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BRISK WALKING EXERCISE: IT'S EFFECT ON THE HEART RATES AMONG FOURTH YEAR HIGH SCHOOL STUDENTS

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ABSTRACT

This paper studied the effects of prescribed brisk walking in lowering heart rates among chosen fourth-year students at X National High School in Region X, using a quasi-experimental design that looked at the study's outcomes after an intervention program was implemented. This study used a pre-test and post-test design in which students were given an intervention program and were separated into two groups: 15-minute exercise and 10-minute exercise. The pre- and post-test findings of the two groups were compared to determine the considerable increase in cardiovascular fitness and reduction in heart rates among the study participants.The findings revealed that more female student-respondents had superior heart rate performance than male student-respondents, owing to other characteristics that may have considerably influenced the female student-respondents' heart rate performance. It's also worth noting that the heart rates of the student-respondents differ before and after they've completed the specified 15-minute and 10-minute brisk walking exercises as part of the intervention program. As a result, the 15-minute and 10-minute durations of brisk walking exercise effectively increased the cardiovascular endurance level of the student-respondents in this study, notably in terms of lowering their heart rates.

Keywords: Brisk walking, heart rates, quasi-experimental study, Philippines

Introduction

Physical fitness is linked to a healthy lifestyle. Physical fitness allows people to live healthier and longer lives. Physical fitness is defined as a person's overall ability to adapt and respond to his everyday physical activity, free of illness and able to function efficiently and effectively in work and leisure activities without being overly tired (Prentice, 2004).

A physically healthy person can also cope with situations and resist hypokinetic disorders, according to Prentice. Physical fitness is not solely determined by physical activity. It also includes things like good medical treatment, eating the right kinds and amounts of food, rewarding employment, healthy play and recreation, and getting enough rest and relaxation. It is critical to concentrate on all aspects of fitness when attempting to become physically fit. Regularly engaging in any physical activity is an excellent predictor of general fitness, which will aid in improving cardio-respiratory endurance.

Fitness is vital since it improves one's quality of life. As a result, the body adapts to the stresses it is subjected to. A lack of physical activity leads the body to degenerate because of its inactivity. This is referred to as disuse atrophy. An individual who is

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physically fit feels better, is happier, is more productive, has more energy during the day, and enjoys activities outside of work (Be Physically Fit Inc. Boston, MA, 2006).

A battery of standardized tests was created to assess an individual's physical fitness. These physical fitness tests were created to determine a person's overall fitness level. Physical fitness has two components: 1) health-related and 2) skill-related. The development of people' health, including cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition, is the focus of health-related fitness. Health-Related Fitness is a type of fitness training that focuses solely on disease prevention and health promotion. It entails the ability to engage in daily exercises or physical activities that will improve one's general health and well-being (Cherubini, 2009).

This study employed an aerobic exercise prescription of brisk walking to build cardiovascular endurance, which is an important health-related fitness component.

Statement of the Problem

This study had investigated the Effects of Prescribed Brisk Walking in Lowering the Heart Rates among the selected Fourth Year Students of Cagayan de Oro National High School in Cagayan de Oro City.

Specifically, the study sought the answers of the following questions:

1. How do the student-participants perform in their brisk walking when grouped according to:
   1.1 Age
   1.2 Gender
2. Do the student-participants vary in their heart rate before and after the intervention when grouped according to age and gender?
3. Which among the prescriptive exercises has significant effect in lowering the heart rates?

Null Hypothesis

With problem assumed in this study, question number 1 is hypothesis-free. For questions number 2 and 3, the null hypotheses are instituted and tested at $\alpha=0.05$, level of significance:

1. There is no significant difference in the pulse rates of the student-participants before and after the introduction of the prescribed walking exercise when grouped according to age and gender.
2. There is no significant difference in the effects of the two brisk walking exercises on the heart rate of the student-respondents when grouped according to age and gender.

Conceptual Framework

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The premise of this study is that aerobic fitness exercises, when used as endurance activities, can improve cardiovascular endurance and, as a result, lower heart rates.Furthermore, the independent variables of this study will be age and gender, as well as the heart rates of Resting Pulse Rate (RPR), Exercise Pulse Rate (EPR), and Recovery Heart Rate (RHR), and how these independent variables affect the individuals' Cardiovascular Endurance (CVE) as the study's dependent variable.

Schematic Diagram

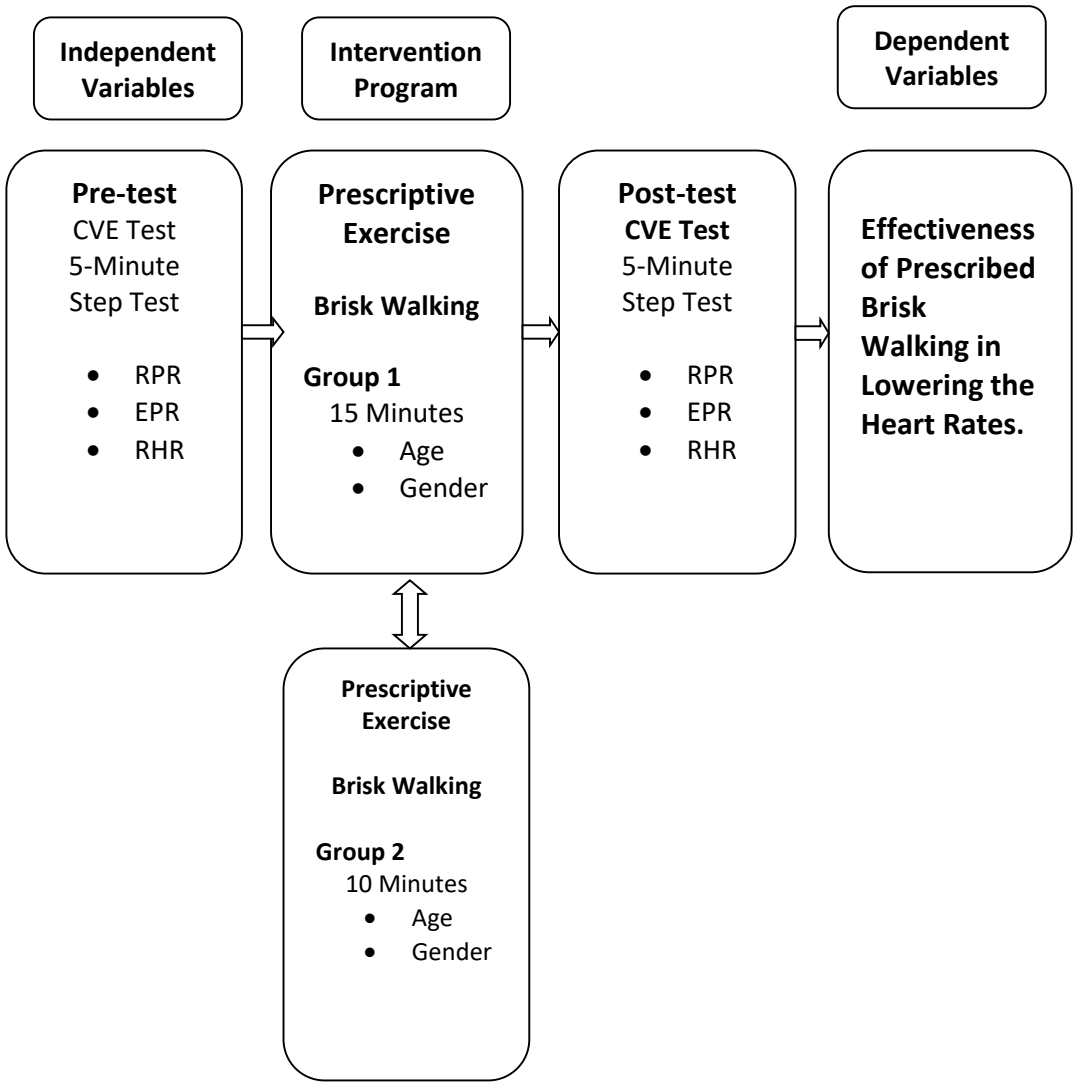

Figure 1 shows the relationships between and among the different variables of the study

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Research Design

The quasi-experimental design was adopted in this investigation. A quasi-experimental design is one in which the study's outcomes are studied after an intervention program has been implemented. This study used a pre-test and post-test design in which the students were put through an intervention program in which they were divided into two groups: 15-minute exercise and 10-minute exercise. The pre- and post-test findings of the two groups were compared to determine the considerable increase in cardiovascular fitness and reduction in heart rates among the study participants.

The researchers used the radial pulse beat to measure heart rates before the activity, immediately after the activity, and after a three-minute post-activity cool down following the final aerobic fitness activity.

Respondents

The participants in this study were 4th year students from X National High School, namely 4th year students in the Special Science Curriculum sections Newton and Edison.

Sampling Procedure

The complete population of the students in the researcher's two Special Science Curriculum classes, Newton and Edison, is the proper sample size for this investigation. The overall number of students who responded to the survey was 48, with seventeen (17) boys and thirty-one (31) girls.

Research Instrument

In conducting pre-test and post-test, the researcher employed self-designed forms to collect relevant data that supported the study; a Physical Fitness Form 1 with the necessary information needed in the study such as name, age, gender, THR, RPR, EPR, and RHR. A Physical Fitness Form 2 that acts as a monitoring sheet for each of the student-respondents to keep track of their RPR, EPR, and RHR data throughout the intervention period. During the pre-test and post-test, a scaling system was utilized to identify and rate the responders based on the results of their resting pulse rate, exercise pulse rate, and recovery heart rate. The researchers also used the following instruments to collect and record the necessary data: a stop watch, which was used to count the pulses of the student-respondents for one minute and time the duration of the prescribed aerobic fitness exercise "brisk walk" as the intervention activity; a whistle, which was used to give signals of the start and end of the prescribed intervention activity "brisk walk," and in indicating start and stop, in co-ordination with the stop watch.

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Statistical Treatment

The information was organized and evaluated using descriptive metrics like percentage, mean, frequency count, and standard deviation. To determine the significant differences between the study's variables, the t-test, f-test, or ANOVA statistical methods were used. Significant changes in the data between the students' pre-test and post-test heart rates, as well as a reduction in the students' heart rates dependent on the duration of the intervention program offered to each group.

Table 1

Frequency and Percentage Distribution of Student Performance on **Resting Pulse Rate** (RPR) **Exercise Pulse Rate** (EPR) and **Recovery Hearty Rate** (RHR) Before and After the 15-Minute Brisk Walking Prescriptive Exercise of **Age 15 and 16-17 Years Old**

15-Minute Brisk Walking Exercise Group

Heart Rates	**15 Years Old**				**16-17 Years old**			
	Pretest		Posttest		Pretest		Posttest	
	f	%	F	%	f	%	f	%
Resting Heart Rate:								
Above Normal	0	0.00	0	0.00	2	18.2	0	0
Normal	13	92.90	3	21.40	8	72.7	7	63.6
Below Normal	1	7.10	11	78.60	1	9.1	4	36.4
Exercise Pulse Rate								
Excellent	0	0.00	4	28.60	0	0.00	0	0
Good	0	0.00	2	14.30	0	0.00	1	9.10
Above Average	0	0.00	2	14.30	0	0.00	0	0.00
Average	0	0.00	2	14.30	0	0.00	4	36.40
Below Average	0	0.00	0	0.00	0	0.00	3	27.30
Poor	0	0.00	0	0.00	1	9.10	0	0.00
Very Poor	14	100.00	4	28.60	10	90.90	3	27.30
Recovery Heart Rate								
Recovered	14	100.00	14	100.0	11	100.00	11	100.00
Not Recovered	0	0.00	0	0.00	0	0.00	0	0.00
Total Respondents	14	100.00	14	100.00	11	100.00	11	100.00

* Significance value is at <.05

Table 1 shows that none of the student-respondents aged 15 fell into the above-normal category during the pretest. Only 7.10 percent of student-respondents fall into the "below" normal category, whereas 92.90 percent fall into the "normal" category. According to the data, the percentage of people in the below-normal category grew to 78.60 percent during the posttest, leaving only 21.40 percent in the normal category.18.20% of the 16–17-year-

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old student respondents are in the above average category, 72.70 percent are in the average category, and 9.10 percent are in the "below normal" category. During the posttest, none of them were classified as "above normal," while 63.60 percent were classified as "normal," and 36.40 percent were classified as "below normal." The table also demonstrates that the Resting Pulse Rate of the 16–17-year-old student-respondents improved after the intervention program of 15-minute brisk walking.

These findings also show that after a 15-minute brisk walking exercise intervention program, the Resting Pulse Rate of the 15- and 16–17-year-old student-respondents improved. Lower Resting Pulse Rate shows good aerobic condition (Prentice,2004), and signifies more efficient cardiac function and greater cardiovascular fitness, as described in earlier chapters (Laskowski, 2009).

Table 1 reveals, on the other hand, that all student-respondents aged 15 were in the "extremely bad" group of Exercise Pulse Rate during the pretest period. Only 28.60 percent of students-respondents remained in the "very poor" category after the posttest period; the rest moved up to higher categories, with 14.30 percent in "average," 14.30 percent in "above average," 14.30 percent in "good," and the remaining 28.60 percent in the "excellent" category. During the pretest period, 90.90 percent of student-respondents aged 16-17 fell into the "extremely poor" group, while 9.10 percent fell into the "poor" category. The posttest data demonstrates that the student-respondents' exercise pulse rate performance has improved after the prescribed 15-minute brisk walking exercise as the intervention program. Only 27.30% of student responders were placed in the "extremely poor" group, with the rest moving up to higher levels. 27.30 percent of student responders were in the "below average" group, 36.40 percent in the "average" category, and 9.10 percent in the "good" category.

The data also shows that the majority of the 15 and 16 to 17-year-old student-respondents completed the task correctly, putting them in higher categories. After the intervention program, student-respondents who were in the "average," "above average," "good," and "outstanding" categories revealed that they had executed the task appropriately within their respective goal heart rate range. Miller (2009) agrees, stating that the largest advantages are obtained while exercising within the target heart rate zone.

The Recovery Heart Rates of all student-respondents in the 15-minute group have recovered from the last aerobic fitness exercise throughout the conduct of the pretest and posttest, as shown in Table 1. It also demonstrates that all student-respondents have exercised at a level that is enjoyable and comfortable, with heart rates returning to 120 beats per minute or lower. Hopkins' explanation is in favor of these observations (2009). The recovery heart rate is used to assess fitness, and a sluggish recovery after exercise suggests a higher risk of heart attack (Mirkin, 2008).

Table 2

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Frequency and Percentage Distribution of Student Performance on **Resting Pulse Rate** (RPR) **Exercise Pulse Rate** (EPR) and **Recovery Hearty Rate** (RHR) Before and After the Prescriptive Brisk Walking Exercise of **Age 15 and 16-17 Years Old**

10-Minute Brisk Waking Exercise Group

Heart Rates	15 Years Old				16-17 Years old			
	Pretest		Posttest		Pretest		Posttest	
	f	%	F	%	f	%	F	%
Resting Heart Rate								
Above Normal	0	0	0	0.00	0	0.00	0	0.00
Normal	15	93.80	11	68.80	4	57.10	4	57.10
Below Normal	1	6.30	5	31.30	3	42.90	3	42.90
Exercise Pulse Rate								
Excellent	0	0.00	4	25.00	0	0.00	0	0.00
Good	1	6.30	0	0.00	0	0.00	0	0.00
Above Average	0	0.00	2	12.50	0	0.00	0	0.00
Average	0	0.00	2	12.50	1	14.30	1	14.30
Below Average	0	0.00	2	12.50	0	0.00	0	0.00
Poor	0	0.00	2	12.50	0	0.00	2	28.60
Very Poor	15	93.80	4	25.00	6	85.70	4	57.10
Recovery Heart Rate								
Recovered	16	100.00	16	100.00	7	100.00	7	100.00
Not Recovered	0	0.00	0	0.00	0	0.00	0	0.00
Total Respondents	**16**	**100.00**	**16**	**100.00**	**7**	**100.00**	**7**	**100.00**

* Significance value is at <.05

Table 2 shows that during the pretest period, 93.80% of student-respondents aged 15 were classified as "normal" and 6.30% as "below normal." The students-respondents' resting heart rate performance improved just slightly in the posttest interval, according to statistics. The resting pulse rate of 68.80% of the students was still "normal," while the resting pulse rate of 31.30 percent was "below normal." The table shows that similar data was supplied throughout the pretest and posttest periods for the student-respondents aged 16-17.None of the student respondents were classified as "above normal," with 57.10 percent classified as "below normal" and 42.90 percent classified as "normal." The data also shows that the 15-year-old student-respondents improved less, and there was no further improvement in the Resting Pulse Rate performance of the 16-17-year-old student-respondents, even after the 10-minute brisk walking exercise as an intervention program.

Table 2 further demonstrates that none of the student-respondents in the age 15 category fell into the "poor," "below average," "average," "above average," or "outstanding" exercise pulse rate categories during the pretest. Only 6.30 percent of student responders were in the good group, while the rest (93.80 percent) were in the extremely poor

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category. During the posttest period, 25% of students remained in the extremely poor category, 12.50 percent in each of the "poor," "below average," "average," and "above average" categories, and 25% in the "excellent" category.. During the pretest, just 14.30 percent of student-respondents aged 16 to 17 fell into the "average" category. The remaining 85.70 percent of student respondents were classified as "extremely poor." The data also shows that the student-respondents' exercise pulse rate performance improved only slightly throughout the posttest period, with 57.10 percent remaining in the "very poor" group, 28.60 percent in the "poor" category, and 14.30 percent remaining in the "average" category. The data also demonstrates that, when compared to the 16- to 17-year-old student-respondents, the majority of the 15-year-old student-respondents performed well in the exercise pulse rate. After the prescribed brisk walking exercise was introduced, most of the 15-year-old students were placed in higher categories.

Furthermore, the data on recovery heart rates shows that throughout the pretest and posttest activities, 100 percent of student-respondents in all age groups in the 10-minute group recovered from the previous aerobic fitness activity. All the student responders exercised out at a level that was fun and comfortable for them, with heart rates of 120 beats per minute or less. The data suggests that the 10-minute brisk walking exercise as an intervention program has something to do with the indicated heart rate improvements of the 15- and 16–17-year-old student-respondents, even though there was only a minor improvement in the heart rates of the student-respondents in the 10-minute brisk walking exercise group. Other factors, such as not being able to do the exercise within the desired cardiac range and physical condition throughout the activity period, could have contributed to the minor changes.

Table 3

Frequency and Percentage Distribution of Student Performance on **Resting Pulse Rate** (RPR) **Exercise Pulse Rate** (EPR) and **Recovery Hearty Rate** (RHR) Before and After the 15-Minute Prescriptive Brisk Walking Exercise of **Male and Female of:**

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15-Minute Brisk Waking Exercise Group

Heart Rates	Male				Female			
	Pretest		Posttest		Pretest		Posttest	
	f	%	f	%	f	%	f	%
Resting Heart Rate								
Above Normal	2	22.20	0	0.00	0	0.00	0	0.00
Normal	7	77.80	5	55.60	14	87.50	5	31.30
Below Normal	0	0.00	4	44.40	2	12.50	11	68.80
Exercise Pulse Rate								
Excellent	0	0.00	1	11.10	0	0.00	3	18.80
Good	0	0.00	0	0.00	0	0.00	3	18.80
Above Average	0	0.00	1	11.10	0	0.00	1	6.30
Average	0	0.00	3	33.30	0	0.00	3	18.80
Below Average	0	0.00	2	22.20	0	0.00	1	6.30
Poor	0	0.00	0	0.00	1	6.30	0	0.00
Very Poor	9	100.00	2	22.20	15	93.80	5	31.30
Recovery Heart Rate								
Recovered	9	100.00	9	100.00	16	100.00	16	100.00
Not Recovered	0	0.00	0	0.00	0	0.00	0	0.00
Total Respondents	9	100.00	9	100.00	16	100.00	16	100.00

* Significance value is at <.05

Table 3 reveals that in the pretest period, 22.20 percent of male student-respondents fell into the "above normal" category, 77.80 percent fell into the "normal" category, and none fell into the "below normal" category.Males' resting pulse rate performance improved after the test, with 55.6 percent falling into the "normal" category and 44.40 percent falling into the "below normal" category. During the pretest period, 87.50 percent of female student-respondents were classified as "normal," whereas 12.50 percent were classified as "below normal." After the posttest, 31.30 percent of male student-respondents were classified as "normal," while 68.80 percent were classified as "below normal." Table 3 shows that female students outperformed male students in terms of resting heart rate performance.

Table 3 further shows that the male student-respondents' exercise pulse rate performance has improved during the pretest and posttest periods. The data show that all male student respondents were in the "very poor" category before the test, but that their exercise pulse rate performance improved and moved up to higher categories after the test. The 22.20 percent went to the "below average" category, the 33.30 percent to "average," the 11.10 percent to "above average," and another 11.10 percent to "excellent," but the 22.20 percent remained in the "extremely poor" category. The performance of female student-respondents in terms of exercise pulse rate was also improved. Considering the data from the pretest, 93.80 percent of female student-respondents were classified as "extremely poor" and 6.30 percent as "poor." After the test, 31.30 percent were remained in the "extremely poor" category. However, most

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female student respondents fell into a higher category, with 6.30 percent falling into the "below" average category, 18.80 percent falling into the "average" category, 6.30 percent falling into the "above average" category, 18.8 percent falling into the "good" category, and 18.8 percent falling into the "excellent" category.

Table 3 reveals that both male and female student-respondents' Recovery Heart Rates (RHR) have recovered from the last aerobic exercise performed during the pretest and posttest activity. The results also show that both male and female student-respondents worked out at a level that was fun and comfortable for them, with heart rates returning to 120 beats per minute or below.

Table 3 also shows that more female respondents correctly completed the required 15-minute brisk walking exercise within their target heart rate range, resulting in better resting heart rate and exercise pulse rate performance during the posttest.

Table 4

Frequency and Percentage Distribution of Student Performance on **Resting Pulse Rate** (RPR) **Exercise Pulse Rate** (EPR) and **Recovery Hearty Rate** (RHR) Before and After the Prescriptive Brisk Walking Exercise of **Male and Female of 10-Minute Brisk Waking Exercise Group**

Heart Rates	**Male**				**Female**			
	Pretest		Posttest		Pretest		Posttest	
	f	%	f	%	f	%	F	%
Resting Heart Rate								
Above Normal	0	0.00	0	0.00	0	0.00	0	0.00
Normal	5	62.50	5	62.50	14	93.30	10	66.70
Below Normal	3	37.50	3	37.50	1	6.70	5	33.30
Exercise Pulse Rate								
Excellent	0	0.00	0	0.00	0	0.00	4	26.70
Good	0	0.00	0	0.00	1	6.70	0	0.00
Above Average	0	0.00	1	12.50	0	0.00	1	6.70
Average	0	0.00	2	25.00	1	6.70	1	6.70
Below Average	0	0.00	1	12.50	0	0.00	1	6.70
Poor	0	0.00	1	12.50	0	0.00	3	20.00
Very Poor	8	100.00	3	37.50	13	86.70	5	33.30
Recovery Heart Rate								
Recovered	8	100.00	8	100.00	15	100.00	15	100.00
Not Recovered	0	0.00	0	0.00	0	0.00	0	0.00
Total Respondents	8	100.00	8	100.00	15	100.00	15	100.00

Significance value is at <.05

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Table 4 shows that none of the male and female student-respondents' resting heart rates were in the "above normal" category during the pretest period of the 10-minute brisk walking group, with 62.50 percent of male respondents in the "normal" category and 37.50 percent male student-respondents in the "below normal" category. The male student-respondents' resting pulse rate performance did not improve during the posttest, according to the data. During the pretest period, 93.30 percent of female student-respondents' resting heart rates were classified as "normal," with 6.70 percent falling into the "below" normal group.Female student-respondents in the posttest were 33.30 percent in the "below normal" category and 66.70 percent in the "normal" category. The statistics also suggest that in the 10-minute brisk walking exercise, female student-respondents showed less improvement in their resting pulse rate performance than male student-respondents.

The exercise pulse rate of male respondents in the pretest was evaluated as "extremely bad," as shown in Table 4. Data from the posttest suggest that male student-respondents' exercise pulse rate performance improves just somewhat. 37.50 percent of people are still in the "extremely poor" group, 12.50 percent are in the "poor" category, 12.50 percent are in the "below average" category, 25% are in the "average" category, and 12.5 percent are in the "above average" category. Data from female student responses revealed that they performed better in terms of exercise pulse rate. Only 33.30 percent of people are still classified as "extremely poor." The remaining female respondents were promoted to higher levels. The "bad" category received 20% of the vote, followed by 6.70 percent for "below average," "average," and "above average," and 26.70 percent for "outstanding." The female respondents' exercise pulse rate improvement during the posttest shows that they performed better than the male respondents during the specified 10-minute brisk walking exercise intervention program.

During the pretest and posttest activities, the student-respondents' Recovery Heart Rates (RHR) data revealed that both male and female student-respondents worked out at a level that was enjoyable and comfortable, with heart rates recovering at 120 beats per minute or lower. Male and female athletes have recovered from their most recent aerobic exertion.

Tables 3 and 4 show that when the recommended 15 and 10-minute brisk walking exercises were introduced, more female student-respondents displayed superior heart rate performance in the activity than their male counterparts. As a result, the researcher hypothesized that other variables could have influenced the study's outcome.

The findings were confirmed when the researcher discovered that most female student-respondents are members of the school dance company, who participate in other aerobic activities such as dancing in addition to the required 15-minute and 10-minute brisk walking exercises. As a result, the existence of this factor had a significant impact on the female student-respondents' heart rate performance. This is backed up by Nieman's (1998) claim that when aerobic exercise sessions are done virtually every day for several

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weeks, the resting pulse rate drops from 10 to 30 beats per minute, improving cardiovascular endurance fitness.

Problem 2. Do the heart rates of the students before and after the intervention differ when they are classified by age and gender?

When grouped by age and gender, there is no significant variation in the pulse rates of the student-participants before and after the introduction of the recommended walking activity.

Table 5

Mean and T-Value Distribution of Heart Rate Level of **Student-respondents-Age 15 and 16-17** Before and After the Prescriptive Exercise **15- Minute Brisk Walking Exercise**

Heart Rate Categories (n = 14)	**15 Years Old**				**T-value**
	Pretest	**Description**	**Posttest**	**Description**	
Resting Pulse Rate	78.29	Normal	67.36	Below Normal	4.320*
Exercise Pulse Rate	159.07	Very Poor	98.57	Above Average	6.227*
Recovery Heart Rate	81.00	Recovered	73.43	Recovered	2.317*
Heart Rate Categories (n = 11)	**16-17 Years old**				**T-value**
	Pretest	**Description**	**Posttest**	**Description**	
Resting Pulse Rate	80.82	Normal	73.45	Normal	1.847 (ns)
Exercise Pulse Rate	157.09	Very Poor	111.82	Below Average	5.791*
Recovery Heart Rate	81.45	Recovered	78.00	Recovered	1.503 (ns)

* Significance value is at <.05 *Ns = not significant

Table 5 demonstrates that after introducing the prescribed brisk-walking exercise, the heart rate level of the student-respondents, aged 15 years old, reduced. This drop indicates that the heart rates of students aged 15 have improved. After the prescription 15-minute brisk walking exercise, the t-values for resting pulse rate, exercise pulse rate, and recovery heart rate are 4.320, 6.227, and 2.317, respectively. Table 5 further demonstrates that the heart rate level of student-respondents aged 16 to 17 years old shows very minor improvement when compared to student-respondents aged 15 years old. Thus, the t-value of 1.847 in resting pulse rate and 1.503 in recovery heart rate for 16- to 17-year-old student-respondents demonstrates no significant difference.

Table 6

Mean and T-Value Distribution of Heart Rate Level of **Student-respondents-Age 15and 16-17** Before and After the Prescriptive Exercise **10-Minute Brisk Walking Exercise**

Heart Rate Categories (n = 16)	**15 Years Old**				**T-value**
	Pretest	Description	Posttest	Description	
Resting Pulse Rate	84.19	Normal	72.88	Normal	4.023*

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Exercise Pulse Rate	157.25	Very Poor	107.75	Average	6.775*
Recovery Heart Rate	85.06	Recovered	77.25	Recovered	2.212*
Heart Rate Categories (n = 7)	**16-17 Years old**				**T-value**
	Pretest	Description	Posttest	Description	
Resting Pulse Rate	76.14	Normal	71.43	Normal	.937 (ns)
Exercise Pulse Rate	158.29	Very Poor	131.14	Very Poor	1.933 (ns)
Recovery Heart Rate	81.00	Recovered	82.86	Recovered	-.316 (ns)

* Significance value is at <.05 *Ns = not significan

Table 6 indicates the reduction in heart rate performance among students aged 15 to 17 years old. The age 15 respondents' resting heart rate, workout pulse rate, and recovery heart rate all had t-values of 4.023, 6.775, and 2.212, respectively, indicating a significant difference. Table 10 shows that there is no significant variation in heart rate between the student-respondents aged 16-17. When the pretest and posttest results of the age 16-17 student-respondents are compared, the data shows very minor improvements in heart rates. The age 15 student-respondents performed better on heart rate improvements after the specified 10-minute brisk walking exercise intervention than the age 16-17 student-respondents in the data given.

Tables 5 and 6 showed that 15-year-old students performed better than 16-17-year-old students in terms of improving heart rates, particularly in terms of lowering heart rates after the recommended 15- and 10-minute brisk walking exercise interventions. Given that there were more female students in the age 15 group in each of the 15 and 10-minute brisk walking groups, who were thought to be more exposed to aerobic activities, and fewer female students in the age 16-17 group.

Table 7

Mean and T-Value Distribution of Heart Rate Level of **Male and Female Student-respondents** Before and After the Prescriptive Exercise **15-Minute Brisk walking Exercise**

Heart Rate Categories (n = 9)	**Male**				**T-value**
	Pretest	**Description**	**Posttest**	**Description**	
Resting Pulse Rate	82.44	Normal	67.89	Below Normal	3.568*
Exercise Pulse Rate	160.00	Very Poor	104.67	Average	5.056*
Recovery Heart Rate	84.22	Recovered	75.56	Recovered	2.511*
Heart Rate Categories (n = 16)	**Female**				**T-value**
	Pretest	**Description**	**Posttest**	**Description**	

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Resting Pulse Rate	77.69	Normal	71.25	Normal	2.652*
Exercise Pulse Rate	157.19	Very Poor	104.25	Average	6.351*
Recovery Heart Rate	79.50	Recovered	75.38	Recovered	1.572 (ns)

* Significance value is at <.05 *Ns = not significant

Table 7 shows that in the 15-minute brisk walking exercise group, there is a significant difference in heart rate performance between male and female student-respondents. The female student-respondents' recovery heart rate improved somewhat, resulting in a t-value of 1.572, indicating that there was no significant change in pulse rates before and after the introduction of the 15-minute prescribed brisk walking exercise. The statistics also suggest that male respondents have improved their resting pulse rate more than female respondents, putting them in the higher category. During the posttest period, the male responders' resting heart rates decreased, and they were classified as "below normal. Even while the females' resting heart rates improved, they remained in the same "normal" category during the posttest time. These findings confirm McIntosh's (1990) theory that gender influences an individual's aerobic capacity, with males performing better aerobically than females, according to Mc Murray RG (2002).

Table 8

Mean and T-Value Distribution of Heart Rate Level of **Male and Female Student-respondents** Before and After the Prescriptive Exercise **10-Minute Brisk Walking Exercise**

Heart Rate Categories (n = 8)	**Male**				**T-value**
	Pretest	Description	Posttest	Description	
Resting Pulse Rate	80.50	Normal	72.75	Normal	2.717*
Exercise Pulse Rate	163.25	Very Poor	119.75	Poor	3.597*
Recovery Heart Rate	85.00	Recovered	82.25	Recovered	.722 (ns)
Heart Rate Categories (n = 16)	**Female**				**T-value**
	Pretest	Description	Posttest	Description	
Resting Pulse Rate	82.40	Normal	72.27	Normal	2.832*
Exercise Pulse Rate	154.53	Very Poor	112.27	Poor	4.947*
Recovery Heart Rate	83.20	Recovered	77.20	Recovered	1.368 (ns)

* Significance value is at <.05 *Ns = not significant

Table 8 shows that both male and female student-respondents have improved their resting and workout heart rates significantly. On recovery heart rates, the t-value of.722 for males and 1.368 for females suggests that there is no significant difference in the performance of male and female student-respondents. Although there was no significant difference in recovery heart rates between male and female students, the data presented in the resting heart rate and exercise pulse rate of male and female respondents would suggest that there was a significant difference in heart rate performance between male and female students before and after the introduction of the 10-minute brisk walking exercise intervention program.

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Furthermore, the data in Tables 7 and 8 show that there is a significant difference in heart rate performance between the 15-minute and 10-minute brisk walking groups of student-respondents in age 15, but no significant difference in age 16-17. The findings also show that following the given intervention of 15 and 10-minute brisk walking exercise, there is a significant difference between male and female student-respondents. As a result of the data in Tables 7 and 8, the hypothesis statement that there is no significant difference in the pulse rates of the student-participants before and after the introduction of the prescribed brisk walking exercise when grouped by age and gender is ruled out.

Problem 3. Which of the two brisk walking activities caused the student-respondents' heart rates to significantly improve?

Ho2: The effects of the two brisk walking activities on the heart rate of the student-respondents are not significantly different.

Because a genuine experimental design was not practicable, this study used a quasi-experimental research design to collect the data needed to answer the research question. Because intact groups were used, the student participants' heart rates were different at the start. However, the results of this study demonstrate a link between their pretest and posttest scores. The following tables, organized by gender and age, explain this.

One of the study's assumptions is that the participants' pulse rates could be a source of considerable variances in the students' pretest scores. The prevalence of these discrepancies was recognized as a threat to internal validity.

Furthermore, using the Analysis of Covariance or ANOVA, baseline differences among the students that may have existed and caused differences between the two groups other than the interventions they got have been statistically addressed (ANCOVA). The pulse rates were regarded the sources of variation in this investigation.

This section so answers the question of whether the two therapies differed in the extent to which they induced meaningful improvements in heart rates.

Table 8.1

Observed Means, Adjusted Means, and Aggregate Correlation on the Heart Rate Category – **Resting Pulse Rate, Exercise pulse Rate and Recovery Heart Rate** of **Student respondents-Age 15 years old**

Means	**Resting Pulse Rate**			
	15 minutes (n = 14)	**Description**	**10 minutes (n = 16)**	**Description**
Observed Means	67.36	Below Normal	72.87	Normal
Adjusted Means	68.99	Below Normal	71.44	Normal
Aggregate Correlation within Samples of pretest scores vs. post test scores **r = 0.41** **r^2 = 0.17**				

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Means	**Exercise Pulse Rate**			
	15 minutes (n = 14)	**Description**	**10 minutes (n = 16)**	**Description**
Observed Means	98.57	Above Average	107.75	Average
Adjusted Means	97.94	Above Average	108.30	Average
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.42** **r^2 = 0.18**				
Means	**Recovery Heart Rate**			
	15 minutes (n = 14)	**Description**	**10 minutes (n = 16)**	**Description**
Observed Means	73.43	Recovered	77.25	Recovered
Adjusted Means	74.45	Recovered	76.36	Recovered
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.4** **r^2 = 0.16**				

Table 8.2

Summary Table of One-Way ANCOVA to Determine Which of the Prescriptive Exercises Have Significant Effect on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate and Recovery Heart Rate of Student respondents-Age 15 years old**

	Resting Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	39.26	1	39.26	**0.4**	**0.53**	Not Significant Do not reject Ho
Adjusted Error	2621	27	97.07			

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Adjusted Total	2660.26	28				
	Exercise Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	801.16	1	801.16	**0.77**	**0.39**	Not Significant Do not reject Ho
Adjusted Error	28238.07	27	1045.85			
Adjusted Total	29039.23	28				
	Recovery Heart Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	26.39	1	26.39	**0.18**	**0.67**	Not Significant Do not reject Ho
Adjusted Error	3964.25	27	146.82			
Adjusted Total	3990.63	28				

Table 9.1

Observed Means, Adjusted Means, and Aggregate Correlation on the Heart Rate Category – **Resting Pulse Rate**, **Exercise Pulse Rate and Recovery Heart rate** of **Student respondents-Age 16 to 17 years old**

Means	**Resting Pulse Rate**			
	15 minutes (n = 11)	**Description**	**10 minutes (n = 7)**	**Description**
Observed Means	73.45	Normal	71.43	Normal
Adjusted Means	72.88	Normal	72.33	Normal

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Aggregate Correlation within Samples of pre test scores vs. post test scores **r = 0.49** **r^2 = 0.24**				
Means	**Exercise Pulse Rate**			
	15 minutes (n = 11)	**Description**	**10 minutes (n = 7)**	**Description**
Observed Means	111.82	Below Average	131.14	Very Poor
Adjusted Means	111.89	Below Average	131.02	Very Poor
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.27** **r^2 = 0.07**				
Means	**Recovery Heart Rate**			
	15 minutes (n = 11)	**Description**	**10 minutes (n = 7)**	**Description**
Observed Means	78.00	Recovered	82.86	Recovered
Adjusted Means	77.91	Recovered	83.00	Recovered
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.65** **r^2 = 0.42**				

Table 9.2

Summary Table of One-Way ANCOVA to Determine Which of the Prescriptive Exercises Have Significant Effect on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate, and Recovery Heart Rate of Student respondents-Age 16 to 17 years old**

	Resting Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	1.27	1	1.27	**0.02**		

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Adjusted Error	1112.32	15	74.15		**0.89**	Not Significant Do not reject Ho
Adjusted Total	1113.59	16				
	Exercise Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	1564.76	1	1564.76	**4.7**	**0.05**	Significant Reject Ho
Adjusted Error	4997.87	15	33.19			
Adjusted Total	6562.62	16				
	Recovery Heart Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	110.9	1	110.9	**1.34**	**0.26**	Not Significant Do not reject Ho
Adjusted Error	1241.5	15	82.77			
Adjusted Total	1352.4	16				

Tables 8.1 and 9.1, which show that r = 0.41 or a r2=0.17 for the Resting Heart Rate, r = 0.42 or a r2=0.18 for the Exercise Pulse Rate, and r = 0.4 or a r2=0.16 for the Recovery Heart Rate of the 15 year-old student-respondents, and r = 0.49 or a r2 = 0.24 for the Resting Heart Rate, r = 0.27 or a r2. Furthermore, the data suggest that 17.0 percent of the variability in the students' posttest scores is due to pre-existing individual differences in the pre-test scores in resting heart rate, 18.0 percent in exercise pulse rate, and 16.0 percent in recovery heart rate of the 15-year-old student-respondents. Pre-existing individual differences in the pre-test scores in the resting heart rate, 70.00 percent in the exercise pulse rate, and 42.00 percent in the recovery heart rate are attributed to the 16- to 17-year-old student-respondents.

Tables 8.2 and 9.2 show the summary table of the analysis of covariance used in the study to see if the 15-minute brisk walking exercise raised the heart rate of 15-year-old

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and 16-to-17-year-old students-respondents substantially more than the 10-minute brisk walking exercise. In other words, the results in Tables 8.2 and 9.2 addressed the issue of which of the two brisk walking activities led the student-respondents' heart rates to significantly improve.

The data shows that the 15-year-old student-respondents' f-values of 0.4 for the Resting Heart Rate, 0.77 for the Exercise Pulse Rate, and 0.18 for the Recovery Heart Rate, as well as the 16 to 17 year-old respondents' f-values of 0.02 for the Resting Heart Rate, and 1.34 for the Recovery Heart Rate, did not reach the critical level of rejection. As a result, the hypothesis is not disproved. Both 15-minute and 10-minute brisk walking workouts were found to be equally beneficial in increasing the heart rates of 15-year-old and 16-to-17-year-old students.However, the Exercise Pulse Rate f-value of 4.7 among 16 to 17-year-old student-respondents has reached the level of rejection. This outcome could be related to various factors influencing student-respondents' heart rate performance. This could contain the gender of the respondents as well as their performance during the activity.

Table 10.1

Observed Means, Adjusted Means, and Aggregate Correlation on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate and Recovery Heart Rate of Male Student respondents**

Means	**Resting Pulse Rate**			
	15 minutes (n = 9)	**Description**	**10 minutes (n = 8)**	**Description**
Observed Means	67.89	Normal	72.75	Normal
Adjusted Means	67.43	Normal	73.27	Normal

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Aggregate Correlation within Samples of pretest scores vs. post test scores **r = 0.68** **r^2 = 0.46**				
Means	**Exercise Pulse Rate**			
	15 minutes (n = 9)	**Description**	**10 minutes (n = 8)**	**Description**
Observed Means	104.67	Average	119.75	Below Average
Adjusted Means	104.91	Average	119.48	Below Average
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.14** **r^2 = 0.02**				
Means	**Recovery Heart Rate**			
	15 minutes (n = 9)	**Description**	**10 minutes (n = 8)**	**Description**
Observed Means	75.55	Recovered	82.25	Recovered
Adjusted Means	75.94	Recovered	81.82	Recovered
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.69** **r^2 = 0.48**				

Table 10.2

Summary Table of One-Way ANCOVA to Determine Which of the Prescriptive Exercises Have Significant Effect on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate and Recovery Heart rate of Male Student respondents**

	Resting Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	143.94	1	143.94	**2.22**		Not Significant

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					0.16	Do not reject Ho
Adjusted Error	905.89	14	64.71			
Adjusted Total	1049.83	15				
	Exercise Pulse Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	894.97	1	894.97	**1.16**	**0.30**	Not Significant Do not reject Ho
Adjusted Error	10846.64	14	774.76			
Adjusted Total	11741.61	15				
	Recovery Heart Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	145.95	1	145.95	**1.23**	**0.29**	Not Significant Do not reject Ho
Adjusted Error	1665.7	14	118.98			
Adjusted Total	1811.66	15				

Table 11.1

Observed Means, Adjusted Means, and Aggregate Correlation on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate and Recovery Heart Rate** of **Female Student respondents**

Means	**Resting Pulse Rate**			
	15 minutes (n = 16)	**Description**	**10 minutes (n = 15)**	**Description**
Observed Means	71.25	Normal	72.27	Normal

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Adjusted Means	71.96	Normal	71.50	Normal
Aggregate Correlation within Samples of pre test scores vs. post test scores **r = 0.29** **r^2 = 0.09**				
Means	**Exercise Pulse Rate**			
	15 minutes (n = 16)	**Description**	**10 minutes (n = 15)**	**Description**
Observed Means	104.25	Average	112.27	Below Average
Adjusted Means	103.60	Average	112.96	Below Average
Aggregate Correlation within Samples: pre test scores vs. post test scores **r = 0.4** **r^2 = 0.16**				
Means	**Recovery Heart Rate**			
	15 minutes (n = 16)	**Description**	**10 minutes (n = 15)**	**Description**
Observed Means	75.37	Recovered	77.20	Recovered
Adjusted Means	75.96	Recovered	76.57	Recovered
Aggregate Correlation within Samples: pretest scores vs. post test scores **r = 0.39** **r^2 = 0.15**				

Table 11.2

Summary Table of One-Way ANCOVA to Determine Which of the Prescriptive Exercises Have Significant Effect on the Heart Rate Category – **Resting Pulse Rate, Exercise Pulse Rate, Recovery Heart Rate of Female Student respondents**

	Resting Pulse Rate					
Source of Variation	**Adjusted Square**	**Df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	1.54	1	1.54	**0.02**		Not Significant

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Adjusted Error	2833.88	28	101.21		**0.89**	Do not reject Ho
Adjusted Total	2835.42	29				
	Exercise Pulse Rate					
Source of Variation	**Adjusted Square**	**Df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	676.11	1	676.11			Not Significant
Adjusted Error	27097.8	28	967.78	**0.07**	**0.41**	Do not reject Ho
Adjusted Total	27773.91	29				
	Recovery Heart Rate					
Source of Variation	**Adjusted Square**	**df**	**Mean Squares**	**F**	**P (α)**	**Decision**
Adjusted Means	2.78	1	2.78			Not Significant
Adjusted Error	3249.41	28	116.05	**0.02**	**0.89**	Do not reject Ho
Adjusted Total	3252.19	29				

As shown in Tables 10.1 and 11.1 of the Male and Female Student-Respondents' Observed Means, Adjusted Means, and Aggregate Correlation on the Heart Rate Category, where r = 0.68 or a r2 = 0.46 for male and r = 0.29 or a r2 = 0.09 for female's Resting Heart Rate, r = 0.14 or a r2 = 0.02 for male and r = 0.4 or a r. The statistics show that the observed heart rates of male and female student-respondents before and after the prescribed brisk walking workouts had a linear relationship. The data also suggest that 46.00 percent of the variability in the students' posttest scores is due to pre-existing individual differences in the pre-test scores in the resting heart rate, 20.00 percent for male and 16.00 percent for female in the exercise pulse rate, and 48.00 percent for male and 15.00 percent for female in the recovery heart rate.

The summary tables of the analysis of covariance utilized in the study to assess whether the 15-minute brisk walking exercise substantially improved the heart rate of male and

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female students-respondents compared to the other activity, 10-minute brisk walking, were reported in Tables 10.2 and 11.2. To put it another way, the data in Tables 10.2 and 11.2 addressed the question: Which of the two brisk walking exercises resulted in a significant improvement in the heart rate of the student-respondents?

The data's f-values of 2.22 for males and 0.02 for females for Resting Heart Rate, 1.16 for males and 0.07 for females for Exercise Pulse Rate, and 1.23 for males and 0.02 females for Recovery Heart Rate did not meet the critical level of rejection. Brisk walking activities were found to be equally beneficial in improving students' heart rates in both male and female students-respondents. As a result, the hypothesis that the effects of the two brisk walking workouts on the heart rate of student-respondents are not significantly different is accepted.

Conclusion

The following conclusions and implications can be drawn from the findings:

The 15-minute and 10-minute brisk walking exercises advised for the 15 to 17-year-old student-respondents considerably improved their heart rate performance, especially in terms of lowering their heart rates after the intervention period. As a result, the 15-minute and 10-minute durations of brisk walking exercise effectively increased the cardiovascular endurance level of the student-respondents in this study, notably in terms of lowering their heart rates.Due to additional characteristics that may have considerably influenced the heart rate performance of the female student-respondents, more female student-respondents had superior heart rate performance than male student-respondents.Due to physicality, men student-respondents do better aerobically than females. (McIntosh, 1990) backs this up.The heart rates of the student-respondents differ before and after they have completed the specified 15-minute and 10-minute brisk walking exercises as part of the intervention program.

Both 15-minute and 10-minute brisk walking exercises were shown to be equally beneficial in improving the heart rates of the 15–17-year-old male and female respondents in this study. These findings also show that an aerobic fitness brisk walking exercise performed on a regular basis for at least 10 minutes improves cardiovascular fitness and reduces heart rates.

Recommendations

Based on the findings, the researcher recommends the following:

1. For the benefit of the school administrators: Physical fitness activity should be encouraged not only among students enrolled in physical education classes, but also among all members of the school community. To improve cardiovascular endurance fitness and prevent hypokinetic disorders, everyone should engage in any aerobic fitness exercise on a regular basis, such as brisk walking.

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2. Planners of Physical Education Curriculum: Curriculum planners should include in the Physical Education Learning Competency program, the phase for prescribing exercise based on individual requirements and the monitoring phase to guarantee its effectiveness, curricular activities that are geared to respond to students' personal needs for improvement.

3. Teachers of Physical Education: Physical education teachers should ensure that pupils are aware of and comprehend the benefits of physical fitness activities, particularly in terms of health and skill development. Physical fitness tests should be correctly conducted (pretest) to discover the students' unique strong and weak body components, as well as (posttest) to assess the improvement produced after the intervention activity time. They should prescribe appropriate exercise for maintenance and improvement based on the student's identified strong and weak components, as well as a monitoring phase to ensure that the intervention activities for improvement supplied to the students are effective.

4. This is for students: Students should be given the essential awareness and understanding of the benefits of physical activity, as well as the opportunity to participate in any physical fitness activities or sports that will improve their health and skill levels.

5. This is for the parents: Provide parents with information about the benefits of participating in physical activity and encourage them to support their children who are participating in any physical activity or sport that will improve their health and skill-related physical fitness components.

6. For Researchers in the Future: Provide future researchers with the information they need on aerobic fitness exercises and their impact on overall fitness. Conduct a study to determine the efficacy of any other specified workouts in improving any health-related or skill-related physical fitness components.