Research Paper

# The Sedentary Time and Physical Activity Level of Adulthood: Comparative by Age and Gender Group

Asyifa Robiatul Adawiyah[1]*, Laila Ulfa[1], Meliyana Nur Afifah[1]

[1] Universitas Respati Indonesia

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**Abstract**

In adulthood, physical activity provides benefits for health outcomes. Watching television, using a computer while sitting, and driving too long can prolong the sedentary time and eventually reduce physical activity. Therefore, this study aimed to associate sedentary time with physical activity level and compared the sedentary time and physical activity levels by age and gender. The study used a descriptive-analytic with a cross-sectional approach to finding the association of sedentary time with physical activity level compared by age and gender group. The data was conducted from 179 adult participants located from inside and outside of Java Island, Indonesia was invited to participate in this study. The International Physical Activity Questionnaire short-form (IPAQ-SF) measured sedentary time and physical activity level. The average age of study participants is 38.69 years old (SD±11.99; min-max=19-65 years old). Sedentary time, described through sitting time, is associated with physical activity level (OR 18.67; 95%CI= 8.48-41.08). Males on 19-44 years old group had greater physical activity total scores (1694.93 MET-minutes a week; SD ± 1256.46; min-max=0-4620) than females (1095.95 MET-minutes a week SD ± 824.66; min-max=0-3756). There are no different physical activity scores between males and females in the 45-65 age group. Sedentary time has a relationship with the level of physical activity performed. Individuals who do low physical activity spend more time on sedentary behaviours, which ultimately have an impact on decreasing their health outcomes and have a higher risk of developing NCD.

**Keywords** *Sedentary time, Sedentary Behaviours, Physical Activity, Adulthood*

## INTRODUCTION

Life expectancy in Indonesia was increased over the past several years. In 2020, Indonesia had 71.77 years, while it increased by approximately 72.32 years in 2023 (United Nations & Macrotrends, 2023). In 2021, women in Indonesia had 73.55 years, and men had 69.67 years of life expectancy (Badan Pusat Statistik, 2021). Indonesian has become an aged population; aging is a physiological process that occurs in every human being (John W. Santrock, 2011). During aging, humans have different lifestyles, ultimately affecting their functional capacity and quality of life. The impact of degenerative disease emergence is representative of poor lifestyle patterns such as following an unhealthy diet, being physically inactive, and being excessively sedentary (World Health Organization, 2020). Non-communicable diseases in Indonesia, such as coronary heart disease and cerebrovascular disease, increased based on Riset Kesehatan Dasar (RISKESDAS) data from 2013 to 2018 (Kementerian Kesehatan Republik Indonesia, 2019); hence there are three main causes increased for the Disability Adjusted Life Years (DALY) rate in Indonesia, specifically (1) increased blood pressure; (2) unhealthy diet; and (3) high fasting blood sugar as the impact of increased costs for curative and rehabilitative the diseases (Mboi et al., 2018).

In adulthood, physical activity provides benefits for health outcomes such as decreased incidence of hypertension, cardiovascular disease, the incidence of type-2 diabetes (Lee et al., 2012), great endurance for the body, improved mental health (reducing anxiety symptoms and depression), cognitive health, and better quality of period of sleep (World Health Organization,


Corresponding author's email: asyifa2506@gmail.com

2010). Watching television, using a computer while sitting, and driving too long can make the sedentary time longer, eventually reducing physical activity. Previous research in the 37-73 years age group explained that participants who reported spending more than 6 hours/day for sedentary time had a higher risk of developing 12 non-communicable diseases (NCD), including diabetes, ischemic heart disease, chronic obstructive pulmonary disease, chronic liver disease, thyroid disorder, depression, migraine, gout, rheumatoid arthritis, chronic kidney disease, and diverticular disease (Cao et al., 2022). Undertakes moderate to vigorous physical activity can effectively replace sedentary time (Stamatakis et al., 2019). Therefore, this study aimed to associate sedentary time with physical activity level and compared the sedentary time and physical activity levels by age and gender.

**LITERATURE REVIEW**

Physical activity refers to any bodily movements that require energy, and it encompasses all of the movements that people engage in throughout the day, with the exception of being sedentary by sitting or lying down (Kohl et al., 2013). Every movement requires activation from the cardiovascular system, respiratory system, and musculoskeletal control (Brooks et al., 1996). Physical activity has three levels: low physical activity, such as doing daily homework and taking a leisurely walk; moderate physical activity, such as jogging, running, cycling, and dancing; and vigorous activity, such as high-intensity interval training (HIIT) and sprint (Forde, 2019). Some regular physical activity is exercise that any movement that can make the muscles work and requires the burning of calories, which is the most essential thing for health outcomes. The main function of the cardiovascular and respiratory systems is to provide the body with oxygen ($O_2$) and nutrients, rid the body of carbon dioxide ($CO_2$), and maintain acid-base balance, body temperature, and hormone regulation. The Cardiovascular system must be able to increase response the skeletal muscle activity. Exercise with low intensity only increases the level of muscle work but eventually has a minor impact on the cardiovascular and respiratory systems to reach the maximum oxygen absorption capacity ($VO_2$ Max). It takes a combination of these organ systems to produce great endurance. The magnitude of these adaptations depends on gender, age, and a person's initial fitness level: intensity, duration, frequency of exercise, and the length of training (Brooks, George. Fahey, Thomas. White, 1996). Endurance exercise increases long-term cardiovascular adaptation, greater capacity for blood flow in the active muscle, and decreases resting blood pressure (systolic/diastolic), -3/-3 mmHg for the average person with normal blood pressure and -10/-8 mmHg for the average of the hypertensive person (Scruggs et al., 1991). Physical inactivity associated with prolonged weightlessness that the result in progressive reversibility of decrements in cardiorespiratory, metabolic, and muscle function (within days to weeks) and progressive reduction in skeletal muscle mass (atrophy) (McLeod et al., 2016), bone mineral density and strength require weeks to months. The decline in physiological function associated with aging is caused by reduced physical activity and aging (Bloomfield & Coyle, 1993). There are differences in gender acute response to exercise. At the same absolute exercise level, females have a higher heart rate response from males, but females have less potential to reach a maximal capacity of oxygen absorption ($VO_2$ MAX) than males because there are have a lower stroke volume, smaller heart size, smaller blood volume, and have a bigger fat mass (Lewis et al., 1986).

Sedentary behaviours over a long period of time lead to obesity hence the accumulation of fat in the skeletal muscles, especially in the muscle cells occupied in a central region within the muscle fibre. Obesity leads to metabolic dysregulation of lipid accumulation in skeletal muscle cells, significantly reducing lipid unsaturation levels. These lipids reduced unsaturation in the muscle cells of obese subjects may occur due to increased lipid peroxidation (Velan et al., 2008; Verdú et al., 2021). Other physiological changes in obesity explain insulin resistance, such as increased fatty

acid synthase (FAS) and choline/ethanolamine phosphotransferase 1 (CEPT1) enzyme activity (Funai et al., 2013; Verdú et al., 2021), FAS activity associated with insulin resistance in skeletal muscle and CEPT1 is also associated with insulin resistance (Funai et al., 2016; Verdú et al., 2021). Obesity causes an increase in perivascular adipose tissue (PVAT), which releases pro-inflammatory factors that interact with the blood vessel's wall cells, favouring the recruitment of monocytes, macrophages, and eosinophils, in turn, generate atherosclerotic plaques (Xia & Li, 2017). A diet consisting of an excessive intake of calories such as fats and carbohydrates, a sedentary lifestyle, and increased visceral adipose tissue are major contributors to metabolic (dysfunction)-associated fatty liver disease (MAFLD) pathogenesis. Insulin resistance also contributes to MAFLD, which promotes lipolysis and de novo lipogenesis (Eslam et al., 2020). Fat accumulation in the hepatocytes further triggers oxidative stress, reticulum endoplasmic stress, and inflammatory pathways, leading to apoptosis and fibrosis of hepatocytes. Liver fat accumulation results from an imbalance between lipid acquisition and lipid disposal, which is regulated by four major pathways: (1) circulating lipid uptake, (2) de novo lipogenesis (DNL), fatty acid oxidation (FAO), and lipid export in very low-density lipoprotein (VLDL) (Eslam et al., 2020b). Obesity causes an increase in abdominal and subcutaneous visceral adipose tissue. Meanwhile, visceral adipose tissue (VAT) is an accumulation adipocyte around the visceral adipose tissue under the subcutaneous skin adipose tissue (SAT) (Kang et al., 2017; Levelt et al., 2016). VAT involves adipose tissue distributed in intrathoracic, intra-abdominal, and intrapelvic cavities. Therefore, VAT is fatty tissue in the abdomen, chest, and pelvis. VAT and SAT excess are associated with insulin resistance, type-2 diabetes, hypertension, impaired glucose tolerance, myocardial infarction, coronary heart disease, arrhythmia, sleep apnea, chronic obstructive pulmonary disease, reduce brain size, stroke, decreased cognitive function, dementia, decreased bone density, polycystic ovaries syndromes, and cancer (Tchernof & Després, 2013; Walker et al., 2014).

## RESEARCH METHOD

### Design and Participants

The study used a descriptive-analytic with the cross-sectional approach to finding the association of sedentary time with physical activity level compared by age and gender group. The data was conducted from July to September 2021; 179 adult participants from DKI Jakarta, West Java, Banten, Central Java, East Java, and the outside of Java Island were invited to participate in this study. The recruitment process was using community associations. Sample sizes were counted using the Lemeshow formula for cross-sectional methods with 95% degree for the confidence interval, and counted 280 samples. Subjects were selected using purposive sampling, with inclusion criteria of 19-65 years old, having no communication constraint, and agreeing to participate in this study. Hereinafter, we collected 179 for total sampling; 101 people were excluded due to incomplete questionnaires, confirming a 63.93% response rate. We divided two categories for age groups, 19-44 and 45-65. Sociodemographic were collected by provinces, gender, ages, marital status, spouse, and education background categories.

### Sedentary time and Physical Activity Level Instrument

The International Physical Activity Questionnaire short-form (IPAQ-SF) measured sedentary time and physical activity level. The IPAQ-SF validity and reliability have been tested in 12 countries (Craig et al., 2003). IPAQ-SF consists of 7 questions based on the participant during the physical activity over level last seven days, including counting the sedentary time the participants spent sitting minutes per day on weekdays, including time spent sitting at work and home, sitting or lying down to watch television, and driving a car or motorbike (Owen et al., 2010;

Healy et al., 2011). The physical activity level can be counted with MET (Metabolic Equivalents of Task) minutes a week to represent the amount of energy expended carrying out physical activity. A MET is a multiple of estimated resting energy expenditure, one MET for the expended when resting, 3.3 METs for walking, 4 METs for moderate physical activity, and 8 METs for vigorous physical activity. We calculated and converted all activity to minutes before calculating MET minutes. To calculate MET minutes a week, multiply the MET value given by the minutes the activity was carried out and count the number of days the activity was undertaken. The formula for calculating all of the physical activity levels is vigorous activity (8 x minutes x day) + moderate activity (4 x minutes x day) + walking (3.3 x minutes x day). Henceforth, we reported the physical activity level in three categories to consist of high activity levels (>1500MET minutes a week); moderate activity levels (1500-600 MET minutes a week); and low activity levels (<600MET minutes a week) (Forde, 2019).

**Statistical Analysis**

Data analysis consists of descriptive analytics to explore the sociodemographic characteristic of the participant, the prevalence of sedentary time, and physical activity level. The bivariate chi-square analysis was counted to assess the independent variable with physical activity level. We used an independent-T test for comparative sedentary time and physical activity level based on age and gender group. We described the differences between age and gender groups using the boxplots by showing the distance between parts of the box with the degree of dispersion and skewness for the data explanation.

**FINDINGS AND DISCUSSION**

This study involved the participation of 179 adults. As shown in Table 1., more than 90% of participants are in the area of the island of Java. The average age of study participants is 38.69 years old (SD±11.99; min-max=19-65 years old), 70.9% of study participants are female, and three-quarters have a college degree. More than 70% of participants have a spouse and are unmarried. According to the sedentary time and physical activity level frequency of participants shown in Table 2., more than 60% of participants engage in a high to moderate physical activity level. Moderate activity has the highest score of all physical activity levels, averaging 539.96 MET minutes/week (SD±553.30; min-max=0-3360 MET minutes/week). They spend time 20 minutes per day doing moderate physical activity or twice a week for one hour a day. The average of participants spends a time in 30 minutes a day twice a week doing a vigorous activity with an average of 300.78 MET minutes/week (SD±497.42; min-max=0-2880 MET minutes/week) and 1 hour five times for walking (501.64 ± 776.56(0-3465). More than a third of respondents spend more than 360 minutes or six hours of sedentary time a day sitting while watching television, using a computer, and driving a car or motorbike.

**Table 1.** Sociodemographic Characteristics of Study Participants

| **Variables** | **Mean ± SD (*range*)** | **Frequency (n)** | **Percent (%)** |
|---|---|---|---|
| Provinces in Indonesia | | | |
| DKI Jakarta | | 56 | 31.3 |
| West Java | | 81 | 45.3 |
| Banten | | 18 | 10.1 |
| Central Java | | 7 | 3.9 |
| East Java | | 3 | 1.7 |
| Outside of Java Island | | 13 | 7.3 |
| Gender | | | |

| | | | |
|---|---|---|---|
| Male | | 52 | 29.1 |
| Female | | 127 | 70.9 |
| Ages | 38.69 years old ± 11.99(19-65 years old) | | |
| 19 – 44 years old | | 114 | 67.0 |
| 45 – 65 years old | | 65 | 33.0 |
| Education Background | | | |
| Collage degree | | 139 | 77.7 |
| Non-Collage Degree | | 40 | 22.3 |
| Marital status | | | |
| Unmarried | | 134 | 73.7 |
| Married | | 39 | 22.9 |
| Widow/Widower | | 6 | 3.4 |
| Have a spouse | | | |
| Yes | | 137 | 76.5 |
| No | | 42 | 23.5 |

**Table 2.** Physical Activity and Sitting Frequency Descriptives

| **Physical Activity** | **Mean ± SD (*range*)** | **Frequency (n)** | **Percent (%)** |
|---|---|---|---|
| Vigorous Activity (MET-min/wk*) | 300.78 ± 497.42(0-2880) | | |
| Moderate Activity (MET-min/wk) | 539.96 ± 553.30(0-3360) | | |
| Walking (MET-min/wk) | 501.64 ± 776.56(0-3465) | | |
| Physical Activity total (MET-min/wk) | 1145.81 ± 931.45(0-4620) | | |
| High Level | | 49 | 27.4 |
| Moderate Level | | 70 | 39.1 |
| Low Level | | 60 | 33.5 |
| Sitting (min/day) | 287.77 ± 209.42(10-1040) | | |
| <360 min/day | | 110 | 61.5 |
| ≥360 min/day | | 69 | 38.5 |

*MET-min/wk (Metabolic Equivalent Task minutes a week)

Table 3. describes the bivariate association between sociodemographic, sedentary time, and physical activity level. Sedentary time described through sitting time is associated with physical activity level (OR 18.67; 95% CI= 8.48-41.08). Gender, age, educational background, marital status, and the couple's relationship were insignificant.

**Table 3.** The Association of Sociodemographic Factors and Sitting Time with Physical Activity

| **Variables** | **Physical Activity Level** | | **P value** | **OR (95%CI)** |
|---|---|---|---|---|
| | **High to Moderate Level (>600MET-min/wk)** | **Low level (≤600 MET-min/wk)** | | |
| | n (%) | n (%) | | |
| Gender | | | | |
| Male | 36 (69.2) | 16 (30.8) | 0.746 | - |
| Female | 83 (65.4) | 44 (34.6) | | |
| Ages | | | | |
| 19 – 44 years old | 81 (71.1) | 33 (28.9) | 0.121 | - |
| 45 – 65 years old | 38 (58.5) | 27 (41.5) | | |
| Education Background | | | | |
| Collage degree | 89 (64.0) | 50 (36.0) | 0.269 | - |
| Non-Collage Degree | 30 (75.0) | 10 (25.0) | | |

| | | | | |
|---|---|---|---|---|
| Marital status | | | | |
| Unmarried | 88 (65.7) | 46 (34.3) | 0.531 | - |
| Married | 28 (71.8) | 11 (28.2) | | |
| Widow/Widower | 3 (50) | 3 (50) | | |
| Have a spouse | | | | |
| Yes | 89 (65) | 48 (35) | 0.555 | - |
| No | 30 (71.4) | 12 (28.6) | | |
| Sitting (min/day) | | | | |
| <360 min/day | 98 (89.1) | 12 (10.9) | <0.0001* | 18.667 |
| ≥360 min/day | 21 (30.4) | 48 (69.6) | | (8.48-41.08) |

*p-value <0.05

The comparison of physical activity by age and gender group in Table 4. shows the different vigorous activity average scores between the 19-44 years old and 45-65 years old (t=2.95; p-value <0.05). Vigorous activity score in the 19-44 years old group had an average difference between males and females (t=3.84; p-value <0.05); the male group had a greater vigorous activity score (698.67 MET-minutes a week; SD ± 756.31; min-max=0-2880) than female (268.57 MET-minutes a week; SD ± 418.58; min-max=0-1920). There are no differences in vigorous activity scores between males and females in the 45-65 age group. The boxplots in Figure 1. described a larger difference in dispersion and skewness between males and females in the 19-44 years old group than males and females in the 45-65 years old group.

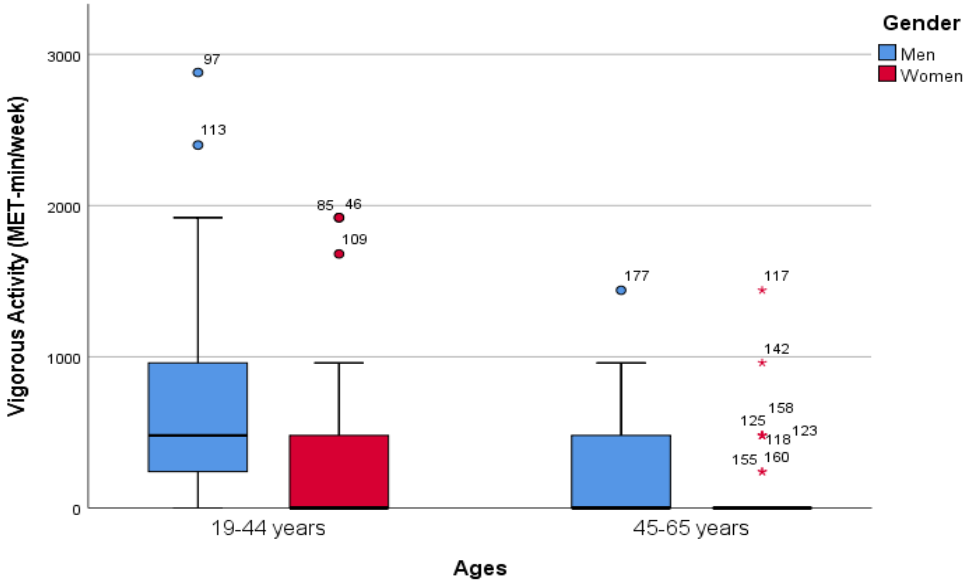


**Figure 1.** Clustered Boxplot of Vigorous Activity by Age and Gender group

Physical activity total showed different average scores between the 19-44 years old group and the 45-65 years old group (t=2.07; p-value <0.05), there had a different average score between males and females in the 19-44 years old group (t=2.95; p-value <0.05), the males' group had a greater physical activity total scores (1694.93 MET-minutes a week; SD ± 1256.46; min-max=0-4620) than females (1095.95 MET-minutes a week SD ± 824.66; min-max=0-3756). There are no different physical activity scores between males and females in the 45-65 age group. The boxplots in Figure 2. described a larger difference in dispersion and skewness between males and females in the 19-44 age group than males and females in the 45-65 age group.

**Table 4**. Comparison of Physical Activity by Ages and Gender Group

| **Variables** | **19 – 44 years old N=114 (n men=30; n women=84)** Mean ± SD (range) | | | **45 – 65 years old (n= men 20; women 39) N=65 (n men=22; n women=43)** Mean ± SD (range) | | | **Compared by age categorize** | |
|---|---|---|---|---|---|---|---|---|
| | **Mean ± SD (range)** | **t** | **p-value** | **Mean ± SD (range)** | **t** | **p-value** | **t** | **p-value** |
| Vigorous Activity (MET-min/wk) | 381.75 ± 558.28 (0-2880) | | | 158.77 ± 325.11 (0-1440) | | | 2.95 | 0.004* |
| Male | 698.67 ± 756.31 (0-2880) | 3.84 | <0.0001* | 229.09 ± 377.09 (0-1440) | 1.25 | 0.215 | | |
| Female | 268.57 ± 418.58 (0-1920) | | | 122.79 ± 293.34 (0-1440) | | | | |
| Moderate Activity (MET-min/wk) | 566.67 ± 574.99 (0-3360) | | | 493.11 ± 513.99 (0-2400) | | | 0.86 | 0.394 |
| Male | 563.33 ± 473.55 (0-1680) | -0.04 | 0.971 | 343.64 ± 260.01 (0-840) | -1.70 | 0.094 | | |
| Female | 567.86 ± 609.73 (0-3360) | | | 569.58 ± 592.52 (0-2400) | | | | |
| Walking (MET-min/wk) | 555.21 ± 864.94 (0-3465) | | | 407.68 ± 585.01 (0-3465) | | | 1.22 | 0.223 |
| Male | 804.10 ± 962.75 (0-3465) | 1.86 | 0.066 | 331.50 ± 325.17 (0-1188) | -0.75 | 0.467 | | |
| Female | 466.32 ± 198.00 (0-3465) | | | 446.65 ± 681.20 (0-3465) | | | | |
| Physical Activity total (MET-min/wk) | 1253.59 ± 987.35 (0-4620) | | | 956.78 ± 796.75 (0-3177) | | | 2.07 | 0.040* |
| Male | 1694.93 ± 1256.46 (0-4620) | 2.95 | 0.004* | 884.00 ± 776.82 (0-2973) | -0.52 | 0.602 | | |
| Female | 1095.96 ± 824.66 (0-3756) | | | 994.02 ± 813.27 (0-3177) | | | | |
| Sitting (min/day) | 277.54 ± 192.31 (10-960) | | | 305.69 ± 236.99 (20-1040) | | | -0.86 | 0.389 |
| Male | 230.67 ± 152.67 (30-540) | -1.57 | 0.120 | 291.36 ± 274.30 (30-1040) | -0.35 | 0.730 | | |
| Female | 294.29 ± 202.80 (10-960) | | | 313.02 ± 218.65 (20-960) | | | | |

SD (Standard Deviation); *p-value <0.05; MET-min/wk (Metabolic Equivalent Task minutes a week); min/day (minutes per day during the last 7 days)

There are no different average scores between males and females in the 19-44 age group and the 45-65 age group in moderate activity, walking, and sedentary time. The boxplots in Figure 3 shown there had no large differences in dispersion and skewness between males and females in the 19-44 years old group than males and females in the 45-65 years old group.

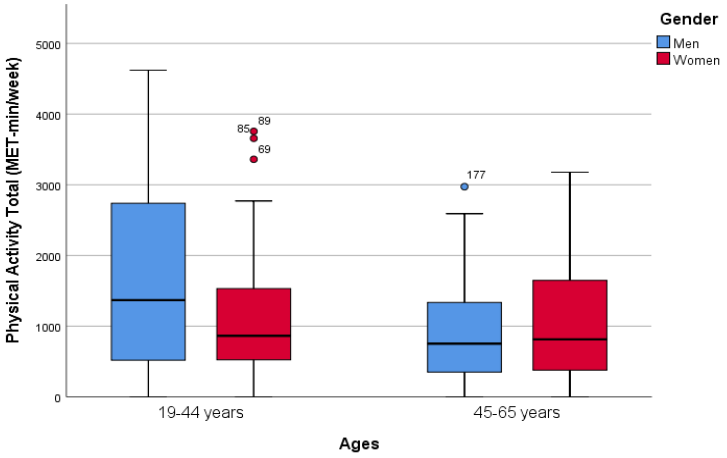


**Figure 2.** Clustered Boxplot of Physical Activity Total by Age and Gender group

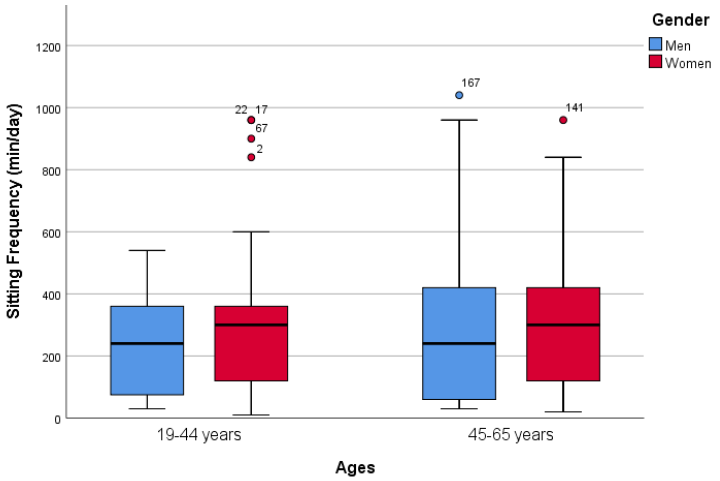


**Figure 3.** Clustered Boxplot of Sedentary time with Sitting Frequency by Age and Gender group

Sedentary behaviours are wakefulness condition that involves sitting or lying down and only a little or none of the energy expenditure from physical activity-usually 1 or 1.5 times the resting metabolic rate (RMR) (Owen et al., 2010; Healy et al., 2011). Sedentary behaviours include lying down while watching TV, sitting while using a computer, and driving a car or motorbike (Healy et al., 2011). Sedentary time can be measured in three categories: (1) particular behaviour (for example, time to lay down when watching TV); (2) sedentary time that occurs in a particular domain (for example: Sitting at work, recreation, household, and transportation); and (3) overall of the time not moved throughout the day (Clark et al., 2009).

Sedentary behaviours have been associated with adverse health outcomes; it increases the risk of NCD and all-cause mortality (Short, 2021). A previous study in the 37-73 years age group explained that participants who reported spending more than 6 hours/day sedentary time had a higher risk of developing 12 non-communicable diseases (NCD), including diabetes, ischemic heart

disease, chronic obstructive pulmonary disease, chronic liver disease, thyroid disorder, depression, migraine, gout, rheumatoid arthritis, chronic kidney disease, and diverticular disease (Cao et al., 2022). Sedentary behaviours cause negative effects of sympathetic overactivity; sympathetic overactivity can deleteriously affect the cardiovascular system. It makes splanchnic circulation produced by either activation of the rostral ventrolateral medulla (RVLM) and impacts decreases in arterial pressure (Mischel & Mueller, 2011). Arterial blood pressure changes blood pressure, cardiac output and total peripheral vascular resistance. Prolonged sedentary time reduces metabolic and systemic blood requirements flow; it decreases insulin sensitivity and vascular function while enhancing oxidative stress and releasing the inflammatory cascade (Dempsey et al., 2018; Park et al., 2020). A study showed that sedentary time in the low physical activity group (<600MET-min/week) had a significant association with an increased CVD risk (OR, 1.29; 95% CI, 1.04–1.62) (Lee et al., 2020).

To eliminate the increased risk of death associated with high total sitting time, individuals must exercise 60-75 minutes of moderate-intensity physical activity daily (Short, 2021). Physical activity for adulthood includes leisure-time to physical activity, walking, cycling, recreation, playing game sports, and planned exercises have benefits such as improving cardiorespiratory, bone health, and muscular fitness and reducing the risk of NCD (World Health Organization, 2010). A systematic review and meta-analysis from 39 studies clarify that a higher level of total physical activity was associated with a lower risk of mortality, with a non-linear dose-response, hazards ratios for light physical activity were 1.00, 0.60 (0.54 to 0.68), 0.44 (0.38 to 0.51), and 0.38 (0.28 to 0.51), and for moderate-to-vigorous physical activity were 1.00, 0.64 (0.55 to 0.74), 0.55 (0.40 to 0.74), and 0.52 (0.43 to 0.61). For a sedentary time, hazard ratios were 1.00 (referent; least sedentary), 1.28 (1.09 to 1.51), 1.71 (1.36 to 2.15), and 2.63 (1.94 to 3.56) (Ekelund et al., 2019).

The types of physical activity in males and females are different. Males prefer to engage in vigorous activity such as sprints and high-intensity interval training (HIIT), and females engage in moderate to light physical activity like Zumba, aerobics, and yoga. The previous study from 820 university staff and students explained that males had greater physical activity participation levels than females (McCarthy & Warne, 2022). Males presented higher activity levels and total leisure-time physical activity practices. Leisure time of physical activity based on the age group from 20-70 years old showed that decreased as age increased (Azevedo et al., 2007).

## CONCLUSIONS

Men tend to do the more strenuous physical activity than women in the productive age group. Both men and women had no differences in sedentary time across age groups. Sedentary time has a relationship with the level of physical activity performed. Individuals who do low physical activity spend more time on sedentary behaviours, which ultimately have an impact on decreasing their health outcomes, have a higher risk of developing NCD, and contribute to the increase in the DALY rate in Indonesia. We shall introduce promotive and preventive to increase the knowledge, attitudes, and behaviour of everybody regarding the relationship between sedentary time and physical activity level, maintain the cardiovascular and respiratory system, provide the body with oxygen ($O_2$) and nutrients, rid the body of carbon dioxide ($CO_2$), maintain acid-base balance, body temperature, and hormones regulation with exercises. It is essential to notice the capacity to exercise based on age and gender.

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