



Cannabis use and psychological distress: An 8-year prospective population-based study among Swedish men and women



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HIGHLIGHTS

- This is a longitudinal cohort study comprising 19 327 Swedish men and women.
- Examine possible associations between cannabis use and psychological distress.
- Cannabis using women had an increased risk of psychological distress at follow-up.
- No support for a reverse association was found.

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ABSTRACT

Background: Previous studies have reported positive associations between cannabis use and mental health problems. However, it has not been possible to draw a definitive conclusion regarding the causal direction between cannabis use and impaired mental health. This study aimed at examining possible associations between cannabis use and psychological distress (as measured by the General Health Questionnaire, GHQ-12) in men and women respectively, using both measures as both exposure and outcome.

Methods: Data were obtained from a cohort study (the Stockholm Public Health Cohort) with an 8-year follow-up in the general population in Stockholm County, Sweden. The study sample comprised 19,327 men and women, aged 18–84 years, who answered surveys in 2002 and 2010.

Results: Cannabis use was associated with increased odds ratios (OR) for psychological distress in women at 8-year follow-up, with OR = 1.37 [1.1–1.7, 95% CI], but not in men; OR = 1.14 [0.9–1.5, 95% CI]. In women, this association remained when adjusted for potential confounders (tobacco smoking, alcohol consumption, socioeconomic position (SEP) and unemployment); OR = 1.27 [1.0–1.6, 95% CI]. Moreover, women reporting psychological distress at baseline had an increased risk of cannabis use at follow-up; OR = 1.40 [1.1–1.8 95% CI]. However, this association was no longer statistically significant when adjustments were made for baseline cannabis use, OR = 1.10 [0.8–1.5, 95% CI].

Conclusions: This study revealed that, in women, cannabis use was associated with an increased risk of psychological distress eight years later. Optimal interventions to identify these women seem warranted.

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1. Introduction

Worldwide, cannabis is the most used illicit drugs (United Nations Office on Drugs and Crime, UNDOC, 2012). Several previous studies have reported positive associations between cannabis use and a variety of psychiatric disorders, such as anxiety (Crippa et al., 2009; Degenhardt et al., 2012), depression (Gage et al., 2015; Lev-Ran et al., 2014), schizophrenia (Andréasson, Allebeck, Engström, & Rydberg, 1987; Zammit,

Allebeck, Andréasson, Lundberg, & Lewis, 2002) and cannabis dependence (Silins et al., 2014). At the same time the results are not entirely robust since in many of these studies the associations have disappeared after adjusting for potential confounders, such as alcohol, tobacco and other substance use, intelligence, childhood conduct problems, education, family situation and socio-economic position (Bechtold, Simpson, White, & Pardini, 2015; Danielsson, Lundin, Agardh, Allebeck, & Forsell, 2016; Manrique-Garcia, Zammit, Dalman, Hemmingsson, & Allebeck, 2012).

Furthermore, it has not always been possible to draw any definitive conclusions regarding the direction of causality between cannabis use, on the one hand, and impaired mental health on the other (Lev-Ran et al., 2014). For one thing, with the current wave of decriminalization

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and liberalization of medical marijuana laws more individuals are reporting self-medicating with cannabis for mental health problems such as depression and anxiety (Babson, Boden, & Bonn-Miller, 2013; Conroy & Arnedt, 2014).

One widely used indicator of mental health is psychological distress (as measured by the General Health Questionnaire, GHQ-12), which is characterized by symptoms of depression anxiety, and stress-related concerns and known to occur on a continuum of severity (Drapeau, Marchand, & Beaulieu-Pre'vost, 2012). Cross-sectional studies, among students, have reported a positive association between psychological distress and maladaptive coping strategies, such as cannabis, alcohol and tobacco use (Deasy, Coughlan, Pironom, Jourdan, & Mannix-McNamara, 2014; Deasy, Coughlan, Pironom, Jourdan, & Mannix-McNamara, 2015; Kelly, Chan, Mason, & Williams, 2015). However, little empirical evidence exists on the longitudinal consequences of psychological distress and possible associations with cannabis use, as well as of differences in associations due to severity of distress and between men and women.

In general, studies show that women report stress, depression and anxiety to a greater extent than men (Deasy et al., 2015; Bahrami & Yousefi, 2011), while the prevalence of cannabis use tend to be higher in men (Lev-Ran et al., 2014). A recent cross-sectional study showed cannabis use to be more strongly associated with poor mental health in women than in men (van Gastel et al., 2014). In contrast, a recent longitudinal study showed marijuana use to be more strongly related to depression symptoms in males (Crane, Langenecker, & Mermelstein, 2015). Thus, possible longitudinal associations as well as discrepancies between the sexes need further examination.

In this study, we will make use of a population based cohort with data on cannabis use and psychological distress both at baseline and follow-up eight years later to find out (1) whether there is an association between cannabis use and psychological distress and (2) whether possible associations are related to severity of distress, (3) the direction of any such association, and (4) if possible associations are different for men and women.

2. Material and methods

2.1. Stockholm Public Health Cohort (SPHC)

This population-based cohort study, i.e., the Stockholm Public Health Cohort (SPHC) has been described in detail previously (Svensson et al., 2013). In brief, we used data from one of the cohorts, with a baseline survey that took place in 2002 comprising 31,182 (equal to a 62% retention rate) randomly selected Swedish men and women aged 18 to 84 years residing within Stockholm County. Only those participants, who at follow-up gave their consent to use of baseline data and record linkages, could be included in our study. Participants answered an extensive questionnaire covering somatic and psychological health, demographics, family situation, housing, work environment, socioeconomic position (SEP) and lifestyle factors. The participants were followed up and re-investigated by questionnaire in 2010 ($n = 19,327$; 62% participated).

A total of 19,168 (8213 men) and (10,955 women) out of 19,327 participants had full information on cannabis use at baseline and were included in the final SPHC study cohort in 2002. When including cannabis users in 2010 for reverse associations, an additional 199 subjects were missing, resulting in a total of 18,969 study subjects (8157 men and 10,812 women).

2.2. Measure of cannabis use

In 2002 the participants were asked if they had ever smoked hashish, and in 2010 marijuana was also included in the same question. In this study we define hashish and/or marijuana as cannabis. All questions had the same responding alternatives; 'no', 'yes, more than one year ago', 'yes, during the past year' and 'yes during the past month' and

we categorized these into never (no) and ever users (e.g., yes, more than one year ago), (yes, during the past year) and (yes during the past month).

2.3. Measure of psychological distress

Evaluation of self-reported psychological distress was based on the 12 item version of the well-established General Health Questionnaire (GHQ-12) (Goldberg, 1988) in 2002 and 2010. The GHQ-12 is a self-report questionnaire capturing symptoms of anxiety, depression, social dysfunction, and stress-related concerns 'in the past few weeks' and is also used to screen for common mental disorders. The validity has been proven good in the Swedish population (Sconfienza, 1998) and elsewhere (Goldberg et al., 1997). The items use a 4-point severity scale ranging from 1 = better than usual to 4 = much worse than usual. We used the recommended scoring on the four responding options, the Standard scoring method (Piccinelli, Bisoffi, Bon, Cunico, & Tansella, 1993) i.e., (0–0–1–1), and created an index by summing the scores of all 12 items, where the recommended sum of scores ≥ 3 was used to as indication of psychological distress (Goldberg et al., 1997). In addition, to study severity of psychological distress, we created four groups based on the following scores, (0 = no distress), (1–2 = mild), (3–7 = moderate) and (8–12 = severe) (Rai et al., 2012).

2.4. Potential confounders

All analyses were controlled for age (18–29, 30–44, 45–64 and 65–84). The choice of potential confounders was based on previous studies on cannabis and mental health (e.g. Bechtold et al., 2015; Danielsson et al., 2016; Manrique-Garcia et al., 2012) and availability in the questionnaire. These included tobacco smoking, alcohol consumption, socioeconomic position (SEP) and unemployment.

Smoking was based on the question "do you smoke on a daily basis", with two responding alternatives, 'yes' or 'no'.

Alcohol consumption was measured with questions on the total quantity of beer, wine, spirits consumed during an average week over the past year. For the purpose of this study, we estimated the amount of 100% alcohol in grams per week, and transformed the volume into standard drinks, where one drink contains 12 g of alcohol. Women drinking >9 drinks per week and men drinking >14 drinks per week were regarded as risk consumers. This definition was based on the Swedish National recommendations (Andréasson & Allebeck, 2005), which largely agree with those in other European countries and the US.

SEP was based on self-reported occupational titles and classified according to the official socioeconomic position classification scheme at Statistics Sweden (Statistics Sweden, 1984). We divided SEP into four groups (high-and medium-level non-manual employees and self-employed), (low-level non-manual employees), (unskilled and skilled workers) and (others). 'Others' were those who did not report current or previous occupation and included students, retired, housewives, unemployed or disability pensioners; the majority being students. Unemployment was based on having been unemployed any time during the two past years, with two responding alternatives, yes or no.

2.5. Statistical methods

Baseline characteristics of the cohort are shown in Table 1. First, age-adjusted odds ratios (ORs) along with 95% confidence intervals (CIs) for cannabis use at baseline and subsequent psychological distress (8 years later) were estimated in a logistic regression analysis, with dummy variables representing various potential confounders. The effect of each potential confounder measured at baseline was controlled for, first one at a time, and then all in the same model, in relation to cannabis use and the outcome of psychological distress. We also adjusted for psychological distress at baseline to make sure that outcome was followed by exposure. In order to investigate a possible reverse association we estimated

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