

Effect of Resistance Training on Health- Related Physical Fitness Components of Dilla University Sport Science Students

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Abstract

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Keywords: Resistance training, muscular endurance, flexibility and body composition.

The purpose of this study was to investigate the impact of resistance training on health-related physical fitness components. The study employed experimental research design. Thirty Dilla University third year sport science students were taken with experimental and control group and divided randomly into two equal groups. Both the exercise group (experimental group, $n = 15$) and control group (controlled group, $n = 15$) had taken pre- and post-testing of 3-minute step test, push-up and sit-up test, sit and reach test and shoulder flexibility test, and navy method to assess cardio-respiratory fitness, muscular endurance, flexibility and body composition respectively. Only experimental group participated in additional eight weeks resistance training interventions. The data collected from the study subject were analyzed using SPSS version 25 software by using descriptive statistics (mean and standard deviation) and inferential statistics (paired t-test and independent t-test) with level of significant 0.05. The results showed that resistance training significantly improved the stated variables muscular endurance and body composition but not cardio-respiratory fitness and flexibility in experimental group at ($p < 0.05$). Furthermore, no more significant differences were found in all of the variables in controlled group ($p > 0.05$). Based on this finding, it can be concluded that resistance training has positive impact on improvement of muscular endurance and body composition variables. But resistance training has poor relationship with cardio-respiratory fitness and flexibility.

1. INTRODUCTION

Resistance training refers to the use of weight, machinery, or one's own body weight to exercise muscles. It is used to increase muscular mass and the ability to overcome load. Stojiljkovi et al. (2016) define it as "an essential component of a well-rounded fitness regimen." Resistance training, according to the International Journal of

Sport, Exercise, and Health Research, is any type of exercise in which an external force is exerted manually or mechanically against a muscle contraction, which can be dynamic or static. Activities that raise one's maximum heart rate, such as resistance training (RT), are considered vigorous. Furthermore, the World Health Organization, the American College of Sports Medicine, and the



American Heart Association have emphasized the value of RT, as well as aerobic and flexibility exercises, in a well-rounded training program for improving health and well-being.

Resistance training is now widely recognized as being beneficial not only to athletes, but also to anyone interested in improving their health and lifespan. Resistance training has been linked to a reduction in hypokinetic diseases caused by a lack of physical activity and a sedentary lifestyle. Resistance training can help athletes 'pre-habilitate,' or prevent prospective injuries, by strengthening joints, muscles, tendons, bones, and ligaments. With the right resistance training methods, you can improve the traits related with physical performance, such as endurance and strength (Fisher et al., 2011).

"The college years are a pivotal time for the formation of beneficial and poor health behaviors that continue into later life," Eichorn et al. (2018) stated. Early on in their undergraduate careers, college students should be informed about the benefits of exercise. What kids do in college could affect their health for the rest of their lives, determining whether they live an active or sedentary lifestyle.

Students in higher education may have a variety of health issues in addition to poor

academic performance. Health issues resulting from physical inactivity are among these issues. Highly explosive physical training, particularly resistance and strength training, may help to alleviate these issues. These sports activities are one of the many ways used to help pupils lessen and eliminate health problems. To put it another way, the proper and suitable usage of sports programs prepares a person for a higher quality of life (Farhangi & Hemati Alamdarloo, 2015).

Now a day's our country, Ethiopia, gives recognition for ministry of science and higher education (MOSHE) to give the course of physical fitness for their students to improve their health along with their academic achievements. But so as to gain the full cumulative effects of training program or to gain an improvement in health, training shall meet certain criteria. And they should be equipped with the basic and advanced technical, tactical, physical, and psychological demands of the training (Demissie et al., 2020). Within this standing truth developing well-structured training program is primarily mandatory.

Resistance training improves muscle and bone strength as well as bone density, resulting in stronger bones and greater protection from fall fractures. Stay Strong Stay Healthy (University of Missouri) and

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other resistance training programs for older individuals contribute to a higher quality of life by increasing independence and contributing to the maintenance of functional capacities (Mith, 2016). Many studies have focused on manipulating the many variables involved in RT prescription in order to better understand how to achieve various muscle properties. In terms of chronic adaptations, the majority of studies that looked at how maximum strength responded to resistance training programs found that the maximal strength of exercises increased more (Salles et al., 2012). As a result of this viewpoint, the investigator set out to find the effect of resistance training on the health related physical fitness components (cardio-respiratory fitness, muscular endurance, flexibility and body composition) on Dilla University sport science regular students.

OBJECTIVE OF THE STUDY

The objective of this study was to evaluate the effect of resistance training on health related physical fitness components on sport science students

MATERIALS AND METHODS

To achieve the purpose of the study it was conducted in Dilla University. The population of this study was sport science

students of Dilla University. Thirty male sport science students were selected for the study purposively and classified in to experimental and control group through simple random sampling. Pre- and post-training data was collected by the researcher on the field and in the gym from the students. Training session consisted of 40 minutes once a day for three days per week for eight weeks consecutively. The training sessions included warming-up and cooling down exercises before and at the ends of each exercise days. Barbell sit up, Dumbbell sit up, Dumbbell chest press, Basic push up, Modified push up and Medicine ball sit up were some of the resistance training exercises given for the students for the specified period.

TRAINING PROTOCOL PROGRAM

As stated by Sands et al (2012), in the resistance training and conditioning world, a program is the actual exercises, sets, repetitions, resistances, inter-set rest periods, inter-lesson rest periods, and so forth. Bird et al. (2015) recommended the researchers to find nearly all resistance training program design literature to be tri-phasic (3 phases), or have three periods/stages such as starter phase, progression phase and maintenance phase. The exercise prescription for



resistance training has three stages: the starter phase, the slow progression phase, and the maintenance phase. Based up on this, 8-week

resistance training program was implemented by the researcher during the intervention program in the following ways:

Table 1: 8-Weeks resistance training intervention program

8-Weeks intervention program		
Warming up		10 minutes
Main exercises	Type / mode of exercise	Frequency
	Frequency	3 days/week
	Intensity	Depend on set and repetition of exercise
	Exercise duration	40 minute/day
	Exercise days	Monday, Wednesday and Friday
Cooling down		10 minutes

METHOD OF DATA ANALYSIS

The desired was collected on before the star of intervention and after the end of the 8th week. Quantitative data analysis techniques were employed. The data collected from pre-test and post-test results were analyzed by descriptive statistics of means and standard deviation; and inferential statistics of independent sample t-test by using SPSS Version 25.0. The statistical significance was

set at 0.05 level of confidence interval (p<0.05).

RESULTS

The mean and standard deviation values on health-related physical fitness variables between experimental and control groups

Table 2: The mean, stand deviation and p-values of health-related physical fitness variables

Variables	Experimental group	P-	Control group	P-
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		Pre-test		Post-test		value (E)	Pre-test		Post-test		value (C)
		Mean	Standard deviation	Mean	Standard deviation		Mean	Standard deviation	Mean	Standard deviation	
CRF	3-minute step-test	154.20	23.379	151.6	21.394	.093	160.33	26.070	159.87	26.896	.661
	Push-up test	35.80	9.182	46.00	10.843	.025	37.93	14.680	38.80	14.118	.234
Muscular Endurance	Sit-up test	29.67	8.321	37.93	9.662	.012	32.87	9.927	33.60	10.112	.143
	Sit-reach test	17.60	7.395	18.67	8.641	.195	11.20	7.720	11.87	7.415	.106
Flexibility	Shoulder flexibility test	6.07	9.453	7.27	10.573	.563	3.53	8.766	3.93	8.581	.138
	7-cite circumference	13.20	4.720	13.02	4.970	.037	17.47	5.934	17.88	5.784	.308

DISCUSSION

This study was carried out to evaluate the effect of resistance training on cardio-respiratory fitness, muscular endurance, flexibility and body composition among sport science students. In this study 15 students were received resistance training for a period of eight weeks. Results from this study showed that resistance training improved the muscular endurance and body composition of training groups of students. But has no significant impact on cardio-respiratory fitness and flexibility of the students. The result indicated that resistance training was more likely to affect muscular endurance and

body composition. The result supported by Azeem et al., (2019) and explained on their experimental research with a pre and posttest design who concluded that a resistance training has a significant effect on the selected physical variables such as body composition, explosive power and muscular strength. Current study has been supported by some results which done in the past as Vol, (2010) studied with total thirty obese women, aged between 35-45yrs to show the effectiveness of resistance training given for alternate days for 6 weeks. Results of that study indicated that resistance training did not show significant difference on the heart

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rate of obese women. Statistical analyses conducted by Kapici et al., (2018) showed that there were no significant differences in the resting metabolic rates, heart rates and respiratory exchange ratios between the training and control groups at the end of the 12-weeks training period. A study done by Peter & Erik, (2018) assured that twelve male subjects performed resistance training for 13 weeks had no statistically significant cardio-respiratory fitness change observed which is tested by resting heart rate.

The results of the current study indicated that students in experimental group significantly increased in muscular endurance over the intervention time period more than control group. In other words, students who took part in the resistance training had a significant increase in their muscular endurance from pre-test to post test. The result of this study is supported by many relative researches. Nor et al., (2020) indicated that 4-weeks resistance training is able to increase the muscle endurance among overweight males. Therefore, it can be suggested that resistance training as one of the strategies to improve muscle endurance among overweight males.

CONCLUSIONS

Based on the finding of this study, implementing eight weeks resistance training

program made significant effect on experimental group students' muscular endurance and body composition compared with controlled group but didn't make significant difference on cardio-respiratory fitness and flexibility of students. In general, there were meaningful differences between experimental and control group students on two variables of the study. There was a significance difference between the post and pretest of experimental group students' muscular endurance and body composition but didn't bring significant difference on cardio-respiratory fitness and flexibility of students. This study also concluded that resistance training intervention program carried out during eight weeks intervention period for experimental group was effective and has a positive influence in improvement of muscular endurance and body composition of students. So, it can be concluded that resistance training intervention would have significance difference on students' muscular endurance and body composition who attend resistance training intervention than those who do not take resistance training intervention.



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