

## Abstract

**Background:** Menorrhagia, characterised by menstrual blood loss exceeding 80 mL per cycle, is a common issue in Western Kenya. However, there are insufficient data on how hormonal disorders contribute to its occurrence.

**Objective:** This study aimed to examine the differences and associations between thyroid and reproductive hormone levels in women with menorrhagia versus those without, in Bungoma County, Kenya.

**Methods:** A comparative cross-sectional study was conducted among 428 women (214 with menorrhagia and 214 controls) aged 18–45 years, between 01 December 2022 and 31 September 2023 at Bungoma County Referral Hospital. The analysis included thyroid stimulating hormone, total and free triiodothyronine, thyroxine, follicle stimulating hormone (FSH), luteinising hormone, prolactin, oestrogen, progesterone, and testosterone.

**Results:** Women experiencing menorrhagia had statistically significant increases in levels of FSH ( $p < 0.0001$ ), oestrogen ( $p < 0.001$ ), and total testosterone ( $p < 0.001$ ), while prolactin levels had a statistically significant decrease ( $p < 0.001$ ) compared to those without menorrhagia. There were no statistically significant differences in total triiodothyronine ( $p = 0.384$ ), free triiodothyronine ( $p = 0.610$ ), total thyroxine ( $p = 0.127$ ), free thyroxine ( $p = 0.360$ ), or thyroid stimulating ( $p = 0.118$ ). No associations were found between menorrhagia and either thyroid or reproductive hormones.

**Conclusion:** Elevated levels of FSH, oestrogen, and testosterone, along with reduced prolactin, may serve as potential biomarkers for diagnosing menorrhagia in premenopausal or reproductively aged women. A screening tool that integrates these hormonal markers could improve the accuracy of diagnosis and optimise treatment strategies in primary healthcare settings.

**What this study adds:** The study suggests that levels of FSH, oestrogen, total testosterone, and prolactin differ significantly between women with and without menorrhagia, indicating their potential use in predicting the condition.