

The Impact Of Mixed Aerobic Exercise On The Body Mass Index (BMI) Of Employees With Sedentary Behavior

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ABSTRACT

Adopting a sedentary lifestyle can elevate the likelihood of developing non-communicable illnesses like obesity and cardiovascular issues. Employees often engage in prolonged sedentary behaviour due to spending over 6 hours gazing at computer screens. This research endeavours to investigate the potential impact of mixed-impact aerobics on Body Mass Index (BMI) as well as its ability to lessen sedentary behaviour. The study employed a quasi-experimental design with a one-group pre-test-post-test design. Sixty individuals were chosen through purposive sampling and split into two groups, but only the experimental group consisting of 30 individuals underwent a pretest-posttest treatment that lasted for 8 weeks with a frequency of 3 treatments per week. The findings of the study indicated a significant impact on the incidence of BMI, as well as a reduction in sedentary behaviour, as evidenced by the values ($p=0.001$ and $0.0065 < 0.05$). This study shows that mixed-impact aerobic exercise has a significant effect on BMI and decreases sedentary behaviour in employees.

Keywords: *Mix Impact Aerobic Exercise; Sedentary Behavior; Body Mass Index.*

INTRODUCTION

Currently, obesity is defined by WHO as a global epidemic, because it is the cause of 10.3% of deaths worldwide and ranks fifth as the cause of death in the world. In 2018, 21.8% of the population in Indonesia was reported to be obese (Asriah & Prasetyo, 2018). This shows that the problem of obesity is increasingly becoming an important concern in Indonesia (Balitbangkes et al., 2010). Obesity and overweight can affect the productivity and health of individuals. Being sedentary, which involves extended periods of sitting in front of a computer or television, along with inadequate physical activity and unhealthy eating habits, are significant contributors to abnormal body mass index (BMI) among workers, including being underweight, overweight, and obese. (*ACSM's Guidelines for*

Exercise Testing and Prescription, n.d.). Body Mass Index (BMI) is an important indicator to determine whether someone falls into the categories of normal weight, underweight, overweight, or obese.

A sedentary lifestyle has become a modern way of life for most people, including office workers. High levels of sedentary behaviour, including prolonged sitting, have negative health effects in the medium and long term (Kurdaningsih et al., 2016; Magnon et al., 2018). In the work environment, many employees spend most of their working hours sitting at a computer or a desk, limiting their physical activity (Lavie et al., 2019). High levels of sedentary behaviour can increase the risk of health problems such as type II diabetes, cardiovascular problems, obesity, musculoskeletal disorders (MSDs), and even cancer (breast, colon, rectal, endometrial, and epithelial ovarian) which shows negative effects (Williams & Wilkins, 2010).

In developing countries like Indonesia, obesity becomes a double burden as it occurs simultaneously with severe malnutrition and nutrient deficiencies. This indicates that people in Indonesia are experiencing both overweight and obesity conditions while malnutrition and nutrient deficiency remain significant problems. A study published in the Journal of the American Heart Association revealed that the risk of non-communicable diseases is higher in people who spend excessive time sitting and watching television. There is a 49% higher chance for someone who spends more than four hours watching television to experience being overweight (Young et al., 2016). This data serves as a strong reminder that obesity is a serious problem that has become a crisis in global public health today. Health Law No. 36 of 2009 has regulated health in Indonesia with efforts to promote healthy living. This law was followed by Presidential Instruction No. 1 of 2017 regarding the "Healthy Living Community Movement" (GERMAS), which serves as a guide for the community to adopt healthy living patterns by maintaining a healthy environment, eating a healthy diet, and exercising regularly (Inpres No. 1, n.d.). The Ministry of Health of Indonesia has set a target to maintain the prevalence of obesity at 21.8% by 2024, by promoting a healthy lifestyle through the "Healthy Living Community Movement" (GERMAS) to prevent the increase in obesity prevalence (Ministry of Health of Indonesia, 2022).

To prevent these health issues, it is recommended to engage in physical activity for a minimum of 150 minutes per week, which equates to approximately 30 minutes of exercise for 5 days each week (Young et al., 2016). If an individual has a significant amount of sedentary behaviour and needs to make a substantial lifestyle change, it may take more time to reduce sedentary behaviour directly. Additionally, developing new habits to

transform sedentary behaviour into a more active, healthy lifestyle requires consistency and patience. Gradual changes can be made to build a healthy lifestyle. If someone with high sedentary behaviour should start with the goal of doing physical activity for 10-15 minutes a day and gradually increase the duration. In addition, finding friends or a community with the same goal of increasing physical activity can help motivate and maintain consistency in changing sedentary behaviour (Young et al., 2016).

One can address sedentary behaviour by incorporating strategies such as standing periodically, utilizing reminders to move every half-hour while working and increasing participation in household chores while at home. Introducing new habits like taking a stroll during lunch breaks or free time, or opting for stairs instead of elevators, are simple physical activities that are highly encouraged to counteract sedentary behaviour (Rio, 2022). Light exercise such as walking in the park, dancing, or starting with exercise routines can reduce sedentary behaviour (HHS, n.d.).

Physical fitness exercises such as aerobic exercise or aerobic gymnastics are forms of fitness training with specific sequences of movements accompanied by music or songs that can help maintain body condition and improve physical health. Research has demonstrated that aerobic exercise, whether conducted at a moderate intensity or in the form of mixed-impact aerobic exercise, is effective in decreasing body fat levels. Aerobic exercise can also help improve physical and mental health. Aerobic exercise has been shown to provide significant changes for mothers in the Boyolali regency (Asriah & Prasetyo, 2018). Aerobic exercise can be done by anyone due to its simple and easy-to-understand practice. Aerobic exercise can be done anywhere and does not require special equipment to do it (Mukarromah et al., n.d.).

Aerobic exercise has several categories of movements that can be done, including high-impact aerobic exercise, low-impact aerobic exercise, and mixed-impact aerobic exercise. High-impact aerobic exercise is done with relatively strong movements such as jogging, running, and jumping. Low-impact aerobic exercise is done with light movements and a slower tempo. The mixed-impact aerobic exercise combines light and hard movements in one music (Listyarini, 2012; Mukarromah et al., n.d.). Aerobic exercise can be done by everyone because of its simple and easy-to-understand practice. Aerobic exercise can be done anywhere and does not require special equipment to do it (Mukarromah et al., n.d.). However, although it is easy to understand and do, many people are still not aware of the importance of exercise, including aerobic exercise, especially office workers who are too focused on their work in front of the computer and forget that physical and mental activity

such as exercise is important for maintaining health (Hita, n.d.).

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Moderate-intensity aerobics or mix-impact aerobics have been proven effective in reducing body fat levels. Aerobics can also help improve physical and mental health (Purwanti et al., n.d.). Moderate-intensity or mix-impact aerobics can increase the number of red blood cells and hematocrit values in the blood (Hita, n.d.). Mix-impact aerobics can also help reduce sedentary behaviour and obesity, as in one study of a group of obese mothers in Pengkol Village, Karang Gede District, Boyolali Regency. This study was conducted for eight weeks with twenty research subjects and was conducted three times a week. The study resulted in a significant effect on weight loss, so it can be applied as one of the most effective and efficient exercise methods to lose weight (Asriah & Prasetyo, 2018). In a study (Rahman et al., 2020) that examined "The Effect of Aerobics and Exercise Motivation on Decreasing Body Fat Percentage," the results showed that mix-impact aerobics were more effective in reducing body fat than low-impact aerobics. Previous studies have proven that mix-impact aerobics is a solution to improving body mass index.

METHOD

The methodology employed in this study is a quantitative descriptive approach, utilizing a quasi-experimental method known as a one-group pretest-posttest design. Within the context of this research, only one group of subjects is given a pretest and posttest. The objective of the experiment is to investigate the impact of X (mixed-impact aerobic exercise) on the Body Mass Index (BMI) of Y1 and Y2 (sedentary behaviour) and

to assess the degree of influence that X has on Y1 and Y2 among employees.

Table 1.
 One Group Pre-test Post-test Design

Pre-test	Treatment	Post-test
Y_1	X	Y_2

The study was carried out to determine the improvement or results of the given treatment. The experiment aims to determine the effect of X (mixed impact aerobics) on Y1 (Body Mass Index - BMI) and Y2 (sedentary behaviour), and how much influence X has on Y1 and Y2 in employees. This quasi-experimental method is used to compare two results obtained and observe changes that occur in employees who have undergone treatment.

The population for this research is comprised of female staff members working for the Ministry of Youth and Sports in the Republic of Indonesia, totalling 594 individuals. The method of sampling utilized in this study was purposive sampling, which is a sampling technique based on considerations focused on a specific purpose. From a population of 594 female employees, a sample of 60 female employees was selected who met the minimum number of participants required for the study. The sample was selected based on the following considerations:

1. Female employees aged 20-55 years old
2. Have a high sedentary behaviour as assessed by the pre-test Sedentary Behavior Questionnaire
3. Have abnormal body mass index (BMI) as assessed by the pre-test BMI using Karada

The research location was carried out in the Ministry of Youth and Sports Republic of Indonesia's workspace and multi-purpose field, Central Jakarta. Starting from the issuance of the research permit, namely October to November, the research was carried out for 2 months.

The research utilized two instruments, the Sedentary Behavior Questionnaire (SBQ) and the Carada Scan Body Composition. The SBQ was specifically developed to gauge the duration of time allocated to nine distinct activities, which include watching television, playing computer/video games, sitting while listening to music, sitting and talking on the phone, completing documents or coursework, sitting and reading, playing games, playing

a musical instrument, and engaging in arts and crafts, as well as sitting while driving or riding in a car, motorcycle, bus, or train.

RESULTS AND DISCUSSION

The findings of the research revealed that the staff members exhibited moderate levels of sedentary behaviour and possessed a Body Mass Index that placed them in the overweight category, on average. The higher the sedentary behaviour, the higher the risk of potential overweight to obesity. The non-parametric Mann-Whitney test was employed to evaluate the results of the normality test, which produced the following outcomes:

Table 2.
Mann-Whitney test result

Result	Z-score	Sig.	Decision	Conclusion
Post-test BMI Experiment Class	-1.390	0.0065	H ₀ rejected	There is a difference

It can be summed up that the experimental group's post-test results for body mass index have a significant effect.

Table 3.
Cross Tabulation Result

Research Class	Sedentary Behavior Category	BMI				Total
		Under	Healthy	Over	Obesity	
Experiment	Low	0	0	0	0	0
	Medium	1	6	18	4	29
	High	0	0	1	0	1
Total		1	6	19	4	30

Based on the crosstab analysis presented, it appears that employees with moderate sedentary behaviour will on average be overweight to obese based on their BMI. Thus, it can be concluded that sedentary behaviour significantly influences a person's Body Mass Index (BMI).

Table 4.
Mann-Whitney test result

Result	Z-score	Sig.	Decision	Conclusion
Post-test BMI Experiment Class	-3.354	0.001	H ₀ rejected	There is a difference

After conducting data analysis with the Mann-Whitney Test on the experimental group, the resulting significance value was $0.001 < 0.05$, thereby resulting in the rejection

of the null hypothesis (H_0). From this, it can be inferred that mixed-impact aerobic exercise has a notable impact on decreasing sedentary behaviour.

This study aims to examine the occurrence of sedentary behaviour and abnormal Body Mass Index (BMI), ranging from overweight to obese, among office workers, with a particular focus on female employees, as women are more prone to being overweight. These results were contradicted by (Kurdaningsih et al., 2016) who found that obesity was more prevalent in men than women. However, this study found that on average, female employees were more likely to be overweight and some were even obese. The 2010 National Health Survey provides the necessary data to support this research, indicating that 21.7% of Indonesia's adult population had a Body Mass Index of overweight or obese. Moreover, the prevalence of obesity in women was recorded at 26.9%, which was higher compared to men at 16.3% (Balitbangkes et al., 2010). In addition, this study of women is supported by several articles that have found that women are more likely to be obese than men. According to an article, female workers are more vulnerable to central obesity in comparison to their male counterparts (Diana et al., n.d.).

According to the research data studied by the researcher, most of the sedentary behaviour experienced by the sample falls into the moderate category, with the average sample of the moderate category experiencing overweight or obesity. From the research data, it can be seen that the higher the sedentary behaviour is, the higher the potential for overweight or obesity. The findings of this study are in line with Anderson's (2011) research theory that identifies the working population as a high-risk group for health problems. Anderson posits that work activities that lack physical exercise and healthy lifestyles can lead to various health issues such as stress, depression, fatigue, and even work errors. Furthermore, consuming instant food can lead to overweight and obesity (Anderson, 2011). Previous research has supported the theory that sedentary behaviour is prevalent among office workers, as they tend to spend more than six hours a day sitting in front of a computer or desk. This prolonged sitting is associated with moderate psychological pressure, including feelings of nervousness, anxiety, and fatigue, which could lead to health issues such as osteoporosis, hypertension, obesity, and decreased cognitive function (Arifin et al., n.d.; Aulia et al., n.d.; Kurniawan, 2021). The lack of continuous physical activity can increase the risk of excessive weight gain up to obesity (Raditya Atmaka et al., 2022).

In this study, the researcher used the treatment of mix impact aerobic exercise performed by the sample three times a week for 8 weeks, based on previous research that showed that mix-impact aerobic exercise performed for eight weeks with three exercise

sessions per week can reduce body weight (Asriah & Prasetyo, 2018). In addition to reducing body weight, mixed-impact aerobic exercise can also reduce excessive waist circumference (Nuraini & Junaidi, 2023). By engaging in physical activity such as mixed-impact aerobic exercise, sedentary behaviour can be reduced (Nugroho, 2021).

From the results of the data processing and analysis presented earlier, it can be concluded that the study on the effect of an aerobic mix impact exercise has significant findings about the prevalence of Body Mass Index (BMI) and reduction of sedentary behaviour, with significance values of 0.001 and 0.0065 respectively, which are less than the threshold level of 0.05. Hence, the research rejects the null hypothesis (H_0) and confirms that there is a significant impact of aerobic mix impact exercise on the reduction of sedentary behaviour and Body Mass Index (BMI) among employees.

CONCLUSIONS AND SUGGESTIONS

Based on the data processing and analysis, the results showed that the influence of aerobic mix impact exercise had a significant effect on the prevalence of body mass index (BMI) and the reduction of sedentary behaviour with a significance value of 0.001 and $0.0065 < 0.05$, thus H_0 is rejected. The study shows that aerobic mix impact exercise has a significant impact on the reduction of sedentary behaviour and BMI in employees.

Recommendations for employees include motivating each other by encouraging them to start living a healthy lifestyle by consuming healthy foods and exercising regularly. Creating a competition program among employees, such as a dance competition, can also be a solution for employees to exercise as they are driven to win the competition.

Recommendations for future researchers are to conduct better research and increase the number of samples studied. The next researcher can also add a second post-test to determine the reduction in sedentary behaviour after treatment. The next researcher can also add variations in the exercise location to make it more varied and avoid boredom for the samples. In addition, future research can focus on reducing sedentary behaviour with aerobic exercise and motivation to exercise.

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