Introduction

It is sometimes difficult to meaningfully engage young people in discussions about potential harms associated with cannabis use; except where it comes to current sexual function and fertility. This bulletin summarises existing research on the effects of cannabinoids on male and female fertility as well as the relatively scant research looking at the effects of cannabinoids on sexual arousal, pleasure, and related issues.

Cannabinoid receptors are found throughout female and male reproductive organs and the endocannabinoid system is critical in regulating a wide variety of reproductive processes in both sexes. Indeed, both sexes are vulnerable to the disruptive effects of exogenous cannabinoids on reproductive functions. Due to both the presence of cannabinoid receptors within sexual organs as well as through the effects of cannabis on hormones, cannabis use can also affect sexual arousal and performance.

Cannabis and male fertility

Cannabis use adversely impacts male fertility by disrupting sperm functions (such as motility) as well as reducing sperm count. It is thought that a way cannabis disrupts sperm functions is through its effects on the cannabinoid receptors in the sperm itself. A number of studies have shown that activation of these receptors by cannabinoids inhibits sperm motility as well as disrupts other important fertility-related sperm functions (such as the acrosome reaction – the process sperm go through once they have reached the egg and try to fertilise it, which enables them to penetrate the egg).

Aside from impacting critical sperm functions, cannabis use may also have a negative effect of male fertility by reducing sperm production, and thereby, sperm count. One way that cannabis use may do this is by reducing leutinising hormone levels, a hormone that regulates testosterone production (via Leydig cells), which is in turn important for sperm production (and motility and viability). Indeed, long-term cannabis use has been linked to reduced testosterone levels and reduced sperm count.
Cannabis and male sexual performance

**Erectile function**

Cannabinoids have also been linked to erectile dysfunction. One way that cannabinoids may cause erectile dysfunction is via the presence of cannabinoid receptors (CB1 and CB2) in the human penis, specifically in the corpus cavernosum (CC), the erectile muscle of the penis. Importantly, recent research has shown that cannabinoids can act on penile cannabinoid receptors to inhibit the relaxation of the CC, a necessary component of penile erection.

**Sexual arousal, pleasure, and orgasm**

As noted previously, evidence suggests that cannabis use may be linked to reduced testosterone levels in men, which in turn has been linked to reduced libido and erectile dysfunction. Unfortunately, human studies that have looked at the issue of cannabis on sexual arousal have been retrospective self-report surveys, in which findings have been mixed: Men report using cannabis enhances their sexual pleasure and quality of orgasm whereas men who use cannabis daily are more likely to report difficulties in reaching orgasm, or reaching it too quickly. No study has examined the issue of the effects on male arousal in a laboratory setting, which would be more helpful in clarifying the role of cannabis in sexual arousal in men, independently from expectancy effects, subjectivity, and confounding factors. From the existing evidence, it seems cannabis might positively affect perceived pleasure during sex while negatively affecting erectile function.

Cannabis and female fertility

The endocannabinoid system is closely involved in regulating female reproductive functions and evidence suggests exposure to exogenous cannabinoids adversely affects female fertility and pregnancy in various ways. For instance, women who smoke regularly may have shorter menstrual cycles, possibly due to the effects of cannabis exposure on luteinising hormone levels. Across animal studies, cannabinoids disrupt the development of the embryo, render it less able to successfully implant into the uterine lining, and negatively affect how the placenta develops to maintain the pregnancy.

Cannabis use also adversely affects foetal growth during pregnancy: evidence from human studies shows cannabis use by pregnant women is associated with low birth weight in infant. Low birth weight babies have significantly greater chances of dying (both at birth and throughout their first year of life) and those who survive are at greater risk of having various neurological conditions (e.g., cerebral palsy) and developmental delays. In fact, the effects of prenatal cannabis exposure on foetal growth may be greater than those of tobacco exposure. Further, the adverse effects of prenatal cannabis exposure extend into childhood, with greater levels of hyperactivity and impulsiveness in prenatally exposed 10-year old children.

The mechanisms by which prenatal cannabis exposure adversely affects foetal development are varied. For instance, exposure to exogenous cannabinoids may affect foetal development via the presence of cannabinoid receptors in uterine, ovarian, and placental tissue (the actions of which influence in utero conditions). Alternatively, the effects of cannabis use on the developing foetus may be more direct: THC passes the placental barrier easily and thereby can directly affect foetal neurodevelopment. Indeed, both animal and human studies have found evidence of altered brain anatomy in infants exposed to cannabinoids in utero.
The effects of cannabis on sexual arousal and motivation in females

Research points to a role for cannabinoids in mediating sexual arousal in women. Though older retrospective surveys using self-report data have previously indicated an association between cannabis use and enhanced sexual arousal\(^\text{12,29}\), more recent experimental and laboratory data actually show the opposite effect: sexual arousal is associated with significant decreases in circulating levels of cannabinoids\(^\text{30}\).

Interestingly, exposure to cannabis in adolescence may have long-term effects on sexual motivation that extend into adulthood. For instance, female rats exposed to cannabinoids in adolescence showed reduced sexual motivation in adulthood\(^\text{31}\), together with reduced activation in areas related to motivation and arousal in response to sexual stimuli\(^\text{32}\). This should be an area of future study in humans.

Conclusion

Cannabis use has been shown to have a number of adverse effects on both male and female fertility. In males, cannabis use can adversely impact sperm production and function. In females, cannabis use can affect fertility by disrupting implantation and embryo development\(^\text{16}\) as well as having adverse effects on the developing foetus\(^\text{1}\).

Cannabis use may also affect sexual arousal, pleasure, and performance in both men and women though good quality research in this area is relatively scarce. From the existing research, there appears to be a dichotomy between perceived positive effects and objective physical effects. Early research\(^\text{31,32}\) is also pointing to a role for adolescent cannabis use to have long-term effects on adult sexual behaviour and sex-related brain reactivity.

References


