Vol 5, Issue 4, 2018 **ISSN 2349-7041**

**Research Article**

**A STUDY TO DETERMINE THE RELATIONSHIP BETWEEN ANTHROPOMETRIC MEASURES OF BODY SIZE AND RISK OF CHRONIC LOW BACK PAIN – A CORRELATIONAL STUDY**

**V.RAJALAXMI1, G.MOHAN KUMAR2, K.KAMATCHI3**

**1,2,3Faculty of Physiotherapy, DR. MGR.Educational and Research Institute, University, Chennai, Tamil Nadu**

**Email:** rajalaxmi.physio@drmrgdu.ac.in

**ABSTRACT**

This Study aims to compare the relationships of LBP with measures of body size and to analyse underlying mechanisms for the association between body size and risk of LBP. **Materials & Methods:** 100 sample, 50 samples with and without LBP, those willing to participate in the study were selected based on the inclusion criteria. Height and weight were measured with the participants wearing light clothes without shoes. Waist and hip circumferences were measured with an inch tape, with participants standing and arms hanging relaxed. **Results:** The four variables body weight, BMI, waist circumference and hip circumference all showed equally strong associations with LBP in women.

**Keyword:** Low back pain, anthropometric measures, body size

**INTRODUCTION**

Obesity and low back pain (LBP) represent major health problems in today's society. Obesity is associated with serious disorders like cardiovascular disease, diabetes and cancer [1]. LBP causes more global disability than any other condition [2], with immense costs to society in terms of suffering and lost productivity [3]. It is therefore important to determine risk factors for LBP and explore potential relations with obesity. The great majority of the cases with LBP seen in clinical practice were nonspecific and cannot assign any particular pathoanatomical diagnosis [4]. Yet at the population level, epidemiologic studies have shown associations between occurrence of LBP and risk factors such as physical activity [5], work status [6] and cigarette smoking [7], although results from different populations have not always been consistent. Overweight and obesity was associated for a long time with LBP [8]

Various mechanisms have been proposed to explain associations between body size and LBP [10,11]. A heavy mechanical load may lead to greater compressive forces or increased shear on the structures of the lumbar spine [10]. Structural modifications involving disc degeneration [12] or Modic changes in vertebral endplates [13] may be related to increasing loads. Moreover, impaired spinal mobility in overweight individuals [14] may affect disc nutrition [10]. Blood supply to the lumbar region may also be affected by atherosclerosis [15], which in turn may be associated with adiposity. More generally, a large amount of fat tissue may lead to an elevated production of cytokines and acute-phase reactants [16], activating pro-inflammatory pathways and producing pain. Finally, emotional [9] or behavioural [11] components may play a certain role.

Previous work indicates that overweight and obese individuals carry an increased risk of Experiencing chronic low back pain (LBP). It is not known, however, the association With body size depends on the choice of anthropometric measure used.

**METHODOLOGY**

Once the study gets approved from IRB ,100 sample where 50 samples with LBP and 50 samples without LBP, those willing to participate in the study were selected based on the inclusion criteria of females having LPB age between 35-55, with a questionnaire

enclosed on health status [38]. One question was formulated in this manner: "During the last year, have you had pain and/or stiffness in your muscles and limbs that has lasted for at least 3 consecutive months. The lower back was one site listed among several possibilities. Respondents checking this alternative were regarded as suffering from chronic LBP [41]. Participants were also invited to a clinical consultation which included measurement of height, weight and waist and hip circumference and blood pressure.

Height and weight were measured with the participants wearing light clothes without shoes. Waist and hip circumferences were measured with an inch tape, with participants standing and arms hanging relaxed. Waist circumference was measured horizontally at the height of the umbilicus, and hip circumference was measured at the thickest part of the hip. Body mass index was defined as weight/height2. The distributions of measures of body size were described for women by mean values and standard deviations within categories of LBP status. Interrelations between different measures were characterized by correlation coefficients. All statistical analyses were carried out using SPSS version 21.

**RESULTS**

The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24. Paired t-test was adopted to find statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups. Mean values of the anthropometric measures were in general slightly greater among individuals with chronic LBP than in those without LBP. Correlations between anthropometric measures among participants without LBP were quite high, in the range from 0.76 to 0.91, except for the waist-hip-ratio which showed much lower correlations with body weight, BMI and hip circumference. Hip and waist circumference along with BMI showed strong association in women with LBP

**CONCLUSION**

Hence the study concludes that there is a high level positive correlation between the body size and the occurrence and severity of low back pain.

**DISCUSSION**

Nissinen M concluded that in 1-year (from 12.8 to 13.8 years) incidence of LBP was 18.4% in girls and 16.9% in boys. Trunk asymmetry measured by the forward bending test and sitting height were significant determinants of the incidence of LBP in pubertal children. The role of anthropometric characteristics seems, however, modest.17. It was suggested a high prevalence of low back pain in adolescents, and that young sufferers with low back pain may be reflecting attributes of their stage of anthropometric growth18. Central adiposity is unlikely to play a major role in the etiology of LBP. Total fat mass may be one common factor underlying the associations observed. The association with body weight may reflect mechanical or structural components with LBP19. The incidence of LBP was inversely related to growth after 14 years, but the association did not reach statistical significance (P for trend = 0.06). Our results are not compatible with the old myth that spinal growth actually contributes to LBP. Abundant growth in early adolescence is a risk factor for LBP20.

**Authors Contribution**

All authors have contributed equally.

**Acknowledgement**

I would like to thank the authorities of Dr. MGR Educational and Research Institute, University and the Principal Faculty of Physiotherapy for providing me with facilities required to conduct the study.

**Ethical Considerations**

The manuscript is approved by the Institutional Review board of faculty of physiotherapy.

**Conflict of Interest**

None

**Funding**

This is a self-funded study.

**REFERENCES**

1. Guh DP, Zhang W, Bansback N, Amarsi Z, Birmingham CL, Anis AH. The incidence of co-morbidities related to obesity and overweight: a systematic review and meta-analysis. BMC Public Health. 2009; 9: 88.
2. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis. 2014; 73: 968–974.
3. Hong J, Reed C, Novick D, Happich M. Costs associated with treatment of chronic low back pain: an analysis of the UK General Practice Research Database. Spine (Phila Pa 1976). 2013; 38: 75–82.
4. Deyo RA, Weinstein JN. Low back pain. N Engl J Med. 2001; 344: 363–370.
5. Heneweer H, Staes F, Aufdemkampe G, van Rijn M, Vanhees L. Physical activity and low back pain: a systematic review of recent literature. Eur Spine J. 2011; 20: 826–845.
6. Coenen P, Kingma I, Boot CR, Bongers PM, van Dieën JH. Cumulative mechanical low-back load at work is a determinant of low-back pain. Occup Environ Med. 2014; 71: 332–337.
7. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between smoking and low back pain: a meta-analysis. Amer J Med. 2010; 123: 87.e7–87.e35.
8. Aro S, Leino P. Overweight and musculoskeletal morbidity: a ten-year follow-up. Int J Obes. 1985; 9: 267–275.
9. Garzillo MJD, Garzillo TAF. Does obesity cause low back pain? J Manipulative Physiol Ther. 1994; 17: 601–604.
10. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. Amer J Epidemiol. 2010; 171: 135–154.
11. Janke EA, Collins A, Kozak AT. Overview of the relationship between pain and obesity: What do we know? Where do we go next? J Rehabil Res Dev. 2007; 44: 245–262.
12. Liuke M, Solovieva S, Lamminen A, Luoma K, Leino-Arjas P, Luukkonen R, et al. Disc degeneration of the lumbar spine in relation to overweight. Int J Obes (Lond). 2005; 29: 903–908.
13. Kuisma M, Karppinen J, Haapea M, Niinimäki J, Ojala R, Heliövaara M, et al. Are the determinants of vertebral endplate changes and severe disc degeneration in the lumbar spine the same? A magnetic resonance imaging study in middle-aged male workers. BMC Musculoskelet Disord. 2008; 9: 51.
14. Mellin G. Correlations of spinal mobility with degree of chronic low back pain after correction for age and anthropometric factors. Spine (Phila Pa 1976). 1987; 12: 464–468.
15. Kauppila LI, McAlindon T, Evans S, Wilson PW, Kiel D, Felson DT. Disc degeneration/back pain and calcification of the abdominal aorta: a 25-year follow-up study in Framingham. Spine (Phila Pa 1976). 1997; 22: 1642–1647.
16. Tilg H, Moschen AR. Adipocytokines: mediators linking adipose tissue, inflammation and immunity. Nat Rev Immunol. 2006; 6: 772–783.
17. Nissinen M, Heliövaara M, Seitsamo J, Alaranta H, Poussa M.Anthropometric measurements and the incidence of low back pain in a cohort of pubertal children. . Spine (Phila Pa 1976). 1994 Jun 15;19(12):1367-70.
18. Steele S, Grimmer K, Williams M, Gill T, Vertical anthropometric measures and low back pain in adolescents. Physiother Res Int. 2001;6(2):94-105.
19. Ingrid Heuch,,Ivar Heuch, Knut Hagen, John-Anker Zwart, A Comparison of Anthropometric Measures for Assessing the Association between Body Size and Risk of Chronic Low Back Pain: The HUNT Study, PLOS,Published: October 27, 2015.
20. Mikko S. Poussa, Markku M. Heliövaara, Jorma T. Seitsamo, Mauno H. Könönen, Kirsti A. Hurmerinta, Maunu J. Nissinen, Anthropometric measurements and growth as predictors of low-back pain: a cohort study of children followed up from the age of 11 to 22 years, European Spine Journal, August 2005, Volume 14, Issue 6, pp 595–598.