UNIVERSITI PUTRA MALAYSIA

SOCIODEMOGRAPHIC AND PSYCHOLOGICAL DETERMINANTS OF PHYSICAL ACTIVITY LEVEL AMONG FORM FOUR STUDENTS IN SELANGOR, MALAYSIA

LEONG IN TYNG

FPSK(m) 2019 55

SOCIODEMOGRAPHIC AND PSYCHOLOGICAL DETERMINANTS OF PHYSICAL ACTIVITY LEVEL AMONG FORM FOUR STUDENTS IN SELANGOR, MALAYSIA

By

LEONG IN TYNG

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

July 2018

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

SOCIODEMOGRAPHIC AND PSYCHOLOGICAL DETERMINANTS OF PHYSICAL ACTIVITY LEVEL AMONG FORM FOUR STUDENTS IN SELANGOR, MALAYSIA

By

LEONG IN TYNG

July 2018

Chair : Associate Professor Nor Afiah binti Mohd Zulkefli, PhD
Faculty : Medicine and Health Sciences

Adolescents reduce their physical activity level as they aged. Socio-demographic and psychological factors are the important factors that closely related to physical activity level. The objective of this study was to determine the socio-demographic and psychological factors that associated with physical activity among Form Four students in Selangor. A total of 1158 Form Four students (aged 16.1 ± 0.2 years old) were selected via clustered random sampling method. All consented Form Four students from randomly selected schools in Selangor participated in this cross-sectional study. A validated and reliable self-administered questionnaire was used for data collection on socio-demographic factors, sedentary activities, psychological factors and anthropometry measurement. The outcome of this study was level of physical activity which was collected using International Physical Activity Questionnaire (IPAQ). The physical activity level of the participants was 47.4%, 39.4% and 13.2% respectively for high, moderate and low physical activity. Socio-demographic factors that had significant association between physical activity level were gender ($\chi^2 = 48.442$, $p < 0.001$), ethnicity ($\chi^2 = 6.932$, $p = 0.031$), number of siblings ($\chi^2 = 6.335$, $p = 0.042$), household size ($\chi^2 = 6.432$, $p = 0.040$), father's education level ($\chi^2 = 15.002$, $p = 0.001$) and mother's education level ($\chi^2 = 7.259$, $p = 0.027$). Sedentary activities were not significantly associated with physical activity except reading ($\chi^2 = 9.041$, $p = 0.011$) and revision ($\chi^2 = 11.058$, $p = 0.004$). Psychological factors that had significant association with physical activity level were introjected regulation (F (2, 1155) = 10.720, $p < 0.001$), identified regulation (F (2, 1155) = 22.976, $p < 0.001$), intrinsic regulation of motivation ($\chi^2 = 52.805$, $p < 0.001$), social physique anxiety (F (2, 1155) = 3.934, $p = 0.020$), stress (F (2, 1155) = 14.628, $p < 0.001$), self-esteem ($\chi^2 = 17.927$, $p < 0.001$) and physical activity level self-efficacy (F (2, 1155) = 43.570, $p < 0.001$). No significant association was found between anthropometry measurement and physical activity level. Multinomial logistic regression analysis on the predicting factors for active physical activity among the students showed that intrinsic regulation of motivation, number of siblings, father's education level, time spent on tuition, revision and reading and physical activity self-efficacy were significant in explaining

high physical activity whereas only physical activity self-efficacy was found to be significant in explaining moderate physical activity. This study suggests that intrinsic regulation and physical activity self-efficacy should be taken into consideration when promoting physical activity intervention among adolescents.

Keywords: psychological factors, sedentary activities, physical activity, adolescents

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

FAKTOR PENENTU SOSIAL DEMOGRAFI DAN PSIKOLOGI KE ATAS TAHAP AKTIVITI FIZIKAL DALAM KALANGAN PELAJAR TINGKATAN EMPAT DI SELANGOR, MALAYSIA

Oleh

LEONG IN TYNG

Julai 2018

Pengerusi : Profesor Madya Nor Afiah binti Mohd Zulkefli, PhD
Fakulti : Perubatan dan Sains Kesihatan

Tahap aktiviti fizikal didapati berkurangan dalam kalangan remaja apabila usia remaja meningkat. Faktor sosial-demografi dan psikologi merupakan faktor-faktor yang penting dan berkait rapat dengan tahap aktiviti fizikal. Justeru itu, objektif kajian ini adalah untuk menentukan faktor sosial-demografi dan psikologi yang berhubung kait dengan tahap aktiviti fizikal dalam kalangan pelajar Tingkatan Empat di Selangor dan seterusnya menentukan faktor ramalan bagi penglibatan aktif dalam aktiviti fizikal. Seramai 1158 pelajar Tingkatan Empat (berumur 16.1 ± 0.2 tahun) telah terpilih melalui kaedah persampelan kluster. Semua pelajar Tingkatan Empat dari sekolah yang dipilih secara rawak telah menyertai kajian keratan rentas ini setelah mendapat kebenaran penyertaan. Kajian ini menggunakan borang soal selidik yang telah diuji dengan kebolehpercayaan dan kesahan bagi mengumpul data tentang faktor sosiodemografi, aktiviti sedentari, faktor psikologi dan pengukuran antropometri. Tahap aktiviti fizikal sebagai hasil kajian ini telah dikumpul melalui *International Physical Activity Questionnaire (IPAQ)*. Peserta dalam kajian ini memaparkan 47.4% dalam kategori tahap aktiviti fizikal tinggi 39.4% dalam kategori tahap aktiviti sederhana dan 13.2% dalam kategori tahap aktiviti fizikal rendah. Faktor sosiodemografi yang siknifikan terhadap tahap aktiviti fizikal ialah jantina (χ^2 = 48.442, $p < 0.001$), etnik (χ^2 = 6.932, $p = 0.031$), bilangan adik-beradik (χ^2 = 6.335, $p = 0.042$), saiz isi rumah (χ^2 = 6.432, $p = 0.040$), tahap pendidikan bapa (χ^2 = 15.002, $p = 0.001$) dan tahap pendidikan ibu (χ^2 = 7.259, $p = 0.027$). Aktiviti sedentari dalam kajian ini tidak mempunyai hubungan signifikan dengan tahap aktiviti fizikal kecuali membaca (χ^2 = 9.041, $p = 0.011$) dan membuat ulang kaji (χ^2 = 11.058, $p = 0.004$). Faktor psikologi yang menunjukkan hubungan signifikan dengan tahap aktiviti fizikal ialah *introjected regulation* (F (2, 1155) = 10.720, $p < 0.001$), *identified regulation* (F (2, 1155) = 22.976, $p < 0.001$), *intrinsic regulation* bagi motivasi (χ^2 = 52.805, $p < 0.001$), kebimbangan terhadap fizikal dalam sosial (F (2, 1155) = 3.934, $p = 0.020$), tekanan (F (2, 1155) = 14.628, $p < 0.001$), harga diri (χ^2 = 17.927, $p < 0.001$) dan keyakinan diri dalam aktiviti fizikal (F (2, 1155) = 43.570, $p < 0.001$). Tiada hubungan signifikan didapati antara saiz antropometri dan tahap aktiviti fizikal. Analysis regresi logistik multinomia menunjukkan faktor ramalan yang signifikan bagi tahap aktiviti

fizikal tinggi ialah *intrinsic regulation* bagi motivasi, bilangan adik-beradik, tahap pendidikan bapa, masa yang diluangkan bagi tuisyen, membuat ulang kaji dan membaca serta keyakinan diri dalam aktiviti fizikal manakala faktor ramalan bagi tahap aktiviti fizikal sederhana ialah keyakinan diri terhadap aktiviti fizikal sahaja. Hasil kajian ini mencadangkan bahawa *intrinsic regulation* dan keyakinan diri dalam aktiviti fizikal harus dipertimbangkan bagi intervensi untuk menggalakkan aktiviti fizikal dalam kalangan remaja.

Kata kunci: faktor psikologi, aktiviti sedentari, aktiviti fizikal, remaja

ACKNOWLEDGEMENT

First of all, I would like to express my deepest gratitude to my supervisory committee, chairperson Associate Professor Dr Nor Afiah binti Mohd Zulkefli and committee member, Dr Salmiah Md Said for their assistance, guidance and encouragement throughout my journey on pursuing the degree. I am grateful for their stimulating and constructive suggestions as well as friendly advice along the journey.

In addition, I would also express my special thanks to the staffs and officers from Department of Community Health of Faculty of Medicine and Health Sciences for their assistance in accessing the facilities and lending the equipment for the research. I am also thankful to the officers from the School of Graduate Studies for their assistance and organising courses which are useful for the study. Moreover, I am grateful for receiving the Universiti Putra Malaysia grant (Geran Putra Inisiatif Putra Siswazah) for this study.

I would also further my gratitude to the school principals and teachers who are helpful, cooperative and supportive during my data collection. My sincere appreciation goes to the parents and students who are willing to participate in the research study. Last but not least, I am grateful for my friends and coursemates who had supported and encouraged me during the study. I appreciate and feel grateful to my family for their support and encouragement whenever I faced difficulties and challenges in this tough journey.

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

Nor Afiah binti Mohd Zulkefli, PhD
Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Salmiah Md Said, PhD
Senior Lecturer (Medical)
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Member)

_____
ROBIAH BINTI YUNUS, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: _____ Date: _____

Name and Matric No.: Leong In Tyng (GS36112)

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature	:	_____
Name of Chairman of Supervisory Committee	:	Nor Afiah Binti Mohd Zulkefli

Signature	:	_____
Name of member of Supervisory Committee	:	Salmiah Md Said

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ASQ	Adolescent Stress Questionnaires
BAI	Beck Anxiety Inventory
BDI	Beck Depression Inventory
BMI	Body Mass Index
CDI	Children Depression Inventory
CES-DC	Center for Epidemiologic Studies-Depression Scale for Children
CSEP	Canadian Society for Exercise Physiology
GPAQ	Global Physical Activity Questionnaire
IPAQ	International Physical Activity Questionnaire
IPAQ-A	International Physical Activity Questionnaire for Adolescents
LTPA	Leisure Time Physical Activity
MVPA	Moderate-Vigorous Physical Activity
PAL	Physical Activity Level
PAQ-C	Physical Activity Questionnaire for Older Children
PASE	Physical Activity Self-Efficacy
PHQ-A	Physical Health Questionnaire for Adolescents
PHQ-9	Nine-item-Patients Health Questionnaire
PSS	Perceived Stress Scale
RAI	Relative Autonomy Index
RCMAS	Revised Children Manifest Anxiety Scale
RSES	Rosenberg Self Esteem Scale
SCARED	Screen for Children Anxiety Related Emotional Disorder
SPAS	Social Physique Anxiety Scale

STAI	State-Trait Anxiety Inventory
USDHHS	United States Department of Health and Human Services
VPA	Vigorous Physical Activity
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Rapid urbanization leads to reduction of healthy lifestyle practice within the population. The environment of excessive usage of motorized vehicles, poor air quality and limited public spaces challenge the practice of being physically active in urbanized cities (WHO, 2010c). This indirectly shape sedentary lifestyle. In addition to that, urban life encourage frequent consumption of energy-dense food (WHO, 2010c) with less nutritional benefits such as fast food, junk food and processed food that containing high level of salt, sugar and fat which have replaced non-processed natural food.

Physical activity is the crucial key component to maintain health. The equilibrium between energy consumption (food intake) and energy expenditure (physical activity) is fundamental to reduce the risk of coronary heart disease and stroke, diabetes, hypertension and various types of cancer (WHO, 2018). Weight control is related insufficient physical activity which subsequently would affect health. At global level, insufficient physical activity and sedentary lifestyle are found as the fourth leading cause of mortality (WHO, 2010a).

In view of that, World Health Organization (WHO) (2018) had recommended that children aged 5-17 years old should have at least 60 minutes of moderate to vigorous physical activity daily. The accumulation of 60 minutes on doing physical activity bring health benefits. However, children and adolescents who are of highly physically active age group decrease their physical activity level (Wilson, 2008). A report by WHO (2018) revealed that 81% of school-going adolescents from worldwide did not achieve the recommended level of physical activity daily. While South-East Asia region had the lowest prevalence (74%) of insufficient of physical activity, yet the prevalence is still high.

Data from Malaysia revealed that less than 35% of Malaysian male and female students met the guidelines of WHO on an accumulation 60 minute of physical activity per day (Wilson, 2008). Malaysian adolescents had low prevalence of physically active (0% to 20%) (Dan, Mohd Nasir & Zalilah, 2011; Hashim, Golok & Ali, 2011). Although health-promoting activities and health education are constantly held in community and schools, the level of physical activity reported were low and moderate among adolescents (Dan et al., 2011; Farah Wahida, Mohd Nasir & Hazizi, 2011; Hashim et al., 2011).

There were many studies conducted to identify the factors that influence the participation in physical activity among adolescents. The common identified factors were environmental factors in terms of the availability and accessibility to equipment and facilities (Abd-Latif, Mohd Nor, Omar-Fauzee, Ahmad & Karim, 2011), social support system with respect to family and peers supports (Park & Kim, 2008), socio-demographic factors, sedentary activities preference (Wilson, 2008) and psychosocial factors (Aniza & Fairuz, 2009; Dan et al., 2011; Hashim et al., 2011). Of all the factors, socio-demographic and psychological factors were important aspects to influence physical activity level among adolescents.

Long term engagement in physical activity is fundamental to maintain good general health and prevention of chronic diseases (WHO, 2018). Perseverance is the key component for continuous effort to engage in physical activity. The persistency and constant adherence to engage in physical activity much depends on individual's psychological aspects. Psychological factors may positively and negatively affect the level of physical activity (Dan et al., 2011; Hashim et al., 2011). As a consequence, psychological factors would be an important aspect to look into. It is crucial to identify the psychological factors affect the participation of physical activity in order to instil active lifestyle for adolescents' general health benefits in their future life.

In spite of emergent study findings on the factors that affect the physical activity level within the population of adolescents, the prevalence of physical activity among adolescents remain low and moderate (Dan et al., 2011; Hashim et al., 2011). The studies searched with Google Scholar, Science Direct, Sport Discuss, Springer Link, with the keywords of "physical activity", "adolescents', "students", "psychological", "psychology" were found deficient in Malaysia. Furthermore, the studies were mostly studied on younger adolescents but not on older adolescents aged 16 years old above.

Psychological aspects may change when adolescents aged and in their higher secondary school. As to effectively promote health among adolescents to be physically active in their future life, the study on identify the psychological factors that affect physical activity level is indeed important. Attention to be given to older adolescents who are of more self-aware of their behaviours particularly health behaviour is important. This would subsequently influence on their future health. Therefore, present study was proposed to determine the psychological factors and physical activity level among Form four secondary school students in Selangor. The psychological factors in this present study were motivation, depression, anxiety, stress, self-esteem and self-efficacy.

1.2 Problem Statement

Malaysian population practiced less healthy lifestyle along with rapid development and urbanization. It was reported that more than half (56.5%) of the Malaysian population were inactive (Cheah & Poh, 2014). Worst still, adults were more active than adolescents though there was 57.2% active adolescents (aged 16-19 years old) (Institute for Public Health, 2011). In view of the fact that adolescents are at their

active age, they are expected to be more physically active and with a lower prevalence of physical inactivity. It is crucial to look into the physical activity level in adolescents' population.

Furthermore, a report by Wilson (2008) revealed that less than half of the adolescent athletes did not achieve recommended level of an accumulation of 60 min moderate-to-vigorous activities daily. Adolescent athletes who had sports training should be more active than other adolescents of their ages. Yet, there was 35% of them did not achieve the recommended level of level of physical activity. This has been a worrying issue on adolescents who were generally less active than athletes.

In addition to that, a low prevalence of active lifestyle was found in various local studies. There was only 22.8% of Malaysian adolescents (aged 13-17 years old) were active in overall physical activity (Active Healthy Kids Malaysia, 2016). Insufficient physical activity was reported in some studies findings on low level of physical activity (Aniza and Fairuz, 2009). The reported high level of physical activity (ranged from 0% to 20%) was much lower than moderate level (ranged from 25.3% to 61.5%) and low level of physical activity (ranged from 20.8% to 74.7%) (Aniza & Fairuz, 2009; Dan et al., 2011; Farah Wahida et al., 2011; Law, Mohd Nasir & Hazizi, 2014).

Since physical inactivity is the fourth leading cause of mortality worldwide (WHO, 2010b), insufficient physical activity is a major contributor to non-communicable diseases and other health problems (Sharif et al., 2016). The globally upsurge of physical inactivity in relation to non-communicable diseases (WHO, 2010b) has been an alarming issue to healthcare providers. With regards to physical activity decreased as children and adolescents aged (Lee, Loprinzi & Trost, 2010), the prevalence of active adolescents (37.3% physically active) was lower in comparison to children (57.0%) (Institute for Public Health, 2018).

Unceasingly effort in health promotion programmes to inculcate healthy lifestyle were held in communities and schools (Institute for Public Health, 2017). However, health promotion efforts seemingly limited effectiveness in encouraging active lifestyle. Physically active students dropped from 22.7% (Institute for Public Health, 2012) to 19.8% (Institute for Public Health, 2017) in the National Health and Morbidity Survey. Hence, it is crucial to find the factors affect physical activity level among adolescents.

There were many studies looking into the factors related to physical activity level among adolescents. However, environmental factors (Abd-Latif et al., 2011), interpersonal factors (Park & Kim, 2008) and intrapersonal factors (Aniza & Fairuz, 2009； Hidayati, Hattahakit & Isramalai, 2012) were the common factors that found influence physical activity level among adolescents. Psychological factors that influence physical activity level of children and adolescents are gaining the concern of researchers (Sallis, Prochaska & Taylor, 2000). Nevertheless, there was deficient studies of psychological factors on physical activity level in Malaysia after using the search engine of Google Scholars, Science Direct, Sport Discuss, Springer Link, by

using the keywords of "physical activity", "adolescents', "students", "psychological", "psychology".

In addition to that, majority of local studies on physical activity were on younger adolescents aged 13-15 years old (Dan et al., 2011; Hashim et al., 2011, Law et al., 2014) but deficient on older adolescents (16-19 years old) (Aniza & Fairuz, 2009). The necessity to increase studies on older adolescents particularly on psychological factors that is essential to encourage active physical activity level. Thus, this study was done to look into the psychological factors that affect physical activity level among Form Four students in Selangor.

1.3 Significance of the Study

Adolescents are future adults. However, physical activity level reduced as adolescents aged (Lee et al., 2010). Majority (55%) of Malaysian students were physically inactive (Institute for Public Health, 2018). It is essential for adolescents to stay physically active and healthy as they can lead our country to a better tomorrow. The fundamental to identify the factors that affect their physical activity level on shaping their future health is extremely important and require research attention. This study is significant to identify the factors that affect physical activity level despite augment the database on physical activity patterns among Malaysian adolescents.

In addition to expansion of local literature, the findings is crucial to enrich and contribute to the development of policy to improve health promotion and health policy in the country. The reduction of physical activity in older adolescents directs the research to identify the relating factors for the reduction of physical activity in adolescents. This enhance the body of knowledge in the field and fill up the research gap on psychological factors that may effectively influence adolescents to be more active. Tackling the psychological factors can reduce the risk of non-communicable diseases which benefits adolescents' future health.

Through the identification of factors influence physical activity, the obligation of psychological factors are important to encourage adolescents to be physically active. The understanding of psychological factors, may aid in modify current health programme and to develop a much comprehensive health policy. The powerful inner will of able to stay physically active rooted from psychology would be more persuasive to adolescents. This may be constructive to implement more effective health programmes on adolescents for their future health (Institute for Public Health, 2017).

Moreover, the changes in physical activity level usually found among older adolescents when they grow up. The unhealthy behaviours may slowly developed into habit and carried into their young adulthood. This may progressively develop chronic diseases in their adulthood. Through targeting the Form Four students, they may revert the unhealthy behaviour or may inculcate good health habits which possibly guide them to take up the healthy behaviour which then carry on in their adulthood life later.

In the effort to uplift physically active behaviour among adolescents, Ministry of Education of Malaysia had introduced a school programme of 1 *Murid* 1 *Sukan* (1 Student 1 Sport) in the year of 2011. This programme was conceptualized to start at school level through two strategies of "Sports for All" and "Sports for Excellence" (Ministry of Education, 2011). Students are compulsory to take up at least one sport under the programme of 1 Students 1 Sport in line with the National Sports Policy to cultivate sports culture in the community (Ministry of Education, 2011).

This programme is anticipating all students benefited from the involvement in sports, particularly for those who are less active via strategies of "Sports for All". School students may revert the physical inactivity and hence followed by a reduction in the risk that may relate to the development of non-communicable diseases. On the contrary, students showed higher and excellent sports performance, their talents and potentials are polished to a higher level through the strategies of "Sports for Excellence" (Ministry of Education, 2011). The fostering of sporting culture among students to become active and to inculcate healthy lifestyle in community would be important to strive towards sporting excellence by successive to create a sporting environment (Ministry of Education, 2011).

Present study findings may take as reference by school authorities, community leaders and researchers in planning health promotion programmes. They may consider the desires, needs and interests of the targeted group in the effort to reduce the prevalence of physical inactivity. This would beneficial for future health programme intervention and implementation by taking psychological factors into consideration.

1.4 Objectives

1.4.1 General Objective

The general objective of present study is to determine the socio-demographic and psychological factors of physical activity level among Form Four students in Selangor.

1.4.2 Specific Objectives

The specific objectives of the present study are:

i. to determine the physical activity level among respondents.
ii. to determine the socio-demographic, sedentary behaviours and body mass index (BMI) characteristics among respondents.
iii. to determine the psychological factors (motivation, level of depression, level of anxiety, social physique anxiety, stress, level of self-esteem and physical activity self-efficacy) among respondents.
iv. to determine the association between physical activity level and socio-demographic factors among respondents.
v. to determine the association between physical activity level and sedentary behaviour level among respondents.

vi. to determine the association between physical activity level and psychological factors (motivation, level of depression, level of anxiety, social physique anxiety, stress, level of self-esteem, physical activity self-efficacy) among respondents.
vii. to determine the association between physical activity level and level of body mass index among respondents.
viii. to determine the predictors of active physical activity among respondents.

1.5 Hypothesis

The hypothesis for this study are:

i. There is significant association between physical activity level and socio-demographic among Form Four students in Selangor.
ii. There is significant association between physical activity level and sedentary behaviours among Form Four students in Selangor.
iii. There is significant difference between physical activity level and psychological factors (motivation, level of depression, level of anxiety, social physique anxiety, stress, level of self-esteem and physical activity self-efficacy) among Form Four students in Selangor.
iv. There is significant association between the physical activity level and level of body mass index among Form Four students in Selangor.

REFERENCES

Abd-Latif, R., Mohd Nor, M., Omar-Fauzee, M.S., Ahmad A.R., & Karim, F. (2011). Influence of recreational facilities among adolescents towards leisure time physical activity (LTPA). *Asian Journal of Environment-Behaviour Studies*. 2(5), 37-46.

Active Healthy Kids Malaysia. (2016). *Malaysia Active Healthy Kids Report Card 2016*. Kuala Lumpur: Universiti Kebangsaan Malaysia.

Adachi, P.J.C., & Willoughby, T. (2014). It's not how much you play, but how much you enjoy the game: The longitudinal association between adolescents' self-esteem and the frequency versus enjoyment of involvement in sports. *Journal of Youth and Adolescence. 43*(1), 137-145.

Adeniyi, A.F., Okafor, N.C., & Adeniyi, C.Y. (2011). Depression and physical activity in a sample Nigerian adolescents: levels, relationships and predictors. *Child and Adolescent Psychiatry and Mental Health. 5*(16), doi: 10.1186/1753-2000-5-16.

Al-Haifi, A.R., Al-Fayez, M.A., Al-Athari, B.I., Al-Ajmi, F.A., Allafi, A.R., Al-Hazzaa, H.M., & Musaiger, A.O. (2013). Relative contribution of physical activity, sedentary behaviours, and dietary habits to the prevalence of obesity among Kuwaiti adolescents. *Food and Nutrition Bulletin*. *34*(1), 6-13.

Al-Hazzaa, H. M., Abahussain, N. A., Al-Sobayel, H. I., Qahwaji, D. M., & Musaiger, A. O. (2011). Physical activity, sedentary behaviors and dietary habits among Saudi adolescents relative to age, gender and region. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 140.

Aniza, I., & Fairuz, M.R. (2009). Factors influencing physical activity level among secondary school adolescents in Petaling district, Selangor. *Medical Journal of Malaysia*. *63*(3), 228-232.

Bagley, S., Salmon, J. O., & Crawford, D. (2006). Family structure and children's television viewing and physical activity. *Medicine and Science in Sports and Exercise*, *38*(5), 910-918.

Bandura, A. (1986). *Social Foundation by thought and action*. Englewood Clifts, NJ: Prentice Hall.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman

Bandura, A. (2006). Guide for constructing self-efficacy scales. In: Pajares, F., Urdan, T. (Eds.), *Self-efficacy Beliefs of Adolescents*. Information Age Publishing, Greenwich, CT, pp. 307–337.

Barnett, L.A. (2008). Predicting youth participation in extracurricular recreational activities: Relationships with individual, parent, and family characteristics. *Journal of Park and Recreation Administration*. *26*(2), 28-60.

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., Martin, B. W., & Lancet Physical Activity Series Working Group. (2012). Correlates of physical activity: why are some people physically active and others not?. *The Lancet*, *380*(9838), 258-271.

Beck, A.T., & Steer, R.A. (1993). *Beck Depression Inventory: Manual*. San Antonio: The Psychological Corporation, Hartcourt Brace & Company.

Biddle, S.J.H., & Fuchs, R. (2009). Exercise psychology: A view from Europe. *Psychology of Sport and Exercise*. *10*, 410-419.

Biddle, S.J.H., & Wang, C.K.J. (2003). Motivation and self-perception profiles and links with physical activity in adolescent girls. *Journal of Adolescence*. *26*, 687-701.

Birmaher, B., Brent, D.A., Chiappetta, L., Bridge, J., Monga, S. & Baugher, M. (1999). Psychometric properties of the Screen For Child Anxiety Related Emotional Disorders (SCARED): A replication study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *38*, 1230-1236.

Blazo, J.A., & Smith, A.L. (2016). A systematic review of siblings and physical activity experiences. *International Review of Sport and Exercise Psychology.* 1-38.

Booth, M. (2000). Assessment of physical activity: An International Perspective. *Research Quarterly for Exercise and Sport*. *71*(2), 114-120.

Brodersen, N.H., Steptoe, A., Boniface, D.R., & Wardle, J. (2007). Trends in physical activity and sedentary behaviour in adolescence: ethnic and socio-economic differences. *British Journal of Sport Medicine*. *41*(3), 140-144.

Brunet, J., & Sabiston, C.M. (2009). Social physique anxiety and physical activity: A self-determination theory perspective. *Psychology of Sport and Exercise. 10*, 329-335.

Bursac, Z., Gauss, C. H., Williams, D. K., & Hosmer, D. W. (2008). Purposeful selection of variables in logistic regression. *Source Code for Biology and Medicine*, *3*(1), 17.doi: 10.1186/1751-0473-3-17

Butcher, K., Sallis, J.F., Mayer, J.A., & Woodruff, S. (2008). Correlates of physical activity guideline compliance for adolescents in 100 US cities. *Journal of Adolescent Health*. *42*, 360-368.

Byrne, D.G., Davenport, S.C., & Mazanov, J. (2007). Profiles of adolescents stress: The development of the adolescent stress questionnaire (ASQ). *Journal of Adolescence*. *30*, 393-416.

Canadian Society for Exercise Physiology. (2012). Canadian physical activity and sedentary behaviour guidelines: You plan to get active every day. Retrieved from https://www.aurora.ca/Thingstodo/Documents/Canadian%20Physical%20Activity%20and%20Sedentary%20Behaviour%20Guidelines.pdf

Casperson, C.J., Powell, K.E., & Christenson, G.M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Report*. *100*(2), 126-131.

Cheah, Y.K. (2011). Influence of socio-demographic factors on physical activity participation in a sample of adults in Penang, Malaysia. *Malaysia Journal of Nutrition*. *17*, 385-389.

Cheah, Y.K., Lim, H.K., Kee, C.C., & Ghazali, S.M. (2016). Factors associated with participation in physical activity among adolescnets in Malaysia. *International Journal of Adolescence Medicine and Health. 28*(4), 419-427.

Cheah, Y. K., & Poh, B. K. (2014). The determinants of participation in physical activity in Malaysia. *Osong Public Health and Research Perspectives*, *5*(1), 20-27.

Chen, L.J., Haase, A.M., & Fox, K.R. (2007). Physical activity among adolescents in Taiwan. *Asia Pacific Journal of Clinical Nutrition*. *16*(2), 354-361.

Chew, W.L., Leong, P.P., Yap, S.F., Yasmin, A.M., Choo, K.B., Low, G.K.K., & Boo, N.Y. (2016). Risk factors associated with abdominal obesity in suburban adolescents from a Malaysian district. *Singapore Med J*. 1-24. doi: 10.11622/smedj.2017013.

Chinapaw, M.J., Mokkink, L.N., van Poppel, M.N., van Mechelen, W., & Terwee, C.B. (2010). Physical activity questionnaires for youth. *Sports Medicine, 40*(7), 539-563.

Chu, A.H.Y, & Moy, F.M. (2012). Reliability and validity of the Malay International Physical Activity Questionnaire (IPAQ-M) among a Malay population in Malaysia. *Asia Pacific Journal of Public Health*. doi: 10.1177/1010539512444120.

Cohen, S., Karmarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behaviour*. *24*(4), 385-396.

Colley, R.C., Garriguet, D., Janssen, I., Craig, C.L., Clarke, J., & Tremblay, M.S. (2011). Physical activity of Canadian children and youth: Accelerometer results from the 2007 to 2009 Canadian Health Measure Survey. *Statistic Canada Health Report*. *22*(1), 1-9.

Connolly, M.C., Quin, E., & Redding, E. (2011). Dance for your life: Exploring the health and well-being implications of a contemporary dance intervention for female adolescents. *Research in Dance Education*. *12*(1), 53-66.

Coopersmith, S. (1967). *The antecedents of self-esteem.* San Francisco: W.H. Freeman & Co.

Cottrell, L., Zatezalo, J., Bonasso A., Lattin, J., Shawley, S., Murphy, E., & Neal, W.A. (2015). The relationship between children's physical activity and family income in rural settings: A cross-sectional study. *Preventive Medicine Reports*. 2, 99-104.

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise*, *35*(8), 1381-1395.

Crimi, K., Hensley, L. D., & Finn, K. J. (2009). Psychosocial correlates of physical activity in children and adolescents in a rural community setting. *International Journal of Exercise Science*, *2*(4), 230-242.

Crocker, P.R.E., Sabiston, C.M., Kowalski, K.C., McDonough, M.H., & Kowalski, N (2006). Longitudinal assessment of the relationship between physical self-concept and health-related behaviour and emotion in adolescent girls. *Journal of Applied Sport Psychology*. *18*, 185-200.

Cronbach, L.J., & Shavelson, R.J. (2004). My current thoughts on coefficient alpha and successor procedures. *Educational and Psychological Measurement, 64*(3), 391-418.

D'Alonzo, K.T., Stevenson, J.S., & Davis, S.E. (2004). Outcomes of a program to enhance exercise self-efficacy and improve fitness in Black and Hispanic college age women. *Research in Nursing & Health*. 27, 357-369.

Dambros, D. D., Lopes, L. F. D., & Santos, D. L. D. (2011). Perceived barriers and physical activity in adolescent students from a Southern Brazilian city. *Revista Brasileira de Cineantropometria & Desempenho Humano*, *13*(6), 422-428.

Dan, S.P., Mohd Nasir, M.T., & Zalilah, M.S. (2007). Sex and ethnic differentials in physical activity levels of adolescents in Kuanta. *Malaysia Journal of Nutrition*. *13*(2), 109-120.

Dan, S.P., Mohd Nasir, M.T., & Zalilah, M.S. (2011). Determination of factors associated with physical activity levels among adolescents attending school in Kuantan, Malayisa. *Malaysia Journal of Nutrition*. *17*(2), 175-187.

De Bruijn, G-J., Kremers, S.P.J., Lensvelt-Mulders, G., de Vries, H., van Mechelen, W., Brug, J. (2006). Modeling individuals and physical environmental factors with adolescent physical activity. *American Journal of Preventive Medicine*. *30*(6), 507-512.

De Cocker, K., Ottevaere, C., Sjostrom, M, Moreno, L.A., Warnberg, J., Valtuena, J., Manios, Y., … De Bourdeaudhuij, I. (2009). Self-reported physical activity in European adolescents: Results from the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) study. *Public Health Nutrition*. *14*(2), 246-254.

Deci, E.L., & Ryan, R.M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry*. *11*(4), 227-268.

Demo, D. H. (1985). The measurement of self-esteem: Refining our methods, *Journal of Personality and Social Psychology, 48*, 1490–1502.

Department of Statistics Malaysia. (2010). Population distribution by local authority areas and mukims. Kuala Lumpur: Department of Statistics Malaysia.

Department of Statistics Malaysia. (2011). Population distribution and basic demographic characteristic report 2010 (updated: 05/08/2011) Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=117&bul_id=MDMxdHZjWTk1SjFzTzNkRXYzcVZjdz09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09.

Department of Statistics Malaysia. (2015). Selangor @ a Glance. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=eGUyTm9RcEVZSllmYW45dmpnZHh4dz09

Department of Statistics Malaysia. (2017). Population Quick Info: Population by age, sex and ethnic group, Selangor, 2017. Retrieved from http://pqi.stats.gov.my/result.php?token=d35451f7a385758e7ec90bfeee0c471e

Dishman, R.K., Motl, R.W., Saunders, R., Felton, Ward, D.S., Dowda, M., & Pate, R.R. (2004). Self-efficacy partially mediates the effects of a school-based physical-activity intervention among adolescent girls. *Preventive Medicine. 38*, 628-636.

Ekeland, E., Heian, F., & Hagen, K.B. (2005). Can exercise improve self esteem in children and young people? A systematic review of randomised controlled trials. *British Journal of Sports Medicine*. *39*(11), 792-798.

Eyler, A. A. (2003). Correlates of physical activity: who's active and who's not?. *Arthritis Care & Research*, *49*(1), 136-140.

Farah Wahida, Z., Mohd Nasir, M.T., & Hazizi, A.S. (2011). Physical activity, eating behaviour and body image perception among young adolescents in Kuantan, Pahang, Malaysia. *Malaysia Journal of Nutrition*. *17*(3), 325-336.

Feldman, D.E., Barnett, T., Shrier, I., Rossignol, M., & Abenhaim, L. (2003). Is physical activity differentially associated with different types of sedentary pursuits? *Archives of Pediatrics & Adolescents Medicine. 157*(8), 797-802.

Fendrich, M., Weissman, M.M., & Warner, V. (1990). Screening for depressive disorder in children and adolescents: Validating the Center for Epidemiologic Studies Depression Scale for Children. *American Journal of Epidemiology. 131*, 538-51.

Fernandes, R. A., & Zanesco, A. (2010). Early physical activity promotes lower prevalence of chronic diseases in adulthood. *Hypertension Research, 33*(9), 926-931.

Fernandes, R. A., Reichert, F. F., Monteiro, H. L., Júnior, I. F. F., Cardoso, J. R., Ronque, E. R. V., & de Oliveira, A. R. (2012). Characteristics of family nucleus as correlates of regular participation in sports among adolescents. *International Journal of Public Health, 57*(2), 431-435.

Ferreira, I., Van Der Horst, K., Wendel-Vos, W., Kremers, S., Van Lenthe, F. J., & Brug, J. (2007). Environmental correlates of physical activity in youth–a review and update. *Obesity reviews, 8*(2), 129-154.

Field, A. (2009). *Discovering statistics using SPSS (3rd Ed.)*. Sage publications.

Gao, Z., Podlog, L., & Huang, C. (2013). Associations among children's situational motivation, physical activity participation, and enjoyment in an active dance video game. *Journal of Sport and Health Science*, *2*(2), 122-128.

Gillison, F., Osborn, M., Standage, M., & Skevington, S. (2009). Exploring the experience of introjected regulation for exercise across gender in adolescence. *Psychology of sport and exercise*, *10*(3), 309-319.

Goldfield, G.S., Henderson, K., Buchholz, A., Obeid, N., Nguyen, H., & Flament, M.F. (2011). Physical activity and psychological adjustment in adolescents. J*ournal of Physical Activity and Health*. *8*, 157-163.

Goodwin, R.N. (2003). Association between physical activity and mental disorders among adults in the United States. *Preventive Medicine*. *36*, 698-703.

Grieve, F., Jackson, L., Reece, T., Marklin, L., & Delaney, A. (2008). Correlates of social physique anxiety in men. *Journal of Sport Behavior*. *31*: 329-337.

Guedes, D.P., Souza, M.V., Ferreirinha, J.E., & Silva, A.J.R.M. (2012). Physical activity and determinants of sedentary behaviour in Brazilian adolescents from an underdeveloped region. *Perceptual and Motor Skills*. *114*(2), 542-552.

Guthold, R. (2009). Report from the WHO Physical Activity Global Surveillance Meeting [power point slides]. Retrieved from http://www.ccm-network.it/documenti_Ccm/convegni/Zurigo_OmsEuropa_2009/Guthold.pdf

Hagströmer, M., Bergman, P., De Bourdeaudhuij, I., Ortega, F. B., Ruiz, J. R., Manios, Y., ... Sjöström, M. (2008). Concurrent validity of a modified version of the International Physical Activity Questionnaire (IPAQ-A) in European adolescents: The HELENA Study. *International Journal of Obesity*, *32*(S5), S42.

Hajian-Tilaki, K., & Heidari, B. (2012). Prevalences of overweight and obesity and their association with physical activity pattern among Iranian adolescents aged 12-17 years. *Public Health Nutrition*. *15*(12), 2246-2252.

Hallal, P.C., Victora, C.G., Azevedo, M.R., & Wells, J.C.K. (2006). Adolescent physical activity and health. *Sports Medicine*. *36*(12), 1019-1030.

Hart, E.A., Leary, M.R., & Rejeski, W.J. (1989). The measurement of Social Physique Anxiety. *Journal of Sport and Exercise Psychology*. 11, 94-104.

Hashim, H.A., Golok, F., & Ali, R. (2011). Profiles of exercise motivation, physical activity, exercise habit, and academic performance in Malaysian adolescents: A cluster analysis. *International Journal of Collaborative Research on Internal Medicine & Public Health*. *3*(6), 416-428.

Haugland, S., Wold, B., & Torsheim, T. (2003). Relieving the pressure? The role of physical activity in the relationship between school-related stress and adolescent health complaints. *Research Quarterly for Exercise and Sport*. *74*(2), 127-135.

Heatherton, T.F., & Wyland, C.L. (2003). Assessing self-esteem. In S.J. Lopez & C.R. Synder (Eds.), *Positive psychological assessment: A handbook of models and measures* (pp.219-233). Washington, DC, US: American Psychological Association.

Hidayati, H., Hatthakit, U., & Isramalai, S-A., (2012). Correlates of physical activity in Asian adolescents: A literature review. *Nurse Media Journal of Nursing*. *2*(2), 451-466.

Ho, S.M., & Lee, T.M. (2001). Computer usage and its relationship with adolescent lifestyle in Hong Kong. *Journal of Adolescent Health*. *29*(4), 258-266.

Hopwood, M. J., Farrow, D., MacMahon, C., & Baker, J. (2015). Sibling dynamics and sport expertise. *Scandinavian Journal of Medicine & Science In Sports*, *25*(5), 724-733.

Humbert, M. L., Chad, K. E., Bruner, M. W., Spink, K. S., Muhajarine, N., Anderson, K. D., ... Gryba, C. R. (2008). Using a naturalistic ecological approach to examine the factors influencing youth physical activity across grades 7 to 12. *Health Education & Behavior*, *35*(2), 158-173.

Humphreys, B.R., & Ruseski, J.E. (2011). An economic analysis of participation and time spent in physical activity. *The BE Journal of Economic Analysis & Policy*. 11(1), 47.

Institute for Public Health of Ministry of Health (Malaysia). (2011). *Malaysia National and Morbidity Survey 2011: Non-communicable diseases.* Putrajaya: Ministry of Health (Malaysia).

Institute for Public Health (2012). The National Health and Morbidity Survey: Malaysia Global School-based Student Health Survey 2012. Kuala Lumpur: Ministry of Health Malaysia.

Institute for Public Health. (2017). *National Health and Morbidity Survey (NHMS) 2017: Adolescents Health Survey 2017*. Malaysia: Kuala Lumpur: Institute for Public Health of Ministry of Health Malaysia.

Institute for Public Health (2018). *National Health and Morbidity Sutvey (NHMS) 2017: Key findings from the adolescents; health and nutrition surveys infographic booklets.* Malaysia: Kuala Lumpur: Institute for Public Health of Ministry of Health Malaysia.

IPAQ. (2005). Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ) – Short and Long Forms, revised on November 2005. Available: http://www.ipaq.ki.se/scoring.pdf Accessed 15 March 2014.

Isomaa, R., Väänänen, J. M., Fröjd, S., Kaltiala-Heino, R., & Marttunen, M. (2013). How low is low? Low self-esteem as an indicator of internalizing psychopathology in adolescence. *Health Education & Behavior*, *40*(4): 392-399.

Jekauc, D., Reimers, A.K., Wagner, M.O., & Woll, A. (2012). Prevalence and socio-demographic correlates of the compliance with the physical activity guidelines in children and adolescents in Germany. *BMC Public Health*, 12(1), 714-722.

Kantomaa, M. T., Tammelin, T. H., Näyhä, S., & Taanila, A. M. (2007). Adolescents' physical activity in relation to family income and parents' education. *Preventive medicine*, *44*(5), 410-415.

Kee, C.C., Lim, K.H., Sumarni, M.G., Ismail, M.N., Poh, K.H., & Amal, N.M. (2011). Physical activity and sedentary behaviour among sedentary in Petaling district, Selangor, Malaysia. *Malaysian Journal of Medicine and Health Sciences*. *7*(1), 83-93.

Kim, H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, *38*(1), 52-54.

Kim, I. G., & So, W. Y. (2014). The relationship between household income and physical activity in Korea. *Journal of Physical Therapy Science*, *26*(12), 1887-1889.

Kim, Y. H. (2004). Korean adolescents' exercise behaviour and its relationship with psychological variables based on stages of change model. *Journal of Adolescent Health. 34*(6), 523-530.

Kololo, H., Guszkowska, M., Mazur, J., & Dzielska, A. (2012). Self-efficacy, self-esteem and body image as psychological determinants of 15-year-old adolescents' physical activity level. *Human Movement. 13*(3), 264-270.

Kovacs, M. (1992). *Children's Depression Inventory (CDI).* New York: Multi-health Systems, Inc.

Kremer, P., Elshaug, C., Leslie, E., Toumbourou, J.W., Patton G.C. & Williams, J. (2014). Physical activity, leisure-time screen use and depression among children and young adolescents. *Journal of Science and Medicine in Sport. 17*(2), 183-187.

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric Annals*, *32*(9), 509-515.

Kumar, K. S., & Akoijam, B. S. (2017). Depression, anxiety and stress among higher secondary school students of Imphal, Manipur. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, *42*(2), 94-99.

Latiff, L. A., Tajik, E., Ibrahim, N., Abu Bakar, A. S., & Ali Shirin, S. S. A. (2016). Depression and its associated factors among secondary school students in Malaysia. *Southeast Asian Journal of Tropical Medicine and Public Health*, *47*(1), 131-141.

Latiff, L.A., Tajik, E., Ibrahim, N., Abu Bakar, A.S., & Albar Ali, S.S.A. (2017). Psychosocial problem and its associated factors among adolescents in the secondary school in Pasir Gudang, Johor. *Malaysian Journal of Medicine and Health Sciences, 13*(1), 35-44.

Lau, X.C., Chong, K.H., Poh, B.K., & Ismail, M.N. (2013). Physical activity fitness and the energy cost of activities: implications for obesity in children and adolescents in the tropics. In *Advances in food and nutrition research*. (Vol. 70, pp. 49-101). Academic Press.

Law, L.S., Mohd Nasir, M.T., & Hazizi, A.S. (2014). Factors associated with physical activity level among adolescents in Sarawak, Malaysia. *Journal of Physical Activity, Sports and Exercise*. *2*(1), 07-14.

Lee, K.S., Loprinzi, P.D., & Trost, S.G. (2010). Determinants of physical activity in Singaporean adolescents. *International Journal of Behavioural Medicine*. *17*(4), 279-286.

Lewis, B.A., Marcu, B.H., Pate, R.R., & Dunn, A.L. (2002). Psychosocial mediators of physical activity behaviour among adults and children. *American Journal of Preventive Medicine. 23*(2S), 26-35.

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), e0157730.

Lin, H.J., & Yusoff, M.S.B. (2013). Psychological distress, sources of stress and coping strategy in high school students. *International Medical Journal*. *20*(6), 672-696.

Lovasi, G. S., Hutson, M. A., Guerra, M., & Neckerman, K. M. (2009). Built environments and obesity in disadvantaged populations. *Epidemiologic Reviews, 31*(1), 7-20.

Lu, C., Stolk, R. P., Sauer, P. J., Sijtsma, A., Wiersma, R., Huang, G., & Corpeleijn, E. (2017). Factors of physical activity among Chinese children and adolescents: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 36.

Luszczynska, A., Sheng Cao, D., Mallach, N., Pietron, K., Mazurkiewicz, M., & Schwarzer, R. (2010). Intentions, planning, and self-efficacy predict physical activity in Chinese and Polish adolescents: Two moderated mediation analyses. *International Journal of Clinical and Health Psychology*, *10*(2). 265-278.

Lwanga, S.K. & Lemeshow, S. (1991). Sample size determination in health studies: A practical manual. Geneva: World Health Organization.

Machado-Rodrigues, A.M., Coelho-e-Silva, M.J., Mota, J., Padez, C., Ronqque, R., Cumming, S.P., & Malina, R.M. (2012). Cardiorespiratory fitness, weight status and objectively measured sedentary behaviour and physical activity in rural and urban Portuguese adolescents. *Journal of Child Health Care, 16*(2), 166-177.

Malaysia Health Promotion Board (*Lembaga Promosi Kesihatan Malaysia)*. (2011). Modul Program Promosi Kesihatan: Aktiviti fizikal 2011. Retrieved from: https://www.slideshare.net/wansuhaimiwansetapa/modul-program-promosi-kesihatan

Malaysia Health Promotion Board. (2018). Mengenai MySihat. Retrieved from: http://www.mysihat.gov.my/index.php/ms/tentang-kami

Mann, M.M., Hosman, C.M.H., Schaalma, H.P., & de Vries, N.K. (2004). Self-esteem in a broad-spectrum approach for mental health promotion. *Health Education Research*. *19*(4), 357-372.

Marcus, M., Yasamy, M. T., van Ommeren, M., Chisholm, D., & Saxena, S. (2012). Depression: A global public health concern. *WHO Department of Mental Health and Substance Abuse, 1*, 6-8.

Markland, D., & Tobin, V. (2004). A modification to be the Behavioural Regulation in Exercise Questionnaire to include an assessment of amotivation. *Journal of Sport and Exercise Psychology*. *26*, 191-196.

McDowell, C. P., MacDonncha, C., & Herring, M. P. (2017). Brief report: Associations of physical activity with anxiety and depression symptoms and status among adolescents. *Journal of adolescence*, *55*, 1-4.

McMahon, E.M., Corcoran, P., O'Regan, G., Keeley, H., Cannon, M., Carli, V., ... Wasserman, D. (2017). Physical activity in European adolescents and associations with anxiety, depression and well-being. *European Child and Adolescent Psychiatry, 26*(1), 111-122.

McMinn, A. M., van Sluijs, E. M., Nightingale, C. M., Griffin, S. J., Cook, D. G., Owen, C. G., ... Whincup, P. H. (2011). Family and home correlates of children's physical activity in a multi-ethnic population: the cross-sectional Child Heart and Health Study in England (CHASE). *International Journal of Behavioral Nutrition and Physical Activity, 8*(1), 11.

McVeigh, J. & Meiring, R. (2014). Physical activity and sedentary behaviour in ethnically diverse group of South African school children. *Journal of Sports Science and Medicine*. 13(), 371-378.

Micklesfield, L. K., Pedro, T. M., Kahn, K., Kinsman, J., Pettifor, J. M., Tollman, S., & Norris, S. A. (2014). Physical activity and sedentary behavior among adolescents in rural South Africa: levels, patterns and correlates. *BMC Public Health, 14*(1), 40-49.

Ministry of Education Malaysia. (2011). *Buku panduan pelaksanaan dasar satu murid satu sukan (1M1S).* Ministry of Education Sports Department: Putrajaya.

Ministry of Health Malaysia. (2010). Key Message 3: Be physically active everyday. In *Malaysian Dietary Guidelines* (pp. 38-62). Putrajaya: Technical Working Group on Nutritional Guidelines.

Ministry of Health Malaysia (2012). Health Education. In *Annual Report Ministry of Health 2012* (pp. 159-161). Putrajaya: Ministry of Health. Retrieved from http://www.moh.gov.my/images/gallery/publications/MOH%202012.pdf

Ministry of Health Malaysia (2017a). Kempen Berjalan 10,000 Langkah. Retrieved from http://www.infosihat.gov.my/index.php/projek-khas/berjalan-10-000-langkah

Ministry of Health Malaysia (2017b). Kempen Nak Sihat. Retrieved from http://www.infosihat.gov.my/index.php/projek-khas/nak-sihat

Moksnes, U.K., Moljord, I.E.O., Espnes, G.A., & Byrne, D.G. (2010). Leisure time physical activity does not moderate the relationship between stress and psychological functioning in Norwegian adolescents. *Mental Health and Physical Activity*. *3*, 17-22.

Moljord, I.E.O., Moksnes, U.K., Eriksen, L., & Espnes, G.A. (2011). Stress and happiness among adolescents with varying frequency of physical activity. *Perceptual and Motor Skills*. *113*(2), 631-646.

Montshiwa, V.T., & Moroke, N.D. (2014). Assessment of the reliability and validity of student-lecturer evaluation questionnaire: A case of North West University, *Mediterranean Journal of Social Sciences, 5*(14), 352-364.

Mony, P.K., Swaminathan, S., Gajendran, J.K. & Vaz, M. (2016). Quality assurance for accuracy of anthropometric measurements in clinical and epidemiological studies: [Errare humanum est=to err is human]. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine, 41*(2), 98-102.

Moreira, S.R., da Cruz, L.C., Diniz, L.C., Albuquerque, J.B., Lima, T.S., Carvalho, F.O., & Goncalves, M.P. (2013). Associating physical activity levels to stress, high blood pressure, and high blood glucose risks in Green Park Users. *Journal of Exercise Physiology. 16*(2), 51-58.

Morrissey, J. L., Janz, K. F., Letuchy, E. M., Francis, S. L., & Levy, S. M. (2015). The effect of family and friend support on physical activity through adolescence: a longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1), 103.

Mota, J., Silva, P., Santos, M. P., Ribeiro, J. C., Oliveira, J., & Duarte, J. A. (2005). Physical activity and school recess time: differences between the sexes and the relationship between children's playground physical activity and habitual physical activity. *Journal of sports sciences*, *23*(3), 269-275.

Mülazimoğlu-Balli, Ö., Koca, C., & Aşçi, F. (2010). An examination of social physique anxiety with regard to sex and level of sport involvement. *Journal of Human Kinetics, 26*, 115-122.

Mullan, E., Markland, D., & Ingledew, D.K. (1997). A graded conceptualisation of self-determination in the regulation of exercise behaviour: Development of a measure using confirmatory factor analysis procedures. *Personality and Individual Differences*. *23*, 745-752.

Muthuri, S. K., Wachira, L. J. M., Leblanc, A. G., Francis, C. E., Sampson, M., Onywera, V. O., & Tremblay, M. S. (2014). Temporal trends and correlates of physical activity, sedentary behaviour, and physical fitness among school-aged children in Sub-Saharan Africa: a systematic review. *International journal of environmental research and public health*, *11*(3), 3327-3359.

Nguyen-Michel, S. T., Unger, J. B., Hamilton, J., & Spruijt-Metz, D. (2006). Associations between physical activity and perceived stress/hassles in college students. *Stress and Health*, *22*(3), 179-188.

Niven, A., Fawkner, S., Knowles, A-M, Henretty, J., & Stephenson, C. (2009). Social physique anxiety and physical activity in early adolescent girls: The influence of maturation and physical activity motives. *Journal of Sports Sciences*. *27*(3), 299-305.

Ntoumanis, N. (2005). A prospective study of participation in optional school physical education using a self-determination theory framework. *Journal of Educational Psychology*, *97*(3), 444.

Odiaga, J. A., & Doucette, J. (2017). Technological Media and Sedentary Behavior in Pediatrics. *The Journal for Nurse Practitioners*, *13*(1), 72-78.

Owen, N., Salmon, J., Koohsari, M. J., Turrell, G., & Giles-Corti, B. (2014). Sedentary behaviour and health: mapping environmental and social contexts to underpin chronic disease prevention. *British Journal of Sports Medicine*, *48*(3), 174-177.

Park, H., & Kim, N. (2008). Predicting factors of physical activity in adolescents: A systematic review. *Asian Nursing Research*. *2*(2), 113-128.

Pearson, N., Braithwaite, R. E., Biddle, S. J., Sluijs, E. M. F., & Atkin, A. J. (2014). Associations between sedentary behaviour and physical activity in children and adolescents: a meta-analysis. *Obesity Reviews*, *15*(8), 666-675.

Prochaska, J. J., Sallis, J. F., & Long, B. (2001). A physical activity screening measure for use with adolescents in primary care. *Archives of Pediatrics & Adolescent Medicine, 155*(5), 554-559.

Pugh, N.E., & Hadjustavropoulos, H.D. (2011). Is anxiety about health associated with desire to exercise, physical activity and exercise dependence?. *Journal and Individual Differences*. 51, 1059-1062.

Reynonld, C.R., & Richmond, B.O. (1978). What I think and feel: A revised measure of Children's Manifest Anxiety. *Journal of Abnormal Child Psychology*. *6*(2), 271-280.

Robinson, A., & Lewis, V. (2016). Social Physique Anxiety: An Exploration of Influence on Sporting Confidence and Participation. *Journal of Applied Biobehavioral Research*, *21*(1), 46-59.

Rocheleau, C.A., Webster, G.D., Bryan, A., & Frazier, J. (2004). Moderators of the relationship between exercise and mood changes: gender, exertion level, and workout duration. *Psychology & Health. 19*(4), 491-506.

Rønbeck, N. F., & Vikander, N. O. (2011). The role of peers: siblings and friends in the recruitment and development of athletes. *Acta Kinesiologiae Universitatis Tartuensis*, *17*, 155-174.

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Rosenkranz, R.R., Welk, G.J., & Dzewaltowski, D.A. (2011). Environmental correlates of objectively measured physical activity and sedentary behaviour in after-school recreation sessions. *Journal of Physical Activity and Health*. *8*(Suppl 2), S214-S221.

Rushton, J.L. Forcier, M., & Schectmen, R.M. (2002). Epidemiology of depressive symptoms in the National Longitudinal Study of adolescents health. *Journal of American Academic in Children and Adolescents Psychiatry*. *41*(2), 199-205.

Ryan, R.M., & Connell, J.P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*. *57*, 749-761.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68.

Sabiston, C.M., Pila, E., Pinsonnault-Bilodeau, G., & Cox, A.E. (2014). Social physique anxiety experiences in physical activity: a comprehensive synthesis of research studies focused on measurement, theory, and predictors and outcomes. *International Review of Sport and Exercise Psychology. 7*(1), 158-183.

Saimon, R., Choo, W.Y., Chang, K.H., Ng, C.J., Bulgiba, A. (2015). Physical activity among adolescents in an East Malaysian rural indigenous community: exploring the influence of neighbourhood environmental factors. *Asia Pacific Journal of Public Health*. *27*(8_suppl), 33S-40S.

Sallis, J.F., Pinski, R.B., Grossman, R.M., Patterson, T.L., & Nader, P.R. (1988). The development of self-efficacy scales for health-related diet and exercise behaviours. *Health Education Research. 3*(3), 283-292

Sallis, J.F., Prochaska, J.J., & Taylor, W.C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise*. *32*(5), 963-975.

Sallis, J.F., & Saelens, B.E. (2000). Assessment of physical activity by self-report: Status, limitations and future directions. *Research Quarterly for Exercise and Sport*. *71*(2 Suppl), S1-S14.

Saunders, R.P., Pate, R.R., Felton, G., Dowsa, M., Weinrich, M.C., Ward, D.S., Parsons, M.A., & Baranowski, T. (1997). Development of questionnaires to measure psychosocial influences on children physical activity. *Preventive Medicine*. *26*, 241-247.

Schraml, K., Perski, A., Grossi, G., & Simonsson-Sarnecki, M. (2013). Stress symptoms among adolescents: The role of subjective psychosocial conditions, lifestyle, and self-esteem. *Journal of Adolescence. 34*, 987-996.

Selangor State Education Department. (2012). Statistik dan maklumat sekolah 2012. Retrieved from http://jpnselangor.moe.gov.my/jpns/index.php

Seyle, H. (1973). The Evolution of the Stress Concept: The originator of the concept traces its development from the discovery in 1936 of the alarm reaction to modern therapeutic applications of syntoxic and catatoxic hormones. *American Scientist*. *61*(6), 692-699.

Sharif, R. Chong, K.H., Zakaria, N.H., Ong, M.L., Reilly, J.J., Wong, J.E., … & Poh, B.K. (2016). Results from Malaysia's 2016 report card on physical activity for children and adolescents. *Journal of Physical Activity and Health, 13*(11 Suppl 2), S201-S205.

Sicilia, A., Sáenz-Alvarez, P., González-Cutre, D., & Ferriz, R. (2014). Exercise motivation and social physique anxiety in adolescents. *Psychologica Belgica*, *54*(1), 111-129.

Silva, D. R., Fernandes, R. A., Ohara, D., Collings, P. J., Souza, M. F., Tomeleri, C. M., ... & Cyrino, E. S. (2016). Correlates of sports practice, occupational and leisure-time physical activity in Brazilian adolescents. *American Journal of Human Biology*, *28*(1), 112-117.

Sreeramareddy, C.T., Kutty, N.A.M., Jabbar, M.A.R., & Boo, N.Y. (2012). Physical activity and associated factors among young adults in Malaysia: An online exploratory survey. *BioScience Trends. 6*(3), 103-109.

Spitzer, R.L., Johnson, J.G. (1995). The Patient Health Questionnaire, Adolescents version. Biometrics Research Unit, New York State Psychiatric Institute.

Su, T. T., Sim, P. Y., Nahar, A. M., Majid, H. A., Murray, L. J., Cantwell, M. M., ... Jalaludin, M. Y. (2014). Association between self-reported physical activity and indicators of body composition in Malaysian adolescents. *Preventive Medicine*, *67*, 100-105.

Tajik, E., Latiff, L.A., Adznam, S.N., Awang, H, Chin, Y.S., & Abu Bakar, A.S. (2016). A study on level of physical activity, depression, anxiety and stress symptoms among adolescents. *The Journal of Sports Medicine and Physical Fitness*. 57(10), 1382-1387.

Tam, C.L., Bonn, G., Yeoh, S.H. & Wong, C.P. (2014). Investigating diet and physical activity in Malaysia: education and family history of diabetes relate to lower levels of physical activity. *Frontiers in Psychology*. 5, 13281. doi:10.3389/fpsyg.2014.01328

Taveras, E.M., Field, A.E., Berkey, C.S., Rifas-Shiman, S.L., Frazier, A.L., Colditz, G.A., & Gillman, M.W. (2007). Longitudinal relationship between television viewing and leisure-time physical activity during adolescence. *Paediatrics*. *119*(2), e314-e319.

Taylor, S.M., Ward, P., Zabriskie, R., Hill, B., & Hanson, C. (2012). Influences on active family leisure and healthy lifestyle among adolescents. *Leisure Sciences*. *34*(4), 332-349

Telford, R. M., Telford, R. D., Olive, L. S., Cochrane, T., & Davey, R. (2016). Why Are girls less physically active than boys? findings from the LOOK longitudinal study. *PloS one*, *11*(3), e0150041.

Troiano, R.P., Berrigan, D., Dodd, K.W., Masse, L.C. Tilert, T., & McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine and Science in Sports and Exercise, 40*(1), 181-188.

United States Department of Health and Human Services. (2008). Part E: Integration and Summary of the Science. In *Physical activity guidelines advisory committee report, 2008: To the secretary of Health and Human Services* (pp. E22-E35). Washington, DC: US. Department of Health and Human Services.

Van der Horst, K., Paw, M.J.A., Twisk, J.W.R., & Van Mechelen, W. (2007). A brief review on correlates of physical activity and sedentariness in youth. *Medicine and Science in Sports and Exercise*. *39*(8), 1241-1250.

Veselskla, A., Geckova, A.M., Reijneveld, S.A., & van Dijk, J.P. (2011). Socio-economic status and physical activity among adolescents: The mediating role of self-esteem. *Public Health*. *125*, 763-768.

Wang, C.K.J., Chia, Y.H.M., Quek, J.J., & Liu, W.C. (2006). Patterns of physical activity, sedentary behaviours, and psychological determinants of physical activity among Singaporean school children. *International Journal of Sport and Exercise Psychology*. *4*(3), 227-249.

Wang, C.K.J., Koh, K.T., Biddle, S.J.H., Liu, W.C., & Chye, S. (2011). Physical activity patterns and psychological correlated of physical activity among Singaporean primary, secondary, and junior college students. *Journal of Research in Health, Physical Education, Recreation, Sport & Dance. 6*(2), 3-9.

Wang, X., Liu, Q.M., Ren, Y.J., Lv, J., & Li, L.M. (2015). Family influences on physical activity and sedentary behaviours in Chinese junior high school students: a cross-sectional study. *BMC Public Health*, *15*(1), 287.

Warren, J. M., Ekelund, U., Besson, H., Mezzani, A., Geladas, N., & Vanhees, L. (2010). Assessment of physical activity–a review of methodologies with reference to epidemiological research: a report of the exercise physiology section of the European Association of Cardiovascular Prevention and Rehabilitation. *European Journal of Cardiovascular Prevention & Rehabilitation*, *17*(2), 127-139.

Watson, A., Eliott, J., & Mehta, K. (2015). Perceived barriers and facilitators to participation in physical activity during the school lunch break for girls aged 12-13 years. *European Physical Education Review, 21*(2), 257-271.

Wilson, N.C. (2008). Section 3: Results. In *Pilot study report for survey of physical activity and sport in Malaysian children (KAFS08)* (pp. 16-31) . Kuala Lumpur: National Sports Institution.

Woon, F.C., Chin, Y.S., & Nasir, M.T.M. (2015). Association between behavioural factors and BMI-for-age among early adolescents in Hulu Langat district, Selangor, Malaysia. *Obesity Research & Clinical Practice*, *9*(4), 346-356.

World Health Organization. (2007). Growth reference 5-19 years: BMI-for-age (5-19 years). Available at: http://www.who.int/growthref/who2007_bmi_for_age/en/

World Health Organization. (2009). *Pharmacological treatment of mental disorders in primary health care.* Geneva: World Health Organization.

World Health Organization. (2010a). *Ten facts on physical activity.* Available at: www.who.int/features/factfiles/physical_activity/en/

World Health Organization. (2010b). Age Group: 5-17 years old. In *Global recommendations on physical activity for health* (pp. 17-21). Geneva: World Health Organization.

World Health Organization. (2010c). *Urbanization and health*. Bulletin of the World Health Organization. 88(4), 245-246. Available at: www.who.int/bulletin/volumes/88/4/100010410/en/

World Health Organization. (2011a). Introduction. In *Strategic directions for improving adolescent health in South-East Asia Region* (pp. 1-2). India, New Delhi: World Health Organization Regional Office for South-East Asia.

World Health Organization. (2011b). Background and meeting objective In WHO (Ed.) *The sexual and reproductive health of young adolescents in developing countries: Reviewing the evidence, identifying research gaps, and moving the agenda: report of a WHO technical consultation, Geneva, 4-5 November 2010 (No. WHO/RHR/11.11)* (pp.3). Geneva: World Health Organization.

World Health Organization. (2014). Malaysia. In *Non-Communicable Disease (NCD) Country Profiles 2014* (pp. 116). Geneva: World Health Organization.

World Health Organization. (2016). *Group Interpersonal Therapy (IPT) for Depression*. Geneva: World Health Organization.

World Health Organization. (2017). *Depression and Other Common Mental Disorders: Global Health Estimates*. Geneva: World Health Organization.

World Health Organization. (2018). *Physical activity*. Available at: www.who.int/news-room/facts-in-pictures/detail/physical-activity

Wu, T. Y., & Pender, N. (2002). Determinants of physical activity among Taiwanese adolescents: An application of the health promotion model. *Research in Nursing & Health*. 25, 25-36.

Yaacob, S.N., Juhari, R., Abu Talib, M., & Uba, I. (2009). Loneliness, stress, self esteem and depression among Malaysian adolescents. *Jurnal Kemanusiaan*. 14, 85-95.

Yusof, M.S.B. (2010). Stress, stressors and coping strategies among secondary school students in a Malaysian government secondary school: Initial findings. *ASEAN Journal of Psychiatry*. *11*(2), Jul-Dec 2010

Zhang, J., Middlestadt, S. E., & Ji, C. Y. (2007). Psychosocial factors underlying physical activity. *International Journal of Behavioral Nutrition and Physical Activity*, *4*(1), 38.

BIODATA OF STUDENT

Leong In Tyng is a student graduated from Universiti Sains Malaysia (USM) with the degree of Bachelor of Health Sciences in Exercise and Sport Science in 2012. She is a dedicated student with great interest in the field of research. Her interest drives her to pursue Master degree in Universiti Putra Malaysia (UPM). She completes her Master of Science in Community Health in 2018.

LIST OF PUBLICATIONS

Leong, I.T., Nor Afiah, M.Z. & Salmiah, M.S. (2017, October). Physical activity self-efficacy and physical activity level among form four students in Selangor. In H.A. Hashim & C.K. Chen, *11th International Sports Science Conference 2017*, Universiti Sains Malaysia, Kelantan, Malaysia.

Leong, I.T., Nor Afiah, M.Z. & Salmiah, M.S. (2018, July). Self esteem and physical activity level among Form Four students. In Malaysian Journal of Public Health Medicine. *9th National Public Health Conference 2018, Translating Health Policies into Effective Action*, Malaysian Public Health Physicians' Association. 18(Suppl 2), 66-67.

Leong, I.T., Nor Afiah, M.Z. & Salmiah, M.S. (2019). Do psychological factors and sedentary activities influence physical activity level? Findings from Malaysian adolescents. *International Journal of Adolscence and Youth*, 1-10. doi: https://doi.org/10.1080/02673843.2019.1628079

UNIVERSITI PUTRA MALAYSIA

STATUS CONFIRMATION FOR THESIS / PROJECT REPORT AND COPYRIGHT

ACADEMIC SESSION : Second Semester 2018/2019

TITLE OF THESIS / PROJECT REPORT :

SOCIODEMOGRAPHIC AND PSYCHOLOGICAL DETERMINANTS OF PHYSICAL ACTIVITY LEVEL AMONG FORM FOUR STUDENTS IN SELANGOR, MALAYSIA

NAME OF STUDENT: LEONG IN TYNG

I acknowledge that the copyright and other intellectual property in the thesis/project report belonged to Universiti Putra Malaysia and I agree to allow this thesis/project report to be placed at the library under the following terms:

1. This thesis/project report is the property of Universiti Putra Malaysia.
2. The library of Universiti Putra Malaysia has the right to make copies for educational purposes only.
3. The library of Universiti Putra Malaysia is allowed to make copies of this thesis for academic exchange.

I declare that this thesis is classified as :

*Please tick (√)

☐	**CONFIDENTIAL**	(Contain confidential information under Official Secret Act 1972).
☐	**RESTRICTED**	(Contains restricted information as specified by the organization/institution where research was done).
☐	**OPEN ACCESS**	I agree that my thesis/project report to be published as hard copy or online open access.

This thesis is submitted for :

☐ **PATENT** Embargo from _____ (date) until _____ (date)

Approved by:

_____
(Signature of Student)
New IC No/ Passport No.:

Date :

_____
(Signature of Chairman of Supervisory Committee)
Name:

Date :

[Note : If the thesis is CONFIDENTIAL or RESTRICTED, please attach with the letter from the organization/institution with period and reasons for confidentially or restricted.]