PHYSICAL ACTIVITY AND ITS ASSOCIATED FACTORS AMONG SECONDARY SCHOOL STUDENTS IN TERENGGANU

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ABBREVIATIONS

ASEAN   Association of Southeast Asian Nations

BMI   body mass index

CI   confident interval

GSHS   Global School-based Student Health Survey

IPH   Institute for Public Health

OR   odds ratio

PAQ-C   physical activity questionnaire for older children

ROC   receiver operating characteristics

SD   standard deviation

SEANUTS   South East Asian Nutrition Survey

USM   Universiti Sains Malaysia

WHO   World Health Organization

ABSTRAK

Aktiviti fizikal dan faktor-faktor yang berkaitan dalam kalangan pelajar sekolah menengah di Terengganu

Pengenalan: Aktiviti fizikal merujuk kepada sebarang aktiviti yang melibatkan pergerakan anggota badan. Tempoh saranan aktiviti fizikal untuk remaja adalah sebanyak 60 minit sehari. Risiko obesiti dan penyakit tidak berjangkit yang lain meningkat bagi mereka yang tidak aktif secara fizikal.

Objektif: Kajian ini bertujuan untuk menentukan tahap aktiviti fizikal dan faktor-faktor yang berkaitan dalam kalangan pelajar sekolah menengah di Terengganu.

Kaedah: Kajian keratan rentas dijalankan pada Ogos 2016 melibatkan pelajar tingkatan satu dan dua daripada enam buah sekolah menengah kerajaan. Kaedah persampelan kluster berstrata berbilang telah digunakan. Data dikumpulkan menggunakan borang soalselidik Aktiviti Fizikal untuk Kanak-Kanak Versi Bahasa Melayu dan Gambar Rajah Skala Penilaian Lukisan Kontur Badan. Data analisa melalui regresi logistik tunggal dan berbilang menggunakan SPSS versi 22.

Keputusan: Sejumlah 603 pelajar terlibat dengan kadar respon 89.7%. Sebanyak 52.9% pelajar adalah tidak aktif secara fizikal. Regresi logistik berbilang menunjukkan pelajar perempuan [OR (95% CI): 5.07 (3.57, 7.20)] dan peruntukan masa ulangkaji [OR (95% CI): 0.86 (0.75, 0.98)] berkait dengan ketidakaktifan fizikal.

Kesimpulan: Dapatan kajian menunjukkan majoriti pelajar adalah tidak aktif secara fizikal. Pelajar yang tidak aktif secara fizikal memperuntukkan masa ulangkaji yang sedikit dan kebanyakannya adalah pelajar perempuan.

Kata kunci: aktiviti fizikal, remaja, sekolah menengah, masa skrin.

ABSTRACT

Physical activity and its associated factors among secondary school students in Terengganu

Introduction: Physical activity refers to any body movement that requires energy expenditure. The suggested time for physical activity for adolescents is 60 minutes per day. The risk for obesity and other non-communicable disease increases for those not physically active.

Objective: This study is to determine the level of physical activity and its associated factors among secondary school students in Terengganu.

Methods: A cross sectional study was conducted in August 2016 involving form one and form two students from six government secondary schools. Multistage stratified cluster sampling was employed. The data were collected using Physical Activity Questionnaire for Children (PAQ-C) (Malay version) and Body Image Contour Drawing Rating Scale. Data were analysed by single and multiple logistic regression using SPSS version 22.

Result: A total of 603 students were involved with response rate 89.7%. About 52.9% of the students were physically inactive. Multiple logistic regression analysis shows that being female [OR (95% CI): 5.07 (3.57, 7.20)] and time allocated for study [OR (95% CI): 0.86 (0.75 , 0.98)] were associated with physical inactivity.

Conclusion: Majority of adolescents were physically inactive. Physically inactive students allocate less time for study and mostly were female.

Key words: physical activity, adolescent, secondary school, screen time

CHAPTER 1: INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (World Health Organization (WHO), 2018). The World Health Organization (WHO) suggested that child and adolescent ranging from 5 to 17 years old need to have moderate to high intensity physical activity at least 60 minutes per day. Physical inactivity refers to those who do not reach the required level of physical activity. Understanding why people are physically active or inactive contributes to evidence-based planning of public health interventions because effective programmes will target factors known to cause inactivity (Bauman *et al.*, 2012).

Physical inactivity is becoming more common and can lead to serious health concern (Booth *et al.*, 2012). It will increase risk of non-communicable diseases, such as, cardiovascular disease, colon and breast cancer, type 2 diabetes mellitus and shorten life expectancy (Lee *et al.*, 2012). Piirtola *et al.* (2017) studying twin for 35 years from adulthood and found that persistently inactive participants and those become inactive had greater weight increment thus lead to higher body mass index (BMI) later in life. Obesity itself relate with metabolic syndrome and other non-communicable diseases. Indirectly, it will also impact socioeconomic activity and directly put more burden to healthcare facilities.

The WHO has made a target for a reduction of 10% physical inactivity by 2025 (Monge-Rojas *et al.*, 2002). In Malaysia, many campaigns had been carried out by Ministry of Health such as '*Healthy lifestyle campaign',* 10,000 steps a day campaign, *'Jom Guna Tangga'* campaign, Obesity Intervention Programme, *'Warga Sihat Warga Produktif'* programme, Communication for Behavioural Impact, and '*Komuniti Sihat Perkasa Negara'.* All these programmes include physical activity as a part of their program.

Ministry of Education also plays a big role in increasing physical activity among school children. They make sure there are physical education session in time table both for primary and secondary schools. They also encourage yearly sports day in schools. The school sports council arrange for sports competition in district, state and national level. '1 Student 1 Sport' module had also been introduced in schools for these purposes. Ministry of Youth and Sports through its Fit Malaysia programme is encouraging physical activity especially among youth. In addition, through collaboration and support from private sectors and non-governmental organisations, many programmes such as walking, running, or cycling are being organized.

There are many factors associated with physical inactivity such as increasing age, sex, weight status, sedentary lifestyle, economic status, transportation, sports and recreation facilities and screen time (Trang *et al.*, 2009). People surrounding including peers, parents and teachers (Neumark-Sztainer *et al.*, 2003), perception of body image appearance (Azli *et al.*, 2014), and underlying medical conditions (Carroll *et al.*, 2014) also contribute to physical inactivity. Some of these factors may contribute to vicious cycle problems.

CHAPTER 2: LITERATURE REVIEW

2.1   Prevalence and burden

The WHO defines adolescents as those people between 10 and 19 years of age. Adolescence is a transition period from childhood to adulthood. Many changes occur during this time that include not only physical but also neurodevelopmental, physiological and social changes. All these changes are crucial and the experience one has during this period will influence the formation of the adult one become later. Adolescents constitute 17.3% of the total population in Malaysia (Jabatan Perangkaan Malaysia, 2017).

WHO has estimated in 2010 that 81% of adolescents aged 11 to 17 years were not sufficiently active physically worldwide (World Health Organization (WHO), 2017). In Malaysia, the number was estimated to be higher at 85.5% (World Health Organization (WHO), 2017). Azli *et al.* (2014) found that the overall prevalence of physically inactive adolescents in Malaysia was 57.3%. In Sarawak, the low level of physical activity among the adolescents was 65.9% (Law *et al.*, 2014). A study in Kuantan showed that about one-third of 13 years old students were in the low physical activity category (Dan *et al.*, 2007). These adolescents will most likely maintain their level of inactivity during adulthood. This was demonstrated through a study, which showed that the prevalence of physical inactivity among university students in Malaysia was 41.4% (Goje *et al.*, 2014).

This is alarming as these adolescents will become adult and may develop serious health concern. Their behaviour during adolescence will influence and give implication in health status later in life. Physical inactivity appears to have an impact comparable to smoking or obesity (Lee *et al.*, 2012). Physical inactivity emerge during youth relate directly to later trends in obesity and chronic diseases (Hasselstrøm *et al.*, 2002). Regular physical activity among young people is beneficial for a range of health outcomes including improved blood lipid profiles, blood pressure, body composition, glucose metabolism, bone strength and psychological health (Lee *et al.*, 2012).

2.2   Factors associated with physical activity

Being female is associated with poorer activity level among the adolescents. In Pahang, 82.7% females were physically inactive compared with 65.0% in males (Farah *et al.*, 2011). Another study showed that 45.1% female adolescents was categorized in the low physical activity level category compared to 22.1% in male adolescents (Dan *et al.*, 2011). Azli *et al.* (2014) using same questionnaire found that 57.3% of school going in Malaysia were physically inactive. Meanwhile, Goje *et al.* (2014) finding was 41.4% respondents from one local university in Selangor were inactive using International Physical Activity Questionnaire and self-efficacy scale.

BMI is postulated to be one of the associated factors for physical activity. Non-overweight children was physically more active compared to overweight and obese children (Planinšec and Matejek, 2004). Their habit may continue into adolescence and eventually adulthood. In Nigeria, a large proportion of children and adolescent participated in physical activity programme showed low prevalence of overweight and

obesity (Senbanjo and Oshikoya, 2010). However, adolescents in Malaysia did not show significant difference between physical activity and BMI (Azli *et al.*, 2014).

Body image influence was an important variable associated with physical activity among Costa Rican adolescents (Monge-Rojas *et al.*, 2002). Body weight perception (underweight perceivers) were significant factors associated with physical inactivity among Malaysian adolescents (Azli *et al.*, 2014). Among adolescents in Kuantan, 82.2% females were dissatisfied with their current body size compared to male (73%) (Farah *et al.*, 2011). Dissatisfaction with body image in women is usually shown by their desire to lose weight, whereas, for men, they wanted to gain weight (Furnham *et al.*, 2002). However, the associations between physical activity level with perception of weight status and body parts satisfaction were not significant in other local study (Dan *et al.*, 2011).

In general screen time is time spend for screen related activity such as watching television, using computer, playing video games, and smart phone. The study among adolescents in Brazil found that higher screen time (more than four hours per day) is associated with physical inactivity (Christofaro *et al.*, 2016) despite the recommendation to reduce screen time for physical inactivity (The United States Department of Health and Human Services, 2008). Another study in Ho Chi Minh City also found that physical inactivity was associated with more time spent playing video game with odds ratio of 2.3 and watching television with odds ratio of 1.5 (Trang *et al.*, 2009).

Adolescents' physical activity is likely to differ from adults' physical activity. Adolescents may engage in higher levels of active transport (e.g., walking or cycling)

because they cannot drive a car (Dollman *et al.*, 2009). Physical education and physical activity opportunities at school also differentiate adolescent from adult physical activity (Dollman *et al.*, 2009).

The physically inactive adolescents spent more time after class for studying and revision (Trang *et al.*, 2009). This is because adolescents in most instances are under pressure to excel in academic. Adolescents also do not have the resources and the power to set-up the environment that suits their type of physical activities and have to rely on adults to provide for them.

Figure 1 shows factor associated with physical activity. It can be divided into three categorized i.e. sociodemographic, time allocation, and body perception. In sociodemographic subheadings, there were sex, race, family income, body mass index, and type of school. Time allocation can further divide to screen time and study time. For body perception, it was divide to body weight perception and body image perception.
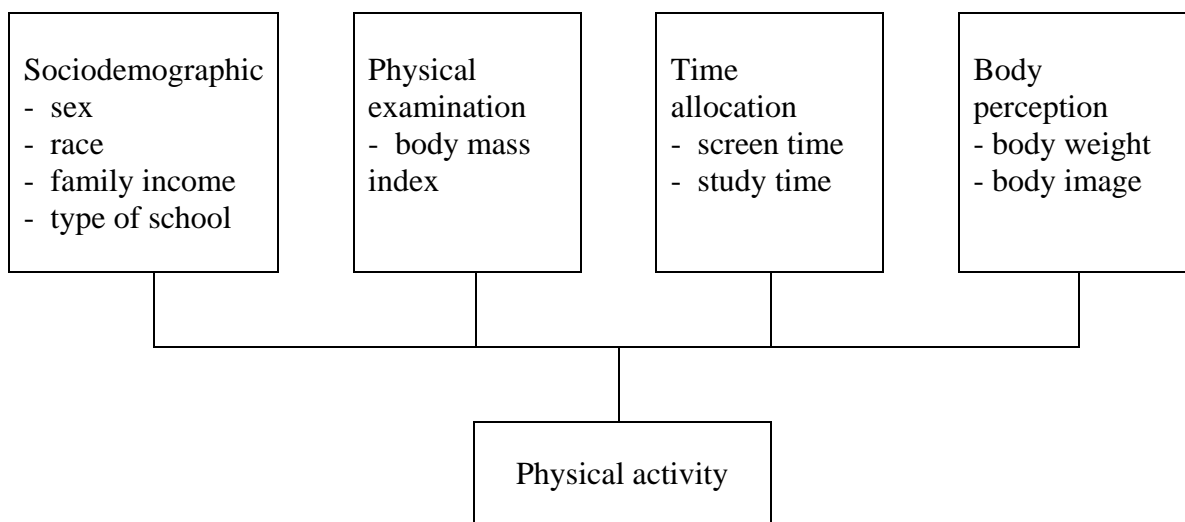
Figure 1: Conceptual frame work

2.3   Rationale of the study

Physical activity is an important part of a healthy life style. No doubt, it has good health consequences. Physical inactivity among adolescents has been reported to be on an uprising trend. It has gaining attention among public health practitioners worldwide and locally. Adolescent is a vulnerable group because it is a transition from childhood to adulthood.

In National Health and Morbidity Survey (NHMS), the national prevalence of obesity among Malaysia children below 18 years old had rose up almost doubling from 6.1% (5.6 − 6.8) (Institute for Public Health (IPH), 2011) to 11.9% (10.9 − 12.9) (Institute for Public Health (IPH), 2015). In Terengganu based on NHMS 2015, the above prevalence was 10.6% (8.0 − 13.9) (Institute for Public Health (IPH), 2015). Whereas the prevalence of being physically active at least 60 minutes daily for five days or more in the past seven days in Terengganu among secondary school students was only 23.2% (21.1 − 26.6) (Institute for Public Health (IPH), 2012).

The local data may help policy makers to make decision for planning and development of programme related with physical activity. At this age, it is easier to catch adolescent as a group and implement a programme. The sustainability of intervention if any is better predicted. Results from this study also can be used to compare with other populations. This can help further in understanding the characteristics of adolescents in different geographical locations.

CHAPTER 3: OBJECTIVES AND HYPOTHESIS

3.1   Research questions

1. What is the proportion of physical inactivity among secondary school students in Terengganu?

2. What are the associated factors for physical inactivity among secondary school students in Terengganu?

3.2   General objective

To determine the proportion of physical activity and identify its associated factors among secondary school students in Terengganu.

3.3   Specific objectives

1. To determine the proportion of physical activity among secondary school students in Terengganu

2. To identify the sociodemographic, time allocation and body perception associated factors for physical activity among secondary school students in Terengganu.

3.4   Research hypothesis

Sociodemographic, time allocation and body perception are significant associated factors for physical activity among secondary school students in Terengganu.

CHAPTER 4: METHODOLOGY

4.1   Study location

Terengganu Darul Iman is located in east coast of Peninsular Malaysia and is bordered in the northwest by Kelantan and the southwest by Pahang. Terengganu has eight official administrative districts which are Kuala Terengganu, Kuala Nerus, Kemaman, Dungun, Marang, Hulu Terengganu, Besut, and Setiu. In 2016, Terengganu has 147 government secondary schools with 105, 468 students enrolment (Jabatan Pendidikan Negeri Terengganu, 2016).

4.2   Study period

1st August 2016 – 30th August 2016

4.3   Study design

Cross-sectional study

4.4   Reference population

All secondary school students in Terengganu.

4.5   Source population

Students from selected government secondary schools in Terengganu.

4.6   Study population

Students from selected government secondary schools in Terengganu fulfilling the inclusion and exclusion criteria.

Inclusion criteria

- Form 1 and Form 2 students (those two forms are not involved with major exam)
- able to read and understand Malay language

Exclusion criteria

- absent during data collection
- full boarding school
- living in hostel
- chronic physical disability in which help for activity daily life is required, such as, muscular dystrophy and cerebral palsy.

4.7 Sampling method

Multistage stratified cluster sampling was used in this study. There were 148 secondary schools in Terengganu in 2016 of which 130 schools were eligible. The schools were further stratified into urban (n = 46) and rural (n = 84) types of school. Simple random sampling was applied in which three schools were selected from each types of school. In each school, three classes were randomly selected from each Form 1 and Form 2. In each class, all the students were selected as shown in figure 2.

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                    ┌─────────────────────────────────┐
                    │      Reference population        │
                    │ All secondary school students    │
                    │         in Terengganu            │
                    └─────────────────────────────────┘
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                    ┌─────────────────────────────────┐
                    │       Source population          │
                    │ Government secondary school in   │
                    │          Terengganu              │
                    │           (n = 148)              │
                    └─────────────────────────────────┘
                                    │        ┌──────────────────────┐
                                    │◄───────│  Exclusion criteria  │
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                    ┌─────────────────────────────────┐
                    │ Government secondary school in   │
                    │          Terengganu              │
                    │           (n = 130)              │
                    └─────────────────────────────────┘
                         │                        │
                         ▼                        ▼
              ┌──────────────────┐      ┌──────────────────┐
              │   Urban school   │      │   Rural school   │
              │     (n = 46)     │      │     (n = 84)     │
              └──────────────────┘      └──────────────────┘
                    │    ┌──────────────────────────┐    │
                    │◄───│  Simple random sampling  │───►│
                    ▼    └──────────────────────────┘    ▼
              ┌──────────────────┐      ┌──────────────────┐
              │   Urban school   │      │   Rural school   │
              │     (n = 3)      │      │     (n = 3)      │
              └──────────────────┘      └──────────────────┘
                    │    ┌──────────────────────────┐    │
                    │◄───│  Simple random sampling  │───►│
                    ▼    └──────────────────────────┘    ▼
        ┌────────────────────────┐      ┌────────────────────────┐
        │ 3 classes from Form 1  │      │ 3 classes from Form 1  │
        │ 3 classes from Form 2  │      │ 3 classes from Form 2  │
        └────────────────────────┘      └────────────────────────┘
                    │      ┌────────────────────┐      │
                    │◄─────│  Cluster sampling  │─────►│
                    ▼      └────────────────────┘      ▼
        ┌────────────────────────┐      ┌────────────────────────┐
        │   n = 352 students     │      │   n = 320 students     │
        └────────────────────────┘      └────────────────────────┘
                         └───────────┬────────────┘
                                     │    ┌──────────────────────────────────┐
                                     │◄───│ Inclusion and exclusion criteria │
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Research tools
1. Demographic and general information
2. Contour Drawing Rating Scale
3. Physical Activity Questionnaire for Older Children

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                                     │
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                    ┌─────────────────────────────────┐
                    │      Data entry & analysis       │
                    └─────────────────────────────────┘
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                    │            Write up              │
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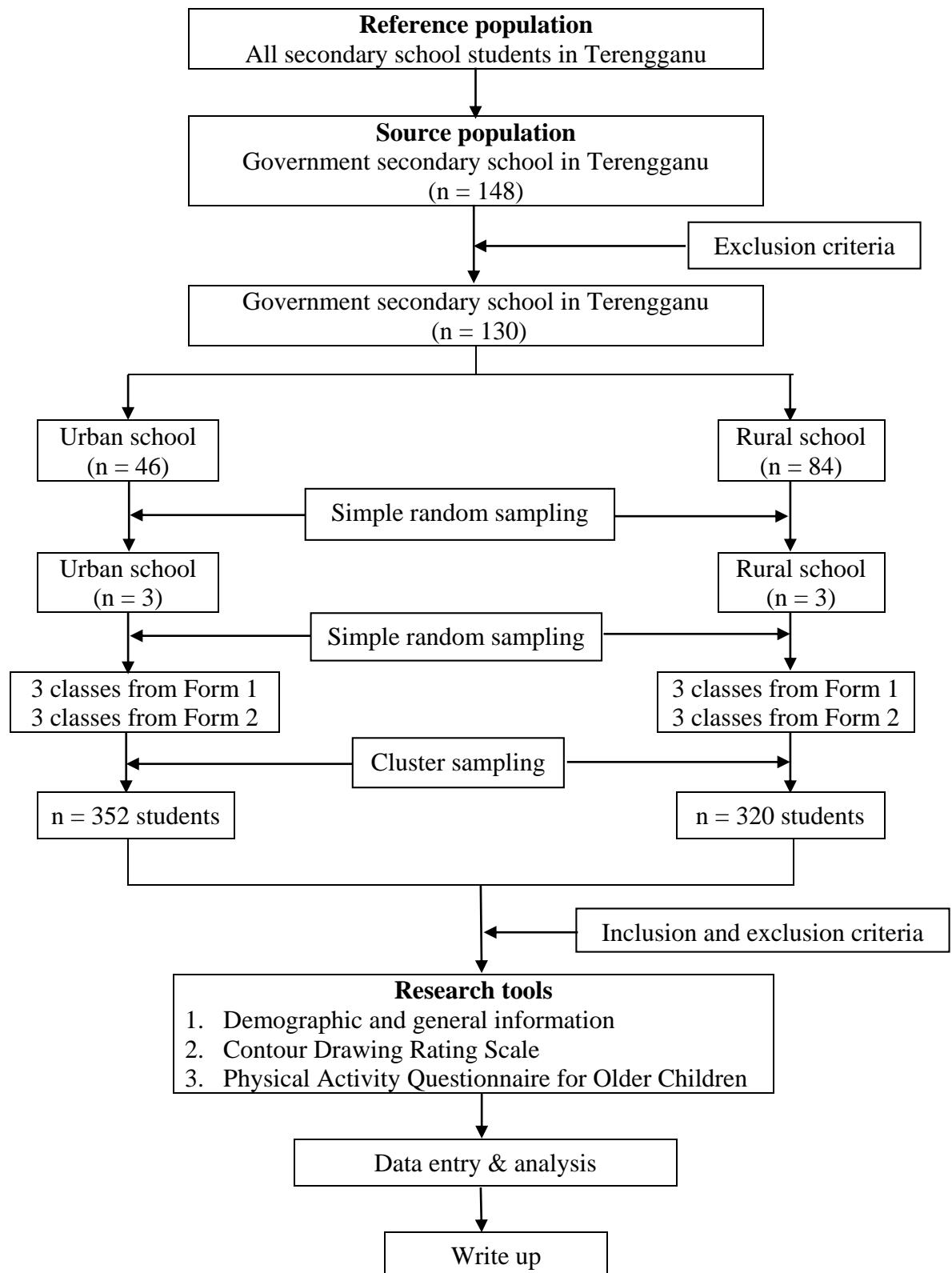
Figure 2: Study flow chart

4.8   Sample size

Objective 1 was to determine the proportion of physical inactivity among secondary students in Terengganu. Single proportion formula was used to determine the sample size.

$n = (z/\Delta)^2 * p(1-p)$

n = minimum required sample

Z = value of standard normal distribution = 1.96

Δ = precision of 0.05

p = 0.57 (Azli *et al.*, 2014)

The prevalence of physical inactivity among adolescents in Malaysia was 57% (Azli *et al.*, 2014). After considering cluster effect of 1.5 and non-response rate of 20%, the required sample size was 679.

Objective 2 was to identify the sociodemographic, time allocation and body perception associated factors for physical activity. The estimated sample size was calculated by comparing two proportions using PS software. The variable sex yielded the biggest sample for this objective.

P_0 = Proportion of female among the physically active in secondary school in Selangor was 0.75 (Aniza and Fairuz, 2009)

P_1= Proportion of female among the physically inactive in secondary school in Selangor was 0.65 (Aniza and Fairuz, 2009)

α = 0.05

After considering cluster effect of 1.5 and non-response rate of 20%, the sample needed was 592. Thus, the biggest sample size was from objective 1 and was taken as the study sample size.

4.9   Research tools

The research tools consist of demographic and general information, contour drawing rating scale and physical activity questionnaire for older children.

4.9.1: Demographic & General Information

This section of the questionnaire obtains responses on date of birth, type of school, form, height, weight, estimated family income per month, sex, race, and body weight perception. Body weight perception refers to the student evaluation of their body weight irrespective of actual body mass index (Bhurtun and Jeewon, 2013). Body height and weight had been obtained twice and recorded to the nearest 0.1 kg and 0.1 cm. Average measurement had been documented in this section. BMI was calculated by weight in kilogram divided with height^2 in metre. This section also asked about duration spent for screen time and studying in the last seven days.

4.9.2: Contour Drawing Rating Scale

The second section of the questionnaire consist of contour drawing rating scale, which is adapted from Childress et al. to assess the body image perception (Childress *et al.*, 1993) (Appendix 6). Body image perception was defined as a person's perceptions, thoughts, and feelings about his or her body (Zaccagni *et al.*, 2014). It was assess using Contour Drawing Rating Scale adapted from Childress et al (Childress *et al.*, 1993). It consists of

eight figures representing children's body outlines, ranging from very slim (contour 1) to obese (contour 8). From the eight outline figures available, students were required to choose the given figures twice. The first figure is the figure that they believe matched their current body size and second figure is the figure they think ideal for them and desired to have. Then, the figures were coded. Discrepancy scores between the two figures were obtained by deducting the scores of figure one from the scores of figure two. Zero discrepancy indicates satisfaction with body image, negative discrepancies indicate the desire to reduce body weight and positive discrepancies indicate the desire to increase body weight.

4.9.3: Physical Activity Questionnaire for Older Children

The third section of the questionnaire contains the Physical Activity Questionnaire for Older Children (PAQ-C). It is a self-administrated, 7-day recall instrument with nine items to assess the general levels of physical activity (Kent *et al.*, 2004). The tenth question in this section was to make sure that students answers were represent usual routine. If they answer yes in last question, their data will be excluded from analysis. The PAQ-C was tested in students 8 to 14 years old and can be administered in classroom setting (Kent *et al.*, 2004). The Cronbach's Alpha for PAQ-C ranged from 0.72 to 0.85 (Janz *et al.*, 2008). This questionnaire had been translated and validated in Malay with the Cronbach's Alpha of 0.79 (Dan *et al.*, 2011).

The dependant variable used in this study was physical activity status coded as active and inactive. Each item was scored on a 5 point scale. The total score of nine item ranging from 9 to 45. Final score was obtained by dividing total score with nine. The final scores categorised into low (scores of 1.00 to 2.33), moderate (scores of 2.34 to 3.66) and high

(scores of 3.67 to 5.00) physical activity level (Dan *et al.*, 2007). Students that has low physical activity was categorized as physically inactive, meanwhile students in moderate and high physical activity level were categorizes as active (Azli *et al.*, 2014).

4.10   Data collection procedure

Permission to carry out the study was obtained from Ministry of Education, Terengganu State Department of Education. Principals of selected schools were contacted and briefed regarding the study. Dates were arranged for data collections in each school. Eligible students were briefed regarding the study and parental consent form were distributed. A copy of questionnaire as well as the information about the study was also given to parents. The parents were also assured of the confidentiality of the information to ensure maximal response rate.

On the day of data collection, the parental consent forms were collected. The recruited students were once again briefed regarding the study and their assents were obtained. They were assured that all information will be kept confidential to ensure that they do not feel threaten and answer truthfully. They were then given a set of self-administered questionnaire. The height and weight were measured upon receiving questionnaire by investigator and research assistants. It was recorded by investigator team in order to avoid mistake in transferring the data. No discussions were allowed among the students to further ensure authentic information and confidentiality. The students were however allowed to ask for clarification from the researcher if any problem arise during answering the questionnaire. It took about 15 minutes to complete questionnaire.

4.11   Data entry and analysis

All collected data were entered, cleaned and analysed using the SPSS software version 22. Data checking and cleaning were performed before analysis. The distributions and frequencies of variables were examined. Categorical variables were described in frequencies and percentage. Small cell categories were identified and collapsed accordingly. Categories with small sample size were identified and meaningful combinations of categories were done when indicated.

Descriptive statistics was used to determine the proportion of physical activity and each variable. Simple and multiple logistic regression analyses were performed to identify the factors associated with physical inactivity. The outcome variable was physical activity status (0 = physically active, 1 = physically inactive). The numerical independent variables were family income, screen time, and study time. They were described as mean and standard deviation (SD) for normally distributed data and median and inter quartile range (IQR) for not normally distributed data. The categorical independent variables were type of school, sex, body mass index, body image perception, and body weight perception.

The numerical variables were defined as follows. Family income was defined as total household income per months. Screen time was defined as time spend with gadgets like television, cellular/mobile/smart phone, computer, lap top, tablet, iPad, iPod, MP3, walkman, discman, video game, etc. Screen time is taken as the mean of total time spent on the gadgets in a day. Study time was defined as mean time spent in a day for study activities outside the formal class in school such as for revision, homework, tuition, and study group.

The categorical variables were defined as follows. Type of school was categorized based on classification of school from Education Data Sector, Education Policy Planning and Research Division, Ministry of Education. BMI was classified using the WHO growth chart 2007 BMI for age Z score. It has different table for boy and girl. Students were categorized as normal weight if their weight fall within minus two SD and plus one SD. Students with more than plus one SD up to plus two SD were categorized as overweight. Students with BMI more than plus two SD categorized as obesity. Those with BMI less than minus two SD were categorized as underweight. Table of weight classifications for both gender were attached in appendix 8 & 9. Body weight perception was classified into normal weight, overweight, obese, or underweight. For body image perception, students will be classified as satisfy with body image, want to increase body size, or want to reduce body size.

The procedure of simple and multiple logistic regression analyses

Simple logistic regression was used as a screening in the selection of variables. All variables with p value less than 0.25 and clinically significant variables were included in multiple logistic regression. The p value was set larger than the level of significance to allow more important variables in the model. Multiple logistic regression using backward LR method was applied in this analysis. The preliminary main effect model was obtained.

Multicollinearity and all possible two way interactions were assessed. The preliminary final model was obtained. Model fitness tested with Hosmer-Lemeshow test, overall classification percentage and area under receiver operating characteristics (ROC) curve. The high overall classification percentage of more than 80% and area under curve of more

than 70% showed the model is fit. The final model was presented as wald stat, adjusted odds ratio (adj OR), 95% confidence interval (95% CI) and p value.

4.12   Vulnerability & ethical consideration

All participation in this study was voluntary. Students were not forced to participate and were assured that their participation or lack there-of will not have any bearing on their study performance. They were required to give their own assent after they were fully briefed of the study which is conditioned to the parental consent. Likewise the selected schools' principles were also assured that their participation in the study will be kept confidential and their individual school findings will be presented generally without revealing any specific names.

The confidentiality of the data will be strictly maintained. Coded number was used for identification. Only investigator and team have access to original data. This study have ethical approvals from Universiti Sains Malaysia Research Ethics Committee (Human) and Ministry of Education, Malaysia.

CHAPTER 5: RESULT

A total of 672 students were eligible from the six randomly selected schools based on inclusion and exclusion criteria. There were 28 students who did not give their assent or parental consent and 41 students did not completely answer the all question given. Thus, only 603 samples were further analysed giving the response rate of 89.7%.

5.1   Sociodemographic data and general information

There were 319 (52.9%) students who are physically inactive among the studied secondary school students in Terengganu. Table 1 show the characteristics of participants.

Table 1: Characteristic of physically inactive & physically active participants (n= 603)

Variables	Physically inactive (n=319)		Physically active (n=284)	
	Mean (SD)	n (%)	Mean (SD)	n (%)
Family income (RM)	1888 (2021)		2320 (3087)	
Screen time (hour/day)	2.68 (2.43)		2.81 (2.45)	
Study time (hour/day)	1.85 (1.31)		2.11 (1.30)	
Type of school				
Urban		151 (47.3)		148 (52.1)
Rural		168 (52.7)		136 (47.9)

Variables	Physically inactive (n=319)		Physically active (n=284)	
	Mean (SD)	n (%)	Mean (SD)	n (%)
Sex				
Male		88 (27.6)		186 (65.5)
Female		231 (72.4)		98 (34.5)
BMI				
Normal		215 (67.4)		188 (66.2)
Underweight		30 (9.4)		30 (10.6)
Overweight		46 (14.4)		37 (13.0)
Obese		28 (8.8)		29 (10.2)
Body weight perception				
Normal		218 (68.3)		198 (69.7)
Underweight		37 (11.6)		30 (10.6)
Overweight		55 (17.2)		47 (16.5)
Obese		9 (2.8)		9 (3.2)
Body image perception				
Satisfy		28 (8.8)		42 (14.8)
Want to reduce weight		194 (60.8)		134 (47.2)
Want to increase weight		97 (30.4)		108 (38.0)

5.2　　Factors associated with physical inactivity

Simple logistic regression showed that family income, study time, type of school, sex, and body image perception (want to reduce weight) have p value of <0.25 (Table 2).

Table 2: Factors Associated with physical inactivity among secondary school students in Terengganu by simple logistic regression

Variables	Regression coefficient (B)	Crude Odds Ratio (95% CI)	Wald statistic	p-value
Family income (RM)	0.00	1.00 (1.00, 1.00)	4.03	0.045
Screen time (hour/day)	-0.02	0.98 (0.92, 1.04)	0.47	0.492
Study time (hour/day)	-0.14	0.87 (0.77, 0.98)	7.23	0.007
Type of school				
Urban		1		
Rural	0.19	1.21 (0.88, 1.67)	1.37	0.242
Sex				
Male		1		
Female	1.61	4.98 (3.52, 7.05)	82.46	<0.001
BMI				
Normal		1		
Underweight	-0.13	0.87 (0.51, 1.50)	0.24	0.628
Overweight	0.08	1.09 (0.68, 1.75)	0.12	0.730
Obese	-0.17	0.84 (0.49, 1.47)	0.36	0.550
Body weight perception				
Normal		1		
Underweight	0.11	1.12 (0.67, 1.88)	0.18	0.668
Overweight	0.06	1.06 (0.69, 1.64)	0.08	0.783
Obese	-0.10	0.91 (0.35, 2.33)	0.04	0.842

Table 2, continued

Variables	Regression coefficient (B)	Crude Odds Ratio (95% CI)	Wald statistic	p-value
Body image perception				
Satisfy		1		
Want to reduce weight	0.78	2.17 (1.28, 3.68)	8.34	0.004
Want to increase weight	0.30	1.35 (0.78, 2.34)	1.12	0.289

The five variables with p value of <0.25 in simple logistic regression and clinically significant variables, such as, screen time, BMI and body weight perception were included in the multiple logistic regression analysis. Sex and study time were found to be the significant associated factors for physical inactivity (Table 3).

There were no multicollinearity and interaction problem. The Hosmer-Lemeshow test (p = 0.794), classification table was 69.3% and area under the ROC curve was 0.72 (95% CI: 0.68, 0.76) indicate the model was acceptable and fit. Therefore, the results in Table 3 is valid for interpretation. Sex and study time have significant association with physical inactivity.

Interpretation of result:

1. Being female had 5.07 odds of physical inactivity compared to male.

2. For every one hour increase in study time, there were 0.86 odds in physical inactivity.