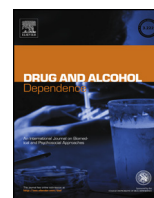




Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep



Cannabis use in adolescence and risk of future disability pension: A 39-year longitudinal cohort study

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ARTICLE INFO

Article history:

Received 19 May 2014

Received in revised form 28 July 2014

Accepted 29 July 2014

Available online xxx

Keywords:

Cannabis

Adolescence

Disability pension

Cohort study

ABSTRACT

Aims: This study aimed at examining a possible association between cannabis use in adolescence and future disability pension (DP). DP can be granted to any person in Sweden aged 16–65 years if working capacity is judged to be permanently reduced due to long-standing illness or injury.

Methods: Data were obtained from a longitudinal cohort study comprising 49,321 Swedish men born in 1949–1951 who were conscripted to compulsory military service aged 18–20 years. Data on DP was collected from national registers.

Results: Results showed that individuals who used cannabis in adolescence had considerably higher rates of disability pension throughout the follow-up until 59 years of age. In Cox proportional-hazards regression analyses, adjustment for covariates (social background, mental health, physical fitness, risky alcohol use, tobacco smoking and illicit drug use) attenuated the associations. However, when all covariates were entered simultaneously, about a 30% increased hazard ratio of DP from 40 to 59 years of age still remained in the group reporting cannabis use more than 50 times.

Conclusions: This study shows that heavy cannabis use in late adolescence was associated with an increased relative risk of labor market exclusion through disability pension.

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1. Introduction

Worldwide, marijuana is among the most widely used illicit drugs (UNODC, 2012). According to the European Drug Report 2013, 85 million adults, a quarter of the European population, have used drugs, and 77 million have used cannabis (EMCDDA, 2013). Increasing number of studies show that cannabis is associated with a variety of psychiatric and somatic diseases, such as anxiety (Degenhardt et al., 2012), schizophrenia (Andréasson et al., 1987; Zammit et al., 2002), depression (Lev-Ran et al., 2013), dependence (Cox et al., 2007), lung cancer (Callaghan et al., 2013), and myocardial infarction (Thomas et al., 2014). Still, much of the relationship between cannabis use and health effects remains unclear.

Furthermore, cannabis use seems to be associated with a range of social and socioeconomic consequences, such as impaired

cognitive functioning (Harvey et al., 2007), low educational attainment (Horwood et al., 2010; Legley et al., 2010), and educational problems (Degenhardt et al., 2010). Also, cannabis use has been found to be systematically higher in individuals with a low socioeconomic position (Redonnet et al., 2012). One recent study related cannabis use with lower work commitment (Hyggen, 2012) and another showed that frequent cannabis users tend to be at increased risk for receiving social welfare assistance (Pedersen, 2011). However, the number of studies in this area is few, and there is to our knowledge no previous study investigating the possible impact of cannabis use on future disability pension (DP).

DP can be granted to any person in Sweden aged 16–65 years if working capacity is judged to be permanently reduced due to long-standing illness or injury (Statistics Sweden, 2009). In most cases, it provides full-time compensation and implies a permanent exclusion from the labor market. Sweden is among the countries with the highest prevalence and largest public spending on DP (OECD, 2009). In 2010 approximately 8% of the Swedish population received DP with psychiatric and musculoskeletal disorders as the most common diagnoses (Mulder, 2011). Previous studies have reported an

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association between lower cognitive ability and DP (Sörberg et al., 2013), and lower level of education and DP (Johansson et al., 2012). Also, mild psychological distress, personality characteristics (e.g., low emotional control), low frequency of physical activity, tobacco use and alcohol use in adolescence, especially “risk use”, have been associated with increased risk of obtaining DP (Rai et al., 2012; Ropponen and Svedberg, 2013; Sidorchuk et al., 2012; Upmark et al., 1999).

Considering the association between cannabis use and psychiatric disorders (e.g. Degenhardt et al., 2012; Lev-Ran et al., 2013; Zammit et al., 2002), there are reasons to believe that cannabis use would be associated with DP. In this study, we will therefore make use of a cohort study spanning over nearly 40 years to investigate (1) if there is an association between cannabis use in adolescence and future DP and (2) if possible associations persist after adjustment for a number of potential covariates.

2. Methods

2.1. Study population

The study cohort, comprising 49,321 Swedish men has been described in detail elsewhere (Andréasson et al., 1987).

In short, our study is a register follow-up to the cohort study including all Swedish men born in 1949–1951 who were conscripted to compulsory military service in 1969–1970 (aged 18–20 years). The cohort covers approximately 97.7% of the Swedish male population at that time. Those not participating were exempted due to severe handicaps or congenital disorders. At time for conscription all men answered two questionnaires, one focused on alcohol consumption, tobacco and illicit drug use, and the other was based on questions on family and social background, school performance, psychological factors, behavior and adjustment and self-rated health. In addition to this, they went through physical and psychological tests and a physician diagnosed physical and mental disorders according to the Swedish version of the International Classification of Disease (ICD) 8th revision (ICD-8). Those with a psychiatric disorder were also examined by a psychiatrist.

2.2. Study exposure

The study exposure is self-reported cannabis use at time for conscription. Questions were asked whether subjects had ever used drugs (including cannabis), which drugs had ever been used, first drug used, drug most commonly used, frequency of use and questions regarding use of specific drugs from a list with alternatives. The question about frequency of use had fixed response alternatives; never, 1–2 times, 3–10 times (those two categories were collapsed into one; 1–10 times), 11–50 times and >50 times, that were used in our analyses.

2.3. Study outcome

The study outcome is first time of being granted DP between 20 and 59 years of age. Data on DP was collected from the National Social Insurance Agency for the years 1971 to 1989 and from Longitudinal Register of Education and Labor Market Statistics from 1990 to 2008.

DP was categorized into three groups, i.e., overall (aged 20–59), early DP (aged 20–39) and late DP (aged 40–59). A majority of all disability pensions occur during the second part of working life, i.e. after the age of 40.

2.4. Study covariates

Based on previous studies on DP, we accounted for the following covariates:

2.4.1. Social background. Social background including childhood socioeconomic position (SEP), i.e., at the age of 9 years, which was based on the father's occupational position, from the National Population and Housing Census 1960 and categorized as unskilled workers, skilled workers, non-manual worker at low, intermediate or high level, farmers and no occupation, divorced parents (yes or no), and short education (studying at time for conscription vs not studying).

2.4.2. Mental functions. Mental functions were measured by emotional stability (in general being calm vs being nervous/anxious/aggressive on a five level scale), social maturity (levels of extraversion, initiative, independence, and responsibility, on a five level scale) (Sörberg et al., 2013) and intelligence, measured on a Stanine scale, which is based on scores from multiple tests (Sörberg et al., 2013). Primarily, low scores on these measures aimed to identify individuals with vulnerability to stress and difficulties with social adjustment. We also included having been diagnosed with a psychiatric disease (according to ICD-8) at conscription in our analyses.

2.4.3. Health behavioral factors. Health behavioral factors included alcohol consumption, measured by risk use, defined as having at least one of the following; ever been apprehended by the police for drunkenness, ever taken an eye-opener, been drunk often/quite often, drinking ≥ 250 g of alcohol per week. Moreover, tobacco smoking, categorized into 0, 1–5, 6–10, 11–20, and >20 cigarettes/day, body mass index (weight/height (m)²), and physical fitness measured by performance on a bicycle ergometer test (Åberg et al., 2014), were included. In addition, we adjusted for having ever used other illicit drugs, e.g., amphetamine, morphine, LSD and Opium (ever vs. never).

2.5. Follow-up

Using unique Swedish personal identification numbers, the conscript cohort was linked to National Social Insurance Agency register data and to the Longitudinal Register of Education and Labor Market Statistics (DP status and DP granting); see Fig. 1 for detailed time line.

2.6. Statistical analysis

To assess the possible association between cannabis use at ~18 years of age and future DP, Cox proportional-hazards regression was used to estimate hazard ratios (HRs) with 95% confidence intervals (CIs).

First, crude associations were examined, and thereafter blocks of potential covariates, such as social background, mental function and health behavior factors were included (model a, b and c in Table 2) in the regression model, and finally all potential covariates were included simultaneously (models a–c in Table 2). All covariates were dichotomised (present/absent) for descriptive purpose (Table 1) but were used in full in the regression analysis (Table 2).

In the cohort 43,587 men had full information on all variables and were included in the analytical sample.

3. Results

Nine percent reported cannabis use at 18 years of age. Table 1 presents the frequency distribution of all covariates. About 654 persons (1.5%) reported having used cannabis more than 50 times. In this group, many of the examined risk factors were present to a considerably greater extent than in the other groups, with for example 55% having a psychiatric diagnosis, 74% having low emotional stability, 65% having low social maturity, 47% reporting risky alcohol use, and 80% also reporting having used other drugs.

Unadjusted, cannabis use in adolescence was associated with increased hazard ratios of future DP in all groups (Table 2). The hazard ratios increased in a graded manner, i.e., the more frequent cannabis use in adolescence, the higher was also the hazard ratio of future DP. When adjusted for covariates, the associations were attenuated; especially when adjusting for health behavioral factors in the groups reporting cannabis use 50 times or less. However, when all covariates were entered simultaneously, the increased hazard ratio of DP remained statistically significant only in the group receiving late DP and reporting cannabis use more than 50 times.

4. Discussion

We found that having used cannabis more than 50 times in adolescence increased the risk for future DP. The increased risks remained to some extent when adjusted for social background, mental function and health behaviors, although they were substantially attenuated. The associations were only statistically significant for individuals receiving late DP. Among those receiving DP in Sweden the great majority is 40 years or older and in our cohort they comprised 84%. This is to the best of our knowledge, the first study reporting the association between cannabis use in adolescence and risk of future DP.

Our results are partially in line with previous research, reporting cannabis use to be associated with exclusion from the labor market. Cannabis users have been found less likely to be in work (Davstad et al., 2013). It has been reported that frequent cannabis users are at increased risk for receiving social welfare assistance; they have been observed to have longer periods of receiving social

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