

## Role of Aerobic Training on Physical Fitness and Body Composition of Female College Teachers of Bahawalpur City



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**Abstract:** This investigation is about the role of an eight-week aerobic training program on the physical fitness and body composition of female college teachers. Sixty participants were divided into an experimental group ( $n = 15$ ) and a control group ( $n = 15$ ). The selected variables were skinfolds, girths, lengths, breadths, agility, flexibility, 30-meter race, set-up, and skipping rope. All measurements were obtained before starting the aerobic training program and post-test after eight weeks of training. One-way ANOVAs were employed for comparative analysis between the experimental and control groups. Results indicated the experimental group significantly improved in iliac-crest skinfold ( $p < .02$ ), arm girth ( $p < .00$ ), thigh girth ( $p < .05$ ), 30 m run ( $p < .00$ ), flexibility ( $p < .00$ ), set-up ( $p < .00$ ), and skipping rope ( $p < .00$ ). It is concluded that eight-week aerobic training is suitable female college teachers to improve physical fitness and reduce body fats.

**Key Words:** Aerobic Training, Physical Fitness, Body Composition, Health Status

### Introduction

The effects of aerobic training can vary on an individual basis on the duration, intensity, frequency, fitness level, and health status. This training boosts the efficacy of the cardiovascular and respiratory systems (Haskell et al., 2007). Warburton and Bredin (2016) report that moderate exercise provides health benefits to physically active people than nonactive. Everyone can get health benefits through physical activities regardless of age, race, and body size (Biddle, Gorely, & Stensel, 2004). Regular aerobic training, such as brisk walking or jogging has been shown positive effects on cardiorespiratory fitness in females (Bjelica et al., 2020). Because there is more variance in heartbeat it

may accelerate or decelerate to adapt to a diversity of situations. Picard et al. (2021) reported aerobic training improves heart rate variability in various situations. Along with cardiovascular fitness, regular aerobic exercise is also associated with the reduction of body fat to improve body composition. A study has explored whether aerobic training is effective for weight loss (Donnelly et al., 2009). However, combining aerobic and resistance training has effective muscular development (Kraemer, et al., 2002). Weight-bearing activities such as fast walking, and jogging rebuild bones and prevent the estimated deprivation (Ilesanmi-Oyelere, Roy, & Kruger, 2021)

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as reported a positive impact of high-impact exercise on bone health (Heinonen et al., [1996](#)).

It was reported that aerobic training reduces body fat (Willis et al., [2012](#); Kraus Slentz & Kraus, 2014). Aerobic exercise alone can significantly be associated with weight loss in both men and women (Donnelly et al., [2013](#)). While there might not be specific studies focusing exclusively on the impact of aerobic training on the body composition of female college teachers, it provides insights into the positive effects of exercise on body composition and overall health (Swift et al., [2013](#); Haskell et al., [2007](#)). It provides guidelines that apply to various adult populations, including female college teachers (Donnelly et al., [2009](#)). It is needed to understand how physical activity is essential for weight loss. The objectives of the study were to investigate the effects of aerobic training programs on body composition, physical fitness, and physical health of female college teachers in Bahawalpur City.

## Method and Material

### Participants of the Study

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Female teachers at the Government Graduate College for Women Dubai Mahal Road Bahawalpur, Pakistan were the participants in this study. Ethical approval and a consent letter were obtained to ensure the confidentiality of the participants. Physical Activity Readiness Questionnaire (PAR-Q) was implemented as a screening method for selecting the teachers for this study (Warburton et al., [2018](#)). The following teachers were not included in the study of those who suffer from diseases such as cardiovascular, chest infections, unconsciousness, muscular-skeletal, and joint pain. The selected participants were (n = 15) experimental group and (n = 15) control group. The current study was experimental in nature with pre-test and post-test measurements. The six weeks of aerobic training were five days per week for the experimental group. The control group did not participate in any type of aerobic and anaerobic exercise except routine physical activities.

### Instrument and Procedure of the Anthropometric Measurements

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Anthropometric measurements refer to the systematic measurement of the body shape and composition of the human. The thickness of adipose tissue by using specialized skinfold callipers. The most frequently

measured sites include the triceps, biceps, subscapular, supraspinal, and calf as suggested (Vehrs & Hager, [2006](#)). These measurements were taken with the individual standing upright in a straight line, with their arms hanging loosely at their sides. To measure the mid-arm skinfold, the skin is gently pinched between the thumb and index finger, and the calliper reading is taken from the underside of the subscapular. For the abdominal measurement, the investigator places the calliper five centimetres to the right of the subject's belly button. Using the left hand, the skinfold is grasped vertically and clamped down the calliper on the specified area. To measure the frontal thigh, the subject is seated in front of a box with their leg bent at a 90-degree angle. One person grasps the upper central marked point of the subject's thigh using their left thumb and index finger, while the other person may assist from the lower side if needed. The calliper was applied vertically to measure the skinfold thickness. For calf measurement, the subject remains seated, and the measurement is taken vertically from the inside side of the calf muscles. Regarding the Supraspinal measurement, the investigator stands in front of the subject and positions the calliper 45 degrees above the ilium's vertical axis, above the designated iliac crest. The Harpenden calliper was used for body measurements with specific techniques for each measurement to ensure accurate results (Vehrs & Hager, [2006](#)).

The girth measurement is the assessment of the upper arm, forearm, chest, waist, hip, midthigh, and maximum calf by using a one-meter measuring tape (Courneya & Friedenreich, [1999](#)). The left-hand borders of the body parts and the right hand to grab the tape case it evident that the full circumference was measured using the pass-hand method (Okely et al., [2004](#)). Length measurement refers to the measurement of the linear distance of specific body segments (López-Ortega & Arroyo, [2016](#)). The upper arm, lower arm, hand, upper leg, lower leg, and total arm and leg lengths were assessed by using a large bone calliper. Breadth measurement refers to the measurement of the width of specific bones and joints. Standardized techniques were followed by using a small bone calliper to obtain the measurements of shoulders, pelvises, transverse, elbow, and knee breadths (Courneya & Friedenreich, [1999](#)).

There are various ways to determine body mass, but the most used is by the weight balance (Vehrs &

Hager, 2006). A stadiometer was used for height and body mass measurements as the subjects were standing in an upright position against the stadiometer and measurement was considered from the floor to the apex of the head. The individual being measured should stand straight, without shoes, with their heels, buttocks, and shoulder blades touching the surface, head should be positioned so that the gaze is straight ahead (Newman et al., 2006).

### The Procedure of the Measurements of Physical Fitness

Hand grip strength refers to gauging the exerted force of hand muscles when gripping the hand grip

dynamometer. A hand dynamometer is a handheld device with an adjustable grip that measures the force applied when squeezing the grip. The hand grip strength is recommended to consult with a healthcare professional (Hassan, Williams & Jaiswal, 2018).

The device used to measure the body's capacity for flexibility is called the sit-and-reach examination box. Sit on the floor with your legs straight out in front of you, flat against the box. Stacking hands, extending forward as you can without bending your knees. To allow for recording, kindly hold this position for two seconds. Move the ruler from its starting point (Castelli & Valley, 2007). The measurements should retake the test three times to achieve the best score.

Figure 1

Flexibility Measurement (Castelli & Valley, 2007)

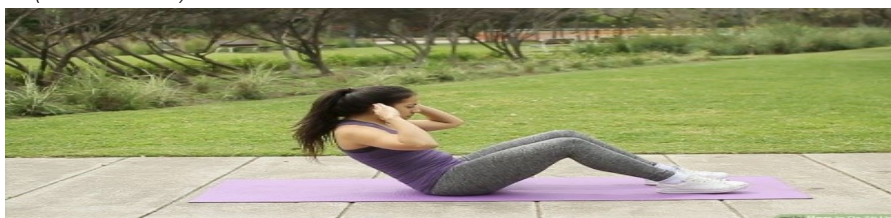


Sit-ups were counted by using a stopwatch, lying on the ground on the back with knees bent at a 90-degree angle, feet about 12 inches apart, and palms placed on the side of the head, when the timer goes

out, the unassuming helper must keep their feet on the ground. Perform sit-ups, bring your elbows to your knees, and then go back to the ground (Nara et al., 2022).

Figure 2

Setups test (Ahlawat, 2022)

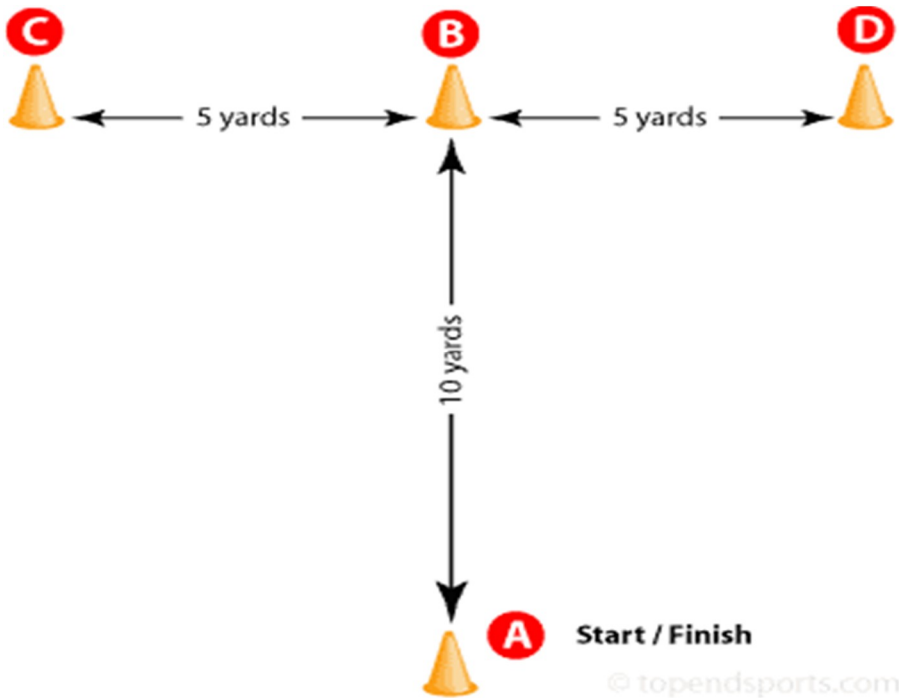


The agility t-test at route was made up of 10 m straight segments that were placed in the shape of the letter t. It included a 10 m sprint with acceleration, followed by 5 m to the left, 10 m to the right, 5 m to the left

again, and 10 m to the starting line. The researcher nodded as the contestants rushed after receiving the caution, and the results were recorded in seconds (Nobari et al., 2022).

Figure 3

Agility test (Nobari et al., 2022)



Skipping rope is performed as the rope with one foot and pulls the handles upward. Keep subject posture straight, shoulders relaxed, and gaze forward. Rotate

the rope with wrists, not subject entire arms, and jump off the ground just enough to clear the rope passing underneath feet (Liu et al., 2022).

Table 01

Aerobic training program of college females of Bahawalpur City

Week	Set × Repetitions	Exercise
1-2	Monday Cardio	45 mints Jogging or Walking
	Tuesday Lower body	10rep, 3set Squats, deadlifts or Hip thrusts, Lunges
	Wednesday Upper body	10rep,3set Bicep curl, triceps dip, chest press
	Thursday Rest and recovery	Rest day
	Friday Lower body with a focus on the glutes	10rep,3set Squats, glue bridges, deadlifts
	Saturday Upper body	10rep,3set Shoulder press and lateral raise
3×4 Monday Cardio	45 mints	Jogging or Walking

	Tuesday		10rep,	Squats, deadlifts or Hip thrusts,
	Wednesday	Lower body	3set	Lunges
	Thursday	Upper body and core	10rep,3set	Bicep curl, triceps, chest press
	Friday	Rest and recovery		Rest day
	Saturday	Lower body with a focus on the glutes	10rep,3set	Squats, glue bridges, deadlifts
		Upper body	10rep,3set	Shoulder press, lateral raise
		Cardio	45 mints	Jogging or Walking
	Monday	Lower body	10rep,	Squats, deadlifts or Hip thrusts,
	Tuesday		3set	Lunges
5×6	Wednesday	Upper body and core	10rep,3set	Bicep curl, triceps dip, chest press
	Thursday	Active rest and recovery		Rest day
	Friday	Lower body with a focus on the glutes	10rep,3set	Squats, glue bridges, deadlifts
	Saturday	Upper body	10rep,3set	Shoulder press and lateral raise

(Razzak, khan & Farooqui., 2019; Gorner & Reineke, 2020)

### Reliability and Validity

The accuracy of the tools and the subject's anthropometric measures using the intra- and inter-investigator method, the same measurement tools were used as suggested (Vehrs & Hager, 2006).

### Statistical Analysis

The anthropometric, physical fitness and body composition of women were examined using various statistical methods. Data were entered into SPSS after being collected. The demographic data, including

height, weight, age, and experience, age, and descriptive statistics as mean, and standard deviation. To gather data for all the variables, pre-data was collected before the start of training, and post-data was collected after six weeks of training. The statistical difference between the experimental and control groups was found by using One-way analysis of variance (ANOVA). Tukey's post hoc was applied to find differences among groups at which stage like pre and post-measurements.

### Results

Figure 04

Skinfold measurement of control and experimental groups of female college teachers

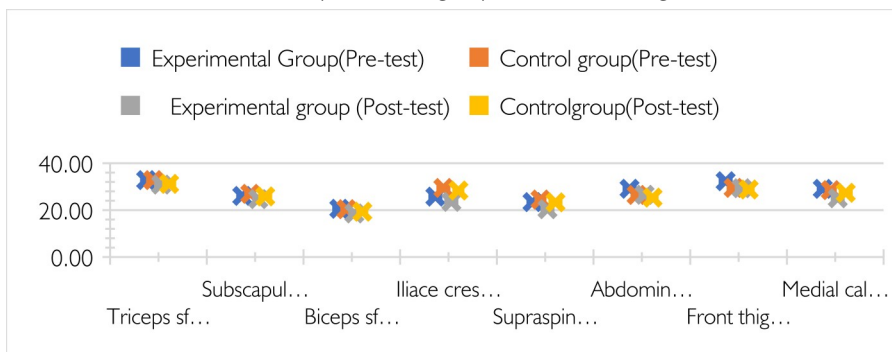


Figure 4 displays that there was a statistically significant difference in iliac crest skinfold measurements between the experimental and control groups post-intervention ( $F = 3.58$ ,  $Sig = 0.020$ ).

**Figure 05**

Girth Measurement of Female College Teachers of Bahawalpur

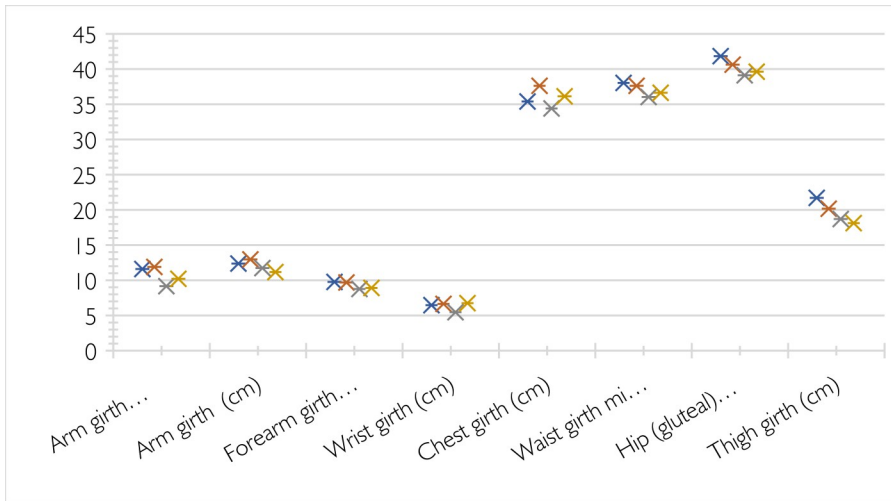


Figure 05 displays the arm girth, both groups exhibited a significant difference in relaxed arm girth pre and post-intervention ( $F = 4.349$ ,  $Sig = 0.008$ ). Arm girth (Flexed) A significant difference was observed in flexed arm girth between the experimental and control

groups post-intervention ( $F = 6.162$ ,  $Sig = 0.001$ ). Thigh girth measurements exhibited a significant difference between the two groups post-intervention ( $F = 2.849$ ,  $Sig = 0.046$ ).

**Figure 06**

Length and breadth measurements of female college teachers of Bahawalpur

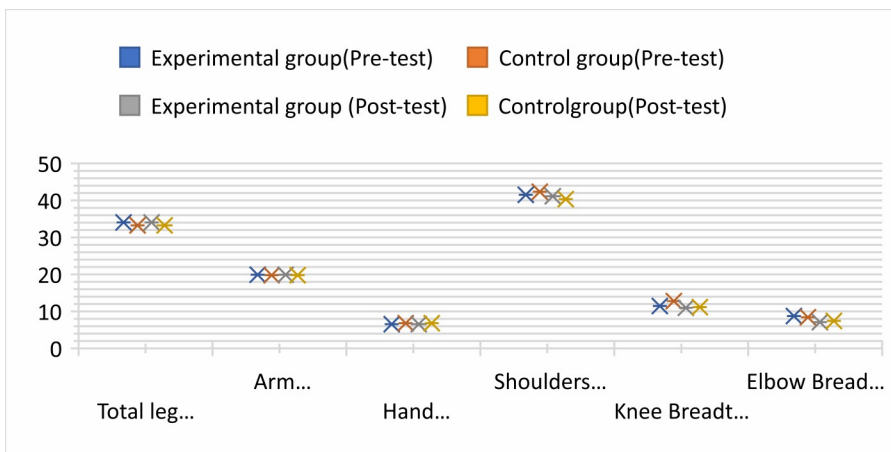


Figure 6 displayed no significant difference between the two groups before and after the intervention ( $F = 0.236$ ,  $\text{Sig} = 0.871$ ). The table presents Body mass

measurements that did not exhibit a significant difference between the two groups before and after the intervention ( $F = 0.583$ ,  $\text{Sig} = 0.629$ ).

### Figure 07

Physical fitness measurements of female college teachers of Bahawalpur

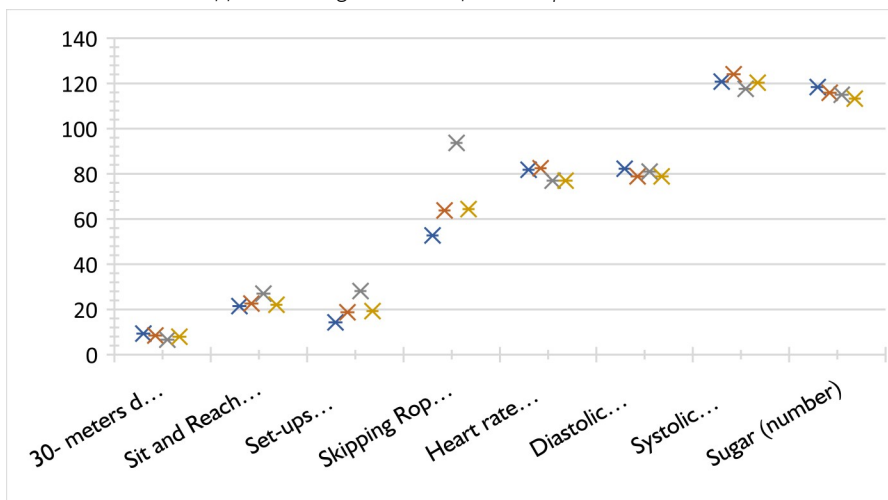


Figure 7 shows that the 30-meter race has a significant difference between the experimental and control groups both pre- and post-intervention ( $F = 22.939$ ,  $\text{Sig} = 0.000$ ). Post-intervention, the experimental group exhibited a mean reduction in race time (6.63 seconds to 7.93 seconds). Flexibility sits and reach exhibited a significant difference between the two groups both pre- and post-intervention ( $F = 21.672$ ,  $\text{Sig} = 0.000$ ). Post-intervention, the experimental group showed an increase in flexibility (21.47 to 27.00) compared to the control group. Set-ups displayed a significant difference between the experimental and control groups both pre- and post-intervention ( $F = 13.391$ ,  $\text{Sig} = 0.000$ ). Post-intervention, the experimental group showed an increase in the number of set-ups (28.13) compared to the control group (19.27). Skipping rope results exhibited a significant difference between the two groups both pre and post-intervention ( $F = 10.323$ ,  $\text{Sig} = 0.000$ ). Post-intervention, the experimental group showed a decrease in skipping time (93.67 seconds to 64.40 seconds) compared to the control group. The results indicate significant improvements in physical fitness as reduced race time, increased

flexibility, set-ups, and decreased skipping rope time of the experimental group of female college teachers compared to the control group. The intervention appears to have positively influenced various aspects of physical fitness among the participants. However, there was a numerical decrease in heart rate in the experimental group post-intervention. Sugar levels did not exhibit a significant difference between the two groups both pre- and post-intervention ( $F = 0.357$ ,  $\text{Sig} = 0.784$ ).

### Discussion

The discussion section should provide a comprehensive analysis of the study. The adoption of a training exercise program among the professors at a women's college in Bahawalpur has resulted in several favourable benefits on physical fitness and body composition. Regular participation in exercise activities has been associated with increased cardiovascular endurance, muscular strength, and flexibility (Morgan et al., 2019). These improvements can be attributed to the program's emphasis on aerobic exercises, resistance training, and flexibility exercises. The teachers' enhanced physical fitness effectively

promoted cardiovascular health and overall fitness. Research conducted by Brown and colleagues (2017) demonstrated that a 16-week exercise program resulted in significant reductions in body obesity and improved muscle mass. The current study confirms that the experimental group's skinfold measurement was lesser than that of the control group in the earlier study (Donnelly et al., 2009; Heilesen et al., 2022). The experimental group had lower subscapular as compared to the control group because the measurement decreased after six weeks of aerobic exercise. Another study discovered the measurements should retake the test three times to achieve the best score (Tremblay et al., 2022). The current analysis reveals that the skinfold measurement of the experimental group was lower than that of the control group in the previous study (Remmers et al., 2014). Another study discovered (Donnelly et al., 2009) a significant decrease in the lower biceps skinfold measurement of female college teachers. The current study reveals that the skinfold measurement of the experimental group was lower than that of the control group in the previous study (Strohle, 2009; Hillman et al., 2011). The current study reveals that the skinfold measurement of the experimental group was lower than that of the control group in the previous study (Beddoes, Prusak & Barney, 2017; Chesham et al., 2018). The current study reveals that the girth measurement of the experimental group was lower than the control group in the previous study (Healey and Kahana 2016; Kahn et al., 2006). The experimental group had lower arm girth flexed as compared to the control group because the measurement decreased after six weeks of aerobic exercise (Westcott, 2012). The current study confirms that the experimental group's breadth measurement was lower than the control group in the previous study (Zhang et al., 2019). For instance, a study by Smith and colleagues (2018) demonstrated that a 12-week exercise led to significant improvements in aerobic capacity, muscular strength, and flexibility (Hallam, 2010). The experimental group has the highest flexibility as the control group because the measurement increases after six weeks of aerobic exercise.

Maintaining optimal blood pressure within healthy ranges is crucial for cardiovascular health and overall well-being. Monitoring blood sugar levels is critical for

diabetics at risk of getting the disease. The study's findings emphasize the significance of frequent blood sugar monitoring in diabetes treatment. Consistently high blood sugar levels can cause a variety of difficulties and health problems. By closely monitoring blood sugar levels, individuals with diabetes can make informed decisions regarding diet, medication, and lifestyle modifications to maintain optimal glucose control (American Diabetes Association, 2021). Studies have consistently emphasized the importance of monitoring heart rate, blood pressure, and blood sugar levels in assessing overall health and managing specific conditions (Zhang et al., 2019).

## Conclusion

Teachers who participate in a training exercise program can improve their cardiovascular health, strength and endurance, flexibility, and well-being. This can help them improve their overall quality of life and work happiness. There are multiple strategies to measure the skin fold, girth, length, and breadth of teachers. Regular exercise activities have resulted in improved cardiovascular endurance, muscular strength, flexibility, and overall fitness. These improvements are crucial for the teachers' ability to meet the physical demands of their profession and maintain optimal health. This shift in body composition is indicative of a healthier physique, which is associated with numerous health benefits for body function. The experimental and control groups changed significantly in physical fitness metrics such as thirty-meter race time, flexibility sit and reach, knee bent set-up, and skipping rope time. The fourth goal of the study was to determine the effects of aerobic training on heart rate, diastolic, systolic, and sugar. The study's findings suggest that monitoring physiological measurements such as heart rate, diastolic and systolic blood pressure, and blood sugar levels might give useful insights into an individual's health state. However, it is important to note that specific health conditions and individual circumstances may require tailored approaches and professional guidance. Based on the study's findings this experimental research concluded that there was a significant improvement in physical fitness and body composition among female college teachers who participated in the training exercise program.

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