

The Effects of Prolonged Use of Caffeine on Thyroid and Adrenal Glands - A Retrospective Cohort Study

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Abstract : Background: Caffeine consumption has skyrocketed in the recent decades as we try to match pace with the machines. Studies have been conducted on animals and a few on humans, mainly on the acute effects of high-dose caffeine intake. Almost none have been conducted on the chronic effects of caffeine consumption. This study involved Medical professionals as case subjects, who consumed caffeine daily. Methods: This study, over a period of 3 months, involved 96 volunteers (chosen randomly w.r.t. gender and field in medical fraternity), including people who drank >500mg of caffeine a day to people who consumed none. People with any co-morbidities at all were excluded straight away. Two sets of blood samples were drawn and assessed. Three groups were created, Group 1 (>200mg caffeine/day) and Group 2 (15-200 mg caffeine/day) and Group 3 (<200mg Caffeine/day). Results: The result of the study found that exposure to caffeine at doses >200mg/day for more than 6 months leads to a significant difference in circulating free T3 [$(-0.96 \text{ pmol/L} \pm 0.07) = (-18.5\%)$, CI 95%, $p = .000024$] and Cortisol [$(-123 \text{ nmol/L} \pm 9.8) = (-46.8\%)$, CI 95%, $p = .00029$] hormones but shows an insignificant effect on circulating TSH [0.4 mIU/L , CI 95%, $p = .37$] and ACTH [$(-3.2 \text{ pg/ml} \pm 0.3)$, CI 95%, $p = .53$] hormones, which stay within normal physiological ranges, irrespective of the daily dose of consumption. Results also highlight that women are more susceptible to decrement in fT3 than men (Relative Risk = 1.58, ANOVA F-static = 7.15, $p = 0.0105$). Conclusions: Caffeine consumption in excess of 200mg/day, for more than or equal to 6 months, causes significant derangement in basal fT3 and Cortisol hormone levels, without affecting the TSH and ACTH (regulatory) hormone levels, indicating disturbance of action at the peripheral and/or cellular levels, possibly via the Paraventricular Nucleus -Leptin-CAR-Adenosine interactions. Women are more susceptible to decrement in fT3 levels than men (at same dose of caffeine).

Keywords : ACTH, adrenals, caffeine, cortisol, thyroid, thyroxin, TSH

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