

Reference intervals of biochemical bone turnover markers for Saudi Arabian women: a cross-sectional study.

[Ardawi MS](#), [Maimani AA](#), [Bahksh TA](#), [Rouzi AA](#), [Qari MH](#), [Raddadi RM](#).

Center of Excellence for Osteoporosis Research, King Abdulaziz University, Jeddah, Saudi Arabia.

Abstract

Biochemical bone turnover markers (BTMs) provide important information on the diagnosis, therapy and monitoring of metabolic bone diseases including osteoporosis. One goal of antiresorptive therapy in women is to decrease biochemical BTMs to the lower half of reference intervals for healthy pre-menopausal counterparts, using newly developed automated assays of such markers. The main objectives of the present study were to: (1) establish reference interval values for the following biochemical BTMs: serum osteocalcine (s-OC), bone alkaline phosphatase (s-bone ALP), procollagen type 1 N-terminal propeptide (s-PINP), crosslinked C-terminal telopeptide of Type 1 collagen (s-CTX), tartarate-resistant acid phosphatase isoform 5b (s-TRACP-5b) and urinary: CTX (u-CTX), N-telopeptides of type 1 collagen (u-NTX), pyridinoline (u-PYD) and deoxypyridinoline (u-DPD) in randomly selected Saudi healthy pre-menopausal women; (2) study the changes in biochemical BTMs in relation to age in pre- and post-menopausal women and the factors reported to influence bone turnover and (3) determine the effect of menopausal status on BTMs. A total of 2125 women were studied [including (n=1557) pre-, and (n=568) post-menopausal women, respectively, aged 20-79 years]. A total of 765 healthy pre-menopausal women (aged 35-45 years) were used to establish reference intervals for biochemical BTMs. All women studied were medically examined and had their bone mineral density (BMD) values obtained for the lumbar spine (L(1)-L(4)) and femoral neck according to detailed inclusion criteria. In all women, values of biochemical BTMs, decreased with increasing age up to the age of 45 years, increased steeply among women in their 50s and remained increased in post-menopausal women. Significant increases were evident in all biochemical BTMs in post-menopausal women with >5 years since menopause with the exception of s-OC, u-DPD, and u-PYD. Using stepwise multiple linear regression analysis, several variables were identified (depending on the BTM) as determinants of BTMs including age, BMI, parity, FSH, LH, PTH, s-Ca, s-Mg, s-PO(4) and 25(OH)D. In the reference intervals group, there are no significant correlations between any of the biochemical BTMs and age of menarche, day of menstrual cycle, physical activity, total daily dietary calcium and caffeine intakes and parity. It is recommended that the age range 35-45 years should be used when establishing biochemical BTMs reference intervals in Saudi Arabian pre-menopausal women