Social and socio-economic factors associated with adolescent Cannabis smoking – Results from the Danish ESPAD survey

Louise Munk¹, Stig Molsted², Maria Pedersen³


BACKGROUND: Cannabis is a widely used psychoactive substance among schoolchildren. It reduces the brain’s learning capacity, is associated with early school leaving and lower educational level in adulthood. The objective was to assess determinants of Cannabis smoking among adolescents in Denmark. Associations between parental education, subjective socioeconomic position, peers smoking Cannabis, family pattern and Cannabis smoking were estimated.

METHOD: The study was based on multiple logistic regression analyses of data from The European School Survey Project on Alcohol and Other Drugs.

RESULTS: Broken family pattern and peer Cannabis smoking were associated with adolescent Cannabis smoking. Neither parental educational level nor the adolescent’s subjective socioeconomic position was found to be associated with frequent Cannabis smoking.

CONCLUSION: Frequent Cannabis smoking among ninth graders is strongly associated with peers smoking Cannabis and living with non-cohabitating parents. Thus in systematic intervention programs, it may be purposeful to pay special attention to young people from non-intact families and intervene in the environments where adolescents socialize.

Key Words: Adolescents; Cannabis; Parental education; Subjective socioeconomic position; Peers; Family pattern

DESCRIPTION

Adolescent Cannabis smoking is a public health problem in Denmark and in many other European countries. After tobacco and alcohol, Cannabis is the most popular psychoactive substance among Danish schoolchildren (1). Even though it is forbidden to sell alcohol to young people below the age of 16 years, forbidden to sell cigarettes to persons younger than 18 years and illegal to smoke Cannabis in Denmark these substances are widely used by many Danish adolescents. In an average Danish ninth grade 31% of all students are daily cigarette smokers, 75% have been drunk at least once within lifetime and 6.8% have smoked Cannabis at least once within the last month (2). This intoxication culture among Danish adolescents is alarming as adolescents are particularly vulnerable to substance use.

Even though the human brain is structurally developed at birth, it is not fully matured until the early adulthood. The brain’s final neural development takes place during adolescence when the capacity of learning is at its highest. This is also a period, where the brain is most vulnerable to repeated use of sedative substances including Cannabis (3).

Recent studies have suggested that Cannabis smoking debut in adolescence is a determinant of early school leaving and lower educational level in adulthood (4,5). Thus, early Cannabis debut may have crucial implications at an individual and a community level. The young Cannabis user may on the long-term experience deprived job opportunities, need for social welfare and reduced satisfaction with life in its whole (6).

Since 1995, substance use among Danish adolescents have been monitored every fourth year by the European School Survey Project on Alcohol And Other Drugs (ESPAD) (2). According to the ESPAD 2011 survey the Danish adolescents stand out as those with the highest alcohol consumption compared to their peers in other European countries (7). Previous studies have reported strong associations between alcohol intake, cigarette smoking and Cannabis smoking among adolescents (8,9).

The task of developing preventive policy and strategies for early Cannabis debut is difficult, partly due to the fact that the drug is illegal in Denmark. Furthermore, more evidence of factors that may lead to Cannabis smoking in adolescence are warranted, among them the effect of socioeconomic and social factors on Cannabis smoking among adolescents. Cannabis smoking may be associated with family factors including the parent’s educational level, financial resources and family pattern. Furthermore, Cannabis smoking among adolescents may also be associated with peers habits and behaviors.

We hypothesized that adolescents with lower educated parents, low subjective socioeconomic position (SSP), Cannabis smoking peers and broken families were more likely to smoke Cannabis.

Therefore, the aim of this study was to investigate the associations between Danish adolescents’ Cannabis smoking and parent educational level, SSP, family pattern and Cannabis smoking among peers.

METHODS

All analyses were based on the Danish data from ESPAD 2011. The ESPAD is a regularly repeated cross-sectional survey aimed to monitor alcohol, tobacco and drug use among students from the ninth grade from 36 European countries every fourth year. The present study was based on the Danish data on 2,768 students from the ESPAD 2011. Data were collected from self-reported questionnaires handed out to the students in randomly selected Danish public and private schools. Out of the 231 selected schools, 97 (42.0%) participated in the survey. Ten percent of the students were not in school on the day that the survey was conducted. The target population of ESPAD was students born in 1995, who were 15 years old at the time of the survey. As all students in the classes answered the questionnaire, persons born in 1993 (0.3%), 1994 (17.3%) and 1996 (2.2%) were also included. The majority of students were born in 1995 (79.8%).

All data in the present study were self-reported.

Measurements

The outcome of interest was frequent Cannabis smoking. The variable was dichotomized into students who had smoked Cannabis more or less than three times within the last month, year or their lifetime (defined as frequent smoking). The students’ use of Cannabis was assessed by asking them “On how many occasions (if any) have you used marijuana or hashish (Cannabis) a) in your lifetime? b) During the last 12 months? c) During the last 30 days?” The answer categories were “0 times”; “1-2 times”; “3-5 times”; “6-9 times”; “10-19 times”; “20-39 times” and “40+ times”.

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Five exposure variables were included:

1. Fathers' and mothers' educational level
2. Paternal control (dichotomized into high/low parent control), and
3. Cigarette smoking (dichotomized into yes/no).

Additionally three other variables were included as potential confounders:

1. Amount of pocket money (dichotomized into <150 Dkr weekly or ≥150 Dkr weekly)
2. Parental knowledge of which the students spend their evenings with (dichotomized into high/low parent control), and
3. Cigarette smoking (dichotomized into yes/no). In all models, the potential confounders were included if they were associated with the exposure variable and were risk factors for the outcome variable (data not shown). Further details on the questionnaire can be viewed elsewhere (2).

Participation in the survey was voluntary and the responses were anonymous. Authorities of all schools approved the students' participation in the survey. All personal information was fully anonymized and the study was in accordance with the rules of the Danish ethical committee and The Data Protection Agency.

Statistical analysis

Multiple logistic regression analyses were used to estimate the associations between Cannabis smoking and the exposure variables. Data are presented as numbers, percentages and odds ratio (or) with 95% confidence interval (CI). Tests for interaction with gender were performed in all models; however, none of the interactions were significant thus no analyses were stratified according to gender. The descriptive data were however stratified by gender to illustrate potential gender differences.

Complete case analyses were used as missing strategy and all incomplete answers were excluded in the specific analyses. Confounder adjustment is described above in Methods. The level of significance was P ≤ 0.05. The statistical analyses were conducted in SAS 9.4.

RESULTS

Table 1 shows the sample characteristics of the participants. Eighteen participants did not report their gender and thus data are based on 2,750 students (48% boys and 52% girls). The majority of students were born in 1995 (boys 75.0% and girls 84.5%) and 71.2% lived with two parents. Frequent Cannabis smoking was reported by 12.0% of the students (61.7% were boys and 38.3% were girls). Twenty percent of the students answered that some or all of their peers smoked Cannabis frequently. Cigarette smoking was reported by 47.4% of the students.

Table 2 shows that there was no significant association between parental educational level and frequent adolescent Cannabis smoking.
Table 3 shows that there was no significant association between frequent Cannabis smoking and SSP.

**TABLE 3**

<table>
<thead>
<tr>
<th></th>
<th>OR (95% CI)</th>
<th>P</th>
<th>OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1.00 (Ref.)</td>
<td></td>
<td>1.00 (Ref.)</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>0.70 (0.53-0.91)</td>
<td>0.94 (0.68-1.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.08 (0.73-1.60)</td>
<td>1.15 (0.73-1.82)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Unadjusted, **Adjusted for gender, age, parental knowledge of with whom the students spend their evenings with and with cigarette smoking.

Table 4 shows that students with many Cannabis smoking peers were significantly more likely to smoke Cannabis compared with students with few Cannabis smoking peers OR 6.09 (4.60-8.08).

**TABLE 4**

<table>
<thead>
<tr>
<th>No. of peers smoking Cannabis</th>
<th>OR (95% CI)*</th>
<th>P</th>
<th>OR (95% CI)**</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Few</td>
<td>1.00 (Ref.)</td>
<td></td>
<td>1.00 (Ref.)</td>
<td></td>
</tr>
<tr>
<td>Many</td>
<td>11.40 (8.83-14.72)</td>
<td>6.09 (4.60-8.08)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Unadjusted, **Adjusted for pocket money, parental knowledge of with whom the students spend their evenings with and with cigarette smoking.

Table 5 shows that adolescents not living with both parents were more likely of being frequent Cannabis smokers than adolescents living with both parents OR 1.87 (1.43-2.45).

**TABLE 5**

<table>
<thead>
<tr>
<th>Living with cohabitating parents</th>
<th>OR (95% CI)*</th>
<th>P</th>
<th>OR (95% CI)**</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living with both parents</td>
<td>1.00 (Ref.)</td>
<td></td>
<td>1.00 (Ref.)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2.21 (1.75-2.79)</td>
<td>1.87 (1.43-2.45)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Unadjusted, **Adjusted for gender, age, pocket money, parental knowledge of with whom the students spend their evenings with and with cigarette smoking.

**DISCUSSION**

This study found that being a frequent Cannabis smoker was associated with having friends who smoked Cannabis and with living without both parents. Neither parental educational level nor the adolescent’s SSP were found to be associated with frequent Cannabis smoking.

Developmental psychology theories have described how young people gradually separate themselves from their parents to become more independent individuals. Young people spend increasingly less time with friends and get their impulses from them (10,11). This phenomenon could help us to frame and understand the findings; i.e., that having Cannabis smoking friends was a more important determinant of Cannabis smoking than parental educational level. The association between frequent Cannabis smoking and having Cannabis smoking friends has been reported in other studies. In a Croatian study based on data provided by ESPAD 2003, Franenic et al. (12) found that Danish girls had a more than seven times increased risk of ever having smoked Cannabis when their friends did. The same result was found in an Icelandic study of 7,084 14-16 year adolescents (13). Thus, the young peoples’ social environment may be a very important area in terms of having an increased risk of Cannabis smoking. Conversely they also found that time spend in company with their friends had a slightly protective effect on young peoples’ experimentation with Cannabis (13). Adolescents’ Cannabis smoking appears to be a social phenomenon as the most important determinant in this study was shown to be peers’ Cannabis smoking. The same trend has been shown for binge drinking among adolescents (7). Thus, the possible association between Cannabis smoking and binge drinking should be estimated in future research.

Strength of this study was that the analyses were based on 2,768 respondents from a well-designed study. As a result of a detailed and comprehensive questionnaire, adjustments of several potential confounders were included in the regression analyses. However, the study results should be interpreted with the following limitations in mind:

1. Due to the nature of the cross-sectional design it was not possible to provide causal associations.
2. The data may comprise some recall bias (e.g. the rating of Cannabis smoking among friends may be overestimated).
3. The study did not include schools for students with special needs, and
4. The data on parental educational level was of poor quality due to a large amount of missing data and students who did not possess information on their parents’ educational level. The lack of a statistical significant association between parental educational level and frequent Cannabis smoking could be the result of low power in the present study.

The study results are viewed as generalizable for other adolescents in countries with a similar intoxication culture as the Danish. As students from special needs schools are not included in the study, results are only generalizable for adolescents without special needs. Finally it should be mentioned that 10% of the students were absent at the day data were collected. Whether or in which extent these students may have a higher consumption of Cannabis than the students attending school that day is unknown.

This study showed that frequent Cannabis smoking among adolescents from ninth grade was strongly associated with peers who smoked Cannabis. Thus, policy and interventions to prevent Cannabis smoking should be implemented in the environments where adolescents meet peers and find their inspiration. This could be in primary and high schools, during leisure and recreational activities like sports clubs and on blocks, YouTube and other social media where young people socialize with peers. The study showed that adolescents not living with both parents had higher odds of being a frequent Cannabis smoker. Thus, when it comes to policy and prevention it may be purposeful to pay special attention to young people from non-intact families or young people who for various other reasons do not live together with cohabitating parents.

**CONCLUSION**

In conclusion, this study revealed factors that were associated with adolescent Cannabis smoking. Adolescents with many Cannabis-smoking peers were at greater risk of smoking Cannabis compared to adolescents with none or few Cannabis-smoking peers. Furthermore, adolescents who did not live with both parents had an increased risk of smoking Cannabis.

**ACKNOWLEDGEMENT**

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**REFERENCES**

9. Moss HB, Chen CM, Yi HY. Early adolescent patterns of alcohol, cigarettes, and marijuana polysubstance use and young adult substance


