https://doi.org/10.29309/TPMJ/2023.30.05.7365

The Professional Medical Journal
www.theprofesional.com
2023, Volume, 30 Issue, 05

ORIGINAL ARTICLE

Correlation of varying heights with cervical spondylosis.

Syeda Bushra Ahmed[1], Amatul Sughra[2], Maria Mohiuddin[3], Afsheen Khan[4], Yasmeen Mahar[5], Aisha Qamar[6]

Article Citation: Ahmed SB, Sughra A, Mohiuddin M, Khan A, Mahar Y, Qamar A. Correlation of varying heights with cervical spondylosis. Professional Med J 2023; 30(05):665-670. https://doi.org/10.29309/TPMJ/2023.30.05.7365

ABSTRACT… Objective: To find correlation of varying heights with cervical spondylosis. **Study Design:** Case Control study. **Setting:** Department of Orthopedic and Radiology, Patel Hospital, Karachi. **Period:** June, 2019 to Dec, 2019. **Material & Methods:** The personal, economical, and demographic features of the 88 cases and 88 controls were compared with the prevalence of cervical spondylosis. All subject's heights were divided into four categories—short, average, tall and very tall and were correlated with cervical spondylosis as well as the various other characteristics stated above. The weight and height were calculated using the stadiometer and body weight and health scale Z-10, and lateral radiographs were taken using an Agfa Fuji Computerized radiography system. **Results and Conclusion:** The results showed that the average height individuals had more disease and were obese and it was also in direct relation with the increased working hours. The average height individuals i.e. height of (150-169cm) were prone for the disease and need to adopt measures to reduce the chances of the disease and choose healthy lifestyle for maintenance of healthy BMI range and consideration of good ergonomic tactics at office and moderate working hours.

Key words: Cervical Spondylosis, Body Height, Height Classification, Obesity, Working Hours, Work Ergonomics.

INTRODUCTION

Cervical spondylosis is defined as "A spinal disorder characterized by degeneration of vertebral bodies, intervertebral discs, facet joints, and ligaments resulting in osteophytes or myelopathy".[1] Cervical spondylosis is a chronic degenerative disease presenting with neck stiffness and back pain as the most initial symptom. It is a pathological condition affecting the cervical spine, known to cause significant disability. It is more common in middle and elderly aged population, around 80% in the total population.[2] It presents as the most common non-traumatic spinal cord injury and cord dysfunction in the elderly.[3] Spondylosis is a degenerative cascade involving wear and tear of vertebrae, intervertebral disc, facets, joints and ligaments with age. It is the most prevalent disease in the aged individuals with the mean age of 70.2 years. Cervical spondylosis accounts for the degenerative changes in 95% of asymptomatic men and 89% of women respectively. It involves multiple spinal levels and can present with neck and regional pain.[4]

Cervical spondylosis has been regarded as an epidemic by the World Health Organization (WHO). Neck pain ranks second after back pain as the common musculoskeletal problem. The prevalence of chronic neck pain is around 10-24%. Vertebrobasilar insufficiency, bad posture, trauma, hormonal and emotional disorders, and intervertebral disc degeneration are responsible for the compression and pain.[5] With mechanized lifestyle as adopted by our society, one spends more than 8 hours a day while sitting, and this sitting posture leads to musculoskeletal problems affecting 25–51% of office workers. Sitting posture increases the load and pressure at intervertebral disc more as compared to standing posture.[6]

Some of the social and economic consequences include decreased quality of life, functional and activity limitations, productivity losses, and direct

1. MBBS, M.Phil, Assistant Professor Anatomy, SMBBMCL, DUHS.
2. MBBS, M.Phil, Assistant Professor Anatomy, Hamdard University.
3. MBBS, M.Phil, Associate Professor Anatomy, Hamdard University.
4. MBBS, M.Phil, Assistant Professor Anatomy, SMBBMCL, DUHS.
5. MBBS, M.Phil, Associate Professor Anatomy, Bahria University.
6. MBBS, M.Phil, Senior Professor and Ph.D scholar Anatomy, Bahria University.

Correspondence Address:
Dr. Syeda Bushra Ahmed
Department of Anatomy
SMBBMCL, DUHS.
sbushra.ahmed@hotmail.com

Article received on: 28/11/2022
Accepted for publication: 01/02/2023

health care expenditures.[7] To reduce the future burden of this disease, it is critical to raise public awareness of the risk factors and preventive measures for neck pain.[8] Aside from a progressive tendency with age (at least until the age of 50) and a possible higher incidence in women and those of shorter stature, little is known about the risk factors for Cervical Spondylosis.[9] The aim of study was to find the association of varying heights with respect to cervical spondylosis in our population.

MATERIAL & METHODS

The study was carried out at Patel Hospital after ethical permission (Approval form no 57). The study aimed to fine correlation between fluctuating heights with the incidence of cervical spondylosis. It was a case control study conducted at Orthopedic and Radiology department, Patel hospital from June 2019 - Nov 2019. Software called G power 3.9.2 determined the sample size and convenient sampling technique was employed for recruiting cases and healthy controls. There were 176 participants, 88 of them were cases and 88 were controls. The study included cases with age range from 18yrs to 75 yrs. They were confirmed cases of cervical spondylosis on the basis of clinical examination and radiography X-ray cervical spine. All those cases reported neck pain and submitted written informed consent. The study included healthy attendants in between age of 18 yrs to 75 yrs as control with no complaint of neck pain. They also provided written informed consent form. All the subjects with cervical spinal illness, cervical rib, tumors, congenital anomalies, surgery, neck trauma and pregnancy were excluded from the study.

The individuals who complained of neck pain were examined by consultant and their history was recorded by principal investigator on subject evaluation form. The patients then underwent lateral cervical spine radiography on an Agfa fuji radiography system CR-35X. The stadiometer was used to measure the subject's weight and height. Four classes of height were identified: short, average, medium-tall, and tall[10] as mentioned in Figure, 1. In the present study the subjects with 0S.D were categorized as short, 1S.D as average, and 2S.D as medium tall and 3S.D as tall. The disease, as well as many socioeconomic and demographic characteristics, were also compared to height.

SPSS software version 24 was used for analysis and data entry. The frequencies of category variables were determined, and the distribution of the data set was analyzed using the Kolmogorov-Smirnov test and 95% confidence interval adopted for analysis. One way ANOVA was employed for comparison of more than two groups. To determine the correlation between categorical variables, the chi-square test was used. Statistics were regarded as significant at a p-value of equal to or less than 0.05

RESULTS

The study demonstrated a direct link between working hours and obesity among people of average height, demonstrating that people in this cohort, as shown in Tables-I and II, had higher working hours and were more obese. As seen in Table-III, other variables revealed statistically insignificant differences.

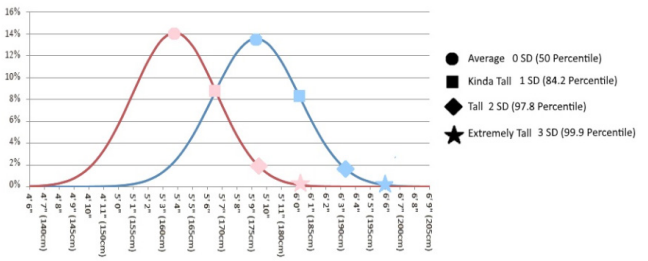

Figure-1. Graph depicting height of man and woman within a population Source:https://tall.life/height-percentile-calculator-age-country/

DISCUSSION

Height plays a crucial role in the development of personality as it has been related to leadership, better academics, occupation, and dominant personality. Normal stature is the result of a coordinated complex processes involving nutrition, genetics, ethnicity and endocrine status. It is a part of the normal distribution curve as the 3rd and 97th percentile. Short and tall stature are just variations of height between different populations.[11]

Work Hours	Height Classification				
	Short	Average	Medium Tall	Tall	P-Value
less than 8 hours	10(45.6)	59(50.9)	19(61.3)	0(0.0)	0.032*
more than 8 hours	12(54.5)	57(49.1)	12(38.7)	7(100.0)	

Table-I. Height classification versus working hours
Key: p value ≤ 0.05, statistically significant*
Test applied: Chi square test

BMI	Height Classification				
	Short	Average	Medium Tall	Tall	P-Value
16-16.9 kg/m^2 moderate underweight	0(0.0)	2(1.7)	0(0.0)	1(14.3)	0.023*
17-18.49 kg/m^2 mild underweight	0(0.0)	1(0.9)	2(6.5)	0(0.0)	
18.5-24.9 kg/m^2 healthy range	5(22.7)	60(51.7)	13(41.9)	3(42.9)	
25-29.9 kg/m^2 pre obese	11(50.0)	42(36.2)	12(38.70	3(42.9)	
30-34.9 kg/m^2 obese class 1	6(27.3)	11(9.5)	3(9.70	0(0.0)	
35-39.9 kg/m^2 obese class 2	0(0.0)	0(0.0)	1(3.2)	0(0.0)	

Table-II. Height classification versus BMI
Key: p value ≤ 0.05, statistically significant*
Test applied: Chi square test

Mobile Use	Height Classification				
	Short	Average	Medium Tall	Tall	P-Value
no use	3(13.6)	22(19.0)	4(12.9)	0(0.0)	0.625
less than 4 hours	11(50.0)	41(35.3)	11(35.5)	4(57.1)	
more than 4 hours	8(36.4)	53(45.7)	16(51.6)	3(42.9)	
Computer Use					
no use	13(59.1)	54(46.6)	14(45.2)	2(28.6)	0.062
less than 4 hours	8(36.4)	40(34.5)	7(22.6)	5(71.6)	
more than 4 hours	1(4.5)	22(19.0)	10(32.3)	0(0.0)	
Radiographic Changes					
minimal anterior osteophytes	3(25.0)	25(41.0)	5(45.5)	1(25.0)	0.82
definite anterior osteophytes, with possible narrowing and some sclerosis	7(58.3)	27(44.3)	5(45.5)	3(75.0)	
moderate narrowing with definite sclerosis and osteophytes	2(16.7)	9(14.8)	1(9.1)	0.(0.0)	
Presenting Complaints					
pain in cervical region	5(41.7)	27(44.3)	5(45.5)	2(50.0)	0.714
pain in arms and hands	3(25.0)	27(44.3)	4(36.4)	2(50.0)	
Headache	0(0.0)	1(1.6)	0(0.0)	0(0.0)	
Vertigo	2(16.7)	2(3.3)	0(0.0)	0(0.0)	
pain in arms, hands and vertigo	2(16.7)	4(6.6)	2(18.2)	0(0.0)	

Table-III. Height classification versus mobile, computer use, radiographic changes and presenting complaint
Test applied: Chi square test

In other study different height ranges as 150-160, 160-170, 170-18-, 180-190, 190-201 cm were compared between different surgery treated cases of cervical spondylosis and there was no significant association found.[12]

As compared to the control group, which was taller at 165 cm, there were more cases of degenerative changes in the cervical spine in loaders who were shorter at 149 cm. These findings were consistent with the current research effort.[13] The loss of lordotic curve and reduction in disc height in loaders, which ultimately resulted in adverse changes in the cervical spine, was implicated for the findings.

The current study's findings revealed a strong positive link between the occurrence of cervical spondylosis and receding stature, with cases being more commonly between (150 and 169 cm) tall. These results were comparable to those from the study[14,15] which additionally noted that cervical spondylosis individuals had shorter heights than controls. Reduced height in people is predisposed to an increased incidence of cervical spondylosis because the transverse area of the spinal cord, the dural tube, and the spinal canal were all directly related to height. This was the most likely reason for the correlation between height and cervical spondylosis. According to Ulbrich et al.[16], the spinal cord was compressed due to the spinal canal's smaller surface area.

It was determined that when working hours between people of different heights were compared, statistically more people of average height were afflicted with the disease and had working duration of more than 8 hours. Furthermore, it was comparable to the study[17] which found that working more hours per week (46-59, as opposed to 8-39) was associated with a higher prevalence of neck pain. Another study[18] demonstrated neck pain and lack of movement in cervical muscles due to increased working hours and inappropriate posture, the results were comparable to the present study.

In the current study, comparison of BMI within height groups showed that persons with cervical spondylosis who had medium height had higher obesity rates. This outcome was in agreement with the research's findings[19] which reported preponderance of disease in the obese population. The results may be related to the excess weight caused by obesity, which increased the axial pressure on the cervical spine and accelerated the degenerative process. The current study's findings does not agree with previous research's findings[20] which reported that obesity had no role in the degenerative disc disorders. Another survey[21] reported a statistically significant mean BMI of males and females within healthy range, which did not correlate with the present study.
Another Chinese study indicated that lower education, larger body mass, sleeping fewer than seven hours per day and holding the same work position for 13 hours per day were also more common in disease supporting the present study.[22]

LIMITATIONS

The study included patients on basis of history, examination and radiography but some patients can be missed due to asymptomatic presentation. Need a larger cohort to generalize the results.

CONCLUSION

The study's objectives were to close a knowledge gap on population height variations impacting the prevalence of cervical spondylosis. The study provides a cut off height limit, 150-169 cm, as the predilected height for cervical spondylosis. To avoid its effects, such as early retirement or disability adjusted life years later on, the people must adopt a healthy lifestyle and implement modifications to working hours and ergonomics in the office. Another important aspect of preventing Cervical Spondylosis is adopting better posture and load exposure.

REFERENCES

1. Ellingson BM, Salamon N, Grinstead JW, Holly LT. **Diffusion tensor imaging predicts functional impairment in mild-to-moderate cervical spondylotic myelopathy.** The spine journal. 2014; 14(11):2589-97. DOI: 10.1016/j.spinee.2014.02.027

2. Woodworth DC, Holly LT, Salamon N, Ellingson BM. **Resting-state functional magnetic resonance imaging connectivity of the brain is associated with altered sensorimotor function in patients with cervical spondylosis.** World Neurosurgery. 2018; 119:e740-e9.DOI: 10.1016/j.wneu.2018.07.257

3. Chanpimol S, Seamon B, Hernandez H, Harris-Love M, Blackman MR. **Using Xbox kinect motion capture technology to improve clinical rehabilitation outcomes for balance and cardiovascular health in an individual with chronic TBI.** Archives of physiotherapy. 2017; 7(1):1-11. DOI: 10.1186/s40945-017-0033-9

4. Toledano M, Bartleson J. **Cervical spondylotic myelopathy.** Neurologic clinics. 2013; 31(1):287-305. DOI: 10.1016/j.ncl.2012.09.003

5. Kolu E, Buyukavci R, Akturk S, Eren F, Ersoy Y. **Comparison of high-intensity laser therapy and combination of transcutaneous nerve stimulation and ultrasound treatment in patients with chronic lumbar radiculopathy: A randomized single-blind study.** Pakistan journal of medical sciences. 2018; 34(3):530. DOI: 10.12669/pjms.343.14345

6. Kwon Y, Kim J-W, Heo J-H, Jeon H-M, Choi E-B, Eom G-M. **The effect of sitting posture on the loads at cervico-thoracic and lumbosacral joints.** Technology and Health Care. 2018; 26(S1):409-18. DOI: 10.3233/THC-174717

7. Kim R, Wiest C, Clark K, Cook C, Horn M. **Identifying risk factors for first-episode neck pain: A systematic review.** Musculoskeletal Science and Practice. 2018; 33:77-83. DOI: https://doi.org/10.1016/j.msksp.2017.11.007

8. Wahlström J, Burström L, Hagberg M, Lundström R, Nilsson T. **Musculoskeletal symptoms among young male workers and associations with exposure to hand–arm vibration and ergonomic stressors.** International archives of occupational and environmental health. 2008; 81(5):595-602. DOI: https://doi.org/10.1007/s00420-007-0250-8

9. Bovenzi M. **A prospective cohort study of neck and shoulder pain in professional drivers.** Ergonomics. 2015; 58(7):1103-16. DOI: https://doi.org/10.1080/00140139.2014.935487

10. Sinanan A. **What Height is Considered Tall?:** Navaslab; 2021 [cited 2021 Feb 17th]. Available from https://navaslab.com/blogs/news/what-height-is-considered-tall.

11. Bramswig JH. **Short and tall stature.** Annales Nestlé (English ed). 2007; 65(3):117-27.

12. Jackson JA, Liv P, Sayed-Noor AS, Punnett L, Wahlström J. **Risk factors for surgically treated cervical spondylosis in male construction workers: A 20-year prospective study.** The spine journal. 2022. DOI: https://doi.org/10.1016/j.spinee.2022.08.009

13. Dave BR, Krishnan A, Rai RR, Degulmadi D, Mayi S. **The effect of head loading on cervical spine in manual laborers.** Asian spine journal. 2021; 15(1):17. DOI: 10.31616/asj.2019.0221

14. Singh S, Kumar D, Kumar S. **Risk factors in cervical spondylosis. Journal of clinical orthopaedics and trauma.** 2014; 5(4):221-6. DOI: https://doi.org/10.1016/j.jcot.2014.07.007

15. Ahmed SB, Qamar A, Imram M, Fahim MF. **Comparison of neck length, relative neck length and height with incidence of cervical spondylosis.** Pakistan Journal of Medical Sciences. 2020; 36(2):219. DOI: 10.12669/pjms.36.2.832

16. Ulbrich EJ, Schraner C, Boesch C, Hodler J, Busato A, Anderson SE, et al. **Normative MR cervical spinal canal dimensions.** Radiology. 2014; 271(1):172-82. DOI:https://doi.org/10.1148/radiol.13120370

17. Yang H, Haldeman S, Nakata A, Choi B, Delp L, Baker D. **Work-related risk factors for neck pain in the US working population.** Spine. 2015; 40(3):184-92. DOI: 10.1097/BRS.0000000000000700

18. ZAFAR A, NIAZ M, AKHTAR SK, SADIQ U, RASHEED S. **Prevelance of cervical pain in make-up artist and hair dressers of Lahore.** Pakistan Journal of Medical and Health Sciences,2022; 16(1): 882-884. DOI: https://doi.org/10.53350/pjmhs22161882

19. Cook C, Brown C, Isaacs R, Roman M, Davis S, Richardson W. **Clustered clinical findings for diagnosis of cervical spine myelopathy.** Journal of Manual & Manipulative Therapy. 2010; 18(4):175-80. DOI: https://doi.org/10.1179/106698110X12804993427045

20. Mesas AE, González AD, Mesas CE, de Andrade SM, Magro IS, del Llano J. **The association of chronic neck pain, low back pain, and migraine with absenteeism due to health problems in Spanish workers.** Spine. 2014; 39(15):1243-53. DOI: 10.1097/BRS.0000000000000387

21. Kumagai G, Ono A, Numasawa T, Wada K, Inoue R, Iwasaki H, et al. **Association between roentgenographic findings of the cervical spine and neck symptoms in a Japanese community population.** Journal of Orthopaedic Science. 2014; 19(3):390-7. DOI:https://doi.org/10.1007/s00776-014-0549-8

22. Birnie D, Healey JS, Krahn AD, Ahmad K, Crystal E, Khaykin Y, et al. **Prevalence and risk factors for cervical and lumbar spondylosis in interventional electrophysiologists.** Journal of Cardiovascular Electrophysiology. 2011; 22(9):957-60. DOI: https://doi.org/10.1111/j.1540-8167.2011.02041.x

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Syeda Bushra Ahmed	Conceptualization, manuscript writing and data curation.	
2	Amatul Sughra	Manuscript and literature review.	
3	Maria Mohiuddin	Data interpretation and analysis.	
4	Afsheen Khan	Literature review and revision for intellectual content.	
5	Yasmeen Mahar	Supervision and final approval of the article.	
6	Aisha Qamar	Supervision and final approval of the article.	