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Prevalence of Use, Abuse and Dependence of Illicit Drugs among Adolescents and Young Adults in a Community Sample

Key Words

Prevalence
Age at onset
Illicit drugs, use, abuse and
dependence

Abstract

Prevalence findings for 1995 of illicit drug use as well as DSM-IV abuse and dependence are reported from a representative population sample of 3,021 respondents from Munich, Germany, aged 14–24 years. Results are based on personal interviews using the M-Composite International Diagnostic Interview (M-CIDI) with its DSM-IV diagnostic algorithms. Findings indicate that more than 30% of the adolescents and young adults are or have been using one or more illicit drugs at least once in their life. Men were slightly more likely to ever use drugs and used them more frequently than women. Cannabinoids were by far the most frequently used type of drug, followed by various stimulating drugs and hallucinogens. There is also considerable polysubstance use among 14- to 24-year-olds. Criteria for DSM-IV abuse without dependence were met by 4.1% of all men and 1.8% of all women, a dependence syndrome of any type of illicit drug was diagnosed in 2.5% of the men and 1.6% of the women. Cumulative age of onset incidence analyses suggest that substance use starts early, in about one-third before the age of 16 years and continues to rise for most drugs throughout adolescence and young adulthood. Overall these findings suggest that substance use and substance disorders are more prevalent than suggested in most previous German studies.

Introduction

A variety of questionnaire surveys conducted in representative population samples in Germany since 1980 [1–3] suggested that the prevalence of illicit drug use has been

increasing not only during the 80s [1], but continues to rise in the 90s [2]. There are, however, considerable variations in findings across regions and in particular considerably different rates in West and former East Germany, making overall estimates of the size of the drug problem in Germany somehow questionable. Since 1990 the frequency of respondents aged 18–59 reporting to have used some type of illegal drug at least once in their life

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increased overall in West Germany from 18.4 to 21.8% and in East Germany from a low of 1.1 to 7.1%. Focusing on current rates, defined as percentage of respondents having used illicit drugs within the past 12 months, the increase in drug use rates becomes even more evident. Current use estimates increased from 5.1 to 9.5% in West Germany and from 0.8 to 3.5% in East Germany. These changes indicate that (1) the gap between low East German and high West German estimates is rapidly closing [2], and (2) that at least West German illicit drug use rates are slowly approaching the lifetime rates of 30–40% illicit drug use, reported from the US [4, 5].

According to the most recent large-scale federal questionnaire survey [2] of more than 6,200 respondents in West Germany, increasing drug use rates are especially pronounced among young adults. About 25% of respondents aged 18–29 years reported in 1995 having used at least once an illicit drug, an increase of more than 30% when compared to 1990. Fairly consistently over time cannabinoids were found to be the most frequently used type of drug [1], followed by various types of stimulants and hallucinogens, which seem to have increased considerably since 1990 [6]. In contrast to the high rates for cannabinoids, rates for opioids are quite low, with prevalence estimates ranging between 1 and 2% of the total population. Also, comparisons with earlier investigations suggest, that the proportion among lifetime users reporting regular and heavy use is also increasing [2, 7]. Unfortunately, no such powerful data are available for adolescents aged younger than 18 years, because since 1994 the regular surveys of the federal ministry have not included this age group anymore [8–10].

Although these data provide essential information about the size of the illicit drug use problem in Germany, they have several limitations. Aside from methodological restrictions, such as fair response rates of about 65% with no adjustments being made for potential non-response distortions and the relative lack of sophistication of the statistical analyses, the almost exclusive use of mailed questionnaires with no established psychometric properties should be mentioned. Mailed questionnaires have the disadvantage that it is not possible to control properly whether the randomly selected target person fills out the questionnaire himself and in privacy, and most importantly, questionnaires do not allow a sufficiently reliable and valid evaluation of the diagnostic status in terms of clinically relevant diagnoses. Because of the more complex structure of diagnostic criteria for abuse and dependence according to international diagnostic classification systems, such as ICD-10 and DSM-III-R/DSM-IV, and

the modest association of frequency of use and diagnostic status, it is unlikely that any self-report scales can provide the details required in diagnostic evaluations [12]. Thus, beyond detailed quantity and frequency information, stratified by age and sex as well as supplementary information about psychosocial risk factors, motivational patterns and self-reported consequences resulting from drug use, these data do not allow the derivation of abuse and dependence diagnoses. The literature review by Perkonig et al. [3] further demonstrates that there are no other data available from more recent clinical epidemiological studies in Germany filling this important gap in knowledge.

Consequently, as no information is available for Germany as a whole or for specific regions, no estimates are feasible that allow us to indicate what proportion of the population suffers from abuse and dependence of specific types of illicit drugs. Whereas the lack of data concerning the prevalence of illicit substance disorders might not be that critical for primary preventive actions, the lack of reliable and valid estimates for clinically relevant substance-specific abuse and dependence symptoms and disorder is critical especially as far as health service planning and resource allocation are concerned.

Aims

This paper is the third [6, 11] in a series of publications providing detailed descriptive epidemiological information about the use, abuse and dependence of illicit substances. In addition to previously reported findings, this paper reports EDSP data about the prevalence of illicit drug use, abuse and dependence according to the criteria and diagnostic algorithms of DSM-IV in 3,021 subjects, aged 14–24 years, focusing on polysubstance use and the association of frequency of use with diagnostic status. It is important to note that the following findings – unlike all previous German surveys – are based on personal examinations by trained interviewers using the M-Composite International Diagnostic Interview (M-CIDI) [12], which assesses quantity and frequency information along with clinically diagnostic questions for onset, course, and the presence of diagnostic criteria for DSM-IV abuse and dependence. The following issues will be addressed: (1) What is the substance-specific lifetime prevalence of illicit drug use in adolescents and young adults? (2) How frequently does multiple substance use occur in this population? (3) What is the prevalence of substance use disorders according to DSM-IV criteria and how are symptoms

of abuse and dependence as well as disorders related to the frequency of use? (4) Finally, age at onset, characteristics of abuse and dependence symptoms will be explored to identify how early and which types of substance-related diagnostically relevant problems occur in 14- to 24-year-olds. It should be mentioned that more detailed descriptions concerning prescription drugs [13] and amphetamines [14] will be discussed more comprehensively elsewhere.

Methods

Since a complete and detailed description of design, sample, instruments, procedures and statistical methods of the EDSP is given elsewhere [15], only a few remarks should be made here.

Sample

The data reported include all 3,021 subjects of the EDSP constituting a representative sample of 14- to 24-year-olds in the greater Munich area, Germany. All prevalence estimates reported are weighted to take into account the age-stratified sampling scheme as well as to adjust for nonresponse. The standard errors for the prevalence rates are available on request.

Assessment of Illicit Drugs

In the initial screening part of the M-CIDI substance section that starts with the assessment of prescription drug use [for a detailed overview of the substance use sections of the M-CIDI see 12, 13], the respondent is first shown a comprehensive list of eight types of substances along with the most frequent market and street names. Whenever the respondent identifies a substance taken at least once in life, he or she is asked to underline this substance on the list for further assessment of quantity and frequency of consumption as well as associated diagnostic problems. Because almost all interviews were conducted in the subjects' home, with the potential risk that someone might be listening, subjects were free not to loudly mention the consumed substances, but to underline the names and simply mention the group of substances. Further it is also important to note that questions for illicit drug use were preceded by a commitment probe establishing whether the person is willing to discuss openly the use of these substances with the interviewer. Less than 1% denied this question. In these cases the section was not administered. In addition to the suggested drugs from the list the respondent was free to add any other substance. All names of substances mentioned were cross-checked by experienced M-CIDI editors, to ensure that the substance was correctly assigned to the respective drug class (cannabinoids, amphetamines, hallucinogens etc).

Terminology

Throughout this paper 'lifetime user' refers to respondents having acknowledged the use of at least one substance on at least one occasion in their life. 'Regular use' is defined in the M-CIDI as having used the substance more than 4 times. 'Heavy use' denotes cases with a prolonged and at least twice per week consumption pattern. 'Diagnostic criteria' and 'diagnostic symptoms or problems' refer to the four DSM-IV abuse and the seven DSM-IV dependence criteria [16].

Results

Prevalence and Age at Onset of Lifetime Ever Use of Illicit Drugs

34.9% of the population aged 14–24 years reported having used at least one of the substances listed in table 1 at least once in their lifetime, with 17.6% reporting infrequent (2 to 4 times) and 17.3% regular use. Overall, men reported slightly higher rates (39.7%) than women (30.4%). Cannabis dominates this picture with 6.5% reporting a single use, 11% infrequent and 15.5% regular use. The next two most frequently used types of substances were stimulants, either of the amphetamine type (5.0%) or cocaine products (4.0%) and hallucinogens (3.2%). Opioid use was acknowledged by 3.4%. It should be noted that this estimation also includes prescription drugs like codeine as well as methadone. Except for cannabis, cocaine and inhalants, there was no significant gender difference. However, regular use of nearly all substances was about 1.1–3.7 times more likely to be reported by men as compared to women.

Figure 1 indicates that throughout all ages there are subjects who use cannabis for the first time. The cumulative hazard curve starts to pick up after age of 13 years with an almost equal number of new incident cases at each age up to 24 years. About one-third of all lifetime cannabis users report an onset of use prior to age 16, another third after age 20. First use of almost all other substances is considerably later, rarely occurring before age 16. On a lower overall cumulative incidence level, a similar steady increase of incident cases over the full age of onset range can be seen for cocaine and hallucinogens, but not for opioids and amphetamines.

Since the data in table 1 suggest considerable overlap between the different classes of substances, table 2 summarizes the prevalence of single substance and multiple lifetime users by frequency of use. By comparing the top row findings of 'any use' with the subsequent rows, only a small proportion of polysubstance users can be identified among respondents that have used the substance just once. However, among the total of 17.3% lifetime regular users, about 40% do report multiple substance use, with 3.8% of the subjects having used regularly substances of two, 1.8% of three, and 2.1% of four and more of the eight classes of drugs assessed. Regular multiple substance use appears to occur more frequently in men (8.8%) than in women (6.7%).

Table 1. Lifetime prevalence (%) of use by substance, frequency of use and gender^{1,2}

Substances	Frequency of use	Total	Men	Women	Odds	95% CI
Cannabis	Just once	6.5	7.1	6.0	1.4*	1.03–1.86
	2–4 times	11.0	12.3	9.6	1.5*	1.19–1.90
	5 times or more	15.5	18.8	12.3	1.8*	1.46–2.19
	Total	33.0	38.2	27.9		
Amphetamines	Just once	1.0	1.1	1.0	1.1	0.55–2.24
	2–4 times	1.5	1.9	1.1	1.7	0.92–3.09
	5 times or more	2.4	3.0	1.9	1.6	0.99–2.55
	Total	5.0	5.9	4.0		
Sedatives/ Hypnotics/ Anxiolytics	Just once	0.2	0.2	0.3	0.6	0.11–2.84
	2–4 times	0.7	0.5	0.9	0.5	0.20–1.24
	5 times or more	0.7	0.9	0.5	1.7	0.71–4.16
	Total	1.6	1.6	1.7		
Opioids	Just once	0.8	0.6	1.0	0.6	0.25–1.37
	2–4 times	1.1	1.0	1.3	0.8	0.39–1.54
	5 times or more	1.5	1.6	1.4	1.1	0.62–2.02
	Total	3.4	3.1	3.6		
Cocaine	Just once	1.4	2.0	0.9	2.4*	1.25–4.60
	2–4 times	1.4	1.2	1.6	0.8	0.42–1.43
	5 times or more	1.2	1.8	0.6	2.8*	1.34–5.88
	Total	4.0	5.0	3.1		
Hallucinogens	Just once	1.1	1.3	1.0	1.3	0.65–2.55
	2–4 times	0.7	0.9	0.4	2.1	0.84–5.33
	5 times or more	1.4	2.0	0.8	2.5*	1.29–4.91
	Total	3.2	4.2	2.2		
Inhalants	Just once	0.2	0.2	0.2	0.9	0.19–4.39
	2–4 times	0.4	0.4	0.3	1.5	0.44–5.06
	5 times or more	0.7	1.1	0.3	3.7*	1.33–10.5
	Total	1.3	1.7	0.8		
Other	Just once	0.2	0.2	0.3	0.6	0.13–2.90
	2–4 times	0.4	0.5	0.3	2.0	0.60–6.39
	5 times or more	0.4	0.5	0.3	1.4	0.44–4.53
	Total	1.0	1.2	0.9		
Any use	Just once	6.5	7.4	5.7	1.4*	1.03–1.85
	2–4 times	11.1	12.1	10.1	1.5*	1.17–1.87
	5 times or more	17.3	20.2	14.6	1.8*	1.46–2.18
	Total	34.9	39.7	30.4		

* $p < 0.05$.¹ Weighted data.² Illicit use of prescription drugs included.

Prevalence of DSM-IV Threshold and Subthreshold Diagnoses of Substance Abuse or Dependence and Heavy Use

Figure 2a, b reveals the prevalence of substance use disorders for men and women for each specific substance. Overall, 2.9% fulfilled criteria for DSM-IV abuse without

dependence and 2% for dependence (with and without abuse). Thus, 4.9% of the population of adolescents and young adults received a diagnosis. Men are 2.3 times more likely to develop substance abuse (OR = 2.3; 95% CI = 1.48–3.63, $p < 0.05$), but only slightly more likely to develop dependence (OR = 1.5; 95% CI = 0.9–2.5, NS).

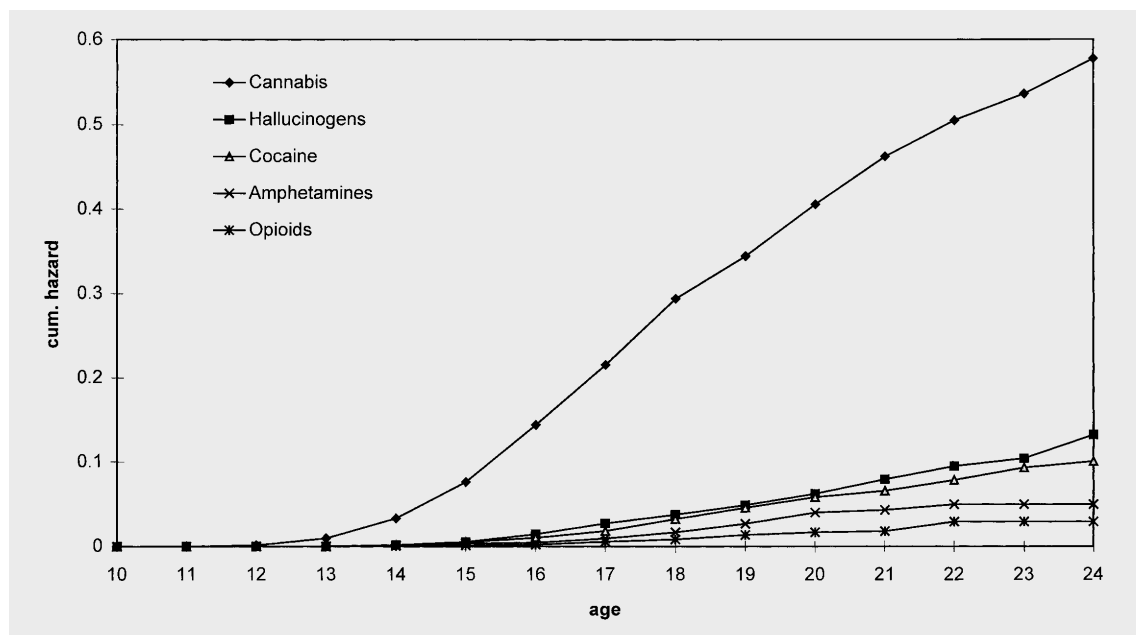


Fig. 1. Cumulative incidence of illicit substance use.

Table 2. Lifetime prevalence of multiple drug use^{1,2}

	Total		Men		Women	
	n	%	n	%	n	%
<i>Any use</i>						
Just once	198	6.5	110	7.4	88	5.7
2-4 times	335	11.1	181	12.1	154	10.1
5 times or more	524	17.3	302	20.2	223	14.6
<i>One substance</i>						
Just once	193	6.4	110	7.3	83	5.4
2-4 times	298	9.9	159	10.6	139	9.1
5 times or more	292	9.7	171	11.5	121	7.9
<i>Two substances</i>						
Just once	5	0.2	1	0.0	4	0.3
2-4 times	32	1.1	20	1.3	12	0.8
5 times or more	114	3.8	59	4.0	54	3.6
<i>Three substances</i>						
Just once	0	0.0	0	0.0	0	0.0
2-4 times	5	0.2	2	0.1	3	0.2
5 times or more	56	1.8	31	2.1	25	1.6
<i>Four or more substances</i>						
Just once	0	0.0	0	0.0	0	0.0
2-4 times	0	0.0	0	0.0	0	0.0
5 times or more	63	2.1	40	2.7	23	1.5

¹ Weighted data.

² Illicit use of prescription drugs included.

Among men, abuse (3.8%) and dependence (2.0%) resulting from the use of cannabinoids are the most prevalent, followed by abuse/dependence of stimulants (amphetamines: abuse 0.8%, dependence 0.5%; cocaine: abuse 0.5%, dependence: 0.5%), and hallucinogens (abuse: 0.5%, dependence: 0.3%).

In each substance class there are a considerable number of respondents that do report heavy regular use and at least some diagnostic symptoms of abuse and dependence without reaching the full DSM-IV diagnostic threshold (subthreshold substance disorders). Figure 2c splits the total number of lifetime ever users for each class of substances into those with heavy use without significant signs of an abuse or dependence syndrome, those with subthreshold diagnoses and those meeting full diagnostic criteria according to DSM-IV criteria. This picture suggests that a considerable number of cases are quite close to getting a diagnosis, especially among hallucinogen and amphetamine users. These two groups also reveal the lowest proportion of heavy users without any signs of abuse or dependence.

Patterns of Polysubstance Abuse and Dependence

Table 3 reveals considerable overlap between substance classes in terms of diagnoses of abuse and dependence, suggesting considerable comorbidity between various classes of substance use disorders. Among those with

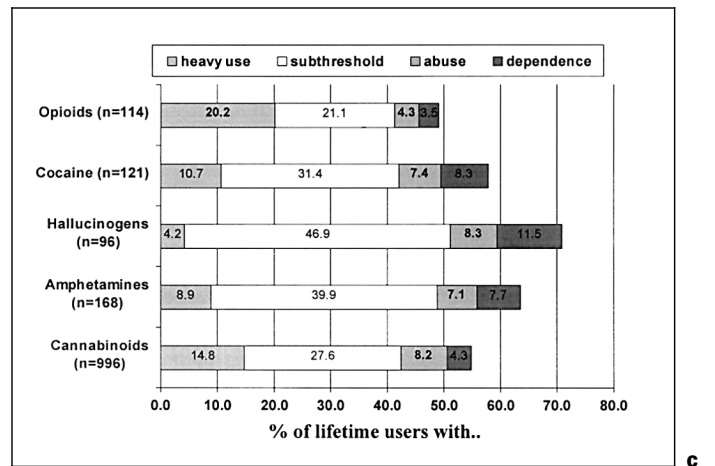
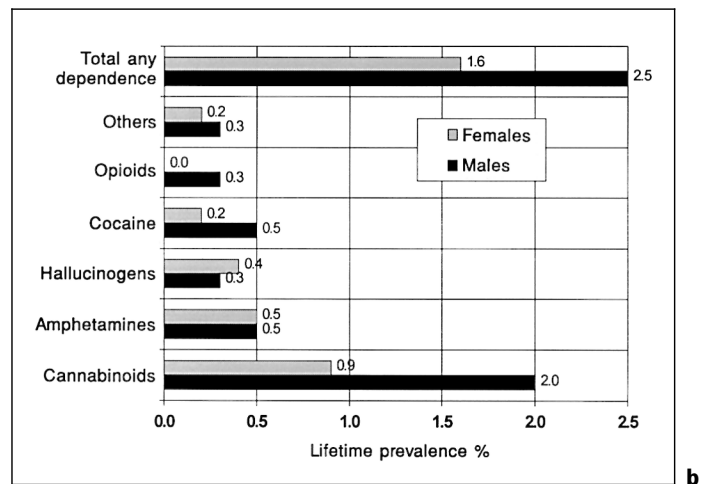
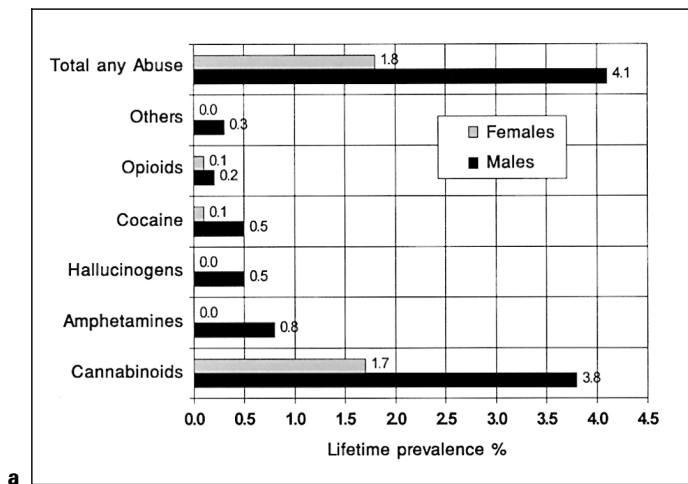


Fig. 2. **a** Lifetime prevalence of DSM-IV abuse. **b** Lifetime prevalence of DSM-IV dependence. **c** Percent of lifetime users with heavy use, subthreshold and threshold disorders.

Table 3. Lifetime substance use disorder comorbidity: pure and multiple substance use disorders ¹

Substance use disorders	n	Cannabis		Amphetamines		Hallucinogens		Cocaine		Opioids		Inhalants		ASH ²	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Cannabis	125	100	80	22	18	18	4.1	15	11.7	5	4	1	0.9	8	6
Amphetamines	25	22	88	0	0	19	76	14	56	5	20	1	4	6	24
Hallucinogens	19	18	94.7	19	100	0	0	9	47.4	2	10.5	1	5.3	4	21.1
Cocaine	19	15	78.9	14	73.7	9	47.4	4	21.1	6	31.6	1	5.3	5	26.3
Opioids	9	5	55.6	5	55.6	2	22.2	6	66.6	3	33.3	0	0	4	44.4
Inhalants	2	1	50	1	50	1	50	1	50	0	0	1	50	0	0
ASH	10	8	80	5	50	4	40	5	50	4	40	0	0	2	20

Values in boxes = Pure substance disorders.

¹ Weighted data.

² ASH = Anxiolytics/Sedatives/Hypnotics.

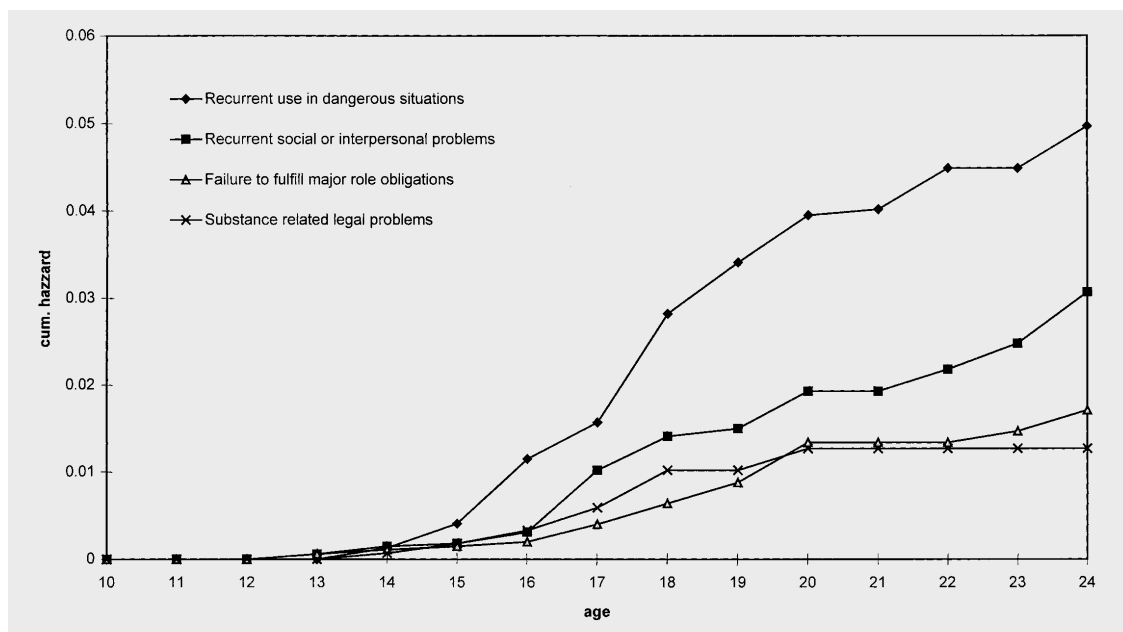


Fig. 3. Cumulative incidence of abuse symptoms for cannabis.

hallucinogen (n = 19) or amphetamine (n = 25) disorders, not one single case was identified having just this disorder. Among amphetamine users, 88% also had a cannabis diagnosis, 76% a hallucinogen disorder and 20% an opioid disorder. Quite similar polysubstance comorbidity is evident for those with cocaine and opiate disorders.

Cumulative Incidence of Diagnostic Symptoms and Criteria for Abuse and Dependence Diagnoses

Figure 3 presents the cumulative hazards by age of first onset for DSM-IV diagnostic criteria of abuse. Due to low base rates for many of the substance classes this figure is restricted to cannabinoids only. The DSM-IV criterion of 'recurrent use in dangerous situations' (driving, operating machines, etc.) is the most frequently endorsed symptom showing a fairly steep and steadily rising cumulative incidence rate, starting after the age of 14 years. After the age of 19 years the curve levels off slightly, suggesting that after this age only few new cases with first onset of this symptom are observed. The second most frequent criterion refers to 'recurrent social and interpersonal problems' because of the cannabis use. There is a slightly later age of onset for this symptom, with two high incident intervals, namely at the age of 16–18 years and less clearly after the age of 22 years. The remaining two DSM-IV symptoms, including substance-related legal problems, occur mostly between the age of 16 and 19 years for the first time. After

the age of 20 years the first occurrence of these symptoms is rare.

Such cumulative incidence curves for dependence criteria were also computed for DSM-IV dependence symptoms discussed elsewhere [11]. Compulsive use as well as the development of tolerance are overall the most frequently reported dependence symptoms in cannabis dependence, with hazards for both increasing steadily after the age of 14 years and peaking for tolerance at the age of 19–20 years as well as after the age of 23 years. The age at first onset of DSM-IV criterion (7) 'use despite knowledge of having a recurrent psychological problem' shows a markedly different pattern, with peak incidence between the age of 14 and 17 years and after the age of 23 years.

Discussion

To our knowledge this is the first study conducted in Germany investigating the prevalence of use, abuse and dependence on the basis of a personally administered diagnostic interview in a representative population sample.

Our findings have revealed that illicit substance use is quite prevalent among adolescents and young adults, with 40% of the men and 30% of the women having tried some drug at least once in their life. As compared to the 1995 questionnaire survey data [2] of 18- to 24-year-olds in

West Germany, the EDSP rates assessed in the same year are considerably higher, overall as well as for the specific substance classes examined. It is hard to know to what degree these differences are due to the different assessment methodology used or simply reflect the different sampling scheme (Germany versus metropolitan Munich). Irrespective of this, our findings indicate that the prevalence of use in Munich is much higher than previously assumed in the vast majority of prior studies [1] and resembles very much findings for the United States [4]. It is remarkable that up to 40% of all drug users in our sample reported having started using drugs before the age of 14 years. In accordance with all previous studies, cannabinoids still dominate the drug scene, substance users that have never tried cannabinoids being extremely rare. However, there are also strong indications that hallucinogens and stimulating drugs, especially Ecstasy and related substances as well as cocaine, are being considerably more frequently used than the 1990, 1994 and 1995 federal surveys [2] have suggested. It is also noteworthy that drug use rates for men and women were relatively similar in our study.

Although we expected predominantly one time only users in 14- to 24-year-olds, the majority of our population has been using drugs regularly and almost one-third could be described as heavy users. Also polysubstance use is not rare with almost 40% of all users reporting the intake of drugs from at least two substance classes. Particularly among stimulating drug users, the concurrent use of hallucinogens and cannabis is quite frequent.

Given the examined age range of 14–24 years and considering that the most frequently used substance – cannabis – is usually rated as having a low dependence potential, the prevalence for full-blown DSM-IV substance disorders of 4.9% could be called considerable. Overall, 4.1% of the men and 1.8% of the women fulfilled criteria for full-blown DSM-IV abuse and additionally 2.5% of the men and 1.6% of the women met criteria for dependence. Additionally, depending on the predominant type of substance used, 21–47% of all regular users were classified as having subthreshold disorders without meeting full diagnostic criteria. The potential for developing abuse and dependence as well as polysubstance disorders is especially pronounced for amphetamines, hallucinogens and cocaine. In our population we could not identify any case having a disorder of just one of these drug classes.

These prevalence findings are partly in contrast to the few available German clinical epidemiological studies, conducted in the 80s, which estimated very low drug disorder prevalence [1, see review in 17]. Our findings are,

however, quite similar to diagnostic rates reported from the US, such as the slightly lower rates in the Epidemiological Catchment Area study conducted in 1981 [18] and the almost identical findings from the National Comorbidity Survey [19].

Use of illicit substances is a period-, age-, and development-dependent phenomenon. Thus, cross-sectional analyses of a fairly broad and, in terms of substance use initiation and its progression to regular and heavy use, critical age range, have the limitation of being only a preliminary report. Such reports do not allow us to draw firm conclusions about use and symptom progression into substance disorders, because such processes depend on many factors, such as cognitive and behavioral developmental and life style changes of an individual, the changing patterns in the availability of drugs over time and more general secular trends.

Thus, although one could assume that due to the finding that even among 14- to 16-year-olds illicit substance use is further on the rise with gradually further rising risks for heavy use, abuse, and dependence this must not necessarily be the case and therefore such cross-sectional findings must be interpreted with caution. Longitudinal prospective designs are needed to examine in more detail the probabilities and associated risk factors of the transitions from first use to regular use and from there to possibly heavy use and the development of abuse and dependence syndromes. However, at each of these developmental stages spontaneous or treatment-related partial and complete remissions, and discontinuation of substance use respectively, might occur. In our ongoing second and third follow-up investigations we are collecting such data and hopefully will provide further insight into the mechanisms of the early stages of illicit substance use disorders.

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