

How Hormonal Birth Control Affects Depression

Mia Mayzel

ABSTRACT

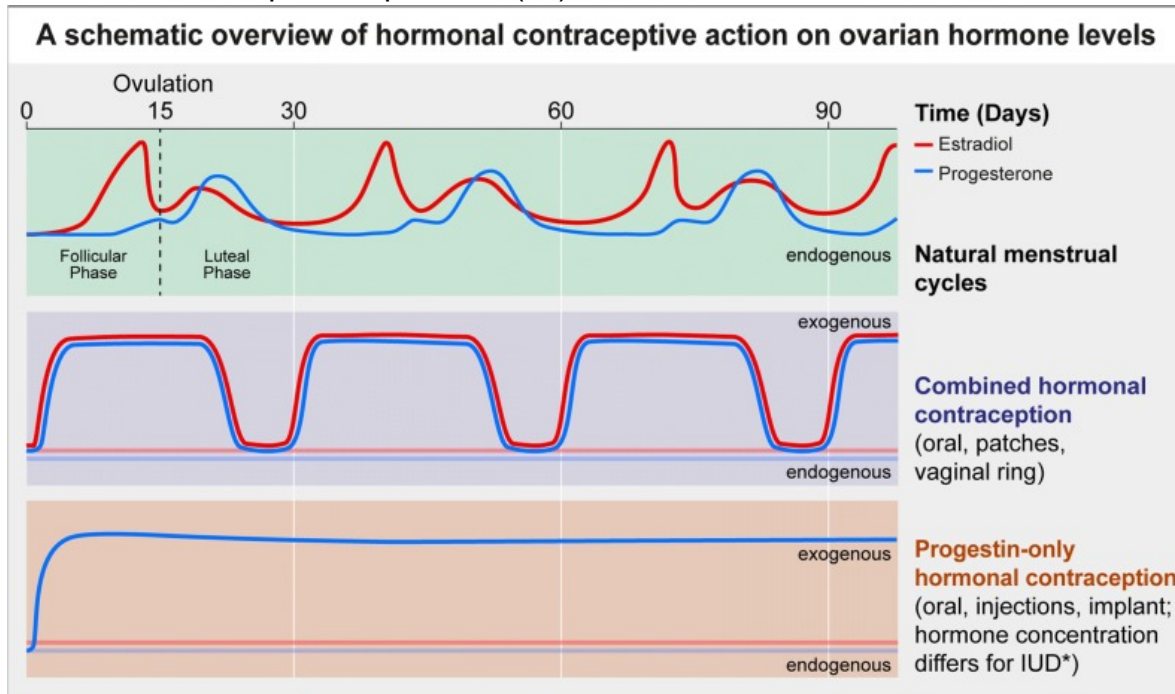
In the 21st century, millions of women have now gained access to hormonal birth control (HC). However, with the increased usage of hormonal birth control, women have reported many side effects, including increased depressive episodes. The background and importance is that the relationship between HC and depression is widely inadequately unaddressed-Specifically among adolescents, a first diagnosis of depression is a negative consequence of HC (11). Additionally, healthcare providers are not supported to the particular side effects that may only affect certain people. Specifically, adhering to women with previous or current psychological illnesses and how HC influences the progesterone and estrogen cycles which can exacerbate psychological symptoms. Furthermore, HC usage has been linked to dampened stress responses in women (17). Overall, HC is a positive invention, but with growing evidence, it is linked to an increased prevalence of depression. In this review article, we will discuss evidence supporting this relationship.

INTRODUCTION

Women have been using the birth control pill since the 1960s (1), and have been developing consistently through technological advancements that help optimize the crucial chemical reactions needed for the birth control pill to function(1). After being approved by the Food and Drug Association (FDA) in 1960, its use skyrocketed within the next two years and successfully reached 1.2 million women across the US (1). Soon after its introduction, the birth control pill reached other parts of the world, and now 300 million women worldwide have used it (1). Some say the birth control pill was modern medicine's most "socially significant" invention (2). Women often take the birth control pill to prevent pregnancy and to help sex hormones, and how the pill does this is widely misunderstood or unknown to the user. Ultimately, the birth control pill stops or reduces ovulation during a woman's menstrual cycle (3). Ovulation is the menstrual cycle stage in which women are most likely to get pregnant; thus, stopping or reducing ovulation reduces the chance of pregnancy (4). Even though the birth control pill is an incredible invention, it does come with its adverse effects.

Women have two main sex hormones, estrogen, and progesterone (3).The body naturally makes these hormones and are primarily responsible for pregnancy (3), puberty (5), menstruation (6), and menopause (7).. The birth control pill introduces its synthetic estrogen and progesterone into the system (8), estradiol, and progestin, respectively, which stops the natural production of estrogen and progesterone by the body (9) (Figure 1). The natural production of estrogen and progesterone is stopped because the synthetic sex hormones travel through the bloodstream to the pituitary gland, which then sends a message to the brain to stop the natural production of estrogen and progesterone (9). Synthetic sex hormones can cause hormonal imbalance because the brain needs them evenly distributed in an individual's body (10), leading

to emotional and physical problems (10). One of the most prevalent emotional problems related to the birth control pill is depression (11).



Adapted and modified Figure 1: Lewis, Carolin A et al. “Effects of Hormonal Contraceptives on Mood: A Focus on Emotion Recognition and Reactivity, Reward Processing, and Stress Response.” *Current psychiatry reports* vol. 21,11 115. 7 Nov. 2019, doi:10.1007/s11920-019-1095-z.

The Effect of Hormonal Contraceptives on the Women’s Natural Menstrual Cycle - (A)
This figure displays the natural menstrual cycle (top row), the effect of the combined hormonal contraception (middle row) on the natural menstrual cycle, and the effect of the progestin-only hormonal contraception (bottom row) on the natural menstrual cycle of to estradiol and progesterone.

How birth control affects depression

Depression is one of the most common mental illnesses in the world (12), affecting nearly 121 million people worldwide (12). Women are about twice as likely to be diagnosed with depression as men because of their hormonal changes (13). Throughout a woman’s lifetime, there are phases when they are most likely to contract depression (13) due to the significant hormonal changes that are happening during those times. These phases would be during puberty (13), prior to menstruation (13), following pregnancy (postpartum depression) (13), and at perimenopause (13). Unfortunately, many young women between the ages of 15 and 34, who are on the birth control pill, are reporting depression as a significant side effect (11), and are even going off the birth control pill because of it. (11), and are even going off of the birth control pill because of it. TThere seems to also be a time component regarding when women start taking birth control and the emergence of major depressive disorder. In particular, women who

started using over-the-counter birth control during adolescence were at a higher risk for developing MDD (major depressive disorder) compared to women who never used over-the-counter (OC) birth control and women who used OC birth control later in adulthood. This study suggests that adolescents who use OC birth control are more sensitive and thus more susceptible to developing MDD than nonusers or women who use it later in life (14). Researchers continue to study and research to try and find one clear answer, but in the meantime, we have to try and make conclusions based on our multiple answers.

Communication barrier between medical healthcare providers and patients regarding hormonal birth control usage

Growing concern regarding HC is specific to the lack of communication regarding possible side effects when starting HC usage. Women have reported that they did not know of a possibility of psychological side effects of the birth control pill from their healthcare provider (15). According to a recent 2023 cross-sectional survey-based study, it was reported that 83% of participants responded that their provider never mentioned the possibility of psychological side effects when using HC (15). This is a liability and affects the trust needed between the patient and their healthcare provider (15). Some healthcare providers are even biased towards certain HCs or HC in general. In the same study, 17% of the participants were concerned that their providers were biased (15). It is partially believed that some healthcare providers avoid this transparency between them and their patients because of financial motives towards profit when a patient successfully goes on HC. However, it is also believed that some healthcare providers are not aware of the specific psychological side effects. The results from this study suggest a disconnect between existing journals and articles on the subject and patients' experiences. The existing literature on the psychological side effects of HC is limited and largely inconclusive, making it challenging for healthcare providers to obtain a clear answer (15). Additionally, according to a journal dedicated to contraception counseling, three of the most common issues that can arise during contraception counseling are clinician preference or bias, discussion of personal experience other than the patient's, and avoidance of less available or familiar methods (18). This illustrates that although many patients trust their healthcare providers, many consistently experience communication barriers between them and their healthcare providers.

Psychological illnesses related to Hormonal Contraception

Women with a history of psychological illnesses have reported being significantly more susceptible to mood changes as a side of their HC (15). According to a cross-sectional survey, 37% of participants experienced mood changes such as increased depression and stress as a side effect of the HC and had no reported history of psychiatric illness (15). One theory researchers have as to why this occurs is due to the HC interfering with the adrenocortical response to psychological stress by influencing the amount of cortisol release, and therefore causing unnatural cortisol level fluctuations and thus impairing cortisol's natural circadian rhythm, which can lead to increased responsiveness to stress, the increased prevalence for developing depression, and severe anxiety (16). They also evaluated participants who experienced mood changes while using HC with a history of psychiatric illness, and 63% of



participants who experienced mood changes as a side effect of the HC had a reported history of psychiatric illness (15). These reported rates of mood changes were significantly higher than those with no reported history of psychiatric illness, meaning individuals with a history of psychiatric illness are more susceptible towards experiencing negative mood changes while on HC. This may be due to the HC aggravating the psychiatric illness again through the unnatural cortisol level fluctuations that the HC causes. Furthermore, according to a research based investigative study, adverse effects of HC on mood are most consistent in women with a history of depressive and psychiatric symptoms (17).

Additionally, they mention a blunted response and a potential dysregulation of stress response (17). Overall, hormonal contraception does affect the possibility of psychological illnesses, specifically depression and stress response.

CONCLUSION

This article aimed to highlight the current state of the literature regarding hormonal birth control and its effects it has on an individual's usage regarding psychiatric illnesses specific to depression and other psychological illnesses (15). Furthermore, a growing concern in the literature points towards a juxtaposition regarding the communication with not only how birth control regulates a woman's estrus cycle but also the individual's experience regarding unwanted side effects leads to. In this article, we discussed how women enter into various stages, that the likelihood of developing psychiatric illnesses is at a higher prevalence rate (13). Furthermore, during one of these pivotal phases in development, young women are known to start using hormonal birth control between the ages of 15 and 34 (11). Not only do we know that it affects depression and mood disorders, but there's also increased literature regarding how mating preference is affected for women who use hormonal birth control, which suggests that not only are there psychological effects that are not being discussed and looked into more but, in addition, reproductive mating behaviors are also being affected (19). Furthermore, although hormonal birth control increases the likelihood of exacerbating the user's previous psychological illnesses, it has also been shown to help menses and women with irregular cycles, such as PCOS (polycystic ovary syndrome) (20). This suggests that although there are some negative connotations with hormonal birth control, it helps regulate the estrous cycle and is beneficial for certain users. However, this does not negate the other side effects, such as psychological illnesses and depression.



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