

# Depression and Anxiety

Research Summary



# Depression and Anxiety

Depression and anxiety are two separate mood conditions that commonly co-occur. They can be experienced acutely or chronically and as self-reported or diagnosed conditions.

## KEY MESSAGES

1. More sex and gender informed evidence is needed to better understand the relationship between cannabis use, depression, and anxiety.
2. The literature on sex, gender, cannabis, and anxiety and depression primarily reports on adolescents and young men and women. Few studies report on the associations in adult populations.
3. Cannabis use may increase men's risk of developing depressive **symptoms**, while among women, the evidence indicates an association between cannabis and anxiety and depression **diagnoses**.
4. Women and girls who use cannabis may be more vulnerable to suicidal thoughts and attempts compared to men and boys who use cannabis.
5. Transgender and gender non-conforming high school students reporting self-harm and suicide attempts are more likely to report cannabis use and depression.
6. More research is needed on the relationship between cannabis use and women's anxiety and depression symptoms during pregnancy.

## INTRODUCTION

This research summary is part of a larger research and knowledge translation project about sex, gender and cannabis use led by the Centre of Excellence for Women's Health and funded by Health Canada. The research methods and other research summaries are posted on the [Sex, Gender & Cannabis Hub](#). While most of the literature considers or studies men and boys and/or women and girls, we include information about all gender groups when available.

Our 2019 [Sex, Gender and Cannabis](#) report assessed a range of sex and gender related factors affecting cannabis use based on literature published prior to 2018. In that report, we found that there was a mixed association between depressive symptoms and cannabis, but that women who experience anxiety may be more vulnerable to cannabis use [1]. Some key findings included:

- » A US study with African American adolescents found that men who reported higher depressive symptoms and women who reported lower depressive symptoms reported more cannabis use over time [2].
- » A US study found that women, but not men, reported a desire to use cannabis to reduce social anxiety [3].
- » A US study found that women who used cannabis reported more emotional or physical problems that interfered with social activities and that they accomplished less due to emotional problems compared to women who did not use cannabis [4].
- » Early cannabis use initiation was associated with suicidal ideation and suicide attempts in girls and boys in France, but only for girls in the US [5, 6].

This summary describes additional evidence from 22 articles from academic and grey literature published between January 2018 and February 2021 related to sex, gender, depression, anxiety and cannabis use.

## SEX, GENDER, DEPRESSION, ANXIETY AND CANNABIS USE

There are mixed findings on the relationship between gender, cannabis use, depression, and anxiety.

- » A Canadian study with men and women ages 14 – 24 found that 61% of women and 72% of men with concurrent internalizing disorders (e.g., depression and anxiety), externalizing disorders (e.g., ADHD and conduct problems), and substance use disorders reported daily or near daily cannabis use [7].

*Studies with young men have demonstrated that cannabis use may put men at risk of developing depressive **symptoms** and that there may be an association between cannabis use and major depression **diagnoses**.*

- » A US longitudinal study with men ages 15 – 26 found that cumulative, annual increases in weekly cannabis use were associated with increases in depression symptoms and anxiety/depression-related issues [8]. In this study, there was no evidence that prior depression symptoms were associated with changes in risk of weekly cannabis use [8].
- » A US study of 9th grade African American boys found that baseline cannabis use predicted the trajectory of increased depressive symptoms over time, whereas baseline depressive symptoms were not predictive of increases in cannabis use over time [9].
- » A Swiss study with men ages 21 – 25 found that major depression had a mediating effect on the link between lower social cohesion and cannabis use dependence severity [10].

*Studies with young women have not found associations between cannabis use and depressive and anxiety **symptoms** [9, 11], but have found associations between cannabis use and depression and anxiety **diagnoses** [12, 13].*

- » A South African study found that among girls and young women ages 16 – 19 years who dropped out of school, the self-reported frequency of depressive and anxiety symptoms in the past 90 days was not significantly associated with a positive cannabis drug screen [11].
- » A US study found that there was no association between cannabis use and depressive symptoms among 9th grade African American girls attending school in Flint, Michigan [9].
- » A US study with participants between the ages of 12 – 38 found that major depressive disorder and general anxiety disorder were associated with cannabis initiation in women. Major depressive disorder was associated with cannabis initiation before the age of 15 in African American women [12].
- » A US study with women ages 18 – 44 found that women currently using cannabis were twice as likely to have been diagnosed with a depressive disorder in the past month compared to women not currently using cannabis [13].

## SEX, DEPRESSION, ANXIETY, AND CANNABIS

While several animal studies suggest that cannabis use does not cause anxiety or depression, others have found that tetrahydrocannabinol (THC) and cannabidiol (CBD) do have some sex specific effects.

- » A Canadian study found that exposure to THC elicited greater anxiety-like behaviour in female rats compared to male rats but prior nicotine exposure reduced anxiety-like effects of THC among both male and female rats [14].
- » A Spanish study found that CBD had antidepressant effects in male adult rats but had limited effects in male adolescent rats. In this study, cannabidiol did not affect anxiety-like behaviour in either adult or adolescent male rats [15].
- » However, three US studies examining the effects of THC or cannabis smoke on anxiety- or depressive-like behaviour found no significant relationships among male or female mice and rats [16-18].

## SUICIDAL THOUGHTS, SELF-HARM, AND CANNABIS USE

Evidence indicates associations between cannabis use, depressive symptoms, major depressive episodes, and suicidal thoughts and attempts in girls, women, boys, and men [19, 20].

- » Among US girls ages 15 – 18 who engaged in risky behaviour, 74% reported depressive symptoms, 63% reported suicidal thoughts, and 74% used cannabis. But among boys who engaged in risky behaviour, 49% reported depressive symptoms, 39% reported suicidal thoughts, and 78% used cannabis [19].
- » A Canadian study found associations between occasional (1-4x/month) and regular (>1/week) cannabis use with suicidal thoughts or attempts, major depressive episodes, and psychological distress for both men and women [20].
- » Canadian women who used cannabis regularly were more likely to report suicidal thoughts, attempts, and psychological distress, but not major depressive episodes, compared to men [20].

Among transgender and gender non-conforming youth who reported suicide attempts and self-harm, both depression and cannabis use were among the factors that distinguished them from those who reported no self-harm [21].

- » A US study found that 46% of transgender and gender non-conforming students in grades 9 and 11 who reported non-suicidal self-injury (NSSI) or suicide attempt used cannabis [21].
- » Among US transgender students who reported NSSI, 21% reported cannabis use compared to 10% of those who did not report any self-harm [21].

## DEPRESSION, ANXIETY, CANNABIS USE AND INTERSECTING FACTORS

Gendered associations between depression, anxiety, and cannabis use also vary by sexual orientation and age.

- » In a Canadian sample of gay, bisexual, and other men who have sex with men (gbMSM):
  - 58.7% of gbMSM diagnosed with depression or bipolar disorder reported any cannabis use and 37.5% reported regular (at least weekly) cannabis use in the past 3 months [22].
  - 57% of gbMSM diagnosed with anxiety reported any cannabis use and 37.6% reported regular cannabis use in the past 3 months [22].
  - There was no significant association between the severity of anxiety or depressive symptoms and frequency of cannabis use in Canadian gbMSM [22].
- » A study from Sweden found that women born between 1980 – 1993 who had used cannabis in their lifetime were at a higher risk of being diagnosed with depression or anxiety compared to an older cohort of women born between 1955 – 1975 who used cannabis, even after controlling for unsafe upbringing, troublesome childhood, educational attainment, and hazardous alcohol consumption [23].

## DEPRESSION, ANXIETY, CANNABIS AND SEXUAL AND REPRODUCTIVE HEALTH

There are mixed findings on the relationships between cannabis and women's anxiety and

depression symptoms during pregnancy. However, there appears to be an association between cannabis use and anxiety and depression symptoms among both males and females in couples trying to conceive.

- » A US study of women who used tobacco and cannabis in their first trimester of pregnancy found that perceived depressive symptoms were low. There was no significant difference in depressive symptoms between women who used only tobacco compared to women who used both cannabis and tobacco [24].
- » Women from Australia, New Zealand, Ireland, and England who used cannabis during pregnancy were younger, had lower socioeconomic status, and higher anxiety and depressive symptoms than women who had never used cannabis or quit cannabis use prior to pregnancy [25].

- » A Canadian report found that women who use cannabis during pregnancy to reduce depression symptoms underreport their cannabis use to their doctors and midwives [26].
- » Among American and Canadian couples planning to conceive, frequent cannabis use was associated with depressive symptoms in males and females [27].

## BRIEF INTERVENTIONS TO REDUCE ANXIETY SYMPTOMS AND CANNABIS USE

There is evidence that brief substance use interventions may reduce cannabis use and anxiety symptoms in men and women [28].

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# Summary

Consistent with our 2019 Sex, Gender, and Cannabis Report [1], the evidence remains mixed on the associations between sex, gender, depression, anxiety and cannabis use and does not yet provide strong evidence on whether or not cannabis use causes depression or anxiety due to the lack of experimental studies with human participants. The research on cannabis, depression and anxiety that is sex and/or gender disaggregated is still limited, in part due to different operationalizations of anxiety and depression as symptoms, diagnoses or anxiety-, depression-like behaviours. Some animal studies have found that cannabis use does not appear to cause anxiety or depression, and others have found that THC and CBD have sex specific effects on anxiety and depression. Recent studies indicate that among young men, there may be an association between cannabis use and depressive symptoms and depression diagnoses. Among young women, there may be an association between cannabis use and depression and anxiety diagnoses but not symptoms, of these conditions. There may also be an association between cannabis use and suicidal thoughts and attempts among women. Finally, there is evidence of both depression and cannabis use among transgender and gender non-conforming youth who self-harm. Nonetheless, promising practice is seen with the use of brief interventions to reduce cannabis use and anxiety symptoms among both men and women. This approach may be useful as we continue to build the sex and gender informed evidence base and more tailored interventions on cannabis, depression and anxiety.

**Suggested Reference:** Huber, E., Adamjee, L., Wolfson, L., Stinson, J., Brabete, A. C., Greaves, L., & Poole, N. (2021). *Sex, Gender and Cannabis: Depression and Anxiety*. Centre of Excellence for Women's Health. Vancouver, Canada

*The Sex, Gender and Cannabis Hub is financially supported by Health Canada's Substance Use and Addiction Program. The views expressed herein are not necessarily those of Health Canada.*

**Last Updated:** January 2022

# References

1. Greaves, L., et al., *Sex, Gender, and Cannabis*. 2019, Sex Gender and Cannabis Vancouver, BC.
2. Repetto, P.B., M.A. Zimmerman, and C.H. Caldwell, *A longitudinal study of depressive symptoms and marijuana use in a sample of inner-city African Americans*. Journal of Research on Adolescence, 2008. **18**(3): p. 421–447.
3. Buckner, J.D., J. Silgado, and N.B. Schmidt, *Marijuana craving during a public speaking challenge: Understanding marijuana use vulnerability among women and those with social anxiety disorder*. Journal of behavior therapy and experimental psychiatry, 2011. **42**(1): p. 104–110.
4. Aspis, I., et al., *Cannabis use and mental health-related quality of life among individuals with depressive disorders*. Psychiatry Res, 2015. **230**(2): p. 341–9.
5. Swahn, M.H., et al., *Early substance use initiation and suicide ideation and attempts among students in France and the United States*. Int J Public Health, 2012. **57**(1): p. 95–105.
6. Manzo, K., et al., *A comparison of risk factors associated with suicide ideation/attempts in American Indian and White youth in Montana*. Arch Suicide Res, 2015. **19**(1): p. 89–102.
7. Hawke, L.D., E. Koyama, and J. Henderson, *Cannabis use, other substance use, and co-occurring mental health concerns among youth presenting for substance use treatment services: Sex and age differences*. Journal of Substance Abuse Treatment, 2018. **91**: p. 12–19.
8. Meier, M.H., J. Beardslee, and D. Pardini, *Associations between Recent and Cumulative Cannabis Use and Internalizing Problems in Boys from Adolescence to Young Adulthood*. Journal of Abnormal Child Psychology, 2020. **48**(6): p. 771–782.
9. Assari, S., et al., *Marijuana Use and Depressive Symptoms; Gender Differences in African American Adolescents*. Frontiers in Psychology, 2018. **9**: p. 2135.
10. Tsai, D.H., et al., *Social cohesion, depression, and substance use severity among young men: Cross-sectional and longitudinal analyses from a Swiss cohort*. Addictive Behaviors, 2020. **110**: p. 106510.
11. Bonner, C.P., et al., *Substance use and depressive and anxiety symptoms among out-of-school adolescent girls and young women in Cape Town, South Africa*. S Afr Med J, 2020. **111**(1): p. 40–45.
12. Werner, K.B., et al., *Patterns of gambling and substance use initiation in African American and White adolescents and young adults*. Psychology of Addictive Behaviors, 2020. **34**(2): p. 382–391.
13. Ewing, A.C., et al., *Current marijuana use among women of reproductive age*. Drug & Alcohol Dependence, 2020. **214**: p. 108161.
14. Manwell, L.A., et al., *Chronic nicotine exposure attenuates the effects of  $\Delta 9$ - tetrahydrocannabinol on anxiety-related behavior and social interaction in adult male and female rats*. Brain and Behavior, 2019. **9**(11): p. e01375.
15. Bis-Humbert, C., R. Garcia-Cabrerizo, and M.J. Garcia-Fuster, *Decreased sensitivity in adolescent versus adult rats to the antidepressant-like effects of cannabidiol*. Psychopharmacology, 2020. **237**(6): p. 1621–1631.
16. Buijnzeel, A.W., et al., *Effects in rats of adolescent exposure to cannabis smoke or THC on emotional behavior and cognitive function in adulthood*. Psychopharmacology, 2019. **236**(9): p. 2773–2784.
17. Kasten, C.R., Y. Zhang, and S.L. Boehm, 2nd, *Acute Cannabinoids Produce Robust Anxiety-Like and Locomotor Effects in Mice, but Long-Term Consequences Are Age- and Sex-Dependent*. Frontiers in Behavioral Neuroscience, 2019. **13**: p. 32.
18. Mohammed, A.N., et al., *Effect of repeated juvenile exposure to DELTA9-tetrahydrocannabinol on anxiety-related behavior and social interactions in adolescent rats*. Neurotoxicology and Teratology, 2018. **69**: p. 11–20.
19. Ahmadi-Montecalvo, H., et al., *A Latent Class Analysis of the Co-occurrence of Risk Behaviors among Adolescents*. American Journal of Health Behavior, 2019. **43**(3): p. 449–463.
20. Halladay, J.E., et al., *Sex Differences in the Association Between Cannabis Use and Suicidal Ideation and*

- Attempts, Depression, and Psychological Distress Among Canadians*. Canadian Journal of Psychiatry – Revue Canadienne de Psychiatrie, 2019. **64**(5): p. 345–350.
21. Taliaferro, L.A., et al., *Risk and Protective Factors for Self-Harm in a Population-Based Sample of Transgender Youth*. Archives of Suicide Research, 2019. **23**(2): p. 203–221.
  22. Chou, F.Y., et al., *A longitudinal analysis of cannabis use and mental health symptoms among gay, bisexual, and other men who have sex with men in Vancouver, Canada*. Journal of Affective Disorders, 2019. **247**: p. 125–133.
  23. Rabiee, R., et al., *Cannabis use and the risk of anxiety and depression in women: A comparison of three Swedish cohorts*. Drug Alcohol Depend, 2020. **216**: p. 108332.
  24. Ashford, K., et al., *Associations of first trimester co-use of tobacco and Cannabis with prenatal immune response and psychosocial well-being*. Neurotoxicology & Teratology, 2019. **73**: p. 42–48.
  25. Grzeskowiak, L.E., et al., *The deleterious effects of cannabis during pregnancy on neonatal outcomes*. Medical Journal of Australia, 2020. **212**(11): p. 519–524.
  26. Thunder Bay District Health Unit, *Cannabis and pregnancy: Getting ahead of policy*. 2018: Thunder Bay, Canada.
  27. Wise, L.A., et al., *Marijuana use and fecundability in a North American preconception cohort study*. Journal of Epidemiology & Community Health, 2018. **72**(3): p. 208–215.
  28. Drislane, L.E., et al., *Therapist and computer-based brief interventions for drug use within a randomized controlled trial: Effects on parallel trajectories of alcohol use, cannabis use and anxiety symptoms*. Addiction, 2020. **115**(1): p. 158–169.

