

Assessment of Lower Limb Muscular Strength among Medical Students

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Abstract— the objective of the study was to assess the lower limb muscular strength among medical students of Karachi. It was a cross sectional study and sample size of 150 medical students were selected for the study. On-probability convenience sampling technique was used. Data was collected through Performa. SPSS version 21 was used for data analysis. The findings of the study revealed that 36.0% participants (n=54) had muscle strength below than average. 29.3% (n=44) had average strength. 21.3% (n=32) had poor strength. 9.3% (n=14) had above average strength. 2.7% (n=4) had good strength. 0.7% (n=1) had excellent strength and 0.7% (n=1) had very poor muscular strength of lower limb. The study concluded that the lower limb muscular weakness was found to be common among medical students of Karachi. The study further concluded that most of medical students have decreased lower limb muscular strength because they were not engaged in physical fitness program nor in a habit of doing muscular strengthen exercises.

1 INTRODUCTION

Muscle is a contractile tissue which realizes developments. Muscle can be viewed as engines of the body. Muscles of lower appendage and body divider are comprised of skeletal muscles, which help in altering the person to outer condition and are under most noteworthy apprehensive control of cerebral cortex. (1)

Muscle strength is characterized as the greatest drive that a muscle can create amid a solitary constriction, and is the after effect of complex collaborations of neurologic, strong, biomechanical and subjective frameworks. Muscle execution can be lessened for an assortment of reasons. The potential variables that can bring about debilitated muscle quality are quickly examined beneath. Muscle strain happens along a continuum from intense full scale traumatic harm to the unending smaller scale traumatic abuse damage. Strain coming about because of muscle abuse is overseen by lessening the heaps. (2) The lower limit alludes to the piece of body from hip to the toes. (3) The lower limit is contained hip, knee and lower leg joints. The lower extremity is contained a mind boggling structure of muscles. Specifically the main muscles are gluteal muscles, iliopsoas, Sartorius muscle, hamstring, quadriceps, calf muscles and so forth. Predominantly the lower appendage is innervated by lumbosacral plexus. (4)

Weakness is the decrease in strength which is considered normal for an individual. Strength varies from individual to individual. Weakness is the commonest symptoms experienced by any patient having muscular problem. We can define weakness as muscular and physical power and strength or feeling in term of some kind of extra effort which is required to do movement by any part of body such as leg, arm, by other muscles or muscle groups. (5, 6)

Generally muscles are divided into two groups one is the type of fibres making muscle belly and second physiological role in movement. This type of muscle is made up of type II fibres; these muscles are supporting the body for a long period of time. Muscle fibres work separately in postural muscles, at one time one group of muscle fibres contract while other relaxes thus providing time for relaxation to each other group of muscles, but if we work continuously the muscles tends to become weak and in term of muscle camps, soreness and pain will be occur. This type of muscle is made up of type I fibres. They help to produce movements in the body. They are very quick and act in short time. These muscles work quick and strong response and makes movement of body. When these muscles become weak then they need to strengthening exercises (7) Individuals lacking the requisite strength may not be able to perform various activities of daily living that are important determinants of independence. A decline in functional status is determined at least in part by muscle strength, flexibility, range of motion, p Considerable evidence suggests that the ability to perform a physical task is determined by a threshold level of muscular strength and endurance, physical fitness, and body composition (8, 9) There are usually two major methods, one is dynamometer and other is and manual muscle testing to measure the strength. Dynamometer measures the power, torque and force to a variable extent to identify areas of weakness. (10) In manual muscle testing it need a good deep knowledge of neurophysiology. In this test we use the grades scale from 0 to 5 which describe the testing tool and also the interpretation of scores with reference to position of patient and force applied (11) Most of the research on the benefits of physical activity and health relates aerobic activity or aerobic fitness to some measure of health, often cardiovascular morbidity or mortality (12, 13).

2. MATERIAL AND METHOD

Study Design: This was a cross sectional study.

Setting: Data was gathered from different medical institutes of Karachi including Isra Institute of Rehabilitation Sciences, Karachi campus, Al-Tibri Medical College and Dow University of Health Sciences.

Sample size: 150 medical Students participated in the study.

Sample Technique: Convenient non-probability sampling technique was used.

Duration: The duration of the study was six months.

Sample Selection

Inclusion Criteria: Both male and female medical students of age 18 to 24 who were willing to participate were included in the study.

Exclusion Criteria: Students not willing to participate, Post graduate students, participants whose age <18 was to >26 and having history of injury or surgery were excluded from the study.

Data Collection Method: Data was collected from the participants on the basis of inclusion & exclusion criteria. Data was collected through Performa.

Data Collection Instrument: Performa measuring Squat test was used.

Data Analysis Procedure: Statistical Package for Social Science (SPSS v 21) used for the data collection.

Descriptive statistics calculate frequency and percentage.

Ethical Consideration

Permission was taken from Ethical review committee of Isra University. Informed consent was taken. Data was be coded to maintain the confidentiality of participants

Budget: Total cost was Rs.15000/= PKR

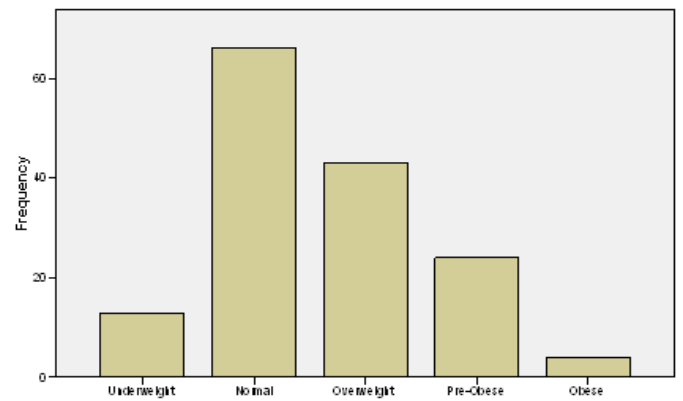


Figure-II: BMI of participants

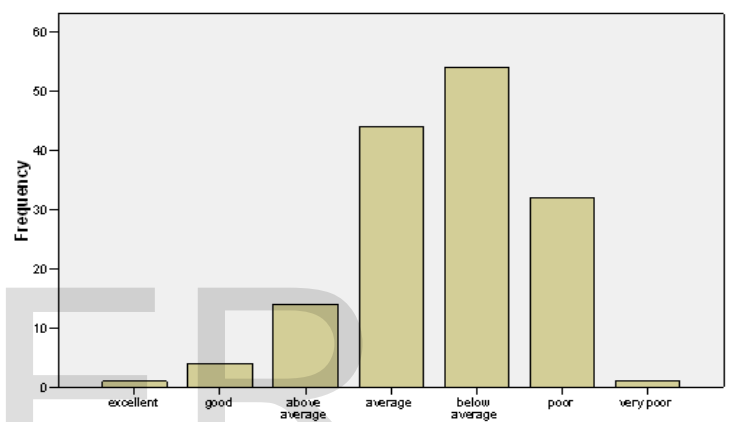


Figure. III: Lower limb muscular strength of participants

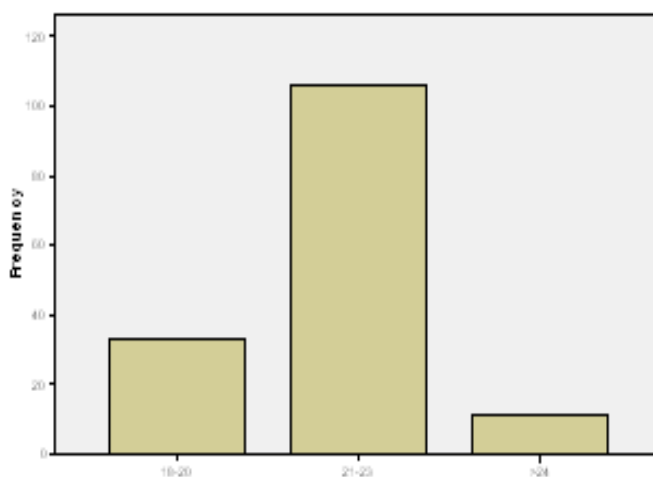


Figure-I: Age of participants

Table I: Age of Participants

	Frequency	Percent
18-20	33	22.0
21-23	106	70.7
>24	11	7.3
Total	150	100.0

Table II: BMI of Participants

	Frequency	Percent
Underweight	13	8.7
Normal	66	44.0
Overweight	43	28.7
Pre-Obese	24	16.0
Obese	4	2.7
Total	150	100.0

Table III: Lower limb muscular strength measure squat test

	Frequency	Percent
Excellent	1	.7
Good	4	2.7
above average	14	9.3
Average	44	29.3
below average	54	36.0
Poor	32	21.3
very poor	1	.7
Total	150	100.0

DISCUSSION

Several studies have been done on this topic before and this study will add more information regarding muscle strength present in medical students.

Previous studies demonstrated that college athlete’s student who usually spends more time on physical activity and sport training tend to have better self-perceived fitness than non-athlete. (13, 14)

Where as in this study muscular strength of lower limb is less in those who are not involved in physical activity or exercise and having pain in their legs after prolong walking

Previous study on other ways of measuring the strength of knee extensors of the elderly people at home and result revealed that there was a significant correlation between the manual muscle testing and hand held dynamometer. The difference between the sensitivity of dynamometer and manual muscle testing was 68.2%, 90.9% respectively and specificity result of dynamometer and manual muscle testing was 94.7%, 78.9% respectively. (15)

Whereas the findings of this study revealed that lower limb muscle strength measured by squat test. 36.0% (n=54) had muscle strength below than average. 29.3% (n=44) had average strength. 21.3% (n=32) had poor strength. 9.3% (n=14) had above average strength. 2.7% (n=4) had good strength. 0.7% (n=1) had excellent strength and 0.7% (n=1) had very poor muscular strength of lower limb.

Another study on recreational physical activities and muscle strength of elderly women and obese women showed that the lower limb muscle strength was less in lean women as compared to obese women. The result concluded that there was no change found in lower limb power in elder women but it is affected by the lifestyle. Those who had active lifestyle were compared to those women having sedentary lifestyle. It showed that activity increased the lower limb strength and obesity does not matter. (16)

Whereas this study results showed that lower limb muscle strength is less in medical students because they are not involved in physical activity or exercise.

Another study on muscle mass, muscle strength, and muscle fat infiltration as predictors of incident mobility limitations in well-functioning older persons. The study concluded that lower muscle mass (smaller cross-sectional thigh muscle area), greater fat infiltration into the muscle, and lower knee extensor muscle strength are associated with increased risk of mobility loss in older men and women. The association between low muscle mass and functional decline seems to be a function of underlying muscle strength whereas this study concluded that muscular strength in medical students is less than in active students who are involved in physical activity (17).

Previous study results clearly indicated that non-athlete student’s did not sufficient skills to competently undertake self-perceived of their fitness. (18)

Whereas this study showed that lower limb muscle strength measured by squat test. 36.0% (n=54) had muscle strength below than average. 29.3% (n=44) had average strength.21.3% (n=32) had poor Whereas this study concluded that most of medical students has lower limb muscular strength because they are not engaged in physical fitness pro-

gram or muscular strengthen exercises and its recommended that fitness level should be maintained to get muscular strength so that to avoid wear and tear, soft tissue injuries and to avoid early degenerative changes.

CONCLUSION

This study identified that the measurement of lower limb muscle strength among medical students. The findings revealed that the lower limb muscular weakness was found to be common among medical students of Karachi. The study concluded that most of medical students have decrease lower limb muscular strength because they are not engaged in physical fitness program nor in a habit of doing muscular strengthening exercises.

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REFERENCES

- [1] B.D Chaurasia. Human Anatomy, volume 2.
- [2] Carol Kisner and Colby. Therapeutic Exercise, 6th edition.
- [3] (Quick BL. The effects of viewing Grey's Anatomy on perception of doctors and patient satisfaction. Journal of Broadcasting & Electronic Media. 2009 Feb 27; 53(1):38-55
- [4] Moore KL, Dalley AF, Agur AM. Clinically oriented anatomy. Lippincott Williams & Wilkins; 2013 Feb 13.
- [5] Ropper Allan H, Martin S, Adams and Victor's Principles of Neurology, 9th ed. McGraw-Hill professionals, 2009.
- [6] AARON S, Evaluation of patient with muscle weakness, Am fem physician, 2005, 71(7), 1327-1336.
- [7] Wilson JM, Loenneke JP, Jo E, Wilson GJ, Zourdos MC, Kim JS, The effect of endurance, strength and power training on muscle fibre type shifting, strength and conditioning J, 2012, 26, 1724-1729.
- [8] 4. BROWN, M., D. R. SINACORE, and H. H. HOST. The relationship of strength to function in the older adult. J. Gerontol. 50A:55-59, 1995.
- [9] 8. EVANS, W. J. Effects of exercise on body composition and functional capacity of the elderly. J. Gerontol. 50A:147-150, 1995.
- [10] Garrett F. Coughlan, Karl Fullam, Eamonn Delahun, Conor Gissane, Brian M. Caulfield, A Comparison Between Performance on Selected Directions of the Star Excursion Balance Test and the Y Balance Test, Journal of Athletic Training, 2012;47(4):366-371
- [11] Hertel J, Braham RA, Hale SA, Olmsted-Kramer LC. Simplifying the Star Excursion Balance Test: analyses of subjects with and without chronic ankle instability. J Orthop Sports Phys Ther. 2006; 36(3):131-13
- [12] BLAIR, S. N., N. N. GOODYEAR, L. W. GIBBONS, and K. H. COOPER. Physical fitness and incidence of hypertension in healthy normotensive men and women. JAMA 252:487-490, 1984.
- [13] John D. Wilson, Mary Lloyd Ireland, Irene Davis, core strength and lower extremity alignment during single leg squats, 2006.
- [14] Marsh, H.S., 1993. The multidimensional structure of physical fitness: invariance over gender and age. Res. Q. Exerc Sport, 64: 256-273.
- [15] Bohannon R, Alternatives for Measuring Knee Extension Strength of the Elderly At Home, American Journal of Sports Medicine, 1998; 12(5):434-546.
- [16] Rolland Y, Lauwers-Cances V, Pahor M, Fillaux J, Grandjean H, Velas B, Muscle Strength in Obese Elderly women, Effect of Recreational Physical Activity in a cross-sectional study, American journal of clinical nutrition, 2004; 79(4):552-778.
- [17] Visser M, Goodpaster BH, Kritchevsky SB, Newman AB, Nevitt M, Rubin SM, Simonsick EM, Harris TB, Muscle mass, muscle strength, and muscle fat infiltration as predictors of incident mobility limitations in well-functioning older persons, 2005;60(3):324-33.
- [18] 3. Blair, S. N., H. W. Kohl, R. S. Paffenbarger, D. G. Clark, K. H. Cooper, and L. W. GIBBONS. Physical fitness and all-cause mortality: a prospective study of men and women. JAMA 262:2395- 2401, 1989.