

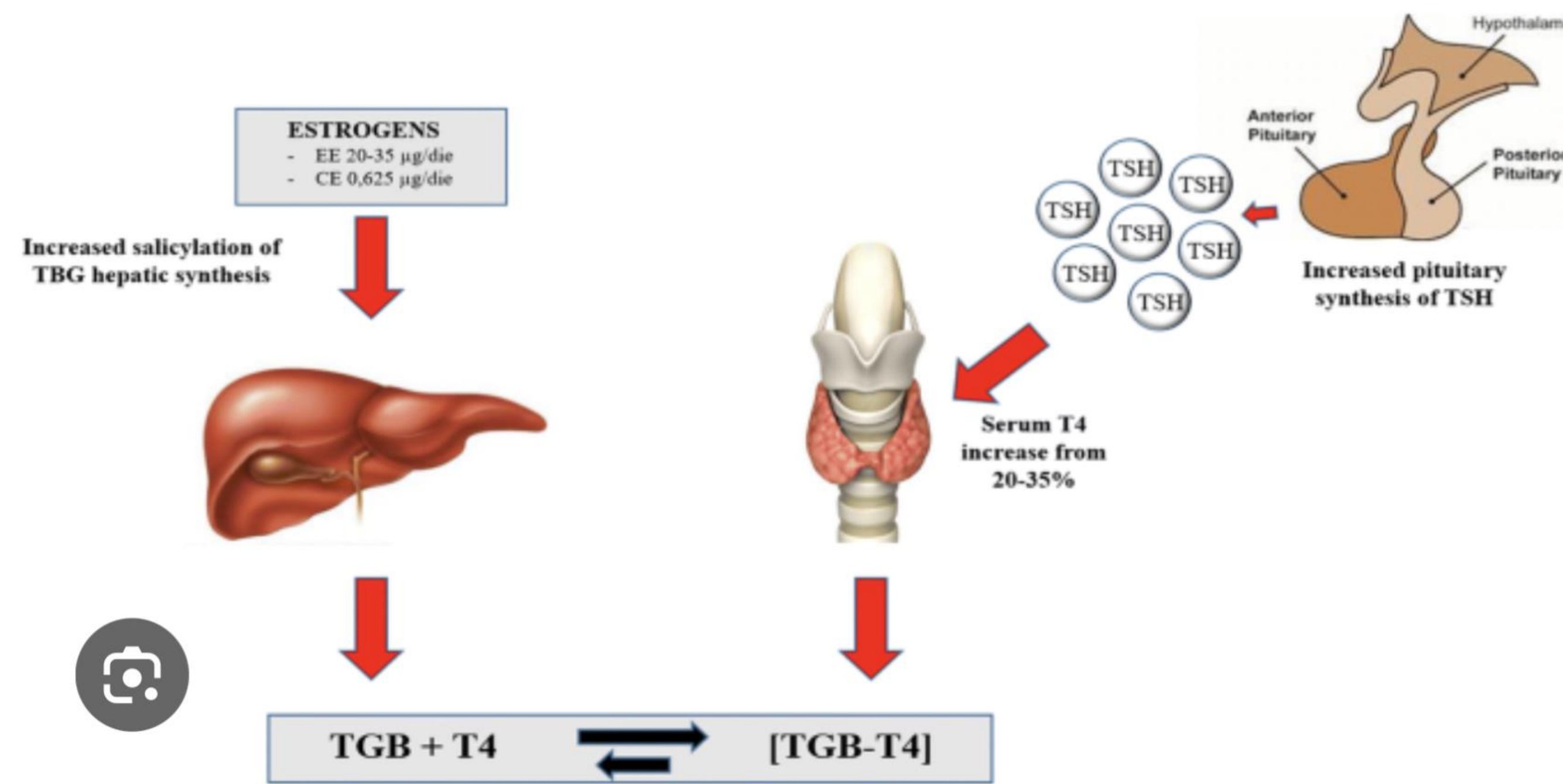
The Link Between Long-Term Oral Contraceptive Use and Thyroid disorder: A Literature Review

Najma Abdullahi

The University of Washington

Abstract

Effects of OC on thyroid function and vice versa



Long Term Contraceptive Use and Thyroid Health

Synthetic hormones in OCs

Oral contraceptives (OCs) contain synthetic forms of estrogen and/or progestins, mimicking naturally occurring hormones.

Impact on thyroid hormone balance

Exogenous hormones in OCs can affect the balance of thyroid hormones, influencing thyroid function.

TBG and thyroid hormones

OCs alter the production and binding of thyroid-binding globulin (TBG) in the liver. Increased TBG production leads to elevated levels of bound thyroid hormones, affecting their availability to target tissues.

Role of progestogens

Progestogens in OCs modulate estrogen's effect on TBG synthesis, further influencing thyroid hormone levels.

Influence of progestins

Progestins like dienogest (DNG) and levonorgestrel (LNG) influence thyroid function by impacting thyroid hormone levels. These progestins can increase T4, T3, and cortisol levels by enhancing thyroid hormone binding to serum globulins.

Effects of DMPA and micronized progesterone

Depot medroxyprogesterone acetate (DMPA) and micronized progesterone affect thyroid function parameters, including TSH, free T4, and free T3 levels.

Lipid metabolism and cardiovascular health

OCs are associated with alterations in lipid metabolism and cardiovascular health. Estrogen in OCs elevates high-density lipoprotein (HDL) cholesterol and reduces low-density lipoprotein (LDL) cholesterol and triglycerides. These lipid-modulating effects of estrogen could contribute to changes in cardiovascular risk factors.

Complex hormonal interactions

Long-term OC use involves complex hormonal interactions and physiological responses. OCs impact thyroid hormone production, binding, and metabolism, altering thyroid hormone levels and related parameters. Effects extend to lipid metabolism and cardiovascular health.

Future Direction

Mechanisms of OC impact on thyroid function

Further research is needed to elucidate the exact mechanisms by which OCs impact thyroid function over the long term. Longitudinal studies with larger sample sizes can provide more comprehensive insights into these effects, particularly across diverse populations.

Cardiovascular outcomes and thyroid health

Investigating the impact of OCs on cardiovascular outcomes alongside thyroid health is crucial. Long-term studies can clarify how OC use influences cardiovascular risk factors, such as lipid profiles and cardiovascular events.

Potential interactions with thyroid medications

There is a need to explore potential interactions between OCs and thyroid medications.

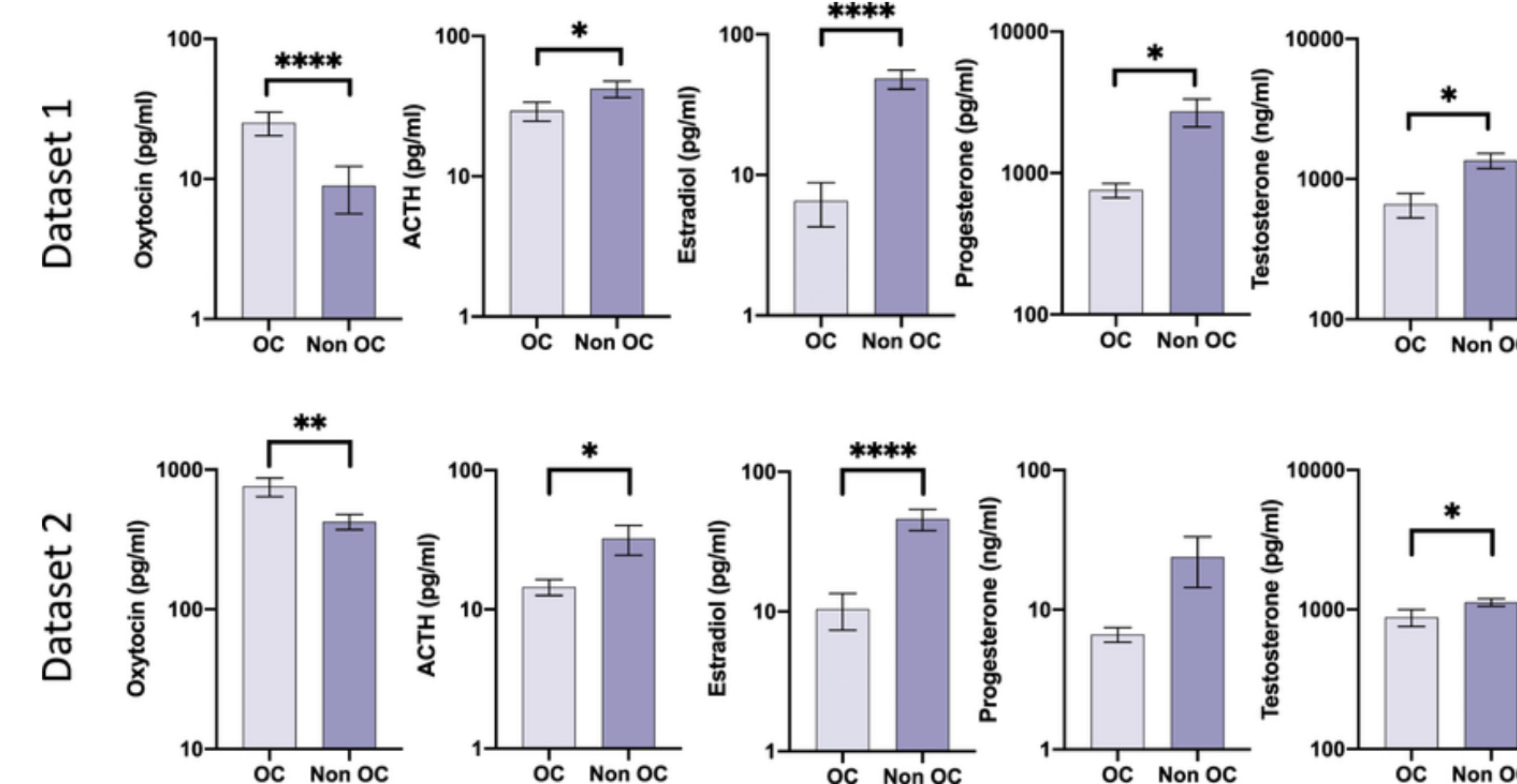
Genetic and environmental factors

Studying how genetic factors and environmental influences interact with OCs to impact thyroid health is essential. This research can help identify individuals who may be predisposed to thyroid dysfunction with OC use, enabling personalized healthcare approaches.

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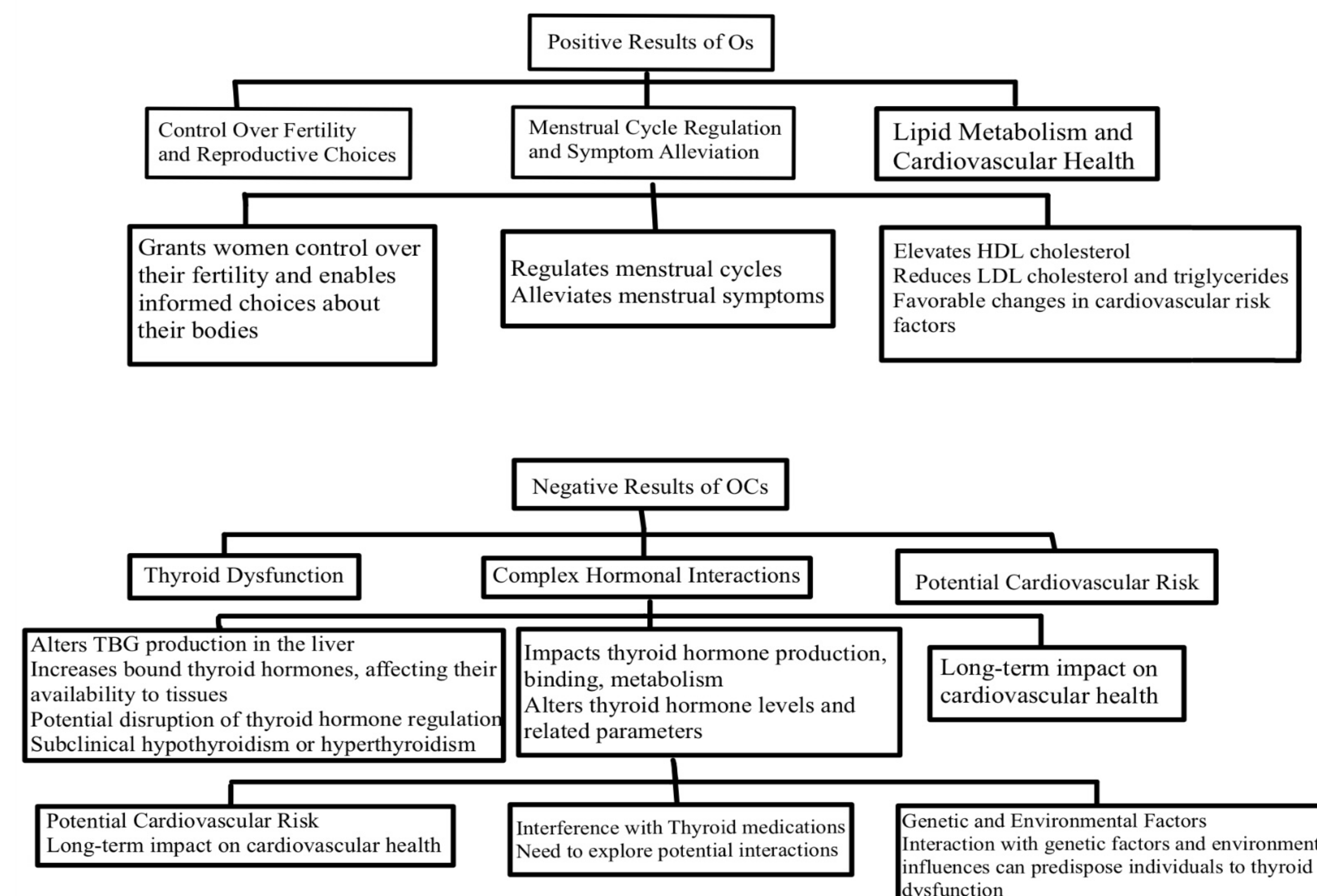


Association Between Hormone Levels and OC use



Graphs showing associations between OC use and hormone levels. Dataset1: Oxytocin (n = 129), ACTH (n = 136), Estradiol (n = 56), Progesterone (n = 73), Testosterone (n = 94). Dataset 2: Oxytocin (n = 47), ACTH (n = 38), Estradiol (n = 49), Progesterone (n = 48), and Testosterone (n = 47). *indicates significance at p < 0.05, **indicates significance at p < 0.01, ****indicates significance at p < 0.0001.

Positive and Negative effects of OC Use



Oral contraceptives: foundational role

Oral contraceptives are foundational in modern reproductive health, granting women control over their fertility and enabling informed choices about their bodies.

Prevalence among young women globally

Among young women globally, the prevalence of oral contraceptive use highlights their major role in family planning.

Health issue: thyroid risk

However, hidden behind the apparent ease of use is a health issue that often gets ignored: the potential link between long-term oral contraceptive use and the heightened risk of developing thyroid issues.

Thyroid biology overview

Thyroid-binding globulin (TBG) is a protein that transports thyroid hormones in the bloodstream. It plays a critical role in maintaining the balance and availability of thyroid hormones, which are essential for regulating metabolism, growth, and development.

Correlation between contraceptives and thyroid dysfunction

Initial studies suggest a correlation between long-term use of oral contraceptives and thyroid dysfunction, with statistics indicating a higher incidence of thyroid issues among users.

Reliable means to prevent unplanned pregnancies

The advent of oral contraceptives has transformed family planning, offering women a reliable means to prevent unplanned pregnancies.

Regulate menstrual cycles and alleviate symptoms

The widespread acceptance of oral contraceptives among young women emphasizes their efficacy and accessibility in navigating the complexities of sexual and reproductive health.

Underexplored aspect of contraceptive use

This review seeks to illuminate this underexplored aspect of contraceptive use, ultimately aiming to inform and guide future research in reproductive health.

Mechanisms of OC and Thyroid disorder w/ Clinical Implications

Effects of Estrogen in Oral Contraceptives

Stimulation of TBG production

Estrogen in OCs stimulates the liver to produce more thyroid-binding globulin (TBG), a protein that binds thyroid hormones (T4 and T3) in the bloodstream.

Impact on thyroid hormone levels

Increased TBG levels lead to higher levels of bound thyroid hormones, altering their distribution and availability to tissues.

Influences the hepatic metabolism of thyroid hormones, potentially affecting their clearance rates from the bloodstream.

Effects of Progestins in Oral Contraceptives

Modulation of TBG production

Progestins in OCs can modulate the effects of estrogen on TBG production, further influencing thyroid hormone binding dynamics.

Specific progestins may have varying impacts on thyroid function parameters such as thyroid-stimulating hormone (TSH), free T4, and free T3 levels.

Clinical Implications of Estrogen Effects on TBG

Altered thyroid hormone levels

Increased TBG production due to estrogen in OCs leads to higher levels of bound thyroid hormones.

While total thyroid hormone levels may increase, the levels of free (unbound) thyroid hormones, which are biologically active, may remain unchanged or decrease.

Clinical Implications

Potential thyroid dysfunction

Long-term use of OCs may disrupt the delicate balance of thyroid hormone regulation.

This disruption could lead to subclinical hypothyroidism or hyperthyroidism in susceptible individuals, potentially impacting metabolic health and overall well-being.