



**UNIVERSITI PUTRA MALAYSIA**

**FACTORS ASSOCIATED WITH BODY WEIGHT STATUS AMONG 15-17 YEAR  
OLD SCHOOL-GOING ADOLESCENTS IN SIBU, MALAYSIA**

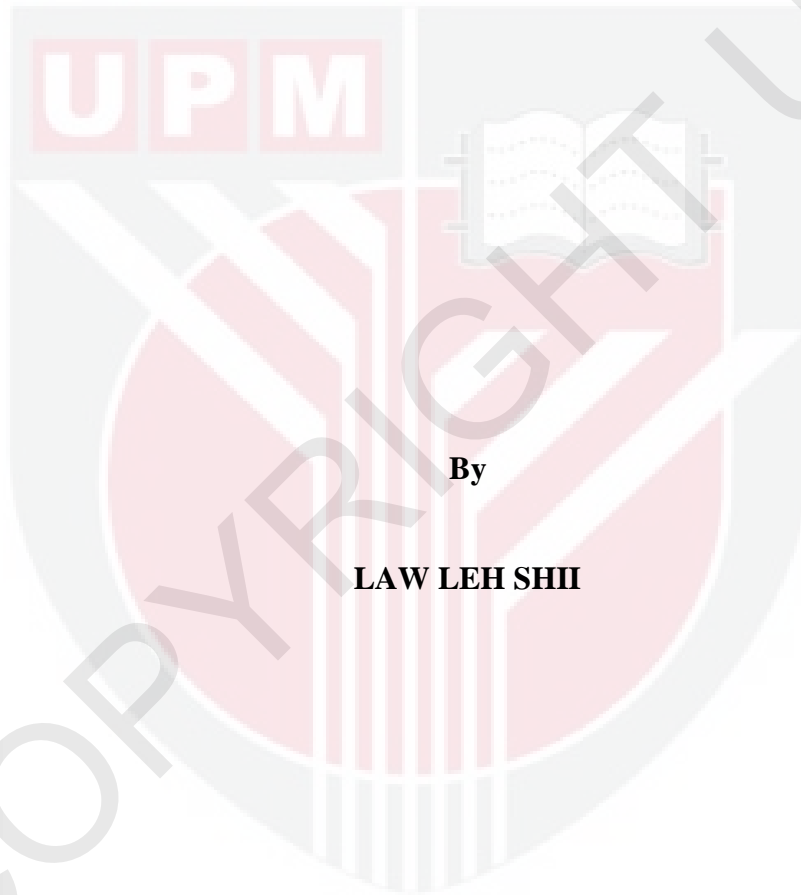
**LAW LEH SHII**

**FPSK(m) 2013 30**



**UPM**  
UNIVERSITI PUTRA MALAYSIA  
BERILMU BERBAKTI

**FACTORS ASSOCIATED WITH BODY WEIGHT STATUS AMONG 15-17  
YEAR OLD SCHOOL-GOING ADOLESCENTS IN SIBU, MALAYSIA**



By

**LAW LEH SHII**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
Fulfilment of the Requirements for the Degree of Master of Science**

**March 2013  
COPYRIGHT**

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**FACTORS ASSOCIATED WITH BODY WEIGHT STATUS AMONG 15-17  
YEAR OLD SCHOOL-GOING ADOLESCENTS IN SIBU, MALAYSIA**

By

**LAW LEH SHII**

**March 2013**

**Chair: Mohd Nasir Mohd Taib, DrPH**

**Faculty: Medicine and Health Sciences**

A tremendous increase was observed in the prevalence of childhood overweight and obesity since a decade ago in both developed and developing countries. A study was conducted to determine factors associated with body weight status among school-going adolescents in Sibu, Sarawak, Malaysia.

Sociodemographic, behavioural, psychosocial, and physical environmental factors were assessed by using a self-administered questionnaire. Dietary intake of the students was assessed by 24-hour dietary recall. Weight and height were also measured following standard procedures and body mass index-for-age (BMI-for-age) was determined.

The study was conducted among 375 students 15-17 year old who agreed to participate (male: 32.0%, female: 68.0%; Chinese: 39.5%, Iban: 26.4%, Malay: 17.1%, and Melanau: 17.1%; mean age:  $16.45 \pm 0.53$  years old) out of a total of 665 students at four

public secondary schools in Sibul (Sarawak). Thus, the response rate was calculated to be 56.4%.

Among behavioural factors, two thirds of the students (65.9%) were categorized in low physical activity category (male: 55.8%, female: 70.6%) while only 2.4% (male: 7.5%, female: 0%) were categorized as having a high physical activity level. The mean time spent on sedentary behaviours was  $2678.18 \pm 850.48$  minutes/week (approximately 6.38 hours a day) (male:  $2814.13 \pm 892.53$  minutes/week, female:  $2614.20 \pm 824.01$  minutes/week). For dietary intake, the mean caloric intake was  $1777 \pm 679$  Kcal (male:  $1950 \pm 678$  Kcal, female:  $1695 \pm 665$  Kcal).

With regards to psychosocial factors, one fifth of the students (total: 19.7%, male: 18.3%, female: 20.4%) were found to have disordered eating (EAT-26 score equal to or more than 20). Meanwhile, around 42.9% of the students (male: 36.7%, female: 45.9%) were grouped as having low self-regulatory efficacy for physical activity while only 9.9% (male: 11.7%, female: 9.0%) were found to have high self-regulatory efficacy for physical activity. Almost one fifth of the students (total: 22.1%, male: 25.0%, female: 20.8%) were categorized as having low weight management self-efficacy. Still, majority of the students (total: 63.2%, male: 65.0%, female: 62.4%) were found to have moderate weight management self-efficacy. In addition, around one fifth of the students (total: 18.7%, male: 20.8%, female: 17.6%) had low nutrition self-efficacy but majority of them (total: 65.6%, male: 64.2%, female: 66.3%) were found to have moderate nutrition self-efficacy.

Regarding body image perception, about half of the students (44.0%) wished to have smaller body size, 27.7% wished to have bigger body size, and 28.3% wished to maintain their body size. Moreover, almost one sixth of the students (total: 14.4%, male: 22.5%, female: 10.6%) had low nutrition knowledge but majority of them (total: 73.6%, male: 68.3%, female: 76.1%) was categorized as having moderate nutrition knowledge. Around 31.2% of the students (male: 36.7%, female: 29.4%) were categorized as having a moderate level of perceived sociocultural pressure while another 2.9% (male: 0%, female: 4.3%) were found to have high perceived sociocultural pressure.

For anthropometric measurements, almost 18.6% of the students were found to be overweight and obese (male: 22.5%, female: 16.9%). A low percentage of students (5.0%) were categorized as thin (male: 5.0%, female: 5.1%).

Significant differences in the mean scores between male and female students were found in physical activity level ( $t = 4.241, p = 0.0001$ ), time spent on sedentary behaviours ( $t = 2.134, p = 0.034$ ), self-regulatory efficacy for physical activity ( $t = 2.111, p = 0.035$ ), weight management self-efficacy ( $t = -2.270, p = 0.020$ ), and nutrition knowledge ( $t = -2.003, p = 0.046$ ).

The variables, which were found to have significant relationships with body weight status were eating attitudes ( $r = 0.178, p = 0.001$ ), body discrepancy score ( $r = 0.645, p = 0.0001$ ), land-use mix-diversity ( $r = -0.112, p = 0.030$ ), perceived sociocultural pressure to be thin ( $r = 0.392, p = 0.0001$ ), and breakfast consumption ( $\chi^2 = 6.532, p = 0.038$ ).

Multiple linear regression analysis showed three factors, namely body discrepancy score ( $\beta = 0.576, t = 13.360, p = 0.0001$ ), perceived sociocultural score to be thin ( $\beta = 0.150, t = 3.482, p = 0.001$ ), and land-use mix-diversity ( $\beta = -0.097, t = -2.490, p = 0.012$ ) were found to be the predictors for body weight status.

In conclusion, the present study showed the significant association between body discrepancy score, land-use mix-diversity, and perceived sociocultural pressure to be thin with the body weight status. Future interventions may consider incorporating the identified factors to increase their effectiveness. More studies should be carried out to investigate the interaction between sociodemographic factors, behavioural factors, psychosocial factors, and physical environment factors with body weight status of adolescents.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**FAKTOR-FAKTOR BERKAITAN STATUS BERAT BADAN DALAM  
KALANGAN REMAJA BERSEKOLAH, 15-17 TAHUN, DI SIBU, MALAYSIA**

Oleh

**LAW LEH SHII**

Mac 2013

**Pengerusi: Mohd Nasir Mohd Taib, DrPH**

**Fakulti: Perubatan dan Sains Kesihatan**

Peningkatan mendadak dalam prevalens kegemukan dan obesiti di kalangan kanak-kanak telah dikesan sejak satu dekad lalu di negara maju dan negara sedang membangun. Satu penyelidikan telah dijalankan untuk menentukan faktor-faktor yang berkaitan dengan status berat badan remaja bersekolah di Sibu, Sarawak.

Faktor-faktor sosiodemografi, tingkah laku, psikososial, dan persekitaran fizikal telah dinilai dengan menggunakan borang soal selidik yang dijawab sendiri oleh pelajar. Pengambilan diet pelajar ditentukan melalui kaedah ingatan diet 24-jam. Berat dan tinggi telah diukur berpandukan prosedur piawaian dan indeks jisim badan-untuk-umur (BMI-untuk-umur) turut ditentukan.

Penyelidikan telah dijalankan ke atas 375 daripada sejumlah 665 orang pelajar berumur 15-17 tahun (lelaki: 32.0%, perempuan: 68.0%) (Cina: 39.5%, Iban: 26.4%, Melayu:



17.1% dan Melanau: 17.1%) (purata umur:  $16.45 \pm 0.53$  tahun) dari empat buah sekolah menengah awam bertempat di Sibu (Sarawak) yang bersetuju untuk menyertai sesi ujikaji tersebut. Maka, kadar respons yang dikira adalah 56.4%.

Berkenaan dengan faktor-faktor tingkah laku, dua pertiga daripada pelajar (65.9%) tergolong dalam kumpulan yang menjalani aktiviti fizikal rendah (lelaki: 55.8%, perempuan: 70.6%) manakala hanya 2.4% (lelaki: 7.5%, perempuan: 0%) tergolong sebagai golongan yang menjalani aktiviti fizikal tinggi. Min masa digunakan untuk tingkah laku sedentar adalah  $2678.18 \pm 850.48$  minit/minggu (lebih kurang 6.38 jam sehari) (lelaki:  $2814.13 \pm 892.53$  minit/minggu, perempuan:  $2614.20 \pm 824.01$  minit/minggu). Untuk faktor pengambilan diet, min kalori yang diambil adalah  $1777 \pm 679$  Kcal (lelaki:  $1950 \pm 678$  Kcal, perempuan:  $1695 \pm 665$  Kcal).

Berkaitan faktor-faktor psikososial, satu perlima daripada pelajar (keseluruhan: 19.7%, lelaki: 18.3%, perempuan: 20.4%) didapati mengalami pemakanan terganggu. Sementara itu, lebih kurang 42.9% pelajar (lelaki: 36.7%, perempuan: 45.9%) tergolong dalam kumpulan berkeyakinan aktiviti fizikal rendah dan hanya 9.9% (lelaki: 11.7%, perempuan: 9.0%) mempunyai keyakinan aktiviti fizikal tinggi. Lebih kurang satu perlima daripada pelajar (keseluruhan: 22.1%, lelaki: 25.0%, perempuan: 20.8%) tergolong dalam kumpulan berkeyakinan pengurusan berat badan rendah tetapi majoriti daripada mereka (keseluruhan: 63.2%, lelaki: 65.0%, perempuan: 62.4%) didapati mempunyai keyakinan pengurusan berat badan sederhana. Tambahan, satu perlima daripada pelajar (keseluruhan: 18.7%, lelaki: 20.8%, perempuan: 17.6%) didapati rendah dalam keyakinan pemakanan tetapi majoriti daripada mereka (keseluruhan: 65.6%,

lelaki: 64.2%, perempuan: 66.3%) didapati mempunyai keyakinan pemakanan sederhana.

Berkenaan dengan persepsi imej badan, lebih kurang separuh daripada pelajar (44.0%) berhasrat untuk mengurangkan saiz badan, hampir 27.7% berhasrat untuk meningkatkan saiz badan, dan 28.3% berhasrat untuk mengekalkan saiz badan. Di samping itu, satu perenam daripada pelajar (keseluruhan: 14.4%, lelaki: 22.5%, perempuan: 10.6%) tergolong sebagai berpengetahuan pemakanan rendah tetapi majoriti daripada mereka (keseluruhan: 73.6%, lelaki: 68.3%, perempuan: 76.1%) mempunyai pengetahuan pemakanan sederhana. Lebih kurang 31.2% daripada pelajar (lelaki: 36.7%, perempuan: 29.4%) didapati mempunyai tekanan tanggapan sosiobudaya sederhana, dan 2.9% daripada pelajar (lelaki: 0%, perempuan: 4.3%) didapati mempunyai tekanan tanggapan sosiobudaya tinggi.

Untuk ukuran antropometri, lebih kurang 18.6% daripada pelajar didapati mengalami status berat badan berlebihan dan kegemukan (lelaki: 22.5%, perempuan: 16.9%) manakala sekumpulan kecil pelajar (5.0%) tergolong dalam kumpulan kekurusan (lelaki: 5.0%, perempuan: 5.1%).

Perbezaan signifikan dalam min skor antara lelaki dan perempuan dikesan dalam tahap aktiviti fizikal ( $t = 4.241$ ,  $p = 0.0001$ ), masa diluahkan untuk aktiviti sedentar ( $t = 2.134$ ,  $p = 0.034$ ), keyakinan aktiviti fizikal ( $t = 2.111$ ,  $p = 0.035$ ), keyakinan pengurusan berat badan ( $t = -2.270$ ,  $p = 0.020$ ), dan pengetahuan pemakanan ( $t = -2.003$ ,  $p = 0.046$ ).

Pemboleh ubah yang didapati berkadar signifikan dengan status berat badan adalah sikap pemakanan ( $r = 0.178, p = 0.001$ ), skor diskrepansi badan ( $r = 0.645, p = 0.0001$ ), penggunaan tanah: kepelbagaian ( $r = -0.112, p = 0.030$ ), tekanan tanggapan sosiobudaya untuk menjadi kurus ( $r = 0.392, p = 0.0001$ ), dan pengambilan sarapan pagi ( $\chi^2 = 6.532, p = 0.038$ ).

Analisis regresi linear berganda menunjukkan tiga faktor iaitu skor diskrepansi badan ( $\beta = 0.576, t = 13.360, p = 0.0001$ ), tekanan tanggapan sosiobudaya untuk menjadi kurus ( $\beta = 0.150, t = 3.482, p = 0.001$ ), dan penggunaan tanah: kepelbagaian ( $\beta = -0.097, t = -2.490, p = 0.012$ ) telah dikenalpasti sebagai peramal kepada status berat badan.

Kesimpulan, skor diskrepansi badan, tekanan tanggapan sosiobudaya untuk menjadi kurus, dan penggunaan tanah: kepelbagaian didapati mempunyai sumbangan signifikan ke atas status berat badan di kalangan remaja. Program intervensi pada masa hadapan harus membuat pertimbangan untuk menggabungkan faktor-faktor tersebut dalam perancangannya demi meningkatkan keberkesanan program. Lebih banyak penyelidikan harus dijalankan untuk menyiasat interaksi antara faktor-faktor sosiodemografi, tingkah laku, psikososial, dan persekitaran fizikal dengan status berat badan remaja.

## ACKNOWLEDGEMENTS

First of all, I would like to express my gratitude to my enthusiastic supervisor, Dr. Mohd. Nasir Mohd. Taib, for his tireless teaching and guidance. The sharing of his experience and expertise ensures the progression and smoothness of the entire journey of my Master of Science. Additionally, I would also like to extend my grateful thanks to Dr. Hazizi Abu Saad for his encouragement and feedback.

Secondly, I personally owe a great deal of appreciation to the parties involved in this research, which include the Ministry of Education (Malaysia), Sarawak Department of Education, school authorities and the participants, for their cooperation and support.

Thirdly, my special thanks go to my friends whom I could not mention individually for supporting and helping me during my difficult time.

Last but not least, my deepest appreciation to my beloved parents and family for their rigid support, motivation, and encouragement.

I certify that a Thesis Examination Committee has met on 14 March 2013 to conduct the final examination of Law Leh Shii on his thesis entitled "Factors Associated with Body Weight Status Among 15-17 Year Old School-Going Adolescents in Sibul, Malaysia" in accordance with the Universities and University Colleges Act in 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

Members of the Examination Committee were as follows:

**Asmah binti Rahmat, PhD**

Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Chairman)

**Loh Su Peng, PhD**

Associate Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Internal Examiner)

**Hejar Abdul Rahman, PhD**

Associate Professor (Medical)  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Internal Examiner)

**Norimah A. Karim, PhD**

Professor  
Universiti Kebangsaan Malaysia  
Malaysia  
(External Examiner)

---

**NORITAH OMAR, PhD**

Associate Professor and Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: 23May 2013

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

**Mohd. Nasir Mohd. Taib, DrPH**

Associate Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Chairman)

**Hazizi Abu Saad, PhD**

Associate Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Member)

---

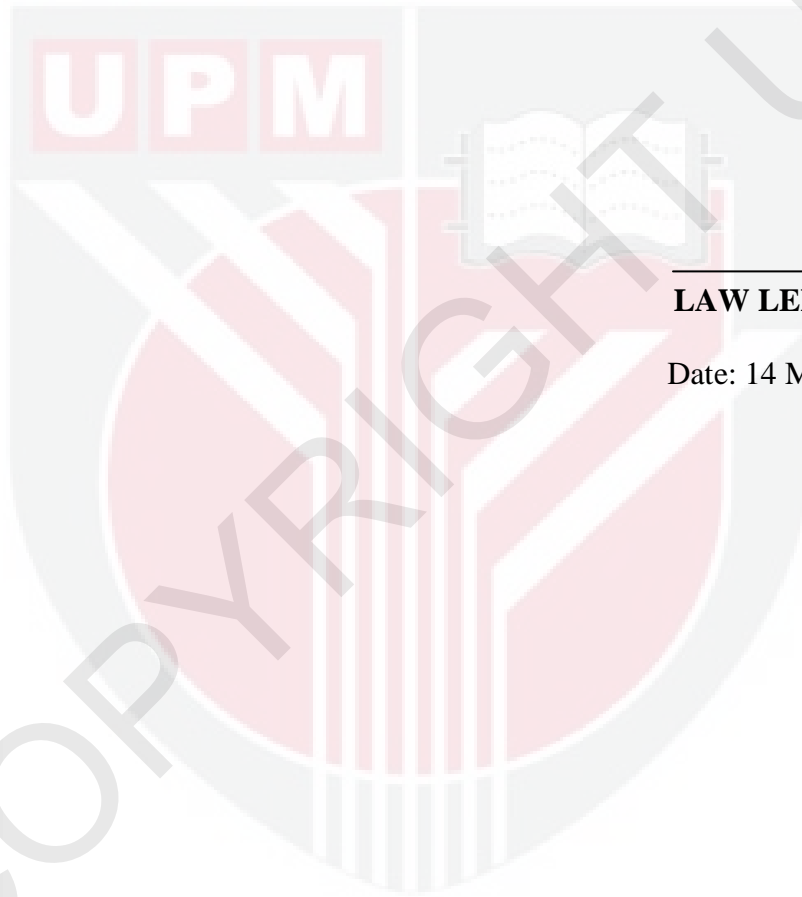
**BUJANG BIN KIM HUAT, PhD**

Professor and Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date:

## DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.



---

**LAW LEH SHII**

Date: 14 March 2013

## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	ii
<b>ABSTRAK</b>	vi
<b>ACKNOWLEDGEMENTS</b>	x
<b>APPROVAL</b>	xi
<b>DECLARATION</b>	xiii
<b>LIST OF TABLES</b>	xvii
<b>LIST OF FIGURES</b>	xix
<b>LIST OF ABBREVIATIONS</b>	xx
<b>LIST OF APPENDICES</b>	xxii
<b>CHAPTER</b>	
<b>1</b>	
<b>INTRODUCTION</b>	1
1.1 Background	1
1.2 Problem Statement	5
1.3 Significance of Study	6
1.4 Objective	7
1.4.1 General Objective	7
1.4.2 Specific Objective	8
1.5 Conceptual Framework	8
1.6 Hypotheses	12
<b>2</b>	
<b>LITERATURE REVIEW</b>	13
2.1 Adolescents and Overweight/Obesity	13
2.2 Definitions of Overweight/Obesity and Underweight	14
2.3 Assessment of Overweight/Obesity and Underweight	16
2.3.1 Body Mass Index (BMI)	17
2.3.2 Waist Circumference and Waist-to-Hip Ratio	17
2.3.3 Skinfold Thickness Measurement	18
2.4 Body Weight Status and Sociodemographic Characteristics	18
2.5 Body Weight Status and Behavioural Factors	22
2.5.1 Body Weight Status and Dietary Factors	22
2.5.2 Body Weight Status and Physical Activity	26
2.5.3 Body Weight Status and Sedentary Behaviours	29
2.6 Body Weight Status and Psychosocial Factors	32
2.6.1 Body Weight Status and Eating Attitudes	32
2.6.2 Body Weight Status and Self-efficacy	34
2.6.3 Body Weight Status and Body Image Perception	37
2.6.4 Body Weight Status and Nutrition Knowledge	40
2.6.5 Body Weight Status and Perceived Sociocultural Pressure	43
2.7 Body Weight Status and Physical Environmental Factors	45



<b>3</b>	<b>METHODOLOGY</b>	50
3.1	Study Design	50
3.1.1	Study Location	50
3.1.2	Sample Size Calculation	51
3.1.3	Ethnics Approval and Permissions	52
3.1.4	Sampling Method	52
3.1.5	Participants	54
3.2	Anthropometric Measurements	54
3.3	Research Instruments	55
3.3.1	Sociodemographic Characteristics	56
3.3.2	Dietary Factors	56
3.3.3	Physical Activity	61
3.3.4	Psychosocial Factors	64
3.3.5	Physical Environmental Factors	70
3.4	Quality Control	73
3.4.1	Translation	73
3.4.2	Pre-test	73
3.4.3	Validity and Reliability Test	74
3.5	Data Collection	76
3.6	Statistical Analysis	76
<b>4</b>	<b>RESULTS</b>	78
4.1	Sociodemographic Characteristics	78
4.2	Anthropometric Measurements	83
4.3	Behavioural Factors	84
4.3.1	Eating Behaviours	84
4.3.2	Caloric Intake	89
4.3.3	Nutrient Intakes	89
4.3.4	Under-reporting	95
4.3.5	Dietary Diversity	95
4.3.6	Physical Activity	95
4.3.7	Sedentary Behaviours	103
4.4	Psychosocial Factors	104
4.4.1	Eating Attitudes	104
4.4.2	Self-Regulatory Efficacy for Physical Activity	107
4.4.3	Weight Management Self-Efficacy	109
4.4.4	Nutrition Self-Efficacy	114
4.4.5	Body Image Perception	116
4.4.6	Nutrition Knowledge	117
4.4.7	Perceived Sociocultural to be Thin	122
4.5	Physical Environmental Factors	125
4.6	Body Weight Status and Sociodemographic Characteristics	126
4.7	Body Weight Status and Behavioural Factors	128
4.8	Body Weight Status and Psychosocial Factors	130

4.9	Body Weight Status and Physical Environmental Factors	131
4.10	Multiple Linear Regression	133
<b>5</b>	<b>DISCUSSION</b>	<b>137</b>
5.1	Prevalence of Overweight/Obesity and Underweight	138
5.2	Body Weight Status and Sociodemographic Characteristics	139
5.2.1	Family Income	139
5.2.2	Number of Siblings	141
5.2.3	Ethnicity	141
5.2.4	Sex	142
5.3	Body Weight Status and Behavioural Factors	143
5.3.1	Dietary Factors	143
5.3.2	Physical Activity	146
5.3.3	Sedentary Behaviours	147
5.4	Body Weight Status and Psychosocial Factors	149
5.4.1	Eating Attitudes	149
5.4.2	Self-efficacy	150
5.4.3	Body Image Perception	151
5.4.4	Nutrition Knowledge	152
5.4.5	Perceived Sociocultural Pressure to be Thin	153
5.5	Body Weight Status and Physical Environmental Factors	154
5.6	Multiple Linear Regression	156
5.7	Limitations	157
<b>6</b>	<b>CONCLUSION AND RECOMMENDATIONS</b>	<b>160</b>
6.1	Conclusion	160
6.2	Recommendations	161
	<b>REFERENCES</b>	<b>164</b>
	<b>APPENDICES</b>	<b>187</b>
	<b>BIODATA OF STUDENT</b>	<b>236</b>
	<b>LIST OF PUBLICATIONS</b>	<b>237</b>