

The Influence Of Hormonal Contraception On Mood Disorders, Breast Cancer, Venous Thrombosis, And Dermatologic Disorder

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Abstract

Objective: During the last decade, the number of women who use oral contraception has increased. Several studies have emphasized the possible influence of sex hormones on the regulation of vegetative, psychophysiological, and cognitive functioning. There is therefore need to further understand the impact of hormonal contraception on women's quality of life, especially regarding adverse effects, such as mood disorders, breast cancer, venous thrombosis, and dermatologic disorders.

Methods: This study conducted a meta-analysis review of evidence to clarify the relationship between hormonal contraceptives and certain risk factors.

Results: Our research clarified that hormonal contraception may be associated with depressive symptoms, breast cancer, and venous thrombosis, and can cure some skin problems. Choosing the most suitable hormonal contraception requires joint decision-making, taking into account the individual preferences and requirements of each woman, as well as her physical and psychosexual conditions.

Keywords: Oral contraceptive, Disorder, Mood, Breast Cancer, Venous Thrombosis, Skin, Hormones .

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Various types of hormonal contraceptives are available to women. Some consist of progesterone only, while others combine progesterone and estrogen (Mu & Kulkarni, 2022). There are various long-acting forms of progesterone. Available as a contraceptive only, these include subdermal release implants, levonorgestrel intrauterine devices, and intramuscular injections of medroxyprogesterone acetate. There are three types of progesterone-only pills (see Table 1).

Table 1

Progestogen-only hormonal contraceptives

Progestogen	Progestogen content	Brand name
Levonorgestrel, oral	30 micrograms	Microlut
Levonorgestrel, intrauterine device	19.5 mg	Kyleena
	52 mg	Mirena
Norethisterone, oral	350 micrograms	Noriday 28
Drospirenone	4 mg	Slinda
Medroxyprogesterone acetate, intramuscular injection	150 mg	Depo-Provera

Note. This table has been adapted from (Hormonal contraception and mood disorders," by E. Mu & J. Kulkarni, 2022. *Australian Prescriber*, 45(3), pp. 75–7(doi:10.18773/austprescr.2022.025).

The most common contraceptive available to women of fertile age is the vaginal ring, which comprises progesterone and estrogen. The vaginal ring can prevent pregnancy by acting locally on reproductive organs and

centrally impeding the hypothalamic–pituitary–ovarian axis. Estrogen is supplied in 20–50 µg in oral contraceptives (OCs) and progesterone, always as a 19-nortestosterone derivative, such as etynodiol diacetate, desogestrel, etynodiol diacetate, gestodene, levonorgestrel, lynestronol, norethisterone, norethisterone acetate, norgestimate, or norgestrel. OCs are the most popular because of their efficacy and ease of use; however, they may have adverse effects, such as mood disorders, breast cancer, venous thrombosis, and dermatologic disorders (Mu & Kulkarni, 2022). Education is important for raising women’s awareness of contraceptive complications and preventing unexpected side effects. In addition, women should be assessed by healthcare professionals before and during the use of hormonal contraceptives .

Current research indicates that progestin-only long-acting reversible contraception (LARC) frequently results in side effects, which may cause an otherwise successful, low-maintenance method of contraception to be abruptly stopped. Despite substantial investigation, the origins of abnormal uterine bleeding, pelvic pain, acne, and weight change that are frequently reported as progestin-only LARC side effects remain unclear. Although most adverse effects improve over time, patients who would rather have medical therapy for unwanted side effects might opt for therapeutic measures. Indeed, research emphasizes the significance of appropriate patient counseling and clinical follow-up (Edwards et al., 2020).

I. Methods:

Our research was based on the PubMed database for all published English articles from 2012 to 2024 that examined women using contraceptives.

Conflicts of Interest:

None declared.

The experiments reviewed, ethical approval was obtained from the National Center for Fertility Research. The studies reviewed was conducted according to the general guidelines relating to laboratory animals in Iraq.

Funding:

This research received no external funding.

II. Results:

Risk of Depression

Several research studies were included in the analysis. Users of combination OCs had a higher rate of initial antidepressant usage than nonusers (Skovlund et al., 2016) for the initial

administration of an antidepressant in users of progestogen-only tablets, users of levonorgestrel intrauterine systems, users of vaginal rings (etonogestrel), and users of patches (norgestrolmin). The relative risk of depression generally decreased with age (Mu & Kulkarni, 2022).

Regarding the Schuh et al., 2024 research paper, 94 adult female mice were exposed to the same conditions involving the administration of ethinyl estradiol (EE) and levonorgestrel (LVNG) in a 10% sucrose solution, EE and drospirenone (DRSP) in a 10% sucrose solution, or a 10% sucrose solution alone to young adult female C57Bl/6 N mice on a daily basis. The acute stress response was decreased by doses of EE + LVNG exposure that were relevant for the dose, but not by doses of EE + DRSP. This finding aligns with the effects found in human OC users. The administration of EE + LVNG resulted in a distinct anhedonia-like impact while not inducing significant alterations in stress-coping behavior, other behaviors associated with depression, or anxiety-like behaviors (Schuh et al., 2024).

Risk of Breast Cancer

The relative risk of breast cancer among all current and recent users of hormonal contraception was higher than that of women who had never used the method. Even after using it for less than a year, this risk increased (Mørch et al., 2017). The risk of breast cancer after hormonal contraception ceased was greater in women who had taken hormonal contraceptives for five years or longer than in those who had not taken contraception at all or taken less than 5 years. The risk assessments related to the use of different oral combination contraceptives. In addition, compared to women who had never used hormonal contraceptives, those who were currently using or had recently used contraceptives were at increased risk of developing breast cancer. This study used a combination of mouse mammary gland tissue ex vivo assays and implanted human breast epithelial cells into mice to assess the capacity of six commonly used progestins to activate the expression of progesterone receptor target genes that are crucial for the proper functioning of progesterone receptor target genes. Additionally, the study examined their ability to promote prolonged proliferation of breast epithelial cells. Progestins commonly found in contraceptives can be classified into two categories: 1) androgenic progestins, which have similar effects to testosterone and stimulate the expression of key components of progesterone

receptor signaling, leading to the growth of human breast epithelial cells; and 2) anti-androgenic progestins, which inhibit the effects of testosterone and do not produce these effects (Carroll, 2021).

Risk of Venous Thromboembolisms

Oral contraceptive users have been shown to experience higher venous thromboembolic incidents than nonusers. Women with underlying mood disorders may be more susceptible to mood effects, but this may be due to factors related to their choice of contraception rather than to the mood disorder itself. Most women using combined hormonal contraceptives reportedly showed no effect or a beneficial effect on mood. Contraceptives containing less androgenic progestins may have fewer adverse effects on mood. Continuous and possibly non-oral dosing of combined hormonal contraceptives have the fewest mood effects (Tepper et al., 2017).

In a study by Dias et al. (2023), female C57BL/6J mice were acquired from Charles River Laboratories (Wilmington, MA, USA). Previously, ER α -AF20 mice were described by Billon-Gales et al. (2011). The processes were conducted in line with the defined principles(Williams et al., 2020).

Dermatologic Disorders

Progesterone-only treatments, such as implants, frequently cause or exacerbate hirsutism, alopecia, acne, and even rosacea (Williams et al., 2020).

An experiment by Khamees et al. (2012) in Iraq used 20 adult female albino mice to test the effects of contraception on the skin.

Hormonal contraceptives show promise in treating hidradenitis suppurativa and androgenetic alopecia, but there is insufficient evidence to support their use in treating other dermatologic conditions(Williams et al., 2020).

III. Discussion:

Women from several research studies were included in the analysis. Women using oral contraceptives had a higher rate of initial antidepressant usage than nonusers. This was noted, in particular, among users of progestogen-only tablets, levonorgestrel intrauterine systems, vaginal rings (etonogestrel), and patches (norgestrolmin). As age increased, the relative hazards generally decreased.

In one study, 94 adult female mice were exposed to the same condition. The study involved the daily administration of ethinyl estradiol (EE) and levonorgestrel (LVNG) in a 10% sucrose solution, EE and Drospirenone (DRSP) in a 10% sucrose solution, or a 10% sucrose solution alone to young adult female C57Bl/6 N mice. The acute stress response was decreased by doses of EE + LVNG exposure that were relevant for translation, but not by doses of EE + DRSP. This finding aligns with the effects found in human OC users. The administration of EE + LVNG resulted in a distinct anhedonia-like impact, while not inducing significant alterations in stress coping behavior, other behaviors associated with depression, or anxiety-like behaviors.

Globally, women take hormones, both as hormonal replacement therapy and contraceptives. An *ex vivo* model studying hormonal activity showed that hormonal-based drugs have varying biological effects on the epithelial layer on the breast and thus suggest different risks for breast cancer. However, the risk of breast cancer can be avoided by using progesterone contraceptives, which can stimulate the production of breast epithelial tissue. Alternative hormonal contraceptives, especially those containing cyproterone acetate (CPA), may also have preventive benefits.

The complementary effect of hormones on the risk of venous thrombosis in women cannot be measured by comparison with mice, in which hormones activate plasma coagulation and increase the tendency for venous thrombosis. A short course of OCs has a minor effect on coagulation and does not cause an aggressive thrombotic tendency.

OCs can successfully treat acne, alopecia, and rosacea. Estrogen reduces the release of sebum, which in turn reduces the lipogenesis whiteout effect of the cellular division of sebocytes, leading to a reduction of fatty acid synthesis enzymes that are induced by estrogen.

IV. Conclusion:

The most widely used reversible form of birth control is the OC pill. The most effective forms of contraception are intrauterine devices and subdermal implants, and the least risky forms are non-hormonal methods. The best choice of contraception, however, takes the values and desires of the individual patient into account.

Depression is reportedly a side effect of using hormonal contraception. Compared to women who have never used hormonal contraceptives, those who now use them or have previously used them have a greater chance of developing breast cancer; this risk increases with continued use.

Hormonal contraception should be counseled about the risk of venous thrombosis especially women who has cardiovascular disease.

With regard to skin conditions, given the complex interactions between hormones and the skin, dermatologists should obtain a comprehensive history of patients' use of medications and contraception to be aware of their mechanisms and effects on the skin.