



# Cannabis use, other substance use, and co-occurring mental health concerns among youth presenting for substance use treatment services: Sex and age differences

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## ABSTRACT

Cannabis use among youth is of significant concern given the potential negative health impacts on young people. This study describes the mental health characteristics, cannabis use, and substance use profiles of youth aged 14 to 24 years seen at the Youth Addiction and Concurrent Disorders Service at the Centre for Addiction and Mental Health, through an age and gender lens. Almost all participating youth indicated lifetime cannabis use. Substance use and mental health profiles among those indicating a history of cannabis use differed along sex and age. Male youth were more likely to use cannabis more frequently, while female youth were more likely to use greater variety of substances and display more co-occurring mental health problems. Adolescent problematic substance use tended to co-occur with externalizing problems whereas problematic young adult substance use tended to co-occur with internalizing problems. Implications for the integrated, coordinated care of substance use and mental health concerns, with attention to the unique needs of subgroups of youth, are discussed.

## 1. Introduction

Cannabis is the illegal drug that is the most widely used around the world (United Nations Office on Drugs and Crime, 2016), and its use among youth is common especially in Canada (World Health Organization & Regional Office for Europe, 2012). Canadian youth ranked first in the world for cannabis use in an international survey, with 33% of youth indicating lifetime cannabis use by the age of 15, and 18% indicating having used cannabis within the past 30 days (World Health Organization & Regional Office for Europe, 2012). Data from the Canadian Community Health Survey shows that among Canadian youth between the ages of 15 and 24, some 17% to 30% have used cannabis, and 2% to 5% use it on a daily basis (Rotermann & Langlois, 2015). Among young Canadians seeking substance abuse services, cannabis has been reported to be the most common substance of concern (Urbanoski, Strike, & Rush, 2005).

However, due to the rapid changes in brain development during adolescence, young people show marked vulnerability to the impacts of substance abuse, including cannabis (Bava & Tapert, 2010). Notably, cannabis use among youth, especially high-frequency use (i.e., daily or near daily use), has been associated with a variety of negative cognitive, physical, and mental health consequences, some of which could

lead to long-term deficits. For example, high-frequency cannabis during adolescence has been linked to attention, learning, memory and executive function problems (Broyd, van Hell, Beale, Yücel, & Solowij, 2016); reduced academic achievement (Silins et al., 2014); respiratory problems (Brook, Stimmel, Zhang, & Brook, 2008); and long-term cancer risk (Callaghan, Allebeck, & Sidorchuk, 2013).

High-frequency cannabis use has also been associated with a variety of mental health and substance use problems. There has been some research suggesting a link between adolescent cannabis use and depression, anxiety, externalizing disorders, and suicidality (e.g., Horwood et al., 2012; Monshouwer et al., 2006; Silins et al., 2014), although the causality and directionality of the relationships have not been definitively determined. Relationships have been found between high-frequency cannabis use and psychotic experiences, especially among those who are predisposed to developing a psychotic disorder (Radhakrishnan, Wilkinson, & D'Souza, 2014). Studies have also shown that early, high frequency cannabis use is associated with the use of other 'harder' illicit drugs such as opiates and cocaine during adolescence and emerging adulthood, as well as later in life, although the majority of cannabis users do not necessarily progress to using other illicit drugs (Fergusson & Horwood, 2000; Lynskey et al., 2003).

In the context of high rates of cannabis use among young people in

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Canada, there is a strong public perception that cannabis is, to a large extent, a harmless drug. A focus group study with 76 youth sampled across Canada found that many adolescents between the ages of 14 and 19 perceived cannabis to be safe, natural, and non-addictive, and many of the youth were unaware, indifferent, or unsure about the negative consequences associated with cannabis use (Porath-Waller, Brown, Frigon, & Clark, 2013). The public perception of harmlessness, despite potential negative impacts on the developing brain, is of particular concern in Canada due to the impending legalization of non-medical cannabis use (Health Canada, 2016). Indeed, in the pre-legalization era, cannabis is readily available.

Some aspects of cannabis use and youth remain understudied and require attention as Canada moves forward toward legalization. Notably, until recently female substance use and sex/gender differences in cannabis use had been understudied. It has been demonstrated that more males than females use cannabis and meet the criteria for cannabis abuse and dependence (Leatherdale & Burkhalter, 2012; Pearson, Janz, & Ali, 2013). Because males are more likely to use cannabis, they represent the majority of the participants in much of the research conducted about youth cannabis use. However, it has been suggested that early cannabis initiation may interact with aspects of health and functioning differently across genders. For example, girls may transition from cannabis initiation to regular use more quickly (Schepis et al., 2011), have poorer socioeconomic and mental health status than boys who use cannabis (Tu, Ratner, & Johnson, 2008), and drop out of school earlier (van Ours & Williams, 2009). The potential gender differences highlight the importance of further examining cannabis use profiles of youth and young adults using a gender lens. By examining these differences among youth and young adults who are seeking treatment, it may be possible to shed light on treatment issues that will enable services to better meet the needs of young people. Similarly, there is emerging discussion regarding the differential needs of adolescents and transition-aged youth presenting for substance use treatment (e.g., Bowers, Cleverley, Di Clemente, & Henderson, 2017; Bukstein, 2017; Ilana, Joanna, Michele, & Abby, 2015), which also warrant further study.

Given the urgent need to understand cannabis use among young people in the context of impending legalization and the paucity of research into the relationship between sex, age and cannabis use in treatment-seeking youth in Canada, the objective of the current study is to explore the cannabis use profiles among male and female youth and young adults in a hospital-based outpatient substance use treatment-seeking sample in Canada. More specifically, this study describes the rates of cannabis use, substance use profiles, and mental health characteristics of male and female adolescents and young adults seeking treatment in a Canadian, hospital-based, youth addiction and concurrent disorders service with a view of informing future service and research directions.

## 2. Methods

### 2.1. Sample characteristics

The sample consisted of 1378 youth receiving services at the Youth Addiction and Concurrent Disorder Service at the Centre for Addiction and Mental Health, a large urban mental health hospital in Toronto, Canada. This is an outpatient treatment service for youth 14 to 24 years of age offering treatment for substance use with or without co-occurring mental health concerns. Since the clinic accepts referrals from multiple routes, ranging from physician referral to self-referral, no diagnosis is required to receive services. All youth who attended an initial orientation session introducing them to the services between 2008 and 2016 were eligible for the research study. A total of 1595 youth were assessed and approached for research consent, and 86% ( $n = 1378$ ) provided consent for the use of their data for research purposes.

### 2.2. Measures

At the orientation session, participants were asked to fill out a battery of questionnaires, including a demographic information form and questionnaires related to their substance use and mental health needs.

#### 2.2.1. Demographic information form

The demographic information form included questions about participant's age at orientation, sex, race/ethnicity, country of origin, first language, employment, education, financial support, living arrangements and legal involvement.

#### 2.2.2. Adolescent Alcohol and Drug Involvement Scale (AADIS)

The Adolescent Alcohol and Drug Involvement Questionnaire (Moberg, 2005) asks youth to rate whether they have ever used, and how frequently they have used, different types of substances using an 8-point scale ranging from never used (0) to several times a day (7). The substances included were: alcohol, tobacco, cannabis, hallucinogens, amphetamines, powder cocaine, rock cocaine, barbiturates, opiates, benzodiazepines, and "other drugs." Beginning in September 2013, for each of the substances the youth had used at least once, they were also asked to indicate the age of first use, resulting in a subsample of the youth ( $n = 390$ ) with age-of-first-use data. Results are presented for the substances most commonly endorsed.

#### 2.2.3. Target substance

Using an open-ended question, youth were asked which substance they found to be most problematic, of greatest concern, or wanted to change (either to reduce or to abstain from). In response to this question, youth could indicate as many substances as they wished as their target substances.

#### 2.2.4. Global Appraisal of Individual Needs – Short Screener (GAIN-SS)

The GAIN Short Screener (GAIN-SS; Chestnut Health Systems, 2010) is a short self-report screening tool based on the Global Appraisal of Individual Needs – Initial (Dennis, 2003; Dennis, White, Titus, & Unsicker, 2008). With 20 items, the GAIN-SS quickly identifies youth who are likely to meet criteria for a diagnosis of an internalizing disorder (e.g., depression, anxiety), externalizing disorder (e.g., ADHD, conduct problems), or substance use disorder, as well as identifying significant crime and violence problems. The youth are asked to report on symptoms using temporal response options: Never (0), More than a year ago (1), 2 to 12 months ago (2), and Past month (3). Due to a change in the measurement protocol, this was expanded into Never (0), More than a year ago (1), 4 to 12 months ago (2), 2 to 3 months ago (3), and Past month (4); however, these ratings were collapsed into the original 0–3 point scale for the purposes of the analyses. The number of past-year symptoms (items with a score of 2 or 3) is counted, and if the count of items with past-year symptoms is 3 or greater for any subscreener, the youth is considered as having a high probability of a diagnosis, in accordance with the norms for the scale. GAIN-SS has good internal consistency (Cronbach's alpha = 0.96 for the total screener), sensitivity (90% or greater), and specificity (92% or greater), and shows a high correlation ( $r = 0.84$  to  $0.94$ ) with the original GAIN-I domains (Dennis, Chan, & Funk, 2006).

In addition to the 20 standard items of the GAIN-SS, seven extension items were added to the screener with the permission of Chestnut Health Systems in 2006, based on community/service provider feedback by co-author JH and team. These items were designed to be used as indicators suggestive of areas for further assessment and reflect domains that are covered in GAIN-I but not in the original GAIN-SS, including eating-concerns, traumatic stress, distorted thinking, overuse of videogames and internet, and gambling concerns. Although these extension items are not part of the original GAIN-SS, a cross-sectoral study has demonstrated their utility (Henderson, Chaim, Hawke, & National

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