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Effect of Resistance Training on Physical, Physiological and Body Composition of Women Students of Central University of Punjab

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Abstract

The present study investigated the effect of resistance training on physical, physiological and body composition of women students at Central University of Punjab. For the study, investigator selected 40 students randomly as subject and divide them as experimental and control group. Each group contain (n=20) twenty subjects. Speed, agility and explosive strength were selected as physical variable, percentage of body fat mass, skeletal muscle mass and body mass index were selected as body composition variable and systolic blood pressure and diastolic blood pressure were selected as physiological variable. To find the normality of the data, the investigator uses Shapiro-Wilk test. To find out the significant differences, Paired sample t-test and independent sample t-test were used and t-ratio (two- tailed) was employed at 0.05 level of significance. The statistical analysis of data revealed that there is no significant change occurred in physical, physiological and body composition variables due to 6 weeks resistance training.

Introduction

Physical inactivity is more common, leading our society into a dangerous path. People today desire a more comfortable lifestyle than earlier generations. People now pay more attention to their televisions, washing machines, vacuum cleaners, and other machines. Most people in our nation, whether young or elderly, do not get enough exercise. Modern civilization is moving away from traditional physical exercise habits physical exercise helps to gain a high degree of physical fitness, and this allows individuals to carry out everyday duties without fatigue, allowing for more enjoyable activities **(**Bouquet, C. A. (2010**)**. In various clinical and healthy populations, resistance training is a well-liked and successful way to enhance muscle function, functional performance, and health

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metrics. Among the various anticipated results, people and medical professionals consider increases in muscle mass and strength as significant and desired for improving performance, health, and functionality (Lopez et al., 2021).

Contemporary society relies heavily on machines and computers to complete most tasks. Physical fitness promotes good health and serves as a foundation for creative thinking, Physical fitness refers to the body's capacity to do daily tasks with little fatigue and adequate energy reserves for emergencies. Physical Fitness is a combination of physical traits everyone requires these traits to varying degrees. A minimum level of fitness is necessary for everyone's optimum health **(**Benton et al., 2011**)**. Training is a set of exercises meant to help athletes improve their abilities and boost their energy capacity for a particular event. Resistance training's significant aims include increasing physical strength and endurance and providing various health advantages such as enhanced bone mass, decreased blood pressure, and relief from low back discomfort. Modern research, covering the last 50 years, has used numerous types of resistance training to promote muscle growth, merging scientific discoveries into practical program design (DeLorme TL 2012).

Resistance training (RT) has become increasingly popular as a workout method in recent years, especially among women. Due to its nature, many of the physiological changes that occur after a period of RT are unique to this type of exercise(Hagstrom et al., 2020)**.** The main objectives of resistance training are to develop physical strength and endurance; other health advantages of resistance training include increased muscle and connective tissue, decreased blood pressure, and increased bone mass(Bird et al., 2005). Skeletal muscle hypertrophy is the term for the growth in muscle fiber and, eventually, whole-muscle cross-sectional area that resistance exercise stimulates. Individuals may experience varying degrees of muscular hypertrophy with resistance exercise, and crucially, biological variations between males and girls that emerge during puberty may also have an impact (Refalo, M. C et al., 2024) Resistance training significantly enhances both upper and lower body strength in women. Studies show large effect sizes for strength improvements, particularly in the upper body, where women may experience greater relative gains compared to men (Kraemer et al., 2001).

Selection of Subjects

The study aimed to investigate the effect of resistance training on selected physical, physiological, and body composition of women. Forty students were chosen randomly as research participants from the Central University of Punjab Bathinda, Punjab, India, to fulfil the study's objectives.

The chosen participants were randomly divided into two groups of twenty (n=20). Group one, designated as the experimental group, trained in resistance training five days a week for six weeks, while the second group served as the control group (n=20). Participants completed an informed consent form before being included in the trial and were advised of potential hazards. There were certain variables selected for assessing their fitness.

Selection of Variables

The following variables were selected for the study

Independent variable

- Resistance training

Criterion Measures

The present study was conducted to find out the effect of resistance training on selected physical, physiological and body composition of Women in Central University of Punjab. By reviewing the related literatures, the following standard tests were being used to collect the pre and post data from the subjects.

Parameters	S.No	Variable	Test Items	Unit Of Measurement
Physical variables	1. 2. 3.	Speed Agility Explosive Strength	50-Meter Dash Shuttle Run Standing Broad Jump	In Seconds In Seconds In Meters
Physiological variables	1. 2.	Systolic Blood Pressure Diastolic Blood Pressure	Sphygmomanometer	In Mm Hg
Body composition	1. 2. 3.	Skeletal Muscle Mass Percentage Of Body Fat Mass Body Mass Index	Bio Electrical Impedance Analysis	In Kgs In Percentage In Units

Data collection

Prior to the training the consent was taken from all the subjects. After this researcher conducted pretest to collect the pre-test data's from both the experimental and control group before 2 days of starting the training. A six week of training was given to the experimental group and control group did not participate in the training and they were advised not to do any training during this time. After the training period the post data were conducted from both the groups.

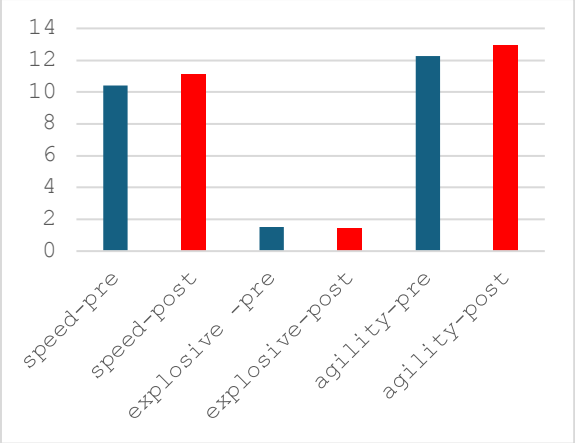
Statistical Analysis and Results

The obtained data were summarized and finalized. The final analysis has been done by using SPSS software to answer the selected research problem by means of Independent "t-Statistics" at level of Significance 0.05

Table 1.1
Independent t-Statistics of The Post Test of Experimental Group and Control Group of Physical Variables

Table 1.1 shows that in case of speed, there was no significant difference observed between the experimental group and control group in in terms of speed. The calculated 't' value was. 1.61 was found to be lesser than the table value 2.02 at the degree of freedom (38) at the level of significance 0.05. In explosive strength, the table shows that there was no significant difference observed between the experimental group and control group in in terms of explosive strength. The calculated 't' value was 1.52 was found to be lesser than the table value 2.02 at the degree of freedom (38) at the level of significance 0.05. Whereas agility there was no significant difference observed between the experimental group and control group in in terms of agility. The calculated 't' value was 979 was found to be lesser than the table value 2.024 at the degree of freedom (38) at the level of significance 0.05.

Variables	F	Sig.	t	df	(2-tailed Sig.)
Speed - pre-pre	1.14	.291	1.61	38	**.115**
Explosive strength – pre-pre	.18	.668	1.52	38	**.135**
Agility- pre-pre	**3.25**	**.079**	**.97**	**38**	**.334**



Graph 1.1
Graphical Representation of Mean Difference of Physical Variables Between Post Experimental and Post Control

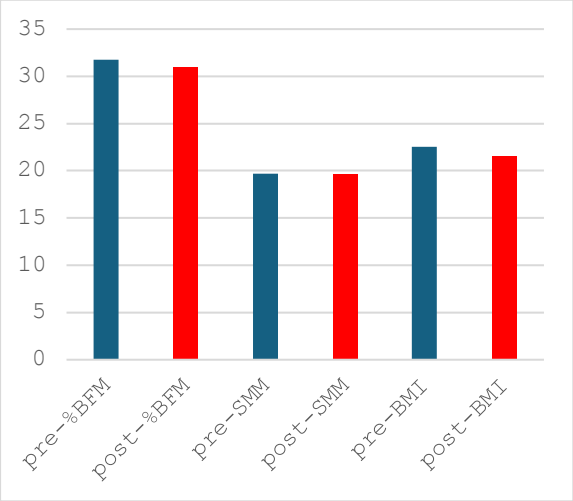
Graph 1.1: - Shows the values of the mean and standard deviation of physical variable that were speed, agility, and explosive strength of the post-test of experimental and control groups of females.

Table 1.2
Independent t-Statistics of The Post Test of Experimental Group and Control Group Of Body composition

Variables	F	Sig.	t	df	(2-tailed Sig.)
Percentage of Body Fat Mass -Post-post	4.05	.05	.35	38	**.72**
Skeletal Muscle Mass post-post	.00	.97	.04	38	**.96**
BMI- post-post	**5.74**	**.02**	**.86**	**38**	**.39**

Table 1.2 shows that in case of percentage of body fat mass, that there was no significant difference observed between the experimental group and control group in in terms of percentage of body fat mass. The calculated 't' value was .35 was found to be lesser than the table value 2.02 at the degree of freedom 38 at the level of significance 0.05. In skeletal muscle mass, there was no significant difference observed between the experimental group and control group in in terms of percentage of skeletal muscle mass. The calculated 't' value was .04 was found to be

lesser than the table value 2.02 at the degree of freedom 38 at the level of significance 0.05. Whereas body mass index there was no significant difference observed between the experimental group and control group in in terms of percentage of body mass index. The calculated 't' value was .86 was found to be lesser than the table value 2.02 at the degree of freedom (38) at the level of significance 0.05.



Graph 1.2
Graphical Representation of Mean Difference of Body composition Between Post Experimental and Post Control

Table 1.3
Independent t-Statistics of The Post Test of Experimental Group and Control Group of Physiological Variables

Variables	F	Sig.	t	df	(2-tailed Sig.)
Systolic Blood Pressure post-post	1.62	.211	-1.52	38	.135
Diastolic Blood Pressure post-post	.08	.771	-1.94	38	.060

Table 1.3 shows that in case of systolic blood pressure, there was no significant difference observed between the experimental group and control group in in terms of percentage of systolic blood pressure. The calculated 't' value was 1.52 was found to be lesser than the table value 2.02 at the degree of freedom (38) at the level of significance 0.05. In diastolic blood pressure, there was no significant difference observed between the experimental group and control group in in terms of percentage of diastolic blood pressure. The calculated 't' value was 1.94 was found to be lesser than the table value 2.02 at the degree of freedom (38) at the level of significance 0.05.

Graph 1.3

Graphical Representation of Mean Difference of Physiological Variables Between Post Experimental and Post Control

Graph 1.3: - Shows the values of the mean and standard deviation of physiological variable that were systole and diastole blood pressure of the post-test of experimental and control groups of females.

DISCUSSION OF FINDINGS

The purpose of the study was to investigate the effect of resistance training on physical, psychological and body composition of women in central university of Punjab. For the study 20 healthy female students were selected to as the experimental group who underwent resistance training for 6 weeks and 20 healthy women acted as control group, and they did not underwent any physical training. The obtained data was analysed by applying paired t-test and independent sample t-test and the results of the tests were discussed below.

Speed

From this study, in case of speed, it was concluded that resistance training on women shows there is a significant difference observed between pre and post-test within the experimental group. But there is no significant difference were found in speed when compared to control group. Due to various reason the given training was not enough to show a significant difference in the females, Heredity has a more significant influence on speed than the environment. People whose fast-twitch muscle fibres (phasic fibres) dominate from birth were suited for occupations requiring rapid acceleration. In endurance sports, slow-twitch or tonic muscle fibres were advantageous. This significant proverb was closely connected to the well-known aphorism "sprinters were born."(hardyal Singh 1991).

Agility

From this study, in case of Agility, it was concluded that resistance training on women in Agility shows there was a significant difference observed between pre and post-test within the

experimental group. But there was no significant difference observed in Agility when compared to control group. The development of critical neural adaptations required for agility requires time and a lot of repetitions; increases in agility take months to become evident. Therefore, agility exercises must be considered a crucial part of the training regimen (Brown, L. E., & Ferrigno, V. 2015).

Explosive strength

From this study, in case of explosive strength, it was concluded that resistance training on women in explosive strength shows there was a significant difference observed between pre and post-test within the experimental group. But there was no significant difference observed in explosive strength when compared to control group. Not only does training increase explosive strength, but explosive strength also depends on muscle morphology, muscular coordination, stored phosphagen in the body, and psychological elements like motivation, emotion, aggression, and so on. (hardyal Singh, 1991)

Body composition

From this study, in case of Body Composition, it was concluded that resistance training on women in percentage of body fat, skeletal muscle mass and body mass index shows an insignificant change. The study shows that the given training was not enough to show a significant change. Exercise causes our muscles to grow and get stronger, almost wholly eliminating subcutaneous fat. This gives it a good, well-built appearance. Conversely, when a person keeps consuming more calories than he burns, that person gains weight and muscle, changing the body's natural composition. Each person has a unique metabolic rate, food preference, and lifestyle, which might impact the study's findings. (Kamlesh, ml.2019)

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