Journal of Positive Psychology & Wellbeing
2022, Vol. 6, No. 4, 260 – 264

http://journalppw.com
ISSN 2587-0130

Evaluating the Relationship of Body Weight to Muscle Pain in Humans

Amal.S.Saleh[1], Majidah.H.Almasoudi[2], Fouzia.M.Abkar[3], Ghadah.F.Alelwani[3], Roba.S.Almehmadi[3], Amani.S.Alkesabri[3], Ramlah.Z.Barnawi[3], Fatima.B.Altakrooni[3], Daliya.A.houldar[4], Sara.F.Shamah[5], Wadyan.M.Ayoub[5], Ashwaq.B.Alhasani[5], Safia.H.Alhawsawi[6], Manal.H.Barnawi[6], Funoon.O.Alansari[7], Sittiy.S.Almalayou[8], Tahani.A.Albishri[9], Ohud.A.Alzaaqi[10], Noha.T.Alhawsawi[11], Rahma.T.Alhawsawi[11]

[1]*Consultant OB-Gyne at Maternity and children hospial*
[2]*Senior nurse specialist at king abdulaziz hospital*
[3]*Nurse specialist at king abdulaziz hospital*
[4]*Nurse specialist at Alazizia Children hospital-Jeddah*
[5]*Nurse specialist at East Jeddah hospital*
[6]*Nurse technician at king abdulaziz hospital*
[7]*Nurse technician at Al-Jamoum PHC*
[8]*Nurse technician at Kudi & Alhejrah PHC*
[9]*Nurse technician at Shamia Asfan PHC*
[10]*Nutrition specialist at king abdulaziz hospital-Jeddah*
[11]*Nurse technician at king abdulaziz hospital*

Abstract

The current study aims to examine the importance of the relationship between body weight and muscle pain in humans, what is the meaning of body mass weight, what are the complications of excess body weight on the back, knee and leg muscles, and what is the role of the doctor and nutritionist in this regard. A questionnaire was prepared via Google Drive and distributed to the population aged 25-55 years, men and women, in the city of Mecca. As for the questionnaire, it was distributed via the social networking program (WhatsApp) for the purpose of distancing for fear of the presence of the Corona virus. 600 questionnaires were distributed, and 550 responses were obtained via email to the principal researcher.

Keywords: *Evaluating, relationship, body weight, muscle pain, humans.*

Introduction

Fat is an important health trouble with a progressively growing universal spread over the past 3 decades. Obesity can be known as undue or abnormal fat accumulation in a style that can weaken health, and it reason a predisposition to chronic diseases (1).

The cardiovascular and metabolic sequels of obesity have been studied extensively, but less attention has been paid to its effect on muscle mission. Excessive body cluster may have direct or indirect effects on balance, posture, physical activity, and muscle task (i.e., total inadequate strength and power) (2). Muscle job—especially strength—relies on the structural and material properties of the muscle. Structural changes (fiber size and pinnation, cross-sectional area) are well known to impact force generation. Previous studies have found that excessive fat infiltration into muscles is connected with minimized muscle strength and

power, as well as functional limitation (3). Muscle quality is crucial for motor performance, capacity of activities of daily living (ADL), and control of joints. fat people need higher absolute forces to move and support their bodies during ADL, such as climbing stairs, sitting, and walking. This can drive to abnormal loading to joints and gait mechanics, and reason malalignment, especially in the lower limb joints However, it is still unclear how fatty infiltration of muscle impacts muscle mechanics. Healthy muscle includes approximately 2% fat (intra- and extramyocellular), which can rise up to 5% in obese people. The intramuscular fat may reach higher values as a result of hypertrophy, and change fiber kinds due to adaptation of mechanical loading in obese individuals. However, excessive weight gain, adipocyte hypertrophy, and fatty infiltration outcome in a rise in fibrous strains (a minimize in contractile elements), and the lowering in the size and number of muscle fibers may drive to changes in viscoelastic properties of the muscle—namely, tone, stiffness, and elasticity. There are few studies that have investigated the marks of BMI on the viscoelastic properties of muscles (4). Various sophisticated methods and populations have been used to evaluate these properties, including elastography, ultrasonography, and force plates (5–9). In a study using a force plate, obese adolescents were found to have greater gastrocnemius muscle stiffness and lower biceps brachii elasticity than their lean counterparts. Fatty infiltration of skeletal muscles in obese people may increase muscle stiffness and reduce flexibility compared to non-obese individuals, due to the limitation of range of motion and stable posture (9). Elastography was used in another study to predict the correlation between BMI and mechanical properties, and it was concluded that BMI was weakly correlated with upper trapezius stiffness (10). In contrast, other studies have failed to identify any relationship between viscoelastic properties of muscles and BMI using various assessment techniques, such as shear wave ultrasound elastography (11,12) Access to such tools is not always possible, or may be limited in most clinics, because of their high purchase and maintenance costs and the requirement of technical expertise (6). More recently, a new handheld tool known as MyotonPRO (Müomeetria Ltd., Tallinn, Estonia) has been introduced. MyotonPRO offers quick, non-invasive, cost effective and quantitative measurement of the mechanical properties of skeletal muscles (6). Objective measurement of fine tissue viscoelastic properties provided by MyotonPRO has high test–retest reliability and repeatability (6). Additionally, this portable, user-friendly device has shown good-to-excellent reliability of muscle stiffness measurements in healthy individuals and those with various disease states, including stroke, cerebral palsy, and paratonia (13–18). More recently, MyotonPRO was used in a single study to identify BMI linked various in cervical muscle stiffness and elasticity, and a weak correlation between the upper trapezius elasticity and BMI was watched, along with a moderate correlation between BMI and stiffness of the sternocleidomastoid and upper trapezius muscles (19).

Material and Methods:

The study began in (the city of Mecca in the Kingdom of Saudi Arabia), and began writing the research and then recording the questionnaire in January 2022, and the study ended with writing the data collection in June 2022. The researcher used descriptive analysis, an approach that uses quantitative or qualitative description of the social phenomenon (Evaluating the relationship of body weight to muscle pain in humans) and the variable. The independent variable (percentage of body weight and its effect on muscles globally) and the dependent variable (percentage of body weight and its effect on muscles in the city of Mecca). This type of study is characterized by analysis, reason, objectivity, and reality. It is also concerned with individuals and societies, as it studies the variables and their impact on the health of the individual, society, and the consumer, and the spread of diseases and their relationship. For demographic variables such as age, gender, nationality, and marital status. Status and occupation (20), and use the Excel 2010 Office suite pie chart to sort the results (21). The questionnaire is a wonderful and useful tool for collecting a huge amount of data, but the researchers were not able to conduct personal interviews with the participants in the online survey, due to social distancing rules at the time to prevent infection between participants and researchers and vice versa (Coronavirus sharing has not completely

disappeared. of the community), and the questionnaire was only answered electronically, because the questionnaire consists of nine questions, all of which are closed-ended. The electronic approach has also been used to generate valid samples in similar studies in the Kingdom of Saudi Arabia and elsewhere (22).

Results and discussion:

The percentage of approval to participate in the questionnaire (evaluating the relationship between body weight and muscle pain in humans) was 99.6%, and the percentage of rejection was 0.1%. The age percentage of the participants was as follows: 23.1% from 25-34 years old, 29.4% from 35-44 years old, and 48.5% from 45-55 years old. As for the gender of the participants, the percentage of males was 31.9%, and the percentage of females was 68.1%. The majority of their nationalities are Saudi men and women, at a rate of 93%, and non-Saudi men and non-Saudi women, at a rate of 7%. As for their professions, the percentage of male and female administrators was 56%, and the percentage of male and female technicians was 44%. As for their educational status, it was as follows: holders of an intermediate certificate 4.7%, secondary school 14.3%, diploma 18.7%, university 51.7%, master's 9.6%, doctorate 1%.When moving to the responses to questionnaire questions, they were as follows: The first question: Is there a relationship between body mass weight and muscle pain? Yes 97.8% and no 2.2%.The second question: Is fat an important health problem with an increasing global prevalence over the past three decades? Yes 98.7% and no 1.3%. The third question about defining obesity as unjustified or abnormal fat accumulation? Yes 95.2% and no 4.8%. The fourth question: Does obesity have a strong relationship with muscle pain? Yes 91.3% and no 8.7%. The fifth question: What are the consequences of obesity on the cardiovascular system and metabolism on a large scale? Yes 99.1 and no 0.9%. The sixth question: Could excessive body mass have direct or indirect effects on balance, posture, and physical activity? Yes 97% and no 3%. The seventh question: Is fat infiltration into muscles linked to a decrease in muscle strength? Yes 89.9% and no 10.1%. Question 8: Are muscles critical to motor performance and the ability to control muscles in daily life activities? Yes 96.4% and no 46.1%. The ninth question: Muscles contain about 2% fat (inside and outside the cell), and it can rise to 5% in people who suffer from obesity? Yes 53.9% and no 46.1%. (figure No.1)

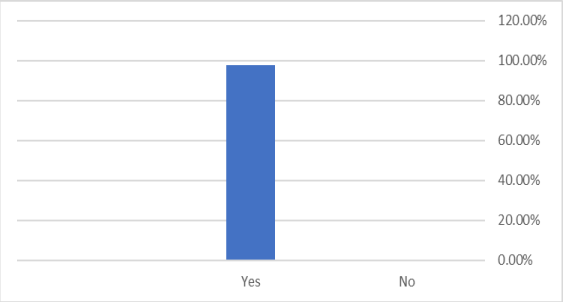

Figure No.1: Participants' opinions regarding the relationship between body mass weight and muscle pain

Conclusion:

From the participants' answers, we find that the weight of the body mass has a direct relationship to muscle pain, as it maintains motor balance and muscle activity for muscle performance, and thus does not exhaust the muscles with excessive body weight, as this results in fatigue of the muscles and their ligaments and thus leads to muscle tearing.

Acknowledgment:

To start with, I would like to Praise God and thank the researchers whose help me to complete this study, and who make the project come to light.

Reference

[1] Flegal, K.M.; Carroll, M.D.; Kit, B.K.; Ogden, C.L. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999–2010. JAMA 2012, 307, 491–497. [CrossRef]

[2] Wang, F.; McDonald, T.; Champagne, L.J.; Edington, D.W. Relationship of body mass index and physical activity to health care costs among employees. J. Occup. Med. 2004, 46, 428–436. [CrossRef]

[3] Hilton, T.N.; Tuttle, L.J.; Bohnert, K.L.; Mueller, M.J.; Sinacore, D.R. Excessive adipose tissue infiltration in skeletal muscle in individuals with obesity, diabetes mellitus, and peripheral neuropathy: Association with performance

and function. Phys. Ther. 2008, 88, 1336–1344. [CrossRef]

[4] Hamaguchi, Y.; Kaido, T.; Okumura, S.; Kobayashi, A.; Shirai, H.; Yagi, S.; Naoko, K.; Hideaki, O.; Shinji, U. Impact of skeletal muscle mass index, intramuscular adipose tissue content, and visceral to subcutaneous adipose tissue area ratio on early mortality of living donor liver transplantation. Transplantation 2017, 101, 565–574. [CrossRef]

[5] Šarabon, N.; Kozinc, Ž.; Podrekar, N. Using shear-wave elastography in skeletal muscle: A repeatability and reproducibility study on biceps femoris muscle. PLoS ONE 2019, 14, e0222008

[6] Feng, Y.; Li, Y.; Liu, C.; Zhang, Z. Assessing the elastic properties of skeletal muscle and tendon using shearwave ultrasound elastography and MyotonPRO. Sci. Rep. 2018, 8,

[7] Gapeyeva, H.; Vain, A. Methodical Guide: Principles of Applying Myoton in Physical Medicine and Rehabilitation; Müomeetria Ltd.: Tartu, Estonia, 2008

[8] Agyapong-Badu, S.; Warner, M.; Samuel, D.; Stokes, M. Practical considerations for standardized recording of muscle mechanical properties using a myometric device: Recording site, muscle length, state of contraction and prior activity. J. Musculoskelet Res. 2018, 21, 1850010. [CrossRef]

[9] Faria, A.; Gabriel, R.; Abrantes, J.; Brás, R.; Moreira, H. Triceps-surae musculotendinous stiffness: Relative differences between obese and non-obese postmenopausal women. Clin. Biomech. 2009, 24, 866–871. [CrossRef]

[10] Kuo, W.H.; Jian, D.W.; Wang, T.G.; Wang, Y.C. Neck muscle stiffness quantified by sonoelastography is correlated with body mass index and chronic neck pain symptoms. Ultrasound Med. Biol. 2013, 39, 1356–1361. [CrossRef]

[11] Seo, A.; Lee, J.H.; Kusaka, Y. Estimation of trunk muscle parameters for a biomechanical model by age, height and weight. J. Occup. Health 2003, 45, 197–201. [CrossRef]

[12] Wood, S.; Pearsall, D.; Ross, R.; Reid, J. Trunk muscle parameters determined from MRI for lean to obese males. Clin. Biomech. 1996, 11, 139–144. [CrossRef]

[13] Bailey, L.; Samuel, D.; Warner, M.; Stokes, M. Parameters representing muscle tone, elasticity and stiffness of biceps brachii in healthy older males: Symmetry and within-session reliability using the MyotonPRO. J. Neurol. Disord. 2013, 1, 1–7. [CrossRef]

[14] Leonard, C.T.; Deshner, W.P.; Romo, J.W.; Suoja, E.S.; Fehrer, S.C.; Mikhailenok, E.L. Myotonometer intra- and interrater reliabilities. Arch. Phys. Med. Rehabil. 2003, 84, 928–932. [CrossRef]

[15] Agyapong-Badu, S.; Aird, L.; Bailey, L.; Mooney, K.; Mullix, J.; Warner, M.; Samuel, D.; Stokes, M. Interrater reliability of muscle tone, stiffness and elasticity measurements of rectus femoris and biceps brachii in healthy young and older males. Work Pap. Health Sci. 2013, 4, 1–11

[16] Chuang, L.L.; Wu, C.Y.; Lin, K.C. Reliability, validity, and responsiveness of myotonometric measurement of muscle tone, elasticity, and stiffness in patients with stroke. Arch. Phys. Med. Rehabil. 2012, 93, 532–540. [CrossRef]

[17] Drenth, H.; Zuidema, S.U.; Krijnen, W.P.; Bautmans, I.; van der Schans, C.; Hobbelen, H. Psychometric properties of the MyotonPRO in dementia patients with paratonia. Gerontology 2018, 64, 401–412. [CrossRef]

[18] Lidström, Å.; Ahlsten, G.; Hirchfeld, H.; Norrlin, S. Intrarater and interrater reliability of myotonometer measurements of muscle tone in children. J. Child. Neurol. 2009, 24, 267–274. [CrossRef]

[19] Kocur, P.; Tomczak, M.; Wiernicka, M.; Goliw ˛as, M.; Lewandowski, J.; Łochy ´nski, D. Relationship between age, BMI, head posture and superficial neck muscle stiffness and elasticity in adult women. Sci. Rep. 2019, 9, 1–10

[20] Alserahy, Hassan Awad, et al (2008), The thinking and scientific research, Scientific Publishing Center, King Abdul-Aziz University in Jeddah, the first edition

[21] Al Zoghbi, Muhammad and AlTalvah, Abas (2000), Statistical system understanding and analysis of statistical data, first edition, Jordon- Amman.

[22] Kadasah, N.A.; Chirwa, G.C.; et al. Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. Front. Public Health 2020, 8, 217