



UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH OVERWEIGHT/OBESITY
AMONG SECONDARY SCHOOL STUDENTS IN
BATANG PADANG DISTRICT, PERAK, MALAYSIA***

MAHALETCHUMY A/P ALAGAPPAN

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AMONG SECONDARY SCHOOL STUDENTS IN
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By

MAHALETCHUMY A/P ALAGAPPAN

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

February 2019

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DEDICATION

To my ever-loving parents and siblings for all the years of bringing me up and my supervisor Prof. Datuk Dr.Lekhraj Rampal who have been a very passionate and helpful mentor for me in this journey of completing my research.

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

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Chairperson : Prof.Datuk Lekhraj Rampal, DrPH
Faculty : Medicine and Health Sciences

Overweight and obesity are the fifth leading risk for global deaths and approximately 300,000 people die each year of ailments related to obesity. Overweight and obese adolescents are at increased risk of significant health problems such as hypertension, diabetes, heart disease, stroke and cancer. The objective of this study was to determine the prevalence of overweight and obesity and factors associated among secondary school students in Batang Padang District, Perak.

An analytic cross sectional study was conducted in selected secondary schools in Batang Padang district, Perak, Malaysia. Sample size was calculated using two proportion formula. Systematic random sampling followed by cluster sampling method was used for selecting the schools. A validated self-administered questionnaire was used to obtain information on sociodemographic factors, lifestyle factors and psychosocial factors. Physical activity questionnaire for adolescents (PAQ-A), which was modified and adapted from Kowalski et al. (2004), was used to assess general level of physical activity. Rosenberg self-esteem Scale was used to measure self-esteem. Body parts satisfaction scale and body size perception scale were used to measure body Image. Anthropometrics measurements of height and weight were measured for each respondent. Body mass index (BMI) was calculated (weight in kg/height in m²). Data collection was done after getting approval from University Ethics Committee for Research Involving Human, University Putra Malaysia and permission from the Ministry of Education. Data analysis was carried out using Statistical Package for Social Sciences version

22 (SPSS Inc, Chicago, IL, USA). Variables that was significantly associated with overweight/obesity were entered into logistic regression model. Simple logistic regression was used to determine the crude odd ratio. Variables with p value < 0.25 were entered into the multivariable logistic regression to determine the adjusted odd ratio. P value < 0.05 in the multivariable logistic regression was considered statistically significant.

The overall response rate was 86%. The results showed that majority were females (53.1%) and Malays (55.9%). The mean age was 14.73 (95%CI = 14.70, 14.77). The overall prevalence of overweight and obesity was 16.0% and 11.5% respectively. It was seen that the prevalence was higher among male (29.8%) compared to female (25.3%). Obesity/overweight was significantly associated with gender ($\chi^2=16.0$, $p=0.0001$), age ($\chi^2=40.3$, $p=0.0001$), ethnicity ($\chi^2=21.3$, $p=0.0001$), education level of father ($\chi^2=8.0$, $p=0.045$) education level of mother ($\chi^2=8.0$, $p=0.045$), physical activity ($\chi^2=4.0$, $p=0.044$), disordered eating ($\chi^2=25.4$, $p=0.0001$), smoking status ($\chi^2=13.3$, $p=0.001$), body size perception ($\chi^2=348.9$, $p=0.0001$) and body part satisfaction ($\chi^2=117.4$, $p=0.0001$). Multivariable logistic regression was used to determine the predictors of overweight/obesity and it showed that the significant predictors of overweight/obesity were gender, physical activity, body parts satisfaction, body perception, and disordered eating. The odds of developing overweight/obesity is 1.5 times higher in male than in females (OR=1.545, 95% CI = 1.4, 1.8, $p<0.001$). Those with lower physical activity are 1.3 times more likely to develop overweight/obesity (OR=1.254, 95%CI 1.1-1.5, $p=0.005$). The odds of developing obesity is 1.9 times higher in those who was dissatisfied with their body parts (OR=1.964, 95%CI =1.7, 2.3, $p<0.001$). Those who was dissatisfied with their body size were 4.2 times more likely to develop overweight/obesity (OR=4.233, 95%CI= 3.6, 5.0, $p<0.001$). Those who are at risk of having eating disorders are 1.4 times more likely to develop overweight/obesity (OR=1.401, 95%CI= 1.2, 1.6, $p<0.001$).

In conclusion the overall prevalence of overweight and obesity was high (overweight (16.0%) and obesity (11.5%)). The findings from this study can be used by policy makers to plan an integrated intervention program to tackle the increasing prevalence of obesity.

Key words: Obesity, overweight, factors associated, prevalence, adolescent

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

**FAKTOR YANG BERKAITAN DENGAN BERAT BADAN
BERLEBIHAN/OBESITI DI KALANGAN PELAJAR SEKOLAH MENENGAH
DI DAERAH BATANG PADANG, PERAK, MALAYSIA**

Oleh

MAHALEETCHUMY A/P ALAGAPPAN

Februari 2019

Pengerusi : Prof. Datuk Lekhraj Rampal, DrPh
Fakulti : Perubatan dan Sains Kesihatan

Berat badan berlebihan dan obesiti adalah risiko kelima tertinggi bagi kematian global dan kira-kira 300,000 orang mati setiap tahun daripada penyakit yang berkaitan dengan obesiti. Remaja yang mempunyai berat badan berlebihan dan obes berada di peningkatan risiko masalah kesihatan yang ketara seperti tekanan darah tinggi, kencing manis, penyakit jantung, strok dan kanser. Objektif kajian ini adalah untuk menentukan prevalen berat badan berlebihan/obesiti dan faktor-faktor yang berkaitan di kalangan pelajar sekolah menengah di daerah Batang Padang, Perak

Satu kajian telah dijalankan di sekolah-sekolah menengah di daerah Batang Padang, Perak, Malaysia. Saiz sampel dikira dengan menggunakan formula dua bahagian. Pensampelan dengan kaedah kebarangkalian berkadar dengan saiz digunakan untuk memilih sekolah-sekolah. Borang soal selidik berstruktur dan disahkan digunakan untuk mendapatkan maklumat mengenai faktor sociodemographic, faktor-faktor gaya hidup dan faktor-faktor psikososial. 'Physical activity questionnaire for adolescents (PAQ-A)', yang telah diubahsuai dan disesuaikan daripada Kowalski et al. (2004) telah digunakan bagi mengukur tahap umum aktiviti fizikal. Skala 'Rosenberg self-esteem' digunakan untuk mengukur harga diri. Skala 'Body parts satisfaction' dan skala 'body size perception' digunakan untuk mengukur imej badan. Ukuran Anthropometrics ketinggian dan berat badan diukur bagi setiap responden. Indeks jisim badan (BMI) dikira (berat dalam kg / ketinggian dalam m²). Pengumpulan data dilakukan setelah mendapat kelulusan dari Jawatankuasa

Etika Universiti Penyelidikan Melibatkan Manusia, Universiti Putra Malaysia dan kebenaran daripada Kementerian Pelajaran. Statistical Package for Social Sciences version 22 (SPSS Inc, Chicago, IL, USA) digunakan untuk menganalisa data.

Pembolehubah yang mempunyai kaitan yang signifikan dengan berlebihan berat badan/obesiti telah dimasukkan ke dalam model regresi logistik. Regresi logistik univariable telah digunakan untuk menentukan 'odd ratio'. Pembolehubah dengan nilai $p < 0.25$ telah masuk ke dalam regresi logistik 'multivariate' untuk menentukan 'crude odd ratio'. P value < 0.05 dalam multivariable logistic regression dianggap sebagai signifikan secara statistik.

Respon keseluruhan kajian ini adalah 86%. Majoriti terdiri daripada wanita (53.1%) dan golongan Melayu (55.9%). Umur purata adalah 14.73 (95%CI = 14.70, 14.77). Prevalens keseluruhan berat badan berlebihan dan obesiti adalah masing-masing 16.0% dan 11.5%. Prevalens yang lebih tinggi adalah di kalangan lelaki (29.8%) berbanding perempuan (25.3%). Berat badan berlebihan /obesiti mempunyai kaitan yang nyata dengan jantina ($\chi^2=16.0$, $p=0.0001$), umur ($\chi^2=40.3$, $p=0.0001$), etnik ($\chi^2=21.3$, $p=0.0001$), tahap pendidikan bapa ($\chi^2=8.0$, $p=0.045$) tahap pendidikan ibu ($\chi^2=8.0$, $p=0.045$), aktiviti fizikal ($\chi^2=4.0$, $p=0.044$), persepsi saiz badan ($\chi^2=348.9$, $p=0.0001$), kepuasan bahagian badan ($\chi^2=117.4$, $p=0.0001$), masalah pemakanan ($\chi^2=25.4$, $p=0.0001$) dan merokok ($\chi^2=13.3$, $p=0.001$).

Regresi logistik multivariate telah digunakan untuk menentukan faktor yang signifikan dengan berat badan berlebihan/obesity. Regresi tersebut menunjukkan faktor yang signifikan dalam kajian ini adalah jantina, aktiviti fizikal, kepuasan bahagian badan, persepsi badan, dan masalah pemakanan. Didapati bahawa kadar mendapat berat badan berlebihan/obesity adalah 1.5 kali lebih tinggi di kalangan lelaki berbanding perempuan (OR=1.545, 95 CI= 1.4-1.8, $p<0.001$). Kadar mendapat berat badan berlebihan/ obesity adalah 1.9 kali lebih tinggi pada respondent yang tidak berpuas hati dengan bahagian badan ((OR=1.964, 95%CI =1.7, 2.3, $p<0.001$). Respondent yang berada di tahap kurang aktiviti fizikal adalah 1.3 kali lebih berkemungkinan untuk mendapat berat badan berlebihan/obesity (OR=1.254, 95%CI 1.1-1.5, $p=0.005$). Responden yang tidak berpuas hati dengan persepsi badan adalah 4.2 kali lebih berkemungkinan untuk mendapat berat badan berlebihan/obesity (OR=4.233, 95%CI= 3.6, 5.0, $p<0.001$). Responden yang berada di tahap risiko untuk mendapat masalah pemakanan adalah 1.4 kali lebih berkemungkinan untuk mendapat berat badan berlebihan/ obesity (OR=1.401, 95%CI= 1.2, 1.6, $p<0.001$).

Kesimpulannya prevalens keseluruhan berat badan berlebihan dan obesiti adalah tinggi iaitu (berat badan berlebihan (16.0%) dan obesiti (11.5%). Hasil daripada kajian ini boleh digunakan oleh penggubal dasar untuk merancang satu program intervensi bersepadu untuk menangani peningkatan prevalens obesiti.

Kata kunci: Obesiti, berat badan berlebihan, faktor berkaitan, prevalens, remaja



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

Professor Datuk Lekhraj Rampal, DrPH

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

Professor Zalilah Mohd Sharif, PhD

Department of Nutrition and Dietetics
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

Kalaiselvam Thevandran, MD

Senior Lecturer
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

ROBIAH BINTI YUNUS, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

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Signature: _____

Name of Chairman
of Supervisory
Committee:

Professor Datuk Lekhraj Rampal, DrPH

Signature: _____

Name of Member of
Supervisory
Committee:

Professor Zalilah Mohd Sharif, PhD

Signature: _____

Name of Member of
Supervisory
Committee:

Kalaiselvam Thevandran, MD

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CHAPTER 1

INTRODUCTION

1.1 Background

Non-communicable Diseases (NCDs) are the leading cause of death of approximately 38 million people yearly (WHO, 2018). Obesity, hypertension, diabetes, high blood sugar, smoking, physical inactivity and having an unhealthy response to pressure are the most significant risk factors of NCD (Lobstein et al., 2004).

Abnormal or excessive fat accumulation can cause overweight and obesity (WHO, 2011a). Overweight and obesity was an important risk for cardiovascular and kidney diseases, diabetes, a few malignancies and musculoskeletal conditions (WHO, 2016; Singh et al., 2008). Excess weight gain during childhood and adolescent is likely accounted to overweight and obesity for the whole life and is related with greater risk and earlier onset of endless issue, for example, type 2 diabetes (Singh et al., 2008). The beginning of numerous NCDs like diabetes, obesity, and cardiovascular diseases can be avoided or postponed by tending to these risk factors earlier in life (Darnton et al., 2004). It additionally leads to serious psychosocial outcomes and brings down instructive achievement like educational achievement (Quek et al., 2017).

There are many short term and long-term impacts of overweight and obesity in children and adolescent. In short term, children and adolescents who are overweight and obese may experience a few issues, for example, low self-esteem, conduct issues and clinical condition. The clinical conditions are systemic inflammation, type 1 diabetes mellitus, asthma and cardiovascular risk factors. Whereas, the long-term effects of obesity include economic and adverse social outcome, diabetes, hypertension, stroke, some types of cancer and premature mortality when the child and adolescents grew up. Approximately 70% to 80% of adolescents who experienced obesity will still continue to be obese during their adulthood (WHO, 2011b).

1.2 Problem statement

Prevalence of overweight and obesity has been increasing at a quick stage for a considerable length of time in both children and adolescent (Ogden et al., 2003). The prevalence of worldwide overweight and obesity was evaluated to be on an expansion in 2005, with assessed 1.6 billion adolescents being overweight and 400 million of them obese. Moreover, more than 20 million

children under 5 years were overweight (WHO, 2004). It was assessed that by year 2015, more than 2.3 billion individuals will be overweight and of these, 700 million will be obese (WHO, 2008b).

The NCD Risk Factor Collaboration revealed that in 2016, on average, 50 million girls and 74 million boys globally were obese. The mean BMI and obesity in children and adolescent aged 5– 19 years have extended across numerous territories and countries in the past four decades. The number of obese adults extended from 100 million in 1975 which includes 69 million women and 31 million men to 671 million in 2016 that comprise of 390 million women and 281 million men respectively. Another 1.3 billion adults were overweight (NCD Risk factor collaboration, 2017).

In developed nation, obesity is the most prevailing disease in children and adolescent. Around 22 million of kids worldwide are overweight (WHO, 2004). In the course of recent decades, obesity has increase quickly to epidemic extents in the United States and numerous nations around the world. The increase in prevalence of overweight happens in both developed nations, as well as in developing nations (WHO, 2004).

Likewise, in Malaysia, the advances of nutrition and way of life have been related with Malaysians indulging diets high in fat and calories and for the most part driving an inactive way of life. The overweight and obesity among grown-ups 18 years and above has expanded from 4.4% in 1996 (MOH, 1996), to 12.3% in 2004 (Rampal et al., 2007a) and 14.0% in 2006 (MOH, 2006) to 17.7% in 2015 (MOH, 2015).

In view of the WHO (2000) order, the prevalence of overweight nationally has expanded progressively from 26.7% in Malaysian Adult Nutrition Survey, MANS 2003, 29.0% in National Health and Morbidity survey, NHMS 2006, 28.9% in NHMS 2011 to 32.4% in MANS 2014. On the other hand, the prevalence of obesity had increased substantially from 12.2% in MANS 2003 to 14.5% in NHMS 2006, 15.4% in NHMS 2011 and 18.5% in the MANS 2014 (MANS, 2015).

A research in 2009 found that among 7 to 12-year-old kids in Peninsular Malaysia, 10.5% were overweight and 5.9% obese. In particular, more Indian kids (18.4%) were overweight and obese as compared to Malay (16.7%) and Chinese (14.8%) kids (Ismail et al., 2009).

In 2005, the prevalence of obesity and overweight were 11.4% and 8.2% respectively for students of secondary school in Klang district (Rampal et al., 2007b) and another investigation in 2010, displayed that prevalence of

overweight and obesity was 12.5% and 11.7% respectively among young people in Putrajaya (Rampal et al., 2011).

These researches firmly show that the issue of overweight and obesity will represent a noteworthy public health challenge for Malaysia later on. Adding to it, the number still contrast ominously when analyzed using the number of other propelled nations of Asian, for example, Singapore and Japan whereby the obesity prevalence rates for male are within 1.3 percent to 1.8 percent whereas for female is fall within 1.5 percent to 1.9 percent (Ono et al., 2008).

1.3 Significance of study

This study provides the prevalence of overweight/obesity and a better understanding of factor associated with obesity among secondary school students in Batang Padang District, Perak. This study will also add knowledge in the respective field and serve as baseline information for the intervention study among adolescent. The information can be used by policy maker to plan preventive measures by focusing on the significant predictors of obesity among adolescent.

1.4 Objective

1.4.1 General Objective

To determine the prevalence of overweight/obesity and its associated factors among secondary school students in Batang Padang District, Perak.

1.4.2 Specific Objective

- i. To determine socio-demographic characteristics (age, gender, ethnicity, education level,), lifestyle characteristics (disordered eating, physical activity, smoking behavior) and psychosocial characteristic (body image perception, self-esteem, body part satisfaction), the prevalence of overweight/obesity.
- ii. To determine the association between socio-demographic factors, lifestyle factors, psychosocial factors and overweight/obesity among secondary school students in Batang Padang, Perak.
- iii. To determine the predictors of overweight/obesity.

1.5 Hypothesis

- i. There is a significant association between socio-demographic factors (age, gender, ethnicity, education level) and overweight/obesity.
- ii. There is a significant association between lifestyle factors (disordered eating, physical activity, smoking behavior) and overweight/obesity.
- iii. There is a significant association between psychosocial factors (body image perception, self-esteem, body part satisfaction) and overweight/obesity.

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BIODATA OF STUDENT



The student, Mahaletchumy A/P Alagappan was born on 20th June 1988 in Kuala Lumpur, Malaysia. She received her early education at Sekolah Kebangsaan Convent Jalan Peel, Kuala Lumpur and pursued her secondary education at SMK Convent Jalan Peel, Kuala Lumpur. After completing her SPM, she further took STPM at SMK Aminuddin Baki, KL before continuing her tertiary education at USCI University, KL majoring in Food Science and Nutrition. She graduated with Bachelor of Science in Food Science and Nutrition in year 2012. In year 2013, she was awarded with two scholarships which were Graduate Research Fellowship (GRF) by UPM and MyBrain15 by Ministry of Education to pursue her Master's Degree in Community Nutrition at Faculty of Medicine and Health Sciences, UPM under the supervision of Prof.Datuk Lekhraj Rampal, DrPH and graduated with Master of Science.



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