

CANNABIS USE AMONG A SAMPLE OF 16 TO 18 YEAR-OLD STUDENTS IN SWITZERLAND

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received: 14.1.2013;

revised: 25.9.2013;

accepted: 12.11.2013

SUMMARY

Background: The aim of this study was to estimate the prevalence of cannabis use among Swiss students and to assess their attitudes regarding health and safety issues associated with drug use.

Subjects and methods: After a workshop, 173 students (23.1% male, 75.7% female; 44.4% age 16, 43.8% age 17 and 11.8% age 18) from a Swiss school were surveyed by questionnaire.

Results: 59.3% (n=103) of all participants had tried cannabis, and 30.1% of those who reported cannabis use had consumed more than 100 joints. Of those 103 students with cannabis experience, 6.8% rated the risk of cannabis-related psychic effects as low, and 9.8% were not concerned about driving under the influence of cannabis. In cases of heavy cannabis use, the chance of increased tobacco, alcohol or other drug use is higher than for those with less or no cannabis use at all (odds ratios of 4.33-10.86).

Conclusions: This paper deals primarily with cannabis prevalence data in adolescents from previous studies and sources, and shows that our findings deviate significantly - and surprisingly - from past research. Our data from a school survey indicates higher cannabis use than data from official drug policy studies. Additionally, our data shows that the students' self-reported attitudes towards health and safety issues were mostly realistic. The examination of methodological issues that might impact prevalence estimates should be added to the cannabis literature.

Key words: cannabis - drug prevention - alcohol and drugs - adolescents - tobacco - school survey

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INTRODUCTION

Cannabis use first became a mass phenomenon in industrialized countries in the 1960s among white, middle-class youth (McGlothlin & West 1968). It has been described as existing within a social environment generally favouring pro-cannabis attitudes and behaviour, in which cannabis was perceived to be easily available. During the 1990s, there was a general increase in cannabis use among adolescents, but recent estimates suggest major fluctuations. Many college students are using substances at levels consistent with substance abuse or dependence, yet little explanation for this phenomenon exists. Important aspects are learning history in the family (Yeh 2006), social facilitation (Beck et al. 2009), peer-group influence and imitative or contagious behaviour (Smith et al. 1989), initiation and rites de passage (Dammann 2011), sexual inhibition (Turchik et al. 2010), personality aspects (e.g., sensation seeking) (Hogan et al. 1970), misperceptions (Lewis et al. 2010), psychopathology (e.g., depression) (Beck et al. 2009), early adolescent smoking (Hayatbakhsh et al. 2009), and social norms of birth cohorts (Keyes et al. 2011).

Epidemiology

In Europe, lifetime and last-month prevalence still vary widely across those countries that participate in the European School Survey Project on Alcohol and Other Drugs (ESPAD) (Hibell et al. 2000, 2012) and the Health Behaviour in School-aged Children (HBSC) (Schmid et al. 2007, Windlin et al. 2011) studies.

Between 1986 and 2002, the development of cannabis use (at least one lifetime episode) by 15-year-old students climbed from 11.6% to 45.9% (boys), and from 9.1% to 36.9% (girls). In 2006 and 2010 studies, use was steady around 35% (boys) and 25% (girls). Data from major surveys suggests that there has been a general trend of increasing prevalence of cannabis use by young people over the two last decades in Europe, as well as in Australia, Canada and the USA (Hibell et al. 2000, Johnston et al. 1997, Rey et al. 2002, von Sydow et al. 2001).

The lifetime prevalence of cannabis use among mid-adolescent 15-year-old students has increased to over 40% in some countries, while in others, it is well below 10% (Hibell et al. 2000, Nic et al. 2000). In Switzerland, a number of drug use surveys are conducted at varying intervals. Also, administrative data

that provide important supplementary information on the characteristics of drug users entering treatment are collected from treatment programs. In the following, the results of three surveys are reported: a) The *Health Behaviour in School-aged Children Study* (HBSC), b) the *European School Survey Project on Alcohol and other Drugs* (ESPAD) 2007 and 2011, and c) the *Schweizerische Gesundheitsbefragung* (SGB) (ESS. The Swiss Health Survey).

The Health Behaviour in School-aged Children Study (HBSC) is a World Health Organisation cross-national collaborative study, which is conducted every 4 years. From 1992 to 2007, in Switzerland, cannabis use in the past by adolescents (15 to 19 years) increased from 8% to 17% and by young adults (20 to 24 years) increased from 13% to 28%. Actual use in 2007 was 7% in the adolescent group and 10% in the young adult group. The study is a survey of the health behaviour of 11 to 15-year-olds in 43 mostly European countries. In Switzerland, which became a participating country in the HBSC Study in 1986, the study is based on Addiction Info Switzerland (formerly Swiss Institute of the Prevention of Alcohol and Drug Problems, SIPA) (Schmid et al. 2007, Windlin et al. 2011).

Data on the positive and negative health behaviour of students are collected according to a standardised methodology to ensure that international comparisons are possible. Results of the 2006 and 2010 HBSC student studies for Switzerland are comparable. The surveys from 2010 (n=894 boys; n=920 girls) showed that 35.7% of the 15-year-old boys and 24.8% of the 15-year-old girls had cannabis experience (Windlin et al. 2011). In comparison to the same study conducted in 1986, the numbers have risen considerably: in 1986, only 11.6% of male and 9.1% of female participants reported having tried cannabis. An important and significant gender difference is that only 28% of the 15-year-old boys in the HBSC reported “having problems as a reason for cannabis use” during the last 12 months, compared to 43% of the 15-year-old girls (Windlin et al. 2011).

The *European School Survey Project on Alcohol and other Drugs* (ESPAD) (Hibell et al. 2000) is a collaborative effort of independent research teams in more than forty European countries and the largest cross-national research project on adolescent substance use in the world (15 to 16-year-old students). The 5th data collection wave (including “The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)”) took place during Spring 2011 (Switzerland didn’t participate) (Hibell et al. 2012).

In 2003, overall lifetime cannabis use in Switzerland for 15 to 16-year old students was 40% (boys 44%, girls 36%), and 20% for the last 30 days (boys 23%, girls 17%). In 2007, overall lifetime use was 33% for 15 to 16-year old students (39% boys; 27% girls), and 15% for the last 30 days (boys 19%, girls 12%).

The ESPAD project was started due to the lack of comparable data on substance use among European

teenagers. The results from Switzerland (2007) were all very close to the ESPAD mean, except for the lifetime prevalence of cannabis use (33%), which was well above average. The majority (85%) of the students had used alcohol during the past 12 months, and 41% had been drunk during the same period. The alcohol volume consumed on the latest drinking day was 3.9 cl of pure alcohol, which was rather close to the ESPAD mean. Almost one third (29%) of the students had smoked cigarettes during the past 30 days. In contrast to cannabis consumption, the reported use of drugs other than cannabis (7%) equalled the mean for all countries. Use of inhalants was reported by 9%, 8% had used tranquillisers or sedatives without a prescription, and 6% had combined pills with alcohol.

In 2007, the ESPAD survey observed higher lifetime prevalence of cannabis use by 6% for males and 1% for females, compared to the HBSC survey conducted in 2006. The results from the 2003 survey show similar data for Switzerland, compared to the ESPAD mean, except that cannabis use prevalence of 33% was well above the ESPAD average (Hibell et al. 2000).

The *Schweizerische Gesundheitsbefragung* (SGB) (ESS. The Swiss Health Survey) (Bundesamt für Statistik 1998, 2003, 2010, Reuter et al. 2009) is a telephone interview including data on health behaviour of 15 to 39-year-olds. It has been conducted four times, most recently in 2002 and 2007. In 1997, only 14.2% of all persons (N=12,989) in the Swiss Health Survey (“*Schweizerische Gesundheitsbefragung*”) over the age of 15 reported having tried cannabis (Bundesamt für Statistik, 1998). By 2002, the number had risen to 15.8% (N=19,678), and in 2007, it was up to 19.4% (N=18,702) (Bundesamt für Statistik 2003, 2010). It might well be that the reported numbers are lower than the actual ones. One reason could be the effect of naming cannabis an “illegal drug”, as was the case in the above-mentioned study.

The WHO Regional Office for Europe collected results from a series of surveys in the European region on drug use among the general population (Harkin et al. 1997). In 21 surveyed countries in the western part of the WHO European Region, cannabis was reported as the most-used illicit drug in the general population. The Pompidou Group (Johnston et al. 1994) undertook a study of the feasibility and validity of using high school surveys to monitor illicit substance use among high school students in Belgium, France, Greece, Italy, the Netherlands, Portugal and Sweden (using a sample from the USA for comparison). It found that the prevalence rates of almost all illicit psychoactive substances were generally higher in the USA sample (Müller et al. 2002).

Taken together, the data suggests that there has been an increase in the prevalence of cannabis use by young people over the last decade in Europe, as well as in Australia, Canada and the USA.

Consequences of Cannabis Use on Health

Cannabis is the most commonly used illicit drug among adolescents (Johnston et al. 2008). The question of whether cannabis is a gateway drug for other drugs (Kandel et al. 1975), and the presence of a distinct “amotivational syndrome” (first described by Smith) (Smith 1968) following cannabis use are controversial (Duncan 1987). Although the development of tolerance (Jones et al. 1981), memory problems (Schwartz et al. 1989), withdrawal phenomena (Georgotas et al. 1979) and various adverse effects of long-term use in observational clinical studies (Halikas et al. 1985, Hendin et al. 1987) were described, cannabis use dependence disorder remains a controversial diagnosis (Terry-McElrath et al. 2008). Controversies also exist for associated psychiatric disorders mediated by cannabis use, especially regarding psychotic episodes (Chaudry et al. 1991, Thomas, 1993). (For newer reviews of mental health consequences, see Minozzi et al. 2010, Rubino et al. 2012, Malchow et al. 2013). Nevertheless, Moore et al. (2007) conclude that there is now sufficient evidence to warn young people of a possible increase in developing a psychotic disorder in later life. In a study with mono- and dizygotic twin pairs, effects of the peer and social context seem to be more important than genetic vulnerability (Lynskey et al. 2003).

A significant percentage (50% of those reporting past 12 month marijuana use) of U.S. high school seniors who are recent marijuana users wish to either reduce or stop their marijuana use and base such desires on a wide variety of reasons, including fear of or actual psychological and physical damage, and not wanting to get high (reported by more than 60%). The least frequently reported reasons included expense, concerns of having a bad trip, and lack of availability (reported by fewer than 25%) (Terry-McElrath et al. 2008). There are different studies documenting cannabis-related problems among college students (Caldeira et al. 2008, Everett et al. 1999, Hammersley et al. 2006, Shillington et al. 2001, Tullis et al. 2003, White et al. 2005). The prevalence of cannabis use disorders (CUD) among one sample of first-year college students was estimated to be 9%, with almost 25% of past year users meeting criteria for CUD (Caldeira et al. 2008).

In order to tackle the question of data validity for cannabis use among adolescents, discussion of the different survey types and comparative designs is needed. For health policy analysis and the development of drug control strategies, reliable data on the prevalence of cannabis use and its actual and potential health consequences, as well as the costs and benefits of different interventions, is critical. Therefore a central research question is whether the reported cannabis consumption rate among adolescents in school surveys (with personal contact with the students) differs from national surveys on drug use, and if this could influence

Table 1. Questionnaire constructed for the purposes of this study

1. Number of hemp shops in town
2. Do you consider the psychic risk potential of cannabis to be
 - a) rather low,
 - b) middle,
 - c) high.
3. Do you consider the somatic risk potential of cannabis to be
 - a) rather low,
 - b) middle,
 - c) high.
4. Under influence of cannabis
 - a) I am not worried about driving a vehicle,
 - b) I am, depending on the dose effect, worried about driving a vehicle,
 - c) I am always concerned about driving a vehicle,
 - d) I do not know.
- 5.* During my lifetime, I have consumed
 - a) 0,
 - b) 1-2,
 - c) 3-9,
 - d) 10-19,
 - e) 20-39,
 - f) 40-99,
 - g) more than 100 joints.
- 6.* I first consumed at the age of
 - a) never consumed,
 - b) 12 years or younger,
 - c) 13 years or older.
- 7.* During the last 30 days, I have consumed
 - a) 0,
 - b) 1-2,
 - c) 3-9,
 - d) 10-19,
 - e) 20-39,
 - f) more than 40 joints.
8. I consider the effect of cannabis to be
 - a) good/positive,
 - b) middle/depending on circumstances,
 - c) bad/negative.
9. The first time I consumed cannabis, I was with
 - a) nobody,
 - b) my parents,
 - c) friends at school,
 - d) other friends.
10. They were
 - a) younger,
 - b) same age,
 - c) older than me.
11. I consume alcohol
 - a) never,
 - b) seldom,
 - c) 1-2 times a week,
 - d) every day.
12. I smoke (number of cigarettes) a day
13. I have had experience with the following other drugs:
 - a) ecstasy,
 - b) heroin,
 - c) cocaine,
 - d) benzodiazepines,
 - e) other.
14. Age (years)
15. Gender

future prevention programmes. The study was conducted in a particular school, since the investigators were invited to conduct a “health day” at this institution.

SUBJECTS AND METHODS

In 2007, 173 students (23.1% male, 75.7% female; 44.4% age 16, 43.8% age 17, and 11.8% age 18) from different classes at one grammar school in Basel, Switzerland were interviewed by questionnaire. We had the opportunity to actively participate in a health day about cannabis for first-year students at a school of a middle educational level (high school). In nine “meet-the-expert workshops”, students had the opportunity to discuss medical and psychiatric questions related to cannabis with addiction medicine MDs, psychologists and nurses from university hospitals.

Each of the nine workshops had up to 20 student participants. In this context, they were asked to fill out a 15-item questionnaire within 3 minutes (see Table 1). Three questions (marked with *) are from the Youth Risk Behaviour Questionnaire (Brener et al. 1995). We asked the students to participate only if they felt able to complete the form honestly. The reliability of our survey questionnaire has yet not been measured under test-retest conditions. Student co-operation, comprehension and logical consistency were high, indicating that our questionnaire elicited generally valid data. The advantage of our questionnaire was its shortness. The better established 2011 ESPAD questionnaire on substance use included 80 questions (Hibell et al. 2012). With the terms “psychic risk” and “somatic risk”, general assessment questions were provided for the students to indicate their subjective risk for mental or physical harm (negative consequences).

The study was approved by the local ethics committee of the City of Basel (Ethikkommission beider Basel, EKBB), and written informed consent was

obtained from all students’ parents before participation in the study.

Data sources for direct and indirect data comparison

For direct comparison, an age and gender matched sample (n=87) from the Swiss Institute for the Prevention of Alcohol and Drug Problems (SFA/SIPA) survey was used (see Table 2). The matched SFA sample of 87 individuals is a representative sample and includes adolescents of all educational levels and Swiss regions. For indirect comparison, the following three surveys were chosen: *Health Behaviour in School-aged Children Study* (HBSC), *European School Survey Project on Alcohol and other Drugs* (ESPAD) and *Schweizerische Gesundheitsbefragung* (SGB) (ESS. The Swiss Health Survey).

To figure out whether students with prior cannabis experience or current cannabis use are at a higher risk of using alcohol, tobacco or illicit drugs more frequently, odds ratios were performed. For statistical analysis, SPSS 10.07 was used (SPSS Inc., Chicago, IL).

RESULTS

All 173 questionnaires (100%) were returned (23.1% male, 75.7% female). The data is shown for male (n=40), female (n=131), total (N=173), those at the age of 17 (average age) (n=74), and those with cannabis experience (n=103). It was considered of interest to provide data on specific groups rather than average consumption, e.g. of 16 to 18-year-olds, as there is a clear age dependence. All results are reported in percentages, if not explicitly noted otherwise.

For descriptive statistics for our study sample and the matched SFA sample, see Table 2. Results (see Table 2) suggest a difference in lifetime use (46% vs. 59.5%), but no difference in past month use (35.7% vs. 34.5%).

Table 2. Descriptive statistics for our study sample and the matched SFA sample for cannabis and cigarettes

Parameter		Our Study	SFA
Age at least one	16	44.4	43.7
	17	43.8	43.7
	18	11.8	12.6
Gender	Female/male	75.7/23.1 (N=173)	73.6/26.4 (N=87)
Lifetime use	at least once	59.5	46
Age at least one	Never	40.5	54
	<13	2.9	4.6
	>13	56.6	41.4
Cannabis use last month	no	65.5	64.3* (79.2**)
Cigarettes/day	0	61.3	72.4
	1-9	15.6	8.1
	>10	23.1	19.5

*without those who consumed several times last year, but less than once a month; **including this group

59.3% of all students and 64.9% of those age 17 (average age) reported having tried cannabis. Of those who reported cannabis use, 30.1% had consumed more than 100 joints. 4.9% of those with cannabis experience used cannabis before their 13th year. 56.3% of those with cannabis experience had consumed it within the last 30 days. Use of more than 40 joints in the last

month was reported by 5.8%. 13.7% of cannabis users reported a negative experience with cannabis. 58.3% reported using cannabis with friends different from those at school. For 67.2%, the majority of these friends were reported to be the same age, and 15.7% stated they had smoked cannabis with older friends. 1.9% reported cannabis use together with their parents (see Table 3).

Table 3. Cannabis use: Frequency, patterns, effect, onset, circumstances of first use

Parameter		Female n=131	Male n=40	Total N=173	Age 17 n=74	Cannabis experience n=103
Number of joints smoked in lifetime	0	44.3	28.6	40.5	35.1	-
	1-2	12.2	7.1	11	14.9	18.4
	3-9	8.4	14.3	9.8	9.5	16.4
	10-19	8.4	2.4	6.9	4.1	11.7
	20-39	6.9	7.1	6.9	9.5	11.7
	40-99	6.1	4.8	5.8	4.1	9.7
	100+	13	33.3	17.9	20.3	30.1
Age of first use	Never used	44.3	28.6	40.5	35.1	-
	<13	3.1	2.4	2.9	4.1	4.9
	>13	52.7	69	56.6	60.8	95.1
Number of joints smoked last 30 days	0	68.7	59.5	65.5	67.6	43.7
	1-2	10.7	7.1	9.8	6.8	16.5
	3-9	6.1	7.1	6.4	10.8	10.7
	10-19	9.2	7.1	8.7	8.1	14.6
	20-39	4.6	7.1	5.7	2.7	8.7
	40+	0.8	11.9	3.2	4.1	5.8
Effect of cannabis	Never used	32.3	14.4	27.9	27.4	-
	Rather good	20.8	47.6	27.3	28.8	44.1
	Middle	25.4	14.3	22.7	21.9	34.4
	Rather bad	16.2	21.4	17.4	16.4	13.7
With whom did you consume first	Never used	44.3	28.6	40.5	35.1	-
	Parents	0.0	4.8	1.2	1.4	1.9
	Friends at school	13.7	21.4	15.6	18.9	26.2
	Other friends	34.4	35.7	34.7	33.8	58.3
Those were	Never used	44.3	28.6	40.7	35.1	-
	Younger	3.1	0.0	2.3	1.4	3.9
	Same age	32.3	52.4	37.2	40.5	62.7
	Older	9.2	9.5	9.3	9.5	15.7

Table 4. How do adolescents judge the health implications of cannabis and the ability to drive under the influence of the drug?

Parameter		Female n=131	Male n=40	Total N=173	Age 17 n=74	Cannabis experience n=103
Number of hemp shops in town	Correct answer	85.4	97.6	88.4	91.9	96.1
Psychic risk of cannabis use	Rather low	3.1	14.3	5.8	5.4	6.8
	Middle	67.9	57.1	65.3	66.2	70.9
	Rather high	23.7	28.6	24.9	23	17.5
Somatic risk of cannabis use	Rather low	22.1	31	24.3	21.6	28.2
	Middle	68.7	54.8	65.3	66.2	61.1
	Rather high	7.6	9.5	8.1	8.1	6.8
Driving under the influence of cannabis	Not concerned	4.6	9.5	5.8	8.1	9.8
	Concerned, depending on circumstances	27.5	47.6	32.7	32.4	54.9
	Always concerned	20.6	9.5	18.1	21.6	26.2
	Do not know	45	23.8	40.4	33.8	5.9

6.8% of the cannabis-experienced students rated the psychic risks of cannabis use as rather low, while 28.2% rated the somatic risks to be rather low. 9.8% of the cannabis-experienced group were not worried about driving a vehicle under the influence of cannabis (see Table 4).

61.3% of all students, and 38.8% of those using cannabis reported that they did not smoke tobacco. 23.1% of the whole sample reported consuming more than 10 cigarettes a day, while 38.8% of the cannabis users reported smoking over 10 cigarettes a day (see Table 5). Alcohol use was

reported as occurring once or twice a week (55.8% of all students and 66% of those with cannabis experience), and daily (1.7 and 2.9% respectively). Use of other drugs was reported more commonly in those reporting experience with cannabis use (9.8% all students vs. 13.6% reporting cannabis use) (see Table 5). Yet, it is notable that most cannabis users (86.4% reported no other substance use.

Those with cannabis experience or currently using cannabis use have odds ratios up to 10.86 for the risk of more frequent use of alcohol, tobacco or illicit drugs (see Table 6).

Table 5. Alcohol, tobacco and drug use

Parameter		Female n=131	Male n=40	Total N=173	Age 17 n=74	Cannabis experience n=103
Alcohol use	0	30.0	16.7	26.7	20.5	18.6
	Seldom	13.8	7.1	12.2	12.2	9.7
	1-2 times a week	51.5	69.0	55.8	62.2	66.0
	Every day	0.0	7.1	1.7	1.4	2.9
Cigarettes	0	60.3	64.3	61.3	60.8	38.8
	1-9	17.6	9.5	15.6	12.2	22.4
	10-20	22.1	26.2	23.1	27.0	38.8
Other drugs used	Ecstasy			2.3	1.35	2.9
	Heroin			1.15	0.0	0.97
	Cocaine			2.3	1.35	2.9
	Benzodia-zepines			1.73	0.0	0.97
	LSD			2.3	1.35	3.88
	Speed			1.73	2.7	2.9
	Ampheta-mines			0.6	0.0	0.97
	Psychedelic Mushrooms			2.3	0.0	2.9
	Other			0.6	0.0	0.97
	None	90.8	88.1	90.2	94.6	86.4
Age	16	48.9	26.2	44.4	-	40.8
	17	41.2	47.6	43.8	-	46.6
	18	9.2	19.0	11.8	-	10.7

Table 6. Association between alcohol, cannabis and other drug use (odds ratio)

Parameter 1	Parameter 2	Odds ratio	95% CI
Gender: female	Lifetime cannabis use >2 times	0.37*	0.17-0.78
Alcohol use (1=none, seldom, 1-3 times /month) 2= 1-2/week, daily	Lifetime cannabis use (1=0, 1 or 2 times) 2= >2 times	4.33*	2.259-8.31
Alcohol use (1=none, seldom, 1-3 times /month) 2= 1-2/week, daily	Cannabis use last 30 days (1=0-9) 2= >10 times	1.33	0.59-3.02
Alcohol use (1=none, seldom, 1-3 times /month) 2= 1-2/week, daily	Cannabis use last 30 days (1=0) 2=>0 times	2.07*	1.06-4.03
Other drugs (illicit) (1=never) 2=ever	Lifetime cannabis use (1=0, 1 or 2 times) 2= >2 times	5.73*	1.58-20.7
Other drugs (illicit) (1=never) 2=ever	Cannabis use last 30 days (1=0-19) 2= >20 times	8.90*	2.61-29.69
Other drugs (illicit) (1=never) 2=ever	Cannabis use last 30 days (1=0-9) 2= >10 times	7.23*	2.51-20.82
Other drugs (illicit) (1=never) 2=ever	Cannabis use last 30 days (1=0) 2= >0 times	5.74*	1.91-17.21
Cigarettes smoked daily (1=0) 2>0	Alcohol use (1=none, seldom, 1-3 times/month) 2= 1-2/week, daily	3.37*	1.66-6.82
Cigarettes smoked daily (1=0) 2>0	Cannabis use last 30 days (1=0) 2= >0 times	10.86*	5.18-22.78

*p<0.05

DISCUSSION

The data of this study is partly consistent and partly in conflict with numerous other scientific papers. Once more, evidence is provided that cannabis use among adolescents in Europe is common and that occasional cannabis use seems to have reached a status of normality among a substantial part of adolescents especially in Anglo-American countries, Switzerland, Greenland and Spain (ter Bogt et al. 2006).

In some countries, today's prevalence of cannabis use among students is almost 3.5 times higher than in 1977. Notable differences of cannabis use by students can be observed in the different studies (ESPAD, HBSC and our study), although all of them used anonymous data survey by questionnaire.

Our study deals primarily with cannabis prevalence data in adolescents from different sources and shows that these deviate surprisingly. The reasons that drug-related population surveys and direct school surveys commonly yield very contradicting results is not easy to explain. Methodological aspects such as lengths of the questionnaire may account for some of these differences.

Our results on cannabis prevalence are in conflict with results of the official Health Behaviour in School-Aged Children: WHO Collaborative Cross-National Study (HBSC) (group of 15 to 19-year-old adolescents) and the European School Survey Project on Alcohol and other Drugs (ESPAD) (group of 15 to 16-year-old students) in Switzerland, in which considerably more students (76% HBSC, 67% ESPAD; both 2007) reported never having used cannabis. Possible explanations for this first major result of our study could include:

- Differences in the questionnaires: more focused questionnaires (ESPAD) revealed higher rates than questionnaires with more general health-related questions (HBSC).
- Reported consumption rate could be higher in school surveys than in drug policy surveys (like HBSC or ESPAD).
- Even if participation is voluntary, adolescents' attitudes can differ depending on the setting of the survey. Surveys based on face-to-face partnership with mutual interest might reveal more open and honest reports (our main hypothesis).
- Furthermore, differences in methodology among the different surveys increase difficulties in comparing results across surveys. Many samples from other studies are difficult to compare, because only age groups, such as 15 to 18, or even wider ranges like 15 to 34, are published.

Published data (Rodondi et al. 2000) from the 1993 Swiss Multicenter Adolescent Survey on Health found a prevalence of 10.2% problem drinkers among 2359 adolescents between 15 and 20 years. As in our results,

more frequent alcohol use was associated with a higher probability of lifetime cannabis use (odds ratio in our study was 4.33, vs. 3.4 in the Swiss Multicenter Adolescent Survey). In our sample, the percentage reporting no previous alcohol use was almost twice as high (26.7% vs. 13%). However, the rate of women reporting alcohol use once or twice a week was 51.5% in our study - almost twice as high compared to data of Rodondi et al. (26.7%) (Rodondi et al. 2000). Alcohol consumption one to two times a week was reported by 55.8%, and daily consumption by 1.7%. As the questionnaire did not address actual quantities, it is uncertain whether this 1.7% would fulfil the criteria of alcohol dependency or not.

Almost 10% of all students, and 13.8% of those with cannabis experience, reported having also used other drugs. 5.8% named ecstasy, heroin, cocaine, speed, benzodiazepines, psychedelic mushrooms, LSD and amphetamines (see Table 5). The trends of these findings are in accord with other results (von Sydow et al. 2001), where cannabis use was found to be accompanied by an increased use of other drugs.

In our study, the students reported first use most commonly taking place with friends different from those at school but of the same age. It is interesting that more highly educated students have a higher prevalence of cannabis use, but do not start smoking with people from the same school. This indicates that the first cannabis use takes place with friends from schools of lower educational levels. One possible hypothesis rising from this fact is that students from schools of lower educational levels tend to show a more frequent use of cannabis and an earlier onset, compared to students attending schools of a higher educational level. Further research is needed to clarify circumstances of first use and to identify different subgroups and differences in cannabis use patterns.

The major methodological problem of our study is the direct comparability of the data from our study with the SFA, HBSC and ESPAD data, and the sample size relative to other research in the area, possibly limiting the generalizability. Comparisons with the data from the HBSC and ESPAD studies are difficult: data differ (a) by age, (b) by area, (c) by level of education and (d) by data collection procedure. We cannot conclude that a scientific study provides more valid data than drug policy surveys in general.

Another limitation of this study is a possible selection bias, as the sample only included students from one school with an above-average level of education. This does limit generalizability and comparability of results. The chosen sample of classes of one school with an above-average level of education could differ from a representative sample of students. It may also differ with respect to substance use, although the school was a typical one in town (students with foreign background, social situation of the parents). Higher or lower rates of

substance use may not be attributable only to differences in reporting, but also to differences in sample composition.

Thus, it might be possible that the data is not generalizable to students in smaller, private or rural schools. Another limitation to generalizing this data is the above-average educational level of the chosen school, and therefore the participants. Lower education levels tend to correlate with higher cannabis use (Macleod et al. 2004). Finally, the reliability of our survey questionnaire was not measured until now. The illegality of cannabis use might give rise to a number of potential biases that lead to under-reporting the prevalence of its use. We asked the students only to participate if they felt able to complete the form honestly. This instruction, as well as any other that differs from the surveys with which our data are compared, may have influenced the responses. The questionnaire was administered at a “health day about cannabis”, which offered the students the opportunity to discuss medical and psychiatric issues. This context may have influenced the results also, when compared with the data of other surveys.

Another important result of our study is that the students’ attitudes toward health and safety issues were mostly realistic. For example, only 9.8% of the cannabis-experienced students in our study declared no concern about driving under the influence of cannabis, and only 6.8% rated the potential psychic risks of cannabis use as rather low. Results of the study of Suris et al. (2007) on the characteristics of adolescent Swiss cannabis users (n=5,263 students aged 16 to 20 years) show that those adolescents who only used cannabis (n=455) were better students and had less psychosocial problems than those who additionally used tobacco (n=1,703). Compared to abstainers (n=3,105), those who only consumed cannabis were more socially driven and did not seem to have psychosocial problems at a higher rate. These results suggest that cannabis is now more and more integrated in the Swiss youth culture, and that not all use can be considered either detrimental or to be “abuse”. Additionally, its use without tobacco dependence might indicate better social integration, whereas in most countries with lower prevalence, cannabis use indicates a higher probability of social problems. Further research is needed.

Although participating in the questionnaire was voluntary, all forms were completed and returned by the adolescents (N= 173; 100%), suggesting that a climate of equality and mutual appreciation with the adolescents had been established. The students surveyed in this study expressed being concerned about alcohol use among their peers. Furthermore, they wished for cannabis prevention programs to start around the age of 12.

There is considerable use of cannabis and other psychoactive substances, including alcohol, tobacco and

illicit drugs, reported in the study. However, a broad majority of adolescents seem to understand risks and hazards. To identify those at risk for harmful or addictive use of psychoactive drugs would be beneficial for the individual and the society. In Switzerland, as throughout Europe, regional differences in drug policy, drug use and patterns of use are notably marked. In this respect one limitation of our data, which is highly selective with regard to educational level, age and localisation, turns out to be a strength. The homogeneity leads to clearly significant results for this subgroup. Future research might benefit from seeking for more detailed data on those at risk, in order to identify predictors for cannabis consumption and to develop strategies for targeted help.

CONCLUSIONS

This paper deals primarily with cannabis prevalence data in adolescents from previous studies and sources and shows that our findings deviate significantly - and surprisingly - from past research. Our data from a school survey indicates higher cannabis use than data from official drug policy studies. Additionally, our data shows that the students’ self-reported attitudes towards health and safety issues were mostly realistic. The examination of methodological issues that might impact prevalence estimates should be added to the cannabis literature.

Acknowledgements

We would like to express our gratitude to the participating students, their parents, their teachers, the school director and E. Ottersbach, M. Schweizer, M. Fasnacht, and D. Ladewig for their support in performing the survey and the Swiss Institute for the Prevention of Alcohol and Drug Problems (SFA/SIPA), Lausanne, Switzerland, namely Herrmann Fahrenkrug, Richard Müller and Gerhard Gmel for providing the data from their survey and advise in preparing the manuscript.

Conflict of interest: None to declare.

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