

Study of Relationship between Body Mass Index (BMI) and Bone Mineral Density (BMD) in Postmenopausal Women

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Obesity and osteoporosis are growing and important public health problems while osteoporotic fractures are main concerns of postmenopausal women. Low BMD is a risk factor for osteoporosis and related fractures. BMI has been found to be inversely related to the risk of osteoporotic fractures. Although several studies have investigated the association between BMI and BMD, the results are inconsistent. The aim of this study was to investigate the relation between BMI and BMD in postmenopausal women. This is a retrospective study of Dual-Energy X-ray Absorptiometry (DXA) database from 01.01.2019 to 31.12.2022 at Nuclear Medicine Unit, University of Peradeniya. Postmenopausal women underwent a standard BMD scan of lumbar vertebrae (L1-L4) and total hip. Participants were categorized into two BMI groups; normal weight $< 25.0 \text{ kg m}^{-2}$ and overweight and obese $\geq 25.0 \text{ kg m}^{-2}$. The clinical details were analyzed by Minitab 18.0 using BMD of lumbar spine and total hip. Total 953 patients, 839 of them were females. Out of them; 765 (91.17 %) were postmenopausal women with the mean age of 61.88 years (SD = 9.538). Among the postmenopausal women; 476 (62.22 %) had BMI $\geq 25.0 \text{ kg m}^{-2}$ and 289 (37.78 %) had BMI $< 25.0 \text{ kg m}^{-2}$. The mean BMD of postmenopausal women with BMI $\geq 25.0 \text{ kg m}^{-2}$ and with BMI $< 25.0 \text{ kg m}^{-2}$ were 0.769 (SD = 1.37) and 0.693 (SD = 1.40) respectively. Mean BMD of postmenopausal women with BMI $\geq 25.0 \text{ kg m}^{-2}$ had higher significance ($P = 0.000$ with 95% CI) than those with BMI $< 25.0 \text{ kg m}^{-2}$. It was noted that higher BMI and weight were associated with a higher BMD. These data indicated both BMI and weight are associated with BMD of hip and vertebrae; and overweight and obesity decrease the osteoporosis risk.

Keywords: Bone mineral density, Body mass index, Osteoporosis, Postmenopause