did not take adequate fruits and/or vegetables as recommended by WHO. By state, the highest proportion of adults not taking adequate fruits and/or vegetables was in Kedah [99.4% (95% CI: 98.7, 99.7)] and lowest proportion in Malacca [83.9% (95% CI: 74.6, 90.2)]. By strata, higher prevalence of inadequate fruits and/or vegetables intake was from the urban area [94.4% (95% CI: 93.5, 95.2)] compared with the rural area [93.0% (95% CI: 91.8, 94.1)]. There was a higher proportion of males [94.4% (95% CI: 93.6, 95.2)] consumed inadequate fruits and/or vegetables as compared with females [93.6 (95% CI: 92.7, 94.4)]. By age group, the highest prevalence of inadequate intake of fruits and/or vegetables was noted among adults aged 35-39 years old [95.4% (95% CI: 94.1, 96.4)].

Our finding showed that, there was only 9.9% (95% CI: 9.2, 10.7)] of Malaysian adults consumed adequate fruits (≥ 2 servings per day). According to the findings, the state with the highest prevalence of adequate fruit intake was Malacca [16.1% (95% CI: 11.9, 21.5)], followed by Penang [13.8% (95% CI: 10.0, 18.8)]. The highest prevalence of adequate fruit consumption was from urban residents [10.1% (95% CI: 9.2, 11.0)], females [11.5% (95% CI: 10.5, 12.5)] and adults aged 55- 59 years [13.4% (95% CI: 11.3, 15.7).

There was 90.1% (95% CI: 89.3, 90.8)] of Malaysian adults who did not consume adequate fruits. By state, Kedah had the highest prevalence of inadequate fruit intake [95.8% (95% CI: 93.6, 97.3]. In addition, the highest prevalence of inadequate fruit intake was among rural residents [90.5% (95% CI: 89.4, 91.5)], males [91.5% (95% CI: 90.6, 92.3)] and adults aged 18 -19 years [94.7% (95% CI: 92.6, 96.3)].

The overall prevalence of adequate vegetable intake (≥ 3 servings per day) among Malaysian adults was 11.2% (95% CI: 10.2, 12.2). By state, Sarawak [25.2% (95% CI: 20.0, 31.2)] had the highest prevalence of adequate vegetable intake followed by Malacca [19.4% (95% CI: 12.6, 28.5)]. A higher prevalence of Malaysian adults from the rural areas [14.5% (95% CI: 12.7, 16.4)], females [12.0% (95% CI: 10.8, 13.3)] and adults aged 40 - 44 years old [12.5% (95% CI: 10.5, 14.8)] had adequate vegetable intake compared to their counterparts.

In contrast, there was 88.8% (95% CI: 87.8, 89.8) of Malaysian adults who did not consume adequate vegetable. By state, Kedah [99.4% (95% CI: 98.8, 100.0] had the highest prevalence of inadequate vegetable intake. Urban residents and males had the highest prevalence of inadequate vegetable intake at 89.9% (95% CI: 88.6, 91.0) and 89.6% (95% CI: 88.4, 90.7 respectively. By age group, elderly aged 75 years and above [91.9% (95% CI: 88.7, 94.3)] showed the highest prevalence of not taking adequate vegetable intake.

The overall prevalence of adequate plain water intake (≥ 6 glasses per day) among Malaysian adults was 72.9% (95% CI: 71.8, 74.1). Sabah & WP Labuan [81.7% (95% CI: 79.1, 84.0)] showed the highest prevalence of adequate plain water intake followed by Negeri Sembilan [79.6% (95% CI: 76.2, 82.5)] and Perak [79.4% (95% CI: 82.9, 75.4)]. The results revealed that there was a high prevalence of Malaysian adults from the urban area [73.3% (95% CI: 12.7, 16.4)] and males [75.5% (95% CI: 74.0, 76.9)] who consumed adequate plain water.

In this study, the prevalence of inadequate plain water intake among Malaysian adults was 27.1% (95% CI: 25.9, 28.2). This prevalence was significantly noted in the rural area [28.2% (95% CI: 26.6, 29.8)] and among female adults [29.8% (95% CI: 28.4, 31.2)].

6.5 Conclusion

In conclusion, the overall consumption of fruits and vegetables among Malaysian adults is still low, except for plain water intake. There is a crucial need for strategies and coordinated efforts of program managers and policy makers at all levels to promote adequate intake of fruits and vegetables among Malaysian adults.

Table 6.1.1: Intake of fruit and/or vegetables by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	1,220	1,200,070	6.0	5.3	6.7
State					
Johor	156	194,117	8.2	6.1	10.9
Kedah	10	8,004	0.6	0.3	1.3
Kelantan	16	15,429	1.5	0.9	2.5
Melaka	167	91,727	16.1	9.8	25.4
Negeri Sembilan	57	30,000	4.4	2.7	7.1
Pahang	124	86,408	8.7	6.2	11.9
Penang	117	121,086	10.1	6.2	15.9
Perak	49	38,072	2.3	1.5	3.5
Perlis	37	4,891	3.0	1.6	5.8
Selangor	76	121,465	2.9	2.1	4.1
Terengganu	33	16,566	2.4	1.5	3.9
Sabah & WP Labuan	166	210,388	9.1	7.3	11.4
Sarawak	172	223,250	12.8	9.1	17.8
WP Kuala Lumpur	18	36,535	2.9	1.3	6.3
WP Putrajaya	22	2,132	4.4	2.7	7.1
Location					
Urban	672	864,860	5.6	4.8	6.5
Rural	548	335,210	7.0	5.9	8.2
Sex			0.0		
Male	519	579,177	5.6	4.8	6.4
Female	701	620,893	6.4	5.6	7.3
Age Group					
18-19	34	47,514	5.0	3.4	7.4
20-24	88	140,195	4.9	3.8	6.3
25-29	120	147,687	5.3	4.2	6.8
30-34	127	139,396	5.3	4.1	6.9
35-39	109	95,357	4.6	3.6	5.9
40-44	120	135,119	7.3	5.7	9.2
45-49	133	127,008	7.6	6.2	9.3
50-54	125	104,530	6.9	5.4	8.8
55-59	120	95,188	7.5	5.9	9.5
60-64	91	65,548	7.0	5.3	9.2
65-69	71	41,250	6.0	4.3	8.3
70-74	43	28,130	7.0	4.6	10.6
75+	39	33,148	5.8	3.8	8.9

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	604	423,515	4.3	3.7	5.0
Chinese	299	391,024	8.3	6.7	10.2
Indians	73	70,250	5.1	3.5	7.6
Other Bumiputras	193	230,220	10.7	8.6	13.2
Others	51	85,062	4.2	2.8	6.3
Marital Status					
Single	205	281,635	5.0	4.2	6.0
Married	922	849,945	6.5	5.7	7.4
Widow/widower/divorcee	93	68,491	4.9	3.8	6.3
Education Level					
No formal education	61	46,855	4.0	2.9	5.5
Primary education	290	230,711	5.6	4.7	6.7
Secondary education	555	547,487	5.9	5.1	6.7
Tertiary education	301	357,896	6.8	5.7	8.1
Unclassified education	10	16,440	5.9	2.4	13.8
Occupation					
Government/semi government employee	160	145,827	7.6	5.8	9.9
Private employee	319	392,185	4.9	4.1	5.8
Self employed	247	235,107	6.9	5.8	8.2
Unpaid worker/home maker	248	196,845	6.8	5.7	8.2
Retiree	60	51,199	8.4	5.8	12.0
Income Group					
Less than RM 1000	208	162,105	5.9	4.8	7.4
RM 1000 - RM 1999	199	178,970	5.4	4.4	6.7
RM 2000 - RM 2999	182	158,350	4.9	3.8	6.1
RM 3000 - RM 3999	158	164,883	6.4	5.1	7.9
RM 4000 - RM 4999	97	111,507	5.6	4.3	7.4
RM 5000 - RM 5999	91	89,158	5.6	4.1	7.5
RM 6000 - RM 6999	47	46,214	4.4	3.1	6.4
RM 7000 - RM 7999	66	74,408	9.1	6.6	12.5
RM 8000 - RM 8999	35	46,076	6.7	4.4	10.2
RM 9000 - RM 9999	20	24,592	6.9	4.0	11.8
RM 10000 & above	117	143,808	8.1	6.2	10.5
Quintile Income Group					
Quintile 1	185	148,240	6.3	5.1	7.9
Quintile 2	197	166,845	4.9	3.9	6.1
Quintile 3	243	221,341	5.3	4.4	6.5
Quintile 4	251	271,161	6.1	5.1	7.4
Quintile 5	344	392,483	6.7	5.7	8.0

Table 6.1.2: Adequate intake of fruits (≥ 2 servings) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,064	1,998,955	9.9	9.2	10.7
State					
Johor	259	311,327	13.2	11.0	15.8
Kedah	62	55,258	4.2	2.7	6.4
Kelantan	105	89,587	8.9	6.7	11.7
Melaka	176	91,343	16.1	11.9	21.5
Negeri Sembilan	108	67,209	9.9	7.0	13.8
Pahang	129	98,669	9.9	7.6	12.9
Penang	189	165,787	13.8	10.0	18.8
Perak	118	106,284	6.4	4.6	8.9
Perlis	130	15,228	9.5	7.1	12.6
Selangor	246	381,835	9.1	7.5	11.1
Terengganu	88	48,021	7.0	5.4	9.2
Sabah & WP Labuan	211	281,127	12.2	10.0	14.9
Sarawak	148	188,768	10.9	9.1	13.1
WP Kuala Lumpur	57	94,450	7.6	5.2	10.9
WP Putrajaya	38	4,060	8.4	5.1	13.4
Location					
Urban	1,228	1,544,801	10.1	9.2	11.0
Rural	836	454,154	9.5	8.5	10.6
Sex					
Male	858	881,250	8.5	7.7	9.4
Female	1,206	1,117,706	11.5	10.5	12.5
Age Group					
18-19	44	49,833	5.3	3.7	7.4
20-24	146	224,253	7.9	6.5	9.6
25-29	213	274,149	9.9	8.4	11.6
30-34	206	229,199	8.8	7.3	10.5
35-39	168	151,034	7.3	6.0	8.8
40-44	183	208,037	11.3	9.3	13.7
45-49	216	190,866	11.4	9.7	13.4
50-54	254	200,225	13.3	11.4	15.4
55-59	209	168,452	13.4	11.3	15.7
60-64	172	117,830	12.6	10.4	15.2
65-69	117	85,218	12.4	9.8	15.6
70-74	66	39,225	9.8	7.1	13.4
75+	70	60,635	10.7	8.0	14.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	1,184	915,358	9.3	8.4	10.2
Chinese	436	552,672	11.7	10.1	13.6
Indians	137	132,876	9.7	7.6	12.3
Other Bumiputras	206	241,090	11.2	9.5	13.3
Others	101	156,959	7.8	5.7	10.6
Marital Status					
Single	324	430,483	7.7	6.7	8.8
Married	1,573	1,445,936	11.0	10.2	11.9
Widow/widower/divorcee	167	122,537	8.8	7.3	10.5
Education Level					
No formal education	98	79,974	6.8	5.4	8.6
Primary education	424	344,003	8.4	7.4	9.6
Secondary education	954	907,486	9.8	8.9	10.7
Tertiary education	573	647,092	12.3	11.0	13.8
Unclassified education	13	19,167	6.9	3.4	13.5
Occupation					
Government/semi government employee	263	240,271	12.5	10.6	14.7
Private employee	532	643,189	8.1	7.2	9.1
Self employed	420	374,745	11.1	9.7	12.6
Unpaid worker/home maker	426	356,932	12.4	10.9	14.1
Retiree	108	89,135	14.7	11.5	18.6
Income Group					
Less than RM 1000	294	261,314	9.6	8.1	11.4
RM 1000 - RM 1999	316	275,049	8.3	7.1	9.7
RM 2000 - RM 2999	309	257,125	7.9	6.6	9.5
RM 3000 - RM 3999	248	229,409	8.9	7.5	10.4
RM 4000 - RM 4999	200	208,441	10.6	8.6	12.9
RM 5000 - RM 5999	158	159,349	10.0	8.0	12.5
RM 6000 - RM 6999	103	98,357	9.4	7.4	12.1
RM 7000 - RM 7999	90	96,924	11.9	9.2	15.2
RM 8000 - RM 8999	73	95,417	14.0	10.2	18.8
RM 9000 - RM 9999	44	41,720	11.7	8.0	16.9
RM 10000 & above	229	275,852	15.5	13.0	18.4
Quintile Income Group					
Quintile 1	267	235,662	10.1	8.6	11.8
Quintile 2	301	259,533	7.6	6.5	8.9
Quintile 3	416	368,294	8.9	7.6	10.3
Quintile 4	439	425,028	9.7	8.4	11.0
Quintile 5	641	710,439	12.2	10.9	13.6

Table 6.1.3: Adequate intake of vegetables (≥ 3 servings) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2195	2250493	11.2	10.2	12.2
State					
Johor	290	375397	15.9	12.7	19.7
Kedah	11	8417	0.6	0.3	1.2
Kelantan	26	24043	2.4	1.3	4.4
Melaka	197	110157	19.4	12.6	28.5
Negeri Sembilan	82	36169	5.3	3.4	8.3
Pahang	228	173903	17.5	14.2	21.5
Penang	208	212711	17.7	10.8	27.6
Perak	131	130393	7.9	5.8	10.6
Perlis	69	8042	5.0	2.9	8.5
Selangor	108	169499	4.1	3.1	5.3
Terengganu	88	51633	7.5	5.3	10.6
Sabah & WP Labuan	300	407148	17.8	15.1	20.9
Sarawak	334	437432	25.2	20.0	31.2
WP Kuala Lumpur	47	98395	7.9	4.4	13.6
WP Putrajaya	76	7154	14.7	10.9	19.6
Location					
Urban	1181	1558009	10.1	9.0	11.4
Rural	1014	692484	14.5	12.7	16.4
Sex					
Male	955	1082404	10.4	9.3	11.6
Female	1240	1168089	12.0	10.8	13.3
Age Group					
18-19	75	108232	11.4	8.4	15.3
20-24	172	282937	10.0	8.3	12.0
25-29	231	306893	11.1	9.3	13.2
30-34	256	320355	12.2	10.3	14.4
35-39	208	205681	9.9	8.3	11.9
40-44	223	230847	12.5	10.5	14.8
45-49	227	205090	12.3	10.3	14.6
50-54	206	170883	11.3	9.5	13.5
55-59	189	140621	11.1	9.3	13.4
60-64	153	113144	12.1	9.6	15.1
65-69	122	73486	10.7	8.4	13.5
70-74	72	46255	11.6	8.5	15.7
75+	61	46071	8.1	5.8	11.3

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	1088	770398	7.8	6.9	8.8
Chinese	495	680531	14.4	12.0	17.1
Indians	109	112255	8.2	5.7	11.6
Other Bumiputras	381	458465	21.4	18.1	25.1
Others	122	228844	11.4	9.0	14.5
Marital Status					
Single	419	606843	10.8	9.4	12.4
Married	1597	1519236	11.6	10.5	12.7
Widow/widower/divorcee	179	124415	8.9	7.2	10.9
Education Level					
No formal education	145	122173	10.5	8.4	12.9
Primary education	569	503716	12.3	10.8	14.0
Secondary education	973	981646	10.5	9.5	11.7
Tertiary education	490	620180	11.8	10.1	13.6
Unclassified education	15	22096	8.0	3.9	15.5
Occupation					
Government/semi government employee	266	228532	11.9	9.6	14.6
Private employee	630	843337	10.6	9.3	12.0
Self employed	421	397536	11.7	10.2	13.4
Unpaid worker/home maker	459	389497	13.5	11.8	15.4
Retiree	94	74080	12.2	9.0	16.4
Income Group					
Less than RM 1000	373	325565	12.0	10.2	13.9
RM 1000 - RM 1999	369	341692	10.3	8.8	12.1
RM 2000 - RM 2999	351	346454	10.6	9.0	12.5
RM 3000 - RM 3999	298	313678	12.1	10.4	14.1
RM 4000 - RM 4999	192	219639	11.1	9.0	13.6
RM 5000 - RM 5999	161	177993	11.2	8.8	14.1
RM 6000 - RM 6999	81	86507	8.3	6.1	11.3
RM 7000 - RM 7999	113	116272	14.3	11.0	18.4
RM 8000 - RM 8999	58	70711	10.3	7.2	14.5
RM 9000 - RM 9999	38	47545	13.4	8.3	20.9
RM 10000 & above	161	204436	11.5	8.7	15.0
Quintile Income Group					
Quintile 1	330	294785	12.6	10.7	14.7
Quintile 2	366	327671	9.6	8.2	11.2
Quintile 3	460	459559	11.1	9.6	12.7
Quintile 4	474	522611	11.9	10.2	13.7
Quintile 5	565	645868	11.1	9.6	12.9

Table 6.1.4: Adequate intake of plain water (≥6 glasses) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	14,291	14,670,418	72.9	71.8	74.1
State					
Johor	1,299	1,723,297	73.1	70.0	76.1
Kedah	908	933,445	71.1	66.8	75.1
Kelantan	764	646,694	64.2	60.3	68.0
Melaka	834	420,162	73.8	66.9	79.7
Negeri Sembilan	955	538,868	79.6	76.2	82.5
Pahang	956	775,213	77.9	74.3	81.1
Penang	962	915,033	75.9	72.3	79.1
Perak	1,075	1,313,021	79.4	82.9	75.4
Perlis	964	120,047	75.3	71.5	78.7
Selangor	1,919	2,935,023	70.2	66.9	73.3
Terengganu	681	390,565	56.9	52.7	61.0
Sabah & WP Labuan	1,290	1,856,698	81.7	79.1	84.0
Sarawak	849	1,180,268	67.7	63.9	71.3
WP Kuala Lumpur	473	885,858	71.1	63.7	77.5
WP Putrajaya	362	36,225	74.6	69.4	79.2
Location					
Urban	8,263	11,237,797	73.3	71.9	74.7
Rural	6,028	3,432,621	71.8	70.2	73.4
Sex					
Male	7,016	7,835,334	75.5	74.0	76.9
Female	7,275	6,835,084	70.2	68.8	71.6
Age Group					
18-19	480	587,916	61.6	57.1	66.0
20-24	1,250	1,917,936	67.6	65.0	70.2
25-29	1,565	2,065,536	74.5	72.0	76.8
30-34	1,583	2,014,845	77.1	74.6	79.4
35-39	1,470	1,608,099	77.8	75.2	80.3
40-44	1,387	1,424,958	77.2	74.6	79.6
45-49	1,422	1,289,290	77.2	74.7	79.5
50-54	1,445	1,146,835	76.2	73.6	78.6
55-59	1,240	927,547	73.7	71.0	76.2
60-64	962	680,908	72.8	69.5	75.9
65-69	660	440,896	64.1	59.8	68.1
70-74	422	254,996	63.7	58.4	68.7
75+	405	310,655	54.7	50.1	59.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	8,546	6,756,312	68.3	66.8	69.8
Chinese	2,388	3,706,621	78.6	76.5	80.5
Indians	1,062	1,000,737	73.1	69.3	76.5
Other Bumiputras	1,338	1,629,691	76.1	72.8	79.0
Others	957	1,577,057	79.1	75.1	82.5
Marital Status					
Single	2,819	3,920,090	69.8	67.8	71.7
Married	10,217	9,830,256	75.1	73.8	76.2
Widow/widower/divorcee	1,255	920,072	65.8	63.0	68.5
Education Level					
No formal education	875	784,317	67.2	63.4	70.9
Primary education	3,397	3,003,325	73.5	71.5	75.3
Secondary education	6,607	6,762,277	72.7	71.3	74.1
Tertiary education	3,251	3,908,045	74.2	72.3	76.0
Unclassified education	148	200,232	72.9	64.4	80.0
Occupation					
Government/semi government employee	1,662	1,425,568	74.2	71.4	76.7
Private employee	4,584	6,107,149	76.7	74.9	78.4
Self employed	2,855	2,533,690	74.7	72.7	76.7
Unpaid worker/home maker	2,362	2,030,464	70.5	68.4	72.6
Retiree	543	418,254	68.9	64.7	72.7
Income Group					
Less than RM 1000	2,206	1,890,771	69.5	67.1	71.7
RM 1000 - RM 1999	2,614	2,417,925	73.1	70.9	75.1
RM 2000 - RM 2999	2,400	2,340,805	72.0	69.7	74.1
RM 3000 - RM 3999	1,836	1,916,807	74.0	71.6	76.4
RM 4000 - RM 4999	1,302	1,462,483	74.0	71.2	76.6
RM 5000 - RM 5999	1,038	1,207,085	75.9	72.6	78.9
RM 6000 - RM 6999	678	733,233	70.5	66.2	74.4
RM 7000 - RM 7999	549	602,883	74.0	69.3	78.3
RM 8000 - RM 8999	410	472,133	68.9	62.5	74.7
RM 9000 - RM 9999	246	285,731	80.3	74.4	85.2
RM 10000 & above	1,012	1,340,564	75.4	71.8	78.7
Quintile Income Group					
Quintile 1	1,884	1,621,837	69.4	67.0	71.7
Quintile 2	2,686	2,504,443	73.3	71.2	75.4
Quintile 3	3,068	2,985,311	72.0	69.9	74.0
Quintile 4	3,004	3,277,698	74.5	72.5	76.3
Quintile 5	3,649	4,281,128	73.6	71.6	75.6

MENTAL HEALTH PROBLEMS OF ADULTS

7. MENTAL HEALTH PROBLEMS OF ADULTS

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7.1 Background

Mental health problem or psychiatric disorder is defined as disorders of psychological function that have been systematically described among the clients of psychiatrists.[1] Mental health represents a complex and complicated public health problem, and one which has wide-ranging social and economic implications, as well as stark consequences for physical health.[2] The data from a study of Health Survey of England (HSE) in 2012 reported that 18% of women and 12% of men had probable mental health problem using General Health Questionnaire (GHQ-12) with cut-off point of 4.[3]

Worldwide, the General Health Questionnaire (GHQ) has been used extensively for assessing and detecting mental health problems in various settings[4, 5]. A validity study in 1997 reported that the 12-items GHQ (GHQ-12), the shortest version, is robust and works equally well as the longer instrument as a screening instrument for case detection. Its brevity makes it attractive for use in busy clinical settings as well as for large-scale epidemiological settings in which study subjects have diverse backgrounds.[6] The application of a standardized measure of the GHQ-12 is useful for clinicians and researchers in comparing the findings either clinically or particularly for epidemiologically obtained studies.

The GHQ has now been used in about 38 languages, and over 50 validity studies have been published. In Malaysia, GHQ12 has been validated for a few times. Prior to the NHMS 1996, validity study at cut-off point of 2/3 (any respondent with a score of 3 and above were considered a case) noted sensitivity and specificity of 86% and 85%, respectively.[7] Another study done in 2009, with cut-off score of 3/4 (score equal to or more than 4) noted sensitivity of 81.3%, specificity of 75.3% with positive predictive value of 62.9%.[6] National Health and Morbidity Survey 1996, using GHQ12 as the screening tool noted the prevalence of mental health disorders among adults aged 16 years and above at 10.7% (9.7-11.7).[6]

For this survey, permission to use this questionnaire was obtained from GL assessment (Qualification Code: 10641).

7.2 Objectives

7.2.1 General objective
To determine the prevalence of mental health problems among Malaysian Adults

7.2.2 Specific objectives
- To determine the prevalence of mental health problem among adults aged 16 years and above.
- To determine the prevalence of mental health problem by socio-demographic profiles.

7.3 Target Population, Study Instrument And Definitions

Module S on Mental Health adults were targeted to household members aged 16 years and above from the randomly selected living quarters. Illiterate respondents or those who cannot understand either Bahasa Malaysia or English were considered as not eligible.

GHQ12 was administered as self-administered questionnaire in two choice of languages; Bahasa Malaysia or English. There were 12 statements related to mental health with of four responses for each statement, in a modified Likert scale which is a graduated scale of positive to negative responses. The first two options were considered as positive responses and given a score of '0', while the remainder two options were considered as negative options and scored as '1'. Incomplete questionnaire (did not answer all items) were considered as not valid for analysis.

For the purpose of analysis and comparison with NHMS 1996, score of 3 and above were considered as a case or having mental health problem. However, there was a difference in the methodology between NHMS 1996 and 2015, whereby in the year 1996, GHQ12 was administered as either self-administered or read-out by interviewer.

7.4 Finding

Out of 29,460 respondents, 20,940 of them were 16 years and above. A total of 3,417 respondents (16.3%) were considered not eligible to be included in the survey. Reasons for ineligibility were either illiterate or unable to read and understand Bahasa Malaysia or English. Out of those who were eligible, 3,161 respondents refused, resulted on response rate of 82%.

Analysis noted that, the prevalence of mental health problem among adults aged 16 years and above in Malaysia was 29.2% (95% CI: 27.9, 30.5).

By state, the prevalence was highest in Sabah and WP Labuan [42.9% (39.3, 46.7)], followed by WP Kuala Lumpur [39.8% (4.7, 45.2)], and Kelantan [39.1% (35.1, 43.2)]. There was no significant difference in the prevalence by locality. By gender, the prevalence was higher among females as compared to males, but it was not significant [30.8% (29.2, 32.5) vs 27.6% (27.3, 30.4)]. Generally, mental health problems were higher among younger adults.

Mental health problems were found to be highest among Other Bumiputras [41.1% (37.4, 45.0)], followed by Others [33.2% (27.8, 39.2)]. By occupation, the prevalence was lowest among government/semi-government employees [2.6% (21.8, 27.7)]. This survey also noted that adults from low household income families were having higher prevalence of mental health problems as compared to higher income families.

7.5 Conclusion

The prevalence of mental health problems among adults showed an increasing trend; increased from 10.7% in 1996 to 29.2% in 2015. This survey showed that females, younger adults, other Bumiputras, and adults from low income families, seems to be at risk of mental health problems.

7.6 References

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Table 7.1.1: Prevalence of Adult Mental Health Status by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	3,752	4,206,697	29.2	27.9	30.5
State					
Johor	310	405,329	22.2	18.4	26.6
Kedah	225	238,814	26.7	22.3	31.6
Kelantan	326	296,883	39.1	35.1	43.2
Melaka	194	93,994	22.9	18.5	27.9
Negeri Sembilan	207	129,093	24.0	19.6	29.0
Pahang	188	168,903	27.8	21.5	35.1
Penang	227	163,745	19.1	14.6	24.7
Perak	197	225,366	17.0	13.1	21.8
Perlis	223	33,098	24.0	19.8	28.8
Selangor	540	897,134	29.3	26.7	32.1
Terengganu	155	95,293	26.0	19.8	33.4
Sabah & WP Labuan	468	746,170	42.9	39.3	46.7
Sarawak	214	354,544	35.8	30.1	41.9
WP Kuala Lumpur	185	348,894	39.8	34.7	45.2
WP Putrajaya	93	9,439	20.7	16.0	26.5
Location					
Urban	2,312	3,231,584	28.8	27.3	30.4
Rural	1,440	975,112	30.3	27.9	32.9
Sex					
Male	1,672	2,025,385	27.6	25.9	29.3
Female	2,080	2,181,311	30.8	29.2	32.5
Age Group					
16-19	422	516,320	34.7	31.4	38.0
20-24	469	716,560	32.1	28.9	35.4
25-29	465	648,115	30.5	27.7	33.5
30-34	411	563,944	28.8	25.8	32.0
35-39	379	417,939	28.3	25.2	31.5
40-44	361	366,324	28.1	25.1	31.4
45-49	344	313,037	27.7	24.6	31.0
50-54	296	231,213	24.8	21.6	28.2
55-59	233	180,258	24.9	21.4	28.6
60-64	169	126,523	27.4	22.7	32.5
65-69	91	59,161	19.6	15.2	24.9
70-74	58	30,564	21.0	14.8	28.8
75+	54	36,738	25.8	18.2	35.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	2,374	2,130,855	28.2	26.6	29.7
Chinese	437	762,033	24.2	21.3	27.3
Indians	283	291,217	28.9	24.6	33.6
Other Bumiputras	453	647,570	41.1	37.4	45.0
Others	205	375,022	33.2	27.8	39.2
Marital Status					
Single	1,143	1,589,448	32.1	30.0	34.3
Married	2,374	2,428,694	27.5	26.0	29.0
Widow/widower/divorcee	235	188,554	29.3	25.6	33.3
Education Level					
No formal education	55	58,645	23.8	16.6	33.0
Primary education	603	591,561	29.1	26.0	32.3
Secondary education	2,159	2,348,346	30.9	29.2	32.6
Tertiary education	889	1,139,090	26.4	24.4	28.5
Unclassified education	44	67,182	30.3	21.1	41.3
Occupation					
Government/semi government employee	399	379,508	24.6	21.8	27.7
Private employee	1,232	1,709,957	29.3	27.3	31.3
Self employed	672	668,030	30.3	27.8	32.9
Unpaid worker/home maker	628	597,787	30.5	27.9	33.3
Retiree	135	101,849	26.4	21.5	32.0
Income Group					
Less than RM 1000	499	498,272	31.9	28.8	35.2
RM 1000 - RM 1999	702	684,076	31.7	29.0	34.6
RM 2000 - RM 2999	656	694,157	28.9	26.2	31.6
RM 3000 - RM 3999	504	569,472	30.1	27.2	33.1
RM 4000 - RM 4999	376	467,074	29.6	26.1	33.3
RM 5000 & RM 5999	255	305,155	25.7	21.9	29.9
RM 6000 - RM 6999	184	229,239	28.8	23.9	34.3
RM 7000 - RM 7999	126	148,391	24.2	19.6	29.5
RM 8000 - RM 8999	109	127,548	24.9	18.9	31.9
RM 9000 - RM 9999	61	83,123	29.4	22.5	37.4
RM 10000 & above	280	400,191	27.6	24.0	31.6
Quintile Income Group					
Quintile 1	411	416,019	32.1	28.6	35.8
Quintile 2	719	702,080	31.2	28.7	33.9
Quintile 3	819	879,897	29.1	26.7	31.7
Quintile 4	844	991,591	29.5	27.2	32.0
Quintile 5	959	1,217,110	27.0	24.8	29.4

MENTAL HEALTH PROBLEMS OF CHILDREN

8. MENTAL HEALTH PROBLEMS OF CHILDREN

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8.1 Background

Mental health problem or sometimes known as emotional and behavioural problems among children is a growing public health problems among children in both developed and developing countries. The World Health Organization (WHO) defines mental health as a state of social and emotional wellbeing, not merely the absence of disorder[1]. Good mental health in childhood is characterized by the achievement of development and emotional milestones, healthy social development, and effective coping skills; such that mentally healthy children have a positive quality of life and can function well at home, in school and in their communities[2,3]. The British Child and Adolescents Mental Health Survey in 1999 and 2004 found that 1 in 10 children and young people under the age of 16 years had a diagnosable mental disorder. The most common problems are conduct disorders, attention deficit hyperactivity disorder (ADHD), emotional disorders (anxiety and depression) and autism spectrum disorders[4,5]. Findings from the National Health and Morbidity Survey (NHMS 2011) using Reporting Questionnaire for Children (RQC) had found that the prevalence of mental health among children aged 5 to 15 years was 20.0% (95% CI: 18.8, 21.3) and it was significantly higher among boys 21.8% (95% CI: 20.1, 23.7)[6] compared to girls 18.1% (95% CI: 16.4, 20.0). Mental health problems among children cause distress and can have wide-ranging effects, including impacts on educational attainment and social relationship, as well as affecting life chances and physical health[7, 8].

8.2 Objective

8.2.1   General Objective
To determine the prevalence of mental health problems among 5 to 15 years children in Malaysia

8.2.2   Specific objective
a. To determine the prevalence of mental health problems among children age 5 to 15 years in Malaysia
b. To determine the prevalence of emotional problem among children age 5 to 15 years in Malaysia
c. To determine the prevalence of conduct problem among children age 5 to 15 years in Malaysia
d. To determine the prevalence of hyperactivity problems among children age 5 to 15 years in Malaysia
e. To determine the prevalence of peer problems among children age 5 to 15 years in Malaysia
f. To determine the prevalence of pro-social skills among children age 5 to 15 years in Malaysia

8.3 Target Population, Study Instrument And Definitions

Information on mental health among children age 5 to 15 years was obtained from their parents or guardian. The informants reported the scores by answering the Strengths and Difficulties Questionnaire (SDQ). The SDQ consisted of 25 items comprised of 5 scales of 5 items which were Total Difficulties Scores, Emotional Problems Scale, Conduct Problems Scale, Hyperactivity Problem Scales, Peer Problem Scales and Pro-Social Scales. Informants answered the questionnaire using Likert Scale of Not True, Somewhat True and Certainly True. For each of 5 the scales, the score could be scaled up to pro-rata if at least 3 items were completed. Each problem scores (i.e. Emotional, Conduct, Hyperactivity, Peer problem and pro Social scores) consisted of five items with a score range of 0 – 10.

A child is considered as having mental health problems if total difficulties score was 14 or more. Total Difficulties Scores were generated by summing scores from all the scales except the Pro-Social scale. The resultant score ranged from 0 to 40, and it was counted as missing if one of the four component scores was missing.

The SDQ scores for each scale were categorized as follows:

Parent completed SDQ	Categories	
	Normal	Abnormal
Total difficulties scores	0-13	14-40
Emotional problem scores	0-3	4-10
Conduct problem scores	0-2	3-10
Hyperactivity problem scores	0-5	6-10
Peer problem scores	0-2	3-10
Prosocial scores	6-10	0-5

8.4 Findings

A total of 5182 (out of total 5823 children) aged 5 to 15 years responded in this topic (response rate: 88.9%). The overall prevalence of mental health problem among children was 12.1% (95% CI: 11.0, 13.4). The prevalence was highest in Sarawak [16.0% (11.6, 21.8)], followed by Sabah & WP Labuan [14.8% (11.8, 18.3)] and Johor [14.0% (10.3, 18.9)]. Children from rural area had higher prevalence of mental health problems as compared to those from urban areas [13.0% (11.1, 15.3) vs. 11.8% (10.4, 13.4)]. By sex, mental health problems were higher among boys than girls [12.4% (10.8, 14.1) vs 11.9% (10.3, 13.6)].

Younger children (5-9 years) showed higher prevalence of mental health problems; 13.1% (11.4, 15.1), as compared to older children (10-15 years); 11.4% (10.0, 12.9). By ethnicity, other Bumiputras' showed highest prevalence of mental health problems [16.5% (12.9, 20.8)] followed by Chinese [14.2% (10.6, 18.9), Indians [13.8% (9.8, 19.2)] and others' [12.9% (7.4, 21.5). Lowest prevalence was found among Malays; 10.4 % (9.1, 11.8).

This survey also revealed that the prevalence of emotional problems among children were 15.7% (14.2, 17.2), conduct problems; 16.7% (15.3, 18.3), hyperactivity; 4.6% (3.9, 5.5), peer problem; 32.5% (30.6, 34.4) and pro-social skill; 11.2% (9.8, 12.7).

8.5 Conclusions

This survey found that children who were at risk of mental health problems were those who were boys, younger age group and from rural areas. Other Bumiputras showed the highest prevalence while Malays were the lowest. It was found that the highest prevalence of mental health problems were peer problems followed by conduct and emotional problems.

8.6 References

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Table 8.1.1: Prevalence of mental health problems among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	612	594,256	12.1	11.0	13.4
State					
Johor	63	72,045	14.0	10.3	18.9
Kedah	32	29,210	8.2	5.6	11.9
Kelantan	44	35,866	10.3	7.5	14.1
Melaka	36	12,241	8.9	5.5	14.2
Negeri Sembilan	37	19,991	11.7	7.5	18.0
Pahang	42	34,277	13.2	8.6	19.8
Penang	32	24,645	10.7	5.4	20.0
Perak	31	23,268	5.7	3.2	9.8
Perlis	16	1,932	4.9	3.0	8.1
Selangor	87	127,308	13.7	10.8	17.2
Terengganu	39	24,391	9.9	7.0	13.9
Sabah & WP Labuan	79	83,027	14.8	11.8	18.3
Sarawak	40	70,048	16.0	11.6	21.8
WP Kuala Lumpur	17	34,099	13.6	8.3	21.5
WP Putrajaya	17	1,908	12.0	6.6	20.6
Location					
Urban	340	431,924	11.8	10.4	13.4
Rural	272	162,332	13.0	11.1	15.3
Sex					
Male	329	315,838	12.4	10.8	14.1
Female	283	278,417	11.9	10.3	13.6
Age Group					
5-9	298	276,243	13.1	11.4	15.1
10-15	314	318,013	11.4	10.0	12.9
Ethnicity					
Malays	396	312,674	10.4	9.1	11.8
Chinese	77	120,228	14.2	10.6	18.9
Indians	39	42,938	13.8	9.8	19.2
Other Bumiputras	81	106,394	16.5	12.9	20.8
Others	19	12,022	12.9	7.4	21.5

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	16	9,430	12.2	6.5	21.6
Primary education	393	386,402	12.1	10.7	13.6
Secondary education	21	25,212	7.9	4.9	12.6
Tertiary education	1	152	100.0	100.0	100.0
Unclassified education	84	86,033	13.4	10.4	17.0
Income Group					
Less than RM 1000	85	77,090	12.8	9.7	16.6
RM 1000 - RM 1999	130	119,798	13.9	10.9	17.5
RM 2000 - RM 2999	107	90,199	11.3	8.9	14.2
RM 3000 - RM 3999	71	69,528	10.3	7.5	13.9
RM 4000 - RM 4999	75	78,828	16.2	11.8	22.0
RM 5000 & RM 5999	32	33,468	9.6	6.0	15.2
RM 6000 & RM 6999	22	26,106	11.6	6.4	20.0
RM 7000 & RM 7999	23	30,484	15.1	8.7	24.9
RM 8000 & RM 8999	25	22,189	11.7	7.0	18.9
RM 9000 & RM 9999	9	5,862	8.2	3.3	19.3
RM 10000 & above	33	40,702	9.2	6.2	13.5
Quintile Income Group					
Quintile 1	73	65,835	12.6	9.4	16.8
Quintile 2	134	127,008	14.7	11.7	18.3
Quintile 3	134	111,821	10.6	8.6	13.0
Quintile 4	133	137,100	12.6	10.0	15.9
Quintile 5	138	152,492	11.1	8.9	13.7

Table 8.1.2: Prevalence of emotional problems among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	769	766,814	15.7	14.2	17.2
State					
Johor	73	86,929	16.9	12.8	22.1
Kedah	45	43,724	12.3	9.2	16.4
Kelantan	61	50,744	14.6	11.2	18.9
Melaka	49	15,792	11.5	7.6	17.2
Negeri Sembilan	55	28,642	16.8	12.3	22.5
Pahang	48	37,983	14.6	9.9	21.0
Penang	41	30,596	13.2	6.8	24.2
Perak	37	36,512	8.9	6.1	12.9
Perlis	19	2,566	6.6	3.8	11.0
Selangor	103	140,111	15.1	12.1	18.7
Terengganu	47	29,130	12.0	8.8	16.1
Sabah & WP Labuan	111	144,094	25.8	20.5	31.9
Sarawak	47	78,321	18.0	12.5	25.3
WP Kuala Lumpur	20	40,188	16.0	9.8	25.0
WP Putrajaya	13	1,482	9.3	5.5	15.2
Location					
Urban	424	557,643	15.3	13.6	17.2
Rural	345	209,171	16.8	14.5	19.5
Sex					
Male	350	362,390	14.2	12.3	16.4
Female	419	404,424	17.3	15.4	19.3
Age Group					
5-9	311	321,640	15.3	13.1	17.9
10-15	458	445,173	15.9	14.3	17.7
Ethnicity					
Malays	523	462,527	15.4	13.6	17.3
Chinese	85	121,855	14.4	11.0	18.8
Indians	32	35,549	11.5	7.4	17.2
Other Bumiputras	100	123,541	19.2	14.9	24.5
Others	29	23,342	25.2	17.7	34.5

ociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	15	8,605	11.2	5.9	20.1
Primary education	514	496,454	15.5	13.9	17.3
Secondary education	43	49,422	15.5	10.9	21.7
Tertiary education					
Unclassified education	108	104,564	16.3	13.3	19.8
Income Group					
Less than RM 1000	105	90,887	15.1	12.0	18.9
RM 1000 - RM 1999	157	159,996	18.7	14.5	23.6
RM 2000 - RM 2999	145	127,448	16.0	13.2	19.3
RM 3000 - RM 3999	93	96,088	14.2	10.9	18.3
RM 4000 - RM 4999	84	75,069	15.5	11.4	20.6
RM 5000 - RM 5999	52	62,588	18.0	12.5	25.3
RM 6000 - RM 6999	26	34,379	15.3	9.8	23.1
RM 7000 - RM 7999	29	32,434	16.0	10.3	24.1
RM 8000 - RM 8999	25	25,758	13.6	8.4	21.4
RM 9000 - RM 9999	9	4,070	5.7	2.2	13.8
RM 10000 & above	44	58,097	13.1	9.4	18.2
Quintile Income Group					
Quintile 1	85	75,040	14.5	11.2	18.5
Quintile 2	163	166,761	19.4	15.2	24.4
Quintile 3	180	153,355	14.5	12.2	17.3
Quintile 4	170	168,853	15.6	12.6	19.1
Quintile 5	171	202,805	14.7	12.3	17.6

Table 8.1.3: Prevalence of conduct problems among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	840	819005	16.7	15.3	18.3
State					
Johor	81	94805	18.5	14.8	22.9
Kedah	48	43933	12.4	8.7	17.5
Kelantan	49	39897	11.5	8.6	15.2
Melaka	50	16364	12.0	8.0	17.4
Negeri Sembilan	49	26996	15.8	10.6	23.0
Pahang	59	54956	21.1	15.9	27.6
Penang	34	22509	9.8	5.7	16.5
Perak	52	50776	12.4	8.9	17.1
Perlis	34	4571	11.6	7.6	17.3
Selangor	117	160963	17.3	14.0	21.2
Terengganu	55	33279	13.6	9.4	19.4
Sabah & WP Labuan	99	96434	17.2	13.6	21.6
Sarawak	64	121562	28.0	20.7	36.6
WP Kuala Lumpur	26	49316	19.6	12.9	28.8
WP Putrajaya	23	2645	16.6	10.8	24.5
Location					
Urban	467	597775	16.4	14.6	18.3
Rural	373	221230	17.8	15.7	20.1
Sex					
Male	457	465151	18.2	16.3	20.4
Female	383	353855	15.1	13.2	17.2
Age Group					
5-9	392	350511	16.7	14.6	19.0
10-15	448	468494	16.8	14.9	18.8
Ethnicity					
Malays	546	444488	14.8	13.2	16.5
Chinese	105	154408	18.4	14.4	23.1
Indians	65	56425	18.2	13.0	24.8
Other Bumiputras	106	149563	23.3	18.9	28.4
Others	18	14122	15.2	7.2	29.2

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	16	9196	11.9	6.4	21.0
Primary education	548	529514	16.6	15.0	18.3
Secondary education	41	51040	16.0	11.7	21.6
Tertiary education			0.0	0.0	0.0
Unclassified education	106	105800	16.5	13.0	20.6
Income Group					
Less than RM 1000	111	105131	17.5	14.0	21.7
RM 1000 - RM 1999	188	161420	18.9	15.6	22.7
RM 2000 - RM 2999	140	124042	15.5	12.3	19.5
RM 3000 - RM 3999	118	134575	19.9	15.3	25.4
RM 4000 - RM 4999	93	97891	20.2	15.4	26.0
RM 5000 & 5999	36	39360	11.3	7.6	16.5
RM6000 - 6999	32	40734	18.1	11.4	27.4
RM 7000 - 7999	36	41459	20.5	13.8	29.4
RM8000 - 8999	29	21806	11.5	7.0	18.4
RM 9000 - 9999	12	8647	12.1	5.7	23.9
RM 10000 and above	45	43939	9.9	6.7	14.5
Quintile Income Group					
Quintile 1	94	90374	17.4	13.6	22.1
Quintile 2	195	171955	20.0	16.7	23.8
Quintile 3	189	167996	15.9	13.0	19.3
Quintile 4	179	197618	18.2	14.8	22.3
Quintile 5	183	191062	13.9	11.6	16.6

Table 8.1.4: Prevalence of hyperactivity problems among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	237	225,988	4.6	3.9	5.5
State					
Johor	26	25,681	5.0	3.1	8.1
Kedah	5	5,111	1.4	0.6	3.3
Kelantan	16	13,226	3.8	2.2	6.4
Melaka	11	2,771	2.0	0.8	5.0
Negeri Sembilan	16	6,834	4.0	2.3	6.9
Pahang	30	25,571	9.9	5.8	16.3
Penang	15	14,169	6.1	3.3	11.0
Perak	17	13,858	3.4	1.5	7.6
Perlis	8	692	1.8	0.7	4.5
Selangor	39	56,538	6.1	4.2	8.9
Terengganu	15	9,893	4.0	2.2	7.4
Sabah & WP Labuan	16	17,400	3.1	1.8	5.4
Sarawak	9	17,386	4.0	1.9	8.3
WP Kuala Lumpur	9	16,252	6.5	3.3	12.3
WP Putrajaya	5	606	3.8	1.5	9.5
Location					
Urban	134	176,934	4.8	3.9	6.0
Rural	103	49,054	3.9	3.0	5.1
Sex					
Male	149	141,761	5.6	4.5	6.8
Female	88	84,226	3.6	2.8	4.6
Age Group					
5-9	149	131,850	6.3	5.1	7.8
10-15	88	94,137	3.4	2.6	4.4
Ethnicity					
Malays	171	140,037	4.7	3.8	5.7
Chinese	28	49,354	5.8	3.6	9.3
Indians	19	16,505	5.3	3.1	9.1
Other Bumiputras	15	17,117	2.7	1.5	4.6
Others	4	2,975	3.2	0.9	10.3

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	4	3,115	4.0	1.2	12.3
Primary education	139	134,513	4.2	3.4	5.2
Secondary education	5	7,773	2.4	1.0	6.1
Tertiary education					
Unclassified education	33	33,498	5.2	3.5	7.8
Income Group					
Less than RM 1000	38	30,282	5.0	3.4	7.3
RM 1000 - RM 1999	37	30,915	3.6	2.4	5.4
RM 2000 - RM 2999	50	39,448	4.9	3.3	7.3
RM 3000 - RM 3999	32	31,997	4.7	2.7	8.1
RM 4000 - RM 4999	23	30,558	6.3	3.7	10.6
RM 5000 - RM 5999	11	12,497	3.6	1.7	7.6
RM 6000 - RM 6999	10	13,432	6.0	2.5	13.3
RM 7000 - RM 7999	11	11,095	5.5	2.9	10.2
RM 8000 - RM 8999	8	4,060	2.2	0.8	5.4
RM 9000 - RM 9999	4	2,676	3.8	1.2	11.0
RM 10000 & above	13	19,028	4.3	2.1	8.5
Quintile Income Group					
Quintile 1	34	27,129	5.2	3.5	7.8
Quintile 2	38	31,216	3.6	2.4	5.4
Quintile 3	60	48,758	4.6	3.2	6.6
Quintile 4	51	58,447	5.4	3.6	8.0
Quintile 5	54	60,438	4.4	3.1	6.2

Table 8.1.5: Prevalence of peer problems among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1732	1589100	32.5	30.6	34.4
State					
Johor	131	168241	32.8	27.7	38.3
Kedah	111	105453	29.8	24.1	36.1
Kelantan	123	104547	30.3	25.7	35.2
Melaka	107	42243	30.9	24.3	38.3
Negeri Sembilan	111	60854	35.7	27.9	44.4
Pahang	101	98163	37.8	28.0	48.8
Penang	70	64833	28.0	19.1	39.1
Perak	91	83517	20.4	15.7	26.1
Perlis	81	11000	28.1	22.4	34.6
Selangor	293	317375	34.2	29.7	38.9
Terengganu	140	89560	36.9	30.9	43.3
Sabah & WP Labuan	185	207783	37.1	30.8	43.9
Sarawak	88	146916	33.6	26.6	41.4
WP Kuala Lumpur	42	81611	32.5	25.4	40.5
WP Putrajaya	58	7003	43.9	33.0	55.4
Location					
Urban	963	1163133	31.9	29.6	34.2
Rural	769	425967	34.2	31.4	37.2
Sex					
Male	918	876604	34.4	31.9	37.0
Female	814	712496	30.4	28.1	32.8
Age Group					
5-9	827	709543	33.8	31.0	36.6
10-15	905	879557	31.5	29.3	33.7
Ethnicity					
Malays	1150	901540	30.0	27.8	32.3
Chinese	212	286151	33.9	28.6	39.7
Indians	127	115228	37.1	31.0	43.7
Other Bumiputras	199	257186	39.9	34.1	45.9
Others	44	28994	31.2	23.2	40.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	39	26414	34.7	25.3	45.5
Primary education	1134	1025096	32.0	30.0	34.2
Secondary education	82	94786	29.8	23.3	37.3
Tertiary education	0	0	-	-	-
Unclassified education	218	201537	31.4	27.4	35.6
Income Group					
Less than RM 1000	267	222671	37.0	31.8	42.5
RM 1000 - RM 1999	362	325586	37.9	33.0	43.0
RM 2000 - RM 2999	306	254400	32.0	27.8	36.4
RM 3000 - RM 3999	225	220395	32.6	27.8	37.8
RM 4000 - RM 4999	170	167454	34.5	28.9	40.6
RM 5000 - RM 5999	86	83318	24.0	18.3	31.0
RM 6000 - RM 6999	59	61288	27.2	19.6	36.4
RM 7000 - RM 7999	73	71272	35.3	26.6	45.0
RM 8000 - RM 8999	60	62788	33.2	25.2	42.3
RM 9000 - RM 9999	24	18852	26.5	15.5	41.4
RM 10000 & above	100	101075	22.9	18.0	28.6
Quintile Income Group					
Quintile 1	228	197020	37.9	32.2	43.9
Quintile 2	359	316196	36.7	31.8	41.9
Quintile 3	400	337756	32.1	28.4	36.0
Quintile 4	367	368290	34.0	29.8	38.3
Quintile 5	378	369839	26.9	23.8	30.2

Table 8.1.6: Prevalence of pro-social skills among children 5-15 years old by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	619	546,097	11.2	9.8	12.7
State					
Johor	40	47,331	9.2	6.5	13.0
Kedah	38	38,344	10.9	7.9	14.7
Kelantan	46	39,559	11.4	8.3	15.4
Melaka	46	21,387	15.6	9.2	25.4
Negeri Sembilan	21	15,658	9.2	5.2	15.8
Pahang	44	51,981	20.0	9.9	36.3
Penang	18	14,097	6.1	2.4	14.4
Perak	40	28,993	7.1	4.5	10.9
Perlis	19	2,557	6.5	3.2	12.8
Selangor	146	131,810	14.2	10.9	18.4
Terengganu	34	19,966	8.1	5.5	11.8
Sabah & WP Labuan	31	32,373	5.7	3.8	8.6
Sarawak	37	59,493	13.7	8.4	21.8
WP Kuala Lumpur	20	37,680	15.0	8.5	25.0
WP Putrajaya	39	4,868	30.5	19.1	44.9
Location					
Urban	341	400,755	11.0	9.3	12.9
Rural	278	145,341	11.7	9.7	14.0
Sex					
Male	339	312,906	12.2	10.4	14.3
Female	280	233,190	10.0	8.4	11.7
Age Group					
5-9	281	223,149	10.6	9.0	12.6
10-15	338	322,947	11.5	9.9	13.4
Ethnicity					
Malays	425	320,398	10.7	9.2	12.3
Chinese	98	130,271	15.5	11.5	20.6
Indians	46	38,088	12.3	8.4	17.5
Other Bumiputras	41	50,973	7.9	5.3	11.6
Others	9	6,368	6.7	2.1	19.0

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal education	13	9,580	12.4	5.7	24.6
Primary education	429	373,580	11.7	10.0	13.6
Secondary education	30	37,103	11.6	7.7	16.9
Tertiary education	0	0	-	-	-
Unclassified education	51	50,060	7.8	5.5	11.1
Income Group					
Less than RM 1000	86	74,620	12.4	9.3	16.3
RM 1000 - RM 1999	119	94,427	11.0	8.5	14.1
RM 2000 - RM 2999	90	75,672	9.5	7.0	12.6
RM 3000 - RM 3999	101	99,474	14.7	11.1	19.2
RM 4000 - RM 4999	85	75,622	15.7	11.4	21.1
RM 5000 - RM5999	25	26,008	7.5	4.6	11.9
RM 6000 - RM 6999	21	20,489	9.1	5.4	14.9
RM 7000 - RM 7999	24	19,129	9.5	4.8	17.7
RM 8000 - RM 8999	22	19,099	10.1	6.1	16.3
RM 9000 - RM 9999	6	2,779	3.9	1.3	11.5
RM 10000 & above	40	38,778	8.8	5.6	13.5
Quintile Income Group					
Quintile 1	80	70,333	13.5	10.0	17.8
Quintile 2	113	92,601	10.8	8.3	13.9
Quintile 3	129	109,307	10.3	8.1	13.2
Quintile 4	168	156,304	14.4	11.5	18.0
Quintile 5	129	117,552	8.5	6.7	10.9

ANAEMIA

9. ANAEMIA

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9.1 Background

Anaemia is a condition where there are insufficient red blood cells to meet the human physiological needs and is usually confirmed by a haemoglobin level measurement[1]. The most common cause of anaemia is iron deficiency anaemia[2]. The World Health Organization estimated the prevalence of anaemia globally at 24.8% (95% CI 22.9, 26.7 %), and 1.62 billion people (95% CI 1.50, 1.74 billion) were affected in 2008. The highest prevalence is in preschool-aged children while the most affected group are the non-pregnant women[3]. Malaysia still lacks data on national prevalence of anaemia for the general population. A study conducted among rural communities in interior Sarawak observed the prevalence of anaemia to be 17.2% among females and 29.2% among males[4], while other studies conducted among pregnant women observed a range of prevalence from 34.6% to 42.3%[5,6]. Iron deficiency anaemia was the main cause of anaemia in the majority of cases and together with other nutritional deficiencies constituted treatable diseases that can be prevented. Anaemia in Malaysia is considered as one of the public health challenges which needs prompt action and should be monitored as a national health indicator.

9.2 Objectives

9.2.1   General Objective
- To determine the prevalence of anaemia in Malaysia.

9.2.2   Specific objectives
- To determine the overall prevalence of anaemia by socio-demographic characteristics.
- To determine the prevalence of anaemia by level of severity (mild, moderate, severe).

9.3 Target Population, Study Instrument And Definitions

The target population for anaemia in this study was all respondents aged 15 years and above. Data on anaemia were collected through haemoglobin measurement using Hemocue© point of care testing (POCT). The Hemocue© system is one of the POCT for haemoglobin measurement using capillary blood sample and has been shown to be stable and durable in field settings. The haemoglobin measurement using Hemocue© POCT is adequate for population based screening. Hemocue© POCT has been used extensively in Ministry of Health especially in the primary care setting. A validity study on Hemocue© POCT revealed sensitivity; 79%, specificity; 97% and both positive predictive value and negative predictive value were above 80%[7]. All the nurses involved in this survey as data collectors were well-trained on the usage on Hemocue© POCT. A drop of blood sample was collected using aseptic technique from the finger prick procedure. Respondents who refused to give their blood sample were classified as refused and no data were collected. All the results were recorded. Definition on anaemia cut-offs is based on Table 1 below.

Table 1: Haemoglobin levels to diagnose anaemia at sea level (g/l)±

Population	Non Anaemia*	Anaemia*		
		Mild	Moderate	Severe
Children 6-59 months of age	110 or higher	100-109	70-99	lower than 70
Children 5-11 years of age	115 or higher	110-114	80-109	lower than 80
Children 12-14 years of age	120 or higher	110-119	80-109	lower than 80
Non-pregnant women (15 years of age and above)	120 or higher	110-119	80-109	lower than 80
Pregnant women	110 or higher	100-109	70-99	lower than 70
Men (15 years of age and above)	130 or higher	110-109	80-109	lower than 80

*Haemoglobin in grams per litre
Source: WHO. Iron deficiency anaemia: assessment, prevention, and control. A guide for programme managers. Geneva, World Health Organization, 2001 (WHO/NHD/01.3)

9.4 Findings

Total number of respondents who responded to this topic was 5410. The overall prevalence of anaemia in Malaysia was 24.6% (95%CI 23.5, 25.6) and with an estimated projection to 4,945,188 populations. Prevalence of mild, moderate, and severe anaemia were 15.7% (95%CI 15.0, 16.5), 7.9% (95%CI 7.4, 8.5) and 1.0% (95%CI 0.8, 1.2) respectively. By state, the highest prevalence of anaemia were 29.7% (95%CI 26.2, 33.4) in Negeri Sembilan and 29.7% (95%CI 26.1, 33.6) in Terengganu while the lowest was in Sarawak at 19.1% (95%CI 15.9, 22.9). By strata, the prevalence of anaemia was 24.7% (95%CI 23.5, 26.0) in urban and 24.3% (95%CI 22.8, 25.8) in rural settings. By gender, the prevalence of anaemia was significantly higher among females; 35.5% (95%CI 34.1, 37.0) than males; 14.3% (95%CI 13.3, 15.4). By ethnicity, Indians had the highest prevalence of anaemia at 30.8% (95%CI 28.0, 33.8), followed by Malays at 25.9% (95%CI 24.7, 27.2) and lastly Chinese at 23.0% (95%CI 21.1, 25.2). Prevalence of anaemia was highest among respondents with no formal education (32.3%; 95%CI: 28.9, 35.9).

9.5 Conclusion

The national prevalence of anaemia is similar with the estimated global prevalence by the World Health Organization in 2008. Prevalence of mild anaemia contributed the most as compared to prevalence of moderate and severe anaemia. Anaemia still remains a health challenge to the female population, those of Indian ethnicity and those with no formal education.

9.6 References

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Table 9.1.1: Prevalence of anaemia by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	5,410	4,945,188	24.6	23.6	25.6
State					
Johor	443	553,891	23.5	21.1	26.1
Kedah	293	297,423	24.4	21.7	27.4
Kelantan	291	237,853	21.9	19.4	24.6
Melaka	298	141,423	27.5	23.2	32.4
Negeri Sembilan	389	187,919	29.7	26.2	33.4
Pahang	290	223,838	21.4	19.0	24.2
Pulau Pinang	384	308,754	25.7	19.7	32.8
Perak	434	439,607	25.6	22.9	28.5
Perlis	406	47,502	28.2	25.1	31.5
Selangor	718	987,745	25.3	22.8	28.0
Terengganu	403	218,921	29.7	26.1	33.6
Sabah & WP Labuan	474	600,194	24.8	21.7	28.1
Sarawak	272	352,161	19.1	15.9	22.9
WP Kuala Lumpur	204	336,288	27.6	22.8	32.8
WP Putrajaya	111	11,670	22.9	18.9	27.5
Location					
Urban	2,981	3,722,718	24.7	23.5	26.0
Rural	2,429	1,222,470	24.3	22.8	25.8
Sex					
Male	1,636	1,485,820	14.3	13.3	15.4
Female	3,774	3,459,368	35.5	34.1	37.0
Age Group					
0-4	-	-	-	-	-
5-9	-	-	-	-	-
10-14	-	-	-	-	-
15-19	471	500,570	21.6	19.4	23.8
20-24	377	531,690	20.4	18.1	22.9
25-29	479	567,098	22.0	19.6	24.7
30-34	464	551,665	22.8	20.4	25.4
35-39	454	447,476	23.3	20.9	26.0
40-44	483	433,092	25.3	22.8	28.0
45-49	507	419,113	26.9	24.3	29.8
50-54	458	344,775	24.4	21.9	27.2
55-59	411	304,253	25.8	23.1	28.7
60-64	401	265,848	30.1	27.0	33.5
65-69	306	197,757	31.0	27.3	35.0
70-74	247	129,779	34.4	29.0	40.3
75+	352	252,072	48.7	43.8	53.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	3,431	2,604,560	25.9	24.7	27.2
Chinese	753	1,012,235	23.0	21.1	25.2
Indians	479	422,452	30.8	28.0	33.8
Other Bumiputras	483	546,247	23.5	20.5	26.8
Others	264	359,694	18.3	15.5	21.4
Marital Status					
Single	1,081	1,251,795	19.2	17.7	20.7
Married	3,619	3,225,507	26.3	25.1	27.5
Widow/widower/divorcee	710	467,887	36.0	32.9	39.3
Education Level					
No formal education	473	362,991	32.3	28.9	35.9
Primary education	1,400	1,042,984	25.4	23.7	27.3
Secondary education	2,448	2,328,275	23.8	22.5	25.1
Tertiary education	1,020	1,146,477	24.1	22.4	25.9
Unclassified education	66	63,418	19.3	14.3	25.6
Occupation					
Government/semi government employee	501	444,813	24.4	21.8	27.2
Private employee	1,220	1,438,507	19.4	18.0	21.0
Self employed	882	713,410	22.0	20.4	23.8
Unpaid worker/home maker	1,153	997,872	36.4	34.1	38.9
Retiree	212	150,186	26.3	22.6	30.4
Income Group					
Less than RM 1000	1,053	777,646	28.3	26.2	30.6
RM 1000 - RM 1999	988	820,568	24.4	22.4	26.5
RM 2000 - RM 2999	890	756,548	22.7	20.7	24.9
RM 3000 - RM 3999	666	640,694	25.2	22.9	27.7
RM 4000 - RM 4999	463	455,164	23.1	20.6	26.0
RM 5000 - RM 5999	372	398,643	25.2	22.1	28.6
RM 6000 - RM 6999	231	250,273	24.1	20.6	28.0
RM 7000 - RM 7999	195	175,019	22.0	18.2	26.3
RM 8000 - RM 8999	159	184,318	27.6	23.3	32.3
RM 9000 - RM 9999	84	97,946	27.2	20.5	35.1
RM 10000 & above	309	388,369	22.6	19.7	25.7
Quintile Income Group					
Quintile 1	916	673,128	28.7	26.4	31.2
Quintile 2	1,017	848,343	24.4	22.3	26.5
Quintile 3	1,121	944,082	22.6	20.8	24.5
Quintile 4	1,110	1,101,293	25.2	23.4	27.1
Quintile 5	1,246	1,378,343	24.0	22.3	25.9

Table 9.1.2: Prevalence of anaemia level by socio-demographic characteristics

Sociodemographic Characteristics	MILD ANEMIA					MODERATE ANEMIA					SEVERE ANEMIA				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	3,416	3,157,301	15.7	15.0	16.5	1,787	1,591,493	7.9	7.4	8.5	207	196,394	1.0	0.8	1.2
State															
Johor	286	364,995	15.5	13.4	17.9	138	168,206	7.1	5.9	8.7	19	20,690	0.9	0.5	1.5
Kedah	191	203,430	16.7	14.0	19.9	89	83,648	6.9	5.4	8.8	13	10,345	0.8	0.5	1.5
Kelantan	186	152,403	14.0	11.9	16.4	99	80,870	7.4	6.0	9.2	6	4,579	0.4	0.2	1.1
Melaka	192	94,936	18.5	14.9	22.7	96	40,747	7.9	6.2	10.2	10	5,740	1.1	0.5	2.5
Negeri Sembilan	225	110,011	17.4	14.5	20.7	156	74,159	11.7	9.7	14.0	8	3,749	0.6	0.3	1.3
Pahang	185	153,625	14.7	12.7	17.0	95	64,924	6.2	4.8	8.0	10	5,289	0.5	0.3	1.0
Penang	251	211,138	17.6	13.8	22.1	124	89,576	7.5	4.6	12.0	9	8,040	0.7	0.2	2.0
Perak	253	269,158	15.7	13.5	18.2	167	158,276	9.2	7.5	11.2	14	12,173	0.7	0.4	1.4
Perlis	263	31,198	18.5	15.6	21.9	131	14,753	8.8	6.9	11.1	12	1,550	0.9	0.5	1.9
Selangor	435	587,503	15.1	13.5	16.8	234	331,380	8.5	7.0	10.2	49	68,863	1.8	1.1	2.8
Terengganu	294	160,226	21.7	18.7	25.2	101	55,550	7.5	5.6	10.1	8	3,144	0.4	0.2	0.9
Sabah & WP Labuan	274	359,527	14.8	12.7	17.3	174	211,542	8.7	7.1	10.8	26	29,125	1.2	0.7	2.0
Sarawak	167	216,620	11.8	9.6	14.5	93	122,534	6.7	5.1	8.7	12	13,007	0.7	0.4	1.4
WP Kuala Lumpur	138	234,407	19.2	15.7	23.3	61	92,402	7.6	5.4	10.6	5	9,479	0.8	0.3	1.8
WP Putrajaya	76	8,124	16.0	12.5	20.2	29	2,925	5.7	4.0	8.2	6	621	1.2	0.5	3.1
Location															
Urban	1,905	2,393,896	15.9	15.0	16.8	959	1,176,252	7.8	7.1	8.6	117	152,569	1.0	0.8	1.3
Rural	1,511	763,405	15.2	14.1	16.3	828	415,241	8.2	7.4	9.2	90	43,825	0.9	0.6	1.2
Sex															
Male	1,345	1,245,965	12.0	11.1	13.0	234	187,553	1.8	1.5	2.2	57	52,302	0.5	0.3	0.8
Female	2,071	1,911,336	19.6	18.6	20.7	1,553	1,403,940	14.4	13.4	15.5	150	144,092	1.5	1.2	1.8

Sociodemographic Characteristics	MILD ANEMIA					MODERATE ANEMIA					SEVERE ANEMIA				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Age Group															
15-19	306	309,156	13.3	11.6	15.2	156	185,768	8.0	6.6	9.7	9	5,646	0.2	0.1	0.6
20-24	246	328,357	12.6	10.9	14.6	115	180,400	6.9	5.5	8.6	16	22,933	0.9	0.5	1.6
25-29	307	376,005	14.6	12.6	17.0	149	153,885	6.0	4.9	7.3	23	37,207	1.4	0.8	2.7
30-34	310	373,686	15.5	13.6	17.6	138	157,709	6.5	5.2	8.1	16	20,271	0.8	0.5	1.6
35-39	286	288,196	15.0	12.9	17.4	144	138,835	7.2	6.0	8.8	24	20,445	1.1	0.7	1.7
40-44	287	270,842	15.8	13.8	18.1	178	146,696	8.6	7.2	10.2	18	15,555	0.9	0.5	1.6
45-49	269	229,760	14.8	12.8	17.0	209	163,227	10.5	8.9	12.3	29	26,126	1.7	1.1	2.7
50-54	288	229,900	16.3	14.1	18.8	149	101,448	7.2	5.8	8.8	21	13,426	1.0	0.6	1.6
55-59	282	204,994	17.4	15.2	19.8	116	89,881	7.6	6.0	9.7	13	9,378	0.8	0.4	1.5
60-64	273	188,458	21.4	18.5	24.6	114	69,021	7.8	6.1	10.0	14	8,369	0.9	0.5	1.8
65-69	207	136,543	21.4	18.1	25.2	95	59,345	9.3	7.1	12.1	4	1,868	0.3	0.1	1.0
70-74	153	76,533	20.3	16.4	24.9	89	49,998	13.3	8.9	19.3	5	3,248	0.9	0.3	2.5
75+	202	144,871	28.0	23.8	32.7	135	95,280	18.4	14.9	22.6	15	11,922	2.3	1.2	4.2
Ethnicity															
Malays	2,199	1,678,455	16.7	15.8	17.7	1,115	835,475	8.3	7.6	9.1	117	90,630	0.9	0.7	1.1
Chinese	505	683,299	15.5	13.9	17.4	219	281,019	6.4	5.4	7.5	29	47,917	1.1	0.6	2.0
Indians	258	233,209	17.0	14.6	19.7	193	167,537	12.2	10.2	14.7	28	21,706	1.6	1.0	2.4
Other Bumiputras	269	311,831	13.4	11.7	15.4	188	211,518	9.1	7.3	11.3	26	22,897	1.0	0.6	1.6
Others	185	250,507	12.7	10.5	15.3	72	95,943	4.9	3.5	6.7	7	13,244	0.7	0.3	1.6
Marital Status															
Single	708	813,861	12.5	11.3	13.7	330	386,749	5.9	5.1	6.8	43	51,185	0.8	0.5	1.4
Married	2,317	2,077,607	16.9	16.0	17.9	1,170	1,024,701	8.3	7.7	9.1	132	123,199	1.0	0.8	1.3
Widow/widower/divorcee	391	265,833	20.5	17.9	23.2	287	180,044	13.9	11.5	16.6	32	22,010	1.7	1.0	2.7
Education Level															
No formal education	277	209,047	18.6	16.0	21.5	180	141,694	12.6	10.5	15.1	16	12,249	1.1	0.6	2.0
Primary education	875	648,690	15.8	14.5	17.2	477	363,235	8.9	7.7	10.2	48	31,058	0.8	0.5	1.1
Secondary education	1,550	1,514,742	15.5	14.5	16.6	803	720,711	7.4	6.7	8.1	95	92,823	0.9	0.7	1.2
Tertiary education	670	738,439	15.5	14.2	17.0	305	350,590	7.4	6.4	8.5	45	57,448	1.2	0.7	2.0
Unclassified education	43	45,526	13.9	9.7	19.4	20	15,077	4.6	2.7	7.8	3	2,815	0.9	0.2	3.1

Sociodemographic Characteristics	MILD ANEMIA					MODERATE ANEMIA					SEVERE ANEMIA				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation															
Government/semi government employee	321	294,866	16.2	14.0	18.7	157	131,899	7.2	5.9	8.9	23	18,048	1.0	0.6	1.7
Private employee	803	953,993	12.9	11.8	14.1	372	428,894	5.8	5.1	6.6	45	55,620	0.8	0.5	1.2
Self employed	633	519,158	16.0	14.5	17.7	217	168,289	5.2	4.4	6.2	32	25,963	0.8	0.5	1.2
Unpaid worker/home maker	638	556,273	20.3	18.5	22.2	468	392,940	14.3	12.7	16.2	47	48,659	1.8	1.2	2.6
Retiree	150	107,003	18.7	15.6	22.4	52	37,913	6.6	4.8	9.2	10	5,270	0.9	0.5	1.9
Income Group															
Less than RM 1000	637	475,817	17.3	15.6	19.2	381	272,942	9.9	8.7	11.4	35	28,886	1.1	0.7	1.6
RM 1000 - RM 1999	599	491,358	14.6	13.1	16.2	353	300,883	8.9	7.6	10.5	36	28,327	0.8	0.5	1.3
RM 2000 - RM 2999	573	485,106	14.6	13.0	16.3	283	248,103	7.5	6.3	8.8	34	23,338	0.7	0.5	1.1
RM 3000 - RM 3999	415	406,609	16.0	14.1	18.1	223	207,466	8.2	6.9	9.7	28	26,620	1.0	0.6	1.7
RM 4000 - RM 4999	303	310,150	15.8	13.7	18.1	141	124,756	6.3	5.1	7.9	19	20,257	1.0	0.6	1.8
RM 5000 - RM 5999	244	266,109	16.8	14.3	19.7	119	123,726	7.8	6.0	10.1	9	8,808	0.6	0.2	1.4
RM 6000 - RM 6999	147	157,445	15.2	12.5	18.3	75	83,096	8.0	6.1	10.5	9	9,732	0.9	0.3	2.7
RM 7000 - RM 7999	134	118,496	14.9	12.1	18.2	52	47,325	5.9	4.0	8.8	9	9,199	1.2	0.5	2.4
RM 8000 - RM 8999	98	117,592	17.6	14.0	21.8	54	58,569	8.8	6.3	12.1	7	8,156	1.2	0.5	2.9
RM 9000 - RM 9999	54	58,989	16.4	11.6	22.6	26	33,268	9.2	6.0	13.9	4	5,690	1.6	0.5	5.1
RM 10000 & above	212	269,628	15.7	13.4	18.3	80	91,361	5.3	4.1	6.9	17	27,380	1.6	0.9	2.9
Quintile Income Group															
Quintile 1	561	419,135	17.9	16.1	19.9	323	229,027	9.8	8.5	11.3	32	24,965	1.1	0.7	1.6
Quintile 2	610	497,008	14.3	12.8	15.9	374	323,118	9.3	7.9	10.9	33	28,217	0.8	0.5	1.3
Quintile 3	717	607,209	14.5	13.2	16.0	362	307,257	7.4	6.3	8.5	42	29,616	0.7	0.5	1.0
Quintile 4	707	719,632	16.5	15.0	18.0	356	331,928	7.6	6.6	8.7	47	49,733	1.1	0.8	1.6
Quintile 5	821	914,317	15.9	14.6	17.4	372	400,163	7.0	6.1	8.0	53	63,863	1.1	0.7	1.8

DENGUE PREVENTION BEHAVIOUR

10 DENGUE PREVENTION BEHAVIOUR

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10.1   Background

Dengue is among the most important vector-borne diseases of the public health importance. It is endemic in Malaysia with frequent epidemics in urban areas. Community participation is one of the critical components in dengue prevention and it needs to be emphasized continuously.

10.2   Objectives

10.2.1 General Objective
- To describe community's participation on dengue control and prevention in the general population

10.2.2 Specific Objectives
- To describe the practices of the community towards dengue prevention in the general population
- To describe the perception of the community on dengue prevention practices in the general population
- To identify the accessibility of health promotion materials for the prevention of dengue in the   general population.

10.3   Target Population, Study Instrument And Definitions

Data on dengue were obtained from adult respondents aged 18 years and above via face-to-face interviews by trained research assistants using pre-coded questionnaires. A total of 19,924 eligible respondents were interviewed in this survey. A set of 24 questions were asked to all adults of the selected living quarters and all answers from respondents were recorded into e-NHMS 2015 application. The scopes of the questionnaires included components of knowledge, perception and practice of the respondents in the dengue prevention.

Definition of Terms/Variables

    i.   Dengue fever
          A disease characterized by a sudden onset of high grade fever and associated with sign and symptoms of headache, myalgia retro-orbital pain, loss of appetite, and sometimes vomiting, loose stool and abdominal pain

    ii.   Containers
          Any objects or structures that can hold and accumulate water.

    iii.   Larvicide
          A substance use to kill mosquito larva by putting inside the water containers.

iv.   Fogging
An activity of spraying anti-mosquito chemical using a specific device.

v.   *Gotong-royong*
A special activity involving participation of the community affected with the dengue fever to clean up and get rid of any objects or structures which can hold and accumulate water.

vi.   Mosquito biting time
Early morning (6-8am) and evening/dusk (6-8pm).

vii.   Dengue health education material
Any printed material contains all the information about dengue such as flyers/ pamphlet/ booklet.

10.4   Findings

In the past 12 months prior to the survey, 62.3% (95% CI: 60.6, 63.9) of the respondents followed the suggestion by the Ministry of Health to "search and destroy" their homes and surroundings to eliminate mosquito breeding sites at least once a week. Terengganu recorded the highest prevalence of 47.9% (95% CI: 41.1, 54.7) while Kelantan recorded the lowest prevalence of 24.3% (95% CI: 20.7, 28.2). There were no significant differences in terms of ethnicity, strata, gender and education level.

In this survey, the findings indicated that 76.0% (95% CI: 74.7, 77.2) of the respondents cleaned the containers, changed water and disposed off unwanted containers [73.2% (95% CI: 71.7, 74.8)] and added larvicide 12.9% (95% CI: 11.9, 13.9) to eliminate indoor breeding sites. Moreover, to eliminate outdoor breeding sites, majority of the respondents [86.9% (95% CI: 85.9, 87.8)] disposed off containers that could hold water around their houses.

More than half of the respondents [64.3% (95% CI: 62.3, 66.3)] stated that there were fogging activities carried out by the Health Department/Local Authority in their neighbourhoods. The percentages of communities carried out the search and destroy activities through *gotong-royong* was 30.6% (95% CI: 28.7, 32.5). However only 58.3% (95% CI: 56.0, 60.5) involved in the *gotong-royong* activity.

The percentage of knowledge on active biting time for *Aedes* mosquitoes among adults was 39.6% (95% CI: 37.9, 41.2). Negeri Sembilan reported having the highest prevalence with 66.2% (95% CI: 59.5, 72.3) and Sabah (including WP Labuan) reported to have the lowest prevalence with 26.8% (95% CI: 22.8, 31.2). There was significant difference on the prevalence of knowledge on active *Aedes* mosquito biting time among urban 41.1% (95% CI: 39.1, 43.2) and rural 34.5% (95% CI: 31.9, 37.2) dwellers.

The method used to prevent mosquito bites among adults was mostly by using insecticide aerosol spray [72.2% (95% CI: 70.8, 73.5)]. Other method frequently used were by: 1) avoiding staying outdoor during mosquito active biting time [24.7% (95% CI: 23.2, 26.2)], 2) using mosquito coils [22.8% (95% CI: 21.6, 24.2)] and 3) wearing long pants and long-sleeved shirts [15.1% (95% CI: 14.0, 16.4)].

Most of the respondents [83.9% (95% CI: 82.7, 84.9)] reported that they did not use larvicide. The reasons for not using were: 1) did not have water storage containers in their houses [45.4% (95% CI: 43.6, 47.2)], 2) did not know there was larvicide [17.9% (95% CI: 16.5, 19.5)] and, 3) did not know where to get the larvicide [16.3% (95% CI: 15.1, 17.5)]. For those who used larvicide [16.1% (95% CI: 15.1, 17.3)], most of them recived from the Health Department or Local Authority staff [45.9% (95% CI: 42.6, 49.2)], bought from the supermarkets [29.2% (95% CI: 26.5, 32.0)] or got it for free from the government health facilities [11.5% (95% CI: 9.9, 13.3)]. Most of them who used larvicide read the instructions at the packaging before using it [85.8% (95% CI: 83.7, 87.7)] and used the larvicide according to the instruction [87.5% (95% CI: 85.6, 89.2)].

Among those who used larvicide, 87.8% (95% CI: 86.0, 89.5) used for water storage containers at home, 34.1% (95% CI: 31.2, 37.0) used for flower pot liners and 26.7% (95% CI: 24.0, 29.5) used for containers for aquatic plants.

Nearly half of the respondents [46.2% (95% CI: 44.9, 47.5)] claimed that if they had fever they would seek treatment from clinics or hospitals on second day of the fever whereas 9.2% (95% CI: 8.5, 9.9) would not seek treatment.

The prevalence of respondents who received dengue health promotion materials was 17.0% (95% CI: 15.9, 18.2). Wilayah Persekutuan Putrajaya had the highest prevalence [38.1% (95% CI: 31.7, 44.9)] while Kedah had the lowest [7.1% (95% CI: 4.7, 10.7)]. Among those who received dengue health promotion materials, 66.9% (95% CI: 64.1, 69.5) received flyers while 63.8% (95% CI: 61.2, 66.4) received pamphlets.

Majority of the respondents [95.8% (95% CI: 95.2, 96.2)] knew that dengue can cause death. A total of, 71.5% (95% CI: 69.9, 73.0) respondents would seek medical treatment immediately if they had fever, 56.0% (95% CI: 54.4, 57.6) would carry out search and destroy activities at their houses when they knew that their neighbours were infected with dengue fever.

Almost half of the respondents [47.8% (95% CI: 45.3, 50.4)] stated to use covered garbage containers to dispose their garbage and 36.6% (95% CI: 34.3, 39.0) reported disposed off their garbage in allocated areas provided. Majority of the respondents 83.3% (95% CI: 81.7, 84.7) reported that cleanliness outside their premises was their responsibilities.

On the action to be taken if there was abandoned garbage around their house 65.4% (95% CI: 63.6, 67.2) of the respondents would clean it themselves, followed by reporting to local authorities [23.3% (95% CI: 21.7, 24.9)]. More than 90% [93.1% (95% CI: 92.4, 93.8)] of the respondents believed there was a relationship between domestic waste garbage and dengue infection.

10.5   Conclusion

In general, respondents perceived that dengue fever is a threat that may lead to death. However, the respondents did not get treatment immediately after they had fever. Additionally, participation in search and destroy activities *(gotong-royong)* and usage of larvicide were poor among respondents. More than half of the respondents eliminated dengue breeding sites inside and outside their houses. More than half of the respondents noticed fogging activities carried out by the Health Department/Local Authority in their neighbourhoods. Majority of the respondents were aware that it is their responsibilities to clean domestic waste outside their houses. Majority of the respondents believed there was an association between waste disposal and dengue infection. Only a small proportion of the respondents received dengue health education materials.

Table 10.1.1: Prevalence of adults who did not check their home at least once a week to eliminate mosquito breading site (aged≥ 18 years old) by socio-demographic

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	7,176	7,562,376	37.7	36.1	39.4
State					
Johor	667	926,200	39.2	34.6	44.0
Kedah	393	444,057	33.8	25.8	42.9
Kelantan	268	241,327	24.3	20.8	28.3
Melaka	274	156,327	27.5	20.3	36.2
Negeri Sembilan	436	260,637	39.0	32.9	45.4
Pahang	470	417,948	42.1	36.2	48.3
Pulau Pinang	609	547,937	45.6	37.9	53.6
Perak	411	523,802	32.0	26.2	38.3
Perlis	537	74,129	46.3	39.3	53.5
Selangor	1,034	1,617,119	38.9	35.2	42.8
Terengganu	561	327,698	47.9	41.1	54.7
Sabah & WP Labuan	455	665,643	29.1	25.5	33.0
Sarawak	570	808,180	46.6	41.2	52.1
WP Kuala Lumpur	300	532,250	43.0	36.6	49.5
WP Putrajaya	191	19,120	39.5	32.9	46.5
Location					
Urban	4,206	5,789,902	37.9	36.0	39.9
Rural	2,970	1,772,473	37.2	34.6	39.8
Sex					
Male	3,670	4,106,661	39.8	37.8	41.8
Female	3,506	3,455,715	35.6	33.9	37.4
Age Group					
18-19	393	482,040	50.8	46.1	55.6
20-24	894	1,272,498	45.4	42.2	48.6
25-29	924	1,202,795	43.7	40.6	46.9
30-34	815	1,013,601	38.9	35.8	42.1
35-39	652	713,380	34.5	31.2	37.9
40-44	563	601,853	32.6	29.6	35.8
45-49	562	512,220	30.7	27.9	33.6
50-54	550	450,724	30.0	27.2	33.0
55-59	475	366,342	29.0	26.2	32.1
60-64	402	280,483	30.0	26.5	33.7
65-69	342	231,718	33.5	29.1	38.3
70-74	248	168,168	42.2	36.2	48.4
75+	356	266,554	47.8	43.0	52.7

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	4,379	3,666,082	37.2	35.3	39.1
Chinese	1,229	1,840,406	39.1	35.8	42.6
Indians	473	461,436	33.9	29.6	38.4
Other Bumiputras	633	826,207	38.4	34.4	42.7
Others	462	768,245	39.2	33.6	45.0
Marital Status					
Single	1,947	2,602,300	46.7	44.0	49.4
Married	4,490	4,423,971	33.8	32.1	35.6
Widow/widower/divorcee	739	536,105	38.5	35.1	42.1
Education Level					
No formal education	525	466,728	40.6	36.3	45.0
Primary education	1,696	1,523,083	37.5	35.0	40.1
Secondary education	3,180	3,362,533	36.2	34.4	38.1
Tertiary education	1,676	2,085,726	39.7	37.2	42.2
Unclassified education	93	119,500	43.4	34.1	53.1
Occupation					
Government/semi government employee	755	678,055	35.3	32.2	38.5
Private employee	2,472	3,253,282	41.1	38.8	43.4
Self employed	1,279	1,154,585	34.1	31.6	36.7
Unpaid worker/home maker	903	839,035	29.2	27.0	31.6
Retiree	208	176,098	29.0	24.9	33.4
Income Group					
Less than RM 1000	1,129	1,024,199	37.7	34.8	40.7
RM 1000 - RM 1999	1,283	1,215,772	36.9	34.3	39.6
RM 2000 - RM 2999	1,199	1,265,301	38.9	36.0	42.0
RM 3000 - RM 3999	938	972,539	37.8	34.9	40.7
RM 4000 - RM 4999	606	695,048	35.3	31.8	38.9
RM 5000 - RM 5999	541	607,781	38.3	34.3	42.6
RM 6000 - RM 6999	339	370,165	35.6	30.6	41.0
RM 7000 - RM 7999	299	340,336	42.3	36.4	48.4
RM 8000 - RM 8999	200	232,435	34.2	28.5	40.3
RM 9000 - RM 9999	123	140,766	40.6	33.3	48.3
RM10000 & above	519	698,033	39.2	35.2	43.3
Quintile Income Group					
Quintile 1	970	880,943	37.8	34.7	41.0
Quintile 2	1,312	1,256,108	36.9	34.3	39.6
Quintile 3	1,522	1,586,827	38.4	35.7	41.1
Quintile 4	1,472	1,614,067	36.8	34.3	39.3
Quintile 5	1,900	2,224,432	38.4	36.0	40.9

Table 10.1.2: Methods used to eliminate indoor mosquito breeding sites among adults (aged≥ 18 years old)

Method to eliminate mosquito breeding site	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Clean container and change water	14,919	15,103,521	76.0	74.7	77.2
Add larvicide	2,809	2,562,498	12.9	11.9	14.0
Dispose of unwanted container	14,514	14,555,273	73.2	71.7	74.8
Others	820	875,372	4.4	3.9	5.0

Table 10.1.3: Methods used to eliminate outdoor mosquito breeding sites among adults (aged≥ 18 years old)

Method to eliminate mosquito breeding site	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Dispose of containers that can hold water	17,172	17,288,305	86.9	85.9	87.8
Close tightly water container with lid	7,180	7,516,535	37.8	36.1	39.5
Add larvicide	2,710	2,512,305	12.6	11.7	13.7
Stop using containers that can hold water	7,822	7,954,120	40.0	38.2	41.8
Organize family search and destroy activities	5,066	5,236,562	26.3	24.9	27.8
Clean rain gutters	2,693	2,783,525	14.0	13.0	15.1
Trim overgrown branch that cover rain gutters	2,763	2,615,100	13.1	12.1	14.3
Others	547	574,779	2.9	2.5	3.4

Table 10.1.4: Prevalence of knowledge of active biting time for Aedes mosquitoes among adults (aged ≥18 years old)

Active biting time	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Early morning	1,119	1,124,564	5.7	5.2	6.3
Noon	64	85,191	0.4	0.3	0.6
Evening/dusk	9,086	9,323,560	47.6	46.0	49.1
Early morning & evening /dusk	8,012	7,750,537	39.6	37.9	41.2
Midnight	1,059	1,314,549	6.7	6.0	7.5

Table 10.1.5: Prevalence of correct knowledge on active biting time for Aedes mosquitoes among adults (aged ≥18 years old) by socio-demographic characteristic

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	8,012	7,750,537	39.5	37.9	41.2
State					
Johor	556	730,195	31.6	27.4	36.1
Kedah	657	713,113	55.0	46.3	63.4
Kelantan	487	412,106	41.7	36.8	46.8
Melaka	389	198,716	36.3	27.2	46.5
Negeri Sembilan	744	428,300	66.2	59.6	72.3
Pahang	380	301,392	30.5	26.1	35.3
Pulau Pinang	519	439,646	37.8	30.3	46.0
Perak	691	750,808	47.1	40.7	53.6
Perlis	581	73,245	46.7	38.7	54.9
Selangor	1,165	1,737,547	43.0	38.9	47.2
Terengganu	445	242,893	35.7	27.1	45.3
Sabah & WP Labuan	429	594,049	26.8	22.8	31.2
Sarawak	360	539,903	32.0	27.3	37.1
WP Kuala Lumpur	305	558,150	45.6	40.8	50.5
WP Putrajaya	304	30,474	63.1	50.5	69.5
Location					
Urban	4,807	6,139,624	41.1	39.1	43.2
Rural	3,205	1,610,913	34.5	31.9	37.2
Sex					
Male	3,904	4,005,592	39.8	37.7	41.8
Female	4,108	3,744,945	39.3	37.4	41.3
Age Group					
18-19	287	313,840	33.4	29.3	37.9
20-24	660	951,331	34.6	31.6	37.6
25-29	836	1,010,293	37.4	34.6	40.4
30-34	863	995,127	38.7	35.7	41.9
35-39	815	862,447	42.6	39.3	45.9
40-44	774	760,165	42.0	38.7	45.3
45-49	827	741,881	45.2	42.0	48.4
50-54	849	660,377	45.0	41.5	48.6
55-59	666	500,697	40.9	37.3	44.5
60-64	543	368,222	40.5	36.6	44.6
65-69	391	260,125	39.0	34.4	43.8
70-74	253	142,392	38.0	32.4	44.0
75+	248	183,641	35.2	30.4	40.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Ethnicity					
Malays	5,400	4,224,722	43.2	41.2	45.3
Chinese	1,187	1,787,631	39.3	35.8	42.9
Indians	642	602,614	45.6	40.4	50.8
Other Bumiputras	469	619,707	29.6	25.5	33.9
Others	314	515,862	27.8	23.3	32.8
Marital Status					
Single	5,400	1,995,619	36.7	34.3	39.2
Married	1,187	5,260,762	41.0	39.3	42.9
Widow/widower/divorcee	720	494,156	36.9	33.6	40.2
Education Level					
No formal education	386	327,292	30.5	26.4	35.0
Primary education	1,675	1,352,628	34.6	32.0	37.3
Secondary education	3,770	3,657,535	40.0	38.0	42.0
Tertiary education	2,089	2,291,884	44.1	41.8	46.4
Unclassified education	84	113,275	43.9	34.5	53.8
Occupation					
Government/semi government employee	1,115	893,595	46.9	43.5	50.4
Private employee	2,341	2,905,303	37.5	35.4	39.6
Self employed	1,568	1,385,271	41.7	39.0	44.4
Unpaid worker/home maker	1,253	1,069,318	37.9	35.4	40.6
Retiree	397	283,990	48.2	43.4	53.1
Income Group					
Less than RM 1000	1,164	952,360	36.6	33.7	39.6
RM 1000 - RM 1999	1,379	1,173,604	36.7	34.1	39.4
RM 2000 - RM 2999	1,306	1,239,135	38.8	36.0	41.8
RM 3000 - RM 3999	1,023	984,999	38.7	35.7	41.8
RM 4000 - RM 4999	764	791,141	41.1	37.5	44.8
RM 5000 - RM 5999	587	625,093	40.2	36.3	44.3
RM 6000 - RM 6999	420	440,127	42.7	37.6	48.0
RM 7000 - RM 7999	329	318,173	40.2	35.3	45.3
RM 8000 - RM 8999	261	284,937	42.9	37.2	48.8
RM 9000 - RM 9999	151	165,945	48.1	40.0	56.3
RM10000 & above	628	775,023	44.3	40.1	48.6
Quintile Income Group					
Quintile 1	1,001	810,013	36.4	33.3	39.5
Quintile 2	1,409	1,219,108	36.9	34.2	39.6
Quintile 3	1,686	1,599,033	39.4	36.8	42.0
Quintile 4	1,698	1,694,389	39.3	36.7	42.0
Quintile 5	2,218	2,427,994	42.6	40.2	45.1

Table 10.1.6: Prevalence of preventive measure taken to prevent mosquito bites among adults (aged≥ 18 years old)

Preventive measure	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Use repellent	2,036	2,304,789	11.5	10.6	12.6
Use insecticide aerosol spray	14,158	14,429,689	72.2	70.8	73.5
Use hand losyen	927	1,177,340	5.9	5.2	6.7
Wear long pants and long -sleeved shirts	2,655	3,027,939	15.1	14.0	16.4
Avoid staying outdoor during mosquito active time	4,782	4,936,682	24.7	23.2	26.2
Use mosquito patch	1,453	1,469,529	7.4	6.6	8.2
Use mosquito screens on windows and doors	738	839,601	4.2	3.7	4.8
Eating herbs	62	54,513	0.3	0.2	0.5
Sleeping under mosquito net	2,314	1,805,724	9.0	8.3	9.8
Use mosquito coil	4,804	4,566,147	22.8	21.6	24.2
Others	998	1,067,748	5.3	4.5	6.3

Table 10.1.7: Prevalence of reasons for not using larvicide among adults (aged≥ 18 years old)

Reason for not using the larvicide	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Do not know there is larvicide	2,416	2,974,711	17.9	16.5	19.5
Do not have water storage in the house	7,409	7,528,612	45.4	43.6	47.2
Do not know how to use	1,689	1,611,640	9.7	8.9	10.6
Dangerous to health	458	427,145	2.6	2.2	3.0
Do not know where to get the larvicide	2,563	2,701,687	16.3	15.1	17.5
Difficult to find	860	826,668	5.0	4.3	5.8
Expensive	43	30,646	0.2	0.1	0.3
Others	459	489,191	2.9	2.5	3.5

Table 10.1.8: Source of larvicide supply

Source of larvicide	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Given by the health department/ local authority staffs	1,797	1,471,577	45.9	42.7	49.2
Get it for free from the government health facilities	415	369,693	11.5	9.9	13.3
Buy from the supermarket	967	935,235	29.2	26.5	32.0
Buy from the hardware shop	401	339,300	10.6	8.9	12.5
Buy from the petrol station	3	2,093	0.1	0.0	0.4
Others	91	88,036	2.7	2.0	3.8

Table 10.1.9: Prevalence of places where larvicide were applied

Places where larvicide were applied	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Water storage container	3,353	2,866,254	87.8	86.0	89.5
Container for aquatic plants	948	862,675	26.7	24.0	29.5
Flower pot liner	1,184	1,101,367	34.1	31.2	37.0
Container for fresh flowers	482	458,966	14.2	12.2	16.6
Others	156	140,818	4.4	3.6	5.4

Table 10.1.10: How soon respondents sought treatment from clinic/hospital if they had fever

Day of seeking treatment	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
First day of fever	4,615	4,958,316	24.7	23.5	25.9
Second day of fever	9,485	9,279,281	46.2	44.9	47.5
Third day of fever	3,276	3,166,616	15.8	14.9	16.7
Fourth day of fever	403	440,306	2.2	1.9	2.5
Fifth day of fever and more	336	388,623	1.9	1.7	2.3
Others	1,695	1,842,918	9.2	8.5	9.9

Table 10.1.11: Prevalence of action taken among adults who did not seek treatment (aged≥ 18 years old)

Action taken	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
No action taken	278	275,137	15.0	12.5	17.8
Take paracetamol	1,270	1,396,179	75.9	72.5	79.0
Seek alternative treatment	143	169,041	9.2	7.2	11.7

Table 10.1.12: Prevalence of adults who received the health promotion material by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	3,507	3,410,189	17.0	15.9	18.2
State					
Johor	315	386,782	16.4	13.1	20.5
Kedah	98	92,972	7.1	4.7	10.7
Kelantan	417	352,219	35.0	27.8	43.0
Melaka	245	102,534	18.1	13.3	24.3
Negeri Sembilan	93	63,887	9.5	6.3	14.1
Pahang	239	182,170	18.4	14.0	23.7
Pulau Pinang	249	175,976	14.6	10.0	21.0
Perak	202	295,601	18.1	14.2	22.7
Perlis	175	22,515	14.2	9.7	20.3
Selangor	451	734,619	17.7	15.2	20.6
Terengganu	308	191,102	27.9	23.1	33.2
Sabah & WP Labuan	279	398,507	17.4	14.4	20.9
Sarawak	129	192,517	11.1	7.9	15.3
WP Kuala Lumpur	117	200,389	16.2	12.3	21.1
WP Putrajaya	190	18,399	38.1	31.7	44.9
Location					
Urban	2,200	2,663,586	17.5	16.1	18.9
Rural	1,307	746,603	15.6	13.9	17.6
Sex					
Male	1,634	1,722,026	16.7	15.4	18.1
Female	1,873	1,688,163	17.4	16.1	18.8
Age Group					
18-19	114	128,008	13.5	11.0	16.5
20-24	326	496,058	17.6	15.5	20.0
25-29	388	475,561	17.3	15.1	19.7
30-34	382	407,076	15.7	13.5	18.1
35-39	376	383,405	18.6	16.2	21.3
40-44	350	357,832	19.4	16.9	22.1
45-49	369	306,891	18.4	16.2	20.8
50-54	370	283,501	18.9	16.5	21.5
55-59	302	213,061	16.9	14.6	19.5
60-64	214	151,007	16.2	13.3	19.6
65-69	152	98,501	14.3	11.6	17.5
70-74	100	58,586	14.7	11.3	18.9
75+	64	50,704	9.2	6.7	12.5

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity					
Malays	2,490	2,071,851	21.0	19.4	22.7
Chinese	389	578,590	12.3	12.3	0.9
Indians	206	194,952	14.3	11.3	17.9
Other Bumiputras	292	353,001	16.5	13.6	19.8
Others	130	211,795	10.9	8.2	14.3
Marital Status					
Single	667	909,976	16.3	14.7	18.1
Married	2,580	2,312,422	17.7	16.5	19.0
Widow/widower/divorcee	260	187,791	13.5	11.5	15.8
Education Level					
No formal education	140	97,980	8.5	6.8	10.7
Primary education	658	541,837	13.4	11.8	15.2
Secondary education	1,644	1,599,119	17.2	15.8	18.7
Tertiary education	1,030	1,129,013	21.5	19.7	23.4
Unclassified education	34	41,940	15.5	9.8	23.8
Occupation					
Government/semi government employee	589	496,938	25.8	23.1	28.8
Private employee	1,016	1,275,966	16.1	14.6	17.8
Self employed	666	592,339	17.5	15.7	19.4
Unpaid worker/home maker	570	457,909	15.9	14.2	17.8
Retiree	154	123,234	20.3	16.8	24.4
Income Group					
Less than RM 1000	420	350,709	13.0	11.3	14.9
RM 1000 - RM 1999	558	481,791	14.7	12.9	16.6
RM 2000 - RM 2999	590	562,426	17.3	15.2	19.7
RM 3000 - RM 3999	482	492,610	19.1	16.8	21.6
RM 4000 - RM 4999	327	322,285	16.3	13.8	19.2
RM 5000 - RM 5999	271	254,869	16.2	13.5	19.3
RM 6000 - RM 6999	200	221,658	21.3	17.3	26.0
RM 7000 - RM 7999	166	162,386	20.3	16.2	25.0
RM 8000 - RM 8999	140	157,971	23.1	18.6	28.4
RM 9000 - RM 9999	70	82,773	23.9	17.1	32.3
RM10000 & above	283	320,712	18.1	15.0	21.6
Quintile Income Group					
Quintile 1	364	298,690	12.9	11.1	14.9
Quintile 2	555	490,080	14.4	12.7	16.4
Quintile 3	736	708,848	17.1	15.2	19.2
Quintile 4	771	770,018	17.5	15.7	19.6
Quintile 5	1,081	1,142,554	19.8	18.0	21.8

Table 10.1.13: Type of health promotion material received among adults (aged≥ 18 years old)

Type of health promotion material	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Flyers	2,423	2,276,386	66.9	64.1	69.5
Small book	343	312,646	9.2	7.8	10.8
Pamphlet	2,287	2,173,183	63.8	61.2	66.4
Bookmark	110	88,227	2.6	2.0	3.4
Sticker	228	218,892	6.4	5.1	8.1
Others	178	194,611	5.7	4.6	7.2

Table 10.1.14: Prevalence of adults who knew dengue can cause death (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	18,807	19,067,691	95.8	95.2	96.3
State					
Johor	1,697	2,212,840	94.9	93.2	96.1
Kedah	1,180	1,219,874	94.7	92.2	96.4
Kelantan	1,150	981,850	97.8	96.4	98.7
Melaka	1,097	537,627	95.3	92.8	96.9
Negeri Sembilan	1,160	631,181	94.1	90.5	96.4
Pahang	1,164	941,913	96.0	94.3	97.2
Pulau Pinang	1,298	1,143,978	96.1	92.9	97.9
Perak	1,287	1,552,832	94.9	92.8	96.4
Perlis	1,164	142,803	89.9	86.1	92.8
Selangor	2,614	3,959,189	95.9	94.4	97.1
Terengganu	1,158	668,077	97.4	95.8	98.4
Sabah & WP Labuan	1,536	2,196,828	97.2	95.9	98.1
Sarawak	1,170	1,649,622	95.0	92.0	96.9
WP Kuala Lumpur	657	1,181,337	96.4	93.3	98.1
WP Putrajaya	475	47,739	98.6	96.7	99.4
Location					
Urban	10,897	14,557,385	95.9	95.3	96.5
Rural	7,910	4,510,306	95.2	94.1	96.1
Sex					
Male	8,903	9,814,069	95.8	95.1	96.4
Female	9,904	9,253,622	95.8	95.0	96.4
Age Group					
18-19	756	897,139	95.2	93.1	96.8
20-24	1,791	2,663,931	94.9	93.2	96.2
25-29	2,034	2,603,694	95.5	94.2	96.6
30-34	1,986	2,465,934	95.3	93.8	96.5
35-39	1,820	1,982,992	97.0	96.0	97.8
40-44	1,701	1,754,695	95.8	94.1	97.0
45-49	1,783	1,604,564	96.5	95.1	97.5
50-54	1,814	1,444,529	96.4	95.1	97.3
55-59	1,605	1,213,276	96.2	94.8	97.2
60-64	1,270	895,013	96.2	94.5	97.4
65-69	951	657,681	96.8	95.0	98.0
70-74	635	376,252	95.6	92.3	97.6
75+	661	507,990	92.9	90.2	94.9

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity					
Malays	11,783	9,542,169	96.8	96.2	97.3
Chinese	2,955	4,398,356	94.0	92.8	95.1
Indians	1,333	1,308,757	95.9	94.1	97.2
Other Bumiputras	1,681	2,085,091	97.0	95.2	98.2
Others	1,055	1,733,320	93.1	90.8	94.9
Marital Status					
Single	3,905	5,265,155	95.0	93.9	95.9
Married	13,101	12,490,286	96.1	95.6	96.7
Widow/widower/divorcee	1,801	1,312,249	95.3	93.8	96.5
Education Level					
No formal education	1,218	1,023,495	92.9	90.4	94.8
Primary education	4,426	3,757,911	94.5	93.3	95.5
Secondary education	8,711	8,934,530	96.2	95.5	96.8
Tertiary education	4,239	5,077,845	96.5	95.7	97.2
Unclassified education	195	257,479	96.5	92.7	98.4
Occupation					
Government/semi government employee	2,145	1,888,238	98.1	97.2	98.8
Private employee	5,733	7,500,549	95.5	94.7	96.2
Self employed	3,616	3,219,614	95.4	94.2	96.3
Unpaid worker/home maker	3,170	2,757,396	96.5	95.5	97.3
Retiree	753	587,814	96.7	94.8	97.9
Income Group					
Less than RM 1000	3,003	2,526,614	94.7	93.5	95.8
RM 1000 - RM 1999	3,431	3,125,057	96.0	94.9	96.9
RM 2000 - RM 2999	3,167	3,072,791	95.2	94.1	96.2
RM 3000 - RM 3999	2,386	2,461,797	95.6	94.2	96.7
RM 4000 - RM 4999	1,706	1,916,123	97.1	95.8	98.0
RM 5000 - RM 5999	1,330	1,502,430	95.2	92.9	96.8
RM 6000 - RM 6999	889	979,461	94.4	91.8	96.2
RM 7000 - RM 7999	736	778,046	97.7	95.3	98.9
RM 8000 - RM 8999	565	656,420	96.6	94.2	98.1
RM 9000 - RM 9999	299	340,534	97.8	94.2	99.2
RM10000 & above	1,295	1,708,417	96.2	94.7	97.3
Quintile Income Group					
Quintile 1	2,583	2,163,390	94.5	93.1	95.7
Quintile 2	3,510	3,220,862	96.1	95.0	96.9
Quintile 3	4,046	3,933,333	95.5	94.5	96.3
Quintile 4	3,897	4,216,210	96.1	95.1	96.9
Quintile 5	4,771	5,533,897	96.0	95.1	96.8

Table 10.1.15: Prevalence of action taken by respondents if neighbour has been infected by dengue fever

Action taken	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
No action taken	488	603,616	3.2	2.7	3.7
Perform search and destroy activities	10,972	10,642,038	56.0	54.4	57.6
Use insecticide aerosol spray	6,054	6,088,856	32.1	30.5	33.7
Get immediate treatment if having fever	13,557	13,582,794	71.5	69.9	73.0

Table 10.1.16: Type of garbage disposal among adults (aged≥ 18 years old)

Garbage disposal	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Using covered garbage can	8,276	9,623,442	47.8	45.3	50.4
Dispose the garbage in the allocated area	7,036	7,366,761	36.6	34.3	39.0
Using the garbage pit	939	656,126	3.3	2.7	3.9
Dispose in the drain/river or roadside	243	265,645	1.3	0.9	1.9
Burn the garbage	3,264	2,079,650	10.3	9.2	11.6
Others	98	123,009	0.6	0.4	0.9

Table 10.1.17: Type of garbage disposal among adults (aged≥ 18 years old) by socio-demographic characteristics

Sociodemographic Characteristics	Using covered garbage can					Dispose the garbage in the allocated area					Using the garbage pit				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Location															
Urban	6,082	8,404,778	54.8	51.6	58.0	4,451	5,948,013	38.8	35.9	41.8	179	213,478	1.4	1.0	2.0
Rural	2,194	1,218,663	25.4	22.0	29.2	2,585	1,418,748	29.6	26.8	32.7	760	442,649	9.2	7.5	11.4
Education Level															
No formal education	384	380,698	32.7	28.0	37.8	421	404,108	34.7	29.8	40.0	94	67,662	5.8	4.2	7.9
Primary education	1,692	1,677,033	41.2	37.9	44.6	1,571	1,474,003	36.2	33.3	39.2	303	193,118	4.7	3.7	6.0
Secondary education	3,841	4,436,103	47.6	44.8	50.4	3,275	3,446,107	37.0	34.4	39.7	428	305,567	3.3	2.6	4.1
Tertiary education	2,257	2,986,039	56.6	53.3	59.9	1,684	1,931,264	36.6	33.5	39.8	104	80,356	1.5	1.1	2.1
Unclassified education	91	134,906	49.7	39.3	60.2	78	101,159	37.3	28.0	47.6	8	8,675	3.2	1.1	9.1

Sociodemographic Characteristics	Dispose in the drain/river or roadside					Burn the garbage					Others				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Location															
Urban	46	57,994	0.4	0.2	0.7	659	625,384	4.1	3.1	5.3	40	75,796	0.5	0.3	0.8
Rural	197	207,650	4.3	2.8	6.6	2,605	1,454,266	30.4	26.8	34.1	58	47,213	1.0	0.5	2.0
Education Level															
No formal education	50	56,593	4.9	3.1	7.6	394	238,598	20.5	17.1	24.4	12	16,421	1.4	0.6	3.2
Primary education	91	95,594	2.3	1.6	3.5	1,082	602,111	14.8	12.9	17.0	24	29,973	0.7	0.4	1.5
Secondary education	83	88,876	1.0	0.6	1.5	1,447	993,153	10.7	9.4	12.1	42	44,398	0.5	0.3	0.7
Tertiary education	18	23,064	0.4	0.2	0.9	309	220,802	4.2	3.5	5.1	20	32,218	0.6	0.3	1.1
Unclassified education	1	1,519	0.6	0.1	3.9	31	24,939	9.2	5.8	14.4	0	0	0.0	0.0	0.0

Table 10.1.18: Responsibility for keeping cleanliness outside respondent's premises

Responsible for the cleanliness	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Me and my family	17,343	16,743,155	83.3	81.8	84.7
Local authorities	1,465	1,920,791	9.6	8.6	10.7
Joint Management Body	602	884,459	4.4	3.6	5.4
Health Department	168	191,497	1.0	0.7	1.3
Neighbours	173	218,534	1.1	0.9	1.4
Others	86	143,218	0.7	0.5	1.1

Table 10.1.19: Action taken by respondents for abandoned garbage

Action taken	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Report to local authorities	3,852	4,673,714	23.3	21.7	25.0
Organise gotong royong	1,445	1,371,244	6.8	6.2	7.5
Clean it myself	13,726	13,124,290	65.4	63.6	67.2
Take no action	689	819,702	4.1	3.6	4.7
Others	109	84,396	0.4	0.3	0.6

TOPIC 11

TUBERCULOSIS

11 TUBERCULOSIS

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11.1   Background

Tuberculosis (TB) is an infectious airborne disease and a major global health problem. In 2013, World Health Organization (WHO) estimated about 9 million people fell ill with TB globally. However, only about 5.7 million newly diagnosed TB were reported to the national TB programmes worldwide. Therefore, it is believed that about 3 million people with TB were 'missed'[1]. This is either because they were not diagnosed or they were diagnosed but not reported. In Malaysia, the reported number of TB cases in 2014 were 24, 711 cases with notification rate of 81 per 100,000 populations. Case detection rate of new and relapse cases in 2014 was 94.5%. This was less than the targeted detection rate of 98%[2]. Thus, it is hoped that the surveillance on health seeking behaviour and TB screening of TB-like symptom will help the TB control program in Malaysia to identify gaps and challenges in order to plan effective intervention to control TB transmission.

11.2   Objectives

11.2.1 General Objective
- To determine the prevalence of TB-like symptoms in Malaysia.

11.2.2 Specific objectives
- To determine the health seeking behaviour of individuals with TB-like symptoms.
- To determine the percentage of individuals with TB-like symptoms who were screened for TB when sought treatment at either government or private health care facilities.
- To identify the reasons behind individuals with TB-like symptoms who did not seek treatment.

11.3   Methodology

11.3.1 Target Population

The tuberculosis data was obtained from respondents 15 years and above surveyed by trained research assistants using pre-coded questionnaires. Respondents were asked whether they had one or more TB-like symptoms which included coughing, coughing up phlegm, having fever and night sweats for duration of more than two weeks as well as cough up blood and unexpected loss of weight. Those individuals with TB-like symptoms who sought treatment at government and/or private healthcare facilities were asked on the TB screening offered to them by the facilities. For individuals with TB-like symptoms who did not seek any treatment were investigated further for the reasons behind their decisions.

11.3.2 *Definition of Variables/ Terms*

Individuals with TB-like symptoms were defined based on self-reporting of having one or more TB symptoms in the last one month. These symptoms included coughing, coughing up phlegm, having fever and night sweats for duration of more than two weeks as well as cough up blood and unexpected loss of weight.

Health seeking behaviour was defined as actions taken by individuals with TB-like symptoms in seeking treatment by self-medication, purchased medicines from pharmacies, seeking treatment from traditional healers as well as from government and/or private healthcare facilities.

Individuals with TB-like symptoms who sought treatment at government and/or private health care facilities were asked on the TB screening offered to them by the facilities.

TB screening was defined as individuals with TB-like symptom having sputum examination and/or chest x-ray conducted in government and/or private healthcare facilities.

11.4   Findings

A total of 1,380 respondents were found to have TB-like symptoms. This self-reported survey had an estimated population of 1,474,861 Malaysians aged 15 years and above. The overall prevalence of individuals with TB-like symptom in Malaysia was 5.0% (4.6, 5.5) with the highest prevalence in Sarawak [7.8% (5.9, 10.2)] followed by Selangor [6.6% (5.4, 8.1)] and Sabah & WP Labuan [6.6% (5.3, 8.1)]. The lowest was in the state of Penang with 1.6% (1.0, 2.6). The prevalence of TB-like symptom was at 5.8% (5.1, 6.8) in the rural areas and 4.7% (4.2, 5.4) in the urban areas with no significant difference (Table 11.1.1).

The prevalence of TB-like symptoms among non-Malaysians and Malaysians were 7.4% (5.2, 10.4) and 4.8% (4.4, 5.3) respectively with no significant difference. Individuals with TB-like symptoms increased as age group increased from 5.8% (4.9, 6.9) in 26 - 35 years to 9.4% (7.8, 11.2) in >65 years old (Table 11.1.1).

This study showed that individuals with TB-like symptoms self-medicated [46.3% (42.8, 49.9)], followed by purchased of medicines from pharmacies [37.6% (34.3, 41.1)]. In choosing healthcare facilities, most respondents sought treatment from government health clinics [34.2% (30.6, 38.0)] compared to other health care facilities. The difference in self-medication as compared to other health seeking behaviour was statistically significant. A total of 9.6% (7.5, 12.2) of individuals with TB-like symptoms did not do anything (Table 11.1.3).

Among individuals with TB-like symptoms who sought treatment in government and/or private health care facilities, 26.6% (23.2, 30.4) reported to have had gone through sputum examination, while 20.8% (17.8, 24.2) reported to have chest X-ray done (Table 11.1.4).

A total of 27.8% (22.5, 33.8) of individuals with TB-like symptoms claimed to have their sputum examined when they sought treatment in government hospitals, as compared to 24.9% (20.4, 30.1) of those who sought treatment in government clinics, 15.9% (12.1, 20.6) in private clinics and 19.7% (12.3, 29.9) in private hospitals. The prevalence of having chest X-ray by individuals with TB-like symptoms who sought treatment at government hospitals was 26.1% (21.1, 31.8), 21.8% (14.2, 31.8) at private hospitals, 18.4% (14.9, 22.4) at government health clinics and 12.4% (8.2, 18.3) at private clinics (Table 11.1.5).

The main reasons for not seeking treatment among those with TB-like symptoms were because they perceived the illness was not severe/serious [47.5% (36.1, 59.1)], treatments were not required [19.3% (11.0, 31.6) and considered the health problem would resolve by itself [7.0% (2.3, 19.4) (Table 11.1.6).

11.5   Conclusion

The overall prevalence of self-reported TB-like symptom was 5.0%. The highest prevalence of individuals with TB-like symptoms was reported in Sarawak and predominantly in rural areas. The highest prevalence of individuals with TB-like symptoms was among those aged 65 years and above. Our findings showed that individuals with TB-like symptoms were more likely to self-medicate than sought treatment from healthcare providers. Those who sought medical treatment at government hospitals were more likely to be screened for TB compared to government clinics, private hospitals and private clinics. Those individuals with TB-like symptoms who did not seek treatment believed the illness was not severe or serious enough to require any medical attention.

11.6   References

1. World Health Organization. (2014). *Global tuberculosis control 2014*.
2.   Ministry of Health, Malaysia. (2014). *Annual report 2014*. (Unpublished data).

Table 11.1.1: Prevalence of individuals with TB-like symptoms 15 years and above by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	1380	1,474,861	5.0	4.6	5.5
State					
Johor	115	155,105	4.6	3.4	6.2
Kedah	73	68,525	3.5	2.1	5.6
Kelantan	98	79,655	4.9	3.5	6.6
Melaka	47	27,957	3.4	1.5	7.4
Negeri Sembilan	57	28,318	2.8	1.8	4.3
Pahang	68	47,127	3.1	2.1	4.4
Pulau Pinang	66	26,648	1.6	1.0	2.6
Perak	89	96,323	4.1	3.0	5.7
Perlis	57	6,898	2.9	2.0	4.3
Selangor	269	385,787	6.6	5.4	8.1
Terengganu	55	33,818	3.0	2.0	4.5
Sabah & WP Labuan	164	228,458	6.6	5.3	8.1
Sarawak	138	200,167	7.8	5.9	10.2
WP Kuala Lumpur	51	86,829	5.1	3.0	8.5
WP Putrajaya	33	3,246	3.8	2.6	5.5
Location					
Urban	759	1,048,392	4.7	4.2	5.4
Rural	621	426,469	5.8	5.1	6.8
Sex					
Male	616	715,134	4.7	4.2	5.3
Female	764	759,728	5.3	4.8	6.0
Age Group					
15-25	281	421,368	7.0	6.0	8.1
26-35	248	304,501	5.8	4.9	6.9
36-45	204	232,918	6.0	4.9	7.4
46-55	237	222,059	7.1	6.0	8.5
56-65	221	152,853	7.3	6.1	8.7
> 65	189	141,162	9.4	7.8	11.2
Nationality					
Malaysian	1284	1,303,526	4.8	4.4	5.3
Non-malaysians	96	171,336	7.4	5.2	10.4
Ethnicity					
Malays	849	755,124	4.9	4.4	5.5
Chinese	156	221,568	3.5	2.8	4.4
Indians	101	104,340	5.4	4.1	7.1
Other Bumiputras	186	227,917	6.6	5.2	8.3
Others	88	165,912	7.3	5.2	10.1

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status					
Single	337	479,097	5.8	5.0	6.7
Married	893	876,854	6.6	5.9	7.4
Widow/ widower/ divorcee	150	118,910	8.5	6.7	10.6
Education Level					
No formal education	133	111,701	6.3	5.1	7.9
Primary education	374	340,337	4.4	3.7	5.2
Secondary education	598	665,817	6.2	5.5	7.0
Tertiary education	255	325,614	6.2	5.3	7.2
Unclassified education	18	29,521	2.8	1.6	5.0
Occupation					
Government/semi government employee	136	134,911	7.0	5.6	8.8
Private employee	373	524,207	6.4	5.5	7.5
Self employed	264	238,518	6.9	5.8	8.2
Unpaid worker/home maker	221	188,674	6.5	5.4	7.7
Retiree	44	36,560	6.0	4.2	8.6
Income Group					
Less than RM 1000	245	204,673	5.1	4.2	6.1
RM 1000 - RM 1999	264	263,389	5.4	4.5	6.4
RM 2000 - RM 2999	238	239,435	5.0	4.2	6.0
RM 3000 - RM 3999	169	216,304	5.7	4.5	7.1
RM 4000 - RM 4999	111	116,086	4.0	3.0	5.3
RM 5000 - RM 5999	111	131,442	5.8	4.4	7.6
RM 6000 - RM 6999	63	81,349	5.5	4.1	7.5
RM 7000 - RM 7999	40	47,164	3.9	2.6	5.8
RM 8000 - RM 8999	37	46,856	4.6	2.8	7.5
RM 9000 - RM 9999	21	20,094	4.0	2.3	7.0
RM 10000 & Above	81	108,069	4.3	3.3	5.5
Quintile Income Group					
Quintile 1	210	176,296	5.1	4.2	6.2
Quintile 2	272	269,027	5.3	4.5	6.3
Quintile 3	292	293,981	4.8	4.1	5.7
Quintile 4	275	333,354	5.2	4.3	6.3
Quintile 5	331	402,203	4.8	4.1	5.7

Table 11.1.2: Proportion of TB-like symptoms among respondents aged 15 years and above

The presence of TB-like symptoms	Count	Proportion (%)
1 symptom		
Cough > 2 weeks in the past 1 month	977	
		4.6
Cough up phlegm or sputum > 2 weeks in the past 1 month	581	
		2.7
Cough up blood for the past 1 month	50	
		0.2
Fever of > 2 weeks in the past 1 month	199	
		0.9
Unexpected loss of weight in the past 1 month	251	
		1.2
Drenching sweats for > 2 weeks in the past 1 month	260	
		1.2
1 + 1 symptoms		
*Cough + fever	124	
		0.6
*Cough + unexpected loss of weight	111	
		0.5
*Cough + drenching night sweats	122	
		0.6
1 + 2 Symptoms		
*Cough + fever + unexpected loss of weight	35	
		0.2
*Cough + fever + drenching night sweat	37	
		0.2
1 + 3 Symptoms		
*Cough+ fever + loss of weight + drenching night sweat	16	
		0.1

*Cough = Any kind of cough; i.e. either cough > 2 weeks in the past 1 month or cough up phlegm or sputum > 2 weeks in the past 1 month or cough up blood for the past 1 month

Table 11.1.3: Health seeking behavior among individuals with TB-like symptoms aged 15 years and above

Health Seeking Behavior	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Self-medicate	613	681,869	46.3	42.8	49.9
Purchase medicine from pharmacy	524	554,414	37.6	34.3	41.1
Seek treatment from government health clinic	520	503,897	34.2	30.6	38.0
Seek treatment from government hospital	336	347,224	23.5	20.5	26.9
Seek treatment from private clinic	319	1,098,153	25.5	22.1	29.1
Seek treatment from private hospital	107	131,892	8.9	7.0	11.4
Seek advice and treatment from traditional healers	94	105,466	7.2	5.7	9.0
Did not do anything	123	141,002	9.6	7.5	12.2

Table 11.1.4: Prevalence of individuals with TB-like symptoms aged 15 years and above screened for tuberculosis by healthcare facilities

TB Screening by healthcare facilities	Sputum Examination					Chest X-Ray				
	Count	Estimated Population	Prevalence (%)	95% CI		Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper				Lower	Upper
Overall	259	236,439	26.6	23.2	30.4	208	184,912	20.8	17.8	24.2
Government Health Clinics	149	125,517	28.7	20.4	30.1	115	92,511	18.4	14.9	22.4
Government Hospitals	117	96,518	34.8	22.5	33.8	115	90,693	26.1	21.1	31.8
Private Clinics	61	59,623	19.1	12.1	20.6	41	46,428	12.4	8.2	18.3
Private Hospitals	20	25,680	18.9	12.3	29.9	25	28,449	21.8	14.2	31.8

Table 11.1.5: Reasons for not seeking treatment for individuals with TB-like symptoms aged 15 years and above

Reasons for not seeking treatment	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Already on treatment	3	3,996	3.4	1.1	10.4
Perceived the illness is not severe/ serious	52	55,149	47.5	36.1	59.1
Fear of negative effects of treatment	1	708	0.6	0.1	4.3
Fear of healthcare provider	3	3,725	3.2	0.8	12.3
Fear of instrument or treatment	0	0	-	-	-
Busy at work place	2	1,663	1.4	0.2	8.7
Unable to take leave from employer	0	0	-	-	-
Busy with household chores / home / child	2	4,203	3.6	0.7	16.7
Shy to see healthcare provider	1	1,786	1.5	0.2	9.3
Gender preference (healthcare provider)	0	0	-	-	-
Stigma	0	0	-	-	-
Cannot afford to pay for the treatment	2	585	0.5	0.1	2.0
No transport	0	0	-	-	-
Cannot afford to pay for the transport	0	0	-	-	-
Insufficient drugs or equipment at the healthcare facilities	0	0	-	-	-
Incompetent healthcare provider	0	0	-	-	-
Had bad service experience before	0	0	-	-	-
Was advised not to go	0	0	-	-	-
Will go later	1	1,394	1.2	0.2	8.1
Health problem will resolve by itself	3	8,078	7.0	2.3	19.4
Might lose earning	0	0	-	-	-
Cannot accept reality	0	0	-	-	-
Operating hours of facility not suitable	1	1,786	1.5	0.2	9.3
Place is far	2	3,357	2.9	0.5	14.4
Treatment is not required	22	22,374	19.3	11.0	31.6
No one to accompany	0	0	-	-	-
It is not an emergency	7	7,406	6.4	2.8	13.6

TOPIC 12

LEPROSY

12 LEPROSY

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12.1 Background

Hansen's disease/leprosy is a chronic communicable disease caused by *Mycobacterium Leprae*. It usually attacks skin, mucosal membrane and peripheral nerve of infected person that can lead to skin disfigurement and deformity of hands, feet and eyes. The disease is commonly transmitted via air droplets from untreated Hansen's disease/leprosy patients to those who are in close contact during coughing, sneezing and etc.

Two main strategies for a successful Leprosy Control Program are;
  i. To find all untreated cases of Hansen's disease/leprosy
  ii. To start treatment with Multiple Drug Treatment (MDT) Regime provided freely by WHO as soon as possible and in complete doses. Undetected or delayed in treating cases of Hansen's disease/leprosy might cause permanent deformity to the patients and transmission of the disease to others.

Community's awareness and knowledge on Hansen's disease/leprosy is essential in order to assist in detecting and treating patients suspected to be infected with Hansen's disease/leprosy. Early treatment will lead to complete cure from the disease without any deformity and disability. Knowledge and perception in the community that Hansen's disease/leprosy can be cured with the current treatment using MDT Regime is crucial in ensuring that patients will start and complete the course of Hansen's disease/leprosy treatment.

12.2 Objectives

12.2.1 General Objective
To assess the community's awareness and knowledge towards Hansen's disease/leprosy in Malaysia

12.2.2 Specific Objectives
  i. To describe the community's awareness towards Hansen's disease/leprosy
  ii. To describe the community's knowledge on Hansen's disease/leprosy

12.3 Target Population

The Hansen's disease / leprosy data were obtained from respondents aged 18 years and above by trained research assistants using pre-coded questionnaires.

12.3.1 Definitions of variables / Terms

a. Symptoms of Hansen's disease/leprosy were defined as skin lesions (hypo-pigmented / hyper-pigmented skin patches) which normally associated with reduce/loss of sensation, not sweating and no pain.

b. Cured from Hansen's disease/leprosy was defined as leprosy patients who had recovered from the disease and would not transmit the disease to others.

c. Deformity from Hansen's disease/leprosy was defined as any disability of eyes/hands/feet with or without facial disfigurement due to the disease.

12.4   Findings

A total of 48.8% (95%CI: 46.8, 50.6) of the respondents had ever heard about Hansen's disease/leprosy. By locality, more urban dwellers (49.6%; 95% CI: 47.2, 51.8) had ever heard about Hansen's disease/leprosy. A significantly higher proportion of females (51.9%; 95% CI: 49.8, 53.9) compared to males (45.8%; 95% CI: 43.7, 47.9) had ever heard of the disease. In terms of age group, the highest proportion of ever heard about Hansen's disease/ leprosy was among the 41 - 50 years old (57.3%; 95% CI: 54.4, 60.1). Comparison by ethnic group showed that Malays had the highest proportion of ever heard of the disease (63.1%; 95% CI: 61.3, 64.9), followed by the Other Bumiputras (53.9%; 95% CI: 48.7, 58.9) Indians (37.5%; 95% CI: 32.9, 42.1) and Chinese (27.1%; 95% CI: 24.0, 30.40). The awareness of Hansen's disease/leprosy increased significantly as the education level increased, highest among those with tertiary education (64.8%; 95% CI: 62.1, 67.4) and lowest among those with no formal education (19.1%; 95% CI: 16.0, 22.6). With regards to income group, those in the 5th quintile (highest) (53.5%; 95% CI: 50.2, 56.6) had the highest level of awareness as compared to those in the lowest 1st quintile (40.5%; 95% CI: 37.3, 43.7).

Overall, 62.9% (95% CI: 61.4, 64.3) of the respondents who had ever heard about Hansen's disease/leprosy believed that the disease still exists in Malaysia and was significantly higher among females (64.8%; 95% CI: 63.1, 66.6) than males (60.8%; 95% CI: 58.7, 62.8). There was a decreasing trend from the youngest (18 - 30 years) (68.7%; 95% CI: 66.1, 71.3) to the oldest age groups (> 60 years) (52.5%; 95%CI 48.4, 56.6) with regards to their belief on the existence of Hansen's disease/leprosy in Malaysia.

A total of 58.5% (95 % CI: 56.5, 60.5) of the respondents who had ever heard about Hansen's disease/leprosy thought that the probable symptoms of Hansen's disease/leprosy were skin lesions associated with reduce/loss of sensation, not sweating and no pain. About 70% (67.7% 95 % CI: 66.2, 69.1) of these respondents thought that a person who had Hansen's disease/leprosy could be cured. On the whole, 81.9% (95% CI: 80.6, 83.0) of these respondents thought that a person with untreated Hansen's disease/leprosy could infect other people and 86.7% (95% CI: 85.5, 87.8) thought that Hansen's disease/leprosy could cause deformity if left untreated.

12.5   Conclusion

In summary, the awareness of Hansen's disease/leprosy among Malaysians was fairly good with nearly 50% of the respondents ever heard about the disease and 63% of those who had ever heard about the disease believed that Hansen's disease/leprosy still exists in Malaysia. Females were significantly more aware as compared to males in terms of ever heard of Hansen's disease/leprosy and believed that Hansen's disease/leprosy still exist in Malaysia. Among these respondents, the basic knowledge on symptoms of Hansen's disease/leprosy, treatment outcome, infectivity and disease sequalae without treatment were considerably good with scores of 58.5%, 67.0%, 81.9% and 86.7% respectively.

Table 12.1.1: Prevalence of ever heard about leprosy by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	10,177	9,590,787	48.8	46.9	50.6
State					
Johor	759	895,469	38.2	32.1	44.6
Kedah	696	697,760	55.1	47.0	62.9
Kelantan	569	470,274	47.7	42.6	52.7
Melaka	652	283,567	51.4	43.2	59.4
Negeri Sembilan	664	356,558	55.1	46.4	63.5
Pahang	589	460,342	49.0	42.4	55.6
Pulau Pinang	779	635,570	54.3	47.6	60.9
Perak	692	938,810	51.2	44.1	58.3
Perlis	672	80,085	50.1	44.4	55.7
Selangor	1,458	2,151,989	52.5	47.8	57.2
Terengganu	666	401,681	58.6	54.2	62.9
Sabah & WP Labuan	854	1,209,519	53.4	48.3	58.5
Sarawak	428	632,121	36.4	30.1	43.3
WP Kuala Lumpur	293	492,601	39.7	32.5	47.4
WP Putrajaya	406	40,791	84.5	80.3	87.9
Location					
Urban	6,034	7,428,447	49.6	47.3	51.9
Rural	4,143	2,162,340	46.1	43.4	48.9
Sex					
Male	4,578	4,648,475	45.8	43.7	48.0
Female	5,599	4,942,312	51.9	49.8	53.9
Age Group					
18-30	2,357	2,950,591	42.4	40.1	44.8
31-40	2,190	2,292,255	52.3	49.3	55.3
41-50	2,197	1,953,561	57.3	54.4	60.1
51-60	1,935	1,417,478	54.4	51.5	57.2
>60	1,498	976,902	42.3	39.2	45.4
Ethnicity					
Malays	7,679	6,153,021	63.1	61.3	64.9
Chinese	816	1,245,432	27.1	24.1	30.5
Indians	465	490,938	37.5	33.0	42.2
Other Bumiputras	903	1,146,662	53.9	48.8	59.0
Others	314	554,733	29.2	24.5	34.4

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status					
Single	1,729	2,223,309	40.4	37.8	43.0
Married	7,656	6,822,464	53.3	51.2	55.3
Widow/widower/ divorcee	792	545,014	40.3	36.9	43.7
Education Level					
No formal education	274	211,181	19.1	16.0	22.6
Primary education	1,894	1,434,802	36.4	33.7	39.1
Secondary education	4,835	4,470,963	49.1	47.0	51.3
Tertiary education	3,107	3,387,186	64.8	62.1	67.4
Unclassified education	62	80,264	30.1	22.0	39.7
Occupation					
Government/semi government employee	1,782	1,542,024	80.3	77.7	82.7
Private employee	2,851	3,428,749	44.1	41.6	46.6
Self employed	1,839	1,539,613	46.4	43.8	49.1
Unpaid worker/home maker	1,784	1,433,632	51.2	48.2	54.1
Retiree	528	397,886	66.2	61.2	70.9
Income Group					
Less than RM 1000	1,335	1,069,387	40.6	37.6	43.7
RM 1000 - RM 1999	1,724	1,440,475	44.7	41.9	47.5
RM 2000 - RM 2999	1,686	1,504,319	47.0	43.9	50.2
RM 3000 - RM 3999	1,350	1,344,904	53.1	49.6	56.5
RM 4000 - RM 4999	965	1,002,872	51.8	47.2	56.4
RM 5000 - RM 5999	787	751,258	48.4	43.2	53.7
RM 6000 - RM 6999	531	536,879	52.3	46.4	58.2
RM 7000 - RM 7999	453	414,584	52.1	46.1	58.1
RM 8000 - RM 8999	346	370,008	54.7	47.2	62.0
RM 9000 - RM 9999	203	215,048	62.4	53.2	70.8
RM 10000 & above	797	941,052	53.8	47.2	60.3
Quintile Income Group					
Quintile 1	1,138	911,741	40.5	37.3	43.7
Quintile 2	1,734	1,460,027	43.8	41.1	46.6
Quintile 3	2,151	1,924,241	47.3	44.4	50.1
Quintile 4	2,226	2,247,834	52.1	49.0	55.2
Quintile 5	2,928	3,046,943	53.5	50.2	56.6

Table 12.1.2: Prevalence of believe leprosy still exist in Malaysia by socio-demographic characteristics

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	5,513	5,353,398	62.9	61.4	64.3
State					
Johor	409	489,327	60.5	55.4	65.4
Kedah	341	344,067	58.4	54.0	62.8
Kelantan	270	230,701	55.0	49.7	60.2
Melaka	351	146,989	67.1	58.0	75.1
Negeri Sembilan	389	210,414	67.8	61.4	73.5
Pahang	349	278,142	67.4	61.4	72.8
Pulau Pinang	331	239,738	43.6	37.6	49.9
Perak	369	463,056	67.1	62.2	71.6
Perlis	241	30,219	43.4	37.6	49.5
Selangor	871	1,236,767	61.9	58.4	65.4
Terengganu	413	251,328	64.6	59.9	68.9
Sabah & WP Labuan	498	710,426	72.1	67.5	76.2
Sarawak	268	401,765	69.9	64.1	75.0
WP Kuala Lumpur	176	296,508	64.1	58.3	69.6
WP Putrajaya	237	23,948	63.4	58.0	68.6
Location					
Urban	3,322	4,163,664	62.5	60.8	64.3
Rural	2,191	1,189,733	64.0	61.7	66.4
Sex					
Male	2,420	2,509,973	60.8	58.7	62.8
Female	3,093	2,843,425	64.8	63.1	66.6
Age Group					
18-30	1,422	1,794,871	68.7	66.1	71.3
31-40	1,240	1,300,504	64.8	61.9	67.5
41-50	1,195	1,073,423	60.9	58.1	63.6
51-60	1,001	736,118	57.6	54.4	60.7
>60	655	448,483	52.5	48.4	56.6
Ethnicity					
Malays	4,209	3,558,158	64.3	62.6	66.0
Chinese	377	582,131	51.5	46.3	56.5
Indians	265	283,153	62.8	56.3	68.9
Other Bumiputras	519	685,348	69.9	66.5	73.2
Others	143	244,607	58.1	50.2	65.6

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status					
Single	1,027	1,358,317	68.7	65.6	71.6
Married	4,126	3,731,182	61.4	59.7	63.1
Widow/widower/divorcee	360	263,899	57.1	52.0	62.1
Education Level					
No formal education	125	99,802	59.0	50.3	67.2
Primary education	841	671,449	56.1	52.4	59.7
Secondary education	2,678	2,524,262	63.8	61.9	65.7
Tertiary education	1,843	2,024,919	64.9	62.6	67.1
Unclassified education	23	29,792	43.7	27.3	61.6
Occupation					
Government/semi government employee	1,086	967,307	67.7	64.5	70.8
Private employee	1,588	1,915,822	62.9	60.6	65.1
Self employed	927	808,640	59.0	55.9	62.0
Unpaid worker/home maker	938	769,648	62.7	59.5	65.7
Retiree	283	208,636	56.5	50.4	62.4
Income Group					
Less than RM 1000	672	585,452	63.6	59.8	67.2
RM 1000 - RM 1999	874	762,540	61.0	57.5	64.3
RM 2000 - RM 2999	901	811,369	62.0	58.6	65.3
RM 3000 - RM 3999	722	711,027	60.5	56.9	64.0
RM 4000 - RM 4999	545	593,938	66.0	61.6	70.2
RM 5000 - RM 5999	438	423,389	62.3	57.5	66.8
RM 6000 - RM 6999	307	314,239	62.9	57.2	68.2
RM 7000 - RM 7999	241	233,474	62.0	55.8	67.9
RM 8000 - RM 8999	204	230,695	67.4	60.6	73.5
RM 9000 - RM 9999	120	134,009	69.1	60.8	76.3
RM 10000 & above	489	553,266	63.8	59.0	68.3
Quintile Income Group					
Quintile 1	560	495,311	63.0	58.9	66.8
Quintile 2	888	779,825	61.8	58.4	65.1
Quintile 3	1,156	1,040,956	61.9	58.9	64.9
Quintile 4	1,212	1,243,855	62.6	59.8	65.4
Quintile 5	1,697	1,793,450	64.0	61.6	66.4

Table 12.1.3: Awareness and perception on leprosy among respondents

Sociodemographic Characteristics	Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
skin lesions with loss of sensation, no pain and not sweating are probably symptoms of leprosy	4,680	4,589,519	58.5	56.5	60.5
think a person who has leprosy can be cured	6,069	5,714,826	67.7	66.2	69.1
think a person with untreated leprosy can infect other people	7,504	7,039,327	81.9	80.6	83.0
think leprosy can cause deformity if left untreated	8,059	7,493,032	86.7	85.5	87.8

DISABILITY

13 DISABILITY

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13.1   Background

Ministry of Health Malaysia (MOH), acknowledges disability as a major health issue and has incorporated Plan of Action (POA) for Person with Disabilities (PWDs) 2011-2020 to be in line with PWD Act 2008 and the Convention on the Right of Person with Disability (CRPD) 2007. The National Health Morbidity Survey (NHMS) 2015 focussed on the prevalence of disability and the impact of disability level on age, education and employment. Findings from NHMS 2015 will assist policy making in planning of health programme and resource allocation.

13.2   Objectives

13.2.1 General Objective
To determine the magnitude of disability and its impact on Malaysian adult population.

13.2.2 Specific objectives
13.2.2.1 To determine the prevalence of difficulty in :-
a) Seeing
b) Hearing
c) Walking or climbing (going up and down) stairs
d) Remembering or paying attention/concentrating
e) Caring for themselves
f) Communicating

13.2.2.2 To define the magnitude of level of difficulties in the siz domains.
13.2.2.3 To describe the types of disability by socio-demographic characteristics

13.3   Target Population, Study Instrument And Definitions

Data on disability was obtained from adult respondent 18 years and above through interviews by trained research assistants using Washington Group Questionnaire (short version).

Level of difficulties were categorised into 4 categories which were 'no difficulty', 'moderately difficult', 'very difficult' and 'unable'. Based on WHO/UNESCAP classification used in the WG questions pre-test report, responses were categorised as below; responses of 'moderately difficult' was categorised into 'mild difficulty', responses of 'very difficult' was categorised into 'severe difficulty', while responses of 'unable' was categorised into 'complete difficulty'.

13.3.1 Definition of terms/variables
Disability is an umbrella term encompassing impairment, activity limitation or participation restriction.

13.3.2 Difficulty in Seeing

Any condition that a person who has vision difficulties or problems of any kind even when wearing glasses (if he/she wears glasses) or contact lenses.

13.3.3 Difficulty in Hearing

Any condition that a person who has some hearing limitation or problems of any kind with their hearing even when using a hearing aid (if he/she wears a hearing aid).

13.3.4 Difficulty in Walking

Any condition that a person who has some limitation or problems of any kind getting around on foot.

13.3.5 Difficulty in Remembering

Any condition that a person who has some problems with remembering and concentrating that contributes to difficulty in doing his/her daily activities.

13.3.6 Difficulty in Self-care

Any condition that a person who has some problems with taking care of himself/herself independently.

13.3.7 Difficulty in Communicating

Any condition that a person who has some problems with talking, listening or understanding speech such that it contributes to difficulty in doing his/her daily activities.

13.4   Finding

13.4.1 General Finding

The prevalence of overall impairment and disability was 26.9% (95% CI: 25.7, 28.1). Among all types of disability, the prevalence of difficulty in seeing was highest at 16.8% (95% CI: 15.9, 17.8), followed by difficulty in walking 11.3% (95% CI: 10.6, 12.0), difficulty in remembering 9.4% (95% CI: 8.7, 10.1), difficulty in listening 5.5% (95% CI: 5.0, 6.0), difficulty in communicating 3.4% (95% CI: 3.1, 3.8) and difficulty in self-care 2.5% (95% CI: 2.2, 2.8).

13.4.2 Difficulty in Seeing

13.4.2.1   Prevalence of Mild Difficult in Seeing

The overall prevalence of mild difficult in seeing among adults of 18 years and above in this survey was 15.5% (95% CI: 14.7, 16.5). There was a large variation between states, with the highest prevalence in Pahang at 21.25% (95% CI: 17.6, 25.5), followed by Kedah at 20.72% (95% CI: 18.4, 23.2) and Sabah/WP Labuan at 20.38% (95% CI: 17.9, 23.2), while the lowest was Pulau Pinang at 8.08% (95% CI: 5.9, 11.1). The prevalence was significantly higher in the

rural areas at 17.80% (95% CI: 16.4, 19.3) compared to urban areas at 14.82% (95% CI: 13.8, 16.0).

The prevalence of mild difficulty in seeing showed an increasing trend with age, from 7.67% (95% CI: 6.7, 8.8) in the 18-30 years age group, reaching a peak of 34.56% (95% CI: 32.2, 37.0) among the 60 years and above. The prevalence was significantly higher among females at 17.47% (95% CI: 16.3, 18.8) compared to males at 13.71% (95% CI: 12.8, 14.7).

In terms of the main ethnic groups, the other Bumiputras had the highest prevalence at 20.52% (95% CI: 18.1, 23.2), followed by Chinese at 15.53% (95% CI: 13.6, 17.6), Malays at 15.52% (95% CI: 14.5, 16.6), Indians at 14.57% (95% CI: 12.1, 17.5) and others ethnic at 10.87% (95% CI: 8.5, 13.9)

The highest prevalence of mild difficulty in seeing was observed among widow/widower/divorcee at 31.32% (95% CI: 28.6, 34.2), followed by married respondents at 17.18% (95% CI: 16.1, 18.3) and singles at 7.75% (95% CI: 6.7, 8.9). The prevalence of moderately difficult in seeing decreased from no formal education (29.95%, 95% CI: 26.4, 33.7) to tertiary education (10.47%, 95% CI: 9.2, 12.0). The prevalence of moderately difficult in seeing was higher among unpaid workers (18.34%, 95% CI: 16.6, 20.3) and those have with household income > RM 1,000 (22.66%, 95% CI: 20.6, 24.8).

13.4.2.2   Prevalence of Severe Difficulty in Seeing

The prevalence of severe difficulty in seeing in Malaysia was 1.06% (95% CI: 0.9 – 1.3) Overall, there is no difference in the prevalence by sex. The prevalence in rural area was 1.63% (95% CI: 1.3 – 2.1). There is an increasing trend in prevalence with age, from 0.32% (95% CI: 0.2, 0.6) in the 18-30 years age group, reaching a peak of 4.26% (95% CI: 3.3, 5.5) among the 60 years old and above.

13.4.2.3   Prevalence of Complete Difficulty in Seeing

The prevalence of complete difficulty in seeing in Malaysia was 0.2% (95% CI: 0.1 – 0.3) Overall, there is no difference in the prevalence by sex. The prevalence in urban area was 0.21% (95% CI: 0.1, 0.3). There was a peak of 0.4% (95% CI: 0.2, 0.8) among the 60 years old and above.

13.4.3 Difficulty in Hearing

13.4.3.1   Prevalence of Mild Difficulty in Hearing

The overall prevalence of mild difficulty in hearing among adults of 18 years and above was 4.87% (95% CI: 4.5 – 5.3), higher in the rural areas 6.16% (95% CI: 5.5 – 6.9) compared to the urban areas 4.47% (95% CI: 4.0 – 5.0). Other Bumiputras had the highest prevalence of hearing difficulty at 6.59% (95% CI: 5.4, 8.0), followed by Chinese at 4.99% (95% CI: 4.1, 6.0), Indians at 4.93% (95% CI: 3.6, 6.7), Malays at 4.71% (95% CI: 4.2, 5.3) and others at 3.48%

(95% CI: 2.4, 5.1). In terms of marital status, widow/widower/divorcee recorded the highest prevalence at 16.05% (95% CI: 14.0, 18.3) followed by married person at 4.90% (95% CI: 4.4, 5.4) and single persons at 2.01% (95% CI: 1.5, 2.7). Respondents with no formal education recorded the highest prevalence at 16.3% (95% CI: 13.8, 19.2) followed by primary education at 9.98% (95% CI: 8.9, 11.2), secondary education 3.05% (95% CI: 2.6, 3.5) and tertiary education at 1.57% (95% CI: 1.2, 2.0).

Respondents with the income of less than RM 1000 recorded the highest prevalence at 9.85% (95% CI: 8.5, 11.4), followed by respondents with income of RM 1000 - 1999 at 5.87% (95% CI: 5.0, 6.9) and income of RM 2000 - 2999 at 4.8% (95% CI: 4.0, 5.8). Respondents with income of RM 3000- 3999, RM 4000-4999, RM 5000-5999, RM 8000-8999 and above RM 10,000 were comparable between 3.08% - 3.89%. Income group of RM 6000-6999, RM 7000-7999 and RM 9000-9999 recorded the least prevalence between 2.05% - 2.92%.

13.4.3.2   Prevalence of Severe Difficulty in Hearing

The overall prevalence of severe difficulty in hearing was 0.43% (95% CI: 0.3, 0.6). Prevalence was highest among rural residents at 0.74% (95% CI: 0.5, 1.0) compared to urban residents at 0.34% (95% CI: 0.2, 0.5). No significant difference between genders was observed in all level of difficulties. Widow/widower/divorcee recorded the highest prevalence at 2.4% (95% CI: 1.7, 3.5) followed by married persons with 0.32% (95% CI: 0.2, 0.5). Respondents with no formal education had the prevalence at 2.30% (95% CI: 1.5, 3.6) and primary education at 1.30% (95% CI: 0.7, 1.6). The prevalence in lower income group of less than RM 1000 was 1.01% (95% CI: 0.6, 1.6) and RM 1000 – 1999 was 0.65% (95% CI: 0.4, 1.1).

13.4.3.3   Prevalence of Complete Difficulty in Hearing

The overall prevalence of complete difficulty in hearing was 0.17% (95% CI: 0.1, 0.3).

13.4.4 Difficulty in walking

13.4.4.1   Prevalence of Mild Difficulty in Walking

The overall prevalence of mild difficulty in walking among adults of 18 years and above was 9.54% (95% CI: 8.9, 10.2). There was a large variation between states, with the highest prevalence in Kedah at 13.76% (95%CI: 11.5, 16.5) followed by WP Putrajaya at 13.16% (95% CI: 9.6, 17.8), Melaka at 12.84% (95% CI: 10.3,15.9), Sarawak at 12.64% (95% CI: 9.9, 16.0), Sabah & WP Labuan at 12.47% (95% CI: 10.7, 14.5) and Johor at 10.52% (95% CI: 8.9, 12.3); while the lowest was in Kelantan at 5.14% (95% CI: 3.7, 7.2).

The prevalence was slightly higher in the rural areas at 11.37% (95% CI: 10.2, 12.7) compared to urban at 8.96% (95% CI: 8.3, 9.7), and female respondents had the highest prevalence of mild difficulty in walking at 11.53% (95% CI: 10.7, 12.4) compared to males at 7.67% (95% CI: 7.0, 8.4). In terms of ethnic group, other Bumiputras had the highest prevalence at 14.68% (95% CI: 12.3, 17.4), followed by Indians at 11.10% (95% CI: 12.3, 17.4), Malays at 9.20% (95% CI: 8.4, 10.0) and Chinese at 9.10% (95% CI: 8.0, 10.3). Widow/widower/divorcee had the highest prevalence of mild difficulty in walking at 26.75% (95% CI: 24.1, 29.6) compared to respondents who were married at 10.57% (95% CI: 9.8, 11.4) and respondents who were single at 2.83% (95% CI: 2.3, 3.5).

By education, respondents with no formal education showed the highest prevalence of mild difficulty in walking at 24.59% (95% CI: 21.4, 28.1) followed by primary education 17.60% (95% CI: 16.1, 19.2), secondary 7.34% (95% CI: 6.6, 8.1) and tertiary 3.83% (95% CI: 3.2, 4.6). The retirees had the highest prevalence of mild difficulty in walking at 17.63% (95% CI: 14.6, 21.1) followed by unpaid workers at 13.24% (95% CI: 11.8, 14.8), self-employed at 8.47% (95% CI: 7.4, 9.7), government/semi government employed at 6.93% (95% CI: 5.6, 8.6) and private employed at 4.61% (95% CI: 4.0, 5.4).

Prevalence was highest among those with household income less than RM1000 16.91% (95% CI: 15.1, 18.9), followed by RM1000-1999 at 11.23% (95% CI: 10.0, 12.6). By quintile income group, the highest prevalence at 17.99% (95% CI: 16.0, 20.2) was found in Q1 while the lowest prevalence was among Q5 group at 6.88% (95% CI: 6.0, 7.9).

13.4.4.2   Prevalence of Severe Difficulty in walking

The overall prevalence of severe difficulty in walking was 1.13% (95% CI: 1.0, 1.3). The highest prevalence was in Sarawak at 2.01% (95% CI: 1.2, 3.2), followed by 1.89% (95% CI: 1.0, 3.7) in Malacca. Higher prevalence was noted in rural areas 1.58% (95% CI: 1.3, 1.9) compared to the urban areas 0.99% (95% CI: 0.8, 1.3). Females had a higher prevalence of severe difficulty in walking at 1.27% (95% CI: 1.0, 1.6) as compared to males at 1.00% (95% CI: 0.8, 1.3).

With regards to the age group, highest prevalence was noted among respondents more than 60 years at 6.12% (95% CI: 5.1, 7.4) followed by 41-50 years at 1.24 (95% CI: 0.9, 1.7). Other Bumiputras had reported to have severe difficulty in walking at 1.83% (95% CI: 1.2, 2.8) followed by Chinese 1.32% (95% CI: 0.9, 1.9), Indians 1.11% (95% CI: 0.7, 1.8) and Malays 1.06% (95% CI: 0.9, 1.3).

The highest prevalence of very difficult in walking was found in those with no formal education at 5.57% (95% CI: 4.1, 7.6), the lowest among those with secondary education at 0.48% (95% CI: 0.3, 0.7). Widow/widower/divorcee had the highest prevalence of very difficult in walking at 5.14% (95% CI: 4.0, 6.5). By quintile income group, Q1 group showed the highest prevalence at 3.14% (95% CI: 2.4, 4.2) while the lowest prevalence was among Q5 group 0.64% (95% CI: 0.4, 1.0).

13.4.4.3   Prevalence of Complete Difficulty in Walking

The overall prevalence of complete difficulty in walking was 0.64 (95% 0.5, 0.8). The prevalence was significantly higher in rural areas 0.95% (95% CI: 0.7, 1.2) as compared to urban areas 0.54% (95% CI: 0.4, 0.7). By gender, females [0.74% (95% CI: 0.6, 1.0)] showed higher prevalence as compared to males [0.54% (95% CI: 0.4, 0.7)]. Prevalence among Malays was 0.78% (95% CI: 0.6, 1.0). By marital status, the prevalence among widow/widower/divorcee was 3.01% (95% CI: 2.2, 4.1).

In terms of education level, prevalence of no formal education was higher at 3.89% (95% CI: 2.8, 5.4), followed by primary education at 1.09% (95% CI: 0.8, 1.5) and secondary education at 0.27% (95% CI: 0.2, 0.4). Respondents with income less than RM1000 showed prevalence at 1.18% (95% CI: 0.8, 1.6), between RM1000-1999 group at 0.72% (95% CI: 0.5, 1.1) and RM

2000-2999 at 0.58% (95% CI: 0.4, 0.9). Prevalence was highest in quintile income Q1 which was 1.35% (95% CI: 1.0, 1.9) while the lowest prevalence was among Q3 group 0.49% (95% CI: 0.3, 0.8).

13.4.5 Difficulty in Remembering

13.4.5.1   Prevalence of Mild Difficulty in Remembering

The overall prevalence of mild difficulty in remembering was 8.57% (95% CI: 7.9, 9.3). There was a large variation between states, with the highest prevalence in Sabah & WP Labuan at 17.43% (95% CI: 14.6, 20.6), followed by Sarawak at 11.31% (95% CI: 8.4, 15.0) and WP Kuala Lumpur at 10.77% (95% CI: 7.9, 14.6), while the lowest was in Penang at 3.79% (95% CI: 2.7, 5.3).

The prevalence was higher in rural areas at 10.11% (95% CI: 8.9, 11.4) compared to urban areas at 8.09% (95% CI: 7.3, 8.9). Females had higher prevalence in mild difficulty in remembering at 9.25% (95% CI: 8.5, 10.1) compared to males at 7.94% (95% CI: 7.2, 8.8). The highest prevalence was observed among those aged above 60 years at 24.65% (95% CI: 22.5, 26.9) and the lowest prevalence was aged between 31-40 years at 4.94% (95% CI: 4.2, 5.9).

By ethnic group, the prevalence of mild difficulty in remembering from highest to lowest was as follows; other Bumiputras 15.43% (95% CI: 12.7, 18.6), Chinese 8.96% (95% CI: 7.7, 10.4), others 8.56% (95% CI: 6.6, 11.1), Indians 7.70% (95% CI: 6.0, 9.8) and Malays 7.01% (95% CI: 6.3, 7.8). Widow/widower/divorcee group had the highest prevalence at 20.93% (95% CI: 18.5, 23.6) followed by married at 8.27% (95% CI: 7.5, 9.1). Prevalence of mild difficulty in remembering was highest among those with no formal education at 22.21% (95% CI: 19.2, 25.5).

Retirees showed the highest prevalence of mild difficulty in remembering at 12.95% (95% CI: 10.0, 16.6) followed by unpaid worker at 9.58% (95% CI: 8.2, 11.2), self-employed at 7.29% (95% CI: 6.2, 8.6), private employed at 5.47% (95% CI: 4.7, 6.3) and government/semi government employed at 5.17% (95% CI: 3.9, 6.8).

By income group, the highest prevalence of moderately difficult in remembering was among those earning less than RM1000 at 14.40% (95% CI: 12.7, 16.3). By quintile income group, Q1 group showed the highest prevalence at 15.40% (95% CI: 13.5, 17.5) while the lowest prevalence was among Q5 group at 6.30% (95% CI: 5.3, 7.4).

13.4.5.2   Prevalence of Severe Difficulty in Remembering

The overall prevalence of severe difficulty in remembering was 0.52% (95% CI: 0.4, 0.7). By state, the highest prevalence was 1.12% (95% CI: 0.7, 1.8) in Sarawak. Higher prevalence was noted in rural areas with 1.10% (95% CI: 0.9, 1.4) compared to the urban areas at 0.34% (95% CI: 0.2, 0.5). Females had higher prevalence in severe difficulty in remembering at 0.60% (95% CI: 0.5, 0.8) as compared to males at 0.45% (95% CI: 0.3, 0.6).

The highest prevalence of severe difficulty in remembering was noted among age group of more than 60 years at 2.45% (95% CI: 1.8, 3.3), Other Bumiputras at 1.43% (95% CI: 1.0, 2.0), those with no formal education at 2.82% (95% CI: 2.0, 3.9) widow/widower/divorcee at 2.45% (95% CI: 1.7, 3.5) and those with income less than RM1000 at 1.03% (95% CI: 0.7, 1.5).

13.4.5.3   Prevalence of Complete Difficulty in Remembering

The overall prevalence of complete difficulty in remembering was 0.27% (95% CI: 0.2, 0.4), with prevalence of 0.26% (95% CI: 0.2, 0.4) and 0.28% (95% CI: 0.2, 0.4) in rural and urban areas respectively.

13.4.6 Difficulty in Self-care

13.4.6.1   Prevalence of Mild Difficulty in Self-care

The overall prevalence of mild difficulty in self-care among Malaysian adults of 18 years and above was 1.8% (95% CI: 1.5, 2.0). By state, Perak had the highest prevalence of mild difficulty in self-care at 2.7% (95% CI: 1.7, 4.2) followed by WP Kuala Lumpur at 2.6 % (95% CI 1.6, 4.3) and Pahang at 2.0% (95% CI: 1.3, 3.1).

The prevalence was slightly higher in the rural areas with 2.0% (95% CI: 1.7, 2.5) compared to urban areas at 1.7% (95% CI: 1.4, 2.0). No significant difference between genders was observed where males showed 1.8% (95% CI: 1.5, 2.2) and females 1.7% (95% CI: 1.5, 2.1). By ethnic group, there was minimal differences in prevalence recorded where Chinese had the prevalence of 2.1% (95% CI: 1.6, 2.8), followed by Indians at 2.0% (95% CI: 1.3, 3.1), Malays at 1.8% (95% CI: 1.5, 2.1), and other Bumiputras at 1.7% (95% CI: 1.2, 2.4). Widow/widower/divorcee recorded the highest prevalence of 6.7% (95% CI: 5.4, 8.2) followed by respondents who were married at 1.6% (95% CI: 1.3, 1.9) and singles at 1.0% (95% CI: 0.7, 1.4).

By education level, the prevalence was 6.6% (95% CI: 5.2, 8.4) for those respondents with no formal education, followed by primary education at 4.0% (95% CI: 3.3, 4.8) and secondary education at 0.9% (95% CI: 0.6, 1.1). The highest prevalence of mild difficulty in self-care was among respondents in income group less than RM 1000 at 3.9% (95% CI: 3.2, 4.9) followed by income group RM 1000-1999 at 2.7% (95% CI: 2.1, 3.4).

13.4.6.2   Prevalence of Severe Difficulty in Self-care

The overall prevalence of severe difficulty in self-care was 0.3% (95% CI: 0.2, 0.4). No difference in the prevalence by locality and sex. The prevalence among widow/widower/divorcee was at 1.3% (95% CI: 0.8, 2.1) and married respondents at 0.2% (95% CI: 0.1, 0.3)

13.4.6.3   Prevalence of Complete Difficulty in Self-care

The overall prevalence of complete difficulty in self-care was 0.4% (95% CI: 0.3, 0.5), slightly higher in rural areas at 0.6% (95% CI: 0.4, 0.8) as compared to urban at 0.3% (95% CI: 0.2, 0.5). No difference in the prevalence by sex. By marital status, widow/widower/divorcee had the highest prevalence at 1.6% (95% CI: 1.0, 2.5).

13.4.7 Difficulty in Communicating

13.4.7.1   Prevalence of Mild Difficulty in Communicating

The overall prevalence of mild difficulty in communicating among adults of 18 years and above was 2.7% (95% CI: 2.3, 3.0). Kuala Lumpur recorded the highest prevalence at 4.1% (95% CI: 9.9, 13.3), followed by Terengganu at 3.7% (95% CI: 2.5, 5.5) and Perak at 3.4% (95% CI: 2.3, 5.0); while Penang being the lowest at 1.5% (95% CI: 1.0, 2.4). Rural areas showed higher prevalence compared to urban at 3.2% (95% CI: 2.8, 3.8) and 2.6% (95% CI: 2.2, 2.9) respectively. By gender, males had a higher prevalence at 2.8% (95% CI: 2.4, 3.2) as compared to females at 2.6% (95% CI: 2.2, 3.1).

By age group, the highest prevalence of mild difficulty in communicating was those above 60 years at 10.4% (95% CI: 8.9, 12.1) and lowest in 31-40 years age groups at 1.3% (95% CI: 0.9, 1.7). The highest prevalence of mild difficulty in communicating was among Chinese at 2.7% (95% CI: 1.9, 3.9), widow/widower/divorcee at 8.7% (95% CI: 7.0, 10.6), those with no formal education at 10.5% (95% CI: 8.6, 12.8), retirees at 4.4% (95% CI: 2.8, 6.9).

Respondents with household income less than RM1000 reported the highest prevalence at 5.6% (95% CI: 4.7, 6.6) while household income of RM4000- 4999 reported the lowest prevalence at 1.7% (95% CI: 1.0, 2.9). For quintile income group, Q1 showed the highest prevalence at 5.8-% (95% CI: 4.9, 6.9), followed by Q2 at 3.5% (95% CI: 2.8, 4.4) and the lowest being Q5 at 1.8% (95% CI: 1.4, 2.3).

13.4.7.2   Prevalence of Severe Difficulty in Communicating

The overall prevalence of severe difficulty in communicating was 0.4% (95% CI: 0.3, 0.5). Higher prevalence was reported in rural areas 0.6% (95% CI: 0.4, 0.8) compared to the urban areas 0.3% (95% CI: 0.2, 0.5). No difference in the prevalence by sex.

Prevalence was highest among respondents aged above 60 years old at 1.3% (95% CI: 0.9, 1.9) and the lowest among age group of 31-40 years old at 0.2% (95% CI: 0.1, 0.5). By ethnic group, Malays had the highest prevalence at 0.3% (95% CI: 0.2, 0.4). The widow/widower/divorcee group had higher prevalence of mild difficulty in communicating compared to single group at 1.4% (95% CI: 0.9, 2.1) and 0.6% (95% CI: 0.4, 0.9) respectively.

Prevalence was higher among no formal education with 2.2% (95% CI: 1.4, 3.6) and primary education group showed prevalence at 0.7% (95% CI: 0.5, 1.1). Those of income less than RM1000 showed prevalence at 0.6% (95% CI: 0.4, 0.9).

13.4.7.3 Prevalence of Complete Difficulty to Communicate

The overall prevalence of complete difficulty to communicate was 0.3% (95% CI: 0.2, 0.5). The highest prevalence of unable to communicate was found among urban residents at 0.4% (95% CI: 0.2, 0.5), males at 0.4% (95% CI: 0.2, 0.6), malays at 0.3% (95% CI: 0.2, 0.5) and respondents who were single at 0.7% (95% CI: 0.4, 1.0).

13.4.7.4 Prevalence of Disability

Based on criteria of 'at least one of the six domains is scored 'severe (lots of difficulty)' or 'complete (unable to do it at all)', the prevalence of disability in this study was 3.3% (95% CI: 3.0-3.7) with an estimated 672,529 population affected.

13.5 Conclusion

This survey has highlighted the extent of major disabilities currently existing in the community. The most commonly functional disability type was difficulty in seeing followed by difficulty in walking, remembering, listening, communicating and self-care. Those with lower education level, lower income and elderly group were more likely to report a disability.

13.6 Recommendation

In view of the findings which were highlighted above, the recommendations below are suggested.

i. Prevention and rehabilitation programme must be designed to targeted group especially those with lower education level, lower income and elderly group.

ii. Focus on public awareness on disability prevention through networking with others government and non-government agencies.

iii. Ensure accessibility to quality rehabilitative care.

iv. Perform regular early identification and screening of disability.

v. Provision of early disability intervention including referral to appropriate services or programme, rehabilitation and prescription of assistive devices.

vi. Healthcare provider should be adequately trained to detect risk factor and early sign of disability and able to manage appropriatly.

vii. Provide appropriate environmental access to various group of disability such as transport, traffic light alarm, accessible toilet, ramp in line with requirement of universal design.

viii. Strengthen promotional activities to create disability awareness which include World Sight Day, Better Speech and Hearing Month, World Stroke Day and so on.

ix. Expand and strengthen the outreach services.

Table 13.1.1: Prevalence of difficulty in seeing by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	3,506	3,135,075	15.5	14.7	16.5	214	213,563	1.1	0.9	1.3	44	40,573	0.2	0.1	0.3
State															
Johor	345	396,100	16.6	13.4	20.5	22	17,359	0.7	0.4	1.3	5	6,942	0.3	0.1	0.7
Kedah	317	273,134	20.7	18.4	23.2	29	28,568	2.2	1.3	3.5	2	2,726	0.2	0.1	0.9
Kelantan	225	157,591	15.7	12.9	19.1	17	12,672	1.3	0.6	2.5	3	2,604	0.3	0.1	0.9
Melaka	182	78,890	13.8	11.3	16.8	5	2,604	0.5	0.1	1.5	9	2,834	0.5	0.2	1.7
Negeri Sembilan	122	60,953	9.0	6.5	12.3	7	3,970	0.6	0.3	1.3	3	1,796	0.3	0.1	0.8
Pahang	293	211,197	21.3	17.6	25.5	11	10,184	1.0	0.5	2.2	1	700	0.1	0.0	0.5
Penang	184	97,583	8.1	5.9	11.1	11	7,036	0.6	0.2	1.7	2	225	0.0	0.0	0.1
Perak	155	139,791	8.5	6.0	11.8	16	16,253	1.0	0.6	1.8	5	6,855	0.4	0.2	1.1
Perlis	206	21,545	13.4	10.2	17.5	7	537	0.3	0.1	0.8	3	712	0.4	0.1	2.7
Selangor	471	630,936	15.1	12.9	17.6	20	27,555	0.7	0.4	1.2	6	7,559	0.2	0.1	0.4
Terengganu	148	69,586	10.2	8.1	12.7	5	4,051	0.6	0.2	2.0	1	1,077	0.2	0.0	1.1
Sabah & WP Labuan	405	469,605	20.4	17.9	23.2	26	25,466	1.1	0.7	1.8	2	3,223	0.1	0.0	0.8
Sarawak	291	344,439	19.7	17.0	22.8	28	43,677	2.5	1.6	4.0	2	3,322	0.2	0.1	0.7
WP Kuala Lumpur	112	178,641	14.3	10.8	18.9	9	13,533	1.1	0.5	2.3					
WP Putrajaya	50	5,085	10.5	6.9	15.6	1	100	0.2	0.0	1.5					
Location															
Urban	1,886	2,280,143	14.8	13.8	16.0	99	135,366	0.9	0.7	1.1	25	32,593	0.2	0.1	0.3
Rural	1,620	854,933	17.8	16.4	19.3	115	78,197	1.6	1.3	2.1	19	7,981	0.2	0.1	0.3
Sex															
Male	1,547	1,428,370	13.7	12.8	14.7	102	103,062	1.0	0.8	1.3	24	19,637	0.2	0.1	0.3
Female	1,959	1,706,706	17.5	16.3	18.8	112	110,501	1.1	0.9	1.5	20	20,936	0.2	0.1	0.4
Age Group															
18-30	384	547,331	7.7	6.7	8.8	14	23,056	0.3	0.2	0.6	17	21,082	0.3	0.2	0.5
31-40	315	363,788	8.1	6.9	9.4	16	20,836	0.5	0.3	0.8	7	4,845	0.1	0.0	0.3
41-50	721	701,267	20.1	18.2	22.1	26	30,314	0.9	0.6	1.4	3	3,142	0.1	0.0	0.3
51-60	873	691,940	26.1	23.9	28.4	40	36,891	1.4	1.0	2.0	4	1,883	0.1	0.0	0.2
>60	1,213	830,751	34.6	32.2	37.0	118	102,466	4.3	3.3	5.5	13	9,621	0.4	0.2	0.8

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity															
Malays	2,127	1,536,595	15.5	14.5	16.6	118	87,758	0.9	0.7	1.1	31	23,467	0.2	0.2	0.4
Chinese	593	736,776	15.5	13.6	17.6	30	46,495	1.0	0.6	1.5	5	7,750	0.2	0.1	0.5
Indians	219	199,681	14.6	12.1	17.5	16	15,784	1.2	0.6	2.1	5	4,361	0.3	0.1	0.8
Other Bumiputeras	412	443,629	20.5	18.1	23.2	36	46,690	2.2	1.4	3.3	2	2,245	0.1	0.0	0.5
Others	155	218,394	10.9	8.5	13.9	14	16,836	0.8	0.5	1.5	1	2,750	0.1	0.0	1.0
Marital Status															
Single	340	436,598	7.8	6.7	8.9	21	30,133	0.5	0.3	0.9	13	15,493	0.3	0.2	0.5
Married	2,541	2,258,442	17.2	16.1	18.3	135	132,167	1.0	0.8	1.3	25	18,072	0.1	0.1	0.2
Widow/widower /divorcee	625	440,035	31.3	28.6	34.2	58	51,263	3.7	2.5	5.2	6	7,009	0.5	0.2	1.2
Education Level															
No formal education	477	352,538	30.0	26.4	33.7	50	52,512	4.5	2.9	6.8	6	3,818	0.3	0.1	1.0
Primary education	1,216	935,438	22.8	21.1	24.6	90	82,154	2.0	1.5	2.6	14	11,336	0.3	0.1	0.5
Secondary education	1,308	1,253,738	13.4	12.4	14.6	56	54,686	0.6	0.4	0.8	13	10,287	0.1	0.1	0.2
Tertiary education	467	552,640	10.5	9.2	12.0	17	23,277	0.4	0.3	0.8	11	15,132	0.3	0.2	0.6
Unclassified education	32	35,824	12.9	7.7	20.8	1	933	0.3	0.1	2.4					
Occupation															
Government/semi government employee	276	248,455	12.9	10.9	15.2	9	11,342	0.6	0.3	1.2	2	4,593	0.2	0.1	1.0
Private employee	744	932,047	11.7	10.5	12.9	29	39,838	0.5	0.3	0.8	11	6,397	0.1	0.0	0.2
Self employed	621	458,593	13.5	12.1	15.0	24	23,207	0.7	0.4	1.1	10	14,309	0.4	0.2	0.8
Unpaid worker/home maker	636	528,110	18.3	16.6	20.3	22	26,101	0.9	0.5	1.7	1	114	0.0	0.0	0.0
Retiree	204	157,998	25.9	21.7	30.7	12	6,221	1.0	0.5	2.3	2	635	0.1	0.0	0.6

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Income Group															
Less than RM 1000	812	619,931	22.7	20.6	24.8	63	60,462	2.2	1.5	3.2	9	3,226	0.1	0.1	0.3
RM 1000 - RM 1999	693	548,937	16.5	15.0	18.3	51	48,248	1.5	1.0	2.1	7	8,009	0.2	0.1	0.6
RM 2000 - RM 2999	543	456,023	14.0	12.5	15.6	37	33,008	1.0	0.7	1.5	8	5,537	0.2	0.1	0.4
RM 3000 - RM 3999	389	350,108	13.5	11.7	15.4	17	18,360	0.7	0.4	1.2	6	4,247	0.2	0.1	0.4
RM 4000 - RM 4999	257	231,111	11.7	9.8	13.8	14	13,313	0.7	0.3	1.4	2	2,426	0.1	0.0	0.5
RM 5000 - RM 5999	228	244,085	15.3	12.8	18.3	15	19,096	1.2	0.7	2.2	2	1,990	0.1	0.0	0.8
RM 6000 - RM 6999	147	156,585	14.9	11.9	18.5	4	4,897	0.5	0.2	1.4	4	3,344	0.3	0.1	0.9
RM 7000 - RM 7999	105	110,113	13.5	10.4	17.4	3	3,028	0.4	0.1	1.3	1	3,025	0.4	0.1	2.6
RM 8000 - RM 8999	80	102,123	14.9	11.2	19.5	3	3,780	0.6	0.1	2.1	3	3,995	0.6	0.2	1.9
RM 9000 - RM 9999	53	53,306	15.0	10.5	20.9	1	1,444	0.4	0.1	2.9					
RM 10000 & above	199	262,753	14.7	12.3	17.5	6	7,927	0.4	0.2	1.1	2	4,775	0.3	0.1	1.1
Quintile Income Group															
Quintile 1	726	551,395	23.5	21.3	25.9	56	56,694	2.4	1.6	3.6	8	3,150	0.1	0.1	0.3
Quintile 2	712	564,805	16.5	14.9	18.2	55	50,249	1.5	1.1	2.1	7	7,970	0.2	0.1	0.6
Quintile 3	683	578,637	13.9	12.5	15.4	42	36,093	0.9	0.6	1.2	9	5,653	0.1	0.1	0.3
Quintile 4	634	582,347	13.2	11.7	14.8	32	33,009	0.8	0.5	1.2	9	6,727	0.2	0.1	0.3
Quintile 5	751	857,891	14.7	13.1	16.4	29	37,518	0.6	0.4	1.0	11	17,073	0.3	0.2	0.6

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Income Group															
Less than RM 1000	812	619,931	22.7	20.6	24.8	63	60,462	2.2	1.5	3.2	9	3,226	0.1	0.1	0.3
RM 1000 - RM 1999	693	548,937	16.5	15.0	18.3	51	48,248	1.5	1.0	2.1	7	8,009	0.2	0.1	0.6
RM 2000 - RM 2999	543	456,023	14.0	12.5	15.6	37	33,008	1.0	0.7	1.5	8	5,537	0.2	0.1	0.4
RM 3000 - RM 3999	389	350,108	13.5	11.7	15.4	17	18,360	0.7	0.4	1.2	6	4,247	0.2	0.1	0.4
RM 4000 - RM 4999	257	231,111	11.7	9.8	13.8	14	13,313	0.7	0.3	1.4	2	2,426	0.1	0.0	0.5
RM 5000 - RM 5999	228	244,085	15.3	12.8	18.3	15	19,096	1.2	0.7	2.2	2	1,990	0.1	0.0	0.8
RM 6000 - RM 6999	147	156,585	14.9	11.9	18.5	4	4,897	0.5	0.2	1.4	4	3,344	0.3	0.1	0.9
RM 7000 - RM 7999	105	110,113	13.5	10.4	17.4	3	3,028	0.4	0.1	1.3	1	3,025	0.4	0.1	2.6
RM 8000 - RM 8999	80	102,123	14.9	11.2	19.5	3	3,780	0.6	0.1	2.1	3	3,995	0.6	0.2	1.9
RM 9000 - RM 9999	53	53,306	15.0	10.5	20.9	1	1,444	0.4	0.1	2.9					
RM 10000 & above	199	262,753	14.7	12.3	17.5	6	7,927	0.4	0.2	1.1	2	4,775	0.3	0.1	1.1
Quintile Income Group															
Quintile 1	726	551,395	23.5	21.3	25.9	56	56,694	2.4	1.6	3.6	8	3,150	0.1	0.1	0.3
Quintile 2	712	564,805	16.5	14.9	18.2	55	50,249	1.5	1.1	2.1	7	7,970	0.2	0.1	0.6
Quintile 3	683	578,637	13.9	12.5	15.4	42	36,093	0.9	0.6	1.2	9	5,653	0.1	0.1	0.3
Quintile 4	634	582,347	13.2	11.7	14.8	32	33,009	0.8	0.5	1.2	9	6,727	0.2	0.1	0.3
Quintile 5	751	857,891	14.7	13.1	16.4	29	37,518	0.6	0.4	1.0	11	17,073	0.3	0.2	0.6

Table 13.1.2: Prevalence of difficulty in listening by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	1,205	983,535	4.9	4.5	5.3	110	87,605	0.4	0.3	0.6	34	35,102.75	0.2	0.1	0.3
State															
Johor	102	115,269	4.8	3.8	6.2	10	7,821	0.3	0.2	0.6	4	3,508	0.2	0.1	0.4
Kedah	111	99,740	7.6	5.9	9.6	8	7,872	0.6	0.3	1.4	3	3,527	0.3	0.1	0.9
Kelantan	89	58,665	5.8	4.2	8.0	7	4,405	0.4	0.2	1.0	2	1,983	0.2	0.1	0.9
Melaka	79	31,998	5.6	4.2	7.5	6	2,020	0.4	0.1	1.5	11	3,532	0.6	0.2	2.0
Negeri Sembilan	56	26,592	3.9	2.5	6.2	5	1,340	0.2	0.1	0.5	1	663	0.1	0.0	0.7
Pahang	99	65,258	6.6	5.0	8.6	4	1,775	0.2	0.1	0.6	1	700	0.1	0.0	0.5
Penang	69	25,212	2.1	1.3	3.3	9	4,479	0.4	0.1	1.0	2	1,937	0.2	0.0	1.0
Perak	81	81,516	4.9	3.3	7.3	9	11,857	0.7	0.3	1.7	2	4,314	0.3	0.1	1.1
Perlis	73	6,229	3.9	2.7	5.5	7	523	0.3	0.1	0.7			0.0	0.0	0.0
Selangor	106	145,173	3.5	2.6	4.6	11	15,909	0.4	0.2	1.0	5	9,055	0.2	0.1	0.6
Terengganu	51	20,818	3.0	2.2	4.2	9	2,731	0.4	0.2	0.9			0.0	0.0	0.0
Sabah & WP Labuan	140	148,890	6.5	5.3	7.9	13	9,920	0.4	0.2	0.9	3	5,885	0.3	0.1	0.9
Sarawak	97	101,762	5.8	4.5	7.5	10	14,276	0.8	0.4	1.5					
WP Kuala Lumpur	41	55,274	4.4	3.1	6.3	2	2,680	0.2	0.1	0.9					
WP Putrajaya	11	1,139	2.3	1.3	4.2										
Location															
Urban	596	687,294	4.5	4.0	5.0	41	52,114	0.3	0.2	0.5	17	26,993	0.2	0.1	0.3
Rural	609	296,241	6.2	5.5	6.9	69	35,491	0.7	0.5	1.0	17	8,110	0.2	0.1	0.4
Sex															
Male	615	505,053	4.8	4.3	5.5	58	45,995	0.4	0.3	0.6	19	19,336	0.2	0.1	0.3
Female	590	478,482	4.9	4.4	5.5	52	41,611	0.4	0.3	0.6	15	15,767	0.2	0.1	0.3
Age Group															
18-30	71	115,286	1.6	1.2	2.1	3	4,455	0.1	0.0	0.2	10	15,963	0.2	0.1	0.5
31-40	67	83,203	1.9	1.4	2.5	5	7,353	0.2	0.1	0.5	9	9,218	0.2	0.1	0.5
41-50	107	106,388	3.1	2.4	3.8	8	9,071	0.3	0.1	0.6	4	3,176	0.1	0.0	0.3
51-60	236	184,236	6.9	5.9	8.1	15	10,268	0.4	0.2	0.7	3	853	0.0	0.0	0.2
>60	724	494,423	20.6	18.7	22.6	79	56,458	2.4	1.7	3.2	8	5,893	0.3	0.1	0.6

Sociodemographic Characteristics	Mild Difficulty					Severe Difficulty					Complete difficulty				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Ethnicity															
Malays	720	466,968	4.7	4.2	5.3	57	31,024	0.3	0.2	0.4	22	16,753	0.2	0.1	0.3
Chinese	211	236,610	5.0	4.1	6.0	26	27,557	0.6	0.3	1.0	7	11,103	0.2	0.1	0.6
Indians	84	67,654	4.9	3.6	6.7	2	1,000	0.1	0.0	0.4	2	1,362	0.1	0.0	0.4
Other Bumiputeras	144	142,451	6.6	5.4	8.0	19	20,566	1.0	0.6	1.6	1	473	0.0	0.0	0.2
Others	46	69,852	3.5	2.4	5.1	6	7,458	0.4	0.1	1.8	2	5,412	0.3	0.1	1.1
Marital Status															
Single	85	113,564	2.0	1.5	2.7	9	12,502	0.2	0.1	0.5	11	15,957	0.3	0.1	0.6
Married	807	644,486	4.9	4.4	5.4	51	41,438	0.3	0.2	0.5	21	16,612	0.1	0.1	0.2
Widow/widower /divorcee	313	225,486	16.1	14.0	18.3	50	33,666	2.4	1.7	3.5	2	2,534	0.2	0.0	0.8
Education Level															
No formal education	261	192,313	16.3	13.8	19.2	35	27,060	2.3	1.5	3.6	7	3,312	0.3	0.1	0.7
Primary education	548	409,740	10.0	8.9	11.2	56	42,276	1.0	0.7	1.6	8	10,449	0.3	0.1	0.6
Secondary education	304	284,460	3.1	2.6	3.5	14	13,530	0.1	0.1	0.3	13	12,767	0.1	0.1	0.3
Tertiary education	81	82,705	1.6	1.2	2.0	3	3,600	0.1	0.0	0.2	6	8,575	0.2	0.1	0.4
Unclassified education	11	14,317	5.2	2.3	11.2	1	1,091	0.4	0.1	2.8	0	0	-	-	-
Occupation															
Government/semi government employee	43	37,633	2.0	1.4	2.8	2	1,621	0.1	0.0	0.4	2	4,810	0.3	0.1	1.0
Private employee	138	172,105	2.2	1.7	2.7	5	6,622	0.1	0.0	0.4	9	9,017	0.1	0.1	0.3
Self employed	188	140,881	4.1	3.4	5.0	9	8,689	0.3	0.1	0.6	10	10,603	0.3	0.1	0.7
Unpaid worker/home maker	161	132,843	4.6	3.7	5.8	7	6,985	0.2	0.1	0.6	2	2,779	0.1	0.0	0.6
Retiree	103	77,573	12.7	9.8	16.5	6	4,057	0.7	0.2	1.8	1	62	0.0	0.0	0.1

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Income Group															
Less than RM 1000	386	269,418	9.9	8.5	11.4	36	27,732	1.0	0.6	1.6	6	2,705	0.1	0.0	0.3
RM 1000 - RM 1999	259	195,164	5.9	5.0	6.9	24	21,455	0.7	0.4	1.1	4	5,761	0.2	0.1	0.6
RM 2000 - RM 2999	194	156,543	4.8	4.0	5.8	21	16,106	0.5	0.3	0.9	8	6,012	0.2	0.1	0.4
RM 3000 - RM 3999	110	95,337	3.7	2.8	4.7	10	10,040	0.4	0.2	0.8	6	4,001	0.2	0.1	0.5
RM 4000 - RM 4999	69	61,065	3.1	2.3	4.1	7	4,497	0.2	0.1	0.6					
RM 5000 - RM 5999	48	58,503	3.7	2.5	5.3	4	2,286	0.1	0.0	0.5	4	5,347	0.3	0.1	1.1
RM 6000 - RM 6999	24	23,971	2.3	1.4	3.7	3	1,263	0.1	0.0	0.7	1	1,390	0.1	0.0	0.9
RM 7000 - RM 7999	29	23,855	2.9	1.9	4.6	2	2,248	0.3	0.1	1.4	1	3,025	0.4	0.1	2.6
RM 8000 - RM 8999	21	22,884	3.3	1.9	6.0	1	1,075	0.2	0.0	1.1	2	2,326	0.3	0.1	1.5
RM 9000 - RM 9999	10	7,277	2.1	1.1	3.9	1	300	0.1	0.0	0.6	1	1,786	0.5	0.1	3.5
RM 10000 & above	55	69,517	3.9	2.9	5.3	1	604	0.0	0.0	0.2	1	2,750	0.2	0.0	1.1
Quintile Income Group															
Quintile 1	351	247,179	10.5	9.1	12.2	33	24,315	1.0	0.6	1.7	5	2,628	0.1	0.0	0.3
Quintile 2	263	197,761	5.8	4.9	6.8	23	22,753	0.7	0.4	1.1	4	4,549	0.1	0.0	0.5
Quintile 3	246	193,515	4.7	3.9	5.5	28	21,041	0.5	0.3	1.0	9	7,301	0.2	0.1	0.4
Quintile 4	168	153,452	3.5	2.8	4.3	15	13,077	0.3	0.2	0.5	8	4,756	0.1	0.0	0.3
Quintile 5	177	191,629	3.3	2.7	4.0	11	6,419	0.1	0.1	0.2	8	15,869	0.3	0.1	0.6

Table 13.1.3: Prevalence of difficulty in walking by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	2,348	1,926,253	9.5	8.9	10.2	301	228,510	1.1	1.0	1.3	175	129,011	0.6	0.5	0.8
State															
Johor	233	250,852	10.5	8.9	12.3	20	19,327	0.8	0.5	1.4	18	16,161	0.7	0.4	1.1
Kedah	200	181,483	13.8	11.5	16.5	28	21,510	1.6	1.0	2.6	18	16,880	1.3	0.7	2.3
Kelantan	82	51,757	5.1	3.7	7.2	12	8,481	0.8	0.4	1.9	8	5,655	0.6	0.3	1.2
Melaka	188	73,384	12.8	10.3	15.9	24	10,786	1.9	1.0	3.7	18	6,001	1.1	0.5	2.1
Negeri Sembilan	115	54,636	8.0	5.5	11.5	22	8,333	1.2	0.8	1.9	6	1,867	0.3	0.1	0.7
Pahang	158	102,120	10.3	8.3	12.7	17	11,832	1.2	0.6	2.3	10	6,437	0.7	0.4	1.2
Penang	132	76,134	6.3	4.9	8.1	31	11,328	0.9	0.6	1.5	12	5,853	0.5	0.2	1.2
Perak	138	119,717	7.2	5.7	9.2	23	26,061	1.6	0.9	2.7	21	20,980	1.3	0.7	2.2
Perlis	150	12,651	7.9	5.9	10.4	20	1,590	1.0	0.5	1.9	14	951	0.6	0.3	1.0
Selangor	243	319,113	7.6	6.3	9.3	21	35,059	0.8	0.5	1.4	18	22,036	0.5	0.3	0.9
Terengganu	94	38,242	5.6	4.4	7.1	10	4,792	0.7	0.3	1.4	6	2,616	0.4	0.1	1.1
Sabah & WP Labuan	259	287,409	12.5	10.7	14.5	26	18,864	0.8	0.5	1.3	14	10,375	0.5	0.2	1.0
Sarawak	207	220,943	12.6	9.9	16.0	34	35,149	2.0	1.2	3.2	10	11,199	0.6	0.3	1.3
WP Kuala Lumpur	86	131,405	10.5	7.9	13.9	13	15,398	1.2	0.6	2.4	1	1,900	0.2	0.0	1.1
WP Putrajaya	63	6,405	13.2	9.6	17.8			0.0	0.0	0.0	1	100	0.2	0.0	1.4
Location															
Urban	1,223	1,379,734	9.0	8.3	9.7	126	152,768	1.0	0.8	1.3	77	83,178	0.5	0.4	0.7
Rural	1,125	546,519	11.4	10.2	12.7	175	75,742	1.6	1.3	1.9	98	45,833	1.0	0.7	1.2
Sex															
Male	919	799,857	7.7	7.0	8.4	122	104,052	1.0	0.8	1.3	75	56,326	0.5	0.4	0.7
Female	1,429	1,126,395	11.5	10.7	12.4	179	124,458	1.3	1.0	1.6	100	72,685	0.7	0.6	1.0
Age Group															
18-30	141	181,944	2.6	2.0	3.2	5	10,027	0.1	0.1	0.4	15	18,962	0.3	0.2	0.5
31-40	191	204,674	4.5	3.8	5.5	13	16,355	0.4	0.2	0.7	10	9,795	0.2	0.1	0.5
41-50	334	308,349	8.8	7.7	10.1	25	22,047	0.6	0.4	1.0	15	11,943	0.3	0.2	0.6
51-60	597	455,548	17.1	15.4	19.0	50	33,080	1.2	0.9	1.7	17	11,616	0.4	0.2	0.8
>60	1,085	775,738	32.3	30.1	34.6	208	147,001	6.1	5.1	7.4	118	76,695	3.2	2.5	4.1

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity															
Malays	1,395	911,943	9.2	8.4	10.0	173	104,799	1.1	0.9	1.3	122	77,184	0.8	0.6	1.0
Chinese	379	431,336	9.1	8.0	10.3	52	62,736	1.3	0.9	1.9	22	23,431	0.5	0.3	0.8
Indians	183	152,266	11.1	9.3	13.2	28	15,171	1.1	0.7	1.8	11	8,854	0.7	0.3	1.5
Other Bumiputeras	303	317,419	14.7	12.3	17.4	40	39,523	1.8	1.2	2.8	16	14,671	0.7	0.4	1.2
Others	88	113,289	5.6	4.3	7.4	8	6,281	0.3	0.1	1.3	4	4,871	0.2	0.1	0.8
Marital Status															
Single	151	159,726	2.8	2.3	3.5	18	20,239	0.4	0.2	0.7	21	25,992	0.5	0.3	0.8
Married	1,672	1,390,777	10.6	9.8	11.4	167	136,063	1.0	0.8	1.3	96	60,751	0.5	0.4	0.6
Widow/widower /divorcee	525	375,751	26.8	24.1	29.6	116	72,208	5.1	4.0	6.5	58	42,268	3.0	2.2	4.1
Education Level															
No formal education	384	289,435	24.6	21.4	28.1	80	65,504	5.6	4.1	7.6	55	45,751	3.9	2.8	5.4
Primary education	971	722,254	17.6	16.1	19.2	148	102,157	2.5	2.0	3.1	71	44,805	1.1	0.8	1.5
Secondary education	767	685,323	7.3	6.6	8.1	57	44,809	0.5	0.3	0.7	34	25,662	0.3	0.2	0.4
Tertiary education	203	201,986	3.8	3.2	4.6	12	11,029	0.2	0.1	0.4	12	11,465	0.2	0.1	0.5
Unclassified education	21	26,455	9.5	5.3	16.6	2	4,825	1.7	0.3	11.2	2	1,127	0.4	0.1	2.7
Occupation															
Government/semi government employee	173	133,405	6.9	5.6	8.6	3	3,100	0.2	0.1	0.5	1	3,025	0.2	0.0	1.1
Private employee	306	368,917	4.6	4.0	5.4	10	10,156	0.1	0.1	0.3	6	2,351	0.0	0.0	0.1
Self employed	356	288,065	8.5	7.4	9.7	19	13,144	0.4	0.2	0.7	8	10,370	0.3	0.1	0.7
Unpaid worker/home maker	498	381,408	13.2	11.8	14.8	26	24,324	0.8	0.5	1.6	7	5,721	0.2	0.1	0.5
Retiree	150	107,406	17.6	14.6	21.1	21	14,690	2.4	1.4	4.1	3	2,044	0.3	0.1	1.4

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Income Group															
Less than RM 1000	647	462,484	16.9	15.1	18.9	105	80,967	3.0	2.3	3.9	52	32,162	1.2	0.8	1.6
RM 1000 - RM 1999	478	373,361	11.2	10.0	12.6	67	49,602	1.5	1.1	2.1	34	23,785	0.7	0.5	1.1
RM 2000 - RM 2999	353	284,942	8.7	7.6	10.0	40	29,998	0.9	0.6	1.5	29	19,028	0.6	0.4	0.9
RM 3000 - RM 3999	254	219,108	8.4	7.2	9.9	28	17,405	0.7	0.4	1.0	23	16,742	0.6	0.4	1.1
RM 4000 - RM 4999	170	149,209	7.5	6.1	9.2	19	11,658	0.6	0.3	1.1	12	10,358	0.5	0.3	1.1
RM 5000 - RM 5999	120	113,485	7.1	5.7	8.9	11	8,017	0.5	0.2	1.1	10	8,709	0.6	0.3	1.1
RM 6000 - RM 6999	70	67,707	6.4	4.6	8.9	7	7,040	0.7	0.3	1.7	5	4,545	0.4	0.2	1.1
RM 7000 - RM 7999	82	63,476	7.8	6.0	10.1	5	3,606	0.4	0.2	1.2	5	6,853	0.8	0.3	2.5
RM 8000 - RM 8999	52	54,902	8.0	5.4	11.8	5	7,236	1.1	0.3	3.8	1	700	0.1	0.0	0.7
RM 9000 - RM 9999	27	22,300	6.3	3.8	10.2	4	3,069	0.9	0.3	2.8			0.0	0.0	0.0
RM 10000 & above	95	115,280	6.5	5.0	8.3	10	9,912	0.6	0.3	1.2	4	6,128	0.3	0.1	1.0
Quintile Income Group															
Quintile 1	583	422,643	18.0	16.0	20.2	97	73,679	3.1	2.4	4.2	50	31,715	1.4	1.0	1.9
Quintile 2	506	389,589	11.4	10.2	12.7	70	55,144	1.6	1.2	2.2	33	22,825	0.7	0.4	1.1
Quintile 3	433	348,718	8.4	7.4	9.5	53	36,021	0.9	0.6	1.4	32	20,437	0.5	0.3	0.8
Quintile 4	409	363,570	8.2	7.2	9.4	41	26,414	0.6	0.4	0.9	40	31,684	0.7	0.5	1.1
Quintile 5	417	401,734	6.9	6.0	7.9	40	37,251	0.6	0.4	1.0	20	22,351	0.4	0.2	0.7

Table 13.1.4: Prevalence of difficulty in remembering by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	1,847	1,731,246	8.6	7.9	9.3	135	105,251	0.5	0.4	0.7	49	54,910	0.3	0.2	0.4
State															
Johor	179	211,773	8.9	7.1	11.2	8	6,797	0.3	0.1	0.6	4	3,328	0.1	0.0	0.4
Kedah	137	121,377	9.2	7.1	11.8	13	11,549	0.9	0.5	1.6	8	10,068	0.8	0.3	1.7
Kelantan	91	63,876	6.4	4.5	8.9	7	5,488	0.6	0.3	1.1	2	2,128	0.2	0.1	0.9
Melaka	66	27,185	4.8	3.6	6.2	6	2,432	0.4	0.1	1.5	11	3,604	0.6	0.2	2.0
Negeri Sembilan	60	29,866	4.4	2.9	6.7	7	2,289	0.3	0.2	0.7	2	669	0.1	0.0	0.4
Pahang	124	80,417	8.1	6.2	10.5	9	5,790	0.6	0.3	1.2	1	700	0.1	0.0	0.5
Penang	101	45,740	3.8	2.7	5.3	14	2,513	0.2	0.1	0.4			0.0	0.0	0.0
Perak	97	106,333	6.4	4.8	8.6	7	8,001	0.5	0.2	1.6	5	6,914	0.4	0.2	1.1
Perlis	93	8,336	5.2	3.8	7.0	2	147	0.1	0.0	0.4	1	75	0.1	0.0	0.3
Selangor	209	261,577	6.3	5.2	7.6	15	19,369	0.5	0.3	0.8	7	17,447	0.4	0.2	0.9
Terengganu	71	36,958	5.4	3.6	8.0	5	2,226	0.3	0.1	0.8			0.0	0.0	0.0
Sabah & WP Labuan	341	401,631	17.4	14.6	20.6	23	15,258	0.7	0.4	1.1	5	7,172	0.3	0.1	0.8
Sarawak	151	197,674	11.3	8.4	15.0	16	19,645	1.1	0.7	1.8	1	1,771	0.1	0.0	0.7
WP Kuala Lumpur	82	134,358	10.8	7.9	14.6	2	3,579	0.3	0.1	1.1	1	933	0.1	0.0	0.5
WP Putrajaya	45	4,144	8.5	5.6	12.7	1	167	0.3	0.1	2.4	1	100	0.2	0.0	1.4
Location															
Urban	994	1,245,754	8.1	7.3	8.9	44	52,456	0.3	0.2	0.5	28	42,471	0.3	0.2	0.4
Rural	853	485,492	10.1	8.9	11.4	91	52,795	1.1	0.9	1.4	21	12,439	0.3	0.2	0.5
Sex															
Male	841	827,545	7.9	7.2	8.8	57	46,592	0.5	0.3	0.6	25	31,037	0.3	0.2	0.5
Female	1,006	903,701	9.3	8.5	10.1	78	58,658	0.6	0.5	0.8	24	23,872	0.2	0.2	0.4
Age Group															
18-30	243	365,102	5.1	4.3	6.0	15	14,172	0.2	0.1	0.4	15	22,956	0.3	0.2	0.6
31-40	194	222,684	4.9	4.2	5.9	7	5,962	0.1	0.1	0.3	8	7,371	0.2	0.1	0.5
41-50	245	246,843	7.1	6.0	8.3	15	12,648	0.4	0.2	0.7	4	4,532	0.1	0.0	0.4
51-60	372	304,184	11.4	10.0	13.1	16	13,501	0.5	0.3	0.9	4	3,083	0.1	0.0	0.4
>60	793	592,433	24.7	22.5	26.9	82	58,968	2.5	1.8	3.3	18	16,967	0.7	0.4	1.3

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity															
Malays	958	695,119	7.0	6.3	7.8	67	43,872	0.4	0.3	0.6	31	26,790	0.3	0.2	0.4
Chinese	359	424,882	9.0	7.7	10.4	22	20,037	0.4	0.2	0.8	7	13,761	0.3	0.1	0.8
Indians	114	105,613	7.7	6.0	9.8	8	4,626	0.3	0.1	0.8	5	5,416	0.4	0.1	1.3
Other Bumiputeras	309	333,674	15.4	12.7	18.6	32	30,957	1.4	1.0	2.0	5	6,193	0.3	0.1	0.7
Others	107	171,958	8.6	6.6	11.1	6	5,758	0.3	0.1	0.9	1	2,750	0.1	0.0	1.0
Marital Status															
Single	263	349,468	6.2	5.3	7.2	21	17,667	0.3	0.2	0.5	19	29,218	0.5	0.3	0.9
Married	1,188	1,087,776	8.3	7.5	9.1	66	53,186	0.4	0.3	0.6	17	11,754	0.1	0.0	0.2
Widow/widower /divorcee	396	294,002	20.9	18.5	23.6	48	34,397	2.5	1.7	3.5	13	13,938	1.0	0.5	1.9
Education Level															
No formal education	316	261,334	22.2	19.2	25.5	45	33,180	2.8	2.0	3.9	16	22,145	1.9	1.1	3.3
Primary education	731	614,064	15.0	13.5	16.6	64	53,786	1.3	0.9	1.8	16	12,937	0.3	0.2	0.6
Secondary education	586	613,083	6.6	5.8	7.4	19	12,445	0.1	0.1	0.2	10	8,167	0.1	0.0	0.2
Tertiary education	189	215,515	4.1	3.4	5.0	3	3,440	0.1	0.0	0.2	6	6,861	0.1	0.0	0.4
Unclassified education	20	23,415	8.4	5.1	13.7	3	2,352	0.9	0.3	2.8	1	4,800	1.7	0.2	11.3
Occupation															
Government/semi government employee	116	99,475	5.2	3.9	6.8			0.0	0.0	0.0	2	3,096	0.2	0.0	1.1
Private employee	314	437,883	5.5	4.7	6.3	10	9,154	0.1	0.1	0.3	5	2,251	0.0	0.0	0.1
Self employed	285	248,038	7.3	6.2	8.6	10	10,912	0.3	0.2	0.6	6	8,395	0.3	0.1	0.6
Unpaid worker/home maker	317	275,799	9.6	8.2	11.2	15	9,774	0.3	0.2	0.6	1	118	0.0	0.0	0.0
Retiree	105	78,902	13.0	10.0	16.6	3	1,806	0.3	0.1	1.2	1	62	0.0	0.0	0.1

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Income Group															
Less than RM1000	491	393,640	14.4	12.7	16.3	40	28,302	1.0	0.7	1.5	16	16,081	0.6	0.3	1.1
RM1000 - RM1999	381	360,542	10.9	9.4	12.5	31	23,790	0.7	0.5	1.1	7	8,306	0.3	0.1	0.6
RM2000 - RM2999	291	262,491	8.0	6.9	9.4	21	19,176	0.6	0.3	1.0	6	8,267	0.3	0.1	0.9
RM3000 - RM3999	207	184,362	7.1	5.8	8.6	17	10,500	0.4	0.2	0.8	3	2,206	0.1	0.0	0.3
RM4000 - RM4999	131	136,060	6.9	5.5	8.5	7	5,957	0.3	0.1	0.7	3	1,515	0.1	0.0	0.4
RM5000 - RM5999	99	107,474	6.8	5.3	8.6	5	6,243	0.4	0.1	1.3	8	7,649	0.5	0.2	1.3
RM6000 - RM6999	52	54,010	5.1	3.4	7.6	4	2,215	0.2	0.1	0.8	1	1,390	0.1	0.0	0.9
RM7000 - RM7999	51	50,909	6.2	4.4	8.8	4	4,330	0.5	0.2	1.7	1	3,025	0.4	0.1	2.6
RM8000 - RM8999	41	48,143	7.0	4.8	10.1			0.0	0.0	0.0	2	771	0.1	0.0	0.7
RM9000 - RM9999	15	16,913	4.8	2.3	9.4	3	2,366	0.7	0.2	2.2			0.0	0.0	0.0
RM10000 & above	88	116,700	6.5	4.8	8.8	3	2,372	0.1	0.0	0.5	2	5,700	0.3	0.1	1.3
Quintile Income Group															
Quintile 1	450	361,576	15.4	13.5	17.5	38	26,770	1.1	0.8	1.6	14	15,328	0.7	0.3	1.3
Quintile 2	386	368,056	10.7	9.3	12.3	31	24,555	0.7	0.5	1.1	8	7,771	0.2	0.1	0.5
Quintile 3	353	312,034	7.5	6.5	8.6	26	23,114	0.6	0.3	0.9	7	9,555	0.2	0.1	0.7
Quintile 4	332	321,884	7.3	6.3	8.4	24	17,528	0.4	0.2	0.7	8	4,475	0.1	0.0	0.3
Quintile 5	326	367,696	6.3	5.3	7.4	16	13,283	0.2	0.1	0.4	12	17,780	0.3	0.2	0.6

Table 13.1.5: Prevalence of difficulty in self-care by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	436	355,745	1.8	1.5	2.0	80	61,594	0.3	0.2	0.4	94	80,069	0.4	0.3	0.5
State															
Johor	33	35,452	1.5	1.0	2.2	2	3,083	0.1	0.0	0.5	13	10,410	0.4	0.3	0.8
Kedah	32	25,560	1.9	1.3	2.9	4	2,955	0.2	0.1	0.7	14	14,098	1.1	0.6	2.0
Kelantan	28	18,886	1.9	1.1	3.1	4	2,039	0.2	0.1	0.5	2	2,208	0.2	0.1	0.9
Melaka	15	7,326	1.3	0.8	2.2	6	1,243	0.2	0.1	0.6	10	3,533	0.6	0.2	2.0
Negeri Sembilan	19	10,327	1.5	0.8	3.0	4	1,272	0.2	0.1	0.5	6	2,056	0.3	0.1	0.8
Pahang	30	19,747	2.0	1.3	3.1	8	5,506	0.6	0.2	1.4	6	3,420	0.3	0.2	0.8
Penang	26	17,644	1.5	0.8	2.7	9	2,376	0.2	0.1	0.5	2	2,580	0.2	0.1	0.9
Perak	44	43,948	2.7	1.7	4.2	5	8,408	0.5	0.2	1.8	7	9,563	0.6	0.2	1.4
Perlis	33	2,450	1.5	1.0	2.3	6	376	0.2	0.1	0.6	5	333	0.2	0.1	0.5
Selangor	40	53,025	1.3	0.8	2.0	11	18,346	0.4	0.2	0.9	13	18,066	0.4	0.2	0.8
Terengganu	35	16,648	2.4	1.7	3.5	3	756	0.1	0.0	0.3	4	1,543	0.2	0.1	0.6
Sabah & WP Labuan	49	44,856	1.9	1.4	2.8	10	6,551	0.3	0.1	0.6	9	9,293	0.4	0.2	0.9
Sarawak	29	27,592	1.6	1.0	2.5	6	5,736	0.3	0.1	0.8	2	2,867	0.2	0.0	1.0
WP Kuala Lumpur	23	32,285	2.6	1.6	4.3	2	2,949	0.2	0.1	0.9					
WP Putrajaya											1	100	0.2	0.0	1.4
Location															
Urban	227	258,520	1.7	1.4	2.0	38	45,386	0.3	0.2	0.4	42	53,328	0.3	0.2	0.5
Rural	209	97,226	2.0	1.7	2.5	42	16,208	0.3	0.2	0.5	52	26,741	0.6	0.4	0.8
Sex															
Male	203	186,633	1.8	1.5	2.2	38	28,297	0.3	0.2	0.4	43	36,559	0.4	0.2	0.5
Female	233	169,112	1.7	1.5	2.1	42	33,297	0.3	0.2	0.5	51	43,509	0.4	0.3	0.6
Age Group															
18-30	22	34,504	0.5	0.3	0.8	8	10,890	0.2	0.1	0.4	17	21,696	0.3	0.2	0.5
31-40	29	36,874	0.8	0.5	1.3	2	4,688	0.1	0.0	0.5	11	10,199	0.2	0.1	0.5
41-50	39	43,731	1.3	0.9	1.8	10	8,711	0.2	0.1	0.5	7	4,633	0.1	0.1	0.3
51-60	65	49,933	1.9	1.4	2.5	7	5,074	0.2	0.1	0.5	7	6,656	0.3	0.1	0.6
>60	281	190,704	7.9	6.8	9.3	53	32,232	1.3	0.9	2.1	52	36,885	1.5	1.1	2.2

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity															
Malays	256	173,718	1.8	1.5	2.1	44	25,884	0.3	0.2	0.4	65	46,153	0.5	0.3	0.6
Chinese	81	99,093	2.1	1.6	2.8	14	19,583	0.4	0.2	0.8	11	11,959	0.3	0.1	0.5
Indians	38	27,118	2.0	1.3	3.1	5	2,425	0.2	0.1	0.5	8	8,921	0.7	0.3	1.6
Other Bumiputeras	46	36,667	1.7	1.2	2.4	13	10,135	0.5	0.3	0.9	8	9,009	0.4	0.2	1.0
Others	15	19,148	1.0	0.5	1.9	4	3,567	0.2	0.1	0.5	2	4,026	0.2	0.1	0.9
Marital Status															
Single	47	56,292	1.0	0.7	1.4	11	14,483	0.3	0.1	0.5	23	28,292	0.5	0.3	0.8
Married	250	205,965	1.6	1.3	1.9	41	28,909	0.2	0.1	0.3	40	29,458	0.2	0.2	0.3
Widow/widower /divorcee	139	93,488	6.7	5.4	8.2	28	18,202	1.3	0.8	2.1	31	22,319	1.6	1.0	2.5
Education Level															
No formal education	118	78,074	6.6	5.2	8.4	24	19,335	1.6	1.0	2.8	31	29,016	2.5	1.6	3.8
Primary education	200	164,353	4.0	3.3	4.8	40	27,221	0.7	0.4	1.1	33	26,046	0.6	0.4	1.0
Secondary education	86	79,854	0.9	0.6	1.1	12	10,343	0.1	0.1	0.2	22	17,097	0.2	0.1	0.3
Tertiary education	19	20,587	0.4	0.2	0.6	3	2,015	0.0	0.0	0.2	6	7,673	0.1	0.1	0.4
Unclassified education	11	12,692	4.6	2.0	10.3	1	2,679	1.0	0.1	6.6	1	36	0.0	0.0	0.1
Occupation															
Government/semi government employee	10	9,419	0.5	0.3	0.9			0.0	0.0	0.0	1	3,025	0.2	0.0	1.1
Private employee	27	39,806	0.5	0.3	0.8	3	4,183	0.1	0.0	0.2	6	2,991	0.0	0.0	0.1
Self employed	25	21,888	0.6	0.4	1.1	1	1,500	0.0	0.0	0.3	6	8,395	0.2	0.1	0.6
Unpaid worker/home maker	37	33,276	1.2	0.8	1.7	2	2,585	0.1	0.0	0.4	5	4,861	0.2	0.1	0.5
Retiree	30	23,652	3.9	2.3	6.4	1	336	0.1	0.0	0.4	1	62	0.0	0.0	0.1

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Income Group															
Less than RM 1000	150	107,642	3.9	3.2	4.9	29	19,792	0.7	0.4	1.2	29	20,145	0.7	0.5	1.1
RM 1000 - RM 1999	113	89,372	2.7	2.1	3.4	15	11,729	0.4	0.2	0.7	11	9,856	0.3	0.1	0.6
RM 2000 - RM 2999	51	44,811	1.4	0.9	2.0	12	6,920	0.2	0.1	0.5	17	12,479	0.4	0.2	0.7
RM 3000 - RM 3999	39	31,198	1.2	0.8	1.8	6	3,043	0.1	0.0	0.3	11	7,635	0.3	0.1	0.7
RM 4000 - RM 4999	22	18,909	1	0.5	1.9	4	4,280	0.2	0.1	0.6	7	6,197	0.3	0.1	0.9
RM 5000 - RM 5999	13	12,856	0.8	0.4	1.5	3	1,928	0.1	0.0	0.5	9	9,304	0.6	0.2	1.4
RM 6000 - RM 6999	14	9,336	0.9	0.5	1.8	4	3,688	0.4	0.1	1.3	3	3,260	0.3	0.1	1.0
RM 7000 - RM 7999	10	13,936	1.7	0.9	3.2	2	3,581	0.4	0.1	1.7	2	3,225	0.4	0.1	2.4
RM 8000 - RM 8999	11	12,554	1.8	0.9	3.7			0	0.0	0.0	1	700	0.1	0.0	0.7
RM 9000 - RM 9999	2	1,779	0.5	0.1	2.3	1	482	0.1	0.0	1.0			0.0	0.0	0.0
RM 10000 & above	11	13,353	0.7	0.3	1.6	4	6,151	0.3	0.1	1.0	4	7,267	0.4	0.1	1.2
Quintile Income Group															
Quintile 1	138	99,549	4.2	3.4	5.3	28	18,632	0.8	0.5	1.4	26	17,926	0.8	0.5	1.2
Quintile 2	116	93,579	2.7	2.2	3.5	14	11,397	0.3	0.2	0.6	13	10,787	0.3	0.2	0.7
Quintile 3	63	50,811	1.2	0.9	1.8	14	8,412	0.2	0.1	0.4	19	15,044	0.4	0.2	0.6
Quintile 4	63	52,807	1.2	0.8	1.7	10	7,323	0.2	0.1	0.4	20	14,965	0.3	0.2	0.6
Quintile 5	56	59,000	1.0	0.7	1.4	14	15,830	0.3	0.1	0.5	16	21,347	0.4	0.2	0.7

Table 13.1.6: Prevalence of difficulty in communicating by socio demographic characteristics

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
MALAYSIA	630	547,834	2.7	2.4	3.0	91	77,891	0.4	0.3	0.5	61	67,112	0.3	0.2	0.5
State															
Johor	48	52,736	2.2	1.6	3.1	5	4,125	0.2	0.1	0.4	4	2,590	0.1	0.0	0.3
Kedah	45	39,173	3	2.0	4.5	5	3,319	0.3	0.1	0.7	9	10,031	0.8	0.4	1.5
Kelantan	47	28,667	2.8	2.0	4.1	7	4,793	0.5	0.2	1.1	1	1,390	0.1	0.0	1.0
Melaka	34	16,423	2.9	1.9	4.3	6	1,004	0.2	0.1	0.6	12	4,733	0.8	0.3	2.2
Negeri Sembilan	25	10,003	1.5	0.9	2.5	4	1,277	0.2	0.1	0.6	1	480	0.1	0.0	0.5
Pahang	44	31,673	3.2	2.2	4.5	7	3,139	0.3	0.2	0.7	1	700	0.1	0.0	0.5
Penang	36	17,855	1.5	0.8	2.7	9	7,861	0.7	0.2	1.9	2	2,591	0.2	0.1	0.9
Perak	49	56,498	3.4	2.3	5.0	2	2,836	0.2	0.0	0.8	7	9,850	0.6	0.3	1.4
Perlis	31	2,418	1.5	1.0	2.4	2	147	0.1	0.0	0.4	3	184	0.1	0.0	0.4
Selangor	75	94,283	2.3	1.7	3.1	9	11,776	0.3	0.1	0.6	9	20,279	0.5	0.2	1.0
Terengganu	51	25,310	3.7	2.5	5.5	3	986	0.1	0.0	0.5	1	776	0.1	0.0	0.8
Sabah & WP Labuan	50	68,080	3	2.1	4.1	16	14,645	0.6	0.3	1.2	9	10,740	0.5	0.2	1.0
Sarawak	52	53,354	3.1	2.2	4.3	7	6,875	0.4	0.2	0.9	1	2,667	0.2	0.0	1.0
WP Kuala Lumpur	37	50,739	4.1	2.8	5.9	9	15,107	1.2	0.5	2.9			0	0.0	0.0
WP Putrajaya	6	622	1.3	0.5	3.1			0	0.0	0.0	1	100	0.2	0.0	1.4
Location															
Urban	327	393,491	2.6	2.2	2.9	37	51,324	0.3	0.2	0.5	36	54,293	0.4	0.2	0.5
Rural	303	154,343	3.2	2.8	3.8	54	26,567	0.6	0.4	0.8	25	12,818	0.3	0.2	0.5
Sex															
Male	323	292,377	2.8	2.4	3.2	45	42,238	0.4	0.3	0.6	32	39,190	0.4	0.2	0.6
Female	307	255,458	2.6	2.2	3.1	46	35,653	0.4	0.3	0.5	29	27,922	0.3	0.2	0.5
Age Group															
18-30	79	107,118	1.5	1.1	2.0	13	20,996	0.3	0.2	0.6	15	24,577	0.3	0.2	0.6
31-40	55	56,751	1.3	0.9	1.7	8	8,894	0.2	0.1	0.5	9	10,552	0.2	0.1	0.6
41-50	47	56,965	1.6	1.2	2.3	10	7,311	0.2	0.1	0.5	8	7,747	0.2	0.1	0.5
51-60	96	77,156	2.9	2.3	3.7	12	8,920	0.3	0.2	0.7	6	4,677	0.2	0.1	0.5
>60	353	249,845	10.4	8.9	12.1	48	31,770	1.3	0.9	1.9	23	19,559	0.8	0.5	1.4

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Ethnicity															
Malays	357	242,115	2.4	2.1	2.9	43	27,371	0.3	0.2	0.4	38	30,309	0.3	0.2	0.5
Chinese	143	170,238	3.6	2.9	4.5	19	18,865	0.4	0.2	0.7	10	19,017	0.4	0.2	0.8
Indians	46	37,090	2.7	1.9	3.9	4	1,882	0.1	0.1	0.4	3	4,327	0.3	0.1	1.3
Other Bumiputeras	49	52,295	2.4	1.8	3.3	18	18,764	0.9	0.5	1.5	7	8,591	0.4	0.2	0.9
Others	35	46,096	2.3	1.5	3.6	7	11,008	0.5	0.2	1.8	3	4,868	0.2	0.1	0.9
Marital Status															
Single	122	148,502	2.6	2.1	3.3	28	33,266	0.6	0.4	0.9	24	37,211	0.7	0.4	1.0
Married	340	277,695	2.1	1.8	2.5	29	25,018	0.2	0.1	0.3	24	18,703	0.1	0.1	0.3
Widow/widower /divorcee	168	121,638	8.7	7.0	10.6	34	19,606	1.4	0.9	2.1	13	11,197	0.8	0.4	1.7
Education Level															
No formal education	163	123,415	10.5	8.6	12.8	32	26,059	2.2	1.4	3.6	19	22,407	1.9	1.1	3.3
Primary education	283	230,376	5.6	4.8	6.5	39	29,623	0.7	0.5	1.1	22	19,724	0.5	0.3	0.8
Secondary education	138	142,317	1.5	1.2	1.9	16	17,128	0.2	0.1	0.4	13	12,614	0.1	0.1	0.3
Tertiary education	30	39,393	0.7	0.5	1.2	1	1,208	0	0.0	0.2	6	7,566	0.1	0.1	0.4
Unclassified education	14	11,338	4.1	2.2	7.5	2	3,825	1.4	0.3	6.0	1	4,800	1.7	0.2	11.3
Occupation															
Government/semi government employee	13	9,317	0.5	0.3	0.9	1	800	0	0.0	0.3	1	3,025	0.2	0.0	1.1
Private employee	76	105,236	1.3	1.0	1.7	7	11,199	0.1	0.0	0.5	7	4,847	0.1	0.0	0.2
Self employed	68	55,834	1.6	1.2	2.2	4	3,999	0.1	0.0	0.4	7	8,435	0.2	0.1	0.6
Unpaid worker/home maker	62	55,407	1.9	1.4	2.6	2	1,562	0.1	0.0	0.2	1	118	0.0	0.0	0.0
Retiree	36	26,938	4.4	2.8	6.9	1	1,525	0.3	0.0	1.8	1	62	0.0	0.0	0.1

Sociodemographic Characteristics	Moderately Difficult					Very Difficult					Unable				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Income Group															
Less than RM1000	218	152,696	5.6	4.7	6.6	23	15,441	0.6	0.4	0.9	17	16,318	0.6	0.3	1.1
RM1000 - RM1999	133	110,998	3.3	2.6	4.2	23	16,502	0.5	0.3	0.8	7	9,055	0.3	0.1	0.6
RM2000 - RM2999	78	75,717	2.3	1.8	3.0	10	7,126	0.2	0.1	0.6	10	11,875	0.4	0.2	0.9
RM3000 - RM3999	66	61,036	2.3	1.7	3.2	11	7,442	0.3	0.1	0.6	8	7,410	0.3	0.1	0.6
RM4000 - RM4999	34	33,029	1.7	1.0	2.9	6	5,553	0.3	0.1	1.1	6	3,966	0.2	0.1	0.5
RM5000 - RM5999	31	34,668	2.2	1.4	3.5	9	15,314	1.0	0.4	2.4	7	7,100	0.4	0.2	1.1
RM6000 - RM6999	23	16,816	1.6	0.9	2.9	2	1,154	0.1	0.0	0.8	1	1,390	0.1	0.0	0.9
RM7000 - RM7999	10	12,663	1.5	0.8	3.0	1	1,810	0.2	0.0	1.6	1	3,025	0.4	0.1	2.6
RM8000 - RM8999	12	15,489	2.3	1.4	3.8	1	1,850	0.3	0.0	1.9	1	700	0.1	0.0	0.7
RM9000 - RM9999	5	5,445	1.5	0.5	4.6	1	482	0.1	0.0	1.0			0	0.0	0.0
RM10000 & above	20	29,276	1.6	0.9	2.9	4	5,218	0.3	0.1	0.9	3	6,272	0.4	0.1	1.2
Quintile Income Group															
Quintile 1	199	135,929	5.8	4.9	6.9	21	13,909	0.6	0.4	1.0	14	13,793	0.6	0.3	1.2
Quintile 2	136	118,953	3.5	2.8	4.4	23	17,457	0.5	0.3	0.8	9	10,291	0.3	0.1	0.7
Quintile 3	101	92,092	2.2	1.7	2.8	14	7,928	0.2	0.1	0.5	11	13,164	0.3	0.1	0.7
Quintile 4	99	96,592	2.2	1.6	2.9	17	14,939	0.3	0.2	0.7	17	13,888	0.3	0.2	0.6
Quintile 5	95	104,269	1.8	1.4	2.3	16	23,658	0.4	0.2	0.8	10	15,975	0.3	0.1	0.6

TOPIC 14.

14. HEALTH LITERACY

Contributors to this section: Norrafizah Jaafar, Abu Bakar Rahman, Mohd Azahadi Omar

14.1   Background

Health literacy (HL) is defined by the World Health Organization (WHO) as cognitive and social skills which determine the motivation and ability of individuals to gain access, to understand and use information in ways which promote and maintain good health. According to Expert Panel on Health Literacy, HL is defined as the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course.

The Institute of Medicine of The National Academies United States of America reported that individuals with inadequate health literacy have poorer health outcomes (1.5 to 3 times more likely to experience) and less likely to use preventive care compared to those with adequate health literacy; who are able to understand the information and make decisions about health and ultimately reduce inequities in health.

At some point, even well-educated individual with strong reading and writing skills may face trouble understanding a medical form or doctor's instructions regarding a drug or procedure. Health literacy is related to convergence of education, culture and language, communication skills of health professional, the nature of materials and messages and the settings in which health-related supports are provided.

14.2   Objectives

14.2.1 General Objective
- To determine the prevalence of health literacy in Malaysian adults.

14.2.2 *Specific objectives*
- To determine the prevalence of overall health literacy by socio-demographic subgroups.
- To determine the prevalence of different levels of health literacy (Limited likely, limited possible and adequate) by socio demographic subgroups.

14.3 Target Population, Study Instrument And Definitions

Data on health literacy was obtained from adult respondents aged 18 years and above through self-administered questionnaires using the Newest Vital Sign tool (NVS). The NVS contains a specially designed ice cream nutrition label that is accompanied by a series of questions and requires 3 minutes for administration.

The score sheet contain 6 domains on calories intake, amount of serving, saturated fat intake, percentage of daily value calories intake, safeness of eating the ice cream and ingredients of the ice cream. The answers were categorised into score 0 to 6 and divided into 3 levels namely as:

14.3.1 Limited likely literacy (CATEGORY 1)

This indicated a high likelihood of low health literacy (LHL). The scoring range from 0 to 1.

14.3.2 Limited possible literacy (CATEGORY 2)

This indicated the possibility of LHL. The scoring range from 2 to 3.

14.3.3 Adequate literacy (CATEGORY 3)

This indicated adequate health literacy. The scoring range from 4 to 6. Those individuals who do not meet criteria for Categories 3 are considered as inadequate health literacy or low health literacy.

14.4 Findings

The overall prevalence of adequate health literacy among adults aged 18 years and above was 6.6% (95% CI: 5.6, 7.7) with no differences between gender [Females (6.6%, 95% CI: 5.6, 7.9)] vs [males (6.5%, 95% CI: 5.3, 7.9)]. The urban population [7.8% (95% CI: 6.6, 9.3)] reported a significantly adequate health literacy compared to the rural population [2.3% (95% CI: 1.7, 3.1)]. The prevalence of adequate health literacy was highest among the age group of 20-34 years old. The level of health literacy decreased with increasing age and this was most apparent in the elderly. The highest prevalence of adequate health literacy was among Chinese [10.6% (95% CI: 8.2, 13.6)] and Indians [10.1% (95% CI: 7.0, 14.6)], followed by Malays [6.0% (95% CI: 4.8, 7.4)], Other Bumiputras [2.4% (95% CI: 1.3, 4.3)], and others [1.8% (95% CI: 0.9, 3.6)]. The level of adequate health literacy was highest among single respondents [8.3% (95% CI: 6.8, 10.1)] compared to married persons [5.8% (95% CI: 4.8, 7.0)] and widow/ widower/ divorcee [5.0% (95% CI: 3.2, 7.8)].

With regards to the level of education, adults with tertiary education [11.0% (95% CI: 9.3, 13.0)] were found to be more adequate in health literacy than those with primary [2.4% (95% CI: 1.5, 3.6)] or secondary education [5.1% (95% CI: 4.1, 6.5)]. In occupational sector, government/semi government employee [8.5% (95% CI: 6.6, 10.8)] had the highest prevalence of adequate health literacy while unpaid worker/home maker [4.3% (95% CI: 3.3, 5.5)] had the lowest. By state, Perak [19.5% (95% CI: 13.2, 27.9)] had the highest prevalence of adequate in health literacy, followed by WP Putrajaya [16.0% (95% CI: 11.4, 21.9)] and Kedah [12.6% (95% CI: 7.6, 20.2)] (Table 14.1.1). There was no trend of adequate health literacy according to income group with the highest among those earned RM6000-RM6999 [11.6% (95% CI: 7.8, 16.9)] and lowest among those earned RM2000-RM2999 [3.6% (95% CI: 2.5, 5.2)].

14.5   Conclusion

This is the first nationwide study on health literacy among Malaysian adults. However, the level of adequate health literacy was 6.6%. There was an obvious difference between urban and rural locality and education level. To address the issue of low health literacy, health professionals and community must be knowledgeable, aware, and responsive to the health literacy of patients and population.

14.6   Recommendations

In order to promote a health literate population:
- Ministry of Health should take the lead in developing uniform standards for addressing health literacy
- Intensity multidisciplinary research on the extent, associations and consequences of limited health literacy.
- Enhancement of health promotion to empower the community on the importance of adequate heath literacy

Table 14.1.1 : Level of Health Literacy Among Malaysian Adult Population

Sociodemographic Characteristics	ADEQUATE					LIKELY POSSIBLE					LIKELY LIMITED				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
MALAYSIA	687	886,426	0.1	0.1	0.1	2,181	2,357,864	0.2	0.2	0.2	10,149	10,281,439	0.8	0.7	0.8
State															
Johor	87	123,273	0.1	0.1	0.1	343	457,771	0.3	0.3	0.4	727	905,091	0.6	0.5	0.7
Kedah	96	120,934	0.1	0.1	0.2	172	190,085	0.2	0.1	0.3	624	647,233	0.7	0.6	0.8
Kelantan	23	23,061	0.0	0.0	0.1	37	35,680	0.1	0.0	0.1	710	654,086	0.9	0.9	0.9
Melaka	4	3,066	0.0	0.0	0.1	51	29,903	0.2	0.1	0.2	342	165,428	0.8	0.8	0.9
Negeri Sembilan	23	18,092	0.0	0.0	0.1	130	80,694	0.2	0.1	0.2	806	422,508	0.8	0.8	0.9
Pahang	5	4,904	0.0	0.0	0.0	51	47,527	0.1	0.1	0.1	647	514,275	0.9	0.9	0.9
Penang	39	61,872	0.1	0.1	0.2	177	193,738	0.3	0.2	0.4	489	397,449	0.6	0.5	0.8
Perak	130	215,040	0.2	0.1	0.3	119	179,394	0.2	0.1	0.2	644	707,331	0.6	0.6	0.7
Perlis	48	8,524	0.1	0.0	0.1	256	36,718	0.3	0.2	0.3	664	84,833	0.7	0.6	0.7
Selangor	93	179,038	0.1	0.0	0.1	367	662,152	0.2	0.2	0.3	1,500	2,207,419	0.7	0.7	0.8
Terengganu	9	6,737	0.0	0.0	0.0	129	79,157	0.1	0.1	0.2	826	488,402	0.9	0.8	0.9
Sabah & WP Labuan	17	27,209	0.0	0.0	0.0	56	93,423	0.1	0.0	0.1	935	1,426,371	0.9	0.9	0.9
Sarawak	17	27,221	0.0	0.0	0.1	66	105,264	0.1	0.1	0.1	636	955,048	0.9	0.8	0.9
WP Kuala Lumpur	26	60,433	0.1	0.0	0.1	74	151,042	0.2	0.1	0.2	383	684,367	0.8	0.7	0.8
WP Putrajaya	70	7,022	0.2	0.1	0.2	153	15,314	0.3	0.3	0.4	216	21,600	0.5	0.4	0.6
Location															
Urban	571	815,855	0.1	0.1	0.1	1,510	2,025,809	0.2	0.2	0.2	5,691	7,597,424	0.7	0.7	0.8
Rural	116	70,572	0.0	0.0	0.0	671	332,055	0.1	0.1	0.1	4,458	2,684,015	0.9	0.9	0.9
Sex															
Male	326	449,315	0.1	0.1	0.1	1,003	1,155,729	0.2	0.2	0.2	4,926	5,322,017	0.8	0.8	0.8
Female	361	437,112	0.1	0.1	0.1	1,178	1,202,135	0.2	0.2	0.2	5,223	4,959,423	0.8	0.7	0.8

Sociodemographic Characteristics	ADEQUATE					LIKELY POSSIBLE					LIKELY LIMITED				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	95% CI Upper
Age Group															
18-19	34	48,348	0.1	0.1	0.1	120	134,366	0.2	0.2	0.2	479	553,665	0.8	0.7	0.8
20-24	89	165,857	0.1	0.1	0.1	289	420,163	0.2	0.2	0.2	1,107	1,617,721	0.7	0.7	0.8
25-29	112	156,114	0.1	0.1	0.1	352	436,812	0.2	0.2	0.2	1,196	1,488,223	0.7	0.7	0.8
30-34	124	172,007	0.1	0.1	0.1	318	359,004	0.2	0.2	0.2	1,157	1,402,474	0.7	0.7	0.8
35-39	82	79,901	0.1	0.0	0.1	244	277,370	0.2	0.2	0.2	1,079	1,143,010	0.8	0.7	0.8
40-44	58	78,459	0.1	0.0	0.1	206	213,632	0.2	0.2	0.2	1,037	1,016,264	0.8	0.7	0.8
45-49	67	72,585	0.1	0.1	0.1	209	178,399	0.2	0.1	0.2	1,003	866,759	0.8	0.7	0.8
50-54	48	50,016	0.1	0.0	0.1	162	137,971	0.1	0.1	0.2	977	742,940	0.8	0.8	0.8
55-59	36	28,622	0.0	0.0	0.0	120	88,179	0.1	0.1	0.1	796	582,720	0.8	0.8	0.9
60-64	17	18,416	0.0	0.0	0.1	82	53,844	0.1	0.1	0.1	587	381,907	0.8	0.8	0.9
65-69	14	12,578	0.0	0.0	0.1	48	37,381	0.1	0.1	0.1	370	238,385	0.8	0.8	0.9
70-74	6	3,523	0.0	0.0	0.1	18	12,575	0.1	0.1	0.2	205	121,508	0.9	0.8	0.9
75+	0	0	.	.	.	13	8,168	0.1	0.0	0.1	156	125,864	0.9	0.9	1.0
Ethnicity															
Malays	428	445,570	0.1	0.1	0.1	1,580	1,391,883	0.2	0.2	0.2	6,821	5,608,449	0.8	0.7	0.8
Chinese	142	297,908	0.1	0.1	0.1	324	602,094	0.2	0.2	0.3	1,216	1,916,648	0.7	0.6	0.7
Indians	79	92,013	0.1	0.1	0.2	159	188,327	0.2	0.2	0.3	653	627,086	0.7	0.6	0.8
Other Bumiputras	26	33,569	0.0	0.0	0.0	70	105,526	0.1	0.1	0.1	973	1,269,801	0.9	0.9	0.9
Others	12	17,366	0.0	0.0	0.0	48	70,034	0.1	0.1	0.1	486	859,455	0.9	0.9	0.9
Marital Status															
Single	209	353,720	0.1	0.1	0.1	625	873,812	0.2	0.2	0.2	2,306	3,031,187	0.7	0.7	0.7
Married	448	499,289	0.1	0.1	0.1	1,455	1,401,236	0.2	0.2	0.2	7,122	6,703,209	0.8	0.8	0.8
Widow/widower /divorcee	30	33,417	0.1	0.0	0.1	101	82,817	0.1	0.1	0.2	720	545,769	0.8	0.8	0.9
Education Level															
No formal education	0	0	.	.	.	16	16,897	0.1	0.0	0.1	217	196,247	0.9	0.9	1.0
Primary education	36	45,497	0.0	0.0	0.0	193	171,896	0.1	0.1	0.1	1,955	1,697,350	0.9	0.9	0.9
Secondary education	294	354,649	0.1	0.0	0.1	1,012	1,053,519	0.2	0.1	0.2	5,541	5,493,422	0.8	0.8	0.8
Tertiary education	352	477,473	0.1	0.1	0.1	945	1,089,952	0.3	0.2	0.3	2,338	2,758,977	0.6	0.6	0.7
Unclassified education	5	8,807	0.1	0.0	0.2	15	25,600	0.2	0.1	0.3	93	130,525	0.8	0.7	0.9

Sociodemographic Characteristics	ADEQUATE					LIKELY POSSIBLE					LIKELY LIMITED				
	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper	Count	Estimated Population	Prevalence (%)	95% CI Lower	Upper
Occupation															
Government/semi government employee	157	134,566	0.1	0.1	0.1	425	345,509	0.2	0.2	0.3	1,235	1,107,997	0.7	0.7	0.7
Private employee	267	421,509	0.1	0.1	0.1	783	1,042,090	0.2	0.2	0.2	3,208	4,120,755	0.7	0.7	0.8
Self employed	87	105,672	0.0	0.0	0.1	315	297,304	0.1	0.1	0.2	2,113	1,829,768	0.8	0.8	0.9
Unpaid worker/home maker	79	80,525	0.0	0.0	0.1	299	279,657	0.1	0.1	0.2	1,768	1,518,148	0.8	0.8	0.8
Retiree	19	17,998	0.0	0.0	0.1	70	53,485	0.1	0.1	0.2	436	326,937	0.8	0.8	0.9
Income Group															
Less than RM 1000	52	66,038	0.0	0.0	0.1	177	169,473	0.1	0.1	0.2	1,284	1,133,030	0.8	0.8	0.9
RM 1000 - RM 1999	66	78,540	0.0	0.0	0.1	294	278,145	0.1	0.1	0.2	1,856	1,675,356	0.8	0.8	0.9
RM 2000 - RM 2999	71	82,843	0.0	0.0	0.1	331	334,779	0.1	0.1	0.2	1,900	1,861,113	0.8	0.8	0.8
RM 3000 - RM 3999	72	90,778	0.0	0.0	0.1	294	325,477	0.2	0.2	0.2	1,383	1,403,268	0.8	0.7	0.8
RM 4000 - RM 4999	102	138,309	0.1	0.1	0.1	229	277,957	0.2	0.2	0.2	964	1,061,946	0.7	0.7	0.8
RM 5000 - RM 5999	64	87,488	0.1	0.1	0.1	176	188,865	0.2	0.1	0.2	782	839,501	0.8	0.7	0.8
RM 6000 - RM 6999	50	83,946	0.1	0.1	0.2	125	144,968	0.2	0.2	0.3	480	493,710	0.7	0.6	0.7
RM 7000 - RM 7999	45	51,445	0.1	0.1	0.1	147	144,018	0.2	0.2	0.3	371	387,139	0.7	0.6	0.7
RM 8000 - RM 8999	38	46,493	0.1	0.1	0.2	100	104,088	0.2	0.2	0.3	287	350,037	0.7	0.6	0.8
RM 9000 - RM 9999	19	21,916	0.1	0.0	0.1	52	66,960	0.2	0.2	0.3	176	194,562	0.7	0.6	0.8
RM 10000 & above	108	138,632	0.1	0.1	0.1	256	323,135	0.2	0.2	0.3	666	881,777	0.7	0.6	0.7
Quintile Income Group															
Quintile 1	44	55,216	0.0	0.0	0.1	158	153,338	0.1	0.1	0.2	1,074	941,655	0.8	0.8	0.9
Quintile 2	71	88,555	0.0	0.0	0.1	290	278,598	0.1	0.1	0.2	1,890	1,736,221	0.8	0.8	0.9
Quintile 3	87	101,288	0.0	0.0	0.1	419	434,179	0.2	0.1	0.2	2,378	2,330,144	0.8	0.8	0.8
Quintile 4	181	248,207	0.1	0.1	0.1	504	569,891	0.2	0.2	0.2	2,221	2,328,485	0.7	0.7	0.8
Quintile 5	304	393,161	0.1	0.1	0.1	810	921,858	0.2	0.2	0.2	2,586	2,944,934	0.7	0.7	0.7

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