UNIVERSITI PUTRA MALAYSIA

DETERMINATION OF PSYCHOSOCIAL, PERSONALITY TRAITS, LIFESTYLES FACTORS AND WEIGHT STATUS AMONG STUDENTS IN A PUBLIC UNIVERSITY IN MALAYSIA

NURUL FAREEZA BT SUHAIMI

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By

NURUL FAREEZA BT SUHAIMI

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

November 2020

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DEDICATION

This thesis is dedicated to

My respected supervisors, my dear family, and my beloved husband alif

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

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November 2020

Chairman : Zuriati binti Ibrahim, PhD
Faculty : Medicine and Health Sciences

The escalating prevalence of overweight and obesity (OW-OB) among university students is a continuous concern. OW-OB raised a public attention as it is considered as one of the risk factors towards development of non-communicable disease including hypertension, cardiovascular disease and diabetes mellitus.

A cross-sectional study was conducted to determine prevalence and factors associated with OW-OB among Universiti Putra Malaysia (UPM) students. Self-administered questionnaires were used to determine sociodemographic background, psychosocial, personality traits, lifestyle factors and weight status. The psychosocial factors consist of self-esteem and social support were determined using Rosenberg Self-Esteem Scale (RSES) and Multidimensional Scale of Perceived Social Support (MSPSS) respectively. Personality traits were assesed using USM Personality Inventory (USMaP-I). Lifestyle factors assesed physical activitiy and sleep quality using Global Physical Activity Questionaire (GPAQ) and Pittsburgh Sleep Quality Index (PSQI) respectively. Dietary factors were assessed by Eating Behaviour Questionaires (EBQ) and Diet Quality Index-Revised (DQI-R). Assesment of nutritional status included measurement of anthropometry included (height, weight, waist circumference, body fat percentage and visceral fat), biochemical data (fasting lipid profiles, fasting blood glucose) and blood pressure. Clinical data on blood pressure were measured using a digital sphygmomanometer.

A total of 240 undergraduates (24.6% male and 75.4% female) with mean (±SD) age of 21.22±1.24 years were recruited from four randomly selected faculties in UPM. The classification of body weigh status of the respondents indicated that

61.3% had normal weight, 12.9% underweight and 19.6% overweight and 6.3% obese. The prevalence of OW-OB were 25.9% vs 74.1% normal and underweight (UW-NW). Majority of respondents were Malay (79.2%) and mostly resided in hostel (95%). More than half of the respondents received adequate social support from their social circles; mainly from significant other (52.5%), family (68.8%) and friends (56.7%) respectively. Personality traits shows majority of the respondents were having neuroticism (76.2%), openness (59.0%) and conscientiousness (61.5%) traits. Almost two – thirds (65.8%) from total respondents were categorized under moderate physical activity level however, half (50.4%) of them experienced poor sleep quality.

Results on eating behaviour indicated that 42.5% of respondents skipped at least one main meal per day where breakfast (77.9%) was the most frequently skipped meal. More than half (53.3%) ate at western fast food restaurant 1-3 times per months. Overall mean DQI-R was 58.38±13.18 suggested in need of improvement. Average score (±SD) of the self-esteem was 18.29±4.67 which indicates respondents had moderate self-esteem. Prevalence of abdominal obesity were 11.3%, 47.9% having high body fat percentage and 7.5% were having high visceral fat level. Assessment of biochemical and clinical data show 26.3% were at risk level for total cholesterol (TC), 3.8% at risk level for triglycerides (TG), 2.1% had low HDL and 60.4% of respondents had at risk level for LDL. All of the respondents had optimal blood glucose level. For blood pressure, about 14.2% and 10.0% from total respondents were at risk level for systolic and diastolic.

Compare across body weight status, OW-OB significantly having lower self-esteem ($p<0.05$), experienced poorer sleep quality ($p<0.05$), skipped more main meal ($p<0.05$), having higher mean of waist circumference (81.70±7.77cm) ($p<0.05$), higher mean of body fat (33.10±5.45) and visceral fat (8.40±3.39) ($p<0.05$), higher mean of TC (4.97±0.67), TG (1.00±0.61), LDL (3.04±0.56), lower HDL (1.47±0.27) ($p<0.05$) and higher mean for systolic (113.12±13.04) and diastolic (73.98±8.76) blood pressure ($p<0.05$) compared to UW-NW counterparts. OW-OB also found to have higher social support in all domains, have predominant personality traits of conscientiousness (8.28±1.95), extraversion (9.29±1.89) and agreeableness (9.04±1.67) and higher engagement in physical activity (67.7%) and poorer diet quality however, these association were too small to be significant.

Multivariate logistic regression indicates that the odds of being OW-OB were five times likely if respondents had high LDL level (OR=5.08, CI=1.29-20.11, $p<0.02$) and frequent skipping meals (OR=4.97, CI=1.06-23.38, $p<0.04$), three times likely if respondents had high triglycerides (OR=2.55, CI=1.10-5.95, $p<0.03$) and twice likely if respondents had poor sleep quality (OR=2.10, CI=1.09-4.05, $p<0.03$). Higher diastolic blood pressure (OR=1.08, CI=1.03-1.12, $p<0.001$) increased chances of respondents being OW-OB compared to normotensive respondents.

As a conclusion, this study found university students with poor sleep quality frequently skipped meals with poor fasting lipid profiles and elevated blood pressure were at higher risk to be OW-OB. This study highlights the importance of conducting healthy lifestyle and having healthy body weight by modify the modifiable lifestyle behaviour by having good sleep quality, and eating behaviours to improve lipid profiles and blood pressure.

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

PENENTUAN FAKTOR PSIKOSOSIAL, TRAIT PERSONALITI, GAYA HIDUP DAN STATUS BERAT BADAN DALAM KALANGAN PELAJAR UNIVERSITI AWAM DI MALAYSIA

Oleh

NURUL FAREEZA BT SUHAIMI

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Peningkatan prevalens masalah berat badan berlebihan dan obesiti (OW-OB) dalam kalangan pelajar universiti adalah membimbangkan. OW-OB menarik perhatian umum kerana dianggap sebagai salah satu faktor risiko terhadap penyakit tidak berjangkit seperti tekanan darah tinggi, penyakit kardiovaskular dan kencing manis.

Kajian rentas dijalankan untuk menentukan prevalens dan faktor berkaitan dengan OW-OB dalam kalangan pelajar Universiti Putra Malaysia (UPM). Soal selidik kendiri telah digunakan untuk mendapatkan latar belakang sosiodemografi, psikososial, personaliti gaya hidup dan status berat badan. Faktor psikososial terdiri daripada harga diri dan sosial telah dinilai menggunakan *Rosenberg Self-Esteem Scale (RSES)* dan *Multidimensional Scale of Perceived Social Support (MSPSS)* masing-masing. Trait personaliti telah dinilai dengan menggunakan *USM Personality Inventory (USMaP-I).* Faktor gaya hidup telah dinilai dengan menggunakan *Global Physical Activity Questionaire (GPAQ)* and *Pittsburgh Sleep Quality Index (PSQI)* masing-masing. Faktor diet telah dinilai menggunakan *Eating Behaviour Questionaires (EBQ)* dan *Diet Quality-Revised Index (DQI-R).* Penilaian status pemakanan terdiri daripada ukuran antropometri (berat, ketinggian, ukur lilit pinggang, peratus lemak badan dan lemak viseral) dan data biokimia (profil lipid dan glukosa berpuasa). Data klinikal tekanan darah telah diukur dengan menggunakan *sphygmomanometer.*

Sejumlah 240 mahasiswa (24.6% lelaki dan 75.4% perempuan) dengan purata umur 21.22 ± 1.24 direkrut melalui persampelan rawak mudah dari empat fakulti terpilih di UPM. Prevalens menunjukkan berat badan berlebihan ialah 19.6%, obesiti 6.3%, kurang berat 12.9% dan berat badan normal 61.3%. Majoriti

responden ialah perempuan (75.4), Melayu (79.2%) dan majoriti tinggal di asrama (95%). Skor purata bagi harga diri ialah 18.29 ± 4.67 menunjukkan harga diri responden dalam kategori sederhana. Dari segi sokongan sosial lebih separuh daripada responden mendapat skor tinggi daripada pasangan (52.5%), keluarga (68.8%) dan rakan-rakan (56.7%). Ini menujukkan lebih daripada separuh responden mendapat sokongan sosial yang mencukupi. Trait personaliti menunjukkan majoriti responden mendapat skor tinggi bagi personaliti *neuroticism* (76.2%) dan lebih daripada separuh responden mendapat skor tinggi bagi personaliti keterbukaan (59.0%) dan *extraversion* (61.5%). Faktor gaya hidup dari segi aktiviti fizikal dan kualiti tidur menunjukkan hampir dua pertiga (65.8%) daripada responden termasuk dalam kategori aktiviti fizikal yang sederhana namun separuh (50.4%) daripada responden mengalami kualiti tidur yang kurang baik.

Dalam 42.5% responden telah melangkau sekurang-kurangnya satu hidangan utama setiap hari di mana sarapan pagi (77.9%) ialah waktu makan yang paling kerap dilangkau. Lebih separuh (53.3%) daripada responden melaporkan sering makan di restoran makanan segera sekali hingga tiga kali pada setiap bulan. Purata skor kualiti diet dalam kalangan pelajar ialah 58.38 ± 13.18 menunjukkan keperluan untuk penambahbaikan. Perbandingan antara status berat badan OW-OB dengan kurang berat badan dan berat badan normal (UW-NW) menunjukkan OW-OB lebih kerap melangkau waktu makan ($p<0.05$), memiliki harga diri yang lebih rendah ($p<0.05$), mengalami kualiti tidur yang lebih rendah ($p<0.05$), mempunyai lilitan pinggang tinggi ($p<0.05$), peratusan lemak badan ($p<0.05$) dan lemak visceral yang tinggi ($p<0.05$), purata kolesterol tinggi ($p<0.05$), lemak trigliserida tinggi ($p<0.05$), HDL rendah ($p<0.05$), LDL tinggi ($p<0.05$) dan tekanan darah sistolik dan diastolik yang lebih tinggi ($p<0.05$) berbanding UW-NW. Kajian mendapati OW-OB mempunyai sokongan sosial yang lebih tinggi dalam semua domain, mempunyai ciri keperibadian yang tinggi bagi ciri personaliti *conscientiousness* (8.28 ± 1.95), *extraversion* (9.29 ± 1.89) dan *agreeableness* (9.04±1.67), penglibatan yang lebih tinggi dalam aktiviti fizikal (67.7%) juga mempunyai kualiti diet yang lebih rendah berbanding UW-NW namun perbezaan ini terlalu kecil untuk menjadi signifikan.

Penilaian status nutrisi antropometri menunjukkan 11.3% memiliki ukur lilit pinggang yang berisiko tinggi, 47.9% mempunyai peratus lemak badan yang tinggi dan 7.5% mempunyai paras lemak viseral yang tinggi. Penilaian data biokimia dan klinikal menunjukkan 26.3% responden mempunyai lemak kolesterol berisiko tinggi, 3.8% mempunyai lemak trigliserida berisiko tinggi, 2.1% mempunyai lemak *HDL* yang rendah dan 60.4% responden mempunyai lemak LDL yang berisiko tinggi. Semua responden mempunyai tahap glukosa darah yang optimum. Bagi tekanan darah, kira-kira 14.2% dan 10.0% daripada jumlah reponden mempunyai tekanan sistolik dan diastolik yang berisiko tinggi.

Regresi logistik multivariate menunjukkan bahawa kemungkinan respondent mengalami masalah OW-OB adalah lima kali ganda jika responden mempunyai tahap LDL yang tinggi (OR = 5.08, CI = 1.29-20.11, $p<0.02$) dan kerap melangkau

makanan (OR = 4.97, CI = 1.06- 23.38, p <0.04), tiga kali ganda jika responden mempunyai trigliserida tinggi (OR = 2.55, CI = 1.10-5.95, p <0.03) dan dua kali ganda jika responden mempunyai kualiti tidur yang kurang baik (OR = 2.10, CI = 1.09-4.05, p <0.03). Tekanan darah diastolik yang lebih tinggi (OR = 1.08, CI = 1.03-1.12, p <0.001) akan meningkatkan peluang responden mengalami masalah OW-OB berbanding dengan responden yang memiliki diastolik yang optimum.

Sebagai kesimpulan, kajian ini mendapati pelajar-pelajar universiti yang mempunyai kualiti tidur yang kurang baik, kerap kali melangkau waktu makan, memiliki profil lipid semasa berpuasa yang tinggi dan tekanan darah yang tinggi akan meningkatkan risiko mengalami masalah OW-OB. Kajian ini menunjukkan kepentingan menjalankan gaya hidup sihat dan mempunyai berat badan yang ideal dengan mengubah gaya hidup kearah lebih baik seperti tidak melangkau waktu makan, mendapat kualiti tidur yang baik serta memiliki profil lipid dan tekanan darah yang optimum.

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This thesis was submitted to the Senate of the 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:

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Date: 10 June 2021

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LIST OF ABBREVIATIONS

BMI	Body mass index
BMR	Basal metabolic rate
BP	Blood pressure
EI	Energy intake
FFQ	Food frequency questionnaire
GPAQ	Global physical activity questionnaire
HDL	High density lipoprotein
LDL	Low density lipoprotein
MPSS	Multidimensional scale of perceived social support
NHMS	National health and morbidity survey
NW	Normal weight
OB	Obese/obesity
OW	Overweight
PSQI	Pittsburgh sleep quality index
RNI	Recommended nutrient intake
TC	Total cholesterol
TG	Triglyceride
UW	Underweight

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Prevalence of overweight and obesity (OW-OB) are increasing at alarming rate with an estimation of 57.8% adult population (3.3 billion people) will becoming obese by 2030 (González-Muniesa et al., 2017). OW-OB raised a public concern as it is considered as one of the risk factors towards development of non-communicable disease including hypertension, cardiovascular disease and diabetes mellitus (World Health Organization, 2018). According to first law of thermodynamic, OW-OB results from disequilibrium between energy intake versus expenditure (González-Muniesa et al., 2017). This translates leading a sedentary lifestyle and overconsumption of energy compared to body requirement results in OW-OB.

However, the problem is beyond this simplistic aetiology as studies showed OW-OB results from more complex relationship between genetic, behaviour, community and environment. These complex relations are systematized in socio-ecological model (SEM) theoretical framework factors that attempt to understand the impact on individual health by capturing from a larger perspective at the community level (local state, federal policies and laws) to physical environment level (rules, regulation policies), narrow down to social environment level (intrapersonal network, family and peers) and further focused on an individual level (interpersonal knowledge, attitude, belief and behaviour).

In order to control increasing prevalence of obesity, at community level several initiatives have been made by local government to tackle the obesity issue such as implementation of *MyWeight MyHealth* program, *MySihat* and 10 000 steps a day campaign and some focusing younger age group such as *Mybody fit and fabulous @ school* to encourage physical activity among Malaysia population. Moreover, local government had made continuous commitment in promoting healthy eating to improve nutrition among population by implementing various nutrition programme under National Plan of Action for Nutrition of Malaysia III from year 2016 until 2025 focusing pregnant women, infants and young children, school children, adults and elderly (Ministry of Health, 2016).

Meanwhile at social level, university students are at risk to develop obesity as they undergo significant lifestyle changes including attending university, living independently and shift of social support (Poobalan & Aucott, 2016). University students devoted most of their time and energy towards study and exam subsequently compromised their dietary behaviour. Previous studies showed university students had limited finances, low nutritional knowledge, lack of food preparation skills (Larson, N., Perry, C., Story, & Neumark-Sztainer, 2006),

inadequate time to plan healthy meal. The problem further compounded by physical environment of university that includes lack of facility to prepare nutritious food and bounded to limited food choices to establishment surrounding campus cafeterias (Munt, A., Partridge, S., & Allman-Farinelli, 2017). These eventually associated to dietary factors associates with obesity including poor eating behaviour (Thanawala, Rubinow, Roga, & Liou, 2018) and poor diet quality (Roy et al., 2017a).

However, the root factors for obesity among Malaysian population may not be adequately addressed as the prevalence of obesity remained to increase especially among university students. This is observed from National Health and Morbidity Survey (NHMS) for Malaysian young adults between aged 20 to 24 years old showed prevalence of overweight increased from 18% to 20% between 2011 and 2015 (Institute for Public Health, 2015a). Meanwhile, prevalence for obesity also showed elevating trends from 11% in 2011 to 12% in 2015 (Institute for Public Health, 2015a). Among Malaysia university students prevalence of overweight (BMI ≥25) ranged between 9% (Gan, W., Nasir, Zalilah, & Hazizi, 2011), 11% (Gan & Yeoh, 2017; Sugathan, S. & Bagh, 2014), 16% (Hadipour, Wan Muda, & Leng, 2015) to 26% (Najwa & Appukutty, 2018) and prevalence of obesity (BMI ≥30) ranged between 3% (Gan, W. et al., 2011; Gan & Yeoh, 2017; Sugathan, S. & Bagh, 2014) to 6% (Hadipour et al., 2015).

1.2 Problem statement

Although university students represent a transient life transition, it is found that this population has a high incidence of OW-OB. Despite their young age, they were also found to have high risk of developing young hypertension, hypercholesterolemia and suffered from poor mental health (Radzi et al., 2019; Cheah et al., 2015; Hussein et al., 2018). Due to the debilitating effects of OW-OB and its devastating role on the development of non-comunicable disease, it is urgent needs to address this problem as this population will be the future young workforce for this country.

From previously published studies, research on OW-OB among this population had been limited to sociodemographic involving non-modifiable factors of gender, ethnicity, marital status and source of income (Jamaluddin, Mokhtari, Jamaluddin, & Saad, 2015; Kabir, Salmiah, & Suriani Ismail, 2014; Nor Afiah M. et al., 2014). In dietary aspect despite numerous published data, the previous study showed this population typically suffered from food insecurity, excessive sugar sweetened beverage, frequent skipping meal, micronutrient deficiency especially vitamin B, calcium and iron with unsatisfactory dietary pattern (Nur Atiqah, Norazmir, Khairil Anuar, Mohd Fahmi, & Norazlanshah, 2015; Koo, Hadirah, Airina, R, & Faziela, 2019).

In terms of dietary, despite numerous work conducted in terms of dietary intake, more expansion is required to cover their overall diet quality. For example, previous research found poor dietary intake by analysed proportion of macronutrient and total calorie intake consumed (Gan, W. et al., 2011) and eating behaviour (Nor Afiah M. et al., 2014) as possible factors associated to OW-OB among university students. However, as food consumed varies between days and individual consumed various type of food from one food group. It has been realised that diet quality over diet quantity will be more relevant to include in this study. Moreover, limited availability in research conducted to assess overall diet quality of university students.

Factors associate with OW-OB are not straightforward as some study suggested pre-existing condition of OW-OB influenced individual to adapt poorly to weight related behaviour and further aggravated their problem. For instance, OW-OB individual commonly stigmatized and prejudiced as lazy, low in motivation, inadequate willpower, getting less attention and consequently results in having low social support and lower self-esteem (Karsay & Schmuck, 2017). Stigmatized by obesity, feeling left out and low self-esteem naturally creates psychological distress that predisposed them to adopt poor lifestyle choice such as low physical activity and poor sleep quality further aggravates OW-OB problem (Karsay & Schmuck, 2017). Moreover, lack of information regarding personality traits of this population and whether it play roles on OW-OB.

Although, university students are assumed to outgrow the problem once they graduated. Realising accumulative associated factors of OW-OB gained during young adult persisted and intensify into later adulthood (Yan Zheng et al., 2017). It becomes important to identify which of these factors are to be relevantly associated with OW-OB to empower future health intervention for individualised recommendation.

Hence, this study was conducted to address research questions as below:

1.3 Research questions

i. What is the prevalence of OW-OB among Universiti Putra Malaysia (UPM) students?

ii. What are the associated factors with OW-OB among UPM students.

1.4 Objectives of the study

a) General objective:

To determine the prevalence and factors associate with OW-OB among UPM students.

b) Specific objectives:

i. To determine the prevalence of OW-OB, socio-demographic, psychosocial (self-esteem and social support), personality trait, lifestyles (physical activity and sleep quality) and nutritional status (dietary, anthropometric, biochemical and blood pressure) among UPM students.

ii. To determine the association between OW-OB and underweight and normal weight (UW-NW) in sociodemographic, psychosocial (self-esteem and social support), personality trait, lifestyles (physical activity and sleep quality) and nutritional status (dietary, anthropometric, biochemical and blood pressure) among UPM students.

iii. To determine factors that associate with OW-OB among UPM students.

1.5 Research hypothesis

i. There is significant association between OW-OB and UW-NW in sociodemographic, psychosocial (self-esteem and social support), personality trait, lifestyles (physical activity and sleep quality) and nutritional status (dietary, anthropometric, biochemical and blood pressure) among UPM students.

ii. Sociodemographic, psychosocial (self-esteem and social support), personality trait, lifestyles (physical activity and sleep quality) and nutritional status (dietary, anthropometric, biochemical and blood pressure) are significant factors that associated with OW-OB among UPM students.

1.6 Significance of the study

Identification of possible factors associate with OW-OB help early prevention at individual level by initiating the dietary and lifestyle modification. Elaborating on various associated factors may improve understanding on OW-OB. The findings from this study is unique as it apprehends to fit the developing body of knowledge by tackling intrapersonal factor (dietary, personality traits and lifestyles) and interpersonal factor (psychosocial) to understand how these factors collectively associated to overweight and obesity. Therefore, as compared to outcome from existing previous study, the outcome of this study may inform public to recognise

the associated factors not only limited by dietary and lifestyle narrowed down to their psychosocial and personality traits that commonly undervalued and underinvestigated in order to improve personal aspect of their life.

1.7 Conceptual framework

Figure 1.1 presents the conceptual framework where the independent variables (IV) assessed in this study refer to associated factors of OW-OB among study population. The independent variables (IV) of 1) intrapersonal or individual influences include socio-demographic, personality traits, lifestyles and nutritional status 2) interpersonal psychosocial and environments. All of these independent variables were assessed with dependent variables: weight status measured using body mass index (BMI).

Socio-demography assessment is important to know whether or not sample population may able to be generalised to other population (Zaccai, 2004). In socio-demographic characteristics, background of respondents are to be retrieved by obtaining current age in years, gender (male or female), race (Malay, Chinese, India, or others) and residential background through answering the structured questionnaires given. Residential background is important in order to identify whether student currently living in the campus or outside campus. Living arrangement can determine possibility of food acquisition and choices which may differ according to their residing area. Financial support included may act as cofounder to limit the food selection and food habits of respondents.

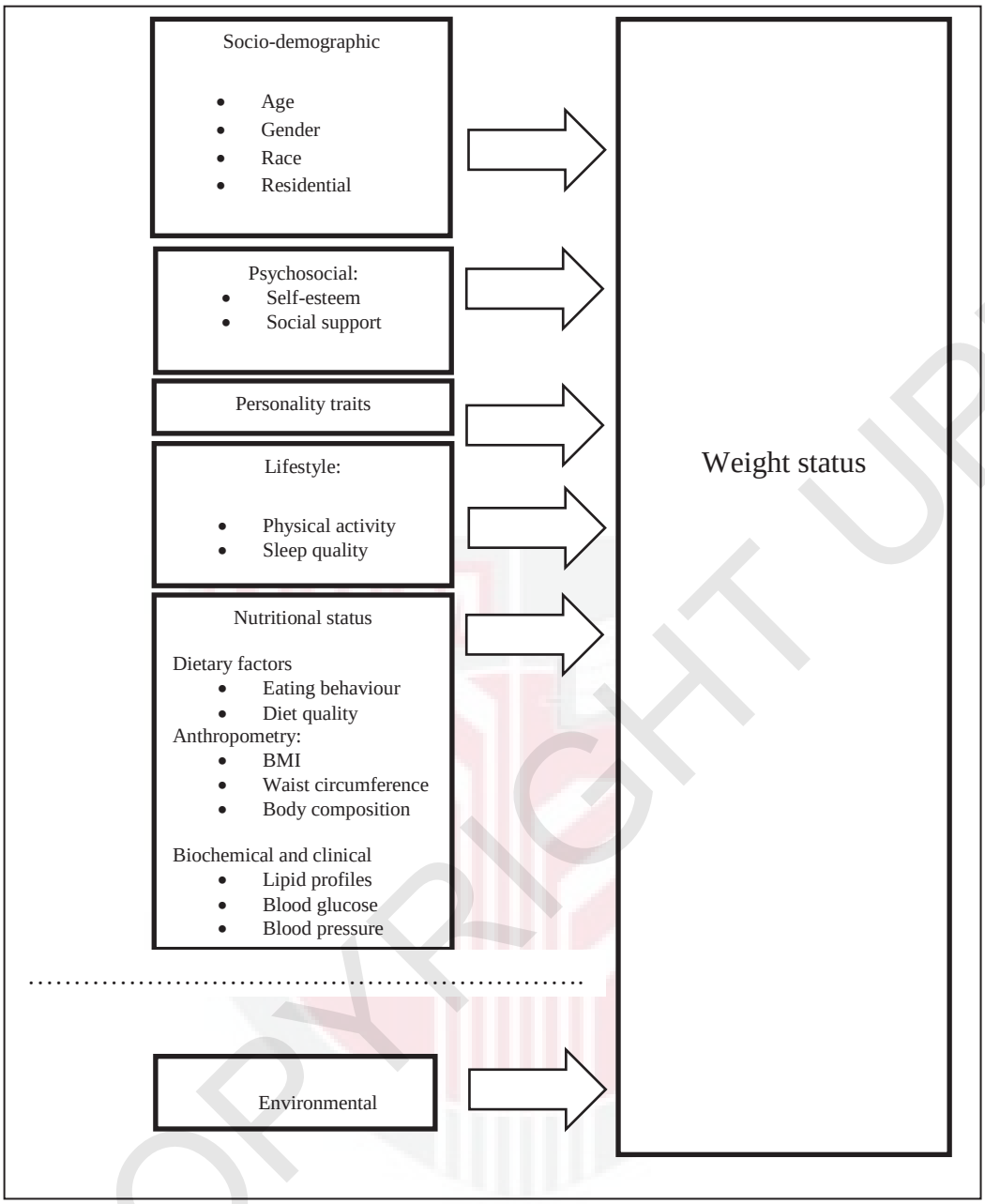

Figure 1.1 : Conceptual framework of the study

REFERENCES

Aainaa Syarfa, M. S., Zuriati, I., & Mohd Nasir, M. T. (2016). Associations between personality traits and body weight status with energy intake of adolescents in hulu Langat District, Malaysia. *Malaysian Journal of Nutrition*, *22*(3), 403–412.

Ab Majid, N. L., Omar, M. A., Khoo, Y. Y., Mahadir Naidu, B., Ling Miaw Yn, J., Rodzlan Hasani, W. S., … Mohd Yusoff, M. F. (2018). Prevalence, Awareness, Treatment and Control of hypertension in the Malaysian population: findings from the National Health and Morbidity Survey 2006–2015. *Journal of Human Hypertension*, *32*(8–9), 617–624. https://doi.org/10.1038/s41371-018-0082-x

Abdel-Khalek, A. M. (2016). Self-esteem: perspectives, influences, and improvement strategies. In *Nova Science Publishers*. https://doi.org/http://dx.doi.org/10.1016/B978-012372564-6/50020-4

Abdollahi, A., & Abu Talib, M. (2015). Self-esteem, body-esteem, emotional intelligence, and social anxiety in a college sample: The moderating role of weight. *Psychology, Health and Medicine*, *21*(2), 1–5. https://doi.org/10.1080/13548506.2015.1017825

Abdollahi, A., & Talib, M. A. (2015). Sedentary behaviour and social anxiety in obese individuals: the mediating role of body esteem. *Psychology, Health & Medicine*, *20*(2), 205–209. https://doi.org/10.1080/13548506.2014.913799

Abdul-Razak, S., Daher, A. M., Ramli, A. S., Ariffin, F., Mazapuspavina, M. Y., Ambigga, K. S., … Yusoff, K. (2016). Prevalence, awareness, treatment, control and socio demographic determinants of hypertension in Malaysian adults. *BMC Public Health*, *16*(1), 1–10. https://doi.org/10.1186/s12889-016-3008-y

Abdul Hakim, N., H., Muniandy, N., D., & Danish., A. (2012). Nutritional status and eating practices among university students in selected universities in Selangor, Malaysia. *Asian Journal of Clinical Nutrition*, *4*(3), 77–87.

Abidin, N. Z., Zaibidi, N. Z., & Zulkepli, J. H. (2014). The role of physical activity to control obesity problem in Malaysia. *AIP Conference Proceedings*, *1605*(2014), 1140–1146. https://doi.org/10.1063/1.4887751

Aday, L. A., & Cornelius, L. J. (2006). *Designing and conducting health surveys: A comprehensive guide*. Jossey-Bass.

Aflah, A., & Aminath, L. (2013). ABSTRACT: Dietary Quality Assessment of Undergraduate Students During The Month Of Ramadhan Using Diet Quality Index-International. *1st Conference on Non-Communicable Diseases (NSM NCD 2013).IIUM*.

AHA/ACC/TOS Obesity Guidelines. (2014). 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults. *Circulation*, *54*(1), e3. https://doi.org/10.1331/JAPhA.2014.14502

Ahadzadeh, A. S., Rafik-Galea, S., Alavi, M., & Amini, M. (2018). Relationship between body mass index, body image, and fear of negative evaluation: Moderating role of self-esteem. *Health Psychology Open*, *5*(1). https://doi.org/10.1177/2055102918774251

Ahmad, N., Adam, S. I. M., Nawi, A. M., Hassan, M. R., & Ghazi, H. F. (2016). Abdominal obesity indicators: Waist circumference or waist-to-hip ratio in Malaysian adults population. *International Journal of Preventive Medicine*, *2016*(June), 16–20. https://doi.org/10.4103/2008-7802.183654

Ahmat, S. N., Muda, M. R., & Neoh, C. F. (2018). Self-esteem level and its relationship to academic performance among undergraduate pharmacy students in a Malaysian public university. *Indian Journal of Pharmaceutical Education and Research*, *52*(2), 197–201. https://doi.org/10.5530/ijper.52.2.21

Aini, N., Yusoff, M., Ismail, K. F., Juahir, H., Sultan, U., Abidin, Z., … Education, P. (2018). Physical activity level among undergraduate students in Terengganu, Malaysia using pedometer. *Journal of Fundamental and Applied Sciences*, *10*(1S), 512–522. https://doi.org/10.4314/jfas.v10i1s.36

Al-Goblan, A. S., Al-Alfi, M. A., & Khan, M. Z. (2014). Mechanism linking diabetes mellitus and obesity. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, *7*, 587–591. https://doi.org/10.2147/DMSO.S67400

AL-Otaibi, H. H. (2016). Associations between Sleep Quality and Different Measures of Obesity in Saudi Adults. *Global Journal of Health Science*, *9*(1), 1. https://doi.org/10.5539/gjhs.v9n1p1

Al-Otaibi, H. H., & Basuny, A. M. (2015). Fast food consumption associated with obesity/overweight risk among university female student in Saudi Arabia. *Pakistan Journal of Nutrition*, *14*(8), 511–516. https://doi.org/10.3923/pjn.2015.511.516

Alibabić, V., Mujić, I., Rudić, D., Golob, M., Šertović, E., Bajramović, M., & Jokić, S. (2013). Assessment of Diet Quality and Nutritional Risks Representation of University of Bihać. *Elsevier-Procedia - Social and Behavioral Sciences*, *116*(2014), 2137–2140. https://doi.org/10.1016/j.sbspro.2014.01.533

Alvani, S. R., Mehrshad, S., Hosseini, P., & Kimura, L. W. (2016). Relationship between Body Weight and Self-Esteem: A Study of Young Men and Women in Iran. *Journal of Obesity and Overweight*, *2*(2), 1–8. https://doi.org/10.15744/2455-7633.2.202

Amarra, M. S. V., Khor, G. L., & Chan, P. (2016). Intake of added sugar in Malaysia: A review. *Asia Pacific Journal of Clinical Nutrition*, *25*(2), 227–240. https://doi.org/10.6133/apjcn.2016.25.2.13

Armon, G., Melamed, S., Shirom, A., Shapira, I., & Berliner, S. (2013a). Personality Traits and Body Weight Measures: Concurrent and Across-Time Associations. *European Journal of Personality*, *27*(4), 398–408. https://doi.org/10.1002/per.1902

Armon, G., Melamed, S., Shirom, A., Shapira, I., & Berliner, S. (2013b). Personality Traits and Body Weight Measures: Concurrent and Across-Time Associations. *European Journal of Personality*, *27*(4), 398–408. https://doi.org/10.1002/per.1902

Aronow, W. S. (2017). Association of obesity with hypertension. *Annals of Translational Medicine*, *5*(17), 350–350. https://doi.org/10.21037/atm.2017.06.69

Asghari, G., Mirmiran, P., Yuzbashian, E., & Azizi, F. (2017). A systematic review of diet quality indices in relation to obesity. *British Journal of Nutrition*, *117*(8), 1055–1065. https://doi.org/10.1017/S0007114517000915

Ashraf, S., & Ali, Z. (2018). Effect of Breakfast Skipping on Lipid Profile Parameters, Body Weight, and Metabolic Measures among University Going Adults. *Journal of Nutrition & Food Sciences*, *08*(03). https://doi.org/10.4172/2155-9600.1000693

Asma, A. (2014). An Exploration of Dietary Patterns and the Relationship with Obesity in the Malaysian Population. Retrieved from http://eprints.soton.ac.uk/158357/

Aye, M., & Sazali, M. (2012). Waist circumference and BMI cut-off points to predict risk factors for metabolic syndrome among outpatients in a district hospital. *Singapore Medical Journal*, *53*(8), 545–550. Retrieved from http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L366132945%5Cnhttp://www.sma.org.sg/UploadedImg/files/SMJ/5308/5308a8.pdf%5Cnhttp://sfx.umd.edu/hs?sid=EMBASE&issn=00375675&id=doi:&atitle=Waist+circumference+and+BMI+cut-off+points+

Azad, M. C., Fraser, K., Rumana, N., Abdullah, A. F., Shahana, N., Hanly, P. J., & Turin, T. C. (2015). Sleep disturbances among medical students: a global perspective. *Journal of Clinical Sleep Medicine*, *11*(1), 69–74. https://doi.org/10.5664/jcsm.4370

Azahadi Omar, M., Irfanita Irfan, N., Yi Yi, K., Muksan, N., Liana Abdul Majid, N., Fadhli Mohd Yusoff, M., … Selangor, H. (2016). Prevalence of Young Adult Hypertension in Malaysia and Its Associated Factors: Findings From National Health and Morbidity Survey 2011. *Malaysian Journal of Public Health Medicine*, *16*(3), 274–283.

Balaraman, T., Ramalingam, V., Kantharuban, P. R., Chandran, J., & Surendran, P. J. (2017). Cardiorespiratory Fitness , Physical Activity Level , Body Mass Index and Blood Pressure Among University Students in Negeri. *Malaysian Journal of Public Health Medicine*, *17*(2), 128–139.

Ball, K., Schoenaker, D. A. J. M., & Mishra, G. D. (2017). Does psychosocial stress explain socioeconomic inequities in 9-year weight gain among young women? *Obesity*, *25*(6), 1109–1114. https://doi.org/10.1002/oby.21830

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory Albert*. New Jersey: Prentice Hall.

Beck, K. L., Conlon, C. A., Kruger, R., & Coad, J. (2014). Dietary determinants of and possible solutions to iron deficiency for young women living in industrialized countries: A review. *Nutrients*, *6*(9), 3747–3776. https://doi.org/10.3390/nu6093747

Begum, G. S., Jabeen, A., Kumar, C., & Rahaman, A. (2018). *Comparative Study of Lipid Profile with Body Mass Index in young Healthy Medical Students*. *14*(1), 19–25.

Bellisle, F. (2014). Meals and snacking, diet quality and energy balance. *Physiology & Behavior*, *134*(2014), 38–43. https://doi.org/10.1016/j.physbeh.2014.03.010

Black, A., E. ., Goldberg, G., R. ., Jebb, S., A. ., Livingstone, M., B. ., Cole, T., J. ., & Prentice, A., M. . (1991). Critical evaluation of energy intake data using fundamental principles of energy physiology: 2. Evaluating the results of published surveys. *European Journal of Clinical Nutrition*, *45*(12), 583–599. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/1810720

Black, A. (2000). Critical evaluation of energy intake using the Goldberg cut-off for energy intake:basal metabolic rate. A practical guide to its calculation, use and limitations. *International Journal of Obesity*, *24*(9), 1119–1130. https://doi.org/10.1038/sj.ijo.0801376

Blodorn, A., Major, B., Hunger, J., & Miller, C. (2016). Unpacking the psychological weight of weight stigma: A rejection-expectation pathway. *Journal of Experimental Social Psychology*, *63*, 69–76. https://doi.org/10.1016/j.jesp.2015.12.003

Borhanuddin, B., Mohd Nawi, A., Shah, S. A., Abdullah, N., Syed Zakaria, S. Z., Kamaruddin, M. A., … Jamal, R. (2018). 10-year cardiovascular disease risk estimation based on lipid profile-based and bmi-based framingham risk scores across multiple sociodemographic characteristics: The Malaysian cohort project. *Scientific World Journal*, *2018*. https://doi.org/10.1155/2018/2979206

Britten, P. ., Lyon, J., Weaver, Connie, M. ., Kris-Etherton, Penny, M. ., Nicklas, Theresa, A. ., Weber, Jennifer, A. ., … Davis, C. A. (2006). MyPyramid

Food Intake Pattern Modeling for the Dietary Guidelines Advisory Committee. In *Journal of Nutrition Education and Behavior* (Vol. 38). https://doi.org/10.1016/j.jneb.2006.08.004

Bulik, C. M., Sullivan, P. F., Tozzi, F., Furberg, H., Lichtenstein, P., & Pedersen, N. L. (2006). Prevalence, Heritability, and Prospective Risk Factors for Anorexia Nervosa. *Archives of General Psychiatry*, *63*(3), 305. https://doi.org/10.1001/archpsyc.63.3.305

Bull, F. C., Maslin, T. S., & Armstrong, T. (2009). Global Physical Activity Questionnaire (GPAQ): Nine Country Reliability and Validity Study. *Journal of Physical Activity and Health*, *6*(6), 790–804. https://doi.org/10.1123/jpah.6.6.790

Burnett, C. M., Allen, M. S., & Vella, S. A. (2016). Personality and sedentary behaviour in Australian adults. *International Journal of Sport and Exercise Psychology*, (July), 1–6. https://doi.org/10.1080/1612197X.2016.1212083

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., Kupfer, D. J., III, C. F. R., … Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Carter, J. S. (2018). Stress and self-esteem in adolescence predict physical activity and sedentary behavior in adulthood. *Mental Health and Physical Activity*, *14*, 90–97. https://doi.org/10.1016/j.mhpa.2018.02.005

Chan, Y. Y., Lim, K. K., Lim, K. H., Teh, C. H., Kee, C. C., Cheong, S. M., … Ahmad, N. A. (2017). Physical activity and overweight/obesity among Malaysian adults: Findings from the 2015 National Health and morbidity survey (NHMS). *BMC Public Health*, *17*(1), 1–12. https://doi.org/10.1186/s12889-017-4772-z

Chang, H. J. J., & Suttikun, C. (2017). The Examination of Psychological Factors and Social Norms Affecting Body Satisfaction and Self-Esteem for College Students. *Family and Consumer Sciences Research Journal*, *45*(4), 422–437. https://doi.org/10.1111/fcsr.12220

Chaudhari, B., Tewari, A., Vanka, J., Kumar, S., & Saldanha, D. (2017). The Relationship of Eating Disorders Risk with Body Mass Index, Body Image and Self-Esteem among Medical Students. *Annals of Medical and Health Sciences Research*, *7*(3), 144–149.

Cheah, W. L., Hazmi, H., Chia, H. Q., Tindin, E., Zafri, N. A. A., & Shah, S. H. M. (2015). Hypertension and its association with anthropometric indexes among pre-university students. *International Journal of Adolescent Medicine and Health*, *2015*(10), 1–7. https://doi.org/10.1515/ijamh-2015-0020

Cheah W. L, Ensayan, J. M., Helmy, H., & Chang, C. T. (2018). Hypertension and its association with Anthropometric indices among students in a public university. *Malaysian Family Physician : The Official Journal of the Academy of Family Physicians of Malaysia*, *13*(1), 2–9. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/29796204%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5962228

Chen, A. H., Rosli, S. A., & Hovis, J. K. (2020). A Survey on Daily Activity Inclination and Health Complaints among Urban Youth in Malaysia. *Journal of Environmental and Public Health*, *2020*, 1–10.

Chennaoui, M., Arnal, P. J., Sauvet, F., & Léger, D. (2015). Sleep and exercise: A reciprocal issue? *Sleep Medicine Reviews*, *20*, 59–72. https://doi.org/10.1016/j.smrv.2014.06.008

Chin, Y. S., & Mohd Nasir, M. T. (2009). Eating Behaviors among Female Adolescents in Kuantan District, Pahang, Malaysia. *Pakistan Journal of Nutrition*, *8*(4), 425–432. https://doi.org/10.3923/pjn.2009.425.432

Christakis, N. A., & Fowler, J. H. (2007). The Spread of Obesity in a Large Social Network over 32 Years. *New England Journal of Medicine*, *357*(4), 370–379. https://doi.org/10.1056/NEJMsa066082

Clemente, F. M., Nikolaidis, P. T., Martins, F. M. L., & Mendes, R. S. (2016). Physical activity patterns in university students: Do they follow the public health guidelines? *PLoS ONE*, *11*(3), 1–11. https://doi.org/10.1371/journal.pone.0152516

Clinical Practice Guidelines Management of Hyperlipidemia 5th edition. (2017). Management of Dyslipidaemia 2017. In *Clinical Practice Guidelines Management Dyslipidemia*. https://doi.org/10.1136/hrt.2003.021287

Clinical Practice Guidelines Management of Hypertension 5th edition. (2018). CPG Management of Hypertension 5th Edition. In *Ministry of Health Malaysia* (Vol. 18). https://doi.org/10.1080/00325481.1947.11691709

Clinical Practice Guidelines Management of Obesity. (2004). *Clinical Practice Guidelines: Management of obesity*.

Clinical Practice Guidelines Management of Type 2 Diabetes Mellitus 6th edition. (2020). Clinical Practice Guidelines Management of Type 2 Diabetes Mellitus. In *Clinical Practice Guidelines Management of Type 2 Diabetes Mellitus* (Vol. 6).

Colten, H. R., & Altevogt, B. M. (2006). Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. In *Committee on Sleep Medicine and Research*. https://doi.org/10.1097/01.CHI.0000270812.55636.3b

Coppock, J. H. (2013). The role of social support in weight changes during freshman year of college. Retrieved from

http://search.proquest.com.ezproxy.library.yorku.ca/docview/1466301082?accountid=15182%5Cnhttp://sfx.scholarsportal.info/york?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+&+theses&sid=ProQ:ProQuest+Dissertations+&+

Daniel, W. W. (1999). Biostatistics: A Foundation for Analysis in the Health Sciences, 7th Edition. In *John Wiley & Sons*. https://doi.org/10.2307/2532686

Darling, K. E., Fahrenkamp, A. J., Wilson, S. M., Karazsia, B. T., & Sato, A. F. (2017). Does Social Support Buffer the Association Between Stress Eating and Weight Gain During the Transition to College? Differences by Gender. *Behavior Modification*, *41*(3), 368–381. https://doi.org/10.1177/0145445516683924

Deliens, T., Clarys, P., De Bourdeaudhuij, I., & Deforche, B. (2014). Determinants of eating behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, *14*(1), 1–12. https://doi.org/10.1186/1471-2458-14-53

Deliens, T., Deforche, B., De Bourdeaudhuij, I., & Clarys, P. (2015). Determinants of physical activity and sedentary behaviour in university students: a qualitative study using focus group discussions. *BMC Public Health*, *15*, 201. https://doi.org/10.1186/s12889-015-1553-4

Duncan, M. S., Vasan, R. S., & Xanthakis, V. (2019). Trajectories of Blood Lipid Concentrations Over the Adult Life Course and Risk of Cardiovascular Disease and All-Cause Mortality: Observations From the Framingham Study Over 35 Years. *Journal of the American Heart Association*, *8*(11). https://doi.org/10.1161/JAHA.118.011433

El-Kassas, G., & Ziade, F. (2016). Exploration and lifestyle behaviors and Weight Status and Their Self Perceptions among Health Sciences University Students in North Lebanon. *Biomed Research International*, *2016*, 16. https://doi.org/10.1155/2016/9762396

Elmadfa, I., & Meyer, A. L. (2014). Developing Suitable Methods of Nutritional Status Assessment: A Continuous Challenge. *Advances in Nutrition*, *5*(5), 590S-598S. https://doi.org/10.3945/an.113.005330

Emad, M., Kandiah, M., Lim, W. K., Barakatun-Nisak, M. Y., Rahmat, A., Norasruddin, S., & Appukutty, M. (2013). Physical Fitness and Metabolic Profile among Malay Undergraduates of a Public University in Selangor Malaysia. *Asian Journal of Science and Technology Development*, *30*(1&2), 37–43.

Eow, S. Y., & Gan, W. Y. (2018). Social media use, body image and body weight status: Comparison between university students with and without disordered eating in University Putra Malaysia. *International Journal of Public Health and Clinical Sciences*, *5*(1), 129–145.

Eslami Omid, Mansour, S., & Touran, S. (2019). Obesity Indices in relation to Lipid Abnormalities among Medical University Students in Zahedan, South-East of Iran. *International Journal of Preventive Medicine*, *10*(15), 1–8. https://doi.org/10.4103/ijpvm.IJPVM

Fakaruddin, F. N., & Tharbe, I. H. A. (2018). Self-Esteem and Emotional Intelligence among Students in a Public Higher Learning Institution in Malaysia. *Advances in Social Science, Education and Humanities Research, 139*(2018), 243–248. https://doi.org/10.2991/uipsur-17.2018.36

Fatima, Y., Doi, S. A. R., & Mamun, A. A. (2016). Sleep quality and obesity in young subjects: a meta-analysis. *Obesity Reviews*, *17*(11), 1154–1166. https://doi.org/10.1111/obr.12444

Fedewa, M. V., Nickerson, B. S., & Esco, M. R. (2018). Associations of body adiposity index, waist circumference, and body mass index in young adults. *Clinical Nutrition*, 1–6. https://doi.org/10.1016/j.clnu.2018.03.014

Feingold, K. R., & Grunfeld, C. (2018). Obesity and Dyslipidemia. In *Endotext*. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/26247088

Field, A. (2009). DISCOVERING STATISTICS USING SPSS (and sex and drugs and rock 'n' roll). In *Revista Mexicana de Biodiversidad* (3rd ed., Vol. 82). https://doi.org/10.1234/12345678

Fokeena, Waqia, B., Jamaluddin, R., & Khaza'ai, H. (2016). Development and Assessment of the Reliability and Validity of a Diet Quality Index in a Sample of Malaysian University Students. *Journal of Food and Nutrition Research*, *4*(4), 251–257. https://doi.org/10.12691/JFNR-4-4-9

Fokeena, W. B., Jamaluddin, R., & Khaza'ai, H. (2015). Contribution of different food groups to the energy intake and weight status of adults: A cross-sectional study in a Malaysian public university. *Asian Journal of Clinical Nutrition*, *7*(2), 45–54. https://doi.org/10.3923/ajcn.2015.45.54

Fonseca-Junior, S. J., Sá, C. G. A. de B., Rodrigues, P. A. F., Oliveira, A. J., & Fernandes-Filho, J. (2013). Physical exercise and morbid obesity: a systematic review. *Arquivos Brasileiros de Cirurgia Digestiva : ABCD = Brazilian Archives of Digestive Surgery*, *26 Suppl 1*(Suplemento 1), 67–73. https://doi.org/10.1590/S0102-67202013000600015

Galvan, J. A. A., Sriram, S., Chinna, K., Shukry, M. S., Khan, N. H. M., & Sabri, F. M. (2019). LOW PREVALENCE OF OVERWEIGHT AND OBESITY AMONG MEDICAL STUDENTS AT A UNIVERSITY IN MALAYSIA. *SoutheaSt ASian J Trop Med Public Health Show*, *50*(6), 1–9.

Gan, W., Y., Nasir, M. T. M., Zalilah, M. S., & Hazizi, A. S. (2011). Differences in eating behaviours, dietary intake and body weight status between male and female Malaysian university students. *Malaysian Journal of Nutrition*, *17*(2), 213–228.

Gan, W. Y., Mohd Nasir, M. T., Zalilah, M. S., & Hazizi, A. S. (2012). Psychological distress as a mediator in the relationships between biopsychosocial factors and disordered eating among Malaysian university students. *Appetite*, *59*(3), 679–687. https://doi.org/10.1016/j.appet.2012.08.002

Gan, W. Y., & Yeoh, W. C. (2017). Associations between body weight status, psychological well-being and disordered eating with intuitive eating among Malaysian undergraduate university students. *International Journal of Adolescent Medicine and Health*, *0*(0), 1–8. https://doi.org/10.1515/ijamh-2017-0095

Ganasegeran, K., Al-Dubai, S. A. R., Qureshi, A. M., Al-abed, A. A. A., Am, R., & Aljunid, S. M. (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: a cross-sectional study. *Nutrition Journal*, *11*(1), 48. https://doi.org/10.1186/1475-2891-11-48

Ganesh Kamath, M., Prakash, J., Dash, S., Chowdhury, S., Ahmed, Z. Bin, & Yusof, M. Z. Z. B. M. (2014). Is there an association between self-reported sleep duration, Body mass index and waist-hip ratio in young adults? A cross-sectional pilot study. *Journal of Clinical and Diagnostic Research*, *8*(9), 5–7. https://doi.org/10.7860/JCDR/2014/8918.4808

Geliebter, A., Astbury, N. M., Aviram-Friedman, R., Yahav, E., & Hashim, S. (2014). Skipping breakfast leads to weight loss but also elevated cholesterol compared with consuming daily breakfasts of oat porridge or frosted cornflakes in overweight individuals: a randomised controlled trial. *Journal of Nutritional Science*, *3*(e56), 1–7. https://doi.org/10.1017/jns.2014.51

Gerke, C. K., Mazzeo, S. E., Stern, M., Palmberg, A. A., Evans, R. K., & Iii, E. P. W. (2013). The Stress Process and Eating Pathology Among Racially Diverse Adolescents Seeking Treatment for Obesity. *Journal of Pediatric Psychology*, *38*(7), 785–793.

Gerlach, G., Herpertz, S., & Loeber, S. (2015). Personality traits and obesity: A systematic review. *Obesity Reviews*, *16*(1), 32–63. https://doi.org/10.1111/obr.12235

Ghazi, H. F., Elnajeh, M., Abdal Qader, M., Baobaid, M. F., & Omar, A. Bin. (2017). Prevalence of hypertension and its association with nutritional factors among university students in Shah Alam, Malaysia. *Pakistan Journal of Nutrition*, *16*(7), 544–549. https://doi.org/10.3923/pjn.2017.544.549

Ghee, L. K. (2016). A review of adult obesity research in Malaysia. *Medical Journal of Malaysia*, *71*(1), 1–19. https://doi.org/10.4103/0022

Global Burden of Disease Obesity Collaborators, Afshin, A., Forouzanfar, M. H., Reitsma, M. B., Sur, P., Estep, K., … Murray, C. J. L. (2017). Health

Effects of Overweight and Obesity in 195 Countries over 25 Years. *The New England Journal of Medicine*, *377*(1), 13–27. https://doi.org/10.1056/NEJMoa1614362

Goldberg, G., R. ., Black, A., E. ., Jebb, S., A. ., Cole, T., J. ., Murgatroyd, P., R. ., Coward, W., A. ., & Prentice, A., M. . (1991). Critical evaluation of energy intake data using fundamental principles of energy physiology: 1. Derivation of cut-off limits to identify under-recording. *European Journal of Clinical Nutrition*, *45*(12), 569–581. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/1810719

González-Muniesa, P., Mártinez-González, M. A., Hu, F. B., Després, J. P., Matsuzawa, Y., Loos, R. J. F., … Martinez, J. A. (2017). Obesity. *Nature Reviews Disease Primers*, *3*. https://doi.org/10.1038/nrdp.2017.34

Goto, M., Kiyohara, K., & Kawamura, T. (2010). Lifestyle risk factors for overweight in Japanese male college students. *Public Health Nutrition*, *13*(10), 1575–1580. https://doi.org/10.1017/S1368980009992813

Greer, S. M., Goldstein, A. N., & Walker, M. P. (2013). The impact of sleep deprivation on food desire in the human brain. *Nature Communications*, *4*(2259), 1–7. https://doi.org/10.1038/ncomms3259

Gu, J. K., Charles, L. E., Burchfiel, C. M., Andrew, M. E., Ma, C., Bang, K. M., & Violanti, J. M. (2013). Associations between Psychological Distress and Body Mass Index among Law Enforcement Officers: The National Health Interview Survey 2004-2010. *Safety and Health at Work*, *4*(1), 52–62. https://doi.org/10.5491/SHAW.2013.4.1.52

Hadipour, R., Wan Muda, W. A. M., & Leng, S. K. (2015). Weight Status, Body Image Perception and Physical Activity of Malay Female College Students in Kota Bharu, Kelantan, Malaysia. *Jacobs Journal of Obesity*, *1*(1), 2–9.

Haines, P. S., Siega-Riz, A. M., & Popkin, B. M. (1999). The Diet Quality Index Revised: A measurement instrument for populations. *Journal of the American Dietetic Association*, *99*(6), 697–704. https://doi.org/10.1016/S0002-8223(99)00168-6

Hamilton, K., Warner, L. M., & Schwarzer, R. (2016). The Role of Self-Efficacy and Friend Support on Adolescent Vigorous Physical Activity. *Health Education and Behavior*, 1–7. https://doi.org/10.1177/1090198116648266

Hariri, A. A., Oliver, N. S., Johnston, D. G., Stevenson, J. C., & Godsland, I. F. (2013). Adiposity Measurements by BMI , Skinfolds and Dual Energy X-Ray Absorptiometry in relation to Risk Markers for Cardiovascular Disease and Diabetes in Adult Males. *Hindawi*, *35*(6), 753–764.

Harrison, C. L., Teede, H. J., Kozica, S., Zoungas, S., & Lombard, C. B. (2017). Individual, social and environmental factors and their association with weight in rural-dwelling women. *Australian and New Zealand Journal of*

Public Health, *41*(2), 158–164. https://doi.org/10.1111/1753-6405.12606

Harvey, A. G. ., Stinson, K. ., Whitaker, K. L. ., Moskovitz, D. ., & Virk, H. (2008). The subjective meaning of sleep quality: A comparison of individuals with and without insomnia. *Sleep*, *31*(3), 383–393. https://doi.org/10.1093/sleep/31.3.383

Herrmann, S. D., Heumann, K. J., Der Ananian, C. A., & Ainsworth, B. E. (2013). Validity and reliability of the global physical activity questionnaire (GPAQ). *Measurement in Physical Education and Exercise Science*, *17*(3), 221–235. https://doi.org/10.1080/1091367X.2013.805139

Hilger, J., Loerbroks, A., & Diehl, K. (2016). Eating behaviour of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. *Appetite*, *109*, 100–107. https://doi.org/10.1016/j.appet.2016.11.016

Hilger, J., Loerbroks, A., & Diehl, K. (2017). Eating behaviour of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. *Appetite*, *109*, 100–107. https://doi.org/10.1016/j.appet.2016.11.016

Hill, A. J. (2017). Obesity in Children and the "Myth of Psychological Maladjustment": Self-Esteem in the Spotlight. *Current Obesity Reports*, *6*(1), 63–70. https://doi.org/10.1007/s13679-017-0246-y

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., … Adams Hillard, P. J. (2015). National sleep foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health*, *1*(1), 40–43. https://doi.org/10.1016/j.sleh.2014.12.010

Hj Ramli, N., Alavi, M., Mehrinezhad, S., & Ahmadi, A. (2018). Academic Stress and Self-Regulation among University Students in Malaysia: Mediator Role of Mindfulness. *Behavioral Sciences*, *8*(1), 12. https://doi.org/10.3390/bs8010012

Hsu, W. C., Araneta, M. R. G., Kanaya, A. M., Chiang, J. L., & Fujimoto, W. (2015). BMI cut points to identify at-Risk asian americans for type 2 diabetes screening. *Diabetes Care*, *38*(1), 150–158. https://doi.org/10.2337/dc14-2391

Hung, S. P., Chen, C. Y., Guo, F. R., Chang, C. I., & Jan, C. F. (2016). Combine body mass index and body fat percentage measures to improve the accuracy of obesity screening in young adults. *Obesity Research and Clinical Practice*, *11*(1), 1–8. https://doi.org/10.1016/j.orcp.2016.02.005

Hussein, A., Sameeha, A. S., Alhawari, H., Al-Saudi, A., Majali, D. A. Al, Al-Faris, L., & AlRyalat, S. A. (2018). Blood Pressure and Its Association with Gender, Body Mass Index, Smoking, and Family History among University Students. *International Journal of Hypertension*, *12*(1), 1–5.

Ievers-Landis, C. E., Olayinka, O., Burant, C., & Moore, S. (2018). Predictors of Weight-Related Quality of Life in Adolescents Who Are Overweight or Obese. *Journal of Developmental & Behavioral Pediatrics*, *39*(2), 126–135. https://doi.org/10.1097/DBP.0000000000000507

Institute for Public Health. (2011). National Health and Morbidity Survey 2011, Volume II. In *Institute for Public Health* (Vol. 2).

Institute for Public Health. (2015a). National Health and Morbidity Survey 2015 (NHMS 2015). Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems. In *Ministry of Health Malaysia*. https://doi.org/10.1017/CBO9781107415324.004

Institute for Public Health, I. (2015b). National Health and Morbidity Survey 2015 (NHMS 2015). Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems. In *Ministry of health* (Volume II). https://doi.org/10.1017/CBO9781107415324.004

Internation Diabetes Federation, I. (2006). *The IDF consensus worldwide definition of metabolic syndrome*.

Ishii, K., Mojaverian, T., Masuno, K., & Kim, H. S. (2017). Cultural Differences in Motivation for Seeking Social Support and the Emotional Consequences of Receiving Support: The Role of Influence and Adjustment Goals. *Journal of Cross-Cultural Psychology*, *48*(9), 1442–1456. https://doi.org/10.1177/0022022117731091

Ismail, M., Chee, S., Roslee, R., & Zawiah, H. (1998). Predictive equations for the estimation of basal metabolic rate in Malaysian adults. *Malaysian Journal of Nutrition*, *4*(1), 73–80.

Iznie Najaa, Amran; Wan Azdie, M. A. B. (2019). Healthy eating and physical activity among female students of IIUM Kuantan Post Weight-Loss Programme Participation. *International Journal of Allied Health Sciences*, *4*(3), 1299–1308.

Izydorczyk, B. (2017). BODY IMAGE PSYCHOTHERAPY IN ANOREXIA AND BULIMIA NERVOSA – AN INTEGRATIVE APPROACH: APPLICATION OF PSYCHODYNAMIC PSYCHOTHERAPY AND PSYCHODRAMATIC TECHNIQUES. *Psychoterapia*, *1*(180), 5–22.

Jauch-Chara, K., & Oltmanns, K., M. (2014). Obesity - A neuropsychological disease? Systematic review and neuropsychological model. *Progress in Neurobiology*, *114*, 4–101. https://doi.org/10.1016/j.pneurobio.2013.12.001

Johansson, L., Solvoll, K., Bjørneboe, G. E. A., & Drevon, C. A. (1998). Under- and overreporting of energy intake related to weight status and lifestyle in a nationwide sample. *American Journal of Clinical Nutrition*, *68*(2), 266–274. https://doi.org/10.1093/ajcn/68.2.266

Kabir; Shaima'u, Salmiah, M. S., & Ismail, S. (2014). Prevalence and Factors associated with Overweight and Obesity among Malaysian Post Graduate Students in a Public University. *International Journal of Public Health and Clinical Sciences*, *1*(1), 131–140. https://doi.org/10.3934/publichealth.2017.3.301

Kamarudin, A., Tengah, R. Y., Raysid, N. M., & Jusoh, N. (2018). Relationship between body mass index, waist circumference, fat mass and fat percentage as a measurement of obesity among Universiti Pendidikan Sultan Idris students. *Journal of Fundamental and Applied Sciences*, *9*(6S), 1161. https://doi.org/10.4314/jfas.v9i6s.86

Karsay, K., & Schmuck, D. (2017). "Weak, Sad, and Lazy Fatties": Adolescents' Explicit and Implicit Weight Bias Following Exposure to Weight Loss Reality TV Shows. *Media Psychology*, *00*(00), 1–22. https://doi.org/10.1080/15213269.2017.1396903

Katzmarzyk, P. T., BARREIRA, T. V., BROYLES, S. T., CHAMPAGNE, C. M., CHAPUT, J.-P., FOGELHOLM, M., … CHURCH, T. S. (2015). Physical Activity, Sedentary Time, and Obesity in an International Sample of Children. *Medicine & Science in Sports & Exercise*, *47*(10), 2062–2069. https://doi.org/10.1249/MSS.0000000000000649

Keller, J., Motter, S., Motter, M., & Schwarzer, R. (2018). Augmenting fruit and vegetable consumption by an online intervention: Psychological mechanisms. *Appetite*, *120*, 348–355. https://doi.org/10.1016/j.appet.2017.09.019

Kilpeläinen, T. O., Qi, L., Brage, S., Sharp, S. J., Sonestedt, E., Demerath, E., … Loos, R. J. F. (2011). Physical activity attenuates the influence of FTO variants on obesity risk: A meta-analysis of 218,166 adults and 19,268 children. *PLoS Medicine*, *8*(11), e1001116–e1001116. https://doi.org/10.1371/journal.pmed.1001116

Kim. (2016). Personality traits and body weight: Evidence using sibling comparisons. *Social Science & Medicine*, *163*(608), 54–62. https://doi.org/10.1016/j.socscimed.2016.06.054

Kim, Y., Austin, S. B., Subramanian, S. V., & Kawachi, I. (2018). The Cardiometabolic Burden of Self-Perceived Obesity: A Multilevel Analysis of a Nationally Representative Sample of Korean Adults. *Nature*, *8*(1), 1–11. https://doi.org/10.1038/s41598-018-26192-z

Kirsch, A. C., Shapiro, J. B., Conley, C. S., & Heinrichs, G. (2016). Explaining the pathway from familial and peer social support to disordered eating: Is body dissatisfaction the link for male and female adolescents? *Eating Behaviors*, *22*, 175–181. https://doi.org/10.1016/j.eatbeh.2016.06.018

Klop, B., Elte, J. W. F., & Cabezas, M. C. (2013). Dyslipidemia in Obesity: Mechanisms and Potential Targets. *Nutrients*, *5*(4), 1218–1240.

https://doi.org/10.3390/nu5041218

Kodama, S., Tanaka, S., & Saito, K. (2007). Effect of Aerobic Exercise Training on Serum Levels of High-Density Lipoprotein Cholesterol. *Review*, *167*(10), 999–1008. Retrieved from 10.1001/archinte.167.10.999%5Cnhttp://0-search.ebscohost.com.library.ucc.ie/login.aspx?direct=true&db=gft&AN=508978309&site=ehost-live

Koo, H. C., Hadirah, Z., Airina, A., R, N. A. A., & Faziela, N. (2019). Effect of nutrient intakes on anthropometric profiles among university students from a selected private University in Klang Valley , Malaysia. *African Health Sciences Vol*, *19*(2), 2243–2251.

Krističević, T., Štefan, L., & Sporiš, G. (2018). The associations between sleep duration and sleep quality with body-mass index in a large sample of young adults. *International Journal of Environmental Research and Public Health*, *15*(4). https://doi.org/10.3390/ijerph15040758

Kutty, N., A., M., Ru, T. Y., Chiang, Qi, Hwang, V., & Zhi, W. Y. (2015). Association of Dietary Habits and Body Mass Index among University Students in Malaysia. *IOSR Journal of Nursing and Health Science Ver. I*, *4*(5), 2320–1940. https://doi.org/10.9790/1959-04517885

Kutty, N. A. M., Ru, T. Y., Chiang, V. H. Q., & Zhi, W. Y. (2015). Association of Dietary Habits and Body Mass Index among University Students in Malaysia. *IOSR Journal of Nursing and Health Science Ver. I*, *4*(5), 2320–1940. https://doi.org/10.9790/1959-04517885

Kwarteng, J. L., Schulz, A. J., Mentz, G. B., Israel, B. A., & Perkins, D. W. (2017). Independent Effects of Neighborhood Poverty and Psychosocial Stress on Obesity Over Time. *Journal of Urban Health*, *94*(6), 791–802. https://doi.org/10.1007/s11524-017-0193-7

Labban, L. (2014). The association between physical activity, overweight and obesity among Syrian University students. *Saudi Journal of Sports Medicine*, *14*(2), 121. https://doi.org/10.4103/1319-6308.142366

Lackey, N., R.; Wingate, A., L. (1998). Advanced Design in Nursing Research. In *Thousand Oaks* (2nd ed). Retrieved from https://books.google.com.my/books?hl=en&lr=&id=hDRwa-JwmdcC&oi=fnd&pg=PA375&dq=Chapter+15:+The+Pilot+Study:+One+Key+to+Research+Success&ots=cXwHJETV56&sig=zE_HrScUI8cg8JS_CxFaBl8exIE&redir_esc=y#v=onepage&q=Chapter 15%3A The Pilot Study%3A One Key to Rese

Lai, P. P., & Say, Y. H. (2013). Associated factors of sleep quality and behavior among students of two tertiary institutions in Northern Malaysia. *Medical Journal of Malaysia*, *68*(3), 196–203.

Landsberg, L., Aronne, L. J., Beilin, L. J., Burke, V., Igel, L. I., Lloyd-Jones, D., & Sowers, J. (2013). Obesity-Related Hypertension: Pathogenesis, Cardiovascular Risk, and Treatment. *The Journal of Clinical Hypertension*, *15*(1), 14–33. https://doi.org/10.1111/jch.12049

Larson, N., Neumark-Sztainer, D., Laska, M. N., & Story, M. (2011). Young adults and eating away from home: Associations with dietary intake patterns and weight status differ by choice of restaurant. *Journal of the American Dietetic Association*, *111*(11), 1696–1703. https://doi.org/10.1016/j.jada.2011.08.007

Lee-Flynn, S. C., Pomaki, G., DeLongis, A., Biesanz, J. C., & Puterman, E. (2011). Daily cognitive appraisals, daily affect, and long-term depressive symptoms: The role of self-esteem and self-concept clarity in the stress process. *Personality and Social Psychology Bulletin*, *37*(2), 255–268. https://doi.org/10.1177/0146167210394204

Lee, C., L. ., Norimah, A., K. ., & Ismail, M., N. (2010). Association of energy intake and macronutrient composition with overweight and obesity in Malay women from Klang Valley. *Malaysian Journal of Nutrition*, *16*(2), 251–260. https://doi.org/10.1002/ijch.201100051

Lee, O., Lee, D., Lee, S., & Kim, Y. S. (2016). Associations between Physical Activity and Obesity Defined by Waist-To-Height Ratio and Body Mass Index in the Korean Population. *Plos One*, *11*(7), 1–11. https://doi.org/10.1371/journal.pone.0158245

Lee, P. Y., Ong, Muna, Syed Alwi, S. A. R., & Kamarudin, K. (2010). Do university students have high cardiovascular risk? A pilot study from Universiti Malaysia Sarawak (UNIMAS). In *Malaysian Family Physician* (Vol. 5).

Lee, T. T., Norimah, A. K., & Safiah, M. Y. (2011). *"Development of Healthy Eating Index for Malaysian adults,*. Retrieved from http://www.sciepub.com/reference/157165

Leggio, M., Lombardi, M., Caldarone, E., Severi, P., D'emidio, S., Armeni, M., … Mazza, A. (2017). The relationship between obesity and hypertension: An updated comprehensive overview on vicious twins. *Hypertension Research*, *40*(12), 947–963. https://doi.org/10.1038/hr.2017.75

Lian, T. C., Bonn, G., Han, Y. S., Choo, Y. C., & Piau, W. C. (2016). Physical activity and its correlates among adults in Malaysia: A cross-sectional descriptive study. *PLoS ONE*, *11*(6), 1–14. https://doi.org/10.1371/journal.pone.0157730

Lim, & Mitra Soma, R. (2017). High salt diets in young university adults and the correlation with blood pressure, protein intake and fat free mass. *Bioscience Horizons*, *10*, 1–13. https://doi.org/10.1093/biohorizons/hzx003

Lim, S. A., & You, S. (2017). Effects of Self-Esteem and Depression on Abnormal Eating Behavior among Korean Female College Students: Mediating Role of Body Dissatisfaction. *Journal of Child and Family Studies*, *26*(1), 176–182. https://doi.org/10.1007/s10826-016-0542-2

Linder, D. E., Sacheck, J. M., Noubary, F., Nelson, M. E., & Freeman, L. M. (2017). Dog attachment and perceived social support in overweight/obese and healthy weight children. *Preventive Medicine Reports*, *6*, 352–354. https://doi.org/10.1016/j.pmedr.2017.04.014

Lingesh, G., Khoo, S., Nahar, M., Mohamed, A., Taib, N. A., & Group, A. M. (2016). Comparing physical activity levels of Malay version of the IPAQ and GPAQ with accelerometer in nurses. *International Journal of Applied Exercise Physiology*, *5*(3), 9–17. Retrieved from https://umexpert.um.edu.my/file/publication/00004688_142708.pdf

Low, H. J., Tan, A. K. G., & Kassim, S. (2016). Determinants of body weight status of university students: Exploratory evidence from Universiti Sains Malaysi. *Malaysian Journal of Nutrition*, *21*(3), 285–297.

Luchetti, M., Barkley, J. M., Stephan, Y., Terracciano, A., & Sutin, A. R. (2014). Five-factor model personality traits and inflammatory markers: New data and a meta-analysis. *Psychoneuroendocrinology*, *50*, 181–193. https://doi.org/10.1016/j.psyneuen.2014.08.014

MacNeill, L. P., Best, L. A., & Davis, L. L. (2017). The role of personality in body image dissatisfaction and disordered eating: discrepancies between men and women. *Journal of Eating Disorders*, *5*(1), 44. https://doi.org/10.1186/s40337-017-0177-8

Magee, C. A., & Heaven, P. C. L. (2011). Big-Five personality factors, obesity and 2-year weight gain in Australian adults. *Journal of Research in Personality*, *45*(3), 332–335. https://doi.org/10.1016/j.jrp.2011.02.009

Manaf, Z. A., Lee, M. T., Ali, N. H. M., Samynathan, S., Jie, Y. P., Ismail, N. H., … Yahya, N. A. (2012). Relationship between food habits and tooth erosion occurrence in Malaysian university students. *Malaysian Journal of Medical Sciences*, *19*(2), 56–66.

MANS. (2014). National Health and Morbidity Survey 2014: Malaysian Adult Nutrition Survey Volume I. In *Institute for Public Health, Ministry of Health, Malaysia*.

Mansor, N., Zuraida, M., Abdullah, K., & Mat Rashid, K. (2016). Meal Selection of Malaysian University's Students. *The Social Sciences*, *11*(7), 7461–7466.

Manzar, M. D., Zannat, W., Kaur, M., & Hussain, M. E. (2015). Sleep in university students across years of university education and gender influences. *International Journal of Adolescent Medicine and Health*, *27*(3), 341–348. https://doi.org/10.1515/ijamh-2014-0037

MAPI, L. V. (2006). MAPI malay.

Marfell-Jones, M., J. ., Stewart, A., D. ., & de Ridder, J., H. (2012). International standards for anthropometric assessment. In *Lower Hutt, New Zealand: International Society for the Advancement of Kinanthropometry*. https://doi.org/10.1152/japplphysiol.00187.2013

Mark, P., Kirsten, B.-D., Liu, K., Sidney, S., Lin, F., Vittinghoff, E., & Hulley, S. (2012). Non-Optimal Lipids Commonly Present in Young Adults and Coronary Calcium Later in Life. *Annals of Internal Medicine*, *153*(3), 137–146. https://doi.org/10.1059/0003-4819-153-3-201008030-00004.Non-Optimal

Mason, T. B., & Lewis, R. J. (2017). Examining social support, rumination, and optimism in relation to binge eating among Caucasian and African–American college women. *Eating and Weight Disorders*, *22*(4), 693–698. https://doi.org/10.1007/s40519-016-0300-x

MDG. (2010). Malaysian Dietary Guidelines - Ministry of Health Malaysia 2010. *Technical Working Group on Nutritional Guidelines*, Vol. 1, pp. 1–215. Retrieved from http://www.moh.gov.my/images/gallery/Garispanduan/diet/introduction.pdf

Mesas, A. E., Muñoz-Pareja, M., López-García, E., & Rodríguez-Artalejo, F. (2012). Selected eating behaviours and excess body weight: A systematic review. *Obesity Reviews*, *13*(2), 106–135. https://doi.org/10.1111/j.1467-789X.2011.00936.x

Miller, G., E., Chen, E., & Parker, K., J. (2011). Psychological Stress in Childhood and Susceptibility to the Chronic Diseases of Aging : Moving Toward a Model of Behavioral and Biological Mechanisms. *American Psychological Association*, *137*(6), 959–997. https://doi.org/10.1037/a0024768

Miller, M. A., Kruisbrink, M., Wallace, J., Ji, C., & Cappuccio, F. P. (2018). Sleep Duration and Incidence of Obesity in Infants, Children and Adolescents: A Systematic Review and Meta-Analysis of Prospective Studies. *Sleep*, 1–19. https://doi.org/10.1093/sleep/zsy018

Ministry of Health, M. (2016). *The Third National Plan of Action for Nutrition of Malaysia (NPANM III), 2016-2025*. Retrieved from http://nutrition.moh.gov.my/wp-content/uploads/2016/12/NPANM_III.pdf

Ministry of Health Malaysia. (2017). Recommended Nutrient Intake for Malaysia. In *RECOMMENDED NUTRIENT INTAKES for MALAYSIA* (2017th ed.). Putrajaya, Malaysia: Ministry of Health Malaysia.

Mirnalini, K., Zalilah, M. S., Safiah, M. Y., Tahir, A., Siti, H. M. D., Siti, R. D., … Normah, H. (2008). Energy and nutrient intakes: Findings from the Malaysian Adult Nutrition Survey (MANS). *Malaysian Journal of Nutrition*, *14*(1), 1–24. https://doi.org/10.1029/2008JA013754

Misra, A., Wasir, J. S., & Vikram, N. K. (2005). Waist circumference criteria for the diagnosis of abdominal obesity are not applicable uniformly to all populations and ethnic groups. *Nutrition*, *21*(9), 969–976. https://doi.org/10.1016/j.nut.2005.01.007

Mohamad Hasnan Ahmad, Nishi, N., Fadhli, M. Y. M., & ArisTahir. (2018). Cardiovascular Disease Risk and its Association with Body Mass Index in Malaysians Based on the World Health Organization/International Society of Hypertension Risk Prediction Chart. *Health Science Journal*, *12*(1), 1–7. https://doi.org/10.21767/1791-809X.1000550

Mohammed, G., Salmiah, M. S., Ahmad Azuhairi, A., & Jusoff, K. (2014). Physical Inactivity and Its Associated Factors among University Students. *IOSR Journal of Dental and Medical Sciences*, *13*(10), 119–130. https://doi.org/10.9790/0853-13101119130

Mohd Zaher, Z. M., Zambari, R., Pheng, C. S., Muruga, V., Ng, B., Appannah, G., & Onn, L. T. (2009). Optimal cut-off levels to define obesity: Body mass index and waist circumference, and their relationship to cardiovascular disease, dyslipidaemia, hypertension and diabetes in Malaysia. *Asia Pacific Journal of Clinical Nutrition*, *18*(2), 209–216.

Mokhtari, T., Jamaluddin, R., & Saad, H. A. (2015). Lifestyle and Psychological Factors Associated with Body Weight Status among University Students in Malaysia. *Pakistan Journal of Nutrition*, *14*(1), 18–28. Retrieved from https://s3.amazonaws.com/academia.edu.documents/39740094/Lifestyle_and_Psychological_Factors_Asso20151105-12066-1olb50n.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1520179182&Signature=c%2FzroUOOE2tmWiobkD7AlHmPL0w%3D&response-content-disposition=inli

Morton, S. M. B., Bandara, D. K., Robinson, E. M., & Atatoa Carr, P. E. (2012). In the 21st Century, what is an acceptable response rate? *Australian and New Zealand Journal of Public Health*, *36*(2), 106–108. https://doi.org/10.1111/j.1753-6405.2012.00854.x

Mõttus, R., McNeill, G., Jia, X., Craig, L. C. A., Starr, J. M., & Deary, I. J. (2013). The associations between personality, diet and body mass index in older people. *Health Psychology*, *32*(4), 353–360. https://doi.org/10.1037/a0025537

Muhamad Saiful Bahri, Y. (2013). Construct validity, internal consistency and normative data of the USMaP-i in a sample of medical students. *International Medical Journal*, *20*(1), 77–83.

Muhamad Saiful Bahri, Y., Ahmad Fuad, R., Aziz, R. A., Pa, M. N. M., Mey, S. C., Ja'Afar, R., & Esa, A. R. (2011). The validity and reliability of the USM personality inventory (USMaP-i): Its use to identify personality of future medical students. *International Medical Journal*, *18*(4), 283–287.

Muhsin, A., & Ibrahim, S. S. (2018). Physical activity, screen time, serum lipid and body mass index among Malay female university students. *INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES*, *9*(2), 78–82.

Muldoon, M. F., Ryan, C. M., Yao, J. K., Conklin, S. M., Manuck, S. B., & Hall, O. E. (2016). Social support for healthy behaviors: Scale psychometrics and prediction of weight loss among women in a behavioral program. *Obesity (Silver Spring)*, *20*(4), 756–764. https://doi.org/10.7205/MILMED-D-14-00168.Long-chain

Mulligan, A. (2011). *Evidence In-sight request summary: The relationship between self - esteem and mental health outcomes in children and youth*. Retrieved from http://www.excellenceforchildandyouth.ca/sites/default/files/eib_attach/SelfesteemandMentalHealth_FINAL_REPORT.pdf

Musa, N. A., Moy, F. M., & Wong, L. P. (2018). Prevalence and factors associated with poor sleep quality among secondary school teachers in a developing country. *Industrial Health*, *56*(5), 407–418. https://doi.org/10.2486/indhealth.2018-0052

Mustaffa, M. B., Nasir, R., Khairudin, R., Zainah, A. Z., Shahrazad, W. W. S., & Salim, S. S. S. (2012). Understanding the personality traits of medical students using the five factor model. *Asian Social Science*, *8*(9), 17–22. https://doi.org/10.5539/ass.v8n9p17

Mustapha, M., & E. Hyland, M. (2017). Relationship of Values and Personality Traits in Malaysian College Students. *Sains Humanika*, *9*(3–2), 111–116. https://doi.org/10.11113/sh.v9n3-2.1282

Mytton, O., T. ., Nnoaham, K. ., Eyles, H. ., Scarborough, P. ., & Ni Mhurchu, C. (2014). Systematic review and meta-analysis of the effect of increased vegetable and fruit consumption on body weight and energy intake. *BMC Public Health*, *14*, 886. https://doi.org/10.1186/1471-2458-14-886

Nagata, J. M., Garber, A. K., Tabler, J., Murray, S. B., Vittinghoff, E., & Bibbins-Domingo, K. (2018). Disordered eating behaviors and cardiometabolic risk among young adults with overweight or obesity. *International Journal of Eating Disorders*, *51*(8), 931–941. https://doi.org/10.1002/eat.22927

Naing, L., Winn, T., & Rusli, B., N. (2006). Practical issues in calculating sample size for prevalence study. *Medical Statistic*, *1*, 9–14. https://doi.org/10.1016/j.dld.2018.11.003

Najwa, R. N., & Appukutty, M. (2018). Breakfast consumption association with body weight status and physical activity among female university students. *Malaysian Journal of Movement, Health & Exercise*, *7*(2), 93–106.

Nasarudin, S. H., Ahmad, N., Latif, J. Y., Tun, B., & Lumpur, K. (2016). Original Article Correlation Between Prehypertension and Obesity Indices Among. *Malaysian Journal of Public Health Medicine 2016, 16*(3), 235–240.

National Health Institute Malaysia. (2014). *Malaysian Adult Nutrition Survey Volume 2*. Retrieved from http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2014-MANS-VOLUME-2-SurveyFindings.pdf

Ng, C., G. ., Zainal, N., Z. ., Amer Siddiq, A., N. ., Aida, S., A. ., & Koh, O., H. (2010). Validation of the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) among a group of medical students in Faculty of Medicine, University Malaya. *Asian Journal of Psychiatry*, *3*(1), 3–6. https://doi.org/10.1016/j.ajp.2009.12.001

Ngan, S. W., Chong, B., Chern, K., Rajarathnam, D. D., Balan, J., Hong, T. S., & Tiang, K. (2017). The Relationship between Eating Disorders and Stress among Medical Undergraduate : A Cross-Sectional Study. *Open Journal of Epidemiology*, *7*, 85–95. https://doi.org/10.4236/ojepi.2017.72008

Nicolaidis, S. (2019). Environment and obesity. *Elsevier: Metabolism*, *100*(Metabolism), 1–21.

Nor Afiah M., Z., Suriani, I., Abdul Hakim M., S., Simmadorai, R., & Nor Shahida Akhma M., N. (2014). Influence of Eating Behavours and Psychosocial Factors on Overweight and Obesity Among Medical Students in a Public University in Malaysia. *International Journal of Public Health and Clinical Sciences*, *1*(1), 151–159.

Norimah, A. K., Safiah, M., Jamal, K., Siti, H., Zuhaida, H., Rohida, S., … Azmi, M. Y. (2008). Food consumption patterns: Findings from the Malaysian Adult Nutrition Survey (MANS). *Malaysian Journal of Nutrition*, *14*(1), 25–39.

Nur Atiqah, A., Norazmir, M. N., Khairil Anuar, M. I., Mohd Fahmi, M., & Norazlanshah, H. (2015). Food security status: It's association with inflammatory marker and lipid profile among young adult. *International Food Research Journal*, *22*(5), 1855–1863.

Odlaug, B. L., Lust, K., Wimmelmann, C. L., Chamberlain, S. R., Mortensen, E. L., Derbyshire, K., … Grant, J. E. (2015). Prevalence and correlates of being overweight or obese in college. *Psychiatry Research*, *227*(1), 58–64. https://doi.org/10.1016/j.psychres.2015.01.029

Ogilvie, R. P., Lutsey, P. L., Widome, R., Laska, M. N., Larson, N., & Neumark-Sztainer, Di. (2017). Sleep indices and eating behaviours in young adults: Findings from Project EAT. *Public Health Nutrition*, *21*(4), 689–701. https://doi.org/10.1017/S1368980017003536

Oliveira, A. J., Rostila, M., De Leon, A. P., & Lopes, C. S. (2013). The influence of social relationships on obesity: Sex differences in a longitudinal study. *Obesity*, *21*(8), 1540–1547. https://doi.org/10.1002/oby.20286

Omar, N. I. K. H., Ling, T. P. E. I., Joe, L. I. M. S., & Ramaya, K. (2015). Dietary Intake and Physical Lifestyle of Residential College Students in Universiti Kebangsaan Malaysia. *Jurnal Personalia Pelajar*, *18*(2), 75–85.

Omron Healthcare Co Ltd. (2014). *Body Composition Monitor HBF-375 Instruction Manual* (Omron Healthcare Co Ltd, Ed.). Retrieved from http://www.omronhealthcare-ap.com/resources/HBF-375.pdf

Ost, C., De Ridder, K. A. A., Tafforeau, J., & Oyen, H. (2017). The added value of food frequency questionnaire (FFQ) information to estimate the usual food intake based on repeated 24-hour recalls. *Archives of Public Health*, *75*(1), 1–13. https://doi.org/10.1186/s13690-017-0214-8

Padwal, R., Leslie, W. D., Lix, L. M., & Majumdar, S. R. (2016). Relationship Among Body Fat Percentage, Body Mass Index, and All-Cause Mortality. *Annals of Internal Medicine*, *164*(8), 532. https://doi.org/10.7326/M15-1181

Palczyńska, M., & Świst, K. (2018). Personality, cognitive skills and life outcomes: evidence from the Polish follow-up study to PIAAC. *Large-Scale Assessments in Education*, *6*(1). https://doi.org/10.1186/s40536-018-0056-z

Park, Y., Wang, S., Kitahara, C. M., Moore, S. C., De Gonzalez, A. B., Bernstein, L., … Willett, W. C. (2014). Body mass index and risk of death in Asian Americans. *American Journal of Public Health*, *104*(3), 520–525. https://doi.org/10.2105/AJPH.2013.301573

Partridge, S. R., McGeechan, K., Bauman, A., Phongsavan, P., & Allman-Farinelli, M. (2016). Improved confidence in performing nutrition and physical activity behaviours mediates behavioural change in young adults: Mediation results of a randomised controlled mHealth intervention. *Appetite*, 1–32. https://doi.org/10.1016/j.appet.2016.11.005

Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine - Evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine and Science in Sports*, *25*(3), 1–72. https://doi.org/10.1111/sms.12581

Pell, C., Allotey, P., Evans, N., Hardon, A., Imelda, J. D., Soyiri, I., & Reidpath, D. D. (2016). Coming of age, becoming obese: a cross-sectional analysis of obesity among adolescents and young adults in Malaysia. *BMC Public Health*, *16*(1), 1082. https://doi.org/10.1186/s12889-016-3746-x

Peltzer, K., & Pengpid, S. (2017a). Sleep duration, sleep quality, body mass index, and waist circumference among young adults from 24 low- and middle-income and two high-income countries. *International Journal of*

Environmental Research and Public Health, *14*(6). https://doi.org/10.3390/ijerph14060566

Peltzer, K., & Pengpid, S. (2017b). The Association of Dietary Behaviors and Physical Activity Levels with General and Central Obesity among ASEAN University Students. *AIMS Public Health*, *4*(3), 301–303. https://doi.org/10.3934/publichealth.2017.3.301

Peltzer, K., Pengpid, S., Alafia Samuels, T., ??zcan, N. K., Mantilla, C., Rahamefy, O. H., … Gasparishvili, A. (2014). Prevalence of overweight/obesity and its associated factors among university students from 22 countries. *International Journal of Environmental Research and Public Health*, *11*(7), 7425–7441. https://doi.org/10.3390/ijerph110707425

Peltzer, K., Pengpid, S., Samuels, T. A., Özcan, N. K., Mantilla, C., Rahamefy, O. H., … Gasparishvili, A. (2014). Prevalence of Overweight/Obesity and Its Associated Factors among University Students from 22 Countries. *International Journal of Environmental Research and Public Health*, *11*, 7425–7441. https://doi.org/10.3390/ijerph110707425

Peltzer, K., Pengpid, S., Sychareun, V., Ferrer, A. J. G., Low, W. Y., Huu, T. N., … Turnbull, N. (2017). Prehypertension and psychosocial risk factors among university students in ASEAN countries. *BMC Cardiovascular Disorders*, *17*(1), 1–9. https://doi.org/10.1186/s12872-017-0666-3

Pendergast, F. J., Livingstone, K. M., Worsley, A., & McNaughton, S. A. (2016). Correlates of meal skipping in young adults: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *13*(1). https://doi.org/10.1186/s12966-016-0451-1

Phing, C. H., Hoa, L. S., & Hua, T. X. (2017). Overweight and obesity in relation to cardiovascular risk factors among university students in Malaysia. *Romanian Journal of Diabetes, Nutrition and Metabolic Diseases*, *24*(3), 195–201. https://doi.org/10.1515/rjdnmd-2017-0025

Pisharody, I., & Prasad, N. (2018). Body mass index an early indicator of abnormal glucose and lipid profiles in young Indian adults. *National Journal of Physiology, Pharmacy and Pharmacology*, *8*(5), 690–693. https://doi.org/10.5455/njppp.2018.8.1247131122017

Poobalan, A., & Aucott, L. (2016). Obesity Among Young Adults in Developing Countries: A Systematic Overview. *Current Obesity Reports*, *5*(1), 2–13. https://doi.org/10.1007/s13679-016-0187-x

Porter, S. R., & Umbach, P. D. (2006). Student survey response rates across institutions: Why do they vary? *Research in Higher Education*, *47*(2), 229–247. https://doi.org/10.1007/s11162-005-8887-1

Radzi, C. W. J. M., Jenatabadi, H. S., Alanzi, A. R. A., Mokhtar, M. I., Mamat, M. Z., & Abdullah, N. A. (2019). Analysis of obesity among malaysian

university students: A combination study with the application of Bayesian structural equation modelling and pearson correlation. *International Journal of Environmental Research and Public Health*, *16*(3), 1–17. https://doi.org/10.3390/ijerph16030492

Rahe, C., Czira, M. E., Teismann, H., & Berger, K. (2015). Associations between poor sleep quality and different measures of obesity. *Sleep Medicine*, *16*(10), 1225–1228. https://doi.org/10.1016/j.sleep.2015.05.023

Rajappan, R., Selvaganapathy, K., & Liew, L. (2015a). Physical Activity Level Among University Students: a Cross Sectional Survey. *International Journal of Physiotherapy and Research*, *3*(6), 1336–1343. https://doi.org/10.16965/ijpr.2015.202

Rajappan, R., Selvaganapathy, K., & Liew, L. (2015b). Physical Activity Level Among University Students: a Cross Sectional Survey. *International Journal of Physiotherapy and Research*, *3*(6), 1336–1343. https://doi.org/10.16965/ijpr.2015.202

Ranasinghe, C., Gamage, P., Katulanda, P., Andraweera, N., Thilakarathne, S., & Tharanga, P. (2013). Relationship between Body mass index (BMI) and body fat percentage, estimated by bioelectrical impedance, in a group of Sri Lankan adults: A cross sectional study. *BMC Public Health*, *13*(797), 1–8. https://doi.org/10.1186/1471-2458-13-797

Raynor, H. A., Goff, M. R., Poole, S. A., & Chen, G. (2015). Eating Frequency, Food Intake, and Weight: A Systematic Review of Human and Animal Experimental Studies. *Frontiers in Nutrition*, *2*(December). https://doi.org/10.3389/fnut.2015.00038

Robinson, E., Aveyard, P., Daley, A., Jolly, K., Lewis, A., Lycett, D., & Higgs, S. (2013). Eating attentively : a systematic review and meta-analysis of the effect of food intake memory and awareness on eating 1 – 4. *Journal of Clinical Nutrition*, *97*, 728–742. https://doi.org/10.3945/ajcn.112.045245.2

Rosenberg. (1965a). Society and the adolescent self-image. In *Princeton University Press*. https://doi.org/10.1007/s12671-015-0407-6

Rosenberg, M. (1965b). Self Esteem and the Adolescent. In *Society and the adolecent self-image*. https://doi.org/10.1126/science.148.3671.804

Roubenoff, R. (1996). Applications of bioelectrical impedance analysis for body composition in epidemiologic studies. *Am J Clin Nutr*, *64*(3), 459S-62S.

Roy, R., Rangan, A., Hebden, L., Yu Louie, J. C., Tang, L. M., Kay, J., & Allman-Farinelli, M. (2017). Dietary contribution of foods and beverages sold within a university campus and its effect on diet quality of young adults. *Nutrition*, *34*, 118–123. https://doi.org/10.1016/j.nut.2016.09.013

Sabet, N. S., Doustjalali, S. R., Zin, K. T., Td, H., Syy, K., Azim, S., … August, J. (2017). Correlation between body mass index (BMI) and blood pressure among undergraduate students. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, *8*(857), 857–865.

Saiful, Y., Fuad, R., Rahman, E. (2010). *The USM Personality Inventory (USMaP-i) Manual*.

Sakurai, M., Yoshita, K., Nakamura, K., Miura, K., Takamura, T., Nagasawa, S. Y., … Nakagawa, H. (2017). Skipping breakfast and 5-year changes in body mass index and waist circumference in Japanese men and women. *Obesity Science & Practice*, *3*(2), 162–170. https://doi.org/10.1002/osp4.106

Salamudin, N., & Harun, M. T. (2013). Physical activity index among Malaysian youth. *Asian Social Science*, *9*(12), 99–104. https://doi.org/10.5539/ass.v9n12p99

Scarapicchia, T. M. F., Sabiston, C. M., Pila, E., Arbour-Nicitopoulos, K. P., & Faulkner, G. (2017). A longitudinal investigation of a multidimensional model of social support and physical activity over the first year of university. *Psychology of Sport and Exercise*, *31*, 11–20. https://doi.org/10.1016/j.psychsport.2017.03.011

Scheinder, B. C., Dumith, S. C., & Orlandi, S. P. (2017). Diet and body fat in adolescence and early adulthood: a systematic review of longitudinal studies. *Ciência & Saúde Coletiva*, *22*(5), 1539–1552. https://doi.org/10.1590/1413-81232017225.13972015

Schipperijn, J., Cerin, E., Adams, M. A., Reis, R., Smith, G., Cain, K., … Sallis, J. F. (2017). Access to parks and physical activity: An eight country comparison. *Urban Forestry and Urban Greening*, *27*(August), 253–263. https://doi.org/10.1016/j.ufug.2017.08.010

Schönfeld, P., Preusser, F., & Margraf, J. (2017). Costs and benefits of self-efficacy: Differences of the stress response and clinical implications. *Neuroscience and Biobehavioral Reviews*, 40–52. https://doi.org/10.1016/j.neubiorev.2017.01.031

Sedikides, C., & Gregg, A. P. (2003). Portraits of the self. In *The SAGE Handbook of Social Psychology*. https://doi.org/10.4135/9781848608221.n5

Shahril, M., Putri, W., Wan, E. Y Lua, P. (2013). Clinical Study A 10-Week Multimodal Nutrition Education Intervention Improves Dietary Intake among University Students : Cluster Randomised Controlled Trial. *Nutrition and Metabolism*, 1–13. https://doi.org/10.1155/2013/658642

Shaw, K. A., Gennat, H. C., O'Rourke, P., & Del Mar, C. (2006). Exercise for overweight or obesity. *Cochrane Database of Systematic Reviews*, (4), CD003817. https://doi.org/10.1002/14651858.CD003817.pub3

Shawar, S., Al-Bati, N., Al-Mahameed, A., Nagalla, D., & Obeidat, M. (2012). Hypercholesterolemia among apparently healthy university students. *Oman Medical Journal*, *27*(4), 274–280. https://doi.org/10.5001/omj.2012.69

Sheldrick, M., Tyler, R., Mackintosh, K., & Stratton, G. (2018). Relationship between Sedentary Time, Physical Activity and Multiple Lifestyle Factors in Children. *Journal of Functional Morphology and Kinesiology*, *3*(1), 15. https://doi.org/10.3390/jfmk3010015

Shim, U., Kim, H.-N., Roh, S.-J., Cho, N. H., Shin, C., Ryu, S., … Kim, H.-L. (2014). Personality Traits and Body Mass Index in a Korean Population. *PLoS ONE*, *9*(3), e90516. https://doi.org/10.1371/journal.pone.0090516

Silva, C. C. Da, Monteil, M. A., & Davis, E. M. (2020). *Overweight and Obesity in Children Are Associated with an Abundance of Firmicutes and Reduction of Bifidobacterium in Their Gastrointestinal Microbiota*. *X*(X), 1–7. https://doi.org/10.1089/chi.2019.0280

Siraj, H. H., Salam, A., Roslan, R., Hasan, N. A., Jin, T. H., & Othman, M. N. (2014). Sleep pattern and academic performance of undergraduate medical students at universiti Kebangsaan Malaysia. *Journal of Applied Pharmaceutical Science*, *4*(12), 052–055. https://doi.org/10.7324/JAPS.2014.41209

Smith, S. S., Smith Carter, J., Karczewski, S., Pivarunas, B., Suffoletto, S., & Munin, A. (2015). Mediating effects of stress, weight-related issues, and depression on suicidality in college students. *Journal of American College Health*, *63*(1), 1–12. https://doi.org/10.1080/07448481.2014.960420

So, W. Y., Swearingin, B., Robbins, J., Lynch, P., & Ahmedna, M. (2012). Relationships between body mass index and social support, physical activity, and eating habits in African American university students. *Asian Nursing Research*, *6*(4), 152–157. https://doi.org/10.1016/j.anr.2012.10.004

Soo, K., Wan Abdul Manan, W., & Wan Suriati, W. (2015). The Bahasa Melayu Version of the Global Physical Activity Questionnaire. *Asia Pacific Journal of Public Health*, *27*(2), NP184–NP193. https://doi.org/10.1177/1010539511433462

Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, *139*(1), 213–240. https://doi.org/10.1037/a0028931

Spaeth, A. M., Dinges, D. F., & Goel, N. (2013). Effects of Experimental Sleep Restriction on Weight Gain, Caloric Intake, and Meal Timing in Healthy Adults. *Sleep*, *36*(7), 981–990. https://doi.org/10.5665/sleep.2792

Spahlholz, J., Baer, N., König, H. H., Riedel-Heller, S. G., & Luck-Sikorski, C. (2015). Obesity and discrimination - a systematic review and meta-analysis of observational studies. *Obesity Reviews*, *17*(1), 43–55.

https://doi.org/10.1111/obr.12343

St-Onge, M.-P., Ard, J., Baskin, M. L., Chiuve, S. E., Johnson, H. M., Kris-Etherton, P., & Varady, K. (2017). Meal Timing and Frequency: Implications for Cardiovascular Disease Prevention: A Scientific Statement From the American Heart Association. *Circulation*, *135*(9), e96–e121. https://doi.org/10.1161/CIR.0000000000000476

Štefan, L., Sporiš, G., Krističević, T., & Knjaz, D. (2018). Associations between sleep quality and its domains and insufficient physical activity in a large sample of Croatian young adults: a cross-sectional study. *BMJ Open*, *8*(7), e021902. https://doi.org/10.1136/bmjopen-2018-021902

Stevens, S. D., Herbozo, S., Morrell, H. E. R., Schaefer, L. M., & Thompson, J. K. (2017). Adult and childhood weight influence body image and depression through weight stigmatization. *Journal of Health Psychology*, *22*(8), 1084–1093. https://doi.org/10.1177/1359105315624749

Stockton, S. (2013). Obesity Etiology: Examination of Fast-Food Eating among College Students. *Journal of Aging Science*, *01*(03), 1–6. https://doi.org/10.4172/2329-8847.1000114

Sugathan, S., & Bagh, D. S. (2014). Prevalence and Correlates of Overweight and Obesity among Medical Students in Ipoh, Malaysia. *Academic Medical Journal of India*, *2*(1), 22–24. Retrieved from http://medicaljournal.in/volume2-issue1-feb-2014-55-original-research-prevalence-correlates-overweight-obesity-medical-students-ipoh-malaysia

Sun, J., Zhou, W., Gu, T., Zhu, D., & Bi, Y. (2018). A retrospective study on association between obesity and cardiovascular risk diseases with aging in Chinese adults. *Scientific Reports*, *8*(1), 1–8. https://doi.org/10.1038/s41598-018-24161-0

Sundaram, D., Ghazi, H. F., & Elnajeh, M. (2018). Breakfast , food consumption pattern and nutritional status among private university students in Shah. *International Journal of Advanced Community Medicine*, *1*(1), 19–22.

Sutin, A., R., Stephan, Y., Wang, L., Gao, S., Wang, P., & Terracciano, A. (2015). Personality traits and body mass index in Asian Populations. *Journal of Research and Personality*, *1*(58), 1–15. https://doi.org/10.1016/j.jrp.2015.07.006.Personality

Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and Obesity across the Adult Lifespan. *Journal of Personality and Social Psychology*, *101*(3), 579–592. https://doi.org/10.1037/a0024286.Personality

Sutin, A. R., Stephan, Y., Luchetti, M., Artese, A., Oshio, A., & Terracciano, A. (2016). The five-factor model of personality and physical inactivity: A meta-analysis of 16 samples. *Journal of Research in Personality*, *63*, 22–28. https://doi.org/10.1016/j.jrp.2016.05.001

Sutin, A. R., Stephan, Y., Wang, L., Gao, S., Wang, P., & Terracciano, A. (2015). Personality traits and body mass index in Asian populations. *Journal of Research in Personality*, *58*, 137–142. https://doi.org/10.1016/j.jrp.2015.07.006

Sutin, A. R., & Terracciano, A. (2016). Personality traits and body mass index: Modifiers and mechanisms. *Psychology and Health*, *31*(3), 259–275. https://doi.org/10.1080/08870446.2015.1082561

Sutin, A. R., & Terracciano, A. (2017). Personality and body weight: Mechanisms, longitudinal associations and context. *The Japanese Journal of Personality*, *26*(1), 1–11. https://doi.org/10.2132/personality.26.1.1

Talwar, P., & Mohd Fadzil, A. R. (2013). Perceived social support among university students in Malaysia: A reliability study. *Malaysian Journal of Psychiatry*, *22*(1), 1–8. Retrieved from http://www.mjpsychiatry.org/index.php/mjp/article/viewFile/226/177

Tam, R., Yassa, B., Parker, H., O'Connor, H., & Allman-Farinelli, M. (2017). University students' on-campus food purchasing behaviors, preferences, and opinions on food availability. *Nutrition*, *37*, 7–13. https://doi.org/10.1016/j.nut.2016.07.007

Tan, C., Hashimah, I., & Hashim, M. (2015). Investigating personality differences between public and private university students and across gender: A focus on Malaysian Chinese sample. *International Journal of Development and Sustainability*, *4*(2), 196–208.

Tan, S., Mohd-sidik, S., Rampal, L., Ibrahim, N., & Tan, K. (2019). *Are Malaysians Getting Fatter and Rounder ?: An Updated Systematic Review (2009 – 2015). 15*(5), 63–77.

Tanton, J., Dodd, L. J., Woodfield, L., & Mabhala, M. (2015). Eating Behaviours of British University Students: A Cluster Analysis on a Neglected Issue. *Advances in Preventive Medicine*, *2015*, 639239. https://doi.org/10.1155/2015/639239

Taylor, J. H., Xu, Y., Li, F., Shaw, M., Dziura, J., Caprio, S., … Savoye, M. (2016). Psychosocial predictors and moderators of weight management programme outcomes in ethnically diverse obese youth. *Pediatric Obesity*, *12*(6), 453–461. https://doi.org/10.1111/ijpo.12165

Teh, C. H., Lim, K. K., Chan, Y. Y., Lim, K. H., Azahadi, O., Hamizatul Akmar, A. H., … Fadhli, Y. (2014). The prevalence of physical activity and its associated factors among Malaysian adults: Findings from the National Health and Morbidity Survey 2011. *Public Health*, *128*(5), 416–423. https://doi.org/10.1016/j.puhe.2013.10.008

Thanawala, N., Rubinow, D. A., Roga, Z., & Liou, H. (2018). *Measuring Health of College Students: Food Security, Diet Quality, and Physical Activity*.

Retrieved from https://ecommons.cornell.edu/handle/1813/57013

Thaweekul, P., & Sritipsukho, P. (2017). Obesity, Metabolic Syndromeand Related Risk Behaviorsamong Thai Medical Students ofThammasat University. *Journal of Nutrition & Health*, *3*(1), 1–5. https://doi.org/10.13188/2469-4185.1000026

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, *52*(2), 145–161. https://doi.org/10.1177/0022146510395592

Thomas, E. L., Frost, G., Taylor-Robinson, S. D., & Bell, J. D. (2012). Excess body fat in obese and normal-weight subjects. *Nutrition Research Reviews*, *25*(1), 150–161. https://doi.org/10.1017/S0954422412000054

Tien Ngu, S., Masalamany, K., Abd Manan, N., & Adam, S. K. (2017). Sleep Quality among Pre-Clinical Medical Students in Universiti Putra Malaysia and Universiti Malaya, Malaysia. *Education in Medicine Journal*, *9*(3), 23–31. https://doi.org/10.21315/eimj2017.9.3.3

Tienxhi, J. Y. (2017). The Gender Gap in Malaysian Public Universities: Examining The 'Lost Boys' . *Journal of International and Comparative Education*, *6*(1), 1–16. https://doi.org/10.14425/jice.2017.6.1.0116

Tok, Ahmad, & Koh. (2018). Dietary habits and lifestyle practices among university students in universiti Brunei Darussalam. *Malaysian Journal of Medical Sciences*, *25*(3), 56–66. https://doi.org/10.21315/mjms2018.25.3.6 LK - http://link.kib.ki.se/?sid=EMBASE&issn=21804303&id=doi:10.21315%2Fmjms2018.25.3.6&atitle=Dietary+habits+and+lifestyle+practices+among+university+students+in+universiti+Brunei+Darussalam&stitle=Malays.+J.+Med.+Sci.&title=Malaysian+Journal+of+Medical+Sciences&volume=25&issue=3&spage=56&epage=66&aulast=Tok&aufirst=Chen+Yun&auinit=C.Y.&aufull=Tok+C.Y.&coden=MJMSA&isbn=&pages=56-66&date=2018&auinit1=C&auinitm=Y.

Tooze, J. A., Krebs-smith, S. M., Troiano, R. P., Amy, F., & Sciences, P. (2012). and 24-hour recalls : Comparison with doubly labeled water. *European Journal of Clinical Nutrition*, *66*(5), 569–576. https://doi.org/10.1038/ejcn.2011.198.The

Tukur, N., Ismail, S., & Manaf, R. A. (2018). Association between frequency of eating and eating outside with 'overweight and obesity' among postgraduate african students in a public university in malaysia. *International Journal of Public Health and Clinical Sciences*, *5*(3), 173–180.

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2015). Dietary Guidelines for Americans 2015-2020. In *U.S. Department of Health and Human Services* (Vol. 165).

https://doi.org/10.7326/L16-0170

Ünal, G., Uzdil, Z., Kökdener, M., & Özeno, A. (2017). Breakfast habits and diet quality among university students and its effect on anthropometric measurements and academic success. *Progress in Nutrition*, *19*(12), 154–162. https://doi.org/10.23751/pn.v19i2.4900

Unick, J. L., Lang, W., Tate, D. F., Bond, D. S., Espeland, M. A., & Wing, R. R. (2017). Objective Estimates of Physical Activity and Sedentary Time among Young Adults. *Journal of Obesity*, *2017*, 1–11. Retrieved from http://www.hindawi.com/journals/jobes/%5Cnhttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed18b&NEWS=N&AN=614158476

UPM. (2018). Universiti Putra Malaysia. Retrieved January 27, 2019, from http://www.upm.edu.my/about_us/facts_figures/facts_figures-8289

Varbo, A., Benn, M., Smith, G. D., Timpson, N. J., Tybjærg-Hansen, A., & Nordestgaard, B. G. (2015). Remnant cholesterol, low-density lipoprotein cholesterol, and blood pressure as mediators from obesity to ischemic heart disease. *Circulation Research*, *116*(4), 665–673. https://doi.org/10.1161/CIRCRESAHA.116.304846

Vargas, P. A., Flores, M., & Robles, E. (2014). Sleep quality and body mass index in college students: The role of sleep disturbances. *Journal of American College Health*, *62*(8), 534–541. https://doi.org/10.1080/07448481.2014.933344

Vitiello, V., Diolordi, L., Pirrone, M., Donini, L. M., & Del Balzo, V. (2016). Energy drink consumption in Italian university students: Food habits and lifestyle. *Clinica Terapeutica*, *167*(6), 175–181. https://doi.org/10.7417/CT.2016.1968

Wang, K., Liang, R., Ma, Z.-L., Chen, J., Cheung, E. F. C., Roalf, D. R., … Chan, R. C. K. (2018). Body image attitude among Chinese college students. *PsyCh Journal*, 1–10. https://doi.org/10.1002/pchj.200

Wang, M., Pbert, L., & Lemon, S. C. (2015). The influence of family, friend, and coworker social support and social undermining on weight gain prevention among adults. *Obesity (Silver Spring, Md.)*, *22*(9), 1–18. https://doi.org/10.1002/oby.20814.The

Wehling, H., & Lusher, J. (2017). People with a body mass index ⩾30 under-report their dietary intake: A systematic review. *Journal of Health Psychology*, 135910531771431. https://doi.org/10.1177/1359105317714318

Weinberger, N. A., Kersting, A., Riedel-Heller, S. G., & Luck-Sikorski, C. (2016). Body Dissatisfaction in Individuals with Obesity Compared to Normal-Weight Individuals: A Systematic Review and Meta-Analysis. *Obesity Facts*, *9*, 424–441. https://doi.org/10.1159/000454837

Wendt, D., van Loon, L. J. C., & Lichtenbelt, W. D. van M. (2007). Thermoregulation during exercise in the heat: strategies for maintaining health and performance. *Sports Medicine (Auckland, N.Z.)*, *37*(8), 669–682. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17645370

Wirth, M. D., Hébert, J. R., Hand, G. A., Youngstedt, S. D., Hurley, T. G., Shook, R. P., … Blair, S. N. (2015). Association between actigraphic sleep metrics and body composition. *Annals of Epidemiology*, *25*(10), 773–778. https://doi.org/10.1016/j.annepidem.2015.05.001

World Health Organization. (2011). Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation. In *Who*. https://doi.org/10.1038/ejcn.2009.139

World Health Organization. (2015a). Guideline : Sugars intake for adults and children. In *World Health Organisation -WHO*. https://doi.org/978 92 4 154902 8

World Health Organization. (2018). WHO | Obesity and overweight. Retrieved April 24, 2018, from WHO website: http://www.who.int/mediacentre/factsheets/fs311/en/

World Health Organization (WHO). (2014). Guideline: sodium intake for adults and children. In *Guideline: Sodium Intake for Adults and Children*. Retrieved from http://www.who.int/nutrition/publications/guidelines/sodium_intake/en/

World Health Organization, W. (2000). Obesity: Preventing and managing the global epidemic. In *World Health Organization - Technical Report Series*. https://doi.org/10.1016/S0140-6736(03)15268-3

World Health Organization, W. (2015b). WHO | Physical Activity and Adults. Retrieved February 14, 2018, from WHO website: http://www.who.int/dietphysicalactivity/factsheet_adults/en/

Yahya, N. F. S., Makbul, I. A. A., Daud, N. M., & Aziz, Q. A. S. A. (2018). Relationship between body mass index, calcium intake and vitamin D status with bone mineral density among young adults: A preliminary investigation. *Pakistan Journal of Nutrition*, *17*(4), 156–162. https://doi.org/10.3923/pjn.2018.156.162

Yan Zheng, Manson, J., E., Yuan, C., Liang, M., H., Grodstein, F., Stampfer, M., J., … Hu, F., B. (2017). Associations ofweight gain from early to middle adulthood with major health outcomes later in life. *JAMA - Journal of the American Medical Association*, *318*(3), 255–269. https://doi.org/10.1001/jama.2017.7092

Yap, W. L., Ng, C. M., & Kaur, S. (2019). Poor Diet Quality among Overweight / Obese (OW / OB) Young Adults in Klang Valley , Malaysia : A Case – control Study. *Pertanika Journal Social Science and Humanity*, *27*(1), 345–

359.

Yau, Y. H. C., & Potenza, M. N. (2013). Stress and eating behaviors. *Minerva Endocrinologica*, *38*(3), 255–267. https://doi.org/10.3410/B2-13

Yeh, S. S. S., & Brown, R. F. (2014). Disordered eating partly mediates the relationship between poor sleep quality and high body mass index. *Eating Behaviors*, *15*(2), 291–297. https://doi.org/10.1016/j.eatbeh.2014.03.014

Yunus, R. M., Wazid, S. W., Hairi, N. N., Choo, W. Y., Hairi, F. M., Sooryanarayana, R., … Mahmud, A. B. A. (2017). Association between elder abuse and poor sleep: A cross-sectional study among rural older Malaysians. *PLoS ONE*, *12*(7), 1–14. https://doi.org/10.1371/journal.pone.0180222

Zamora, D., Gordon-larsen, P., Jr, D. R. J., & Popkin, B. M. (2010). Diet quality and weight gain among black and white young adults : the Coronary Artery Risk Development in Young Adults (CARDIA) Study (1985 – 2005) 1 – 4. *Am J Clin Nutr*, *92*(2), 784–793. https://doi.org/10.3945/ajcn.2010.29161.A

Zhang, G., Wu, L., Zhou, L., Lu, W., & Mao, C. (2016). Television watching and risk of childhood obesity: A meta-analysis. *European Journal of Public Health*, *26*(1), 13–18. https://doi.org/10.1093/eurpub/ckv213

Zheng, M., Sui, Z., Li, Z., & Rangan, A. (2017). A modeling study of beverage substitution and obesity outcomes among Australian adults. *Nutrition*, *39–40*, 71–75. https://doi.org/10.1016/J.NUT.2017.03.010

Zheng, W., McLerran, D. F., Rolland, B., Zhang, X., Inoue, M., Matsuo, K., … Potter, J. D. (2011). Association between Body-Mass Index and Risk of Death in More Than 1 Million Asians. *New England Journal of Medicine*, *364*(8), 719–729. https://doi.org/10.1056/NEJMoa1010679

Zilberter, T., & Zilberter, E. Y. (2014). Breakfast: To Skip or Not to Skip? *Frontiers in Public Health*, *2*(June), 10–13. https://doi.org/10.3389/fpubh.2014.00059

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*, 30–41. https://doi.org/10.1017/CBO9781107415324.004

Zin, T., Yusuff, A. S. M., Myint, T., Naing, D. K., Htay, K., & Wynn, A. A. (2015). Body fat percentage, BMI and skinfold thickness among medical students in Sabah, Malaysia. *South East Asia Journal of Public Health*, *4*(1), 35–40. https://doi.org/10.3329/seajph.v4i1.21838

Zulkia, D. R., Zainol, R., Zainol, N., Nordin, N. A., & Ahmad, F. (2014). Factors Determining Youth's Recreational Behaviour and its Effects on Body Mass Index (BMI). *Journal of Surveying, Construction & Property*, *5*(2), 1–11.

https://doi.org/10.22452/jscp.vol5no2.1

Zvolensky, M. J., Taha, F., Bono, A., & Goodwin, R. D. (2015). Big five personality factors and cigarette smoking: A 10-year study among US adults. *Journal of Psychiatric Research, 63,* 91–96. https://doi.org/10.1016/j.jpsychires.2015.02.008