CARDIO EXERCISE PROGRAM FOR WOMEN PLANTATION WORKER

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Abstract: This study investigates the impact of an aerobic exercise program on the cardiovascular fitness of female plantation workers in Cisaat Village, West Java, Indonesia. With women's labor force participation significantly lower than men's and many workers experiencing physical fatigue, the need for structured physical exercise is apparent. A total of 15 women aged 30 to 56, with at least three years of experience in plantation work, participated in a 12-session aerobic program over four weeks, conducted three times weekly. The Rockport test measured their VO2 max before and after the intervention. Results indicated a significant improvement in participants' cardiovascular fitness, with many progressing from the "poor" and "fair" categories to the "good" category. The average VO2 max increased from 29.8 to 34.2 ml/kg/min, demonstrating the effectiveness of the aerobic exercise regimen. This study highlights the importance of structured physical exercise for enhancing physical fitness and productivity among female workers in the plantation sector. Future research should explore the effect of age, work hours, and different intensities of aerobic training on physical fitness and work productivity among female plantation workers. Additionally, investigating the long-term adherence to fitness programs and their influence on musculoskeletal health would provide valuable insights.

Keywords: Cardio Exercise, Woman Plantation Workers, Cardiovascular Fitness

1. INTRODUCTION

The labor force participation rate for women in Indonesia has remained around 50 percent over the past 20 years, significantly lower than the 80 percent participation rate for men. Women's participation declined from 55.5 percent in 2019 to 50.72 percent in 2020 due to the

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pandemic. This underrepresentation could potentially generate tax revenues of Rp 406 trillion (US$27.7 billion) and contribute Rp 2.9 quadrillion (US$197.8 billion) to the economy. Thus, women, like men, have the right to improve their physical fitness to support work productivity, which plays a crucial role in economic progress [1], [2]. Physical fitness is a determinant of health. While a fit person is generally healthy, a healthy person is not necessarily fit. Fitness encompasses not only health but also the ability to perform physical and mental tasks without undue fatigue over an extended period. Health involves more than the absence of disease; it encompasses overall well-being. Internal issues such as low physical fitness and health problems, including psychological disorders, stress, anxiety, stroke, coronary heart disease, and cancer, significantly impact the productivity of human resources and work quality.

Observations in Cisaat Village, Ciater Sub-district, Subang Regency, West Java Province, reveal that 70% of woman plantation workers frequently experience physical fatigue, such as shortness of breath or muscle pain, after their work. These issues negatively affect their productivity at the plantation and impact their household life, including reluctance to perform tasks such as washing clothes, cooking, and child care.

A solution to these problems is engaging in physical exercise or sports. Exercise not only helps prevent but can also treat various health issues [2], [3], [4], [5], [6]. Although plantation work involves significant physical activity, additional structured physical exercise is still necessary. Physical activity refers to movements that involve muscle contraction, such as climbing stairs, gardening, and housework. In contrast, physical exercise is a more planned and structured activity aimed at improving physical fitness. Components of physical fitness include muscular endurance, strength, flexibility, balance, and body composition. Daily activities may not always follow proper procedures, potentially causing injuries and poor posture. Therefore, tailored physical exercises can help prevent, minimize, or correct these issues before they become severe. Research has shown that exercises such as stretching, yoga, walking, body-weight strength training, swimming, and aerobic activities can improve women's physical fitness and health [7]. These exercises should be adjusted according to each individual's capacity, considering intensity, frequency, and duration to ensure

effective and targeted training while minimizing injury risks [8], [9], [10], [11].

Given these considerations, the researcher aims to investigate the effect of aerobic exercise on the cardiovascular fitness of woman plantation workers in Cisaat Village. Cardiopulmonary fitness will be assessed using the VO2max test, which measures the volume of oxygen used by the body during maximum exercise. VO2max is a key indicator of cardiovascular health and physical fitness. This will be measured using the Rockport test, which involves walking or running 1.6 kilometers [12], [13], [14], [15]. The choice of aerobic exercise is based on its popularity among Cisaat Village residents, who enjoy its easy-to-follow movements and suitable music. The researcher hopes that aerobic exercise training will positively impact the VO2max or cardiopulmonary fitness of woman plantation workers, thereby enhancing their work productivity in Cisaat Village, Ciater Sub-district, Subang Regency, West Java Province.

2. METHOD

Participants

The participants in this study were 15 women plantation workers. The research was conducted from March 2022 to October 2022 in Cisaat Village, Ciater District, Subang Regency, West Java Province, Indonesia.

Sampling Procedures

The population of this study comprised all woman plantation workers in Cisaat Village, Ciater District, Subang Regency, West Java Province. Purposive sampling was used to select participants based on specific criteria. The criteria for inclusion were: Woman; Aged between 30 and 56 years; At least 3 years of experience working in the plantation sector.

The exclusion Criteria:

1. Women with pre-existing or diagnosed cardiovascular conditions, respiratory issues, or any other chronic illness that could hinder participation in physical activity.
2. Women currently pregnant or who have given birth in the past six months.
3. Women with musculoskeletal injuries or physical disabilities that prevent them from engaging in the exercise program.

4. Women who are currently undergoing treatment for any condition that could interfere with regular exercise, such as severe anemia or uncontrolled diabetes.
5. Women who are unwilling or unable to commit to the full duration of the exercise program or data collection sessions.
6. Women who regularly participate in structured physical exercise programs outside of their daily plantation work.

Design

The research employed an experimental method to examine the effects of specific treatments under controlled conditions. The experimental design utilized was a Pre-Experimental Design with a One-Group Pretest-Posttest Design model [16], [17], [18], [19].

Instrument

VO2max was measured using the Rockport test, which involves walking or jogging a distance of 1.6 kilometers. This method was chosen due to its advantages, including ease of execution, no requirement for specialized equipment, safety for individuals with health risks, and suitability for both individual and group settings.

Procedures

Participants underwent the Rockport test before and after the aerobics program to assess VO2max. The Rockport test involved walking or running 1.6 kilometers as quickly as possible, which is approximately 15 and a half laps around a badminton court in the sport centre. Aerobics sessions were conducted three times a week for approximately 45 minutes each. Each session comprised three phases: a 5-minute warm-up, a 35-minute core workout, and a 5-minute cool-down, all supervised by a gym instructor. The program was conducted over 12 sessions (one month) with moderate intensity (participants could talk but not sing) [20], [21], [22], [23].

Data Analysis

Data analysis involved both qualitative and quantitative techniques. Qualitative analysis was used for interviews with participants and for categorizing physical fitness levels. Quantitative analysis was performed using Microsoft Excel to calculate the results of the Rockport test.

3. RESULTS AND DISCUSSION

3.1 Results

The following are the results of the Rockport test before and after treatment

Table 1: VO2 Max Categories Before Treatment

Category	VO2 Max (ml/kg/min)	Number of Participants	Percentage (%)
Poor	<25	3	20%
Fair	25-30	8	53.3%
Good	30-35	3	20%
Excellent	>35	1	6.7%
Total		15	100%

source: collected data

Before the aerobic training program, 53.3% of participants were in the "Fair" category, with 20% classified as "Poor." Only 20% of participants had "Good" cardiovascular fitness, and just 6.7% fell into the "Excellent" category, highlighting the overall low level of cardiorespiratory fitness among the female plantation workers in Cisaat Village.

Table 2: Vo2 Max Categories After Aerobic Training

Category	VO2 Max (ml/kg/min)	Number of Participants	Percentage (%)
Poor	<25	0	0%
Fair	25-30	5	33.3%
Good	30-35	9	60%
Excellent	>35	1	6.7%
Total		15	100%

source: collected data

Following the aerobic training program, the number of participants in the "Good" category increased from 20% to 60%, while none remained in the "Poor" category. This significant improvement illustrates the program's effectiveness in enhancing cardiovascular fitness.

Table 3. Average Rockport Test Results Before Treatment

Age	Traveling time	VO2max	Category
±41	14'24"	29.8	Enough

source: collected data

The table above shows the physical fitness of Cisaat village woman workers before treatment, namely: one person in the very good category, three people in the good category, eight people in the fair category, and three people in the poor category. Based on the results of the Rockport test before the aerobic exercise treatment, the average physical fitness of woman workers in Cisaat village was enough.

Table 4. Average Rockport Test Results After Treatment

Age	Traveling time	VO2max	Category
±41	12'51"	34.2	Good

source: collected data

Based on the Rockport test results after treatment, namely: category there was one person in the excellent category, nine people in the good category, five people in the fair category, and none in the poor category. There was an increase in travel time and VO2 max (cardiopulmonary fitness) after being treated for 1 month (12 meetings, 3 times per week, each session approximately 1 hour). Evidenced by an increase in the category (from 3 people to 9 people), less than zero category. Daily activities on plantations are not enough to increase the physical fitness of woman workers to good or even excellent. Supporting physical exercise is needed to improve physical fitness that is directed, structured, and consistent, such as aerobics for 45 minutes to 1 hour at least 3 times a week, and must be done sustainably. Plantation women in Cisaat Village continue to do aerobic exercise regularly and consistently even after completing this research so that their physical fitness is always maintained.

3.2. Discussion

The findings of this study indicate a clear improvement in the cardiorespiratory fitness of female plantation workers following a structured aerobic exercise program. The participants' VO2 max increased significantly after 12 sessions of moderate-intensity aerobic exercise over a one-month period. Prior to the intervention, 73.3% of the participants fell into the "Fair" and "Poor" categories, highlighting suboptimal cardiovascular health. After the intervention, the majority of participants (60%) moved into the "Good" category, and none remained in the "Poor" category. One of the participants, a 43-year-old woman, serves as a representative example of the improvements observed in the study. Before the aerobic training program, she completed the Rockport test in 15 minutes and 10 seconds, with a calculated VO2 max of 24.5 ml/kg/min**,** placing her in the "Poor" category. After the one-month intervention, her Rockport test time improved to 12 minutes and 30 seconds**,** and her VO2 max increased to 33 ml/kg/min**,** moving her into the "Good" category. This example demonstrates a significant improvement in both cardiovascular fitness and overall physical health due to the structured aerobic trai

Moving forward, it is crucial to conduct further research that not only focuses on enhancing cardiorespiratory fitness but also examines other components of physical fitness relevant to work productivity.

Such additional studies could provide deeper insights into the relationship between physical fitness and work productivity, particularly among female workers in the plantation sector. Following this aerobic exercise program, an increase in productivity among female workers in the plantations is anticipated. A good level of cardiorespiratory fitness (VO2 max) is necessary for enhancing work productivity (Mikalački et al., 2017; Park & Kim, 2021; Pinckard et al., 2019; Tian & Meng, 2019; Organisasi Kesehatan Wolrd, 2020).

According to several expert studies, physical exercise enhances work productivity by improving physical fitness and boosting mood. Active and fit individuals experience increased energy, higher self-confidence, and a more positive outlook on life. These positive effects influence work performance. Although it may be difficult to measure, substantial evidence from researchers supports this. In addition to sharpening mental performance, regular physical activity improves time management skills, which in turn enhances the ability to meet deadlines. Exercise has been shown to improve overall performance by approximately 15%, according to a 2005 study by Health Professor Jim McKenna from Leeds Metropolitan University. Harvard researchers have found that post-exercise blood flow creates optimal conditions for performing tasks that require focused thinking. Exercise is a powerful remedy. Workers who engage in exercise report positive effects including increased tolerance, reduced emotional outbursts, decreased anxiety and depression, improved morale, and a greater sense of calm. Although it may seem counterintuitive, exercising can actually provide more energy at work. McKenna's findings from the UK indicate that employees who exercise regularly tend to be more patient with clients or colleagues, and they report higher productivity compared to those who do not exercise. A 2008 study from the University of Bristol noted that workers who exercise took 25% fewer breaks than those who did not. Similarly, the Journal of Exercise Physiology reported a 22% reduction in absenteeism among employees participating in fitness programs. The American Council on Exercise found that exercise led to a 17% reduction in workplace injuries. Most research on the relationship between exercise and work performance finds that it is most effective for employees to exercise during workdays, either before work or during breaks. Researchers have found that all types of exercise, from team sports to yoga and walking, positively impact work productivity. Research on physical exercise and work productivity spans various

workplaces, from technology companies to academic environments, consistently showing positive findings (Adams et al., 2019; Elmagd, 2016; Ketchum, 2022).

Physical exercise should prioritize activities that encompass all components of physical fitness, such as cardiovascular endurance, muscular endurance, muscle strengthening, flexibility, and balance, all of which can be trained through aerobic exercises. In addition to incorporating all these components of physical fitness, aerobic exercise also stimulates enthusiasm and motivation with music that suits the participants' preferences. Aerobic exercise is beneficial not only for improving cardiorespiratory fitness but also for strengthening muscles and bones, enhancing muscle flexibility, reducing subcutaneous fat, visceral fat, blood lipids, uric acid, and improving body balance, which helps prevent falls and injuries. [24], [25]. Psychologically, the benefits of exercise include the prevention and treatment of depression, anxiety, and other mental health disorders. The aerobic exercise provided must be tailored to the participants' capacity, with intensity, frequency, and duration adjusted accordingly. The exercise program should also be customized to each individual's capacity to ensure optimal performance, avoid injury, and achieve significant improvements in physical fitness components.

Psychologically, exercise offers benefits in the prevention and treatment of mental health disorders such as depression and anxiety [26], [27], [28]. The aerobic training program must be tailored to each participant's capacity, with intensity, frequency, and duration adjusted accordingly to ensure optimal performance and minimize the risk of injury. This individualized approach ensures that participants achieve significant improvements in all components of physical fitness, impacting overall health and productivity enhancement

4. CONCLUSION

It can be concluded that a cardio exercise program incorporating aerobics for woman plantation workers in Cisaat Village is effective in improving VO2 max. The results of the Rockport test, administered before and after the intervention, demonstrate a significant enhancement in VO2 max, with participants showing progress from the "poor" and "fair" categories to the "good" category. It is anticipated that this aerobic exercise program will positively impact the work productivity of woman plantation workers. Enhancing cardiopulmonary

fitness (VO2 max) requires not only engaging in physical activity at work but also committing to regular, structured, and consistent physical exercise. The exercise program should address all components of physical fitness, including cardiopulmonary endurance, muscular endurance, muscle strength, flexibility, and balance. Moreover, the program must be individualized to ensure optimal results, minimize the risk of injury, and achieve significant improvements in physical fitness. Future research should explore the effect of age, work hours, and different intensities of aerobic training on physical fitness and work productivity among female plantation workers. Additionally, investigating the long-term adherence to fitness programs and their influence on musculoskeletal health would provide valuable insights.

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