The Normal Reference Range of Testosterone among Thai Fertile Men: A Cross-sectional Observational Study

Kittithat Taemkaew1 Noppadol Kietsiriroje1
Chusana Petpichetchian2 Rattana Leelawattana1

1Division of Endocrinology and Metabolism, Department of Internal Medicine, Faculty of Medicine, Prince of Songkla University, Hatyai, Songkhla 90110, Thailand, 2Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Faculty of Medicine, Prince of Songkla University. Hatyai, Songkhla 90110, Thailand

Background: In a bid to determine whether a male patient has hypogonadism, a clinician must consider clinical signs and symptoms in conjunction with serum testosterone levels. The use of normal reference range as a diagnostic tool should be the population-based specific reference range.

Objective: To establish the normal reference range of testosterone for the diagnosis of male hypogonadism among Thai subjects.

Methods: Fertile men, defined by the ability to give an offspring within the past year, were enrolled and categorized into 4 age groups (18-29, 30-39, 40-49 and 50-65 years). Baseline characteristic data and androgen deficiency screening questionnaires were taken by investigators. Serum levels of total testosterone (TT), sex-hormone binding globulin (SHBG), Follicle-stimulating hormone (FSH), luteinizing hormone (LH), and albumin were measured using radioactive immunoassay (RIA) technique. Bioavailable testosterone (BT) and free testosterone (FT) were calculated by a calculator using Vermeulen’s formula. Multiple linear regressions were used to identify covariates interfered TT, BT and FT levels.

Results: Fifty-five fertile men were enrolled into the study. The mean BMI, WC were (mean +/- SD) 25.09 +/- 4.53 kg/m2 and 85.86 +/- 11.71 cm., respectively. Only 3 volunteers (5.45 %) had diabetes. The TT levels by age groups were (2.5-97.5 percentile) 225.3 - 677.0, 287.4 - 627.4, 216.8 - 756.7 and 407.2 – 605.8 ng/dL, respectively. The cBT levels by age group (2.5-97.5 percentile) were 121.4 – 300.6, 148.2 – 299.0, 105.4 – 286.2, and 148.7 – 177.2 ng/dL, respectively. The cFT levels by age group (2.5-97.5 percentile) were 48.4 – 111.3, 55.7 – 109.0, 41.4 – 116.9, and 59.3 – 71.0 pg/mL, respectively. Age, WC, SHBG were the significant covariates for TT measurements, while the measurements of BT and FT were affected by only age and WC.

Conclusion: This study establishes the normal reference range of sex hormones categorized by age-groups for male subjects with normal reproduction.

Keywords: Normal reference range, Testosterone, Fertile men, Thai population