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RESEARCH ARTICLE

The Role of Lumbar CT Scan Anthropometric Parameters to Predict the Height of Indonesian Adults

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Abstract

Anthropometry, the study of human body measurements, is crucial in estimating stature, which is valuable in medical research, forensic science, anthropology, and ergonomic design. While various methods exist for estimating stature, lumbar spine measurements make a significant contribution to this estimation. This study aimed to analyze the relationship between lumbar spine dimensions and stature in the Indonesian population using three-dimensional computed tomography (3D CT) scan data. This analytical observational study, employing a cross-sectional approach, was conducted at the Department of Radiology, Dr. Soetomo General Academic Hospital, Surabaya, from August to September 2023. The key measurements included heights of the posterior, anterior, and central vertebral bodies from lumbar 1 to lumbar 5 (L1 to L5), transverse pedicle diameter, pedicle axis length, vertical pedicle diameter, and overall stature. The study included 66 subjects (30 males and 36 females). Males had an average height of 165.86 cm, while females had an average height of 155.85 cm. Significant gender differences were observed in heights of the posterior vertebral body (HPVB), heights of the central vertebral body (HCVB), and pedicle axis length (PAL) measurements. HPVB of L1 can be used as a predictor of height in females ($p<0.001$), whereas PAL of L5 can be used as a predictor of height in males ($p=0.006$). Lumbar spine dimensions measured using 3D CT scans provide reliable stature predictions, with specific measurements such as HPVB from L1 in females and PAL from L5 in males showing high accuracy. These findings support the development of population-specific anthropometric tools and enhance understanding of factors influencing stature in Indonesia.

Keywords: BMD-DXA, CKD, osteoporosis, panoramic radiography, T-score

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