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CORRELATION OF SPINAL FLEXORS AND EXTENSORS MUSCLE POWER ON WAIST HIP RATIO IN COLLEGIATE

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ABSTRACT

People who are inactive are more likely to gain weight.Obesity is a worldwide epidemic and is characterized by excess adipose tissue. It contributes and early mortality.It is a disease characterized by excess body fat. .The phenomenon is global and about 30 million Indians are obeseThe objective of the study was correlation of spinal flexors and extensors muscle power on waist hip ratio in collegiate.TheStudy design wasNon-Experimental, Study type was observational. Inclusion criteria were both males and females, age between 17 to 22 years.100Subjects were selected according to inclusion and exclusion criteria. Outcome measures were Waist- Hip Ratio, muscle power of spinal flexors and extensors.There was positive correlation between spinal flexors and Waist-Hip Ratio (r = 0.078).But there was negative correlation between spinal extensor and waist hip- ratio (r = -0.025).The study concluded that when Waist-Hip Ratio increases abdominal musclepower decreases but extensors muscles power won't changes with Waist- Hip Ratio.

KEYWORDS: ***Waist- Hip Ratio, muscle power, spinal flexors, collegiate, spinal extensors***

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INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Quality of life of individuals varies and it is influenced by life style, infrastructure, emotional and social wellbeing. People who are inactive are more likely to gain weight.Obesity is a worldwide epidemic and is characterized by excess adipose tissue. It contributes and early mortality.It is a disease characterized by excess body fat. People who are medically obese usually are affected by behavior, genetic, and environmental factors that are difficult to control with dieting [1].The phenomenon is global and about 30 million Indians are obese.Obesity in Indian has reached epidemic proportions in the 21st century, with morbid obesity affecting 5% of the country population.Obesity is a major risk factor for cardiovascular disease, NGOs such as the Indian Heart Association have been raising awareness about this issues, India the third most obese country in the world. A country where 270 million people live below the poverty line obesity seems to be a distant issue, meant for the rich kids of first world.But India is under siege: junk food, alcohol, and sedentary life style are leading us to silent self-destruction, making one in every five Indian men and women either obese or overweight.According to statistics, about 10-20% of children in India or obese. This number increases to up to 30% among adolescents. About 2/3rd of children with obesity continue to be obese in adult life. So, obesity is becoming an evolving health problemand it has to be taken care of [2]. Overweight in adult is categorized as Body Mass Index of 22.99 to 24.99 and obesity as Body Mass Index of more than 25.Overweight and obese were estimated to cause 3 to 4 million deaths, 3.9 percent of years of life lost, and 3.8 percent of disability-adjusted life- years worldwide.India is currently witnessing rising number of people in the middle-class who are obese. A lot of Indian population has started relying on processed foods that contain a huge percentage of trans-fat,sugar, and other unhealthy and artificial Ingredients.Obesity is consider the core of many disease. Increased weight carries significant health risks for some cancers, diabetes, heart diseases and stroke.Obesity is associated with functional limitation in muscleperformance and increased likelihood of developing a functional disability such as mobility, strength, postural and dynamic balance limitation [3]. However when maximum muscle strength is normalized to body mass, obese individuals appear weaker. This relative weakness may be caused by reduce mobility, neural adaptations and changes in muscle morphology.To predict weight related risk, Body mass index and waist circumferences are most commonly used. Measurement of height, weight, circumferences are used to estimate body weight composition.In India observed that about 20% of adults who were not overweight or obese as per the Body Mass Index definition still had abdominal obesity.Health risk is very high for young men when Waist-Hip Ratio is more than 0.95 and for young women when Waist-Hip Ratio is more than 0.86.As there is an increase in the awareness among the people about the various risk factors associated with obesity, many individuals are undergoing different weight reduction programs[4].Shaiba Sana Qureshi et al he said that life style modifications such as physical exercise (30 minutes, at least, 3 times per week) to reduce weight and obesity, even a weight loss of 10-15 pounds[5]. Abdominal muscle weakness it leads to increase lumbar lordosis and anterior pelvic tilt.The muscle weakness leads to anterior pelvic tilt and mechanical low back pain which may persist as a chronic low back pain in adult life too. Anterior pelvic tilt caused by increased lumbar lordosis and thoracic kyphosis, stretched abdominal musclesand tightened the hip flexors. To keep balance standing upright with anterior pelvic tilt, the spine is hyper-extended with the rectus abdominis lengthening and the erector spinae shortening. This is associated with lumbar lordosis. Lordosis does not always occur with anterior pelvic tilt when the weight is borne in other ways, such as when supported by arms, or when the hips drift backward (posterior femur tilt) or when enough hip flexion occurs that a kyphotic spine can be balanced over an anterior tilted pelvis [6]. Aim of the study wasto find out the correlation between Spinal Flexors and Extensors muscle power andWaist – Hip Ratio in collegiate.

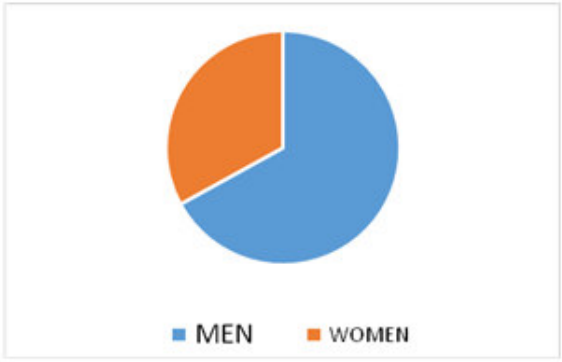
METHODOLOGY

The study design was non- experimental study, study type was observational,sampling method was convenient sample,and sample size was 100and studysetting was SRM College of Physiotherapy, Occupational Therapy and Nursing. The Subjects wereselected according to inclusion and exclusion criteria.The whole procedure of this project was explained in detail and informed consent form was provided.Institutional ethical committee approval also obtained before starting the study.The inclusion criteria were subjects aged between 17 to 22 years, both males and females which was shown in Graph 1.Exclusion consists of individuals with recent spinal trauma, upper or lower limb fracture and low back pain with/ without neurological symptoms and individuals who were undertaking any other form of treatment for weight reduction. Waist-Hip Ratio is calculated as,waist circumference divided by hip circumference.To measure the Waist circumference,locate the upper hip bone and the top of the right iliac crest.Place a measuring tape in a horizontal place around the abdomen at the level of iliac crest.Before reading the tape measure, ensure that the tape is snug, but does not compress the skin, and is parallel to the floor. Hip circumference is measured with the subject standing erect and feet together, a horizontal measure is taken at the maximal circumference of buttocks [7].Muscle power measured by manual muscle test (MMT). Spinal extension was measured in prone lying.Muscle power Grade V was assessed by subject in prone lying with head and upper trunk extending off the table from about the nipple line, hands are kept behind the head. Muscle powerGrade IV was assessed by prone lying with head and upper trunk extending off the table from about the nipple line and shoulder in extension. Muscle power Grade III, IIwas assessed by Prone with head off the table with arms at side. Spinal flexion was measured in supine lying. Muscle power Grade V was assessed by subject in supine lying with hands clasped behind head. Head and trunk was lifted in maximal level. Muscle power Grade IV was assessed

by supine lying with arms crossed over chest. Head Trunk was lifted in maximal level. Muscle power Grade III was assessed by supine lying with arms outstretched in full extension above plane of the body. Muscle power Grade II was assessed by supine lying with arms at sides, upper trunk flexed off the table and the Knees flexed [8].

RESULTS

Results wereanalyzed by using 1BM SPSS version 20.0 software.Pearson's correlation test was applied to assess the relationship between Waist- Hip Ratio and muscle power of spinal flexors and extensors.



Graph 1
Gender distribution

Table 1
Correlation of spinal flexors muscle power and waist-hip ratio

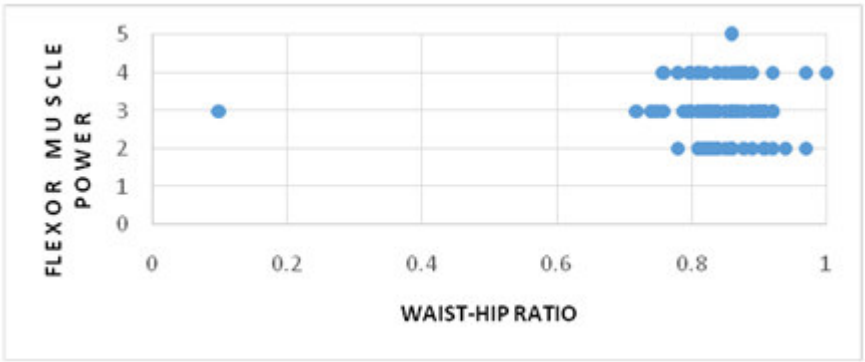
		waist hip ratio	flexor muscle power
waist hip ratio	Pearson Correlation	1	.078
	Sig. (2-tailed)		.443
	N	100	100
flexor muscle power	Pearson Correlation	.078	1
	Sig. (2-tailed)	.443	
	N	100	100

Table 1 shows, Positive correlation between Flexors Muscle Power and Waist -Hip Ratio.

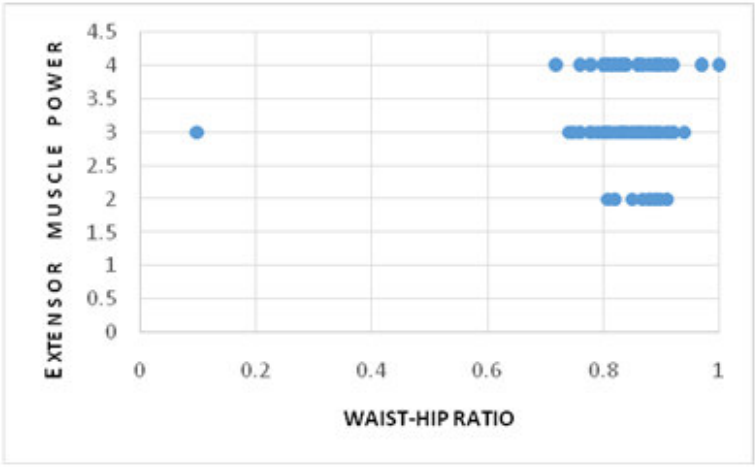
Table 2
Correlation of spinal extensors muscle power and waist-hip ratio

		waist hip ratio	extensor muscle power
waist hip ratio	Pearson Correlation	1	-.025
	Sig. (2-tailed)		.809
	N	100	100
extensor muscle power	Pearson Correlation	-.025	1
	Sig. (2-tailed)	.809	
	N	100	100

Table 2 shows, Negative correlation between Extensors Muscle Power and Waist Hip Ratio.



Graph 2
Correlation of spinal flexors muscle power and waist-hip ratio



Graph 3
Correlation of spinal extensors muscle power and waist-hip ratio

DISCUSSION

The aim of the study was to find out the correlation of spinal flexors and extensors muscle power and Waist-Hip Ratio. The results of the study shows that if the Waist- Hip Ratio value increases means there will be decrease in the power of flexor muscles ,(Table 1 and Graph 2)If the Waist Hip Ratio value increases means there will be no changes in the power of extensor muscles according to Table 2 and Graph 3. Obese adolescents had poorer neural activation capacity and / or sub-optimal motor neurons firing frequency, leading to a reduction in the degree of muscle fire recruitment [9].The obese adolescents had lower habitual physical activity levels, which one would normally expect to lead to a lowering in muscle activation capacity [10]. Indeed as reported earlier, in 1990 found muscle activation to be significantly lower in obese adolescent boy's[11]. Abdelmoula*et al*. (2012), He also proposed that there could have been an increase in the contribution from the synergistic muscles in obese adolescent boys. Whether there may be an obesity-induced alteration in muscle recruitment strategy in young adolescents has yet to be demonstrated. However, it needs to be noted that there is a lack of research examining the neural responses into maximal strength capacity in adolescent obese individuals after controllingfor physical activity levels [12]. Obese individuals store chronically high levels of adipose tissue, which cause an increase in circulating pro- inflammatory cytokines [13]. Pro-inflammatory cytokines, such as tumor necrosis factor alpha (TNF-α), interleukin -1α , Interleukin-6 (IL-6) [14] and C-reactive protein (CRP) play a role in cell signaling in the response to both acute and chronic systemic inflammation and can have a detrimental impact on skeletal muscle by stimulating muscle protein degradation [15]causing muscle wasting/atrophy and reducing muscle protein synthesis[16]. The initiation of muscle wasting/atrophy is modulated via numerous mechanisms such as activation of the ubiquitin-proteasome pathway [17,18,19]. Which has been shown to be effected via TNF- α. chronically highlevels of TNF-α initiates protein degradation and decreased protein synthesis, with the net effect being skeletal muscle atrophy. The decrease in protein synthesis can also be related to a reduction in anabolic hormones that would otherwise promote the repair and regeneration of skeletal muscle. Physical activity was controlled for and defined as being active by taking part in at least one recreational physical activity (i.e. hiking, swimming and gardening) for greater than one hour per week. The obese individuals were shown to be less physically active than both the lean and normal weight cohorts, yet when classifying participants as either sedentary or active, obese individuals with high activity levels demonstrated higher absolute isometric knee extension strength when compared to lean individuals.However, when individuals were classed as sedentary, any significant differences between cohorts were eradicated in relation to knee extension strength. Interestingly, there was no difference in handgrip or elbow extension strength between cohorts even though obese individuals had significantly larger arm muscle mass when compared to categorized normal weight and lean individuals[20].Arshpreetkalsi et al. concluded that regular stretching and physical exercise prevent various diseases and obesity [21].

CONCLUSION

The study concluded that when Waist-Hip Ratio increases abdominal muscle power decreases but extensors muscles power won't changes with Waist- Hip Ratio. The Limitation of the study was the measurement of muscle power was done manually. Recommendations of the study were the same study can be done on sedentary people, interventions to abdominal muscles to find out effectiveness , Volume of Oxygen, Respiratory Parameter can also taken for analysis. The same study can be done with Mechanical low Back Pain.

CONFLICT OF INTEREST

Conflict of interest declared none.

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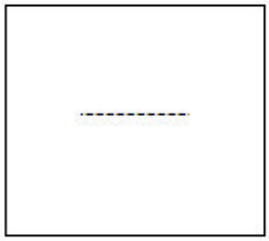

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