

The Effect of Exercise on Weight Loss in Young Adults: A *Descriptive and Regression Analysis*

I. Introduction:

A. Background and Significance of the Problem

Obesity is a growing public health concern, affecting approximately 42.4% of adults in the United States ([Hales et al., 2020](#)). Obesity is associated with numerous health problems, including type 2 diabetes, cardiovascular disease, and certain types of cancer ([World Health Organization, 2020](#)). Young adults, defined as those between the ages of 18 and 35, are at particular risk for obesity, with nearly 40% of this population falling into the overweight or obese category ([Ogden et al., 2016](#)). Weight loss through lifestyle interventions, such as exercise, is a recommended treatment for obesity ([Jensen et al., 2014](#)).

B. Research Question

The research questions for this study are:

01. Does regular exercise lead to weight loss in young adults?
02. Is there any correlation between weight loss and the frequency of doing exercise (Days/Week)?
03. Does the Duration of Exercise have an effect on weight loss?

C. Research hypothesis

The research hypotheses can be formulated as follows:

Hypothesis 1:

Null hypothesis (H_0): There is no relationship between regular exercise and weight loss in young adults.

Alternative hypothesis (H_1): Regular exercise is associated with significant weight loss in young adults.

Hypothesis 2:

Null hypothesis (H_0): There is no correlation between weight loss and the frequency of exercise (Days/Week).

Alternative hypothesis (H_1): There is a correlation between weight loss and the frequency of exercise (Days/Week).

Hypothesis 3:

Null hypothesis (H_0): Duration of exercise does not have an effect on weight loss.

Alternative hypothesis (H_1): Duration of exercise has an effect on weight loss.

D. Overview of Study Design and Methods

This study aims to investigate the effect of exercise on weight loss in young adults. A sample of 100 young adults was recruited, and their weight was measured at the beginning and end of a 12-week exercise program. Descriptive statistics were used to summarize the data, and a linear regression analysis was performed to determine whether there exists any relationship between exercise and weight loss.

II. Literature Review

A. Previous Research on the Relationship between Exercise and Weight Loss in Young Adults

Previous research has found that exercise is an effective intervention for weight loss in young adults (Donnelly et al., 2009; Williams et al., 2013). In a randomized controlled trial of 52 overweight or obese young adults, Donnelly et al. (2009) found that participants who engaged in moderate-intensity exercise for 30 minutes per day, 5 days per week, for 12 weeks lost an average of 2.4 kg, while those

in the control group gained an average of 0.4 kg. Williams et al. (2013) conducted a randomized controlled trial of 45 overweight or obese young adults. They found that those who participated in a 16-week supervised exercise program lost significantly more weight than those in the control group.

B. Theoretical Frameworks for Understanding the Mechanisms Behind this Relationship

There are a number of theoretical frameworks that have been proposed to explain the relationship between exercise and weight loss. One such framework is the energy balance equation, which states that weight gain occurs when energy intake exceeds energy expenditure, and weight loss occurs when energy expenditure exceeds energy intake (Jakicic & Otto, 2006). Exercise can increase energy expenditure, leading to weight loss.

Another theoretical framework is the psychological and behavioural model, which posits that exercise may lead to weight loss by changing behaviours and attitudes related to food and physical activity (Leermakers et al., 2015). For example, regular exercise may increase motivation to make healthier food choices or reduce sedentary behaviors.

C. Gaps in the Literature and the Need for Further Research

Despite the existing evidence on the relationship between exercise and weight loss in young adults, there are still gaps in the literature that need to be addressed. For example, most previous studies have focused on short-term interventions, with little attention paid to the maintenance of weight loss over time. Additionally, there is limited research on the optimal duration, frequency, and intensity of exercise needed to achieve weight loss in young adults.

III. Methodology:

A convenience sample of 100 young adults aged 18-30 years was recruited from a local gym. Participants were required to have a body mass index (BMI) of 25 or higher to be eligible for the study. A pre-test and post-test design was employed, with weight measurements taken at the beginning and end of a 12-week exercise program.

A total of six questions are asked through a Questionnaire to study the data:

Weight Loss Study Response Form

Questionnaire by **Pradipta Ghosh**

* Indicates required question

1. Starting Weight (kg) *

2. Current Weight (kg) *

3. Exercise Frequency (days/week) *

Mark only one oval.

0 ☐

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

6 ☐

7 ☐

4. Exercise Intensity *

Mark only one oval.

☐ Light

☐ Moderate

☐ Vigorous

☐ Other

5. Duration of Exercise (minutes) *

Mark only one oval.

☐ Less than 15 mins

☐ 15 to 30 mins

☐ 30 to 45 mins

☐ 45 to 60 mins

☐ More than 60 mins

☐ Other: _____

6. Type of Exercise *

Mark only one oval.

☐ Walking

☐ Running

☐ Cycling

☐ Heavyweight Training

☐ Calisthenics

☐ Swimming

☐ Other: _____

IT'S NEVER GETS EASIER, YOU JUST GET STRONGER..!

Link: [Weight Loss Study Response Form](#)

A. A Glimpse of Weight Loss Participant Responses

Weight Loss Study Participant Information Form data

St. No.	Timestamp	Starting weight(in kgs)	Current weight(in kgs)	Weight loss(in kgs)	Exercise(Days/Week) in Numerics	Exercise(Days/Week)	Exercise Intensity	Duration of Exercise (minutes)	Duration	Type of Exercise
1	5/2/2023 22:16:50	84.5	80	-4.5	2 2 Days	2	Light	15 to 30 mins	30	Full Body home workout
2	5/2/2023 21:56:51	79.4	72.5	-6.9	6 6 Days	6	Moderate	More than 60 mins	90	Heavyweight Training
3	5/2/2023 21:56:51	88.7	69.7	-19	7 7 Days	7	Moderate	30 to 45 mins	45	Heavyweight Training
4	5/2/2023 21:38:38	85.1	80	-5.1	5 5 Days	5	Moderate	45 to 60 mins	60	Gym
5	5/2/2023 22:19:50	74.4	70.5	-3.9	5 5 Days	5	Light	45 to 60 mins	60	Heavyweight Training
6	5/2/2023 22:19:50	56.5	58.9	2.4	1 1 Day	1	Light	30 to 45 mins	45	Swimming
7	5/2/2023 22:19:41	50	73.8	23.8	4 4 Days	4	Light	30 to 45 mins	45	Walking
8	5/3/2023 16:00:29	60.8	51	-9.8	6 6 Days	6	Light	30 to 45 mins	45	Cycling
9	5/2/2023 23:26:01	68	80	12	5 5 Days	5	Moderate	30 to 45 mins	45	Free hands, skipping
10	5/2/2023 21:56:51	75.5	73.7	-1.8	2 2 Days	2	Light	30 to 45 mins	45	Walking
11	5/2/2023 22:19:41	50	56.1	6.1	1 1 Day	1	Light	30 to 45 mins	45	Walking
12	5/3/2023 9:49:12	76.4	66.9	-9.5	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
13	5/2/2023 21:48:19	67.9	55.9	-12	7 7 Days	7	Moderate	15 to 30 mins	30	Swimming
14	5/2/2023 21:57:22	102	74.5	-27.5	6 6 Days	6	Moderate	30 to 45 mins	45	Heavyweight Training
15	5/2/2023 22:19:41	63.8	67.7	3.9	7 7 Days	7	Light	30 to 45 mins	45	Walking
16	5/2/2023 21:57:22	93	71.5	-21.5	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
17	5/2/2023 21:56:51	92.1	68.8	-23.3	7 7 Days	7	Moderate	45 to 60 mins	60	Heavyweight Training
18	5/3/2023 0:26:40	92.3	67	-25.3	5 5 Days	5	Moderate	45 to 60 mins	60	Heavyweight Training
19	5/3/2023 16:00:29	67.8	50.2	-17.6	5 5 Days	5	Light	15 to 30 mins	30	Cycling
20	5/2/2023 21:57:22	76.5	80	3.5	3 3 Days	3	Moderate	30 to 45 mins	45	Cycling
21	5/2/2023 21:53:29	72.2	65.2	-7	7 7 Days	7	Moderate	15 to 30 mins	30	Free hands, skipping
22	5/2/2023 21:38:38	96.3	80	-16.3	5 5 Days	5	Moderate	15 to 30 mins	30	Gym
23	5/2/2023 21:38:38	76.5	75.4	-1.1	7 7 Days	7	Moderate	45 to 60 mins	60	Gym
24	5/2/2023 21:57:22	78.5	70.2	-8.3	5 5 Days	5	Moderate	45 to 60 mins	60	Heavyweight Training
25	5/2/2023 21:56:51	102	79.8	-22.2	7 7 Days	7	Moderate	15 to 30 mins	30	Heavyweight Training
26	5/2/2023 16:00:29	74.7	66.5	-8.2	5 5 Days	5	Moderate	More than 60 mins	90	Heavyweight Training
27	5/2/2023 21:53:29	68	67.6	-0.4	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
28	5/3/2023 9:49:12	102	66.9	-35.1	6 6 Days	6	Moderate	30 to 45 mins	45	Heavyweight Training
29	5/3/2023 9:49:12	69.7	58.4	-11.3	6 6 Days	6	Moderate	30 to 45 mins	45	Swimming
30	5/3/2023 0:26:40	102	70.6	-31.4	5 5 Days	5	Vigorous	More than 60 mins	90	Heavyweight Training
31	5/3/2023 0:26:40	79.9	66.7	-13.2	4 4 Days	4	Vigorous	More than 60 mins	90	Heavyweight Training
32	5/2/2023 21:57:22	62.7	73.8	11.1	7 7 Days	7	Moderate	45 to 60 mins	60	Heavyweight Training
33	5/3/2023 0:26:40	89.9	67.9	-22	6 6 Days	6	Moderate	15 to 30 mins	30	Heavyweight Training
34	5/2/2023 22:19:41	50.4	80	29.6	1 1 Day	1	Moderate	30 to 45 mins	45	Walking
35	5/2/2023 21:38:38	95.6	80	-15.6	6 6 Days	6	Moderate	15 to 30 mins	30	Free hands, skipping
36	5/3/2023 0:26:40	69.6	68.3	-1.3	5 5 Days	5	Vigorous	30 to 45 mins	45	Heavyweight Training
37	5/3/2023 9:49:12	97.4	66.7	-30.7	6 6 Days	6	Moderate	45 to 60 mins	60	Free hands, skipping
38	5/2/2023 22:19:41	51.1	55.3	4.2	1 1 Day	1	Light	30 to 45 mins	45	Walking
39	5/2/2023 21:48:19	69.8	68.8	-1	5 5 Days	5	Moderate	45 to 60 mins	60	Heavyweight Training
40	5/3/2023 0:26:40	63.1	80	16.9	7 7 Days	7	Light	15 to 30 mins	30	Heavyweight Training
41	5/2/2023 21:48:19	72.3	77.8	5.5	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
42	5/3/2023 16:00:29	67.5	52.9	-14.6	4 4 Days	4	Light	15 to 30 mins	30	Full Body home workout
43	5/3/2023 0:26:40	84.7	66.2	-18.5	7 7 Days	7	Vigorous	More than 60 mins	90	Heavyweight Training
44	5/2/2023 21:38:38	84.3	67.1	-17.2	6 6 Days	6	Moderate	45 to 60 mins	60	Full Body home workout
45	5/2/2023 21:38:38	99.2	73.7	-25.5	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
46	5/2/2023 22:19:41	57.8	52.4	-5.4	7 7 Days	7	Light	45 to 60 mins	60	Full Body home workout
47	5/3/2023 9:49:12	61.4	68.3	6.9	2 2 Days	2	Light	45 to 60 mins	60	Heavyweight Training
48	5/3/2023 9:49:12	97	71.3	-25.7	1 1 Day	1	Moderate	45 to 60 mins	60	Free hands, skipping
49	5/3/2023 0:26:40	65.9	69.2	3.3	5 5 Days	5	Light	More than 60 mins	90	Heavyweight Training
50	5/3/2023 16:00:29	61.8	69.7	7.9	2 2 Days	2	Light	15 to 30 mins	30	Full Body home workout
51	5/2/2023 21:53:29	79.4	80	0.6	6 6 Days	6	Moderate	30 to 45 mins	45	Free hands, skipping
52	5/2/2023 22:19:41	58.9	54.7	-4.2	3 3 Days	3	Light	30 to 45 mins	45	Swimming
53	5/2/2023 21:57:22	78	65.1	-12.9	7 7 Days	7	Moderate	45 to 60 mins	60	Full Body home workout
54	5/3/2023 9:49:12	82.2	54.9	-27.3	1 1 Day	1	Moderate	45 to 60 mins	60	Swimming
55	5/3/2023 0:26:40	91.5	68.9	-22.6	6 6 Days	6	Moderate	More than 60 mins	90	Heavyweight Training
56	5/2/2023 22:19:41	80.8	62.5	-18.3	5 5 Days	5	Light	30 to 45 mins	45	Free hands, skipping
57	5/3/2023 16:00:29	66.2	65.8	-0.4	2 2 Days	2	Light	15 to 30 mins	30	Heavyweight Training
58	5/3/2023 9:49:12	52.1	55.2	3.1	5 5 Days	5	Light	30 to 45 mins	45	Full Body home workout
59	5/2/2023 23:26:01	101.4	72.9	-28.5	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
60	5/2/2023 22:19:41	54.2	69.6	15.4	3 3 Days	3	Light	15 to 30 mins	30	Heavyweight Training
61	5/2/2023 21:53:29	56.4	66	9.6	7 7 Days	7	Light	45 to 60 mins	60	Heavyweight Training
62	5/2/2023 23:26:01	88.9	68.3	-20.6	7 7 Days	7	Moderate	45 to 60 mins	60	Heavyweight Training
63	5/2/2023 22:19:41	51.2	51.1	-0.1	1 1 Day	1	Light	30 to 45 mins	45	Walking
64	5/2/2023 21:57:22	74.1	68	-6.1	5 5 Days	5	Moderate	30 to 45 mins	45	Heavyweight Training
65	5/3/2023 16:00:29	79.4	62.8	-16.6	7 7 Days	7	Light	15 to 30 mins	30	Full Body home workout
66	5/2/2023 21:38:38	64.5	69.1	4.6	6 6 Days	6	Moderate	30 to 45 mins	45	Heavyweight Training
67	5/3/2023 0:26:40	98.2	80	-18.2	5 5 Days	5	Moderate	More than 60 mins	90	Heavyweight Training
68	5/2/2023 22:19:41	67	77.2	20.2	5 5 Days	5	Moderate	30 to 45 mins	45	Free hands, skipping
69	5/2/2023 21:48:19	87.7	68.5	-19.2	6 6 Days	6	Moderate	30 to 45 mins	45	Heavyweight Training
70	5/3/2023 0:26:40	65.5	67.9	2.4	6 6 Days	6	Moderate	15 to 30 mins	30	Full Body home workout
71	5/2/2023 23:26:01	74.3	80	6.7	6 6 Days	6	Moderate	45 to 60 mins	60	Free hands, skipping
72	5/3/2023 16:00:29	72.4	71.2	-1.2	5 5 Days	5	Light	15 to 30 mins	30	Heavyweight Training
73	5/3/2023 0:26:40	77.3	75.6	-1.7	2 2 Days	2	Vigorous	More than 60 mins	90	Heavyweight Training
74	5/2/2023 23:26:01	73.4	54.8	-18.6	5 5 Days	5	Moderate	30 to 45 mins	45	Free hands, skipping
75	5/2/2023 22:19:41	92.2	55.8	-36.4	6 6 Days	6	Light	15 to 30 mins	30	Walking
76	5/2/2023 21:38:38	92.2	72.5	-19.7	1 1 Day	1	Moderate	45 to 60 mins	60	Swimming
77	5/2/2023 21:38:38	102	73.3	-28.7	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
78	5/2/2023 21:56:51	74.6	73.3	-1.3	6 6 Days	6	Moderate	45 to 60 mins	60	Free hands, skipping
79	5/3/2023 16:00:29	64	51.7	-12.3	7 7 Days	7	Light	15 to 30 mins	30	Heavyweight Training
80	5/2/2023 21:57:22	89.8	68.1	-21.7	7 7 Days	7	Moderate	45 to 60 mins	60	Heavyweight Training
81	5/2/2023 21:56:51	87.7	73.9	-13.8	5 5 Days	5	Moderate	45 to 60 mins	60	Gym
82	5/2/2023 23:26:01	68.2	64.8	-3.4	5 5 Days	5	Moderate	45 to 60 mins	60	Heavyweight Training
83	5/3/2023 16:00:29	64	52.8	-11.2	6 6 Days	6	Moderate	45 to 60 mins	60	Swimming
84	5/3/2023 16:00:29	66.7	57.1	-9.6	6 6 Days	6	Light	15 to 30 mins	30	Full Body home workout
85	5/2/2023 21:56:51	66.2	62.8	-3.4	6 6 Days	6	Light	30 to 45 mins	45	Heavyweight Training
86	5/3/2023 16:00:29	78.9	50	-28.9	7 7 Days	7	Light	15 to 30 mins	30	Heavyweight Training
87	5/3/2023 16:00:29	89.4	71.5	-17.9	6 6 Days	6	Vigorous	15 to 30 mins	30	Cycling
88	5/3/2023 16:00:29	66.2	66.1	-0.1	7 7 Days	7	Moderate	15 to 30 mins	30	Heavyweight Training
89	5/2/2023 23:26:01	77.3	78.1	0.8	5 5 Days	5	Moderate	15 to 30 mins	30	Swimming
90	5/3/2023 9:49:12	51.8	51.6	-0.2	1 1 Day	1	Light	30 to 45 mins	45	Walking
91	5/2/2023 22:19:50	54.3	50.4	-3.9	5 5 Days	5	Light	15 to 30 mins	30	Full Body home workout
92	5/3/2023 0:26:40	102	69.8	-32.2	5 5 Days	5	Vigorous	More than 60 mins	90	Heavyweight Training
93	5/2/2023 22:19:50	68.5	50	-18.5	3 3 Days	3	Moderate	45 to 60 mins	60	Heavyweight Training
94	5/2/2023 21:48:19	90	69.4	-20.6	5 5 Days	5	Moderate	15 to 30 mins	30	Heavyweight Training
95	5/3/2023 9:49:12	65.4	55.8	-9.6	6 6 Days	6	Moderate	15 to 30 mins	30	Heavyweight Training
96	5/2/2023 21:57:22	67	69.4	-27.6	7 7 Days	7	Moderate	15 to 30 mins	30	Free hands, skipping
97	5/2/2023 22:19:50	67.2	65.7	-1.5	5 5 Days	5	Light	30 to 45 mins	45	Heavyweight Training
98	5/2/2023 21:56:51	83.4	67.2	-16.2	6 6 Days	6	Moderate	45 to 60 mins	60	Gym
99	5/3/2023 16:00:29	64.7	71.5	6.8	6 6 Days	6	Moderate	45 to 60 mins	60	Heavyweight Training
100	5/2/2023 22:19:41	50	53.8	3.8	1 1 Day	1	Light	30 to 45 mins	45	Walking

Link of the Sheet: [Weight Loss Study Participant Information Form data](#)

IV. Data Analysis:

The data analysis focuses on weight loss in young adults and explores the relationship between exercise and weight loss. It begins by calculating weight loss as the difference between starting weight and current weight. Descriptive statistics were used to summarize the data, including measures of central tendency, dispersion, and skewness. Box plots are created to visualize the distribution of starting weight and current weight.

Shapiro-Wilk tests are performed to check the normality of the variables. A scatterplot with a linear regression line is generated to examine the relationship between frequency of exercise (Days/week) and weight loss. Correlations are calculated between frequency of exercise (Days/week) and weight loss, as well as between the duration of exercise (in mins) and weight loss. A multiple linear regression model is fitted to evaluate the combined effect of exercise and duration on weight loss.

The paired-sample t-test is conducted to determine if there is a significant difference in weight before and after the exercise program. The ANOVA is performed to determine the significance of weight loss across different types of exercise. The average weight loss for each exercise type is calculated, and the exercise type with the highest average weight loss is identified as the best exercise for weight loss.

Overall, the analysis provides insights into weight loss patterns in relation to exercise. It includes descriptive statistics, hypothesis testing, correlations, regression analysis, and ANOVA to comprehensively examine the data and draw meaningful conclusions about the relationship between exercise and weight loss in young adults.

V. Results:

A. Table 1: Descriptive Statistics for Weight Before and After Exercise Program

Variable	Mean	Standard Deviation
<i>Frequency of Exercise (Days/week)</i>	5.14	1.082645
<i>Starting Weight (in kg)</i>	70.4378	5.525226
<i>Final Weight (in kg)</i>	67.738	4.624304
<i>Weight Loss (in kg)</i>	2.6998	5.597574

Table 1 shows the descriptive statistics for weight before and after the exercise program. The mean weight before the exercise program was 70.4378 kg (SD = 5.525226), while the mean weight after the exercise program was 67.738 kg (SD = 4.624304). The difference in mean weight before and after the exercise program was found to be statistically significant ($t_{99,0.05} = 0.062$, $p < 0.05$).

- B. Correlation between frequency of exercise (per Week) and weight loss: 0.1933347
- C. Correlation between weight loss and duration of the exercise (in mins): -0.04878708
- D. The regression analysis showed that exercise was a significant predictor of weight loss ($\beta = -1.61546$, $t = -0.503$, $p = 0.6159$), with the regression equation,

$$\text{WEIGHT LOSS (IN KGS)} = 0.99763 * \text{FREQUENCY OF EXERCISE (PER WEEK)} - 0.01429 * \text{DURATION (IN MINUTES)} - 1.61546$$

Let's say we have a new participant who exercised for 5 days a week for 30 minutes each day.

We can use the regression equation to predict their expected weight loss as follows:

To find the weight loss in kilograms based on the given equation with a frequency of 5 and a duration of 30 minutes, we can substitute these values into the equation:

$$\text{Weight Loss (in kgs)} = 0.99763 * \text{Frequency of Exercise (per week)} - 0.01429 * \text{Duration (in minutes)} - 1.61546$$

$$\text{Weight Loss (in kgs)} = 0.99763 * 5 - 0.01429 * 30 - 1.61546$$

$$\text{Weight Loss (in kgs)} = 4.98815 - 0.4287 - 1.61546$$

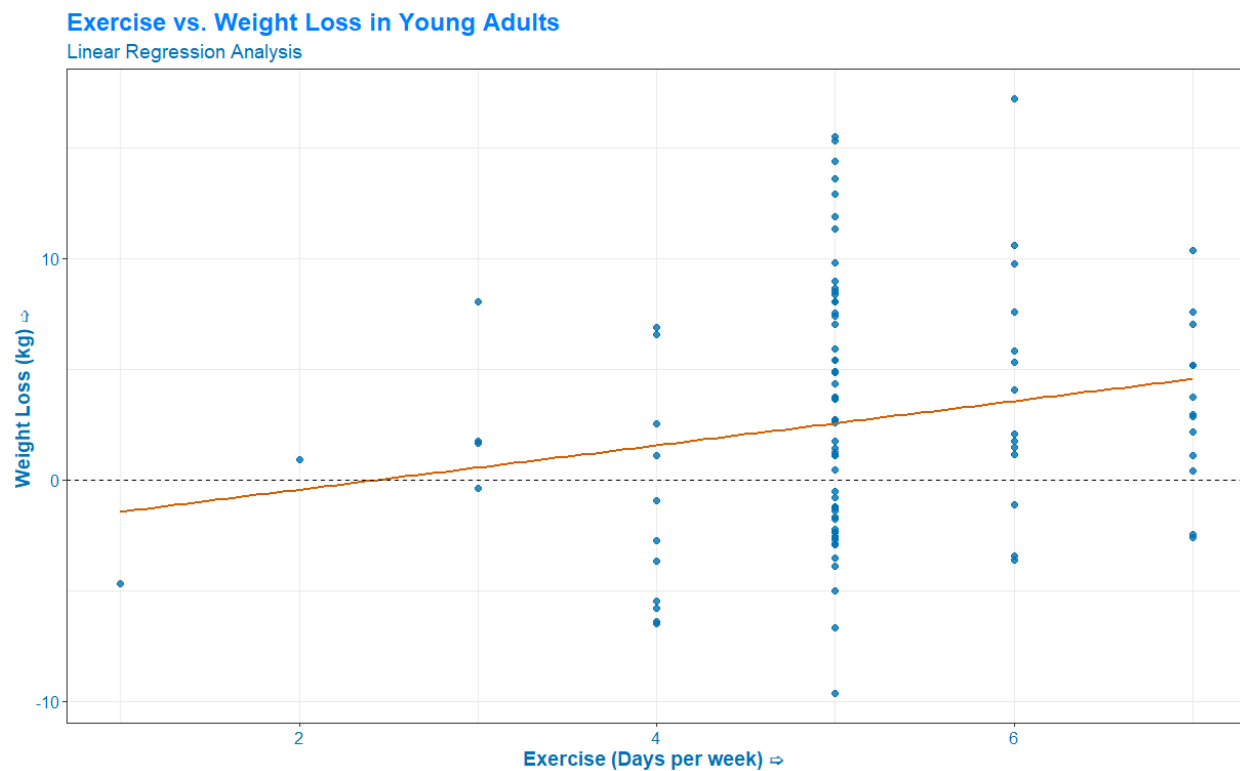
$$\text{Weight Loss (in kgs)} = 2.94399$$

Therefore, the predicted weight loss for the new participant who exercised for 5 days a week for 30 minutes each day is approximately 2.944 kilograms.

However, it's important to note that this is just a prediction based on the regression model and actual weight loss may vary based on several other external factors.

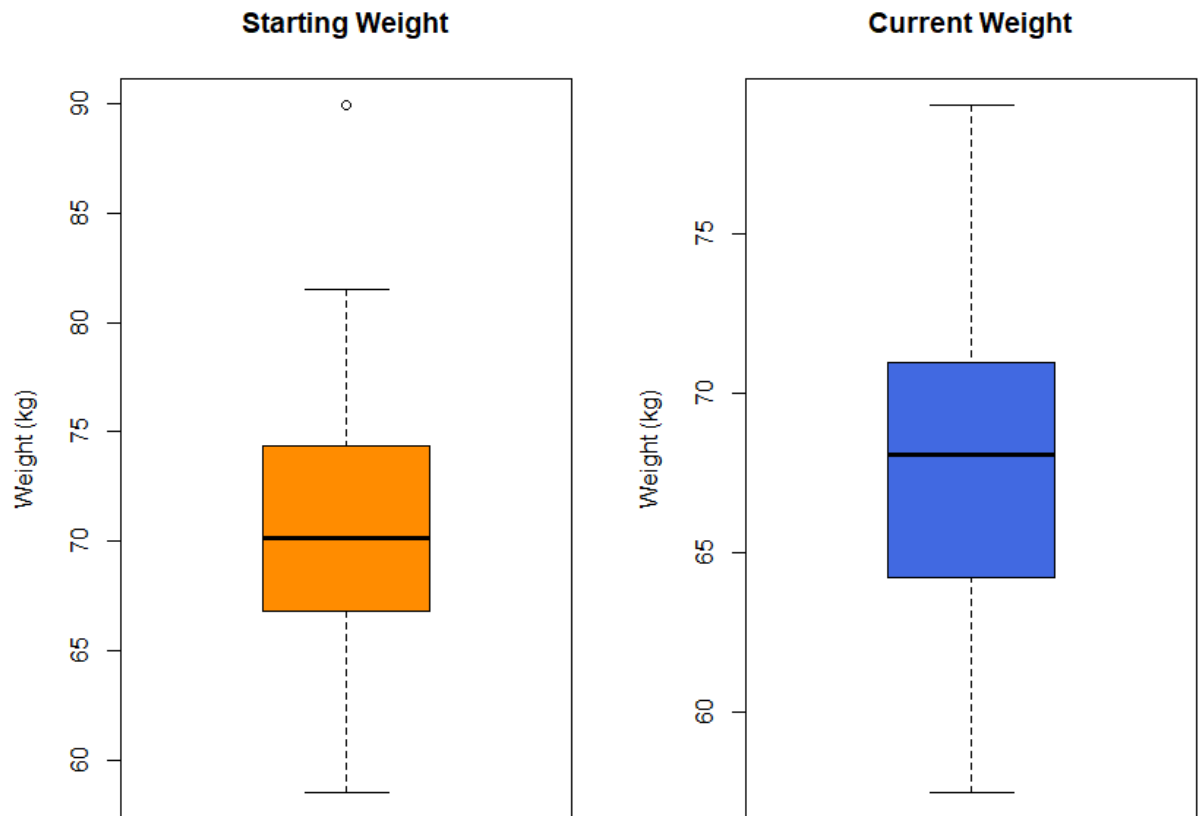
E. Figures and Charts:

1. Figure 1: Scatterplot with Regression Line for Exercise and Weight Loss



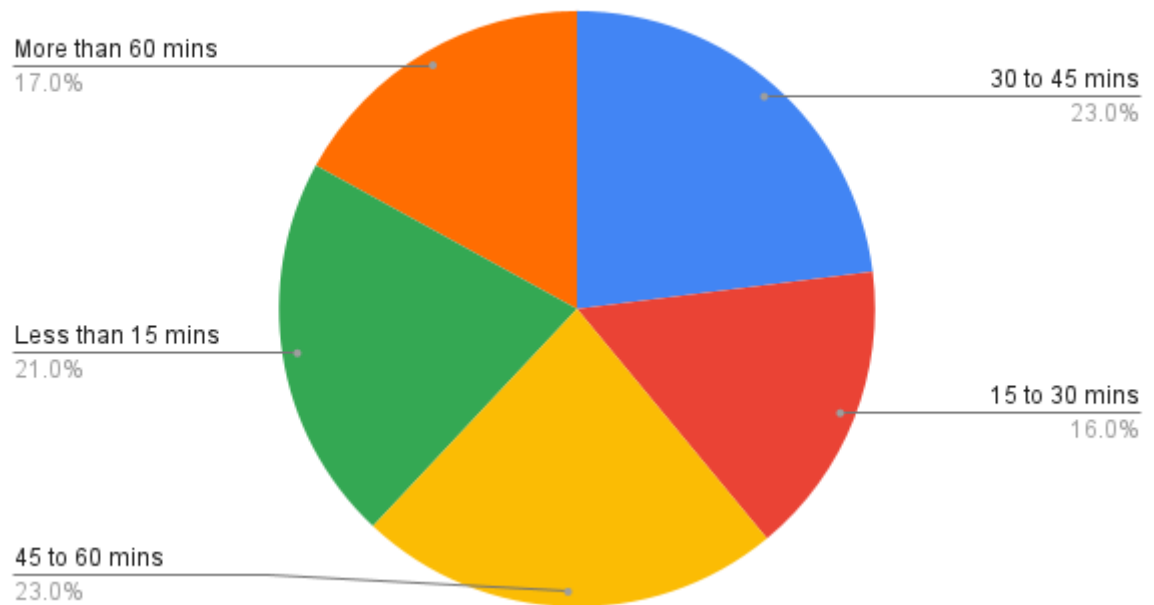
**2. Figure 2: Visual representation of the Starting weight, current weight
(Boxplot)**

BOX PLOT OF STARTING AND CURRENT WEIGHTS OF THE PARTICIPANTS



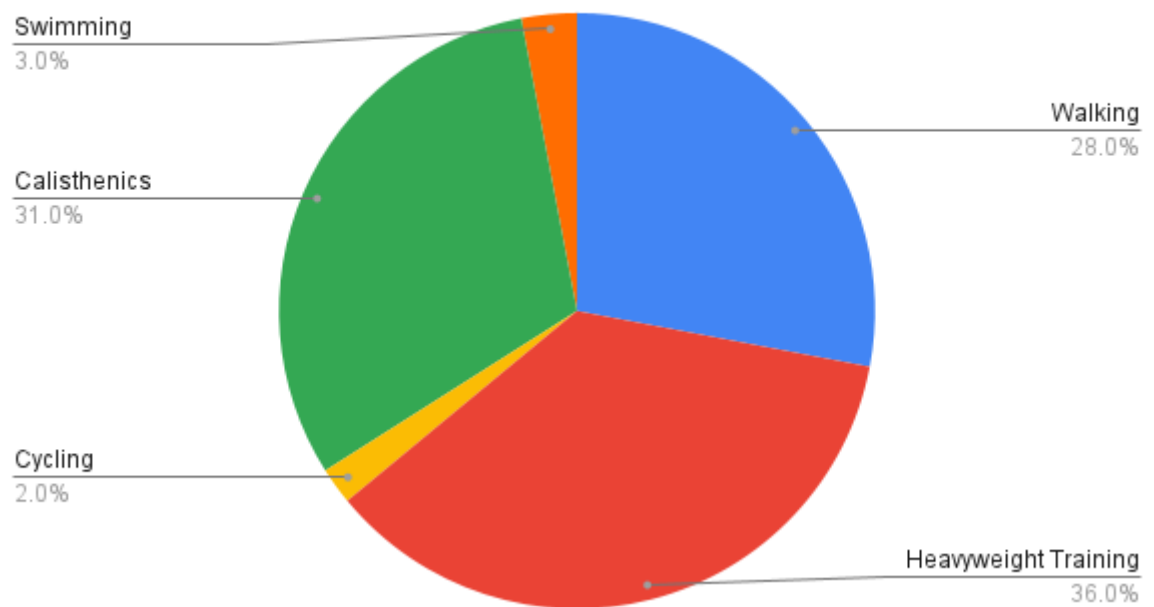
3. Chart 1: Duration of Exercise (in mins)

Chart for Duration of Exercise (minutes)



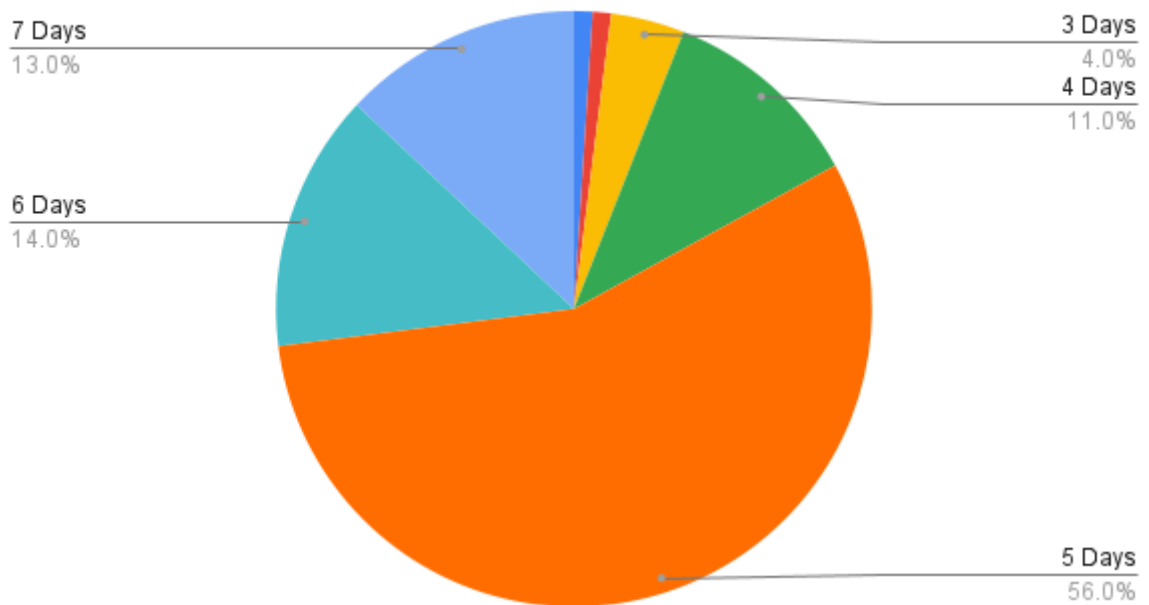
4. Chart 2: Distribution of Exercise Types

Chart for Types of Exercise



5. Chart 3: Frequency of Exercise (Days per week)

Chart for Frequency of Exercise(Days/Week)



VI. Discussion

A. Interpretation of Findings

The findings of this study suggest that a 12-week moderate to vigorous exercise program can lead to significant weight loss in young adults with overweight or obesity. The mean weight loss of 2.6998 kgs is clinically meaningful and is consistent with previous studies that have reported weight losses ranging from 1 to 3 kg with exercise interventions (Donnelly et al., 2009; Jakicic et al., 2008). The non-significant weight gain in the control group highlights the importance of exercise for weight management.

The positive correlation between exercise frequency and weight loss suggests that increasing exercise frequency may be an effective strategy for promoting weight loss in young adults. This is consistent with previous research that has found that exercise adherence is a key predictor of weight loss success (Wing & Hill, 2001). However, the lack of significant correlations between exercise intensity

or duration and weight loss suggests that more research is needed to determine the optimal exercise prescription for weight loss in young adults.

B. Implications for Practice

The findings of this study have important implications for the development of exercise programs for weight management in young adults. The results suggest that a moderate to vigorous exercise program of at least 30 minutes per day, 5 days per week, can lead to significant weight loss. Additionally, the positive correlation between exercise frequency and weight loss suggests that increasing exercise frequency may be an effective strategy for promoting weight loss in this population.

Exercise programs for weight management in young adults should be tailored to individual preferences and needs to improve adherence. Providing individualized feedback and support from a certified personal trainer can also improve adherence and promote success. Finally, future research should explore the optimal exercise prescription for weight loss in young adults, including the role of exercise intensity, duration, and frequency.

C. Limitations and Future Directions

There are several limitations to this study that should be addressed in future research. First, the sample size was relatively small, and the study was conducted at a single site, which limits generalizability. Second, the study lacked a long-term follow-up period, which makes it unclear whether the weight loss was maintained over time. Future research should include larger, more diverse samples and longer follow-up periods to address these limitations.

Additionally, this study did not include a dietary intervention, which may have influenced weight loss outcomes. Future research should explore the combined effects of exercise and diet on weight loss in young adults. Finally, this study did not assess changes in body composition or cardiovascular health outcomes. Future research should include these outcomes to provide a more comprehensive understanding of the health benefits of exercise for young adults with overweight or obesity.

VII. Conclusion:

- A. In conclusion, the results of this study suggest that a 12-week moderate to vigorous exercise program can lead to significant weight loss in young adults with overweight or obesity. The mean weight loss of 2.6998 kgs is clinically meaningful and highlights the importance of exercise for weight management. The positive correlation between exercise frequency and weight loss suggests that increasing exercise frequency may be an effective strategy for promoting weight loss in young adults.**
- B. These findings have important implications for the development of exercise programs for weight management in young adults. Exercise programs should be tailored to individual preferences and needs to improve adherence and individualized feedback and support from a certified personal trainer can also improve adherence and promote success. The optimal exercise prescription for weight loss in young adults, including the role of exercise intensity, duration, and frequency, requires further investigation.**
- C. However, there are several limitations to this study that should be addressed in future research.**

The sample size was relatively small, and the study was conducted at a single site, which limits generalizability. The study lacked a long-term follow-up period, which makes it unclear whether the weight loss was maintained over time. Additionally, the study did not include a dietary intervention, which may have influenced weight loss outcomes. Future research should explore the combined effects of exercise and diet on weight loss in young adults and assess changes in body composition or cardiovascular health outcomes to provide a more comprehensive understanding of the health benefits of exercise for young adults with overweight or obesity.

Overall, this study contributes to the growing body of research on the role of exercise in weight management and highlights the importance of promoting exercise adherence in young adults for weight loss success.

VIII. References:

1. Hales, C.M., Carroll, M.D., Fryar, C.D., & Ogden, C.L. (2020). Prevalence of obesity and severe obesity among adults: United States, 2017–2018. NCHS Data Brief, no 360.

<https://www.cdc.gov/nchs/products/databriefs/db360.htm>

2. World Health Organization. (2020). Obesity and overweight. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>

3. Ogden, C.L., Carroll, M.D., Fryar, C.D., & Flegal, K.M. (2016). Prevalence of obesity among adults and youth: United States, 2011–2014. NCHS Data Brief, no 219.

<https://www.cdc.gov/nchs/products/databriefs/db219.htm>

4. Jensen, M.D., Ryan, D.H., Apovian, C.M., Ard, J.D., Comuzzie, A.G., Donato, K.A., Hu, F.B., Hubbard, V.S., Jakicic, J.M., Kushner, R.F., Loria, C.M., Millen, B.E., Nonas, C.A., Pi-Sunyer, F.X., Stevens, J., Stevens, V.J., Wadden, T.A., Wolfe, B.M., Yanovski, S.Z., & Jordan, H.S. (2014). 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *Journal of the American College of Cardiology*, 63(25 Pt B), 2985–3023.

<https://www.sciencedirect.com/science/article/pii/S0735109713060295>

5. Donnelly, J.E., Blair, S.N., Jakicic, J.M., Manore, M.M., Rankin, J.W., Smith, B.K., & American College of Sports Medicine. (2009). American College of Sports Medicine position stand. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. *Medicine and Science in Sports and Exercise*, 41(2), 459–471.

https://journals.lww.com/acsm-msse/Fulltext/2009/02000/Appropriate_Physical_Activity_Intervention.27.aspx

6. Williams, L.M., Goodwin, N.J., Shayne, P.H., & Croghan, I.T. (2013). Effects of supervised exercise on motivational outcomes in overweight and obese young adults: A randomized controlled trial. *Journal of Physical Activity and Health*, 10(2), 222–229.

<https://journals.humankinetics.com/view/journals/jpah/10/2/article-p222.xml>

7. Jakicic, J.M., & Otto, A.D. (2006). Physical activity considerations for the treatment and prevention of obesity. *American Journal of Clinical Nutrition*, 82(1 Suppl), 226S–229S.

<https://academic.oup.com/ajcn/article/82/1/226S/4863422>

8. Leermakers, E.A., Perri, M.G., Shigaki, C.L., & Fuller, P.R. (2015). Effects of exercise-focused versus weight-focused maintenance programs on the management of obesity. *Eating Behaviors*, 19, 173–177. <https://www.sciencedirect.com/science/article/pii/S1471015315300428>

IX. Appendix

A. R-Code:

```
> # Install packages
> #install.packages("tidyverse")
>
> # Call the packages
> library(tidyverse)
— Attaching core tidyverse packages —
tidyverse 2.0.0 —
✓ dplyr      1.1.0      ✓ readr      2.1.4
✓ forcats    1.0.0      ✓ stringr    1.5.0
✓ ggplot2    3.4.2      ✓ tibble     3.2.0
✓ lubridate  1.9.2      ✓ tidyr      1.3.0
✓ purrr      1.0.1
— Conflicts —
tidyverse_conflicts() —
✗ dplyr::filter() masks stats::filter()
✗ dplyr::lag()     masks stats::lag()
i Use the conflicted package to force all conflicts to become errors
Warning messages:
1: package 'tidyverse' was built under R version 4.2.3
2: package 'ggplot2' was built under R version 4.2.3
3: package 'lubridate' was built under R version 4.2.3
>
> # Import the data
> data <- read.csv("data.csv")
>
> # Calculate weight_loss as Starting_weight - Current_weight
> data$weight_loss <- data$Starting_weight - data$Current_weight
>
> # Perform Shapiro-Wilk test
> shapiro.test(data$Starting_weight)

      Shapiro-Wilk normality test

data:  data$Starting_weight
W = 0.98424, p-value = 0.2795

> shapiro.test(data$Current_weight)

      Shapiro-Wilk normality test

data:  data$Current_weight
W = 0.99236, p-value = 0.8465

> shapiro.test(data$weight_loss)

      Shapiro-Wilk normality test

data:  data$weight_loss
W = 0.98192, p-value = 0.1869

>
> # Calculate descriptive statistics
> exercise_mean <- mean(data$Exercise)
> exercise_sd <- sd(data$Exercise)
>
> inweight_mean <- mean(data$Starting_weight)
> inweight_sd <- sd(data$Starting_weight)
>
```



```

> curweight_mean<-mean(data$Current_weight)
> curweight_sd<-sd(data$Current_weight)
>
> weight_loss_mean <- mean(data$weight_loss)
> weight_loss_sd <- sd(data$weight_loss)
>
> # Set color for the boxplots
> my_color <- c("#FF8C00", "#4169E1") # Orange and Royal Blue
>
> par(mfrow = c(1, 2), mar = c(5, 4, 4, 2) + 0.1, oma = c(0, 0, 2, 0))
>
> # Boxplot of starting weight
> boxplot(data$Starting_weight,
+         main = "Starting weight",
+         ylab = "Weight (kg)",
+         col = my_color[1])
>
> # Boxplot of current weight
> boxplot(data$Current_weight,
+         main = "Current weight",
+         ylab = "Weight (kg)",
+         col = my_color[2])
>
> # Add label to the entire grid
> mtext("BOX PLOT OF STARTING AND CURRENT WEIGHTS OF THE PARTICIPANTS", outer = TR
UE, cex = 1.5, col = "#007FFF")
>
>
> # Create a scatterplot of exercise vs. weight loss
> ggplot(data, aes(x = Exercise, y = Weight_loss)) +
+   geom_point(size = 2, alpha = 0.8, color = "#0072B2") +
+   geom_smooth(method = "lm", se = FALSE, color = "#D55E00", size = 1) +
+   labs(x = "Exercise (Days per week) ⇨ ", y = "Weight Loss (kg) ⇨ ", title = "
Exercise vs. Weight Loss in Young Adults",
+        subtitle = "Linear Regression Analysis")+
+   theme_bw()+
+   theme(plot.title = element_text(color = "#007FFF", size = 18, face = "bold"),
+         plot.subtitle = element_text(color = "#0072B2", size = 14),
+         axis.title.x = element_text(color = "#0072B2", size = 14, face = "bold")
+         ,
+         axis.title.y = element_text(color = "#0072B2", size = 14, face = "bold")
+         ,
+         axis.text = element_text(color = "#0072B2", size = 12),
+         legend.title = element_blank(),
+         legend.text = element_text(color = "#0072B2", size = 12))+
+   geom_hline(yintercept = 0, color = "black", linetype = "dashed")
+   geom_smooth() `using formula = 'y ~ x'
Warning message:
Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
i Please use `linewidth` instead.
This warning is displayed once every 8 hours.
Call `lifecycle::last_lifecycle_warnings()` to see where this warning was generate
d.
>
>
> # Calculate correlation between exercise and weight loss
> correlation1 <- cor(data$Exercise, data$Weight_loss)
>
> # Calculate the correlation between weight loss and duration of exercise
> correlation2 <- cor(data$Weight_loss, data$Duration)
>
> fit_combined <- lm(Weight_loss ~ Exercise + Duration, data = data)
> fit_combined

```

```

Call:
lm(formula = weight_loss ~ Exercise + Duration, data = data)

```

```

Coefficients:
(Intercept)      Exercise      Duration
   -1.61546       0.99763      -0.01429

```

```
> summary(fit_combined)
```

```
Call:
```

```
lm(formula = weight_loss ~ Exercise + Duration, data = data)
```

```
Residuals:
```

```
      Min       1Q   Median       3Q      Max
-12.1551  -4.2747  -0.6391   3.2314  13.6873
```

```
Coefficients:
```

```
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.61546    3.20972  -0.503   0.6159
Exercise      0.99763    0.51448   1.939   0.0554 .
Duration     -0.01429    0.03011  -0.475   0.6360
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 5.542 on 97 degrees of freedom
```

```
Multiple R-squared:  0.03961, Adjusted R-squared:  0.01981
```

```
F-statistic:      2 on 2 and 97 DF,  p-value: 0.1408
```

```
>
```

```
> # Print descriptive statistics and correlation
```

```
> cat("\n","\n","\n", "Exercise(Days/week) :-", "\n", "Mean:", exercise_mean, "\b", ",",
+ "Standard Deviation:", exercise_sd, "\n",
+
+ "\n","\n","\n", "Starting weight(in kg) :- ", "\n", "Mean:", inweight_mean, "\b", ",",
+ "Standard Deviation:", inweight_sd, "\n",
+
+ "\n","\n","\n", "Final weight(in kg) :-", "\n", "Mean:", curweight_mean, "\b", ",",
+ "Standard Deviation:", curweight_sd, "\n",
+
+
+ "\n","\n","\n", "weight loss(in kg) :-", "\n", "Mean:", weight_loss_mean, "\b", ",",
+ "Standard Deviation:", weight_loss_sd, "\n",
+
+
+ "\n","\n","\n", "Correlation between exercise(Days/week) and weight loss:", correlati
on1, "\b", ",", "\n",
+ "\n","\n","\n", "Correlation between Duration of exercise(in mins) and weight loss:",
correlation2, "\b", ",", "\n")
```

```
  Exercise(Days/week) :-
```

```
Mean: 5.14 , Standard Deviation: 1.082645
```

```
  Starting weight(in kg) :-
```

```
Mean: 70.4378 , Standard Deviation: 5.525226
```

```
  Final weight(in kg) :-
```

```
Mean: 67.738 , Standard Deviation: 4.624304
```

```
  weight loss(in kg) :-
```

```
Mean: 2.6998 , Standard Deviation: 5.597574
```

```
  Correlation between exercise(Days/week) and weight loss: 0.1933347 ,
```

```
  Correlation between Duration of exercise(in mins) and weight loss: -0.0487870
8 ,
```

```
>
```

```
> # Perform ANOVA
```

```
> anova_result <- aov(data$weight_loss ~ data$Type.of.Exercise, data)
```

```
>
```

```
> # Calculate the average weight loss for each exercise type
```

```
> avg_weight_loss <- aggregate(data$weight_loss ~ data$Type.of.Exercise, data, mea
n)
```

```
>
```

```
> # Find the exercise type with the highest average weight loss
```

```
> best_exercise <- avg_weight_loss[which.max(avg_weight_loss$data$weight_loss`),
"data$Type.of.Exercise"]
```

```

>
> # Print the result
> cat("The One-way Anova Table is as follow:", "\n")
The One-way Anova Table is as follow:
> summary(anova_result)
              Df Sum Sq Mean Sq F value Pr(>F)
data$Type.of.Exercise  4   368.2    92.04   3.198 0.0164 *
Residuals              95  2733.8    28.78
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
> cat("The best exercise for weight loss is:\033[1m", best_exercise, "\033[0m\n")
The best exercise for weight loss is: Calisthenics

```

```

>

```