

New study could help explain why some women develop mood-related disorders after oral contraceptive use

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They are used by 150 million women worldwide and have been around for over 60 years. Oral contraceptives—like birth control pills—are part of many women's lives, often starting during puberty and early adolescence. Do they have any impact on brain health? A uOttawa team of researchers has been investigating the question. We sat down with senior author Nafissa Ismail, Associate Professor at the uOttawa School of Psychology and University Research Chair in Stress and Mental Health, to learn more.

Why did you decide to look into the effects of oral contraceptives on stress reactivity and brain activity?

"Millions of women have been taking [oral contraceptives](#), but little is known about whether the synthetic hormones found in the oral contraceptives have behavioural and neurophysiological effects, especially during puberty and [early adolescence](#), which are critical

periods of brain development.

Dr. Andra Smith, Full Professor at the School of Psychology, and I collaborated to investigate whether there are differences in stress reactivity—or how someone responds to stress—and [brain structure](#) and function between women who had begun taking oral contraceptives during puberty or in adulthood and those who had never used them. This study was carried out by graduate student Rupali Sharma, supported by imaging analyst Dr. Zhuo Fang and a team of undergraduate students."

What did you find?

"We found differences in brain structure and function between oral contraceptive users and non-users.

First, oral contraceptive use is linked to increased activation in the [prefrontal cortex](#) during working memory processing for negatively arousing stimuli, like images of a gun, [car accident](#), etc.

In our study, we also used a social stressor and we also found that women who started using oral contraceptives during puberty or adolescence display a blunted stress response, meaning that they do not react to stressors as much as women who started taking oral contraceptives in adulthood.

Women who started using oral contraceptives during puberty or adolescence also experience different [brain activity](#) during working memory processing of neutral images compared to women who started using oral contraceptives during adulthood.

In summary, oral contraceptive use is related to significant structural changes in brain regions implicated in memory and emotional processing. It

also alters stress reactivity."

Why is it important?

"Our findings offer critical insight into women's health. It brings awareness to the potential influences of oral contraceptive use.

It could also provide a neural mechanism for why some women develop mood-related disorders following oral contraceptive use. One possibility is depression. Some women have complained of depression symptoms during oral [contraceptive](#) use. We need to be aware of it and talk to our physician if we are experiencing these symptoms.

The goal of our research is not to worry women or to discourage them from taking oral contraceptives. We just want to advise them so that they can make an informed decision about what is best for them. There is still a lot of work to be done to fully understand the impact of oral contraceptives on women's health."

The paper "Use of the birth control pill affects stress reactivity and brain structure and function" is published in the journal *Hormones and Behavior*.

More information: Rupali Sharma et al, Use of the birth control pill affects stress reactivity and brain structure and function, *Hormones and Behavior* (2020). [DOI: 10.1016/j.yhbeh.2020.104783](#)

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