



**THE STUDY OF AEROBIC PHYSICAL FITNESS, QUALITY OF
LIFE AND DEPRESSION IN ADOLESCENTS AT NIGHT SHIFT
WORKING IN PATHUMTHANI PROVINCE**

BY

MR. WARUNCHAI LIMCHAROENSUK

**A PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE
PHYSICAL THERAPY**

FACULTY OF ALLIED HEALTH SCIENCES

THAMMASAT UNIVERSITY

ACADEMIC YEAR 2019

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THESIS

BY

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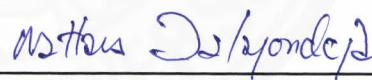
ENTITLED

THE STUDY OF AEROBIC PHYSICAL FITNESS, QUALITY OF LIFE AND
DEPRESSION IN ADOLESCENTS AT NIGHT SHIFT WORKING IN
PATHUMTHANI PROVINCE

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the degree of Master of Sciences

on June 5, 2019

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ABSTRACT

Objective: The purpose of this study was to study the effect of working intensity at night shift on the aerobic fitness, the quality of life, and depression in working and non-working adolescents.

Method: The participants were 96 students divided into non-working group and working groups divided by the intensity of work.

Result: This study found increasing of the heart beat count from YMCA step test of working girls compared with non-working girls ($p < 0.05$). The level of aerobic fitness in “very good” category in non-working group was 33.3% and would decrease according to the intensity of work, i.e. 28.6%, 8.3%, and 11.3% (low, moderate, and high intensity respectively). Results from the Health Survey Short Form 36 (SF-36) found that the scores of Role-emotional category in working groups were significantly higher than non-working group ($p < 0.05$). Moreover, stress from The Thai Perceived Stress Scale-10 (T-PSS-10) and depression from The Center for Epidemiologic Studies Depression scale (CES-D), Thai version were likely to be found in working adolescents.

Conclusion: The intensity of working at night shift in adolescents may affect aerobic fitness, especially in girls, and has a chance of stress and depression.

Keywords: Working adolescent, aerobic physical fitness, quality of life, depression, stress

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LIST OF ABBREVIATIONS

Symbols/Abbreviations	Terms
ACTH	Adrenocorticotrophic hormone
BMI	Body Mass Index
CAPA	Child and Adolescent Psychiatric Assessment
CDI-Thai	Thai version of Children's Depression Inventory
CES-D	Center for Epidemiologic Studies- Depression Scale
CRH	Corticotropin releasing hormone
DSM IV-TR	Diagnostic and Statistical Manual of Mental Disorders-IV-TR
FSH	Follicle stimulating hormone
GH	Growth hormone
GPA	Grade Point Average
GnRH	Gonadotropin releasing hormone
HBC	heart beat count
HPA	Hypothalamus-pituitary-adrenal
HPG	Hypothalamus-pituitary-gonadal
K-SADS-PL	Schedule for Affective and Schizophrenia for School age
LH	Luteinizing hormone
PedsQL 4.0	Pediatric Quality of Life Inventory 4.0
SES	Socioeconomic status
SF-36 Thai version	36-items short form health survey
SCN	Suprachiasmatic nucleus
T-PSS-10	Perceived Stress Scale Thai version
TYC	Thai Youth Checklist

CHAPTER 1

INTRODUCTION

1.1 Background and rationale

Development and quality of life of children are the indications of the economic status of a developed country. As mentioned “Children are the future of nation”, therefore children should be protected, promoted, got more care, and done appropriately in physical and feeling, which that will promote child development completely and good potential ⁽¹⁾. However, previous studies have shown children in many countries are suffering from physical and emotional problems. In addition, society not only force children to work hard or to do unethical and immorality, but also force children to work in an inappropriate environment and do high-risk work that cause of an accident, injury, and sickness from inappropriate working, such as working at night shift ⁽²⁻⁴⁾.

A child is a person whose age is younger than 18 years ⁽⁵⁾. In addition, children aged between 15 to less than 18 years are allowed to work legally, and they are called working children or child worker. Works that children can do have to be harmonized with mental health, moral, child development, and moreover, are not an obstacle to education and occupational training. However, working should promote child experience, and promote child protection, according to the law. Thai law defines work hour, type of work, work-station does not allow the child to do and standard work ⁽⁶⁾.

Children age between 15 to less than 18 years, is a period of changing in physical rapidly, begin to develop into an adult. However, their emotion is still being a child. Adolescents are very important because of this age is the basis of physical development, emotional development, and social development, therefore adolescents should be caring, given a chance for learning and parenting ^(7, 8). A family unit is the first unit of everyone’s life, and it is the smallest unit, but this unit is very important to the development of people. In the present, economic condition together with the unreadiness of parents affects to many families cannot take care of their children. Therefore, many children were forsaken due to many problems, such as poverty, broken family, lack parenting, inappropriate parenting, etc., that contribute adolescents have to

work as an employee. The adolescent who works as the employee may be inappropriately taken care in studying, hygiene, exercise, that affect the development of children, especially adolescents who work at night shift may affect development, health, physical fitness, stress, depression, quality of life, and also sleeping^(9, 10). A previous study has found that working children grow up less than non-working children, and working children suffer from depression, mental health and also a risk of toxic exposures⁽¹¹⁾. The previous study in working children in Brazil, have found increasing the risk of cardiovascular disease, kidney disease, and increasing the prevalence of depression^(7, 12).

Depression is an important mental health problem. In the present, depression in children is an important issue it is, and is gradually increasing, but is often ignored⁽¹³⁾. The previous study has shown children, 20 percent of children were suffered from mental health problems, and only 10 percent shown clinical symptoms, therefore, the screening test of depression in children is very important⁽¹⁴⁾. A previous study has predicted that depression of children in 2020 is the second health problem from the third health problem that the World Health Organization (WHO) report in 2004⁽¹⁵⁾.

Cardiovascular fitness has been related to metabolic syndrome in adolescents. The prevalence of metabolic syndrome and abnormal cholesterol levels (Low level of high-density lipoprotein, high level of triglyceride) are increasing, to be risk factors for cardiovascular disease, hypertension, diabetes mellitus, and stroke, and is the problem in Thailand. At present, Thai people are increasing the risk of cardiovascular diseases because of low physical activity and dieting. Thai people like to eat so sweet, oily, salty food and fewer fruits and vegetables. Cardiovascular disease cause of death, increase health care costs⁽¹⁶⁻¹⁸⁾.

Employment has benefits for children, such as improved self-esteem, improved responsibility, independence on the part of their parents, achievement, and positive effect on mental health. However, previous studies have found high intensity of working with children also has negative effects on children, such as affect mental health, alcohol use, smoking, substance use, and study that included increased school problem behavior, decreased levels of school commitment, grade, Grade Point Average (GPA), decrease the time doing homework, extracurricular participation. Decreasing

extracurricular activity for physical activity and physical fitness in children, which may contribute to cardiovascular disease ^(19, 20).

Therefore, the National Statistical Office has reported in 2012, there are over 189,000 children aged between 15-17 years work in companies, mostly in the Bangkok area and perimeters ⁽²¹⁾. Children who work in companies include tailoring, sewing, diamond cutter, motor car mechanic, gas station attendant, and waiter/waitress. Therefore, this study is interested in the study of working with adolescents at night shift in Pathum Thani province. This study would provide appropriate working intensity for adolescents who work at night in the countryside in Thailand.

1.2 Research questions

1. Does level of working intensity at night shift affect the aerobic fitness, the quality of life, and depression in working adolescents?
2. How differences are there in the aerobic fitness, the quality of life, and depression between working and non-working adolescents?

1.3 Objectives

1. To study the effect of working intensity at night shift on the aerobic fitness, the quality of life, and depression in working adolescents.
2. To compare the aerobic fitness, the quality of life, and depression between working and non-working adolescents.

1.4 Hypothesis

H01: There is no difference in the aerobic fitness, the quality of life, and depression at a working intensity at night shift.

H11: There is a difference in the aerobic fitness, the quality of life, and depression at a different working intensity at night shift.

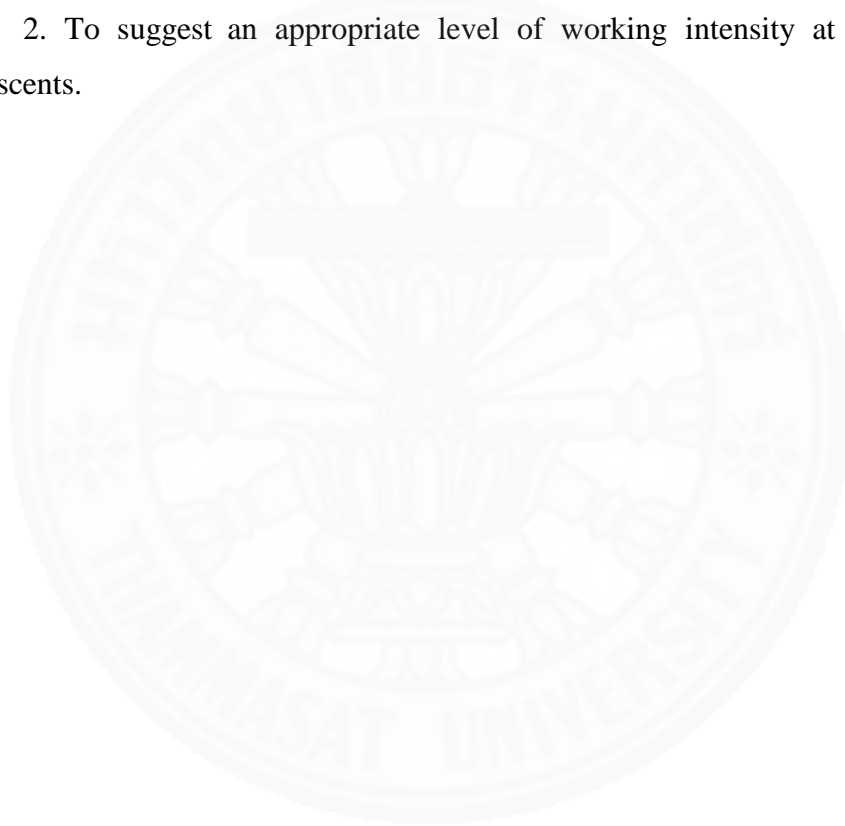
H02: There is no difference in the aerobic fitness, the quality of life, and depression between working and non-working adolescents.

H12: There is a difference in the aerobic fitness, the quality of life, and depression between working and non-working adolescents

1.5 Benefit of the present study

1. The study would provide the evidence for the intensity of night shift on the physical fitness, the quality of life and depression in adolescents.

2. To suggest an appropriate level of working intensity at night shift in adolescents.



CHAPTER 2

REVIEW OF LITERATURE

2.1 Work intensity effects on adolescents

In Thailand, the law defines the children's aged that can work is 15 years or more than and define penalty people who employ children age below 15 years. Children who work as an employee for help household expenses or for a living maybe inappropriately taken care in studying, hygiene, exercise, that affects the development of children and especially physical fitness. Adolescents should exercise for increase cardiovascular endurance, flexibility, and strength ^(7, 8, 22-24). Previous studies have found the change in emotion and fatigue from working for a long time can affect the ability to work, decrease performance, increase response time, maybe increase error, decrease ability the of muscle response, increase reaction time. Therefore, working for a long time may adversely affect physical and mental health in adolescents ⁽²⁵⁻²⁸⁾. A Manenschijn's study has found children who work at night shift are more stress than day workers, and shift workers are more body mass index (BMI) than day workers ⁽²⁹⁾.

2.1.1 Positive effects on working in adolescents

2.1.1.1 Benefits of working in adolescents

Adolescent Employment has benefit, include increased self-esteem, responsibility, independence on the part of their parents, achievement, and positive effect on adolescent's mental health. Mortimer's study has found that students who work 20 hours per week or less increased self-esteem ⁽¹⁹⁾. A Phillips and Sandstrom's study has found that working in adolescents could increase responsibility, independence on the part of their parents ⁽³⁰⁾. Elder and Rockwell's study has found working in adolescents has positive on mental health and achievement ⁽³¹⁾.

2.1.2 Negative effects on working in adolescents

2.1.2.1 Mental health

Working in adolescents has a negative effect on adolescent's mental health. A Bronfenbrenner's study has found that working in adolescents affect adolescents mental health that influences adolescent's life ^(32, 33), and Mortimer's study

has found the high intensity of working has negative effects on adolescents mental health ⁽¹⁹⁾.

2.1.2.2 Studying

Working in adolescents has a negative effect on studying that includes decreased levels of school commitment, grade, Grade Point Average (GPA), and increase school problem behavior ^(19, 20). Paschall's study has found that working time more than 10 hours per week decrease level of school commitment, GPA, but working time 1-11 hours per week increase level of school commitment, GPA ⁽²⁰⁾. Mortimer's study has found the high intensity of working in adolescents decrease grade, time on homework, increase school problem behavior, but the low intensity of working increase grade ⁽¹⁹⁾.

2.1.2.3 Alcohol use, smoking, and substance use

In previous studies have found working in adolescents have a negative effect on alcohol use, smoking, and substance use ^(19, 20). Paschall's study has found that students who work 11 to 20 hours per week, and more than 20 hours per week increase alcohol drinking, and higher levels of work intensity (11 to 20 or more than 20 hours per week) can predict heavy drinking ⁽²⁰⁾. Mortimer's study has found the high intensity of working affect the adolescent's alcohol use, smoking, and substance use ⁽¹⁹⁾.

2.1.2.4 Cardiovascular fitness

The cardiovascular fitness can reflect the capability of circulatory and pulmonary system to supply skeletal muscles with O₂ during sustained physical activity ⁽³⁴⁾. The cardiovascular fitness can be predicted cardiovascular disease ⁽³⁵⁾. Previous studies support that aerobic capacity can indicate physical fitness overall of the body ^(22, 23). Aerobic capacity can be measured in several ways, such as a measure of the maximum rate of oxygen consumption (VO₂ max) is often used from bicycle Ergometer, treadmill, shuttle run, step test. A previous study has found that inappropriate working affect an increase in cardiovascular disease ⁽¹²⁾.

2.1.2.5 Quality of life

A Post's study defines the quality of life as "The overall enjoyment of life" ⁽³⁶⁾. The previous studies have shown inappropriate working in children may affect quality ^(37, 38).

2.1.3 Prohibited work and prohibited working place

In Thailand, the law defines prohibited work and prohibited working place. (Figure 2.1 and 2.2) ^(6, 24).

<p>มาตรา ๔๕ ห้ามมิให้นายจ้างให้ลูกจ้างซึ่งเป็นเด็กอายุต่ำกว่าสิบแปดปีทำงานอย่างหนึ่งอย่างใดดังต่อไปนี้</p> <p>(๑) งานหลอม เป่า หล่อ หรือรีดโลหะ</p> <p>(๒) งานบีมโลหะ</p> <p>(๓) งานเกี่ยวกับความร้อน ความเย็น ความสั่นสะเทือน เสียง และแสงที่มีระดับแตกต่างจากปกติ อันอาจเป็นอันตรายตามที่กำหนดในกฎกระทรวง</p> <p>(๔) งานเกี่ยวกับสารเคมีที่เป็นอันตรายตามที่กำหนดในกฎกระทรวง</p> <p>(๕) งานเกี่ยวกับจุลชีวนเป็นพิษซึ่งอาจเป็นเชื้อไวรัส แบคทีเรีย รา หรือเชื้ออื่นตามที่กำหนดในกฎกระทรวง</p> <p>(๖) งานเกี่ยวกับวัตถุมีพิษ วัตถุระเบิด หรือวัตถุไวไฟ เว้นแต่ในงานในสถานบริการน้ำมันเชื้อเพลิงตามที่กำหนดในกฎกระทรวง</p> <p>(๗) งานขับหรือบังคับรถยกหรือปั้นจั่นตามที่กำหนดในกฎกระทรวง</p> <p>(๘) งานใช้เลื่อยเดินด้วยพลังไฟฟ้าหรือเครื่องยนต์</p> <p>(๙) งานที่ต้องทำได้ดิน ใต้น้ำ ในถ้ำ อุโมงค์ หรือปล่องในภูเขา</p> <p>(๑๐) งานเกี่ยวกับกัมมันตภาพรังสีตามที่กำหนดในกฎกระทรวง</p> <p>(๑๑) งานทำความสะอาดเครื่องจักรหรือเครื่องยนต์ขณะที่เครื่องจักรหรือเครื่องยนต์กำลังทำงาน</p> <p>(๑๒) งานที่ต้องทำบนนั่งร้านที่สูงกว่าพื้นดินตั้งแต่สิบเมตรขึ้นไป</p> <p>(๑๓) งานอื่นตามที่กำหนดในกฎกระทรวง</p>

Figure 2.1 Prohibited work of working adolescents

<p>“มาตรา ๕๐ ห้ามมิให้นายจ้างให้ลูกจ้างซึ่งเป็นเด็กอายุต่ำกว่าสิบแปดปีทำงานในสถานที่ดังต่อไปนี้</p> <p>(๑) โรงฆ่าสัตว์</p> <p>(๒) สถานที่เล่นการพนัน</p> <p>(๓) สถานบริการตามกฎหมายว่าด้วยสถานบริการ</p> <p>(๔) สถานที่อื่นตามที่กำหนดในกฎกระทรวง</p>

Figure 2.2 Prohibited working place of working adolescents

2.2 Depression

2.2.1 Definition

Depression is the most common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration ⁽³⁹⁾. The previous study has found the effect of depression, such as ineffective coping ⁽⁴⁰⁾. Therefore, identified and preventative interventions depression in school is very important for adolescents' life ⁽⁴¹⁾. Depressive disorders including “disruptive mood dysregulation disorder, major depressive disorder (including major depressive episode), persistent depressive disorder (dysthymia), premenstrual dysphoric disorder, substance/medication-induced depressive disorder, depressive disorder due to another medical condition, other specified depressive disorder, and unspecified depressive disorder ⁽⁴²⁾” Depression disorder is a complex condition. The term depression cover not only patients in psychiatric hospitals but also cover people who suffer from emotional disturbances ^(43, 44).

2.2.2 Prevalence of adolescent depression in Thailand

Previous studies have found depression in Thailand was 1.7% to 40.8% ^(13, 14, 45-47). Trangkasombat's study in 2012 has assessed depression in high school children grade 10 to 12 aged between 15-19 years in Bangkok. The Center for Epidemiologic Studies Depression scale (CES-D), Thai version, include 20 item self-report questionnaires, is used to assess depression. They have found a prevalence of depression in adolescent boys 19%, and girls 17%, and no statistically significant between boys and girls ⁽¹⁴⁾. Trankasombat's study in 1996 has assessed depression in

junior high school aged between 10-17 years in Bangkok. The Thai version of Children's Depression Inventory (CDI-Thai), is used to assess depression. They have found at more than 15 scores cut off point, the prevalence of depression was 40.8%, and more than 20 scores cut off point, the prevalence of depression was 13.3% ⁽⁴⁵⁾. A Wisitpongaree's study has assessed the prevalence of depression in primary school students in grade 4 to 6. CDI-Thai which cut off scores more than 15, is used to screen depression and participants who are screened to be clinical depression are diagnosed by a child and adolescent psychiatrist's clinical interview or the Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM IV-TR) ⁽¹³⁾. A Wacharasindhu's study has assessed the prevalence of depression in school children aged between 8-11 years. Thai Youth Checklist (TYC) and Child and Adolescent Psychiatric Assessment (CAPA) are measured depression. They have found the prevalence of depression was 7.1% ⁽⁴⁷⁾.

2.2.3 Prevalence of adolescent depression in Abroad

Previous studies have found depression in Abroad are between 2.8% to 5.6% ^(48,49). Sarkar's study has assessed the prevalence of depression in school children grade 1 to 7, and use Schedule for Affective and Schizophrenia for School age Children (K-SADS-PL). They have found the prevalence of depression was 3.13% ⁽⁴⁸⁾. In meta-analysis Costello's study has shown analysis of the prevalence of depression from 26 studies between 1965 to 1996. This meta-analysis has shown the prevalence of depression in children aged less than 13 years is 2.8%, and the prevalence of depression in children aged 13 to 18 years is 5.6% ⁽⁴⁹⁾.

2.3 Socioeconomic status (SES)

2.3.1 Stress

A previous study has found the correlation between SES of parents and children's stress. Lupien's study has shown income correlated negatively with stress, and family income is also the predictor for child's cortisol level. The decreasing income of parents contribute to increasing cortisol hormone (stress hormone) in children, and these differences gradually increase over time (difference in age 10 years is larger than 6, and 8 years) ⁽⁵⁰⁾. Harburg's study has found children from low SES areas are more stress than children from high SES areas ⁽⁵¹⁾.

2.3.2 Residential

A previous study has shown the lower SES could limit residential choices. Many of the environments of lower SES families that their lives are associated with crime, and mortality rate ⁽⁵²⁾.

2.3.3 Mother's depression

Hirschfeld and Cross's study has found that the higher prevalence of a mother's depression in low SES families, and Lupien's study has also found that family income correlated negatively with the depression score of a mother ^(50, 53).

2.4 Stress

2.4.1 Stress-related factor

Previous studies found many factors that affected stress, such as environmental factor, genetic factor, high school progression, student loan, too many activities, having too high expectations, night shift working, romantic breakups, etc. ⁽⁵⁴⁻⁵⁶⁾

2.4.2 Effect of stress

The previous study showed overloading with stress might affect anxiety, withdrawal, aggression, and physical illness ⁽⁴¹⁾. A Sandin's study has found an effect of stress related to suicide attempts in adolescents ⁽⁵⁷⁾.

2.4.3 Correlation between stress and depression

A previous study has found an association between stress and depression. Lupien's study has shown chronic increasing of glucocorticoid effected to the physical pathology and is associated with depression ^(50, 58-60). A Maritta's study has assessed stress in public urban school adolescents in Thailand. The Perceived Stress Scale Thai version (T-PSS-10) was used to assess adolescents stress and the Quick Depression Assessment (PHQ-9) was used to measure depression. This study has found a correlation between stress and depression: the more stress lead to be the more depression ($r=0.69$, $p<0.001$) ⁽⁴¹⁾.

2.5 Hormones

2.5.1 Cortisol

The cortisol is often called the stress hormone. The previous studies used a cortisol level and a cortisol awakening response to assess stress. Increasing of cortisol level is associated with increasing stress level ^(29, 61-63), and the awakening of the cortisol ⁽⁶¹⁾. Cortisol is depicted as a circadian rhythm ^(29, 61-64).

2.5.1.1 Circadian rhythm of cortisol

The circadian rhythm of cortisol is depicted by a rise in the sleep to a peak at the early morning and decline in a cortisol level during the day to minimal level during the first two hours of sleep ^(29, 61-64). This rhythm may be disturbed by alterations to sleep-wake cycle duration ⁽⁶⁵⁾, partial sleep deprivation ⁽⁶⁶⁾, and after total sleep deprivation ⁽⁶⁴⁾. Moreover, Manenschijn's study has found that working at night shift affect the increase of cortisol level ⁽²⁹⁾. This study is consistency with the Lindholm's study that has found increasing cortisol level after awakening in irregular shift worker. In addition, this study has also found irregular shift work, severe stress, and less sleep were associated with an increased cortisol level after awakening ⁽⁶³⁾.

2.5.2 Growth hormone

Growth hormone (GH) is an important hormone because of this hormone stimulus bone and tissue development from infants to adolescents. The GH is depicted as a sleep dependent rhythm ^(64, 67).

2.5.2.1 Sleep dependent rhythm

The releasing of GH in young adults is evident by a surge within a first two hours of sleeping following sleep onset. The GH surge within a first two hours is called as the nocturnal GH surge. When sleep deprivation (sleep does not appear) occur the nocturnal GH surge disappear ^(64, 67). The peak of GH surge is associated with slow wave sleep ⁽⁶⁸⁾. A Davidson's study has found that GH level is higher during slow wave sleep than other sleep stages. Moreover, the deprivation of slow wave sleep terminates GH release ⁽⁶⁴⁾. However, the previous study has found an appropriate exercise is important to stimulate GH secretion ⁽⁶²⁾.

2.6 Effect of shift work

A usually work day is 8 hours work starting from 7 a.m. or 8 a.m. ⁽⁶⁹⁾. The previous studies have found that shift work is associated with implicated in cardiovascular diseases ⁽⁶⁹⁻⁷¹⁾. A Asare-Anane's study has found the effect of working at night shift. This study has found that the shift workers were associated with high BMI, fasting blood glucose, glycated hemoglobin, highly sensitive C-reactive protein, and dyslipidemia. The increasing of fasting blood glucose will induce increasing glycated hemoglobin and increasing of glycation will induce the formation of advanced glycosylated end products, which leads to produce and secrete of inflammatory cytokines. The increasing of BMI associated with shift work is associated with cardiovascular disease. In addition, shift workers might suffer from working under pressure, night wakefulness, smoking, poor dieting, sleeping. Moreover, the disturbed circadian rhythm, disturbed sociotemporal pattern are also appeared, and induce disturbed normal metabolic and hormonal function ⁽⁶⁹⁾. The Boggild's study has found the effect of shift work on circadian rhythm, disturbed sociotemporal patterns, and behavioral changes ⁽⁷¹⁾.

2.6.1 Disturbed circadian rhythms

The shift work affects change in the circadian rhythm of the body. The imbalance of homeostasis will lead to internal desynchronisation. The imbalance of homeostasis is called a mismatch of circadian rhythm that causes of nutrition. The shift worker may consume meals when the stomach empties at night. A previous study has found consuming meals at night correlated with high cholesterol levels ⁽⁷²⁾. The shift worker is well known to sleep less than a day worker and to be more fatigue. The lack of sleep induces stress ⁽⁷³⁾. The previous studies have found shift work is more fatigue than day worker ⁽⁷⁴⁾. In human, the suprachiasmatic nucleus (SCN) generates 24 hours endogenous circadian rhythms. The SCN allows for a coordination of physiological, metabolic, and behavioral activities with anticipates daily environmental changes ⁽⁷⁵⁾. In addition, the function of SCN is regulation of leptin, plasma glucose, glucose tolerance, corticosteroids, and cardiovascular function. Moreover, the cardiovascular

function is regulated by neural and humoral signals of SCN to the white adipose tissue, liver, pancreas, adrenal cortex, and heart ⁽⁷⁶⁾.

2.6.2 Disturbed sociotemporal patterns

The previous study has found shift work affect problem in family life, reducing the time available for family and recreation, social isolation, and stress ⁽⁷¹⁾. A Cesana's study has found the changing of psychophysiological is associated with stress ⁽⁷⁷⁾.

2.6.3 Behavioral changes

The shift work not only affects stress but also affect acting through attempts to cope with the stress. A previous study has found that the lifestyle of shift worker and day worker are different. This study has found higher smoking, nutrition, and regular exercise. The most important risk factor of cardiovascular is smoking. In addition, this study has found a few differences in nutritional intake between shift worker and day worker. However, this study has found a difference between shift worker and day worker in meal frequency and the timing of meal intake. The shift worker has more nocturnal feeding than the day worker. This problem will lead to circadian desynchronisation of uptake and metabolism ⁽⁷¹⁾. A previous study has also found that changing in the feeding time schedule for several day affect desynchronisation of a circadian rhythm ⁽⁷⁸⁾.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Participants

Participants age between 15 to less than 18 years who are studying at the secondary in public school and private school in Pathum Thani province include Mueang Pathum Thani district and Khlong Luang district (Table 3.1 and 3.2) were randomized. Participants were be classified into a non-working group, low work intensity group (working 1 to 10 hours a week), moderate work intensity group (working 11 to 20 hours a week), and high work intensity group (working more than 20 hours a week) ⁽²⁰⁾.

Table 3.1 Public school in Pathum Thani province

District	School
Pathum Thani district	1. Kanarat Bamrung Pathum Thani school 2. Pathumthani Nunthamuneebumroong school 3. Pathumwilai school 4. Horwang Pathumthani school
Khlong Luang district	1. Dipangkornwittayapat (Mattayom Wat Hattasarn Kaset) School 2. Thammasat khlongluang withayakhom school 3. Suankularbwittayalai Rangsit School

Table 3.2 Private school in Pathum Thani province

District	School
Pathum Thani district	1. St.Joseph Mueang-Ake School
Khlong Luang district	1. Sarasas Witaed KlongLuang School 2. Udomsuksa Rangsit School

3.2 Working intensity

This study defines the intensity of work was defined by Mortimer's study and Paschall's study ^(19, 20).

- Low work intensity is working hours 1-10 hours/week
- Moderate work intensity is working hours 11-20 hours/week
- High work intensity is working hours more than 20 hours/week

3.3 Selection criteria

3.3.1 Inclusion criteria

The inclusion criteria of working adolescents were:

1. Secondary school adolescents aged between 15 to less than 18 years.
2. Work since 18.00, 3 consecutive hours, at least 2 days in a row.
3. Been working for at least 3 months.
4. Normal BMI (18.5 to 24.9 kg/m².) ⁽⁷⁹⁾.
5. School adolescents who studying in Pathum Thani province.
6. Able to follow the command and can read the Thai language.

The inclusion criteria of non-working adolescents were:

1. Secondary school adolescents aged between 15 to less than 18 years.
2. Normal BMI (19.5 to 21.5 kg/m²).
3. School adolescents who studying in Pathum Thani province.
4. Able to follow the command and can read the Thai language.

3.3.2 Exclusion criteria

The exclusion criteria were:

1. Has been an accident and the severe injury of the musculoskeletal system 1 year before the study.
2. Has been a neurological or musculoskeletal disorder that uses medication to affect daily living.
3. Has been a cardiorespiratory disease, which must be under the control of the doctor.

4. Adolescents who work for prohibited work

3.4 Sample size

This study calculates sample size by of G power program. Effect size, α , and power was set at 0.35, 0.05, and 0.8 respectively (Figure 3.1). Therefore, the sample size for this study was 96 people, 24 people a group, for 4 groups.

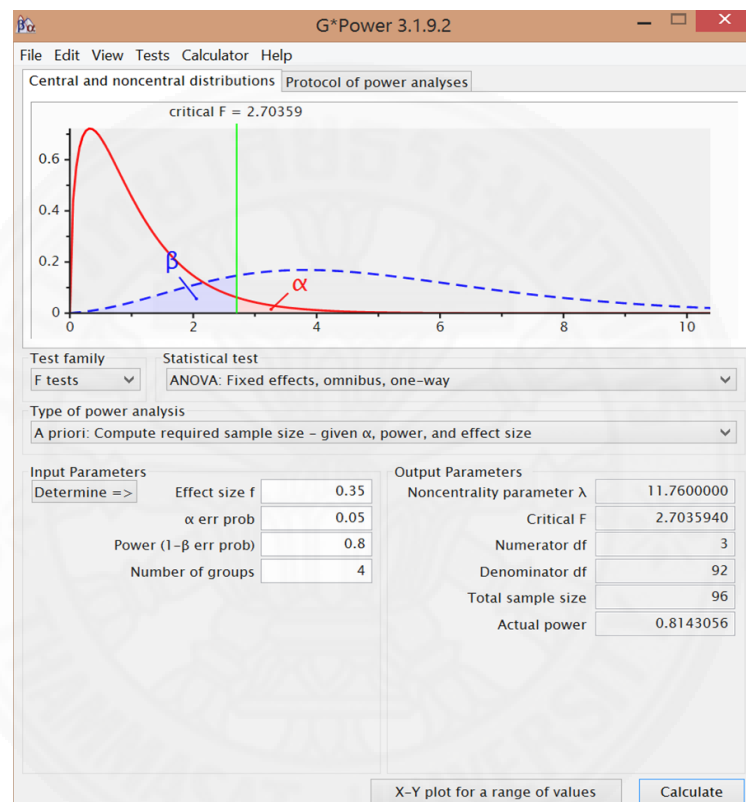


Figure 3.1 Calculation of the sample size by G power program

3.5 Study design

This study was conducted as a cross sectional design. This study assessed non-working, and working adolescents aged 15 to less than 18 years in Pathum Thani province. Working at night shift is working since 18.00, which working is 3 consecutive hours a day at least 2 days a week. Working at night is work that adolescents can do since 18.00 to 22.00 ⁽⁸⁰⁾.

3.6 Outcome measures and procedure

3.6.1 YMCA step test

This study used the YMCA step test to measure aerobic capacity from step test by step box. In the present study, the step test is used extensively due to this test is simple, use a small area. Moreover, the YMCA step test has a high correlation ($r=0.6-0.8$) compared with a treadmill^(81, 82). The YMCA step test use 12 inch bench height, a duration of 3 minutes and the metronome will be set at 96 bpm. We measure 1 minute heart beat count (HBC) after step test immediately. The participants' HBC of each group were be compared as shown in Appendix C.

3.6.2 36-items short form health survey Thai version (SF-36 Thai version)

36-items short form health survey (SF-36) is a questionnaire that has been standardized, has developed in America. Many studies had translated and used to measure the quality of life in many countries. SF-36 can be used in normal people or people with conditions. SF-36 Thai version was used to measure health related quality of life. SF-36 Thai version contains 36 items, 8 dimensions includes physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health, was retranslated by Leurmarnkul. SF-36 Thai version has Cronbach's alpha coefficient 0.88, content validity index 0.87. Scoring of SF-36 Thai version is 0 to 100 scores, with a higher score present a better quality of life and lower score present lower quality of life⁽⁸³⁾.

3.6.3 Center for Epidemiologic Studies-Depression Scale Thai version (CES-D)

Depression in participants will be screened by the CES-D Thai version. CES-D Thai version has developed by Trankasombat. CES-D is used to screen clinical depression in adolescents. The CES-D has a reliability coefficient (alpha) 0.83, high discriminant validity, Sensitivity 0.6140, Specificity 0.848, and positive predictive value 0.385. The CES-D Thai version has reliability (alpha) 0.86, a cutoff point of 22 shows the best screening characteristics. At 22 score cutoff point has sensitivity 0.72, specificity 0.85, and accuracy 0.82. Scoring of CES-D Thai version is 0 to 60 scores,

the score of more than 22 scores will be classified in clinical depression groups, and the score 0 to 22 scores will be classified in normal group^(14, 84, 85).

3.6.4 Thai Perceived Stress Scale-10 (T-PSS-10)

The Thai Perceived Stress Scale-10 (T-PSS-10) will be used to measure stress in all participants. The T-PSS-10 contains 10 items. In addition, the T-PSS-10 has the Cronbach's alpha 0.85, the ICC 0.82, and the concurrent validity 0.55 and 0.60 when compare with the Thai Depression Inventory and the State Trait Anxiety Inventory⁽⁸⁶⁾.

3.7 Data collection

1. All participants and their parents have signed informed consent.
2. Participants filled in the questionnaire for participants about individual history, and profile.
3. Participants were classified as a non-working group, low work intensity group (working 1 to 10 hours a week), moderate work intensity group (working 11 to 20 hours a week), and high work intensity group (working more than 20 hours a week) based on their working hours.
4. Blood pressure and heart rate were measured.
5. SF-36 was used to assess the quality of life of participants.
6. CES-D was used to assess the depression of participants.
7. T-PSS-10 was used to assess the stress of participants.
8. YMCA step test was used to assess the aerobic capacity of participants.

3.8 Analysis

Data were analyzed using the IBM SPSS Statistics 20. The Kolmogorov-Smirnov Goodness of Fit test will be used to test for distributional adequacy. If the data distribute normally, One-Way ANOVA used to determine the statistically significant difference between groups, and Independent t-test used to determine the statistically significant difference between non-working adolescents and working adolescents. If the data is not normally distributed, Kruskal-Wallis test used to determine the statistically significant difference between groups, and Mann-Whitney U test used to

determine the statistically significant difference between non-working and working adolescents. The p-values less than 0.05 was considered the statistically significant.



CHAPTER 4

RESULTS

4.1 General characteristics

Ninety six students aged between 15-18 years were recruited to this study. There are 24 non-working adolescents and 72 working adolescents, consisting of 7 low work intensity adolescents, 12 moderate work intensity adolescents, and 53 high work intensity adolescents. The non-working, low work intensity, and moderate work intensity group had 13 (54.2%), 5 (71.4%), and 8 (66.7%) girls respectively. The high work intensity group had 34 (64.2%) boys. Most of the age of non-working group, low work intensity, and moderate work intensity group were 17 years 18 (75.0%), 4 (57.1%), and 8 (66.7%) people respectively, and the most of the age of the high work intensity group was 16 and 17 years 19 (35.8%) people. BMI of non-working, low work intensity, moderate work intensity, and high work intensity group were 21.22 ± 2.05 , 20.85 ± 2.10 , 20.90 ± 2.63 , and 20.65 ± 2.15 kg/m² respectively. “Parents live together” in non-working, low work intensity, moderate work intensity, and high work intensity group had 24 (100.0%), 5 (71.4%), 9 (75.0%), and 39 (73.6%) respectively. “Live with parents” in non-working, low work intensity, moderate work intensity, and high work intensity group had 24 (100.0%), 5 (71.4%), 9 (75.0%), and 39 (73.6%). The sleep time of in non-working, and high work intensity groups were 6-8 hours had 14 (58.3%), and 23 (43.4%) people, the sleep time of low work intensity, and moderate work intensity groups were 4-6 hours had 6 (85.7%), and 9 (75.0%) people. The bedtime of non-working, moderate work intensity, and high work intensity groups were 22.00-24.00 had 17 (70.8%), 6 (50.0%), and 27 (50.9%) people, the bedtime of low work intensity group was 20.00-22.00 had 4 (57.1%) people. “Join the tutorial” in non-working, low work intensity, moderate work intensity, and high work intensity groups had 7 (29.2%), 3 (42.9%), 4 (33.3%), and 1 (1.9%) respectively. The duration of working in low work intensity, moderate work intensity, and high work intensity groups were 3-6 months had 4 (57.1%), 9 (75.0%), and 44 (83.0%) respectively. The working hour in low work intensity, moderate work intensity, and high work intensity groups were 8.43 ± 1.54 , 15.71 ± 2.78 , and 54.34 ± 15.78 (Table 4.1).

Table 4.1 General characteristics

General characteristics	Non-working group (percent)	Working adolescents		
		Low work intensity group (percent)	Moderate work intensity group (percent)	High work intensity group (percent)
Count	24	7	12	53
Gender				
- Boy	11 (45.8)	2 (28.6)	4 (33.3)	34 (64.2)
- Girl	13 (54.2)	5 (71.4)	8 (66.7)	19 (35.8)
Age				
- 15 years	1 (4.2)	0 (0.0)	0 (0.0)	5 (9.4)
- 16 years	4 (16.7)	2 (28.6)	2 (16.7)	19 (35.8)
- 17 years	18 (75.0)	4 (57.1)	8 (66.7)	19 (35.8)
- 18 years	1 (4.2)	1 (14.3)	2 (16.7)	10 (18.9)
BMI	Mean±SD	Mean±SD	Mean±SD	Mean±SD
- BMI (kg/m ²)	21.22±2.05	20.85±2.10	20.90±2.63	20.65±2.15
Family status				
- Parents live together	24 (100.0)	5 (71.4)	9 (75.0)	39 (73.6)
- Parents separation	0 (0.0)	2 (28.6)	3 (25.0)	9 (17.0)
- Father passed away	0 (0.0)	0 (0.0)	0 (0.0)	3 (5.7)
- Mother passed away	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.8)
Living with family				
- Father and mother	24 (100.0)	5 (71.4)	9 (75.0)	39 (76.3)

Table 4.1 General characteristics (cont.)

General characteristics	Non-working group (percent)	Working adolescents		
		Low work intensity group (percent)	Moderate work intensity group (percent)	High work intensity group (percent)
- Father or mother	0 (0.0)	1 (14.3)	2 (16.7)	10 (18.9)
- Relative or friend	0 (0.0)	1 (14.3)	1 (8.3)	4 (7.5)
- Alone	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Sleep time				
>8 hours	1 (4.2)	0 (0.0)	0 (0.0)	5 (9.4)
6-8 hours	14 (58.3)	1 (14.3)	3 (25.0)	23 (43.4)
4-6 hours	8 (33.3)	6 (85.7)	9 (75.0)	22 (41.5)
<4 hours	1 (4.2)	0 (0.0)	0 (0.0)	3 (5.7)
Bedtime				
20.00-22.00	5 (20.8)	4 (57.1)	2 (16.7)	9 (17.0)
22.00-24.00	17 (70.8)	2 (28.6)	6 (50.0)	27 (50.9)
24.00-2.00	2 (8.3)	1 (14.3)	3 (25.0)	15 (28.3)
2.00-4.00	0 (0.0)	0 (0.0)	1 (8.3)	2 (3.8)
Tutorial				
- Join the tutorial	7 (29.2)	3 (42.9)	4 (33.3)	1 (1.9)
- Not a tutorial	17 (70.8)	4 (57.1)	8 (66.7)	52 (98.1)
Duration of working				
- 3-6 months	0 (0)	4 (57.1)	9 (75.0)	44 (83.0)
- 6-12 months	0 (0)	0 (0)	0 (0)	3 (5.7)
- >12 months	0 (0)	3 (42.9)	3 (25.0)	6 (11.3)

Table 4.1 General characteristics (cont.)

General characteristics	Non-working group (percent)	Working adolescents		
		Low work intensity group (percent)	Moderate work intensity group (percent)	High work intensity group (percent)
Working hour				
- (hour)	-	8.43±1.54	15.71±2.78	54.34±15.78

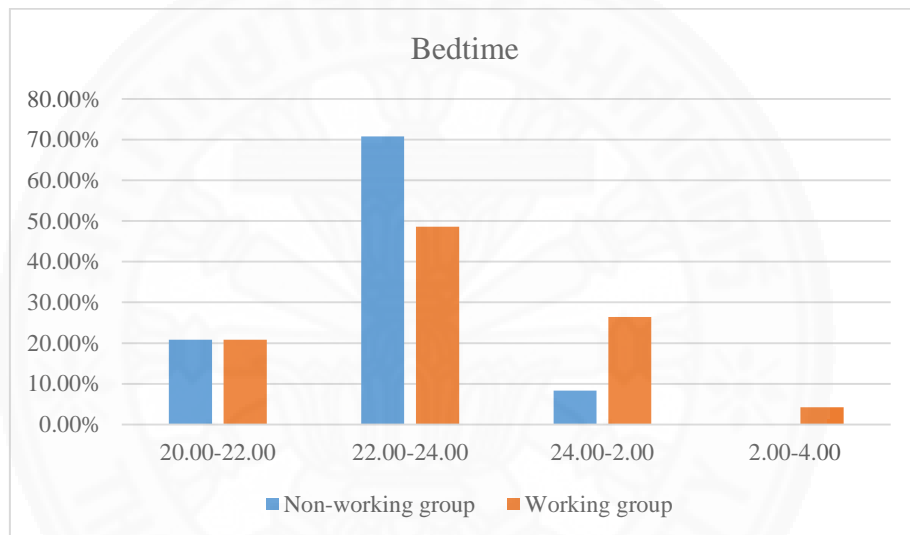


Figure 4.1 The bedtime in non-working and working adolescents groups

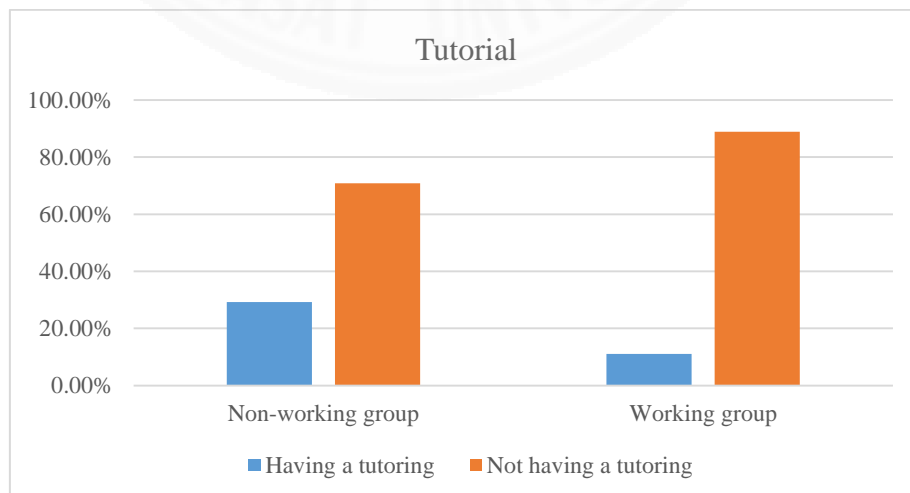


Figure 4.2 The tutorial in non-working and working adolescents groups

4.2 The resting heart rate in non-working, low work intensity, moderate work intensity, and high work intensity adolescents groups

This study found no significantly different from the One way ANOVA test. The heart beat count from the YMCA step test of non-working, low work intensity, moderate work intensity, and high work intensity were 83.98 ± 8.04 , 88.36 ± 11.80 , 89.33 ± 11.59 , and 85.42 ± 18.57 bpm ($p=0.754$).

4.3 The heart beat count from the YMCA step test between non-working and working adolescents groups

The results of the Independent t-test found no significant difference in HBC from the YMCA step test between non-working and working adolescents groups. The heart beat count from the YMCA step test of non-working group was 121.71 ± 24.34 bpm and working group was 127.17 ± 21.80 bpm ($p=0.305$).

4.4 The result of the YMCA step test in non-working, low work intensity, moderate work intensity, and high work intensity adolescents groups

This study found that the aerobic fitness in non-working group was excellent 8 (33.3%) people, low work intensity group 2 (28.6%) people, moderate work intensity group 1 (8.3%) people, and high work intensity group 6 (11.3%) people (Table 4.2).

Table 4.2 The aerobic fitness from the YMCA step test in non-working, low work intensity, moderate work intensity, and high work intensity adolescents groups

The YMCA step test	Non-working group (percent)	Low work intensity group (percent)	Moderate work intensity group (percent)	High work intensity group (percent)
Very poor	10 (41.7)	2 (28.6)	4 (33.3)	26 (49.1)
Poor	2 (8.3)	0 (0.0)	4 (33.3)	5 (9.4)
Average	4 (16.7)	3 (42.9)	3 (25.0)	12 (22.6)
Good	0 (0.0)	0 (0.0)	0 (0.0)	4 (7.5)
Excellent	8 (33.3)	2 (28.6)	1 (8.3)	6 (11.3)

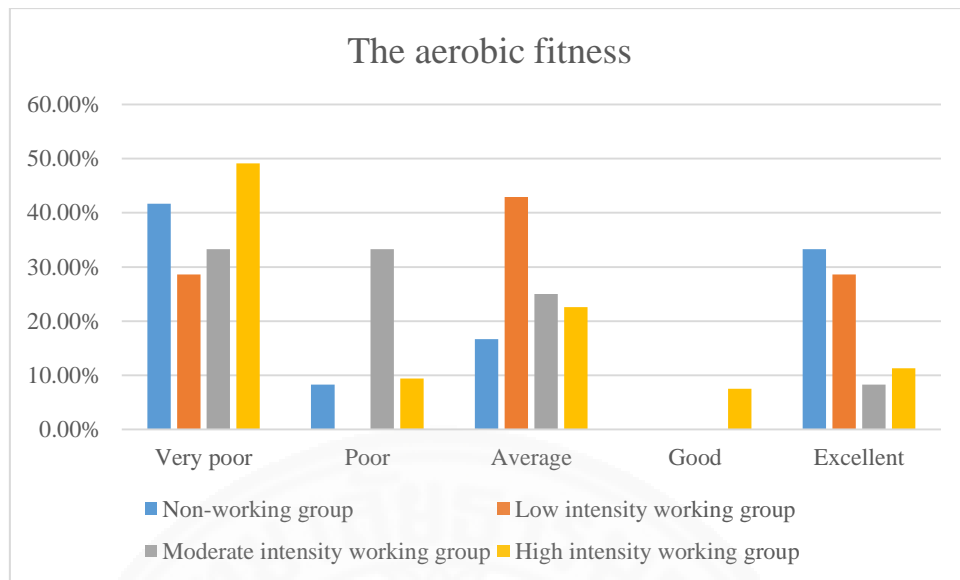


Figure 4.3 The aerobic fitness from the YMCA step test in non-working, low work intensity, moderate work intensity, and high work intensity adolescents groups

4.5 The heart beat count from the YMCA step test between non-working and working adolescents groups in boys and girls

The results of the Independent t-test found no significantly different in the heart beat count from the YMCA step test in boy participants. The heart beat count of non-working boy was 126.55 ± 24.34 bpm and working boy was 123.83 ± 20.88 bpm (Table 4.3).

However, this study found significantly different in the heart beat count from the YMCA step test in girl participants ($p=0.027$). The heart beat count of non-working girl was 114.58 ± 22.96 bpm and working girl was 132.03 ± 22.52 bpm (Table 4.5).

Table 4.3 The heart beat count from the YMCA step test between non-working and working adolescents groups in boys and girls

The YMCA step test	Non-working group (Mean±SD)	Working group (Mean±SD)	p-value
Heart beat count in boy participants (bpm)	126.55±24.34	123.83±20.88	0.713
Heart beat count in girl participants (bpm)	114.58±22.96	132.03±22.52	0.027*

*Significance level < .05.

4.6 The heart beat count from the YMCA step test in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

This study found no significantly different from the One way ANOVA test. The heart beat count from the YMCA step test of non-working, low work intensity, moderate work intensity, and high work intensity were 121.71±24.34, 125.14±24.34, 130.00±18.01, and 126.79±22.57 bpm (Table 4.4).

Table 4.4 The heart beat count from the YMCA step test in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

	Groups (Mean±SD)				p-value
	Non-working	Low work intensity	Moderate work intensity	High work intensity	
Heart beat count (bpm)	121.71±24.34	125.14±24.34	130.00±18.01	126.79±22.57	0.729

4.7 The Health Survey Short Form 36 (SF-36) between non-working and working adolescents groups

The results of the Independent t-test found no significantly different in the total score between non-working group and working adolescents group. The total score of non-working was 108.83±11.50 scores and working group was 106.12±11.28 scores.

The physical function of non-working group was 108.83 ± 11.50 scores and working group was 106.12 ± 11.28 scores. Therefore, there were no significantly different between groups in other dimension. However, there were significantly different in the physical function between non-working and working group ($p=0.045$) (Table 4.5).

Table 4.5 The Health Survey Short Form 36 (SF-36) between non-working and working adolescents groups

SF-36	Non-working group (Mean \pm SD)	Working group (Mean \pm SD)	p-value
Total score	108.83 \pm 11.50	106.12 \pm 11.28	0.312
Physical function	27.21 \pm 2.69	25.92 \pm 2.71	0.045*
Role-physical	6.79 \pm 1.32	7.19 \pm 1.16	0.158
Bodily pain	7.77 \pm 1.63	8.21 \pm 1.86	0.295
General health	15.61 \pm 1.47	15.39 \pm 2.09	0.636
Vitality	16.88 \pm 3.07	15.76 \pm 2.90	0.112
Social functioning	7.42 \pm 2.04	7.67 \pm 1.43	0.510
Role-emotional	4.92 \pm 1.06	5.32 \pm 0.93	0.080
Mental health	22.25 \pm 3.86	20.65 \pm 4.30	0.110

*Significance level $< .05$.

4.8 The Health Survey Short Form 36 (SF-36) between non-working and working adolescents groups in boys and girls

The results of the independent t-test show that there were no significantly different in the total score between non-working boy and working boy. This study found a total score of non-working boy was 110.03 ± 11.15 scores and working boy was 105.91 ± 11.87 scores. However, this study found significantly different in the physical function between non-working boy and working boy ($p=0.024$). The physical function score of non-working boy was 28.18 ± 2.14 scores and working boy was 26.08 ± 2.77 scores (Table 4.6).

This study found no significantly different in the total score between non-working girl and working girl. The total score of non-working girl was 107.82 ± 12.15 scores and working girl was 106.37 ± 10.69 scores. Furthermore, there were no significantly different in other dimensions between groups (Table 4.6).

Table 4.6 The Health Survey Short Form 36 (SF-36) between non-working and working adolescents groups in boys and girls

SF-36	Non-working group (Mean \pm SD)	Working group (Mean \pm SD)	p-value
Boy participants			
Total score	110.03 \pm 11.15	105.91 \pm 11.87	0.308
Physical function	28.18 \pm 2.14	26.08 \pm 2.77	0.024*
Role-physical	6.64 \pm 1.43	7.08 \pm 1.25	0.322
Bodily pain	7.79 \pm 1.86	8.35 \pm 1.79	0.370
General health	15.87 \pm 1.29	15.24 \pm 2.38	0.403
Vitality	17.36 \pm 3.56	15.88 \pm 3.13	0.181
Social functioning	7.18 \pm 2.40	7.40 \pm 1.34	0.693
Role-emotional	4.91 \pm 1.22	5.30 \pm 0.91	0.248
Mental health	22.09 \pm 4.42	20.60 \pm 4.69	0.349
Girl participants			
Total score	107.82 \pm 12.15	106.37 \pm 10.69	0.693
Physical function	26.38 \pm 2.90	25.72 \pm 2.66	0.462
Role-physical	6.92 \pm 1.26	7.34 \pm 1.04	0.252
Bodily pain	7.75 \pm 1.48	8.05 \pm 1.95	0.620
General health	15.38 \pm 1.62	15.58 \pm 1.68	0.730
Vitality	16.46 \pm 2.67	15.63 \pm 2.62	0.340
Social functioning	7.62 \pm 1.76	8.00 \pm 1.50	0.463
Role-emotional	4.92 \pm 0.95	5.34 \pm 0.97	0.193
Mental health	22.38 \pm 3.50	20.72 \pm 3.83	0.183

*Significance level < .05.

4.9 The Health Survey Short Form 36 (SF-36) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

The results from the One way ANOVA test showed no significantly different in the total score. The total score of non-working, low work intensity, moderate work intensity, and high work intensity groups were 108.83 ± 11.50 , 108.77 ± 8.65 , 102.14 ± 12.57 , and 106.67 ± 11.26 scores respectively. Nevertheless, there are significantly different in role-emotional ($p=0.048$). The role-emotional of non-working, low work intensity, moderate work intensity, and high work intensity groups were 4.92 ± 1.06 , 4.57 ± 1.13 , 5.50 ± 0.80 , and 5.38 ± 0.90 scores respectively (Table 4.7).

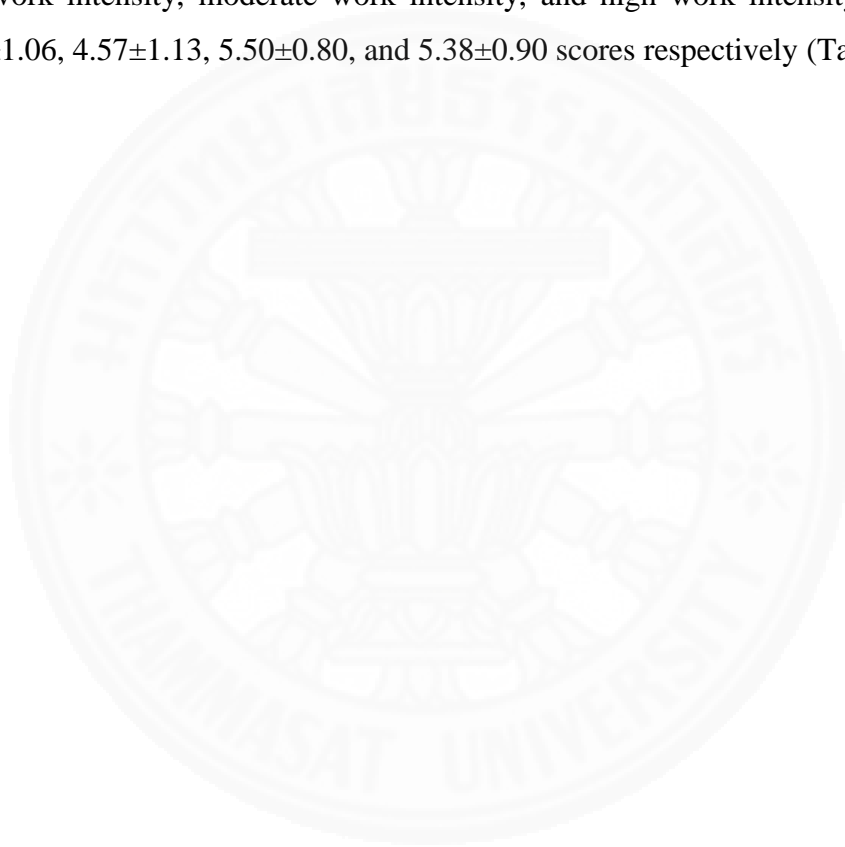


Table 4.7 The Health Survey Short Form 36 (SF-36) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

SF-36	Groups (Mean±SD)				p-value
	Non-working	Low work intensity	Moderate work intensity	High work intensity	
Total score	108.83±11.5 0	108.77±8.6 5	102.14±12.5 7	106.67±11.2 6	0.394
Physical function	27.21±2.69	26.71±2.63	25.50±1.98	25.91±2.87	0.183
Role-physical	6.79±1.32	7.57±0.54	7.00±1.35	7.19±1.18	0.396
Bodily pain	7.77±1.63	8.09±2.04	7.80±2.17	8.32±1.78	0.591
General health	15.61±1.47	17.11±3.09	15.00±1.75	15.25±1.94	0.089
Vitality	16.88±3.07	16.43±1.72	14.33±2.96	16.00±2.95	0.110
Social functioning	7.42±2.04	8.14±1.35	7.67±1.83	7.60±1.36	0.772
Role-emotional	4.92±1.06	4.57±1.13	5.50±0.80	5.38±0.90	0.048*
Mental health	22.25±3.86	20.14±2.48	19.33±4.36	21.02±4.47	0.239

*Significance level < .05.

4.10 Role-emotional of The Health Survey Short Form 36 (SF-36) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

The results from the post hoc tests showed no significantly different in between groups. Mean difference between non-working and low work intensity was 0.345, between non-working and moderate work intensity was -0.583, between non-working and high work intensity was -0.461, between low work intensity and moderate work intensity was -0.929, between low work intensity and high work intensity was -0.806,

and between moderate work intensity and high work intensity was 0.123 scores (Table 4.8).

Table 4.8 Role-emotional of The Health Survey Short Form 36 (SF-36) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Non-working	Low work intensity	0.345	0.408	0.832	-0.72	1.41
	Moderate work intensity	-0.583	0.336	0.311	-1.46	0.30
	High work intensity	-0.461	0.234	0.206	-1.07	0.15
Low work intensity	Non-working	-0.345	0.408	0.832	-1.41	0.72
	Moderate work intensity	-0.929	0.452	0.176	-2.11	0.25
	High work intensity	-0.806	0.382	0.158	-1.81	0.19
Moderate work intensity	Non-working	0.583	0.336	0.311	-0.30	1.46
	Low work intensity	0.929	0.452	0.176	-0.25	2.11
	High work intensity	0.123	0.304	0.978	-0.67	0.92
High work intensity	Non-working	0.461	0.234	0.206	-0.15	1.07
	Low work intensity	0.806	0.382	0.158	-0.19	1.81
	Moderate work intensity	-0.123	0.304	0.978	-0.92	0.67

4.11 The Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups

There were no significantly different between non-working and working groups from the Mann-Whitney U test. The mean rank of the CES-D of non-working group was 43.25 scores and working group was 50.25 scores (Table 4.9).

Table 4.9 The Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups

CES-D	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asym. Sig. (2-tailed)
Non-working	24	43.25	1038.00	738.00	-	0.286
Working	72	50.25	3618.00		-1.067	
Total	96					

4.12 Depression from the Center for Epidemiologic Studies-Depression Scale (CES-D) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

The results from this study showed depression in non-working group was 5 (20.8%) people, low work intensity group was 1 (14.3%) people, moderate work intensity group was 4 (33.3%) people, and high work intensity group was 14 (26.4%) people (Table 4.10).

Table 4.10 Depression from the Center for Epidemiologic Studies-Depression Scale (CES-D) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

CES-D	Non-working group (percent)	Low work intensity group (percent)	Moderate work intensity group (percent)	High work intensity group (percent)
Normal	19 (79.2)	6 (85.7)	8 (66.7)	39 (73.6)
Depression	5 (20.8)	1 (14.3)	4 (33.3)	14 (26.4)

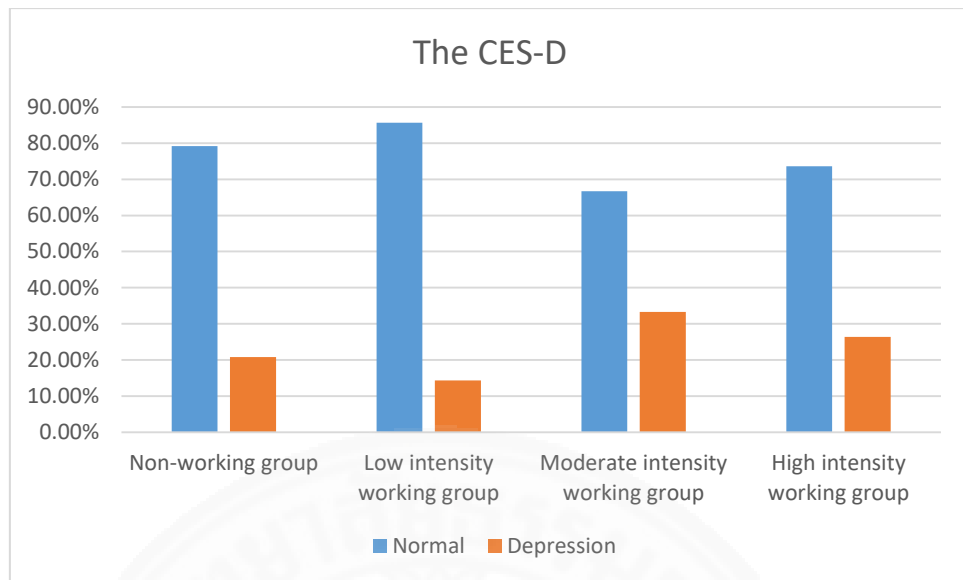


Figure 4.4 Depression from the Center for Epidemiologic Studies-Depression Scale (CES-D) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

4.13 The Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups in boys and girls

The results of the Mann-Whitney U test found no significantly different from the CES-D scores between non-working boy and working boy. The mean rank of non-working boy was 21.09 scores and working boy was 27.35 scores (Table 4.11).

The result of this study found no significantly different from the CES-D scores between non-working girl and working girl. The mean rank of non-working girl was 22.23 scores and working girl was 23.31 scores (Table 4.11).

Table 4.11 The Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups in boys and girls

CES-D	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asym. Sig. (2-tailed)
Boy participants						
Non-working	11	21.09	232.00	166.00	-	0.215
Working	40	27.35	1094.00		-1.239	
Total	51					
Girl participants						
Non-working	13	22.23	289.00	198.00	-	0.802
Working	32	23.31	746		-0.251	
Total	45					

4.14 The Center for Epidemiologic Studies-Depression Scale (CES-D) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

The results from the Kruskal-Wallis test showed the CES-D mean rank score of non-working group was 43.25 scores, low work intensity group was 45.71 scores, moderate work intensity group was 54.00 scores, and high work intensity group was 50.00 scores. However, there were no significantly different was found (Table 4.12).

Table 4.12 The Center for Epidemiologic Studies-Depression Scale (CES-D) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

	Groups				p-value
	Non-working (mean rank)	Low work intensity (mean rank)	Moderate work intensity (mean rank)	High work intensity (mean rank)	
CES-D	43.25	45.71	54.00	50.00	0.671

4.15 Depression from the Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups

The results from the Chi-square test showed, there was no significant association between CES-D and working ($\chi^2=0.296$, $p=0.586$) (Table 4.13).

Table 4.13 Depression from the Center for Epidemiologic Studies-Depression Scale (CES-D) between non-working and working adolescents groups

CES-D	Non-working group (percent)	Working group (percent)	Total (percent)
Normal	19 (79.2)	53 (73.6)	72 (75.0)
Depression	5 (20.8)	19 (26.4)	24 (25.0)
Total	24 (100.0)	72 (100.0)	96 (100.0)

4.16 The Thai Perceived Stress Scale-10 (T-PSS-10) between non-working and working adolescents groups

The results from the Mann-Whitney U test found no significantly different of T-PSS-10 scores between non-working and working groups. The mean rank scores of non-working group was 48.27 scores and working group was 48.58 scores (Table 4.14).

Table 4.14 The Thai Perceived Stress Scale-10 (T-PSS-10) between non-working and working adolescents groups

T-PSS-10	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asym. Sig. (2-tailed)
Non-working	24	48.27	1158.50	858.50	-	0.963
Working	72	48.58	3497.50		-0.047	
Total	96					

4.17 The Thai Perceived Stress Scale-10 (T-PSS-10) between non-working and working adolescents groups in boys and girls

In boy participants, the results of the Mann-Whitney U test showed that there were no significantly different from the T-PSS scores between non-working and working groups. The mean rank of non-working boy was 26.86 scores and working group was 25.76 scores (Table 4.15).

Moreover, this study found no significantly different between non-working girl and working girl. The mean rank of non-working girl was 20.08 scores and working girl was 24.06 scores (Table 4.15).

Table 4.15 The Thai Perceived Stress Scale-10 (T-PSS-10) between non-working and working adolescents groups in boys and girls

T-PSS-10	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asym. Sig. (2-tailed)
Boy participants						
Non-working	11	26.86	295.50	210.50	-	0.827
Working	40	25.76	1030.50		-0.219	
Total	51					
Girl participants						
Non-working	12	20.08	241.00	193.50	-	0.366
Working	33	24.06	794.00		-0.365	
Total	45					

4.18 The Thai Perceived Stress Scale-10 (T-PSS-10) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

The results from the Kruskal-Wallis test showed no significantly different between groups. The mean rank of non-working, low work intensity, moderate work intensity, and high work intensity groups were 48.27, 55.14, 51.92, and 46.95 scores (Table 4.16).

Table 4.16 The Thai Perceived Stress Scale-10 (T-PSS-10) in non-working adolescents, low work intensity, moderate work intensity, and high work intensity

	Groups				p-value
	Non-working (Mean rank)	Low work intensity (Mean rank)	Moderate work intensity (Mean rank)	High work intensity (Mean rank)	
T-PSS-10	48.27	55.14	51.92	46.95	0.861

4.19 The correlation between the Thai Perceived Stress Scale-10 (T-PSS-10) and working hour

The results from the Spearman's correlation coefficient showed there was no significant correlation between the T-PSS-10 and working hour ($r=-0.173$, $p=0.146$).

4.20 The correlation between the Center for Epidemiologic Studies-Depression Scale (CES-D) and the Thai Perceived Stress Scale-10 (T-PSS-10)

The results from the Spearman's correlation coefficient showed there was a weak correlation between the CES-D and the T-PSS-10 ($r=0.318$, $p=0.002$) (Table 4.17).

Table 4.17 The correlation between the Center for Epidemiologic Studies-Depression Scale (CES-D) and the Thai Perceived Stress Scale-10 (T-PSS-10)

Spearman's correlation coefficient		CES-D	T-PSS-10
CES-D	Correlation Coefficient	1.000	0.318*
	Sig. (2-tailed)	.	0.002
	N	96	96
T-PSS-10	Correlation Coefficient	0.318*	1.000
	Sig. (2-tailed)	0.002	.
	N	96	96

*Significance level < .05.

4.21 Predictor of depression on binary logistic regression

The results from the binary logistic regression showed there was no significant difference between groups (Table 4.18).

Table 4.18 Predictor of depression on binary logistic regression

Groups	B	S.E.	Wald	df	p-value	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Non-working (reference)	-1.335	0.503	7.055	1	0.008	0.263		
Low work intensity	-0.457	1.191	0.147	1	0.701	0.633	0.061	6.542
Moderate work intensity	0.642	0.792	0.656	1	0.418	1.900	0.402	8.976
High work intensity	0.310	0.591	0.276	1	0.600	1.364	0.428	4.347

CHAPTER 5

DISCUSSION

5.1 Aerobic physical fitness

The previous studies found an environment could affect the aerobic physical fitness and physical activity ^(7, 22, 87). The result of Mitchell's study showed environmental factor (expose green space area) and low socioeconomic status were associated with mortality from circulatory disease. In participants who expose more green space have lower incidence rate ratio of mortality from circulatory disease than participants who expose less area due to more physical activity is found in green areas ⁽⁸⁷⁾. In the present study, the heart beat count from YMCA step test of non-working, low work intensity, moderate work intensity, and high work intensity groups were no significantly different (Table 4.4). This study included the participants who are studying at the secondary in public school and private school in Pathum Thani province. It might be possible that the participants in all groups had the same environmental. Therefore, they were the same physical activity and exercise. It might affect the result in this study were no different. In addition, the results of this study showed no significant difference in resting heart rate between groups. However, this study found the aerobic physical fitness in an excellent level of aerobic physical fitness more participants in the number of participants in non-working groups compared to working groups. On the other hand, non-working group was 8 people (33.3%), low work intensity group was 2 people (28.6%), moderate work intensity group was 1 people (8.3%), and high work intensity group was 6 people (11.3%) (Table 4.2). Working at night shift might be affected to the aerobic physical fitness, and would be more effective when increasing the intensity of work, therefore, the resting heart rate of each group had no statically difference.

The aerobic physical fitness measurements could predict the risk of cardiovascular disease ^(34, 35). A low aerobic physical fitness was associated with cardiovascular disease. This study found that the aerobic physical fitness levels in most participants (non-working, moderate work intensity, and high work intensity groups) were very poor (Table 4.2). Therefore, the aerobic physical fitness should be corrected to reduce the risk of cardiovascular disease in the future.

A Martinez-Vizcino studied a school-based physical activity intervention in school age children on the cardiometabolic risk factors, found that the improvement of girl participants in triceps skinfold thickness, body fat %, fat-free mass, waist circumference, LDL-cholesterol, and insulin levels. However, the boy participants only found an improvement of fat-free mass and waist circumference. They concluded that the intervention effects were more visible in the girls ⁽¹⁶⁾. The results of this study showed that boys might have better adaptation than the girls and this study also found significant differences at $p < 0.05$ only in the girls (Table 4.3). For this reason, working at night shift affected the aerobic physical fitness in the girls. In addition, changes in aerobic physical fitness that found in the girls who work at night shift might come from the influence of hormonal changes. Emami and coworker studied the static and dynamic balance during the follicular phase and ovulation phase. The two phases were very different from estrogen, while ovulation had a higher estrogen value. The result of their study found both static and dynamic balance were better in the ovulation phase in comparison to early follicular phase ⁽⁸⁸⁾, and previous studies also found estrogen affected muscle strength ^(89,90). Furthermore, Naessen's study which studied the sway velocity in elderly women receiving estrogen and not receiving estrogen. The results found that the sway velocities were significantly lower in elderly women receiving than not receiving estrogen and concluded that increasing balance ability was influenced by estrogen. Estrogen effected increasing muscle strength and connective tissue elements, and also affected a neuronal transmission function ⁽⁸⁹⁾. For this reason, working at night shift and intensity of working might affect change in sex hormone in the girls leading affected the nervous system and the muscular system. Therefore, the changes in aerobic physical fitness level were more visible in the girls than boys.

According to the aerobic physical fitness could predict the risk of cardiovascular disease ⁽³⁵⁾. The results of this study found the aerobic physical fitness in most participants were very poor in both non-working and working groups (Table 4.2). Then, there might be a risk of cardiovascular disease in the future.

5.2 Quality of life

The results of this study found no significant differences in the total score of the health survey short form 36 (SF-36) between non-working and working adolescents

groups. Both groups of participants were in Pathum Thani province which had the same environment that might had a similar quality of life ^(87,91). Furthermore, the participants were in an age that had rapid change in physical, development of muscle strength, and development of hormonal change which this age had more power ^(7, 8, 22, 24). The participants might be able to adapt, therefore that did not affect the quality of life. However, it might affect the physical, mind, and even the quality of life, if there were a long time problem.

In the girls, there were no significantly different in a physical function from the SF-36 between non-working and working adolescents. In the physical function items of SF-36, there are activities that boys tend to do more often do than girls. For example, In vigorous activities, such as running, lifting heavy objects, participating in strenuous sports, in moderate activities, such as moving a table, watering a tree, cycling 100 meters, washing by yourself 8-10 pieces, and lifting or carrying groceries. However, there were significant differences in a physical function in the boys when compared between non-working and working adolescent groups. This study found that non-working adolescents had a better a physical function than those in working adolescent groups. The results from the SF-36 showed that the total score was the most likely in non-working group, which was consistent with the results from the YMCA step test which found the excellent level of the aerobic physical fitness in number of participants in non-working group compared to working groups. Moreover, a decrease in the level of aerobic physical fitness was found when increasing the intensity of the workload. Nevertheless, the working adolescents had more score in the role-emotional than the non-working adolescents ($p < 0.05$). Working might be beneficial to emotional problems adaptation, i.e. be able to solve many problems. Consequently, working might affect emotional adjustment to be more stable and prudent. Previous studies found, working in adolescents had a positive impact on working skill, behavior, time management, punctuality, self-control, increasing of income, and working experience ^(92, 93). However, the results from the post hoc test showed no significantly different between. It might be a result of the number of participants having different. On the other hand, a too heavy workload could affect the quality of life in adolescents. Graves's study found that the working adolescents had a lower quality of life scores which were value

according to the level of workload. However, low work intensity (≤ 10 hours per week) would not affect the quality of life in students 12th grade ⁽⁹²⁾.

5.3 Depression

The results of this study found no significantly different in the Center for Epidemiologic Studies-Depression Scale Thai version (CES-D) between non-working adolescents and working adolescents (Table 4.9 and 4.12). The Onek's study found that 49.5% of working adolescents age between 15-18 years who work 78.1 ± 10.7 hours/week had Psychological health symptoms. Moreover, Onek's study also found that the Psychological health symptoms were correlated with having break times, lack of annual leave, daily working hours, etc ⁽⁹⁴⁾. It might be possibility that the working adolescents had enough having break times, annual leave, and appropriate daily working hours. Furthermore, the duration of working of participants of this study was less than 1 year. The majority of participants (85 percent) had 3-6 months. Therefore, this study found no significantly different in CES-D scores (Table 4.1). However, this study found that the CES-D scores were more likely to be found among working adolescents compared to non-working adolescents. The Balazs's study that found that the suicidal risk in adolescents were emotional symptoms and conduct problems ⁽⁹⁵⁾. Working adolescents might be at risk of depression when working for a long time, therefore, parents and employer should always observe and assess the depression of working adolescents ^(94, 96).

The results of this study when compared with boys and girls (Table 4.11). There were no significantly different between non-working boys and working boys, and between non-working girls and non-working girls. The previous studies found that boys had externalizing problems (e.g. hyperactivity disorder, conduct disorder) more than girls. The girls had internal problems (emotional symptoms and loneliness) more than boys. Both externalizing and internalizing problems were associated with depressive symptoms ^(97, 98). Therefore, boys and girls participants might have the same depression. The Alpaslan's study which studied gender and the Children's Depression Inventory (CDI) scores and found that there were no significantly different between boys and girls ⁽⁹⁷⁾, which was consistent with the results from this study.

In addition, the scores of CES-D and T-PSS-10 were correlated (Table 4.17). In adolescents with more scores of the T-PSS-10 (Stress) will be more scores of CES-D (Depression). In addition, the previous studies found the prevalence of depression in children and adolescents in abroad were only 2.8%-5.6% ^(48, 49). However, the prevalence of depression in children and adolescents in Thailand were 1.7%-40.8% ^(13, 14, 45-47). Therefore, the prevalence of depression in children and adolescents in Thailand were more than the prevalence of depression in children and adolescents in abroad, the depression measurement is important. Therefore, self-employed adolescents, parents, teachers, and employer are supposed to care for working adolescents who have more stress, especially in high work intensity group to prevent the effect of depression in the further.

5.4 Stress

The results of this study found that there were no significantly different in The Perceived Stress Scale Thai version (T-PSS-10) between non-working adolescents and working adolescents in all work intensity (Table 4.14 and 4.16)

The results of this study, when compared between boys and girls, found that there were no significant differences in T-PSS-10 scores. The mean rank of T-PSS-10 of non-working boys and working boys were 26.68 and 25.76 scores, and non-working girls and working girls were 20.08 and 24.06 scores (Table 4.15). However, there was no statistic difference in T-PSS-10 scores between non-working and working boy and girl groups.

The Hypothalamus-pituitary-adrenal (HPA) was responsible for controlling reaction to stress. The HPA consisted of hypothalamus, anterior pituitary, and adrenal cortex. The hypothalamus secreted Corticotropin releasing hormone (CRH) which stimulated anterior pituitary to release Adrenocorticotrophic hormone (ACTH). The ACTH stimulated adrenal cortex to secreted cortisol hormone (Stress hormone). In addition, increasing cortisol level might conduct negative feedback to hypothalamus level and anterior pituitary level ⁽⁹⁹⁾. The Hypothalamus-pituitary-gonadal (HPG) was responsible for controlling endocrine glands. The HPG consisted of hypothalamus, anterior pituitary, ovaries, and testes. The hypothalamus secreted Gonadotropin releasing hormone (GnRH) to stimulate the anterior pituitary to secrete Luteinizing

hormone (LH) and Follicle stimulating hormone (FSH). The secretion of LH and FSH stimulated secretion estrogen from ovaries and secretion testosterone from testes ⁽⁹⁹⁾.

The HPA and the HPG were related to each other. In a male, testosterone inhibited the HPA at hypothalamus level. However, in a female, estrogen stimulated the HPA at hypothalamus level and adrenal level, and there were differences in the menstrual cycle. In addition, the CRH inhibited the HPG at all levels (Hypothalamus, anterior pituitary, ovaries, and testes) ⁽⁹⁹⁾. In this study, the T-PSS-10 scores of working girls were higher than non-working girls. Nevertheless, the T-PSS-10 scores of working boys were lower than non-working boys. Therefore, there was no statistic difference between non-working adolescents and working adolescents. The results of this study consisted of the van der Voorn's study which found that in girls age between 8-18 years had salivary cortisol and serum cortisol higher than boys ⁽⁹⁹⁾.

The Davidson's study found that sleeping affects the secretion of growth hormone (GH) which was important in human development. The GH was secreted in the first 90 minutes of sleeping at night, and the GH was associated with slow wave sleep. If there was no slow wave sleep, it would affect the GH secretion ⁽¹⁰⁰⁾. The Lac's study found that the night shift worker who had sleep deprivation affected increasing of cortisol level ⁽¹⁰¹⁾. The results of this study found no difference in the T-PSS-10 scores between non-working adolescents and working adolescents. Non-working adolescents and working adolescents had different sleep time and bedtime. Working adolescents tended to sleep late at night, therefore, working adolescents had stress from sleep deprivation than non-working adolescents. Furthermore, non-working adolescents had a join the tutorial rate more than those in working adolescents, it was possible that the non-working adolescents had stress from studying more than those in working adolescents. Therefore, non-working adolescents and working adolescents showed no statistic difference in T-PSS-10 scores. On the other hand, the T-PSS-10 scores of working adolescents showed no significant difference when compared with non-working adolescents (Table 4.14), which similar to the CES-D scores of this study. As a result, working at night shift in adolescents might be at risk of stress and depression in adolescents. The previous study which studied psychopathology, quality of life, and suicidal risk, reported the psychopathology problem (Emotional symptoms) might affect the quality of life and higher suicidal risk ⁽⁹⁵⁾. Therefore, parents and employer

should always watch and help to solve the adolescent's emotional problems. Helping as quickly as possible could reduce the risk of self-harm and suicide in adolescents.

5.5 Limitation

This study had several limitations. The number of children in each group is not equal. The schools that were in contact rarely had adolescents who work low work intensity and moderate work intensity. Most working adolescents would work for many hours. Therefore, this study might contact many schools.

Moreover, this study was done in a cross-sectional study. This study might not see the effects of night shift working in working adolescents obviously.

In addition, the process of contacting each school took a long time. Some schools were in the student's examination. Consequently, the data collection could not be done at the time. It made data collection took longer time than expected.

Furthermore, this study did not assess the data immediately after work. The working adolescents might adapt to the changes of various variables in the daytime.

Moreover, some items of the questionnaires of this study are not suitable for both sexes. For example, items in the physical function dimension, there are some items, which are activities that require the strength that boys make on a daily basis.

In addition, this study did not measure reliability in each measurement. Therefore, this study was unable to measure the accuracy of measurements

Furthermore, this study only questioned sleep time and bedtime. This study did not measure sleep quality, therefore, this study was unable to measure the period of sleep each phase.

5.6 Further study

Further studies should increase the number of participants to reduce the distribution of information, which may find a significant difference in other variables.

The cross-sectional study can only find the relationship. Therefore, further studies should be done with Cohort study due to can find the effect of night shift working in adolescents.

Further studies should assess after work because it will reduce the effect of adaptation of working adolescents.

Stress measurement in further studies should be done with the objective examination for the purpose of increasing reliability.

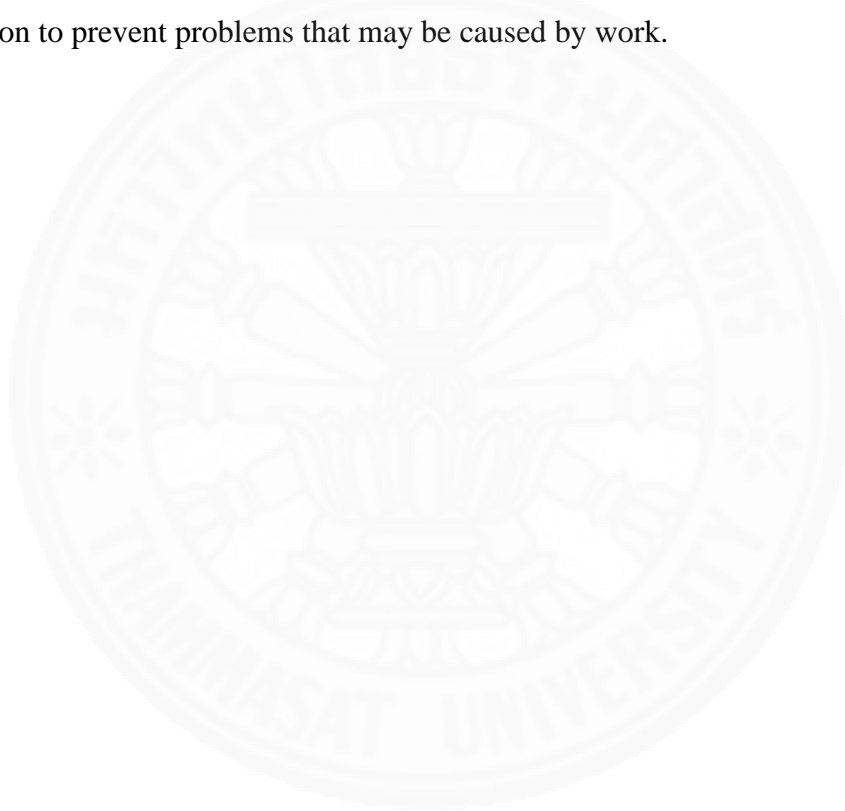
Further studies should have a measurement of reliability and quality of sleep.



CHAPTER 6

CONCLUSIONS

Working at night shift in adolescents who were studying at the secondary in Pathum Thani province and level of work intensity affects decreasing in aerobic physical fitness level and quality of life especially in girls. Moreover, working at night shift and level of work intensity (moderate and high work intensity) tended to increase the depression and stress in boys and girls. The results of this study would benefit for self-employed adolescents, parents, teachers, and employer for planning and finding a solution to prevent problems that may be caused by work.



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APPENDIX A
Data collection form

หมายเลข.....

ตัวอย่างแบบบันทึกผลการทดสอบ

วัน เดือน ปี ที่ทำการทดสอบ.....

ชื่อ นามสกุล..... เพศ ชาย หญิง

วัน/เดือน/ปีเกิด..... อายุ.....ปี เบอร์โทรศัพท์ที่ติดต่อได้.....

น้ำหนัก.....กิโลกรัม ส่วนสูง.....เซนติเมตร ดัชนีมวลกาย (BMI).....

- ทำงานกลางวัน สถานที่ทำงาน.....
ทำงานตั้งแต่เวลา.....ถึงเวลา..... จำนวนวันที่ทำงานติดต่อกันก่อนวันที่ทดสอบ..... วัน
- ไม่ทำงาน สถานศึกษา.....

ลำดับที่	รายการ	วัดครั้งที่		ค่าที่ได้	การแปลผล
		1	2		
1	ความดันโลหิต (มิลลิเมตรปรอท)				
2	อัตราการเต้นหัวใจขณะพัก (ครั้ง/นาที)				
3	ค่าสมรรถภาพทางกายแบบแอโรบิกด้วย กล่องไม้ ประเมินจากอัตราการเต้นของ หัวใจ (ครั้ง/นาที)				
4	ค่าคะแนนจากแบบทดสอบคุณภาพชีวิต SF36				
5	ค่าคะแนนจากแบบคัดกรองภาวะซึมเศร้าใน เด็ก				

แปลผลรวมและข้อเสนอแนะ

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APPENDIX B

Questionnaire for participants

แบบสอบถามทั่วไปสำหรับอาสาสมัคร

ส่วนที่ 1 ข้อมูลทั่วไป

ชื่อ นามสกุล..... ชื่อเล่น..... เพศ ชาย หญิง
 วัน/เดือน/ปีเกิด..... อายุ.....ปี เบอร์ที่ติดต่อดี.....
 น้ำหนัก.....กิโลกรัม ส่วนสูง.....เซนติเมตร ดัชนีมวลกาย (BMI).....
 ทำงานกลางวัน สถานที่ทำงาน.....
 ไม่ทำงาน สถานศึกษา..... ระดับชั้น.....

ส่วนที่ 2 ข้อมูลครอบครัว

2.1 สถานภาพครอบครัว บิดา-มารดา อยู่ด้วยกัน แยกกันอยู่ หย่าร้าง
 บิดาเสียชีวิต มารดาเสียชีวิต
 2.2 ปัจจุบันอาศัยอยู่กับ บิดา-มารดา บิดา มารดา อื่นๆ (ระบุ).....
 2.3 จำนวนสมาชิกในครอบครัว (รวมท่านด้วย)..... คน
 2.4 รายได้ครอบครัว (รายได้ผู้ปกครอง)..... บาท/เดือน

ส่วนที่ 3 ข้อมูลสุขภาพ

3.1 ท่านมีโรคประจำตัวหรือไม่
 มี (ระบุ.....) ไม่มี
 3.2 ในช่วง 1 ปีที่ผ่านมาท่านเคยได้รับอุบัติเหตุหรือไม่
 เคย (ระบุ.....) ไม่เคย
 3.3 ในช่วง 1 ปีที่ผ่านมาท่านเคยได้รับการผ่าตัดหรือไม่
 เคย (ระบุ.....) ไม่เคย
 3.4 ใน 7 วันที่ผ่านมาท่านเคยได้รับการบาดเจ็บหรือเป็นโรคทางระบบกระดูกและกล้ามเนื้อหรือไม่
 เคย (ระบุ.....) ไม่เคย
 3.5 ท่านออกกำลังกายหรือไม่
 มี (ระบุชนิด.....) ไม่มี
 3.6 ความถี่การออกกำลังกาย ครั้ง/สัปดาห์ นาที/ครั้ง
 3.7 ท่านสูบบุหรี่หรือไม่
 สูบ (ระบุจำนวน มวน/วัน) ไม่สูบ

APPENDIX B

Questionnaire for participants (cont.)

3.8 ท่านดื่มเครื่องดื่มแอลกอฮอล์หรือไม่

ดื่ม (ระบุความถี่..... ครั้ง/เดือน) ไม่ดื่ม

3.9 ใน 1 เดือนที่ผ่านมา มีสิ่งใดที่ทำให้ท่านเกิดความเครียดหรือไม่

มี (ระบุ.....) ไม่ดื่ม

ส่วนที่ 4 ข้อมูลรูปแบบการดำเนินชีวิต

4.1 ท่านมีงานอดิเรกหรือไม่

มี (ระบุ.....) ไม่มี

4.2 ท่านเข้านอนเวลาใด

20.00-22.00 น. 22.00-24.00 น. 00.00-02.00 น.
 02.00-04.00 น. อื่นๆ (ระบุเวลา.....)

4.3 ท่านนอนกี่ชั่วโมง/วัน

< 4 ชั่วโมง 4-6 ชั่วโมง
 6-8 ชั่วโมง > 8 ชั่วโมง

ส่วนที่ 5 ข้อมูลสำหรับเด็กนักเรียนทั่วไป

5.1 ท่านเรียนวันละ..... ชั่วโมง/วัน

5.2 ระบุกิจกรรมในช่วงพักกลางวัน.....

5.3 ระบุกิจกรรมหลังเลิกเรียน.....

5.4 ท่านเรียนเสริมหรือไม่

เรียน (ระบุ..... วัน/สัปดาห์) ไม่เรียน

ส่วนที่ 6 ข้อมูลสำหรับเด็กทำงานกลางคืน

6.1 ท่านทำงานมาเป็นระยะเวลาเท่าไร

< 3 เดือน 3-6 เดือน
 6-12 เดือน > 12 เดือน

6.2 ลักษณะงานที่ท่านทำ.....

6.3 ท่านทำงาน..... วัน/สัปดาห์

6.4 ทำงานตั้งแต่เวลา..... ถึงเวลา.....

6.5 ก่อนหน้านี้ท่านเคยทำงานอื่นมาก่อนหรือไม่

เคย (ระบุ.....) ไม่เคย

APPENDIX C

Interpretation of aerobic physical fitness in adolescents aged 17-19 years

ค่าอัตราการเต้นหัวใจ (ครั้งต่อนาที)		การแปลผล สมรรถภาพทางกาย
ชาย	หญิง	
91 ลงมา	111 ลงมา	ดีมาก
92 – 98	112 – 119	ดี
99 – 113	120 – 136	ปานกลาง
114 – 120	137 – 144	ต่ำ
121 ขึ้นไป	145 ขึ้นไป	ต่ำมาก

Reference: การกีฬาแห่งประเทศไทย กศ. แบบทดสอบสมรรถภาพทางกายอย่างง่ายของการกีฬาแห่งประเทศไทย. กรุงเทพฯ: นิเวศมิตรการพิมพ์; 2546

APPENDIX D

SF-36 Thai version

แบบสำรวจสุขภาพ SF-36

แบบสอบถามนี้เป็นแบบสอบถามที่สำรวจความคิดเห็นของท่านที่มีต่อสุขภาพของท่านเอง ซึ่งจะเป็นคำถามเกี่ยวกับสุขภาพและความสามารถในการทำกิจกรรมโดยทั่วๆ ไป โปรดตอบคำถามทุกคำถาม โดยการวงกลมตัวเลือกในแต่ละข้อ ถ้าหากท่านไม่แน่ใจ ให้เลือกคำตอบที่ท่านคิดว่าใกล้เคียงที่สุด

1. โดยทั่วไปท่านคิดว่าสุขภาพของท่านเป็นอย่างไร ในขณะนี้ (วงกลมหนึ่งคำตอบ)

ดีเลิศ	.....1
ดีมาก	.....2
ดี	.....3
พอใช้	.....4
ไม่ดี	.....5
2. เมื่อเทียบกับปีที่แล้ว ท่านคิดว่าสุขภาพของท่านเป็นอย่างไร (วงกลมหนึ่งคำตอบ)

ดีกว่าเมื่อปีที่แล้วมาก	.....1
ค่อนข้างดีกว่าเมื่อปีที่แล้ว	.....2
เหมือนกับเมื่อปีที่แล้ว	.....3
ค่อนข้างแย่กว่าเมื่อปีที่แล้ว	.....4
แย่กว่าเมื่อปีที่แล้ว	.....5
3. คำถามต่อไปนี้เป็นคำถามเกี่ยวกับกิจกรรมที่ท่านปฏิบัติในแต่ละวัน ท่านคิดว่า สุขภาพของท่านทำให้ท่านมี ปัญหา ในการทำกิจกรรมเหล่านี้หรือไม่ ถ้ามี มีมากหรือน้อยเพียงใด (วงกลมหนึ่งคำตอบในแต่ละบรรทัด)

ท่านมีปัญหาเวลาทำสิ่งเหล่านี้มากน้อยเพียงใด	มี ปัญหา มาก	มีปัญหา เล็กน้อย	ไม่มี ปัญหา เลย
ก. กิจกรรมที่ต้องใช้แรงมาก เช่น วิ่งไกลๆ ทำงานที่ต้องออกแรงมากๆ ยกของหนัก ออกกำลังกายอย่างหนัก	1	2	3
ข. กิจกรรมที่ต้องใช้แรงปานกลาง เช่น เลื่อนโต๊ะ รัดน้ำดันไม้ ซี จักรยาน 100 เมตร ชักเสื้อผ้าด้วยตนเอง 8-10 ชั้น	1	2	3
ค. เดินยกหรือหิ้วของซ้ำเต็มสองมือ	1	2	3
ง. เดินขึ้นบันไดหลายชั้นติดต่อกัน	1	2	3
จ. เดินขึ้นบันไดหนึ่งชั้น	1	2	3
ฉ. งอเข้า คุกเข้า ไก้โค้ง/โน้มตัวลง	1	2	3

APPENDIX D
SF-36 Thai version (cont.)

ข. เดิน มากกว่าหนึ่งกิโลเมตร	1	2	3
ข. เดิน ประมาณครึ่งกิโลเมตร	1	2	3
ฉ. เดิน ประมาณหนึ่งร้อยเมตร	1	2	3
ญ. อาบน้ำ แต่งตัว	1	2	3

4. ในระยะหนึ่งเดือนที่ผ่านมา สุขภาพกายของท่านทำให้ท่านมีปัญหา เวลาทำงานหรือกิจวัตรประจำวัน หรือไม่ (วงกลมหนึ่งคำตอบในแต่ละบรรทัด)

ท่านมีปัญหาเหล่านี้หรือไม่	มี	ไม่มี
ก. ทำงานหรือทำกิจกรรมต่างๆ ได้ ไม่นานเท่าเดิม	1	2
ข. ทำงานได้น้อยกว่าที่ต้องการ	1	2
ค. ไม่สามารถทำงานหรือกิจกรรมบางอย่างได้อย่างที่เคยทำ	1	2
ง. มีความยากลำบากในการทำงานหรือกิจกรรม (เช่น ต้องใช้ความพยายามมากเป็นพิเศษ)	1	2

5. ในระยะหนึ่งเดือนที่ผ่านมา อารมณ์ของท่าน (เช่น รู้สึกหดหู่ หรือวิตกกังวล) ทำให้ท่านมีปัญหาในการทำงานหรือกิจกรรมปกติประจำวัน หรือไม่(วงกลมหนึ่งคำตอบในแต่ละบรรทัด)

ท่านมีปัญหาเหล่านี้หรือไม่	มี	ไม่มี
ก. ทำงานหรือทำกิจกรรมต่างๆ ได้ ไม่นานเท่าเดิม	1	2
ข. ทำงานได้น้อยกว่าที่ต้องการ	1	2
ค. มีความระมัดระวังในการทำงานหรือกิจวัตรประจำวันน้อยกว่าเดิม	1	2

6. ในระยะหนึ่งเดือนที่ผ่านมา สุขภาพทางร่างกายหรืออารมณ์ของท่านมีผลกระทบต่อการทำกิจกรรมทางสังคม เช่น การพบปะสังสรรค์กับครอบครัวญาติสนิทมิตรสหาย หรือเพื่อนฝูงหรือเพื่อนบ้าน มากน้อยเพียงใด(วงกลมหนึ่งคำตอบ)

ไม่มีผลเลยจนคนเดียว	.....1
มีผลเล็กน้อย	.....2
มีผลปานกลาง	.....3
มีผลค่อนข้างมาก	.....4
มีผลมากที่สุด	.....5

APPENDIX D

SF-36 Thai version (cont.)

7. ในระยะหนึ่งเดือนที่ผ่านมาท่านมีอาการปวดเมื่อยร่างกาย เช่น ปวดหัว ปวดท้อง ปวดเข่า ปวดกล้ามเนื้อ รุนแรงเพียงใด(วงกลมหนึ่งคำตอบ)
- ไม่มีอาการเลย1
 มีอาการเล็กน้อยมาก2
 มีอาการเล็กน้อย3
 มีอาการปานกลาง4
 มีอาการมาก5
 มีอาการรุนแรงมาก6
8. ในระยะหนึ่งเดือนที่ผ่านมา อาการปวดเมื่อยร่างกายของท่าน มีผลกระทบต่อการทำงาน ทั้งงานที่ทำงานและงานบ้าน (เช่น ทำความสะอาด ล้างจาน ทำครัว) มากน้อยแค่ไหน(วงกลมหนึ่งคำตอบ)
- ไม่มีผลเลย1
 มีผลเล็กน้อย2
 มีผลปานกลาง3
 มีผลค่อนข้างมาก4
 มีผลมากที่สุด5

9. ในระยะหนึ่งเดือนที่ผ่านมา ท่านเคยมีความรู้สึกต่อไปนี้บ่อยเพียงใด(วงกลมหนึ่งคำตอบในแต่ละบรรทัด)

	ตลอด เวลา	เกือบ ตลอด เวลา	บ่อยๆ	บางครั้ง	นานๆ ครั้ง	ไม่มีเลย
ก. ท่านรู้สึกมีชีวิตชีวา กระปรี้กระเปร่า	1	2	3	4	5	6
ข. ท่านรู้สึกวิตกกังวล	1	2	3	4	5	6
ค. ท่านรู้สึกหุดหู่เศร้าซึมมากจน ไม่มี อะไรทำให้ท่านรู้สึกดีขึ้นได้	1	2	3	4	5	6
ง. ท่านรู้สึกอารมณ์เย็นและสงบ	1	2	3	4	5	6
จ. ท่านรู้สึกมีพลังกำลังมาก	1	2	3	4	5	6
ฉ. ท่านรู้สึกห่อหุ้มและหดหู่ใจ	1	2	3	4	5	6
ช. ท่านรู้สึกหมดเรี่ยวแรง	1	2	3	4	5	6
ซ. ท่านรู้สึกว่าตนเองเป็นคนที่มีความ สุขคนหนึ่ง	1	2	3	4	5	6
ฅ. ท่านรู้สึกเหนื่อยล้า	1	2	3	4	5	6

APPENDIX D

SF-36 Thai version (cont.)

10. ในระยะหนึ่งเดือนที่ผ่านมา สุขภาพทางร่างกายหรืออารมณ์ของท่านมีผลกระทบต่อการทำกิจกรรมทางสังคม เช่น การพบปะสังสรรค์กับครอบครัวญาติสนิทมิตรสหาย หรือเพื่อนฝูง หรือเพื่อนบ้านบ่อยแค่ไหน(วงกลมหนึ่งคำตอบ)

ตลอดเวลา	.....1
เกือบตลอดเวลา	.....2
บางครั้ง	.....3
นาน ๆ ครั้ง	.....4
ไม่มีเลย	.....5

11. ข้อความต่อไปนี้ เป็นจริงสำหรับท่านหรือไม่ (วงกลมหนึ่งคำตอบในแต่ละบรรทัด)

	จริงแท้ แน่นอน 1	จริง 2	ไม่รู้ 3	ไม่ค่อย จริง 4	ไม่จริง แม้แต่น้อย 5
ก. ฉันไม่สบายง่ายกว่าคนอื่น					
ข. ฉันมีสุขภาพดีเหมือนกับเพื่อนๆ					
ค. ฉันคิดว่าสุขภาพของฉันจะแย่ลง					
ง. ฉันคิดว่าสุขภาพของฉันแข็งแรงสมบูรณ์ดีเลิศ					

APPENDIX E

Center for Epidemiologic Studies-Depression Scale (CES-D)

(CES-D) ฉบับภาษาไทย

แบบทดสอบภาวะซึมเศร้าในวัยรุ่น (Center for Epidemiologic Studies-Depression Scale ;CES-D) ฉบับภาษาไทย ได้มีการปรับปรุงและพัฒนาโดยศาสตราจารย์ แพทย์หญิงอุมาพร ศรีงคสมบัติ ภาควิชาจิตเวชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย (อุมาพร, 2539) ผู้พัฒนาและนำไปใช้ทางคลินิก เพื่อคัดกรองภาวะซึมเศร้าที่อาจจะพบได้ในวัยรุ่น การศึกษาพบว่ามีค่า reliability coefficient (alpha) = 0.83 และมีค่าในการจำแนก (discriminant validity) สูง นอกจากนี้มีค่า Sensitivity = 0.6140 , Specificity =0.848, และมีค่า positive predictive value = 0.385 (Klinkman et al., 1997)

การให้คะแนนจะให้ตามความรุนแรง หรือความถี่ของอาการซึมเศร้า มี 4 ระดับ คือ

กลุ่ม 1 1,2,3,5,6,7,9,10,11,13,14,15,17,18,19,20 แต่ละข้อให้คะแนน ดังนี้

ไม่เลย	(< 1 วัน)	ให้	0	คะแนน
นาน ๆ ครั้ง	(1-2 วัน)	ให้	1	คะแนน
บ่อย ๆ	(3-4 วัน)	ให้	2	คะแนน
ตลอดเวลา	(5-7 วัน)	ให้	3	คะแนน

กลุ่ม 2 4,8,12,16 แต่ละข้อให้คะแนน ดังนี้

ตลอดเวลา	(5-7 วัน)	ให้	3	คะแนน
บ่อย ๆ	(3-4 วัน)	ให้	2	คะแนน
นาน ๆ ครั้ง	(1-2 วัน)	ให้	1	คะแนน
ไม่เลย	(< 1 วัน)	ให้	0	คะแนน

การแปลผล

เมื่อรวมคะแนนทุกข้อแล้วนำมาเปรียบเทียบกับเกณฑ์ที่ปกติ ดังนี้ คะแนนรวมสูงกว่า 22 ถือว่าอยู่ในข่ายภาวะซึมเศร้าสมควรได้รับการตรวจวินิจฉัย เพื่อช่วยเหลือต่อไป

APPENDIX E

Center for Epidemiologic Studies-Depression Scale (CES-D) (cont.)

แบบคัดกรองภาวะซึมเศร้าในวัยรุ่น

Center for Epidemiologic Studies-Depression Scale (CES-D) ฉบับภาษาไทย

ศาสตราจารย์ แพทย์หญิงอุมาพร คริ่งคสมบัติ ภาควิชาจิตเวชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยผู้พัฒนา
ชื่อ.....นามสกุล.....

กรุณา ✓ ลงในช่องที่ตรงกับความรู้สึกของท่านมากที่สุด ใน 1 สัปดาห์ที่ผ่านมา

ในระยะ 1 สัปดาห์ที่ผ่านมา	ไม่เลย (< 1 วัน)	นาน ๆ ครั้ง (1-2 วัน)	บ่อย ๆ (3-4 วัน)	ตลอดเวลา (5-7 วัน)
1. ฉันรู้สึกหงุดหงิดง่าย				
2. ฉันรู้สึกเบื่ออาหาร				
3. ฉันไม่สามารถจัดความเศร้าออกจากใจได้ แม้จะมีคนคอยช่วยเหลือก็ตาม				
4. ฉันรู้สึกว่าตนเองดีพอ ๆ กับคนอื่น				
5. ฉันไม่มีสมาธิ				
6. ฉันรู้สึกหดหู่				
7. ทุก ๆ สิ่งที่ทำให้ฉันกระทำจะต้องฝืนใจ				
8. ฉันมีความหวังเกี่ยวกับอนาคต				
9. ฉันรู้สึกว่าชีวิตมีแต่สิ่งล้มเหลว				
10. ฉันรู้สึกหวาดกลัว				
11. ฉันนอนไม่เคยหลับ				
12. ฉันมีความสุข				
13. ฉันไม่ค่อยอยากคุยกับใคร				
14. ฉันรู้สึกเหงา				
15. ผู้คนทั่วไปไม่ค่อยเป็นมิตรกับฉัน				
16. ฉันรู้สึกว่าชีวิตนี้สนุกสนาน				
17. ฉันร้องไห้				
18. ฉันรู้สึกเศร้า				
19. ผู้คนรอบข้างไม่ชอบฉัน				
20. ฉันรู้สึกห้อยลอยในชีวิต				
	รวมคะแนน			

APPENDIX F

Thai Perceived Stress Scale-10 (T-PSS-10)

คำแนะนำ: ต่อกำหนดนี้เป็นคำถามเกี่ยวกับความรู้สึก และความคิดของคุณในรอบ 1 เดือนที่ผ่านมา โปรดทำเครื่องหมาย X ลงในช่องที่ตรงกับที่คุณ คิดหรือรู้สึกแบบนั้น	ไม่ เลย	แทบจะ ไม่มี	มี บางครั้ง	ค่อนข้าง บ่อย	บ่อย มาก
1. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึก ไม่สบายใจเพราะมีสิ่งที่เกิดขึ้นอย่างไม่คาดคิด?					
2. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึก ว่าคุณไม่สามารถควบคุมเรื่องสำคัญๆ ในชีวิตของ คุณได้?					
3. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึก กระสับกระส่าย และ ตึงเครียด?					
4. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึก มั่นใจในความสามารถของตนเองที่จะรับมือกับ ปัญหาส่วนตัวทั้งหลายได้?					
5. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึก ว่าสิ่งทั้งหลายเป็นไปในทิศทางที่คุณต้องการ?					

APPENDIX F

Thai Perceived Stress Scale-10 (T-PSS-10) (cont.)

คำแนะนำ: ต่อไปนี้เป็นคำถามเกี่ยวกับความรู้สึก และความคิดของคุณในรอบ 1 เดือนที่ผ่านมา โปรดวงกลมลงบนตัวเลขที่ตรงกับที่คุณคิดหรือรู้สึก แบบนี้	ไม่ เลย	แทบจะ ไม่มี	มี บางครั้ง	ค่อนข้าง บ่อย	บ่อย มาก
6. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึกว่า คุณไม่สามารถจัดการกับสิ่งทั้งหลายทั้งที่เป็นสิ่ง ที่ล้วนเคยทำมาแล้ว?					
7. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึกว่า สามารถควบคุมสิ่งทั้งหลายที่มากวนใจได้?					
8. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึกว่า คุณควบคุมสถานการณ์ต่างๆได้?					
9. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณโกรธ อันเนื่องมาจากสิ่งทีนอกเหนือการควบคุมของคุณ?					
10. ในรอบ 1 เดือนที่ผ่านมา บ่อยแค่ไหนที่คุณรู้สึกว่า ปัญหาต่างๆ ทับถมมากขึ้นจนคุณไม่สามารถ แก้ไขได้หมด?					
คะแนนรวม				/40	

APPENDIX G
Research Ethics Approval



บันทึกข้อความ

ส่วนราชการ สำนักงานคณะกรรมการจริยธรรมการวิจัยในคน มธ. ชุดที่ 3 โทร. 0 2-986-9813 ต่อ 7373

ที่ ศธ 0516.25 /EC ๕5๖

วันที่ 2 สิงหาคม 2561

เรื่อง แจ้งผลการพิจารณารายงานความก้าวหน้าและขอต่ออายุใบรับรองของคณะกรรมการจริยธรรมการวิจัยในคน มธ. ชุดที่ 3 สาขาวิทยาศาสตร์

เรียน ผศ.ดร.เกษรา รัชพงษ์ศิริ

ตามที่ ท่านได้เสนอขอรับการพิจารณารายงานความก้าวหน้าและขอต่ออายุใบรับรอง จาก คณะอนุกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยธรรมศาสตร์ ชุดที่ 3 สาขาวิทยาศาสตร์ โครงการวิจัยเรื่อง “การศึกษาสมรรถภาพทางกายแบบแอโรบิก คุณภาพชีวิต และ ภาวะซึมเศร้า ในเด็กวัยรุ่นที่ทำงานช่วงกลางคืน จังหวัดปทุมธานี” รหัสโครงการที่ 114/2560 นั้น

บัดนี้ คณะอนุกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยธรรมศาสตร์ ชุดที่ 3 สาขาวิทยาศาสตร์ ได้ พิจารณา และมีมติรับทราบรายงานความก้าวหน้าและอนุมัติการขอต่ออายุใบรับรองให้กับโครงการวิจัยดังกล่าว โดย แนบเอกสารใบรับรองผลการพิจารณามาพร้อมนี้ ทั้งนี้ ข้อกำหนดของการดำเนินงานวิจัย เมื่อครบระยะเวลา 6 เดือน ให้ ผู้วิจัยดำเนินการส่งรายงานความก้าวหน้าโครงการวิจัยนับจากวันที่ได้รับอนุมัติ ส่งมาที่สำนักงานคณะกรรมการ จริยธรรมการวิจัยในคน มธ. ชุดที่ 3 สาขาวิทยาศาสตร์ อาคารราชสุดา ชั้น 1 (ภายในศูนย์วิจัยฯ คณะพยาบาลศาสตร์) มหาวิทยาลัยธรรมศาสตร์ ศูนย์รังสิต

จึงเรียนมาเพื่อโปรดทราบ และโปรดดำเนินการตามข้อกำหนดดังกล่าวด้วย จักขอบคุณยิ่ง

(ศาสตราจารย์ ดร.ประนอม โอทกานนท์)

ประธานคณะกรรมการจริยธรรมการวิจัยในคน มธ. ชุดที่ 3 สาขาวิทยาศาสตร์

APPENDIX G

Research Ethics Approval (cont.)



คณะอนุกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยธรรมศาสตร์ ชุดที่ 3 สาขาวิทยาศาสตร์
อาคารราชสุดา ชั้น 1 ภายในศูนย์วิจัยฯ คณะพยาบาลศาสตร์ ต.คลองหนึ่ง อ.คลองหลวง จ.ปทุมธานี 12121
โทรศัพท์: 0-2986-9213 ต่อ 7373 โทรสาร: 0-2516-5381 E-mail: ecsctu3@nurse.tu.ac.th

COA No. 309/2560

ใบรับรองโครงการวิจัย

โครงการวิจัยที่	:	114/2560
ชื่อโครงการวิจัย	:	การศึกษาสมรรถภาพทางกายแบบแอโรบิก คุณภาพชีวิต และ ภาวะซึมเศร้า ในเด็กวัยรุ่นที่ทำงานช่วงกลางคืน จังหวัดปทุมธานี
	:	The study of aerobic physical fitness, quality of life and depression in adolescents at night shift working in Pathumthani province.
ผู้วิจัยหลัก	:	ผู้ช่วยศาสตราจารย์ ดร.เกษรา รักษ์พงษ์ศิริ
หน่วยงาน	:	คณะสหเวชศาสตร์ มหาวิทยาลัยธรรมศาสตร์

คณะอนุกรรมการพิจารณาจริยธรรมการวิจัยในคน มหาวิทยาลัยธรรมศาสตร์ ชุดที่ 3 ได้พิจารณา
โดยใช้หลัก ของ The International Conference on Harmonization – Good Clinical Practice (ICH-GCP)
อนุมัติให้ดำเนินการศึกษาวิจัยเรื่องดังกล่าวได้

ลงนาม.....*[Signature]*.....

(ศาสตราจารย์ ดร.ประนอม โอทกานนท์)

ประธานคณะอนุกรรมการ

วันที่รับรอง : 2 สิงหาคม 2561

ลงนาม.....*[Signature]*.....

(ผู้ช่วยศาสตราจารย์ ดร.ลักขณา เหล่าเกียรติ)

อนุกรรมการและเลขานุการ

วันหมดอายุ : 1 สิงหาคม 2562

กำหนดส่งรายงานความก้าวหน้า: ครั้งที่ 3: 2 กุมภาพันธ์ 2562

เอกสารที่คณะอนุกรรมการรับรอง

- 1) โครงการวิจัย
- 2) ข้อมูลสำหรับประชากร/กลุ่มตัวอย่างหรือผู้มีส่วนร่วมในการวิจัยและใบยินยอมของประชากร/กลุ่มตัวอย่างหรือผู้มีส่วนร่วมในการวิจัย
- 3) ประวัติผู้วิจัย
- 4) เอกสารเครื่องมือต่างๆที่ใช้ในการวิจัย เป็นต้นว่า แบบสอบถาม
- 5) เอกสารอื่นๆ ที่เกี่ยวข้อง เช่น เอกสารประชาสัมพันธ์ เป็นต้น

APPENDIX G
Research Ethics Approval (cont.)

เอกสารชี้แจงเงื่อนไขเพิ่มเติม

1. ผู้วิจัยรับทราบว่าเป็นการผิดจริยธรรม หากดำเนินการเก็บข้อมูลการวิจัยก่อนได้รับการอนุมัติจาก คณะอนุกรรมการจริยธรรมการวิจัยฯ
2. หากใบรับรองโครงการวิจัยหมดอายุ การดำเนินการวิจัยต้องยุติ เมื่อต้องการต่ออายุต้องขออนุมัติใหม่ล่วงหน้า ไม่ต่ำกว่า 1 เดือน พร้อมส่งรายงานความก้าวหน้าโครงการวิจัย (AF 01_14)
3. ต้องดำเนินการวิจัยตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
4. ใช้เอกสารข้อมูลสำหรับประชากรหรือผู้มีส่วนร่วมในการวิจัย ใบยินยอมของประชากรหรือผู้มีส่วนร่วมในการวิจัย และเอกสารเชิญเข้าร่วมการวิจัย (ถ้ามี) เฉพาะที่ประทับตราอนุกรรมการเท่านั้น
5. หากเกิดเหตุการณ์ไม่พึงประสงค์ร้ายแรงในสถานที่เก็บข้อมูลที่ขออนุมัติจากคณะอนุกรรมการฯ ต้องรายงาน คณะอนุกรรมการฯ ภายใน 5 วันทำการ
6. หากมีการเปลี่ยนแปลงการดำเนินการวิจัย ให้ส่งคณะอนุกรรมการฯ รับรองการเปลี่ยนแปลงก่อนการ ดำเนินการ ตามแบบรายงานแก้ไขเพิ่มเติมโครงการวิจัย (AF 01_13)
7. ผู้วิจัยมีหน้าที่รายงานความก้าวหน้าเมื่อครบกำหนด (ระยะเวลา 6 เดือน นับจากวันที่อนุมัติ) ตามแบบ รายงานความก้าวหน้าโครงการวิจัย (AF 01_14) ให้แก่คณะอนุกรรมการฯ รับทราบ
8. เมื่อดำเนินโครงการวิจัยเสร็จสิ้น ให้ผู้วิจัยส่งแบบรายงานสิ้นสุดโครงการวิจัย (AF 03_12) และบทความย่อผล วิจัยภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น สำหรับโครงการวิจัยที่เป็นวิทยานิพนธ์ให้ส่งบทความย่อผลงานวิจัย ภายใน 30 วัน เมื่อโครงการวิจัยเสร็จสิ้น
9. หากโครงการวิจัยไม่สามารถดำเนินการให้เสร็จสิ้นได้ และมีการยุติการดำเนินโครงการวิจัยก่อนกำหนด ผู้วิจัย ต้องแจ้งให้คณะอนุกรรมการฯ รับทราบตามแบบรายงานเพื่อยุติโครงการวิจัยก่อนกำหนด (AF 01_17) และ แบบรายงานความก้าวหน้าโครงการวิจัย (AF 01_14)