

Malaysian Adult Nutrition Survey 2003

General Findings



First Published in Malaysia 2008
Copyright © Nutrition Section, Family Health Development Division
Ministry of Health Malaysia, 2008
ISBN 978-983-44156-0-0

Published by:
Nutrition Section
Family Health Development Division
Ministry of Health Malaysia
Level 7, Block E10
Federal Government Administrative Centre
62590 Putrajaya, Malaysia
Tel. : 603-88834086
Fax : 603-88884647
Website : www.nutrition.moh.gov.my

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Printed in Malaysia by :
ATINA MARKETING SDN. BHD.
No.17A & 17M, Kompleks Selayang, 8½ Mile
Jalan Ipoh-Rawang
68100 Batu Caves, Selangor

ACKNOWLEDGEMENTS

The Malaysian Adult Nutrition Survey was funded by the Ministry of Health through the operating budget of three Divisions, the Family Health Development Division, the Food Safety and Quality Division and the Health Education and Communication Division. This survey was coordinated by the Nutrition Section of the Family Health Development Division.

The completion and success of this survey was due to the hard work and dedication of the scouting team, survey team and the Technical Committee for the Malaysian Adult Nutrition Survey. The latter was responsible for the development of the survey design and the survey questionnaire, monitoring the quality of the survey data, analyzing the data and preparing this report. Throughout this period the survey team and the Technical Committee members showed a high level of professionalism and team spirit.

The Technical Committee comprised of members from several divisions in the Ministry of Health, the Health Departments of the states of Johor and Selangor, the Public Health Institute, the Institute of Medical Research, the Institute for Health Systems Research, as well as academicians from the local universities. Their commitment and contribution is highly acknowledged. We would like to acknowledge support from the Directors of the State Health Department, Director of the Institute for Public Health, Director of the Institute of Medical Research, Director of the Institute for Health Systems Research, Heads of Departments of Nutrition and Dietetic, of the Universiti Kebangsaan Malaysia and Universiti Putra Malaysia and the Dean, School of Health Sciences, Universiti Sains Malaysia for their support and cooperation.

Special thanks are due to the staff at the Nutrition Laboratory, Institute for Medical Research for their help in the nutrient analysis of 41 food samples to supplement the data in the current Malaysian Food Composition Tables, which was used in the analysis of certain food items not in the database. This survey would not have been possible without the understanding, commitment and participation of our respondents. We offer our deepest gratitude to the nearly 7000 Malaysians who welcomed us into their homes and made this Adult Nutrition Survey a success.

The report of this survey has been written in nine volumes which are:

Volume 1: Methodology

Volume 2: General Findings

Volume 3: Nutritional Status of Adults Aged 18 to 59 Years

Volume 4: Meal Pattern of Adults Aged 18 to 59 Years

Volume 5: Dietary Intake of Adults Aged 18 to 59 Years

Volume 6: Physical Activity of Adults Aged 18 to 59 Years

Volume 7: Habitual Food Intake of Adults Aged 18 to 59 Years

Volume 8: Dietary Supplement Use among Adults Aged 18 to 59 Years

Volume 9: The Field Survey and Data Support Team

VOLUME 2

General Findings

Malaysian Adult Nutrition Survey 2003

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FOREWORD BY DIRECTOR GENERAL OF HEALTH MALAYSIA

This report and the results of the Malaysian Adult Nutrition Survey 2003 mark the outcome of five years of planning, development, field work and analysis. This was brought about by a successful collaboration between the Ministry of Health and the local universities.

This report provides definitive information on the nutritional status of Malaysian adults. For the first time, a detailed food and nutrient intake information of the adult population in various parts of the country, whether urban or rural, and of the various ethnic groups. Findings from this survey of a representative sample of the population indicate the magnitude of the nutrition problems in this country, for example, the estimated number of adults who are overweight and obese, those who are sedentary, not consuming adequate energy or over consuming calories from fats.

This report is timely, as it coincides with our 9th Malaysia Plan mid-term review, and thus provides useful guidance in the development of policies regarding health, nutrition, food safety, agriculture and trade. This will place Malaysia at par with the developed countries, an important milestone in our quest for standard setting and evidence-based planning of programmes.

The information obtained from this survey is essential in keeping up with the changing eating habits due to globalisation and urbanisation. I, therefore, hope similar surveys will be continued on a regular basis, and that future surveys cover other age groups such as infants, children, adolescents and the elderly.

The Ministry of Health Malaysia would like to congratulate the Family Health Development Division, Ministry of Health Malaysia and everyone involved in making this study a success. Special thanks to the Technical Committee for the Malaysian Adult Nutrition Survey, all State Health Departments and universities for their commendable effort in coming up with this extremely important document for planning of Public Health programmes.

Thank you.



Tan Sri Dato' Seri Dr. Hj Mohd. Ismail Merican
Director General of Health Malaysia

FOREWORD BY DEPUTY DIRECTOR GENERAL OF HEALTH (PUBLIC HEALTH)

The increase in diet-related diseases during the last few decades in Malaysia has prompted the government to recognize the important role that nutrition plays in the promotion of good health. To achieve the goal of healthy population, Malaysians must have access to a nutritionally adequate diet, safe foods and a sustainable healthy living environment.

The publication of the Malaysian Adult Nutrition Survey (MANS) 2003 would generate much interest amongst all health and nutrition care stakeholders in the country. Data and information gathered by these surveys are extremely valuable to all decision makers at the national, state and district level as well as those interested in the nutritional status of the Malaysian population.

Results of the MANS 2003 can be utilised as indicators to evaluate the achievements of the targets in the National Plan of Action for Nutrition (2006-2015). The outcome of this survey can also be used to measure the impact of current nutrition intervention programmes as well as to plan future activities to cater for the unique needs of the various target population. This report will serve as a useful reference for future research and helps in improving the availability of local data sources.

I would like to take this opportunity to congratulate and thank the Director of Family Health Development Division and the Principal Investigator MANS 2003, all those directly involved in the conduct of the survey, the Technical Committee Members and research field survey teams for their dedication and tenacious efforts in completing this survey and publishing this invaluable report.



Dato' Dr. Hj. Ramlee Hj. Rahmat
Deputy Director General of Health (Public Health)
Ministry of Health Malaysia

FOREWORD BY DIRECTOR OF FAMILY HEALTH DEVELOPMENT DIVISION

I am very happy with the successful completion of this report of the Malaysian Adult Nutrition Survey (MANS) 2003. I appreciate the concerted effort, persistence and endurance of the officers who have been involved in this survey. I am extra proud of the report which is the first National Adult Survey of its kind conducted in this country.

This survey provides the data for action and policies, as well as the direction for further research efforts towards improving the nutritional well-being of the population in line with the objectives of the National Nutrition Policy of Malaysia.

I believe this survey report is an important document to provide guidance in the implementation and evaluation of nutrition programmes and activities in the country under the Ninth and Tenth Malaysia Plans.

The results of this study have given us a more comprehensive and up-to-date picture of the nutritional status, dietary intake and physical activity of the adult population as well as their use of food supplements. The report will also be valuable in assisting with the decision making for research, services or training.

I would like to take this opportunity to thank the immediate past Director of Family Health Development Division Dato' Dr Narimah Awai, whose support was instrumental in making this study a success. I must congratulate Datin Dr Safiah Mohd Yusof the Principal Investigator and the research team members whom with passion, dedication and hardwork, have successfully undertaken and completed this study. I would also like to thank all individuals and agencies who have directly or indirectly, contributed towards the completion of this study.



Dr. Hjh Safurah Hj. Jaafar
Director of Family Health Development Division
Ministry of Health Malaysia

FOREWORD BY PRINCIPAL INVESTIGATOR

A nutrition survey involves measuring multiple variables that are interrelated. Moreover, a person's food intake or physical activity can change from time to time. However, this type of information and others to assess the nutritional status of the Malaysian population is urgently needed to develop food and nutrition policies, intervention and educational programmes as well as to monitor the country's nutrition situation.

This is the first time that a cross-sectional nutrition survey has been conducted nationwide, covering Peninsular Malaysia, Sabah and Sarawak. The main objective of this survey is to determine the nutritional status, food consumption and physical activity pattern of Malaysian adults from 18 to 59 years old.

It is my sincere wish that the results of this study be maximally utilized by all stakeholders of nutrition and health services in the country, including programme managers of the Ministry of Health Malaysia, academicians, food manufacturers, private health institutions and individuals concerned. The results should be used for the betterment of the nation, directly or indirectly in nutrition planning, prioritisation, research or training.

I would like to take this opportunity to thank the Director General of Health Malaysia, Tan Sri Dato' Seri Dr. Hj Mohd Ismail Merican for giving valuable support in this survey.

A note of gratitude goes to the Deputy Director General of Health Malaysia (Public Health), Dato' Dr. Hj. Ramlee Hj. Rahmat as an advisor to Technical Committee for this survey for his patience, understanding and guidance to ensure the success of this survey.

I would like to acknowledge support from the Director of the Family Health Development Division, Directors of all the State Health Departments, Director of the Institute for Public Health, Director of the Institute of Medical Research, Director of the Institute for Health Systems Research, Heads of Nutrition Departments of Universiti Kebangsaan Malaysia and Universiti Putra Malaysia and the Dean, School of Health Sciences, Universiti Sains Malaysia for their support and cooperation. Their commitment and contribution is highly appreciated.

The completion and success of this survey was due to the hard work and dedication of the scouting team, survey team and the Technical Committee for the Malaysian Adult Nutrition Survey. The latter was responsible for the development of the survey design and the survey questionnaire, monitoring the quality of the survey data, analyzing the data and preparing this report. Throughout this period the survey team and the Technical Committee members showed a high level of professionalism and team spirit.

This survey would not have been possible without the understanding, commitment and participation of our respondents. I offer my deepest gratitude to the nearly 7000 Malaysians who welcomed us into their homes and made this Adult Nutrition Survey a success.



Datin Dr. Safiah Mohd Yusof
Principal Investigator
Malaysian Adult Nutrition Survey 2003
Family Health Development Division
Ministry of Health Malaysia

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General Findings

2.1 INTRODUCTION

Information on nutrition of the Malaysian population is needed to develop evidence-based food and nutrition policies, intervention and educational programmes as well as monitoring the country's nutrition situation. The Malaysian Adult Nutrition Survey (MANS) 2003 was the first cross-sectional nutrition survey conducted nationwide, covering Peninsular Malaysia, Sabah and Sarawak.

This survey provides information on anthropometric measurements, the food and nutrient intakes, dietary habits, physical activity pattern, and intake of dietary supplements among Malaysian adults. This survey was based on a nationally representative sample of 6,928 Malaysian adults in selected households aged between 18 and 59 years old, carried out between October 2002 and December 2003.

The Malaysian Adult Nutrition Survey 2003 used a sampling frame that had included populations in six zones of the country, namely Northern, Southern, Central, East Coast, Sabah and Sarawak. Subjects were interviewed in their homes using the face-to-face interview technique. The survey data collected included: weight and height measurements; a 24-hour diet recall; meal pattern; the frequency and amount of intake of foods over the previous one year; a 24-hour physical activity recall; and intake of nutrient and food supplements during the past one year.

This report is the second volume of nine series of the entire report for the survey. It explains the study population, the response rate for the survey and the distribution of respondents in six zones of the country. It also describes the characteristics of 6,928 respondents which represent 14,178,135 adult Malaysians. The socio demographic characteristics of the population are described according to zone, strata, sex, age, ethnicity, marital status, educational level, household size, occupational group and income.

2.2 THE STUDY POPULATION

A stratified random sampling, proportionate to the population size was used to select the Enumeration Blocks (EB) and Living Quarters (LQ). These Enumeration Blocks and Living Quarters were provided by the Department of Statistics Malaysia.

The country was divided into six zones. A two-stage sample selection was employed to select the EBs and then approximate height LQs within each EB. A total of 1,109 EBs and 8,641 LQs were selected (Table 2.2.1). During pre-survey it was found that the highest percentage of LQs came from the Central zone (2,735 LQ, 31.65%) whereas, Sarawak zone had the least (816 LQ, 9.44%).

Table 2.2.1 Distribution of EBs and LQs by zone and strata

Zone	No. of EBs Selected	No. of EBs Resolved	% EBs Resolved	No. of LQs Selected	No. of LQs Resolved	% LQs Resolved	Total no. of Respondents
Southern	203	202	99.51	1,624	1,590	97.91	1,329
Central	359	348	96.94	2,735	2,636	96.38	2,321
East Coast	172	171	99.42	1,291	1,249	96.75	943
Northern	150	149	99.33	1,194	1,164	97.49	893
Sabah	123	115	93.50	981	961	97.96	737
Sarawak	102	102	100.00	816	816	100.00	705
Malaysia	1,109	1,087	98.02	8,641	8,416	97.40	6,928

2.3 RESPONSE RATE

The sampling units of this survey were Malaysian adults aged 18 to 59 years old. In Figure 2.3.1 the total sample known as units represented by the first box at the top of the flow chart is the total number of resolved and unresolved living quarters, which was 8,641.

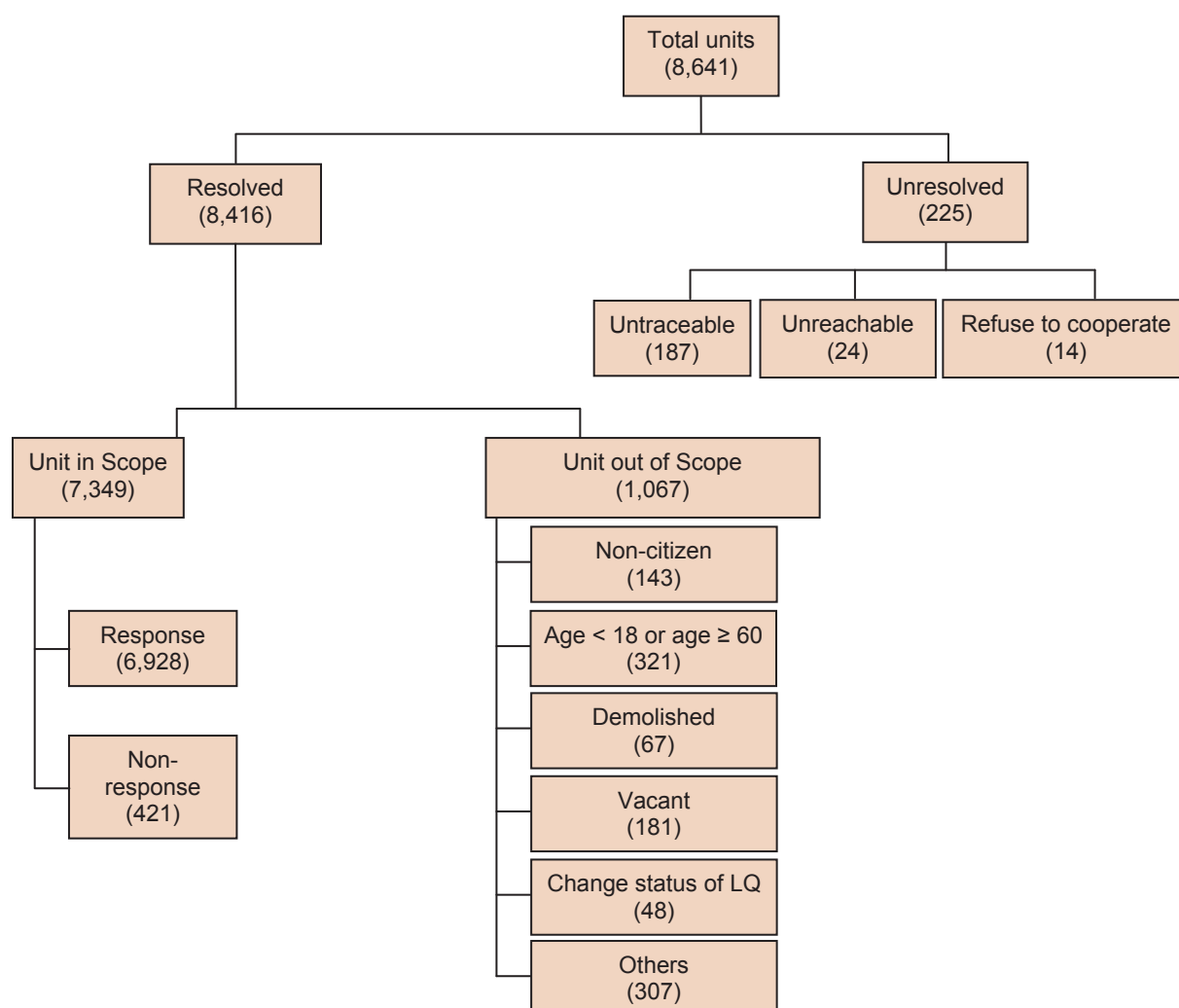


Figure 2.3.1: Scheme for calculation of response rate

Resolved units refer to the target population that includes demolished, empty and change in status of living quarters by the survey criteria. A household can be identified as unresolved Malaysian adults because of their unwillingness to provide the needed information, or they were unreachable or untraceable. Those unresolved units however could have been units which were within the scope or out of scope for this survey. This information was obtained from reports of the Survey Scout Team, and had been verified by the Survey Field Managers or the Team Leaders or both. In this survey, the number of unresolved household was 225 (2.6%), of which 24 were unable to be reached (for example, inaccessible due to remoteness of the area, or due to bad weather or other causes). A total of 187 addresses

were unable to be traced and 14 whose status of eligibility were unknown due to refusal to cooperate in the survey even at the initial stage.

Units which are in the scope are defined as a member of the target population that should be included in the survey and usually identified as eligible respondents. In this survey out of 7,349 subjects who were eligible, 6,928 had fully responded to the survey and 421 had been classified as non-response. Among the non-responses, there were 187 respondents with whom some contact had been made. However the selected household members had declined to be interviewed. There were also 204 respondents who were not available when the interviewer wanted to conduct an interview after repeated visits. A minimum of three visits by the team members were made to each living quarters before it was reported as never available. The remaining of the non-response were 30 respondents who agreed to take part, but were not interviewed because they were physically or mentally handicapped or both. These included those who were dumb, deaf, had Down's syndrome, had suffered from stroke or were bedridden (Table 2.3.1).

Table 2.3.1: Distribution of non-respondents who were of physically or mentally handicapped or both, according to zone

Medical Condition	Zone						
	Northern	Central	Southern	East Coast	Sabah	Sarawak	Malaysia
Dumb	1	0	1	1	0	0	3
Deaf	1	0	0	2	3	0	6
Dumb and deaf	1	2	0	0	1	0	4
Bedridden	0	0	1	0	0	0	1
Mentally retarded	0	0	0	0	0	1	1
Stroke	0	0	0	2	0	0	2
Slow learner	0	0	0	0	0	0	0
Down syndrome	4	0	0	0	0	0	4
Mental illness	2	4	0	2	0	1	9
Total	9	6	2	7	4	2	30

Units that are out of scope refer to non-members of the target population which comprised of 12.7% of the resolved units in this survey. Those who were considered out of scope during the survey period included the non-citizens (13.4%) and individuals who were less than 18 years old or 60 years old or more (30.1%). In addition, 28.8% (307) were individuals who were away for further studies, or had gone

outstation for more than two weeks or had died during the survey period. Living quarters that had been demolished, changed in status and unoccupied during the survey were also considered as out of scope (27.7%).

Response rate was the number of selected adults who had taken part in the survey divided by the total number of eligible adults inclusive of the estimated number of eligible adults from unresolved living quarters. Based on this definition, the overall response rate was 94.3% (Table 2.3.2). The highest response rate was observed in Sabah (99.5%) and the lowest was in Sarawak (88.9%).

Table 2.3.2: Response rate (%) by zone

Zone	No. of eligible respondents	No. of respondents	Response rate (%)
Northern	958	893	93.2
Southern	1,403	1,329	94.7
East Coast	982	943	96.0
Central	2,472	2,321	93.9
Sabah	741	737	99.5
Sarawak	793	705	88.9
Malaysia	7,349	6,928	94.3

2.4 SURVEY RESPONDENTS

The estimated weighted population of this survey was 14,178,135, while the projected population reported by the Department of Statistics Malaysia for 2003 was 14,237,200 (Table 2.4.1). The difference was mainly attributed to the lost occupants from LQs that were already demolished, vacant, changed status, those that could not be found and those found to be locked or respondents who were not in their homes after repeated visits.

Table 2.4.1: Distribution of MANS 2003 population and the projected population of Malaysia in 2003 according to zone

Zone	MANS 2003		Projected Population of Malaysia in 2003*	
	Estimated Population	Percentage (%)	Projected 2003	Percentage (%)
Southern	2,972,294	21.0	2,620,700	18.4
Central	5,388,794	38.0	4,895,300	34.4
East Coast	1,616,847	11.4	1,953,200	13.7
Northern	1,886,983	13.3	1,934,800	13.6
Sabah	1,121,712	7.9	1,592,100	11.2
Sarawak	1,191,505	8.4	1,241,100	8.7
Malaysia	14,178,135		14,237,200	

* Source: Department of Statistics, Malaysia 2003

2.5 SOCIO DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF THE STUDY POPULATION

2.5.1 Study population by zone

The study used the six zones in Malaysia which consist of Northern, Central, Southern, East Coast, Sabah and Sarawak. Figure 2.5.1 shows that the highest percentage of respondents came from the Central zone (38.01%), the least were from Sabah (7.91%).

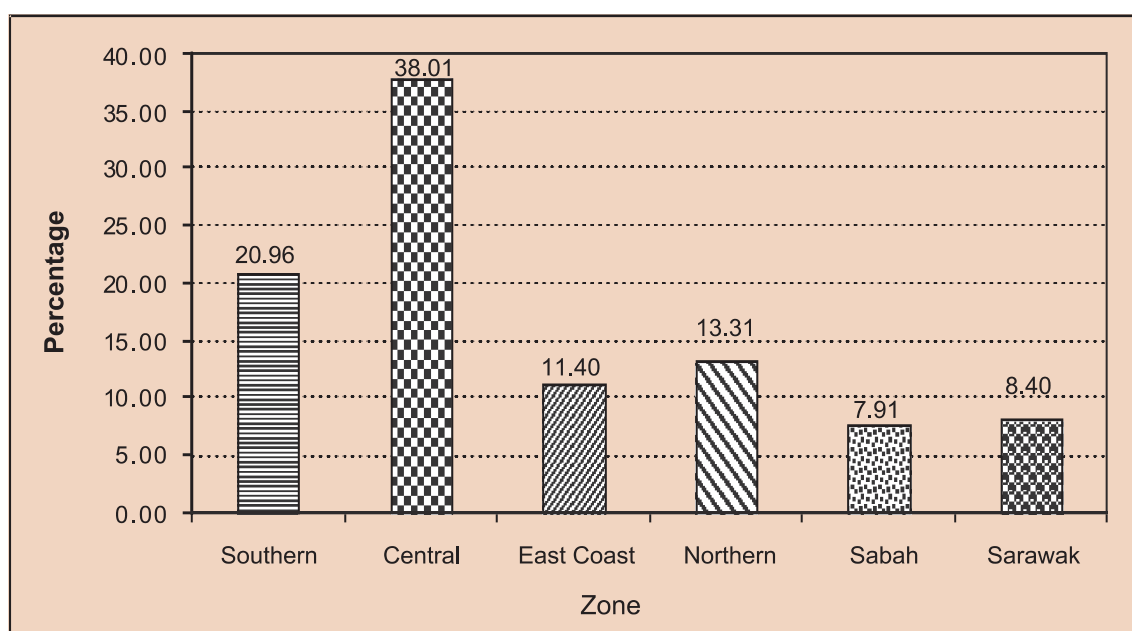


Figure 2.5.1: Percentage of the study population by zone

2.5.2 Study population by strata

The study population was stratified into urban and rural. About 60% (8,441,210) of the respondents came from urban area (Figure 2.5.2).

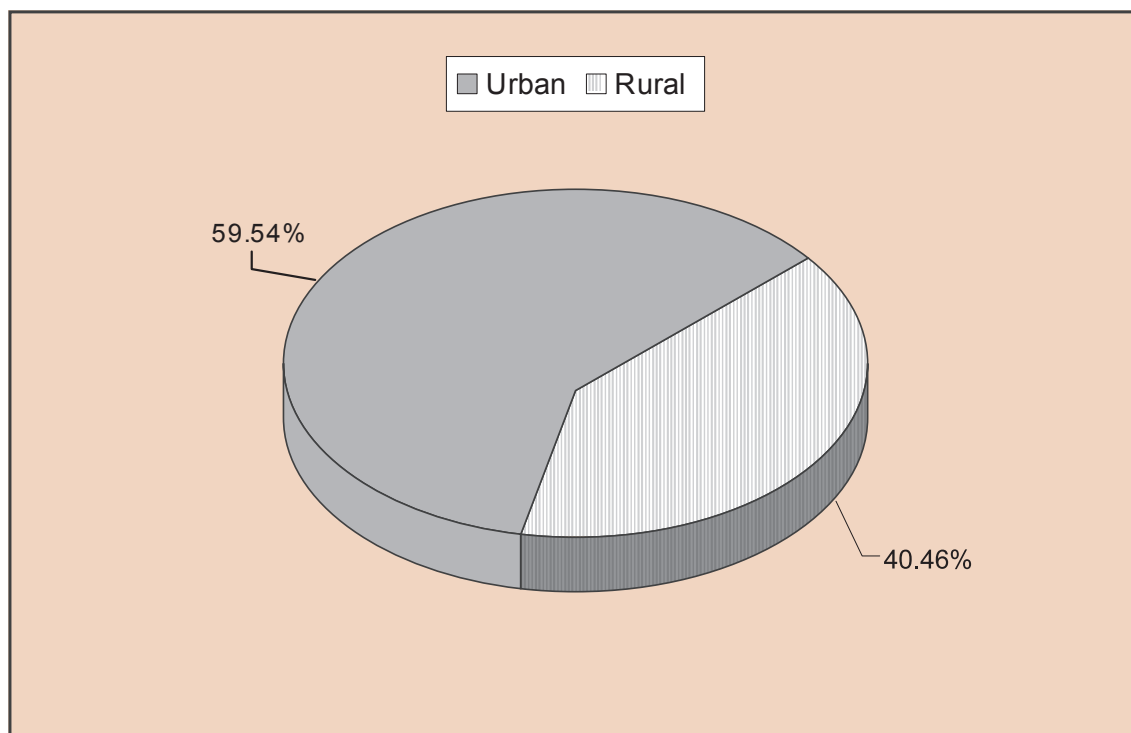


Figure 2.5.2: Percentage of the study population by strata

Comparing between zones, Central zone had the highest urban population (77.4%, 4,170,911), and the lowest urban population is in the East Coast. Inversely East Coast had the highest rural population and Central zone had the lowest.

2.5.3 Study population by strata in various zones

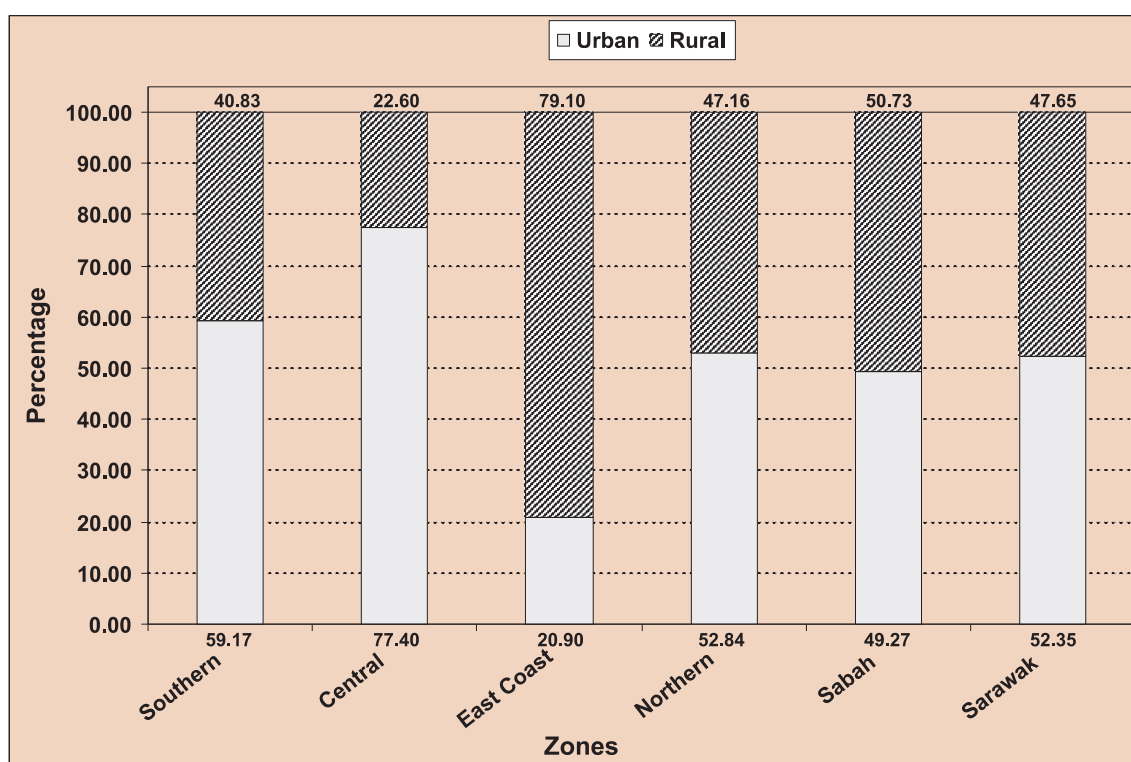


Figure 2.5.3: Percentage of the study population by strata in various zones

2.5.4 Study population by sex

There was almost an equal proportion of sexes in this study of which 51% (7,210,108) were men and 49 % (6,968,208) were women (Figure 2.5.4).

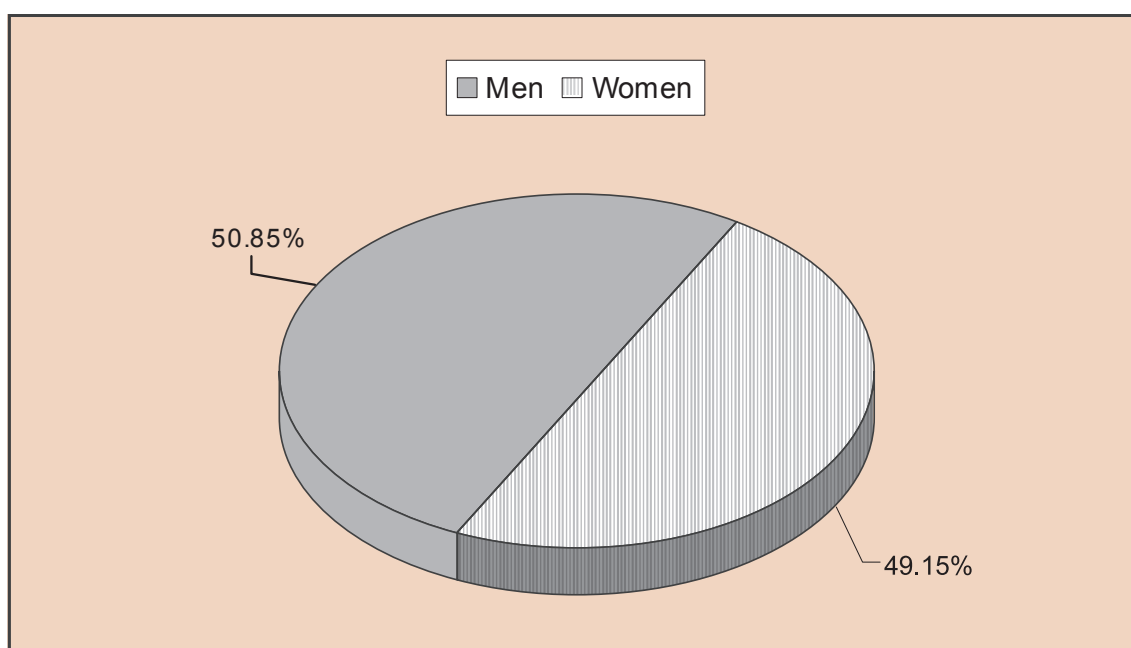


Figure 2.5.4: Percentage of the study population by sex

2.5.5 Study population by sex in various zones

The distribution between men and women were equal in all zones, except in the Northern zone where there were more women (13.89%) than men (12.74%), (Figure 2.5.5). A similar distribution between men and women was found in the urban and rural areas (Figure 2.5.6).

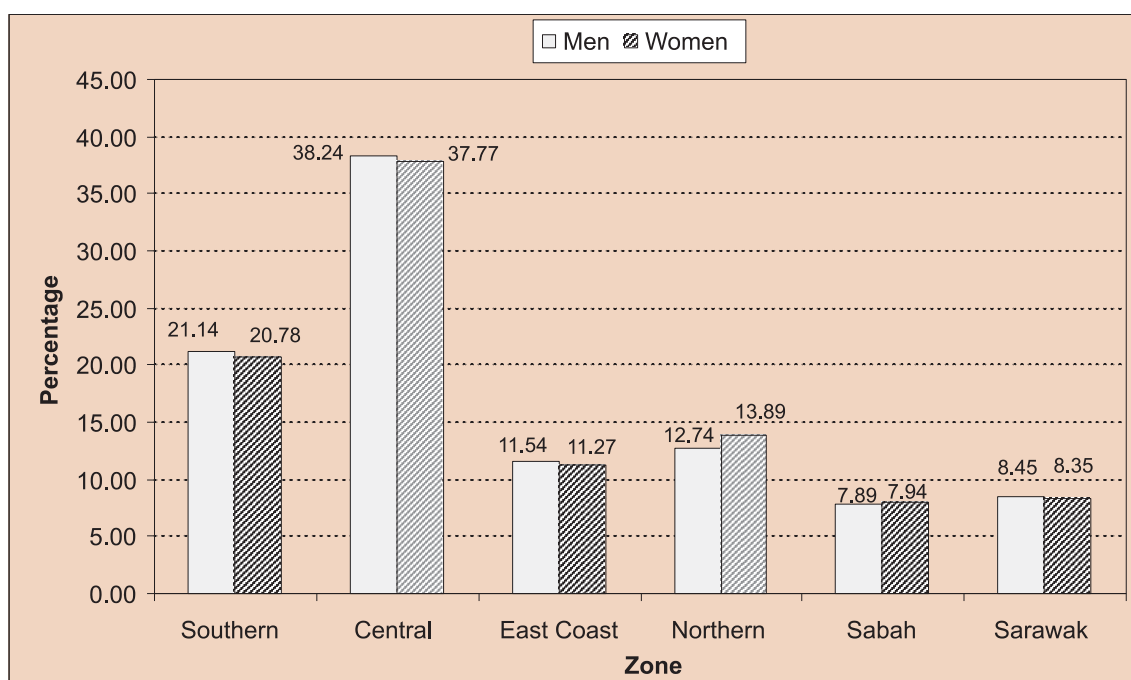


Figure 2.5.5: Percentage of the study population by sex in various zones

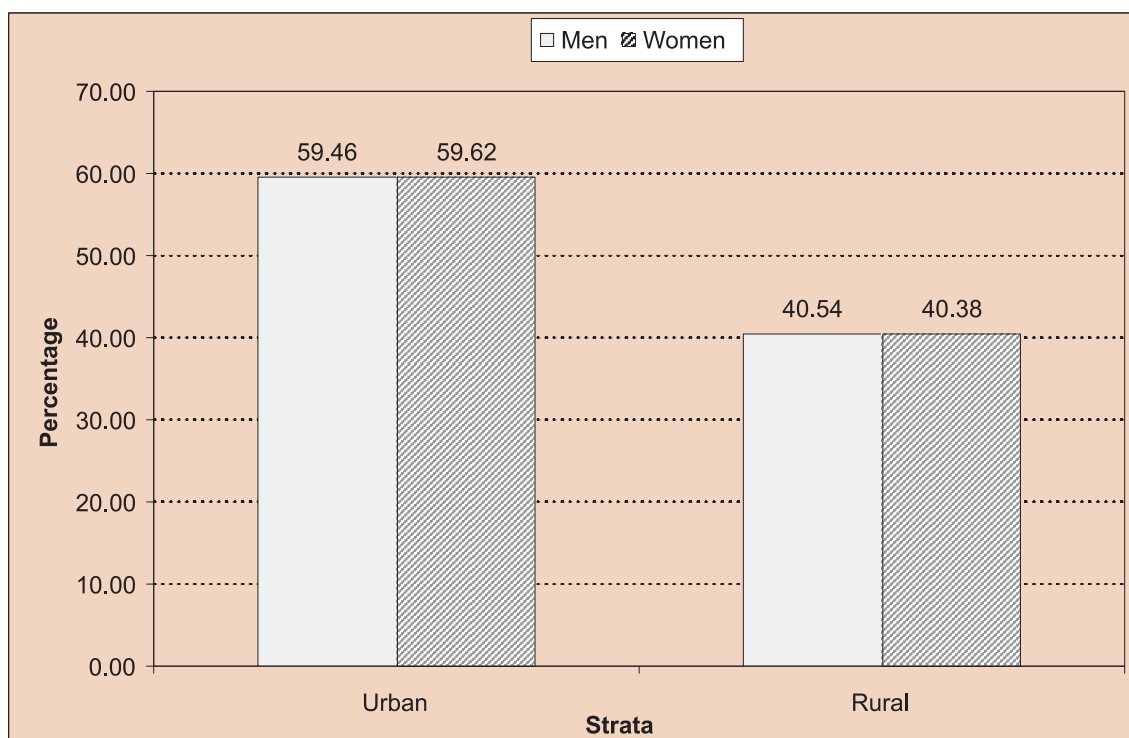


Figure 2.5.6: Percentage of the study population by sex in urban and rural areas

2.5.6 Study population by age group

The distribution of the age group is shown in Figure 2.5.7. The highest number of respondents was from the 20 to 24 years old age group (15.86%), followed in decreasing order by the 25 to 29 years old age group (14.11%), 30 to 34 years old, (13.24%), and 35 to 39 years old age group (12.54%). While the youngest age group 18 to 19 years old consisted of only 10.22%.

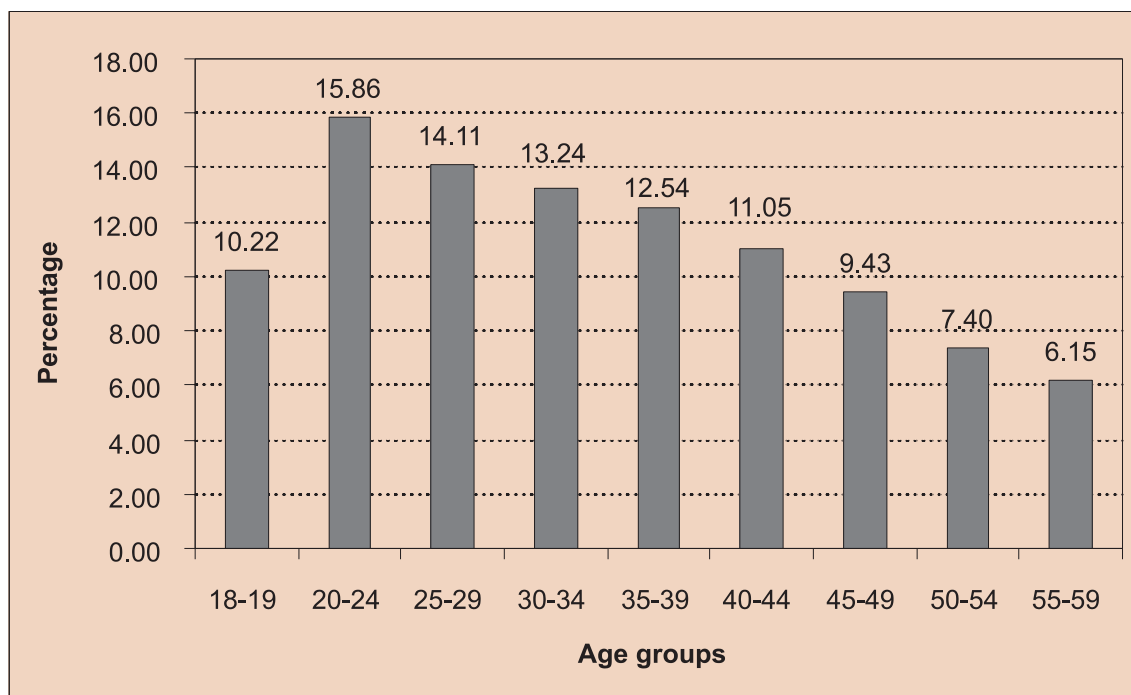


Figure 2.5.7: Percentage of the study population by age-groups

2.5.7 Study population by age-group in various zones

Sarawak had the highest percentage of study population in the 18 to 19 and 50 to 54 years age group. For age group 20 to 24 years, the highest percentages came from Southern and Central zones (16.41%). Besides that, Southern zone had the highest percentage in the 25 to 29 and 40 to 44 years age group. Meanwhile, Sabah had highest percentage for the 30 to 34 years and 35 to 39 years age group. Northern zone had the highest percentage in the age group 45 to 49 and 55 to 59 years (Table 2.5.1).

Table 2.5.1: Percentage of study population by age-group in various zones

Age group (Years)	Southern No. (%)	Central No. (%)	East Coast No. (%)	Northern No. (%)	Sabah No. (%)	Sarawak No. (%)
18-19	72 (8.36)	173 (11.93)	44 (8.87)	53 (7.96)	38 (9.92)	47 (12.86)
20-24	206 (16.41)	367 (16.41)	141 (15.94)	134 (15.34)	100 (15.38)	94 (13.16)
25-29	219 (15.52)	334 (13.88)	136 (14.19)	122 (13.52)	92 (12.68)	102 (13.81)
30-34	171 (12.65)	306 (12.38)	122 (13.55)	124 (14.37)	120 (15.87)	101 (13.92)
35-39	212 (13.92)	332 (11.59)	145 (12.45)	131 (12.33)	128 (15.20)	98 (11.36)
40-44	186 (12.54)	274 (10.33)	137 (11.43)	111 (10.65)	100 (11.07)	86 (10.65)
45-49	107 (8.43)	226 (9.64)	85 (9.43)	86 (10.40)	72 (9.28)	76 (9.51)
50-54	86 (6.73)	182 (7.89)	71 (7.38)	58 (6.75)	51 (6.87)	58 (8.45)
55-59	70 (5.44)	127 (5.96)	62 (6.75)	74 (8.69)	36 (3.73)	43 (6.28)
Total	1,329 (20.96)	2,321 (38.01)	943 (11.40)	893 (13.31)	737 (7.91)	705 (8.40)

2.5.8 Study population by age-group in urban and rural areas

From figure 2.5.8, the study showed that the respondents were evenly distributed between urban and rural areas in all age groups.

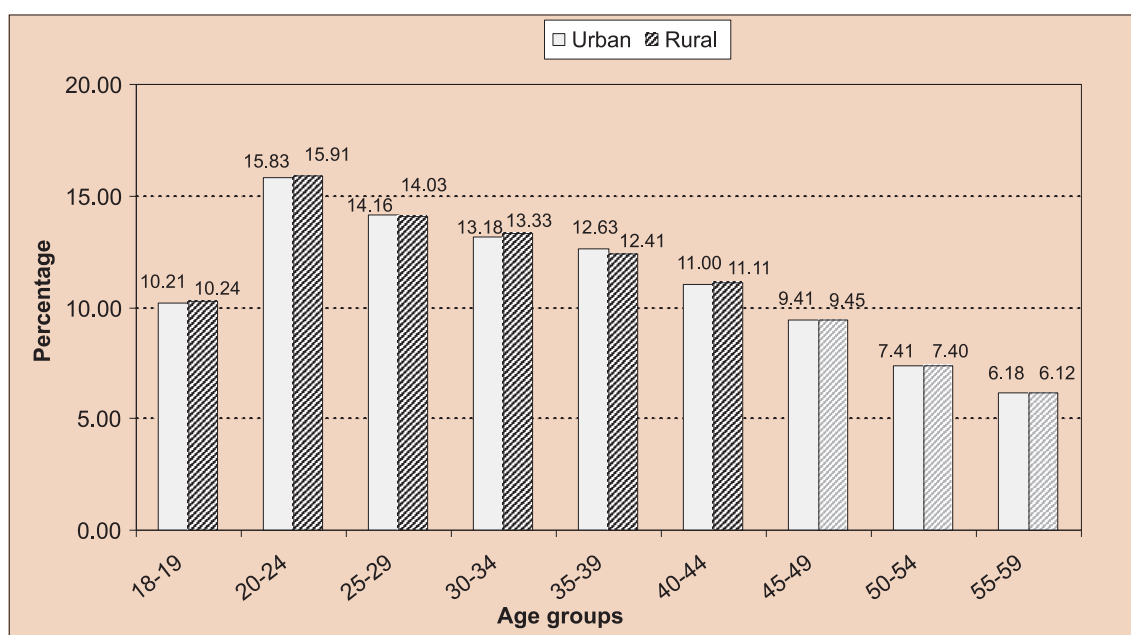


Figure 2.5.8: Percentage of the study population by age-group in urban and rural areas

2.5.9 Study population by age-group by sex

The study showed that there was even distribution between male and female respondents in all age groups (Figure 2.5.9).

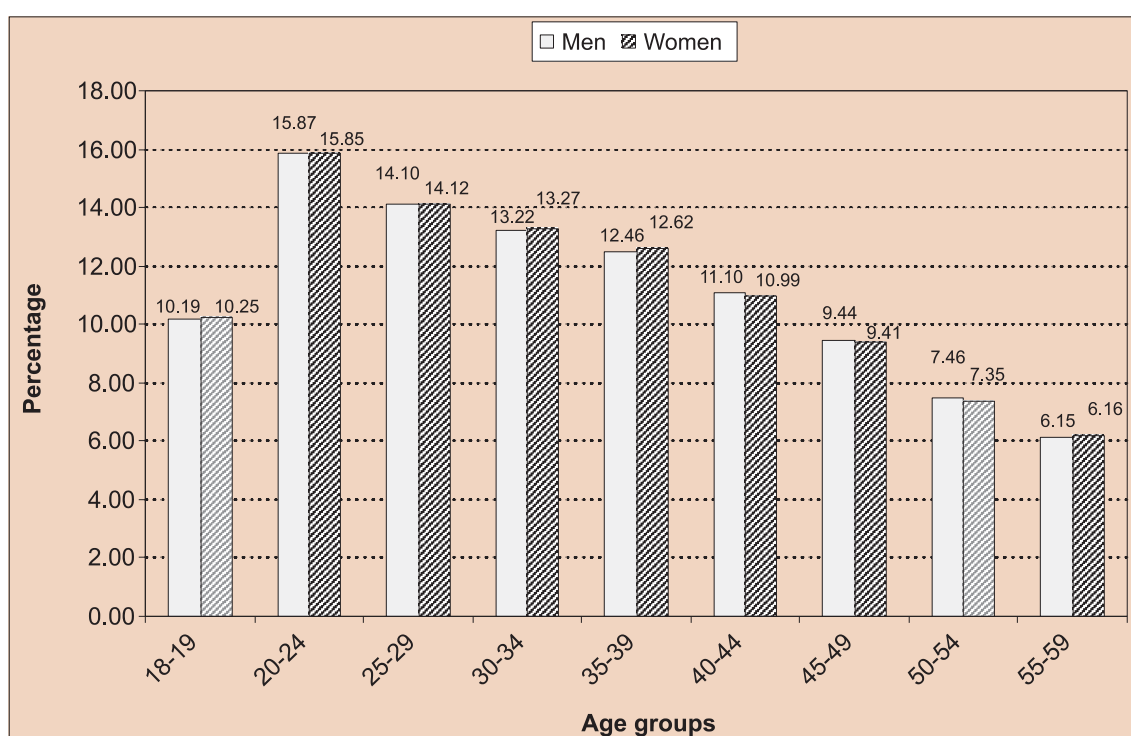


Figure 2.5.9: Percentage of the study population by sex in various age-groups

2.5.10 Study population by ethnic groups

It was found that the highest percentage of the respondents were Malays (54.41%), followed by the Chinese (24.97%), then by the Indians (9.68%). Other ethnic groups were Sarawak Bumiputera (4.37%), Sabah Bumiputera (4.10%). Other Bumiputera consisted of 1.98% and only 0.49% of were Orang Asli Peninsular Malaysia (Figure 2.5.10).

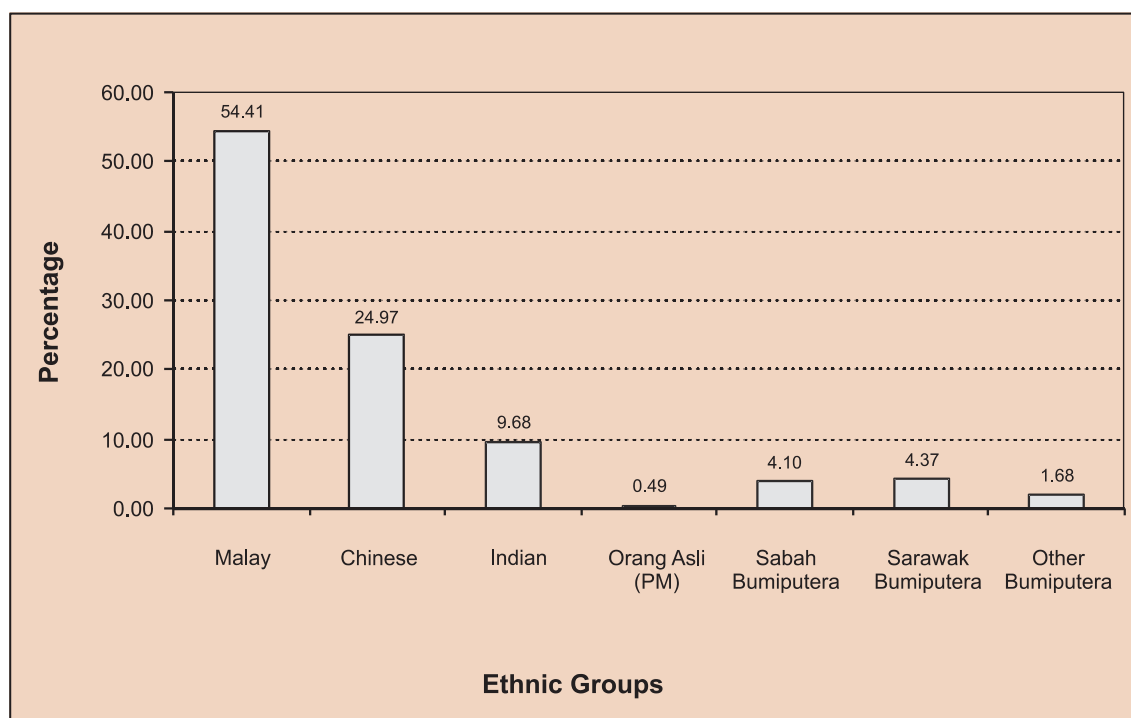


Figure 2.5.10: Percentage of the study population by ethnic groups

2.5.11 Study population by ethnicity in various zones

The percentage of Malays was highest in the East Coast (87.0%), while Chinese was the highest in Sarawak (33.61). Central zone had the highest percentage of Indians (16.58%) and East Coast had the highest percentage of Orang Asli Peninsular Malaysia (1.94%), (Table 2.5.2).

Table 2.5.2: Distribution of ethnic group in various zones

Ethnic Group	Southern No. (%)	Central No. (%)	East Coast No. (%)	Northern No. (%)	Sabah No. (%)	Sarawak No. (%)
Malay	831 (62.86)	1,275 (54.00)	840 (87.00)	536 (59.71)	68 (9.49)	177 (24.79)
Chinese	357 (27.37)	625 (28.31)	67 (8.66)	252 (29.02)	78 (10.16)	214 (33.61)
Indian	127 (8.80)	394 (16.58)	19 (1.97)	88 (9.61)	2 (0.17)	2 (0.19)
Orang Asli PM	1 (0.06)	17 (0.67)	11 (1.94)	0	0	0
Sabah Bumiputera	5 (0.24)	2 (0.19)	1 (0.11)	0	390 (50.08)	0
Sarawak Bumiputera	7 (0.60)	6 (0.17)	0	0	66 (8.92)	311 (41.39)
Other Bumiputera	1 (0.07)	2 (0.08)	5 (0.32)	17 (1.66)	133 (21.18)	1 (0.03)
Total	1,329 (20.96)	2,321 (38.01)	943 (11.40)	893 (13.31)	737 (7.91)	705 (8.40)

2.5.12 Study population by ethnicity in urban and rural areas

This study found that more Malays were in rural (64.89%) compared to urban areas (47.28%). Meanwhile, there were more Chinese and Indians in the urban than rural areas. Sarawak Bumiputera, Sabah Bumiputera and other Bumiputera had a higher percentage in the rural areas.

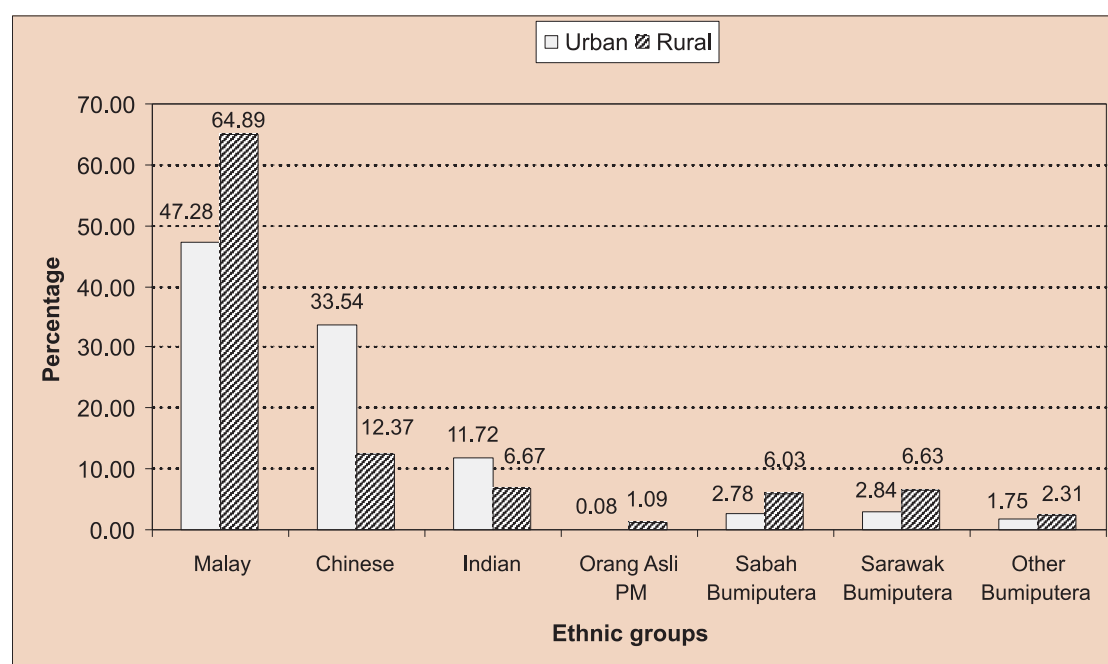


Figure 2.5.11: Percentage of the study population by ethnic group in urban and rural areas

2.5.13 Study population by ethnicity and sex

Similar percentages of men and women were found in all ethnic groups (Figure 2.5.12).

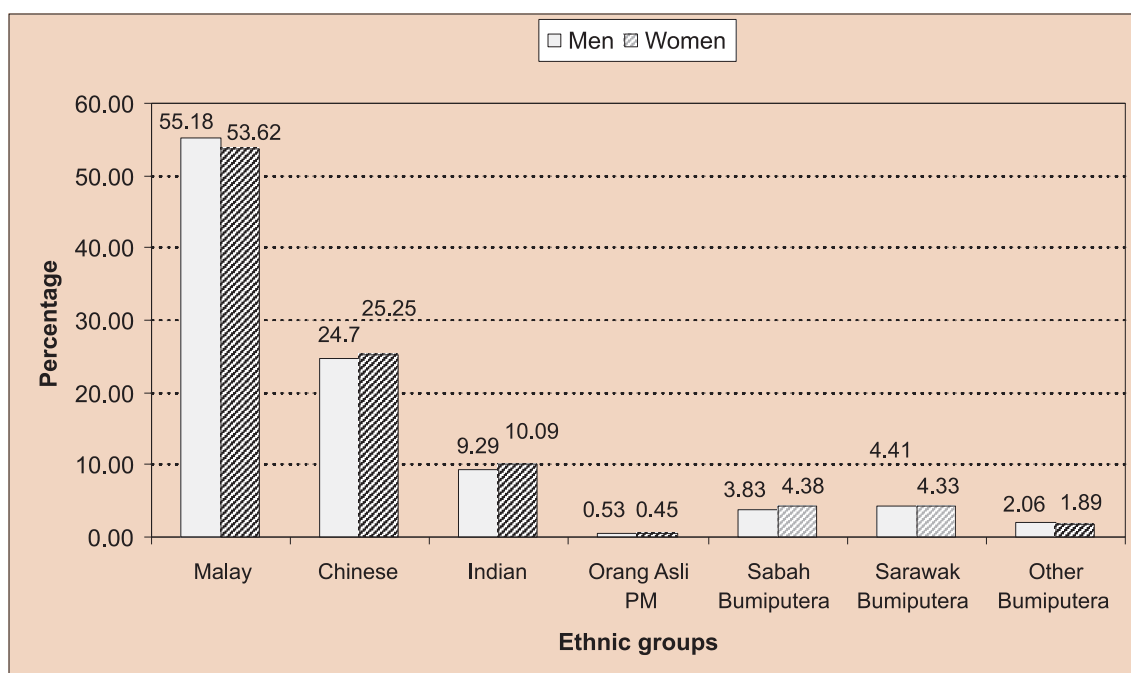


Figure 2.5.12: Percentage of the study population by ethnic group and sex

2.5.14 Study population by marital status

Almost two thirds of the study population were married (65%), while 31% (4,417,000) were unmarried (Figure 2.5.13).

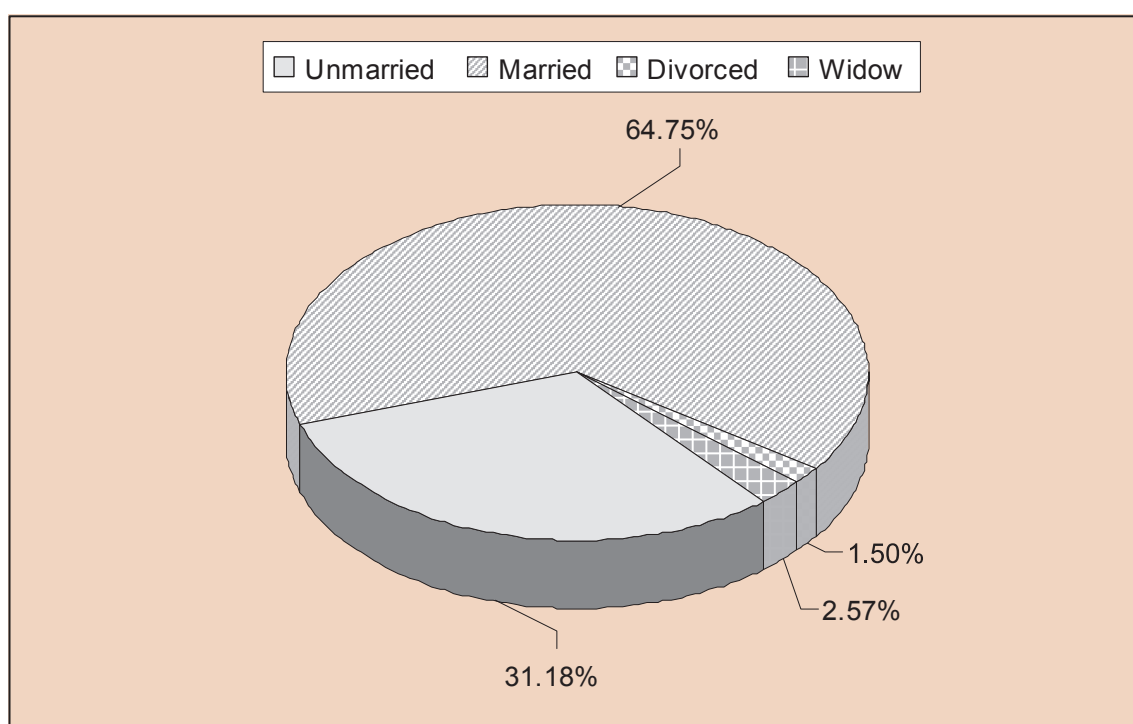


Figure 2.5.13: Percentage of the study population by marital status

2.5.15 Study population by marital status in various zones

The percentage of those who were unmarried varied from 25.09% to 33.83% in all zones, where the highest was in the Central zone (Table 2.5.3). Sabah had the highest married population (70.80%). East Coast zone had the highest percentage of divorcees (2.20%).

Table 2.5.3: Distribution of study population by marital status in various zones

Marital status	Southern No. (%)	Central No. (%)	East Coast No. (%)	Northern No. (%)	Sabah No. (%)	Sarawak No. (%)
Unmarried	372 (32.07)	713 (33.83)	240 (31.26)	207 (25.37)	147 (25.09)	178 (31.79)
Married	921 (64.37)	1535 (62.66)	664 (63.10)	648 (69.98)	562 (70.80)	499 (63.38)
Divorced	14 (1.25)	25 (1.42)	18 (2.20)	11 (1.48)	12 (1.74)	5 (1.37)
Widow	22 (2.31)	45 (2.09)	19 (3.43)	27 (3.18)	15 (2.37)	23 (3.46)
Total	1,329 (20.96)	2,321 (38.01)	943 (11.40)	893 (13.31)	737 (7.91)	705 (8.40)

2.5.16 Study population by marital status in urban and rural areas

The patterns of marital status in urban and rural areas were similar (Figure 2.5.14).

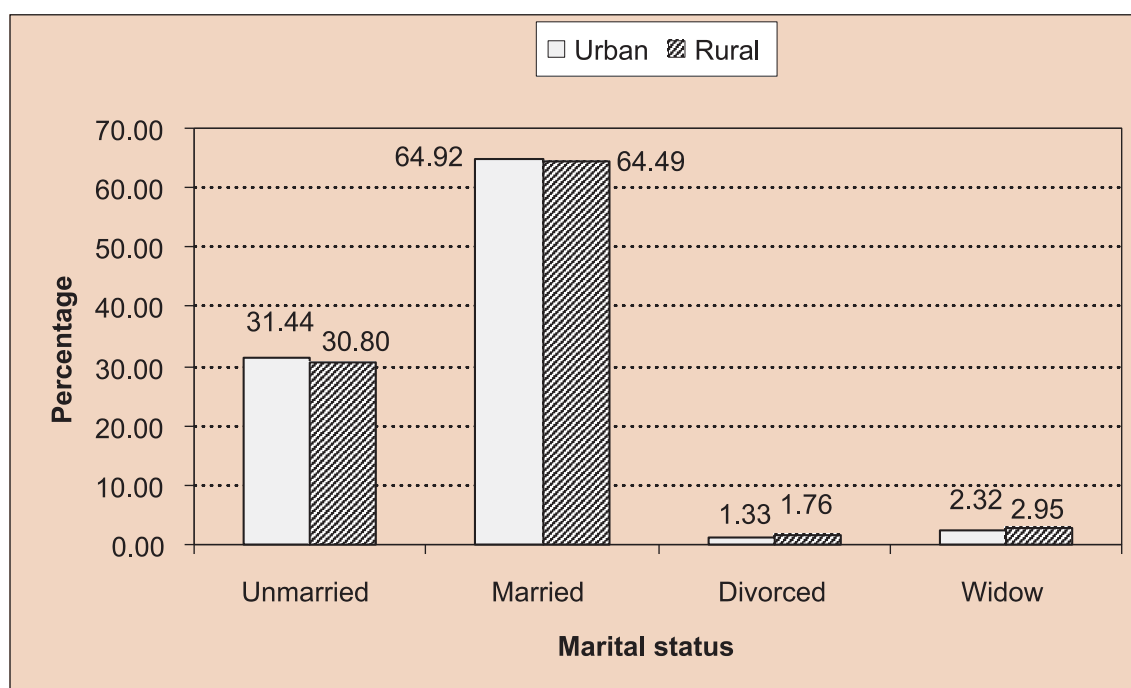


Figure 2.5.14: Percentage of the study population by marital status and strata

2.5.17 Study population by marital status and sex

From this study it was found that there was a higher percentage of unmarried men in the population (38.11%) compared to unmarried women (24.01%) (Figure 2.5.15), while inversely there were more women (69.02%) who were married than men (60.61%).

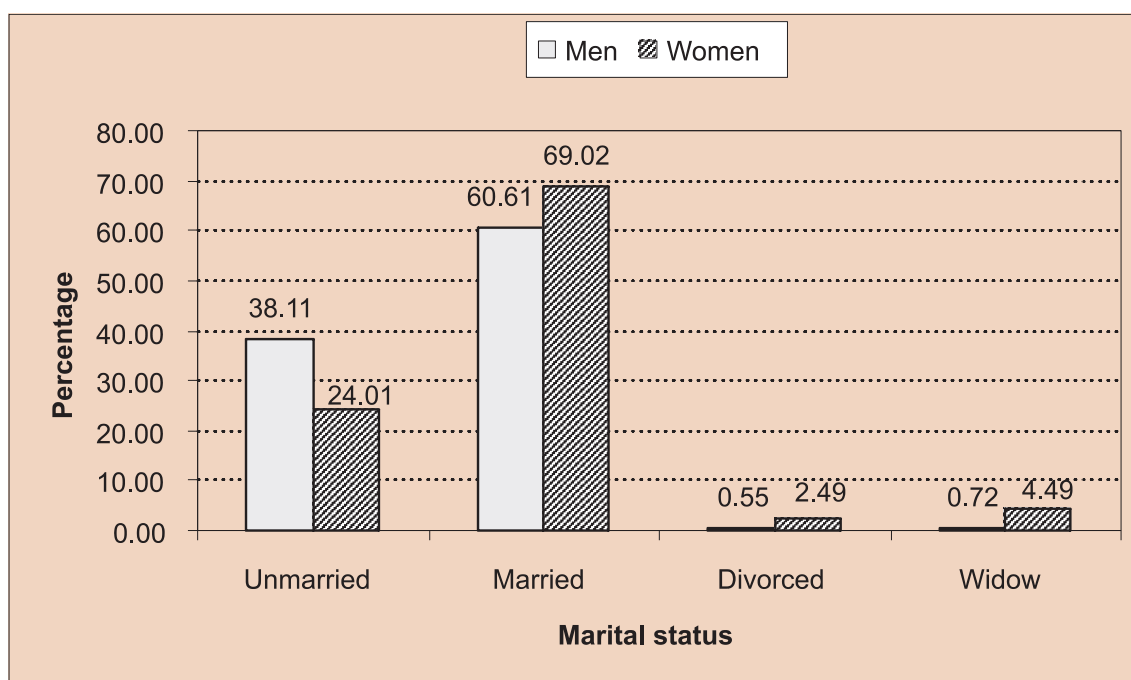


Figure 2.5.15: Percentage of the study population by marital status and sex

2.5.18 Study population by educational level

From this study, it was found that 34.63% of the respondents had achieved the upper secondary level of education. About 20.35% of them had completed lower secondary school level and 19.06% had completed up to the primary school level. The percentage of respondents who had completed their college or university level of education were only 15.52%, followed by 5.56% respondents who had completed up to matriculation or form 6. Only 4.88% of the respondents had obtained other types of education (Figure 2.5.16).

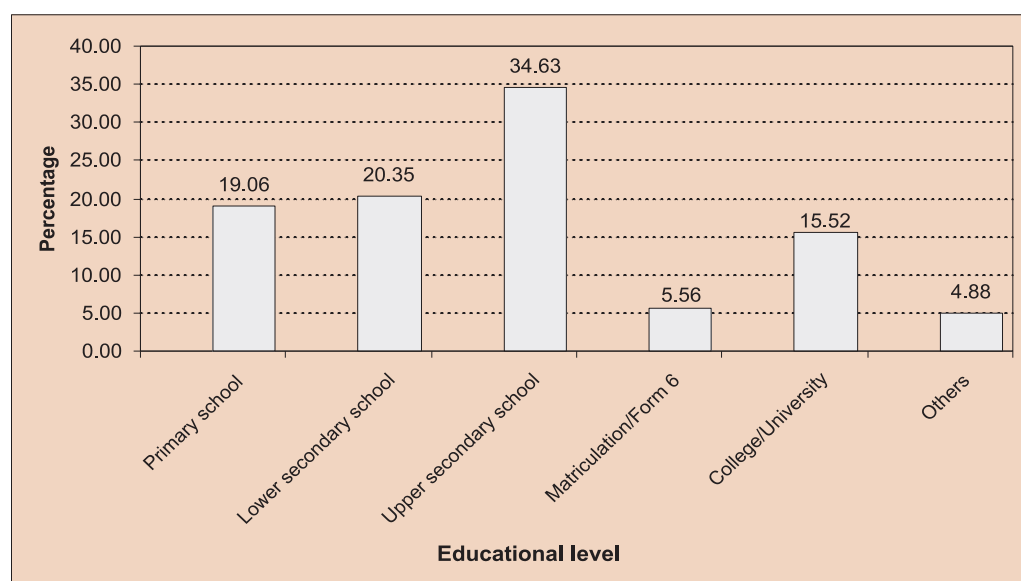


Figure 2.5.16: Percentage of the study population by educational level

2.5.19 Study population by educational level in various zones

Sabah had the highest percentage of study population which had achieved primary school education (26.45%), while the Southern zone had the highest percentage of those who achieved secondary school education (57.65%), (Table 2.5.4). East Coast zone had the highest percentage with Matriculation (7.52%), and Central zone had the highest who achieved college or university education (21.56%).

Table 2.5.4: Distribution of study population by educational level in various zones

Educational level	Southern No. (%)	Central No. (%)	East Coast No. (%)	Northern No. (%)	Sabah No. (%)	Sarawak No. (%)
Primary school	257 (19.11)	364 (14.32)	230 (22.41)	181 (19.55)	194 (26.45)	209 (28.10)
Lower secondary school	301 (21.39)	486 (19.61)	190 (19.54)	188 (21.08)	170 (21.16)	147 (20.29)
Upper secondary school	490 (36.26)	809 (35.97)	309 (34.16)	307 (35.92)	204 (30.21)	185 (27.21)
Matriculation/ Form 6	59 (5.16)	122 (5.50)	65 (7.52)	60 (6.09)	26 (3.82)	28 (4.99)
College/ University	177 (14.47)	474 (21.56)	100 (10.76)	103 (11.80)	42 (5.99)	791 (2.13)
Others	42 (3.61)	65 (3.05)	47 (5.60)	52 (5.56)	101 (12.37)	56 (7.28)
Total	1,329 (20.96)	2,321 (38.01)	943 (11.40)	893 (13.31)	737 (7.91)	705 (8.40)

2.5.20 Study population by educational level and strata

From this study it was found that more urban population (20.26%) had achieved college or university education compared to rural (8.54%), (Figure 2.5.17). It was similar for upper secondary education. For other level of education rural population had a higher percentage compared to urban.

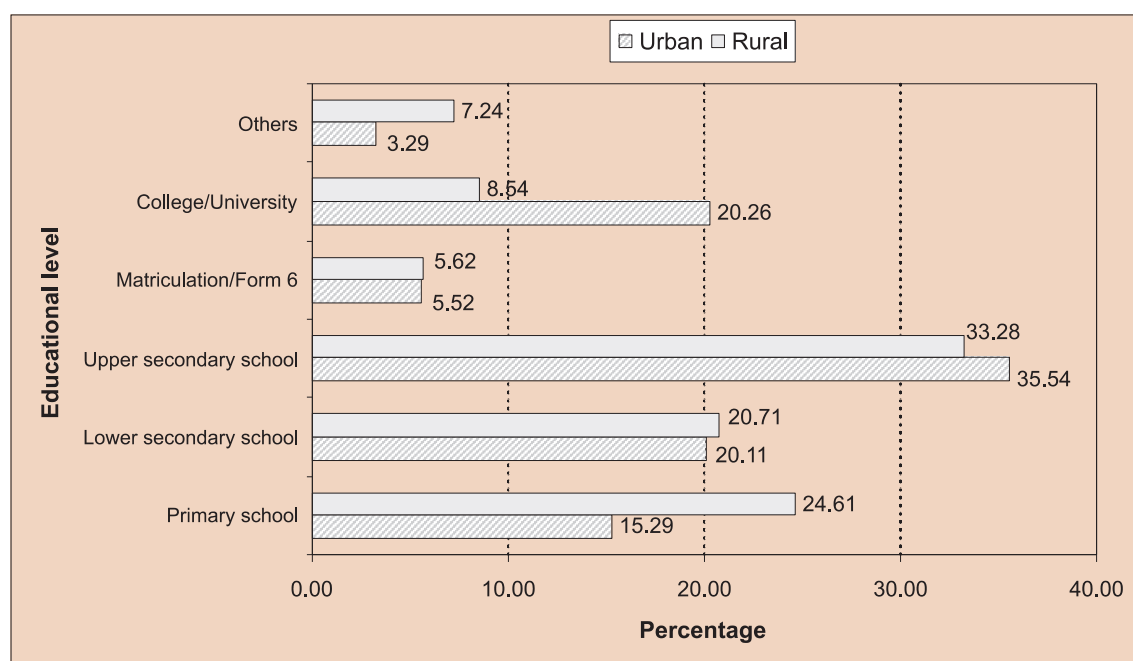


Figure 2.5.17: Percentage of the study population by educational level and strata

2.5.21 Study population by educational level by sex

This study had shown that higher percentage of men had achieved college, university, upper secondary and lower secondary education (Figure 2.5.18), while, women population had higher percentage in other levels of education.

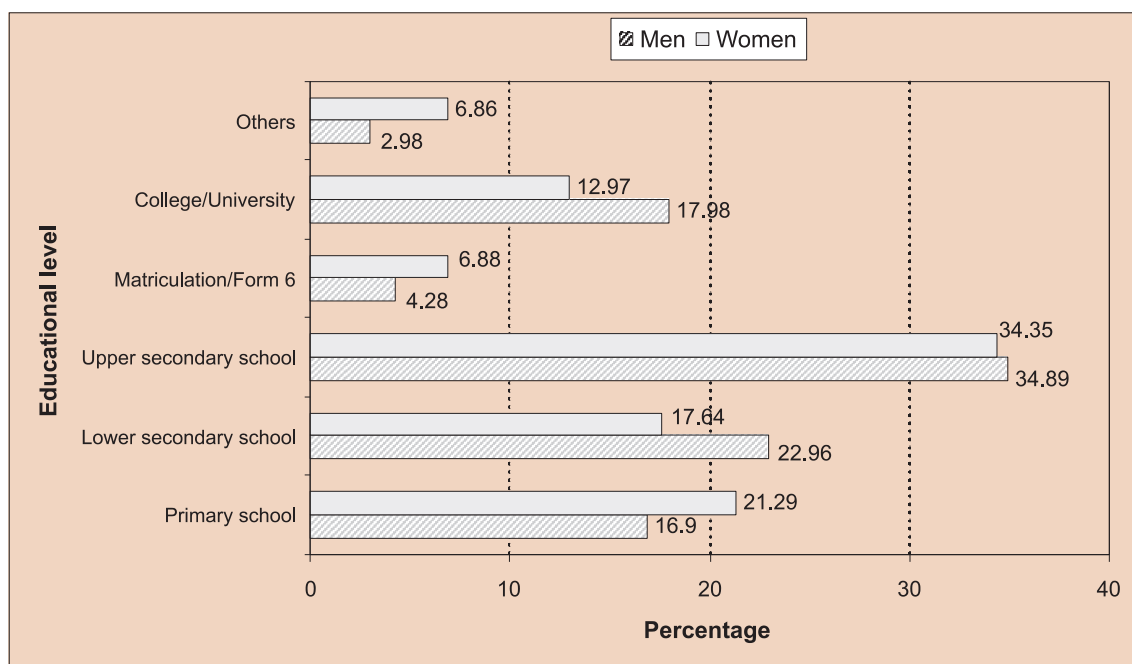


Figure 2.5.18: Percentage of the study population by educational level and sex

2.5.22 Study population by occupational group

The highest percentage of the study population were housewives 22.79%, (3,224,622) (Figure 2.5.19). The second largest group was the technician and allied professional group (10.27%). However this proportion is not representative of the actual magnitude of the occupational groups.

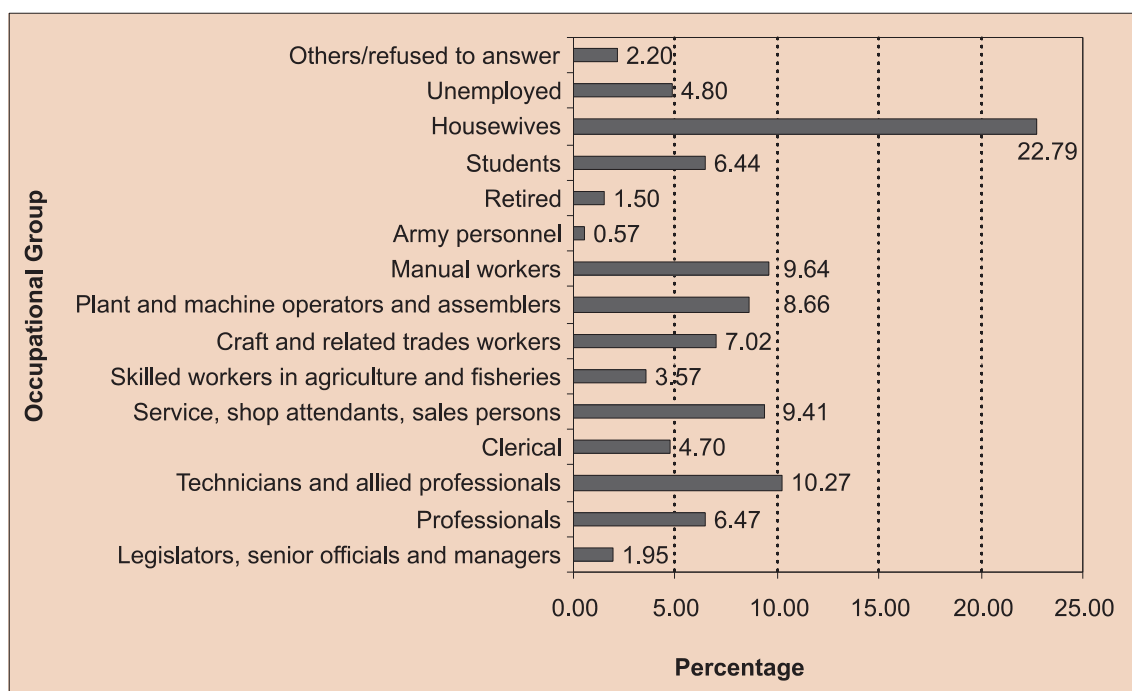


Figure 2.5.19: Percentage of the study population by occupational groups

2.5.23 Study population by household income group

This study had found that slightly more than half of the population (50.50%) had a household income less than RM1,500 per month (Figure 2.5.10). Meanwhile, 35% of the study population belonged to the middle household income group (RM1,500 - RM3,500) and only 14.5% belonged to the high household income group.

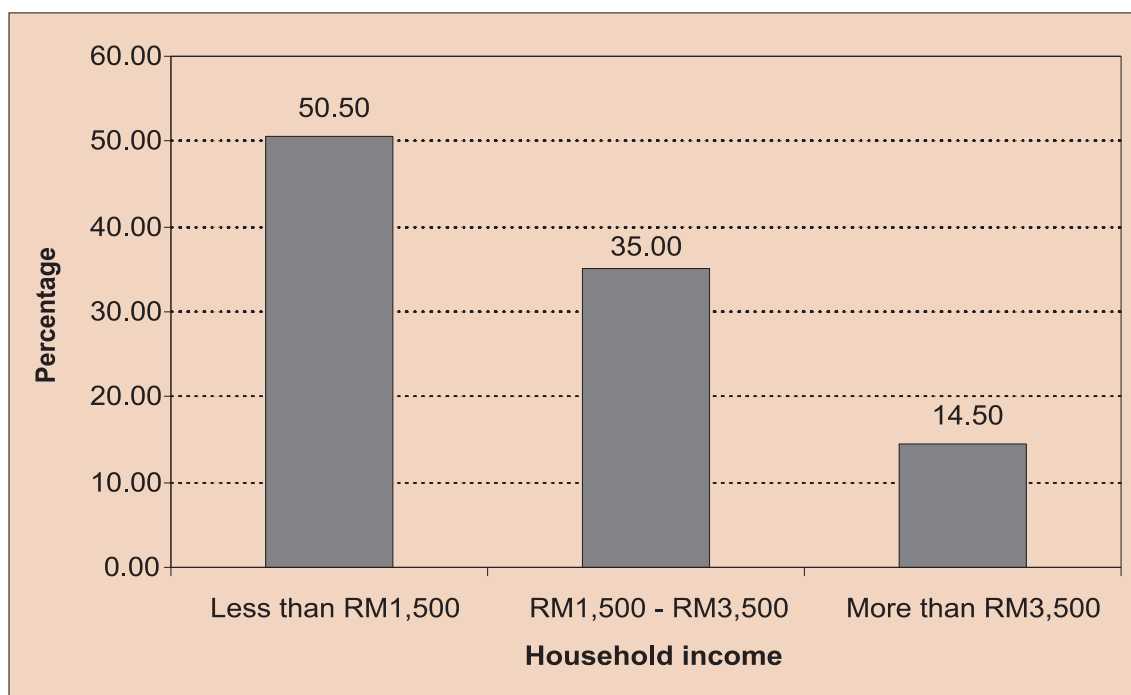


Figure 2.5.20: Percentage of the study population by household income

2.5.24 Study population by household size

In this survey, the mean household size in Malaysia was 4.99 (95% CI: 4.92, 5.06). Sabah zone had the highest mean household size (5.56, 95% CI: 5.30, 5.82) and Southern zone had the lowest (4.71, 95% CI: 4.56, 4.86) (Table 2.5.5).

Table 2.5.5: Mean household size by zone

Zone	Mean	95% Confidence Interval (CI)		Total sample household	Estimated population household
		Lower	Upper		
Southern	4.71	4.56	4.86	1,328	2,964,445
Central	4.92	4.81	5.04	2,320	5,386,301
East Coast	5.40	5.20	5.59	942	1,615,033
Northern	4.80	4.60	5.00	893	1,886,983
Sabah	5.56	5.30	5.82	737	1,121,712
Sarawak	5.18	4.95	5.41	705	1,191,505

2.6 REPORTED ILLNESS

Among those who reported of their illnesses, the most common illness reported was hypertension from 451 respondents (6.51%), representing 922,939 adult population. Diabetes was the next common illness reported by 217 respondents (3.28%), representing 464,261 adults (Table 2.6.1).

Table 2.6.1: Proportion of reported illness

Characteristic	Among those who reported illness (%)	95% CI		Total Sample	Estimated Population
		Lower	Upper		
Reported Illness					
Hypertension	6.51	5.84	7.25	451	922,939
Diabetes	3.28	2.79	3.84	217	464,261
Asthma	2.20	1.85	2.62	162	312,421
Gastritis	1.44	1.15	1.80	103	204,458
Others	1.32	1.06	1.65	98	187,097
Heart disease	0.94	0.71	1.25	62	133,672
Migraine	0.46	0.31	0.69	33	65,544
Allergic	0.44	0.30	0.65	33	62,446
Kidney problem	0.36	0.24	0.54	29	51,028
Arthritis	0.36	0.23	0.54	27	50,609
Gout	0.33	0.20	0.54	22	47,115
Thyroid	0.25	0.15	0.43	16	35,598
Cancer	0.19	0.11	0.34	14	27,410
Gallstone	0.15	0.07	0.30	9	20,760
Haemorrhoid	0.12	0.06	0.25	10	17,340
Appendicitis	0.11	0.04	0.31	7	15,693
Anaemia	0.11	0.06	0.22	11	16,254
Mental problem	0.08	0.04	0.19	6	11,619
Hypercholesterolemia	0.06	0.02	0.14	6	8,205
Stroke	0.03	0.01	0.11	2	3,839
Kidney failure	0.02	0.00	0.10	2	2,930
Poor hearing	0.02	0.00	0.11	1	2,266

2.7 PREGNANCY AND CONFINEMENT

2.7.1 Pregnancy and confinement status

Pregnant women in the study comprised 5.80% (403,708) of the population (Figure 2.7.1). The range for duration of pregnancy was between 0.50 months to 9.00 months and the mean duration of pregnancy was 5.73 months.

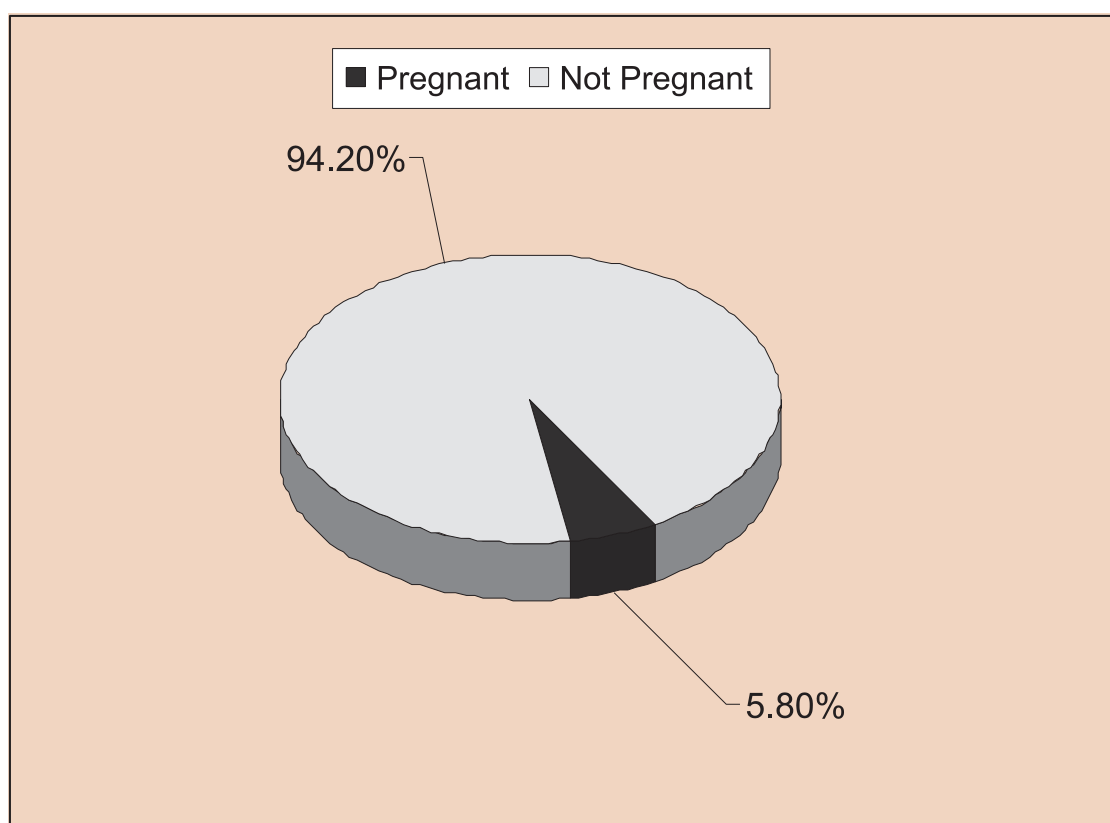


Figure 2.7.1: Percentage of the study population by pregnancy status

There were 89,821 (1.37%) women who were in 'confinement'. The confinement day ranged between 2 days and 111 days, with a mean of 27.41 days.

2.8 RESPONDENTS FOR EACH QUESTIONNAIRE MODULE

The total number of respondents who were interviewed and from whom data were collected was 6,928. However, the number of respondents who answered for each module differed. Table 2.8.1 shows the number of respondents for each questionnaire module. All respondents answered questions on socio-demography. Physical activity was the module with second highest number of respondents and meal pattern with the lowest.

Table 2.8.1: Response to modules

Form	Response to modules	Respondent		Non-respondent	
		N	%	N	%
A	Socio-demography	6,928	100.00		
B1	24-Hour-Diet Recall	6,887	99.41	41	0.59
B2	Meal pattern	6,400	92.38	528	7.62
C1	Habitual Physical Activity	6,926	99.97	2	0.03
C2	24-Hour Physical Activity Recall	6,926	99.97	2	0.03
D	Anthropometry	6,775	97.79	153	2.21
E1	Food Frequency Questionnaire	6,742	97.32	186	2.68
E2	Supplements	6,919	99.87	9	0.13
Total respondents		6,928			

2.9 REFERENCES

1. Biemer PP & Lyberg LE (2003). Introduction to Survey Quality. John Wiley & Sons Publications, New Jersey.
2. Department of Statistics, Malaysia. Vital Statistics Malaysia 2003. Malaysia

APPENDIX 2

General Findings

Malaysian Adult Nutrition Survey 2003

Table 1: Distribution of respondents by zone and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Zone				
Total	Southern	20.96	1,329	2,972,294
	Central	38.01	2,321	5,388,794
	East Coast	11.40	943	1,616,847
	Northern	13.31	893	1,886,983
	Sabah	7.91	737	1,121,712
	Sarawak	8.40	705	1,191,505
Male	Southern	21.14	624	1,524,151
	Central	38.24	1,159	2,757,054
	East Coast	11.54	453	831,825
	Northern	12.74	417	918,873
	Sabah	7.89	359	568,661
	Sarawak	8.45	331	609,544
Women	Southern	20.78	705	1,448,143
	Central	37.77	1,162	2,631,740
	East Coast	11.27	490	785,022
	Northern	13.89	476	968,110
	Sabah	7.94	378	553,051
	Sarawak	8.35	374	581,962

Table 2: Distribution of respondents by strata and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Zone				
Total	Urban	59.54	3,701	8,441,210
	Rural	40.46	3,227	5,736,925
Male	Urban	59.46	1,807	4,286,916
	Rural	40.54	1,536	2,923,192
Women	Urban	59.62	1,894	4,154,294
	Rural	40.38	1,691	2,813,733

Table 3: Distribution of respondents by age group and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Age group (years)				
Total	18-19	10.22	427	1,448,992
	20-24	15.86	1,042	2,248,568
	25-29	14.11	1,005	2,000,458
	30-34	13.24	944	1,877,264
	35-39	12.54	1,046	1,778,124
	40-44	11.05	894	1,566,059
	45-49	9.43	652	1,336,499
	50-54	7.40	506	1,049,598
	55-59	6.15	412	872,574
Male	18-19	10.19	208	734,969
	20-24	15.87	551	1,144,289
	25-29	14.10	439	1,016,824
	30-34	13.22	436	952,893
	35-39	12.46	483	898,527
	40-44	11.10	443	800,466
	45-49	9.44	326	680,941
	50-54	7.46	257	537,717
	55-59	6.15	200	443,482
Women	18-19	10.25	219	714,022
	20-24	15.85	491	1,104,279
	25-29	14.12	566	983,634
	30-34	13.27	508	924,371
	35-39	12.62	563	879,597
	40-44	10.99	451	765,593
	45-49	9.41	326	655,558
	50-54	7.35	249	511,881
	55-59	6.16	212	429,092

Table 4: Distribution of respondents by ethnic group and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Ethnic group				
Total	Malay	54.41	3,728	7,714,922
	Chinese	24.97	1,592	3,540,373
	Indian	9.68	632	1,372,449
	Orang Asli PM	0.49	29	69,202
	Sabah Bumiputera	4.10	398	581,075
	Sarawak Bumiputera	4.37	390	619,696
	Other Bumiputera	1.98	159	280,418
Male	Malay	55.18	1,823	3,978,731
	Chinese	24.70	756	1,781,201
	Indian	9.29	299	669,482
	Orang Asli PM	0.53	12	38,171
	Sabah Bumiputera	3.83	187	275,841
	Sarawak Bumiputera	4.41	191	317,936
	Other Bumiputera	2.06	75	148,746
Women	Malay	53.62	1,905	3,736,191
	Chinese	25.25	836	1,759,172
	Indian	10.09	333	702,967
	Orang Asli PM	0.45	17	31,032
	Sabah Bumiputera	4.38	211	305,235
	Sarawak Bumiputera	4.33	199	301,760
	Other Bumiputera	1.89	84	131,672

Table 5: Distribution of respondents by religion and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Religion				
Total	Islam	60.36	4,248	8,557,255
	Buddhist	20.81	1,335	2,949,874
	Hinduism	7.98	526	1,131,229
	Christian	8.55	664	1,212,222
	Others	2.30	154	325,692
Male	Islam	60.82	2,070	4,385,383
	Buddhist	20.25	622	1,459,999
	Hinduism	7.81	256	563,068
	Christian	8.91	327	642,224
	Others	2.21	68	159,433
Women	Islam	59.89	2,178	4,171,872
	Buddhist	21.39	713	1,489,875
	Hinduism	8.16	270	568,161
	Christian	8.18	337	569,997
	Others	2.39	86	166,258

Table 6: Distribution of respondents by marital status and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Marital status				
Total	Unmarried	31.18	1,857	4,417,000
	Married	64.75	4,829	9,172,330
	Divorced	1.50	85	212,824
	Widow	2.57	151	364,469
Male	Unmarried	38.11	1,129	2,744,325
	Married	60.61	2,176	4,364,407
	Divorced	0.55	13	39,682
	Widow	0.72	20	51,894
Women	Unmarried	24.01	728	1,672,675
	Married	69.02	2,653	4,807,923
	Divorced	2.49	72	173,142
	Widow	4.49	131	312,574

Table 7: Distribution of respondents by educational level and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Educational Level				
Total	Primary school	19.06	1,435	2,697,449
	Lower secondary school	20.35	1,482	2,880,629
	Upper secondary school	34.63	2,304	4,901,071
	Matriculation/Form 6	5.56	360	786,855
	College/University	15.52	975	2,196,924
	Others	4.88	363	691,410
Male	Primary school	16.90	626	1,217,632
	Lower secondary school	22.96	797	1,654,445
	Upper secondary school	34.89	1,133	2,513,833
	Matriculation/Form 6	4.28	139	308,479
	College/University	17.98	549	1,295,506
	Others	2.98	97	214,636
Women	Primary school	21.29	809	1,479,818
	Lower secondary school	17.64	685	1,226,185
	Upper secondary school	34.35	1,171	2,387,239
	Matriculation/Form 6	6.88	221	478,376
	College/University	12.97	426	901,418
	Others	6.86	266	476,774

Table 8: Distribution of respondents by occupational group and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Occupational group				
Total	Legislators, senior officials and managers	1.95	115	276,401
	Professionals	6.47	436	915,718
	Technicians and allied professionals	10.27	686	1,452,969
	Clerical	4.70	350	664,877
	Service, shop attendants, sales persons	9.41	679	1,331,826
	Skilled workers in agriculture and fisheries	3.57	269	504,759
	Craft and related trades workers	7.02	468	993,745
	Plant and machine operators and assemblers	8.66	587	1,225,953
	Manual workers	9.64	726	1,363,760
	Army personnel	0.57	32	81,100
	Retired	1.50	93	211,718
	Students	6.44	328	911,258
	Housewives	22.79	1,729	3,224,622
	Unemployed	4.80	267	679,792
	Others/refused to answer	2.20	152	311,380
Male	Legislators, senior officials and managers	3.12	92	224,760
	Professionals	7.81	256	562,533
	Technicians and allied professionals	12.84	418	924,439
	Clerical	3.38	118	242,992
	Service, shop attendants, sales persons	11.73	416	844,841
	Skilled workers in agriculture and fisheries	5.40	197	388,835
	Craft and related trades workers	11.49	386	827,330
	Plant and machine operators and assemblers	11.63	407	837,322
	Manual workers	13.30	497	957,678
	Army personnel	1.10	31	79,495
	Retired	2.42	80	174,436
	Students	6.45	171	464,235
	Housewives	0.58	15	41,896
	Unemployed	5.72	149	411,849
	Others/refused to answer	3.01	105	216,960

Table 8: continue

Characteristic		Proportion (%)	Total Sample	Estimated Population
Occupational group				
Women	Legislators, senior officials and managers	0.74	23	51,641
	Professionals	5.08	180	353,185
	Technicians and allied professionals	7.60	268	528,530
	Clerical	6.07	232	421,886
	Service, shop attendants, sales persons	7.01	263	486,984
	Skilled workers in agriculture and fisheries	1.67	72	115,924
	Craft and related trades workers	2.39	82	166,415
	Plant and machine operators and assemblers	5.59	180	388,631
	Manual workers	5.84	229	406,082
	Army personnel	0.02	1	1,604
	Retired	0.54	13	37,282
	Students	6.43	157	447,023
	Housewives	45.79	1,714	3,182,726
	Unemployed	3.86	118	267,943
	Others/refused to answer	1.36	47	94,420

Table 9: Distribution of respondents by individual income and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Individual income				
Total	Less than RM1,500	48.74	3,426	6,910,233
	RM1,500 - RM3,500	16.86	1,144	2,389,868
	More than RM3,500	34.40	2,357	4,876,216
Male	Less than RM1,500	59.39	2,053	4,280,667
	RM1,500 - RM3,500	23.45	784	1,690,371
	More than RM3,500	17.16	505	1,237,251
Women	Less than RM1,500	37.74	1,373	2,629,566
	RM1,500 - RM3,500	10.04	360	699,497
	More than RM3,500	52.22	1,852	3,638,965

Table 10: Distribution of respondents by household income and sex

Characteristic		Proportion (%)	Total Sample	Estimated Population
Household Income				
Total	Less than RM1,500	50.50	3,613	7,160,146
	RM1,500 - RM3,500	35.00	2,363	4,962,569
	More than RM3,500	14.50	952	2,055,420
Male	Less than RM1,500	48.02	1,648	3,462,171
	RM1,500 - RM3,500	37.05	1,218	2,671,386
	More than RM3,500	14.93	477	1,076,551
Women	Less than RM1,500	53.07	1,965	3,697,975
	RM1,500 - RM3,500	32.88	1,145	2,291,183
	More than RM3,500	14.05	475	978,870

Table 11: Household income by zone

Characteristic		Proportion (%)	Total Sample	Estimated Population
Household Income				
Southern	Less than RM1,500	47.42	614	1,409,371
	RM1,500 - RM3,500	39.74	535	1,181,318
	More than RM3,500	12.84	180	381,605
Central	Less than RM1,500	37.34	855	2,012,008
	RM1,500 - RM3,500	41.10	979	2,214,751
	More than RM3,500	21.56	487	1,162,035
East Coast	Less than RM1,500	69.89	671	1,130,026
	RM1,500 - RM3,500	24.70	215	399,291
	More than RM3,500	5.41	57	87,529
Northern	Less than RM1,500	56.65	515	1,069,027
	RM1,500 - RM3,500	32.18	282	607,246
	More than RM3,500	11.17	96	210,710
Sabah	Less than RM1,500	72.89	525	817,564
	RM1,500 - RM3,500	21.32	170	239,186
	More than RM3,500	5.79	42	64,962
Sarawak	Less than RM1,500	60.61	433	722,150
	RM1,500 - RM3,500	26.92	182	320,776
	More than RM3,500	12.47	90	148,580

Table 12: Household income by strata

Characteristic		Proportion (%)	Total Sample	Estimated Population
Household Income				
Urban	Less than RM1,500	38.63	1,409	3,260,901
	RM1,500 - RM3,500	41.21	1,533	3,478,545
	More than RM3,500	20.16	759	1,701,765
Rural	Less than RM1,500	67.97	2,204	3,899,245
	RM1,500 - RM3,500	25.87	830	1,484,024
	More than RM3,500	6.16	193	353,656

Table 13: Mean household size by socio-demographic characteristics

Characteristics	Mean	Standard Error	Total Sample	Estimated Population
Malaysia	4.99	0.04	6,925	14,165,979
Zone				
Southern	4.71	0.08	1,328	2,964,445
Central	4.92	0.06	2,320	5,386,301
East Coast	5.40	0.10	942	1,615,033
Northern	4.80	0.10	893	1,886,983
Sabah	5.56	0.13	737	1,121,712
Sarawak	5.18	0.12	705	1,191,505
Strata				
Urban	4.86	0.05	3,699	8,430,868
Rural	5.18	0.06	3,226	5,735,111
Sex				
Men	4.92	0.06	3,342	7,208,294
Women	5.06	0.05	3,583	6,957,685
Age group (years)				
18-19	6.05	0.18	427	1,448,992
20-24	5.00	0.09	1,041	2,240,719
25-29	4.54	0.08	1,005	2,000,458
30-34	5.06	0.07	944	1,877,264
35-39	5.30	0.07	1,046	1,778,124
40-44	5.18	0.08	894	1,566,059
45-49	4.85	0.09	652	1,336,499
50-54	4.44	0.11	504	1,045,290
55-59	3.99	0.13	412	872,574
Ethnic Group				
Malay	5.01	0.05	3,726	7,712,060
Chinese	4.70	0.07	1,591	3,531,079
Indian	5.13	0.14	632	1,372,449
Orang Asli PM	6.59	0.76	29	69,202
Sabah Bumiputera	5.83	0.19	398	581,075
Sarawak Bumiputera	4.99	0.14	390	619,696
Other Bumiputera	5.07	0.33	159	280,418
Marital Status				
Unmarried	4.99	0.09	1,857	4,417,000
Married	5.08	0.03	4,827	9,162,668
Divorced	3.37	0.24	85	212,824
Widow	3.68	0.20	150	361,975

Table 13: continue

Characteristics	Mean	Standard Error	Total Sample	Estimated Population
Educational Level				
Primary school	4.95	0.07	1,434	2,695,636
Lower secondary school	5.05	0.07	1,482	2,880,629
Upper secondary school	5.11	0.06	2,304	4,901,071
Matriculation/Form 6	4.98	0.16	360	786,855
College/University	4.65	0.11	974	2,189,075
Others	5.09	0.22	363	691,410
Occupational Group				
Legislators, senior officials and managers	4.85	0.19	115	276,401
Professionals	4.78	0.13	436	915,718
Technicians and allied professionals	4.43	0.09	686	1,452,969
Clerical	4.69	0.11	350	664,877
Service, shop attendants, sales persons	5.02	0.09	678	1,323,977
Skilled workers in agriculture and fisheries	5.24	0.22	268	502,946
Craft and related trades workers	4.82	0.11	468	993,745
Plant and machine operators and assemblers	5.05	0.10	587	1,225,953
Manual workers	5.23	0.12	726	1,363,760
Army personnel	4.92	0.47	32	81,100
Retired	3.85	0.25	93	211,718
Students	5.51	0.32	328	911,258
Housewives	5.11	0.06	1,728	3,222,128
Unemployed	5.44	0.19	267	679,792
Others/refused to answer	4.71	0.20	152	311,380
Individual Income				
Less than RM1,500	4.97	0.05	3,424	6,900,571
RM1,500 - RM3,500	4.79	0.06	1,144	2,389,868
More than RM3,500	5.11	0.06	2,356	4,873,722
Household Income				
Less than RM1,500	4.89	0.05	3,612	7,158,332
RM1,500 - RM3,500	5.10	0.05	2,362	4,954,720
More than RM3,500	5.07	0.11	951	2,052,927

Table 14: Pregnancy status by socio-demographic characteristics

Characteristics	Proportion (%)	Total Sample	Estimated Population
Zone			
Southern	20.39	41	82,189
Central	30.15	58	121,544
East Coast	10.73	31	43,245
Northern	18.71	34	75,432
Sabah	12.24	30	49,350
Sarawak	7.77	20	31,318
Strata			
Urban	64.58	125	260,289
Rural	35.42	89	142,789
Ethnic Group			
Malay	62.28	129	251,051
Chinese	16.30	36	65,694
Indian	7.00	13	28,230
Orang Asli PM	6.58	17	26,516
Sabah Bumiputera	5.38	13	21,666
Sarawak Bumiputera	2.46	6	9,921
Other Bumiputera	62.28	129	251,051



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