

Variation of urinary and serum bone turnover marker reference values among pre and postmenopausal women in Asia: a systematic review

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Abstract

Purpose: Bone turnover markers (BTMs) are not widely used in clinical decision-making partly due to the wide variation of the reference values. This paper describes the geographical variation in BTMs reported from Asian countries.

Method: A systematic search was conducted using the PubMed, EMBASE, and Ovid. We searched for BTMs or individual BTMs in Asia or different countries in the Asian region. Original research which published BTM values were included while reviews, comments, and meta-analyses were excluded.

Results: Of 650 articles, 23 fulfilled the selection criteria and were considered for this study. Among premenopausal women, mean intact OC ranged from 3.35 in Japan to 7.38 ng/mL (55%) in Thailand while it ranged between 3.35 and 5.8 ng/mL (42%) within Japan. Mean BALP varied from 15.9 in India to 41.2 U/L (61%) in Japan whereas in India, it ranged between 15.9 and 53.7

U/L (70%). Mean sP1NP ranged from 29.5 in Japan to 38.02 ng/mL in China (22%) whereas sCTX varied from 0.26 in Thailand to 0.099 ng/mL (62%) in Japan. Among postmenopausal women, mean total OC ranged from 10.02 in India to 29.8 ng/mL (66%) in Japan and intact OC ranged between 2.69 and 9.49 ng/mL (72%) within China. Mean BALP ranged from 20.9 in Japan to 60.28 U/L (65%) in China, and within China, it ranged from 28.2 to 60.28 U/L (53%). Mean sP1NP ranged from 40.11 in China to 56.4 ng/mL (29%) in Japan whereas it ranged within China from 40.11 to 53.76 ng/mL (25%). Mean sCTX varied from 0.25 to 0.433 ng/mL (42%) between the same countries respectively while within China, it varied from 0.25 to 0.395 ng/mL (37%). Urinary BTMs showed a lesser variation.

Conclusion: A wide inter-country and intra-country variation of serum BTMs was observed among pre and postmenopausal women in Asia. Differences in selection criteria of subjects and those inherited to analytical methods may have contributed to these differences.

Keywords: Asia; Bone turnover markers; Reference ranges; Women.