

## **Protective Factors of Low Bone Mineral Density: An Examination between Two Samples of Premenopausal Women**

CHARLENE R. NORGAN RADLER<sup>1</sup>, CHRISTINE M. FLOREZ<sup>2</sup>, COLIN WILBORN<sup>1</sup>, LEM TAYLOR<sup>3</sup>, ARIANE HOLLUB SECREST<sup>1</sup>

<sup>1</sup>Public Health Program; School of Health Professions; University of Mary Hardin-Baylor; Belton, TX

<sup>2</sup>Energy Balance & Body Composition Laboratory; Department of Kinesiology; Texas Tech University; Lubbock, TX

<sup>3</sup>Doctor of Physical Therapy Program; School of Health Professions; University of Mary Hardin-Baylor; Belton, TX

---

*Category: Masters*

*Advisor / Mentor: Secrest, Dr. Ariane Hollub (asecrest@umhb.edu)*

### **ABSTRACT**

While minimal longitudinal data exists to support osteoporosis screening among premenopausal women, an increasingly modernized society may contribute to modifiable osteoporosis risk factors including poor nutrition and low physical activity. Evaluation of bone mineral density (BMD) and body composition differences in populations with varied levels of physical activity is of importance. **PURPOSE:** The purpose of the current research was to determine if there is a difference across body composition measurements including total lean mass, body mass index (BMI), and BMD among a subset of physically active premenopausal women (ACTIVE) at a small, southern Christian university compared to premenopausal women from the general U.S. population in the National Health and Nutrition Examination Survey (NHANES). **METHODS:** BMD z-scores were calculated for premenopausal females who underwent a Dual-Energy X-Ray Absorptiometry (DXA) scan in a university performance lab from 2009 to 2023, matched to age, sex, and race/ethnicity participants from NHANES. Participants were classified by low or normal BMD using the International Society for Clinical Densitometry recommended cutoff of -2.0 for total body and by BMI using standard weight status categories published by the Centers for Disease Control and Prevention. Descriptive statistics were used to analyze participant characteristics and percentage across BMI and BMD categories. Total lean mass was reported by mean and standard deviation for ACTIVE and NHANES participants across BMI and BMD categories. Independent *t*-tests were used to determine if any differences existed between the ACTIVE and NHANES participants across total lean mass, BMI, and BMD. **RESULTS:** Data analysis included 2037 from the ACTIVE sample and 4326 from the NHANES sample. The frequency of low BMD (<-2.0) among ACTIVE participants is 0.39% (n = 8) compared to 3.7% (n = 78) among NHANES participants. ACTIVE participants had significantly higher BMD [ $t(3361.21) = 26.49$ ,  $p < 0.001$ ] and a significantly greater total lean mass [ $t(4677.71) = 11.14$ ,  $p < 0.01$ ] than NHANES participants. Intriguingly, ACTIVE participants had a higher mean total lean mass than NHANES participants across all BMI categories except those classified as obese, regardless of BMD. **CONCLUSION:** The ACTIVE sample demonstrated a decreased prevalence of low BMD, likely attributed to increased physical activity. These observed differences in BMD are supported by higher total lean mass and lower rates of obesity likely also attributed to their physical activity history. This data supports the importance of lifestyle habits and its beneficial effects on both BMD and indices of body composition among premenopausal women.