



# A STUDY TO COMPARE THE MOTIVATIONAL LEVEL AND EXERCISE ADHERENCE IN YOUNG MALE AND FEMALE ADULTS AFTER COMPLETING EIGHT WEEKS OF AEROBIC EXERCISE TRAINING - A CROSS-SECTIONAL STUDY

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**Abstract:** Exercise is important for maintaining physical fitness, which is the ability to do daily tasks with ease. Physical fitness can protect against many chronic diseases that are major causes of death and disability, such as cardiovascular diseases, hypertension, diabetes, and so on. The purpose of this study was to compare the motivation and adherence levels of young men and women who completed an eight-week aerobic exercise training program. Motivation is the psychological process that initiates, directs, and sustains behaviour toward a certain goal or outcome. Adherence is the extent to which a person follows or completes a prescribed course of action or behaviour. The study also examined the relationship between motivation and adherence in physical activity and exercise behaviour. Method : The study used a cross-sectional design, where 35 university students (19 females and 16 males) were included in the study after completing an eight-week structured aerobic exercise training program. The program consisted of three sessions per week, each lasting 45 minutes, at a moderate intensity of 60-70% of the maximum heart rate. The program was supervised by trained instructors and tailored to the individual fitness levels and preferences of the participants. Three weeks after completing the program, the participants' motivation and adherence levels were assessed using two questionnaires: the Behavioural Regulation in Exercise Questionnaire-3 (BREQ-3) and the Exercise Adherence Rating Scale (EARS). The BREQ-3 measures the different types of motivation for exercise, ranging from intrinsic motivation (doing exercise for its own sake) to extrinsic motivation (doing exercise for external reasons). The EARS measures how well the participants followed or completed their prescribed exercise sessions. The results of the study showed that there was no significant difference in motivation ( $t = -0.57$ ;  $P = 0.57$ ) or adherence ( $t = 0.61$ ;  $P = 0.55$ ) levels between men and women. This means that gender did not have a significant effect on these variables. However, the results also showed that there was a strong positive correlation ( $P = 0.00$ ) between motivation and adherence levels among the participants. This means that the higher the motivation level for exercise, the higher the adherence level for exercise, and vice versa. This suggests that motivation and adherence are closely related factors that influence each other in physical activity and exercise behaviour.

**KEYWORDS :** Aerobic exercise, motivation, exercise adherence, BREQ-3, EARS.

## INTRODUCTION:

Exercise training is a type of physical activity that is planned, structured, and repeated to improve or maintain physical fitness<sup>1</sup>. Physical fitness is the ability to do daily tasks with ease and have enough energy left for leisure activities or emergencies<sup>2</sup>. Physical activity and exercise training can have many benefits for health and well-being, such as preventing or reducing the risk of chronic diseases that are major causes of death and disability worldwide. These diseases include cardiovascular diseases (CVDs), diabetes, obesity, cancer, and respiratory diseases<sup>3</sup>. According to the World Health Organization (WHO), physical inactivity is the fourth leading risk factor for global mortality, accounting for more than 3 million deaths per year<sup>4</sup>. Among these deaths, CVDs are the most common, causing about 17.9 million deaths per year<sup>5</sup>. The WHO recommends that adults aged 18-64 years should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week, or an

equivalent combination of moderate- and vigorous-intensity activity<sup>6</sup>. Aerobic physical activity is any activity that increases the heart rate and breathing rate, such as walking, jogging, cycling, or swimming. Aerobic exercise training can improve the function and efficiency of the cardiovascular system. Aerobic exercise training can lower blood pressure and resting heart rate, increase the amount of blood pumped by the heart per beat (stroke volume), improve the ability of the heart to recover quickly after exercise (heart rate recovery), and enhance the delivery of oxygen and nutrients to the muscles and organs<sup>7</sup>. Aerobic exercise training can also improve mental health and cognitive function, such as mood, memory, attention, and learning<sup>8</sup>.

However, despite the well-known benefits of physical activity and exercise training, many people do not meet the recommended levels of physical activity and are considered physically inactive or sedentary. The COVID-19 pandemic has worsened this situation, as many people have been forced to stay at home and limit their social interactions to prevent the spread of the virus. This has reduced their opportunities and motivation to be physically active and exercise regularly. This can have negative consequences for their physical and mental health, as well as increase their susceptibility to COVID-19 and other diseases<sup>9</sup>. Therefore, it is important to understand the factors that influence physical activity and exercise behaviour among different groups of people, especially young adults who are in a critical stage of life transition and development.

One of the key factors that affects physical activity and exercise behaviour is motivation. Motivation is the psychological process that initiates, directs, and sustains behaviour toward a certain goal or outcome<sup>10</sup>. Motivation can be classified into two types: intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to doing an activity for its own sake, because it is enjoyable or satisfying. Extrinsic motivation refers to doing an activity for external reasons, such as rewards, recognition, or goals. According to the self-determination theory (SDT), a widely used framework to explain human motivation and behaviour, intrinsic motivation is more conducive to long-term adherence and positive outcomes than extrinsic motivation<sup>11</sup>. SDT proposes that there are three basic psychological needs that underlie intrinsic motivation: autonomy (the need to feel self-directed and in control), competence (the need to feel effective and capable), and relatedness (the need to feel connected and supported by others)<sup>11</sup>. When these needs are satisfied by an activity or environment, people are more likely to be intrinsically motivated and enjoy what they are doing. When these needs are thwarted by an activity or environment, people are more likely to be extrinsically motivated or lose interest in what they are doing.

Another important factor that determines how well people perform and maintain their physical activity and exercise programs is adherence. Adherence is the extent to which a person follows or completes a prescribed course of action or behavior<sup>12</sup>. In the context of physical activity and exercise interventions, adherence can be measured by various indicators, such as attendance rate (the percentage of sessions attended out of the total number of sessions prescribed), dropout rate (the percentage of participants who quit the program before completion), compliance rate (the percentage of sessions completed according to the prescribed intensity, duration, frequency, and mode), or self-reported frequency (the number of times a person reports doing physical activity or exercise per week)<sup>12</sup>. Adherence is crucial for achieving the desired outcomes of physical activity and exercise interventions, such as improving fitness, health, or quality of life. However, adherence is often low or declines over time among many people who start a physical activity or exercise program. This can be due to various personal, social, environmental, or program-related factors that influence motivation and behaviour<sup>12</sup>.

The purpose of this study is to compare the levels of motivation and adherence among young men and women who participate in an eight-week aerobic exercise training program. The results of this study may help us to understand how motivation and adherence affect the effectiveness of aerobic exercise training among young adults, and how to design and implement more engaging and sustainable physical activity and exercise interventions for this population. The results may also help us to promote the fitness and health of young adults and prevent them from developing chronic diseases in the future.

#### **AIM & OBJECTIVES:**

1. To assess the motivational level in young male and female adults to continue exercises after completing 8 weeks of aerobic exercise training. 2. To assess the exercise adherence in young male and female adults after completing 8 weeks of aerobic exercise training. 3. To study the relation between motivational levels and exercise adherence in young adults to continue exercises after completing 8 weeks of aerobic exercise training.

#### **METHODOLOGY:**

The study aimed to investigate the effect of aerobic exercise on motivation and adherence in young adults. The study was conducted at Sri Venkateswara Institute of Medical Sciences (SVIMS University), Tirupati. The study design was an observational study with convenient sampling. The study sample consisted of 35 subjects, aged 18-25 years, of both genders, who were willing and able to participate in an 8-week structured aerobic exercise program. The subjects were recruited and screened for any musculoskeletal disorders, recent surgeries, cardiovascular or respiratory diseases, or any other contraindications for exercise. The subjects who met the inclusion criteria and gave informed consent were enrolled in the study.

The aerobic exercise program consisted of five sessions per week, each lasting 45 minutes, for a total duration of eight weeks. The exercise intensity was set at 60-70% of the maximum heart rate (MHR), which was calculated using the formula  $220 - \text{age}$ . The exercise sessions included a 10-minute warm-up, 25 minutes of continuous aerobic exercise (such as jogging, cycling, or skipping), and a 10-minute cool-down. The subjects were instructed to maintain their usual diet and lifestyle during the study period. The subjects were contacted three weeks after the completion of the exercise program to assess their adherence to exercise(14).

The motivation to exercise was measured by the Behavioural Regulation in Exercise Questionnaire (BREQ-3), which is a validated instrument that assesses the different types of motivation based on the self-determination theory. The BREQ-3 consists of 24 items that measure six subscales: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation. The items are rated on a 5-point Likert scale ranging from 0 (not true for me) to 4 (very true for me). The relative autonomy index (RAI) was calculated by weighting and summing the subscale scores according to the following formula:  $RAI = (2 \times \text{intrinsic motivation}) + \text{integrated regulation} + (0 \times \text{identified regulation}) - \text{introjected regulation} - (2 \times \text{external regulation}) - (3 \times \text{amotivation})$ . The RAI reflects the degree of self-determination in exercise behavior, with higher positive scores indicating higher levels of autonomous motivation and lower negative scores indicating lower levels of autonomous motivation (15).

The adherence to exercise was measured by the Exercise Adherence Rating Scale (EARS), which is a reliable and valid instrument that assesses both adherence behavior and adherence/non-adherence cognitions. The EARS consists of 17 items that measure six dimensions: enjoyment, perceived benefits, perceived barriers, social support, self-efficacy, and intention. The items are rated on a 5-point Likert scale ranging from 0 (completely agree) to 4 (completely disagree). The positively phrased items are reverse scored and the total score is obtained by summing all the item scores. The total score ranges from 0 to 64, with higher scores indicating better adherence to exercise.

## STATISTICAL ANALYSIS & RESULTS:

The study used various methods to collect and analyze the data. The study parameters, such as age, BMI, BREQ-3 scores, EARS scores, and RAI scores, were entered in a spreadsheet using Microsoft office excel. The statistical analysis was performed using the software package for social sciences (SPSS) version 21.0. The continuous variables, such as BMI, BREQ-3 scores, EARS scores, and RAI scores, are presented as mean  $\pm$  standard deviation (SD). Normality was checked for the baseline values of the. Independent t-test was used to test the significant difference between two means of the continuous variables for the two groups (male and female). This test compares the means of two independent samples and determines whether they are significantly different from each other. Pearson correlation test was used to test the association between motivation and exercise adherence. This test measures the strength and direction of the linear relationship between two continuous variables. A positive correlation indicates that as one variable increases, the other variable also increases. A negative correlation indicates that as one variable increases, the other variable decreases. A P value of  $<0.05$  is statistically significant, which means that there is a low probability that the observed results are due to chance. A P value of  $\geq 0.05$  is not statistically significant, which means that there is a high probability that the observed results are due to chance or random error.

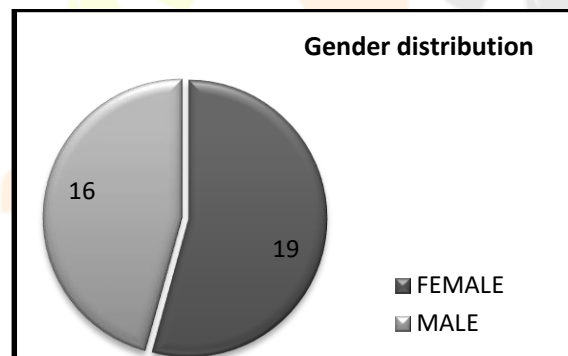


Figure 1: Gender distribution

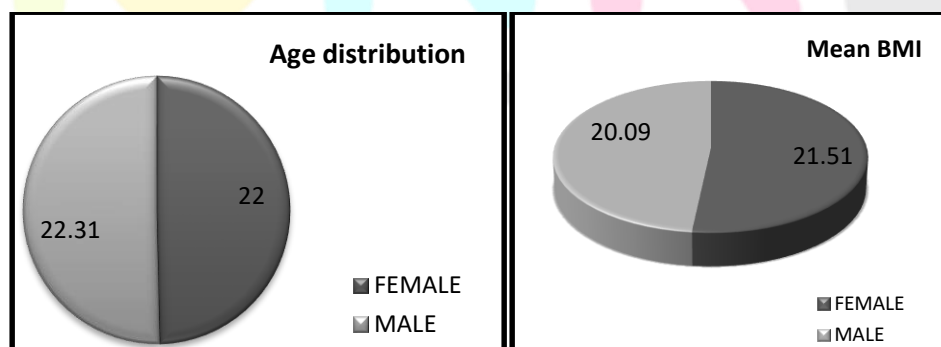


Figure 2: Age and BMI distribution

**Table 1:** Baseline descriptives

Variables	Gender	Values
AGE	Female	22 ± 0.28
	Male	22.31 ± 0.22
HEIGHT	Female	1.55 ± 0.01
	Male	1.69 ± 0.02
WEIGHT	Female	52 ± 1.80
	Male	64.13 ± 2.25
BMI	Female	21.51 ± 0.70
	Male	20.09 ± 1.89

Values are mean ±std.err.

The participants' characteristics at the start of the study are shown in Table 1. The mean age of the female participants = 22 ± 0.28, while the mean age of the male participants = 22.31 ± 0.22 (Figure 2). The female participants had a mean height = 1.55 ± 0.01, while the male participants had a mean height of 1.69 ± 0.02, and a mean weight of 64.13 ± 2.25. The body mass index (BMI) was calculated by dividing the weight in kilograms by the square of the height in meters. The female participants had a mean BMI of 21.51 ± 0.70, while the male participants had a mean BMI of 20.09 ± 1.89. To check if the age and BMI values were similar across the two groups, the Levene's test was used to assess the homogeneity of variance. The results showed that there was no significant difference in the variance of age ( $P = 0.287$ ) or BMI ( $P = 0.100$ ) between the female and male groups, indicating that the assumption of homogeneity was not violated.

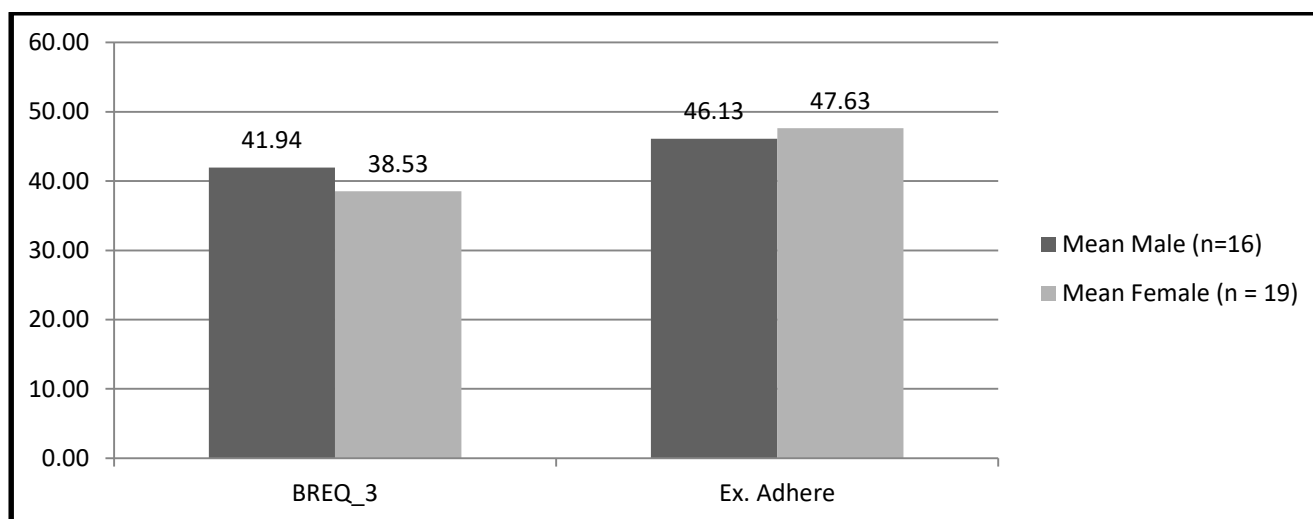
**Table 2:** Test of Homogeneity

	Levene Statistic	df1	df2	Sig.
AGE	1.17	1	33	.287
BMI	2.87	1	33	.100

The motivation and adherence levels of the participants after the eight-week aerobic exercise training program were measured using two questionnaires: the Behavioural Regulation in Exercise Questionnaire-3 (BREQ-3) and the Exercise Adherence Rating Scale (EARS). The BREQ-3 assesses the different types of motivation for exercise, ranging from intrinsic motivation (doing exercise for its own sake) to extrinsic motivation (doing exercise for external reasons)<sup>13</sup>. The EARS evaluates how well the participants followed or completed their prescribed exercise sessions<sup>12</sup>. The scores of these questionnaires were compared between the male and female groups using an independent t-test. The results are shown in Table 3 and Figure 3. The t-test showed that there was no significant difference in the BREQ-3 scores between the male and female groups ( $p = 0.57$ ). This means that the motivation levels for exercise were similar across the two groups, even though the male group had a slightly higher mean score (41.94) than the female group (38.53). The t-test also showed that there was no significant difference in the EARS scores between the male and female groups ( $p = 0.55$ ). This means that the adherence levels for exercise were similar across the two groups, even though the female group had a slightly higher mean score (47.63) than the male group (46.48). These results suggest that gender did not have a significant effect on the motivation and adherence outcomes of the aerobic exercise training program.

**Table 3:** Comparison of motivation and exercise adherence in males and females

	Mean Male (n=16)	Mean Female (n = 19)	Mean Difference	95% Confidence Interval of the Difference		t value	df	P value
				Lower	Upper			
BREQ_3	41.94	38.53	3.41	-15.59	8.77	-0.57	33.00	0.57
EARS	46.13	47.63	-1.5	-3.54	6.56	0.61	33.00	0.55



**Figure 3:** Comparison of motivation and exercise adherence in males and females

The relationship between the motivation and adherence levels of the participants was examined using a Pearson correlation test. This is a statistical method that measures the strength and direction of the linear association between two continuous variables<sup>14</sup>. The Pearson correlation coefficient  $r$  ranges from -1 to 1, where -1 indicates a perfect negative correlation, 0 indicates no correlation, and 1 indicates a perfect positive correlation<sup>14</sup>. The p-value is the probability of obtaining a correlation coefficient as extreme or more extreme than the observed one, assuming that there is no correlation in the population<sup>14</sup>. A p-value less than 0.05 is usually considered statistically significant, meaning that the observed correlation is unlikely to be due to chance<sup>14</sup>. The Pearson correlation test showed that there was a strong positive correlation between the BREQ-3 scores and the EARS scores of the participants ( $r = 0.81$ ,  $p < 0.001$ ). This means that the higher the motivation level for exercise, the higher the adherence level for exercise, and vice versa. This also means that the correlation was very unlikely to be due to chance, as the p-value was very small. This result suggests that motivation and adherence are closely related factors that influence each other in physical activity and exercise behaviour.

### Correlations

		BREQ_3	EX_ADH
BREQ_3	Pearson Correlation	1	.594**
	Sig. (2-tailed)		.000
EX_ADH	Pearson Correlation	.594**	1
	Sig. (2-tailed)	.000	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### DISCUSSION

Young adults can benefit from exercise, but they need motivation to keep doing it. Motivation can come from different sources, such as internal or external reasons, and different levels of pressure or choice. By knowing these sources and using some strategies to increase them, young adults can boost their motivation and stick to their exercise plans. This can lead to better outcomes for their physical, mental, and emotional health. Many health problems, such as heart disease, diabetes, obesity, cancer, bone and joint problems, depression, and early death, can be caused by not moving enough (Hallal et al., 2012)<sup>1</sup>.

Some studies have found that men and women have different motives for exercising. For example, Egli et al. (2011)<sup>2</sup> found that men were more motivated by internal factors, such as strength, competition, and challenge, while women were more motivated by external factors, such as weight management and appearance. Another study by Al Kubaisy et al. (2015)<sup>3</sup> found that more women than men participated in physical exercise, which contradicts the previous findings by Lenhart et al. (2012)<sup>4</sup> and Mohd et al. (2012)<sup>5</sup> that showed a higher likelihood of men to exercise. A possible explanation for this difference is that women may feel more pride or guilt associated with exercise or lack of it, as suggested by Wilson (2004)<sup>6</sup>. Zabinski et al. (2001)<sup>7</sup> also suggested that women's desire to be thin may be influenced by fitness workouts. Men, on the other hand, wanted to have a muscular and lean body, as shown by McCreary and Saucer (2009)<sup>8</sup>. Rasa Jankauskienė et al. (2011)<sup>9</sup> also showed that men who exercised had a more positive body image and less anxiety about their physical appearance than women who exercised, except for how they evaluated their appearance. However, in our study, we did not find any significant difference between men and women in their motivation to exercise ( $p = 0.57$ ) or their adherence to exercise ( $p = 0.55$ ). This may be because our participants were mainly from the medical background and were aware of the health benefits of exercise and exercise training.

Another factor that affects how people start and continue exercising is the direction, intensity, and persistence of their motivation. Direction refers to whether a person chooses to exercise or not. Intensity refers to how hard a person works during exercise. Persistence refers to how long a person maintains exercise behavior. As with exercise participation motivation, attitudes and beliefs influence exercise adherence motivation. Attitudes and beliefs about the importance of exercise play a role in adherence, but so do individuals' expectations about the effects that exercise is having on them personally (Abernethy et al., 2013)<sup>10</sup>. In our study, we found a strong correlation between motivation and exercise adherence ( $p < 0.001$ ). This means that the more motivated people were to exercise, the more likely they were to follow or complete their prescribed exercise sessions, and vice versa.

One way to increase motivation and adherence is to enhance the sense of control over one's exercise choices. Teixeira et al. (2012)<sup>11</sup> found that people who exercised for their own reasons tended to start and stick to exercise more than those who exercised for external rewards. However, they also found that intrinsic motivation was more important for long-term exercise than short-term exercise. This means that people need to find enjoyment or satisfaction in exercising itself, not just in the outcomes of exercising.

The limitations of our study are the small sample size and the lack of consideration for the professional heterogeneity during sampling. These factors may limit the generalizability of our findings to other populations or settings. Future studies should use larger and more diverse samples to test the validity and reliability of our results.

## CONCLUSION

The main finding of this study was that motivation and exercise adherence were strongly related in both young men and women who completed an eight-week aerobic exercise training program. This means that the more motivated they were to exercise, the more likely they were to follow their exercise sessions, and vice versa. This finding suggests that motivation is a key factor that influences exercise behaviour and outcomes. However, this study did not find any significant difference in motivation or exercise adherence between men and women. This means that gender did not have a significant effect on these variables. This finding contradicts some previous studies that showed gender differences in motivation or exercise adherence. This may be because of the different characteristics or backgrounds of the participants in this study compared to other studies.

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