



Persistence and perceived consequences of cannabis use and dependence among young adults: implications for policy

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Abstract

Aims. To document patterns of cannabis use and dependence from late-adolescence through to the mid-twenties; to describe perceived consequences of cannabis use among young people; and to consider policy implications of these findings.

Methods. This was a longitudinal study of the Dunedin Multidisciplinary Health and Development Study birth cohort with repeated measures of cannabis use at ages 18, 21 and 26 years.

Results. Twelve month prevalence rates of cannabis use (just over 50%) and dependence (just under 10%) remained stable between age 21 and 26 years, contrary to an expected decline. Cannabis dependence, as distinct from occasional

use, was associated with high rates of harder drug use, selling of drugs and drug conviction. Cumulatively, almost 3/4 of our cohort had tried cannabis by age 26. Young people thought the risk of getting caught using cannabis was trivial, and that using cannabis had few negative social consequences.

Conclusions. The persistent high rates of cannabis use and dependence among young New Zealand adults raises important issues for policy makers. Current laws are not particularly effective in deterring use. Whereas occasional use does not appear to present a serious problem, cannabis dependence among users is a serious public health issue that warrants immediate action.

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Recent findings have demonstrated high rates of cannabis use and dependence among young New Zealanders^{1,2} but it is unknown if these high rates persist at older ages. This is important information because it has been suggested that heavy cannabis use is a temporary stage that begins to decline in the early twenties, reaching relatively low levels by the early thirties.³ These data have been interpreted as indicating that there is little long-term health risk associated with cannabis use.^{4,5} However, the Chen and Kandel report³ was based on Americans sampled 20 years ago and the findings may not apply to contemporary New Zealanders. If rates of cannabis use and dependence in New Zealand are found to remain high into the mid-twenties then important health and social/legal policy consequences may arise.⁶⁻⁸

This study documents change in patterns of use from adolescence to the mid-twenties. In addition, we investigated young people's perceptions of the consequences of using cannabis as these attitudes are likely to impact upon rates of use. Differences between occasional versus dependent cannabis users in terms of other drug use and history of drug convictions were also investigated because such information can inform the current cannabis decriminalisation/legalisation debate in New Zealand.

Methods

Participants. The sample consisted of 499 male and 481 female (mean age 26.0 years) members of the Dunedin Multidisciplinary Health and Development Study (DMHDS), a longitudinal investigation of the health, development and behaviour of 1037 children born in Dunedin during 1972-73.⁹ 96% of the living sample (980/1019) participated at the 'age-26' assessment, of whom 79% (774) were still resident in New Zealand at the time of interview, with the remaining 21% (206) living overseas. We report data for the full cohort as it is expected that many of those currently living overseas will return to New Zealand within five years.¹⁰

Cannabis use. At age 26 years, study members were asked about their use of cannabis in the previous twelve months. Response categories were 'not used', 'used less than six times', and 'used more than six times'. The same approach had been used at previous assessments at ages 18 and 21 years.

Cannabis dependence. Cannabis dependence describes a maladaptive pattern of behaviour induced by frequent (daily or almost daily) use of cannabis. At age 26 years study members were asked questions relating to time spent using, obtaining, or recovering from cannabis use; impairment of ability to control cannabis use; tolerance; continued use despite social, psychological or physical health problems caused or exacerbated by cannabis use; use of cannabis in hazardous situations, and whether cannabis had led them to neglect any of their usual responsibilities or to give up any of their usual social, occupational or recreational activities. In order to meet DSM-IV¹¹ criteria for cannabis dependence, our Study members had to report that symptoms in three (or more) of the above areas had occurred at some time during the previous twelve month period. **Other drug use.** Study members were also asked if they had used any of the following substances in the past year, either when they were not prescribed or for longer than prescribed in order to feel more active or alert, to feel calm, or to feel good/high: amphetamines (ie speed, diet pills, dexedrine, ice); sedatives (ie tranquillizers, sleeping pills barbituates, Seconal, Valium, Xanax, Quaaludes); cocaine, crack; opiates (eg heroin, codeine, Demerol, Percodan, Talwin, morphine, methadone, opium, Darvon, Dilaudid); phencyclidine, (Angel Dust), hallucinogens (ie, LSD, mescaline, peyote, dimethyltryptamine, mushrooms); inhalants (ie, glue, toluene, gasoline, paint); other (ie betel nut, nitrous oxide, amyl nitrate, poppers, ecstasy).

Selling of drugs. As part of the age 26 interview about illegal behaviour,¹² Study members were asked whether they had obtained money in the past year from selling cannabis or other drugs.

Perceived risk of detection of cannabis use. Study members were asked to indicate how often they thought they would get caught for using cannabis on ten different occasions. Respondents indicated their response on a 0 to 10 scale. As a comparison, Study members were similarly asked to indicate their likelihood of getting caught for car theft. The importance of *informal sanctions* were assessed by asking Study member's four questions about what would happen if it became known by others that they had used cannabis. Specifically, they were asked (a) if they would lose the respect and good opinion of close friends; (b) if they would lose the respect and good opinion of parents and relatives, (c) if it would harm future job prospects; (d) if it would harm the chance to attract or keep an ideal partner.

Convictions for drug offences. Computerised records of participants' court convictions at all courts in New Zealand and Australia were obtained by searching the central computer system of the New Zealand police. Informed consent for the search was obtained from Study members. The total number of drug conviction records since age seventeen years was determined.

Statistical methods. Sex differences in patterns of cannabis use were tested using chi-squared tests, computed using the statistical package



Results

At age 26 years the 12-month prevalence rate of cannabis use was 51.3% (Table 1). Of those who had used cannabis, approximately 40% used occasionally (<6 times), and 60% used 6 or more times in the previous year. The 12-month prevalence rate of cannabis dependence was 9.4% – lower than that observed for alcohol (17.2%) and tobacco dependence (13.6%) in this cohort. The prevalence rates of both occasional cannabis use and dependence remained virtually identical between age 21 and 26 years (Table 2). Sex differences were observed for prevalence of use and dependency, with males over-represented in both categories. ($p < 0.01$).

Table 1. Lifetime and 12-month prevalence of cannabis use in the DMHDS birth cohort at age 18, 21 and 26 years.

Age (yr)	% Males		% Females		% Total	
	Lifetime	12-month	Lifetime	12-month	Lifetime	12-month
18	48.3	46.7	44.3	40.0	46.3	43.4
21	65.5	58.6	58.3	46.1	61.9	52.4
26	75.5	62.0	64.7*	40.3*	70.1	51.3

Note: Most Study members using cannabis ($n=609$, 64.9%) maintained their level of use between age 21 and age 26, with similar numbers increasing ($n=171$, 18.2%) and decreasing levels of use ($n=159$, 16.9%) during this period. However, sex differences were apparent with more females than males (20.5% vs 13.4%) decreasing their cannabis use between 21 and 26 years, while more males (21.4% vs 14.9%) than females increased use ($p < 0.01$).

*differs from males at $p < 0.01$.

Table 2. Percentage of males, females and the total sample meeting DSM-III-R (ages 18 and 21) or DSM-IV (age 26) criteria for cannabis dependence.

Age (years)	Males %	Females %	Total %
18	8.6	4.4	6.6
21	14.3	4.7	9.6
26	13.5	5.2†	9.4
18 & 21	5.1	1.6†	3.4
21 & 26	7.0	2.0†	4.7
18, 21 & 26	3.1	1.1*	2.1

* differs from males at $p < 0.10$. † differs from males at $p < 0.01$.

Attitudes towards cannabis use. Young people thought the risk of getting caught for cannabis use was very low (ie 2 of 10 occasions using cannabis), while both occasional and cannabis dependent users thought the risk was minimal (eg 0.2/10 for cannabis dependent users). The same question applied to car theft resulted in a much higher estimate of 7/10 (70% of the time).

Of perceived social consequences if it were to become known that they were a cannabis user, only 10% thought they would lose the respect of friends, 50% thought it would damage relations with their parents, and 20% thought it would harm their chance to get and keep their ideal partner. In contrast, two thirds of Study members thought it would harm their employment opportunities.

The relation between cannabis use, illegal behaviour and other drug use. Among Study members who met diagnostic criteria for cannabis dependence at age 26, 75% reported using harder drugs than cannabis in the past year, and 66% also reported having sold drugs in the past year (Figure 1). The equivalent figures for occasional cannabis users were 38% and 12%, and for non-users 4% and 1%.

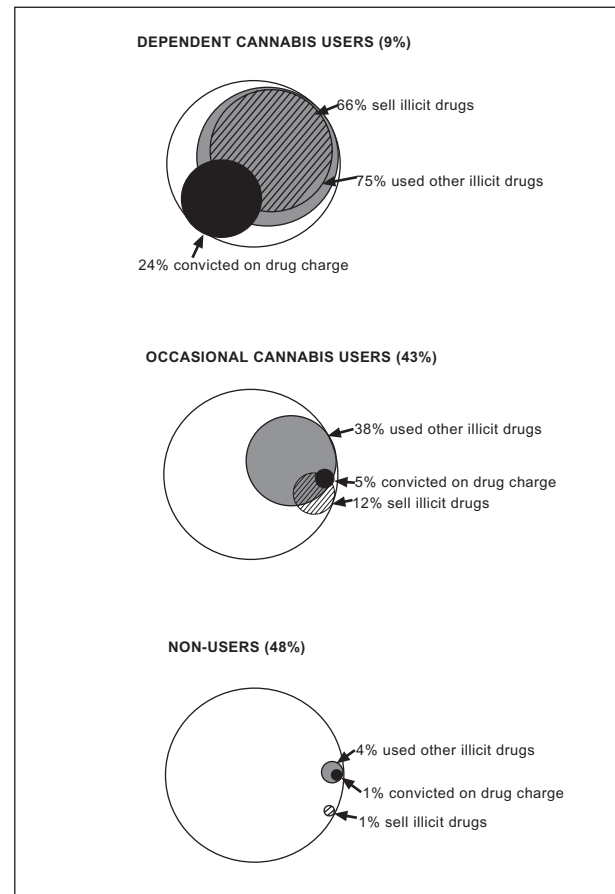


Figure 1. Comorbid drug use, sale of drugs and court convictions among 26-year-old non-users, occasional and dependent cannabis users in the DMHDS.

50 Study members (5% of their age cohort) had been convicted at court for a drug related offence (72% of these convictions were for possession, sale or cultivation of cannabis). 44% of those with a conviction met criteria for cannabis dependence. Put another way, 92 Study members (almost 10%) met criteria for cannabis dependence at 26, and 24% of them had a drug conviction, and were thus known to law enforcement agencies. Further analysis revealed that 45% of the cannabis dependent group had any kind of (non-traffic) conviction, which compares to 19% of occasional cannabis users and 8% of non-users. Finally, among cannabis users, those already convicted versus those not convicted were compared on their estimation of the likelihood of getting caught. Both groups agreed in their perception that the likelihood was trivial.

Discussion

Approximately 50% of the New Zealand population aged 18-26 years are likely to have used cannabis at some time in the previous twelve months. In the DMHDS, the cumulative rate of use up to age 21 was 61.9%.¹ This figure had risen to 70.1% by age 26 indicating that a substantial number of Study members used cannabis for the first time after 21 years. Among users of cannabis, 18.3% also met criteria for DSM-IV¹¹ cannabis dependence at age 26. This ratio of 'Use' to 'Dependence' is similar to that observed for alcohol (17.9%) but lower than that for tobacco dependence (34%) in our cohort.¹³

It is important to note that these cumulative figures are likely to underestimate lifetime rates of use because we restricted ourselves to twelve month reporting periods at



each assessment age (ie the twelve months prior to ages 18, 21 and 26 years). Also, these rates are higher than those reported in a recent national study.¹⁴ One possible explanation for the difference is non-random sample loss. That is, the most difficult to recruit individuals in community studies tend to have higher rates of substance use. In this regard, the National Drug Survey¹⁴ had a response rate of 77% - almost 20% lower than that obtained in the DMHDS at age 26 (ie 96%), suggesting the DMHDS prevalence rates may be more accurate.

Rates of cannabis use and dependence remained stable between ages 21 and 26 years. This contrasts with an expected decline during this age period.³ Although there is some evidence of a decline in casual use by females, the percentage of females meeting criteria for cannabis dependence actually increased slightly in this five year period. Males were more likely than females to be defined as persistently cannabis dependent and as such constitute a particularly high risk group.

Young people thought the risk of getting caught with cannabis was very low. Further, with the exception of employer opinions, young people did not expect serious social sanctions against known cannabis use. Cannabis-dependent Study members expected even fewer negative consequences than casual or non-users. This suggests that most young New Zealanders view cannabis use as relatively harmless and socially acceptable. These low-risk perceptions are similar to recent findings from North America.¹⁵

Among Study members who met diagnostic criteria of cannabis dependence at age 26, 75% reported using harder drugs than cannabis in the past year, and 66% also reported having sold drugs in the past year. This suggests that the lives of cannabis dependent young people are embedded more deeply in drug markets than casual cannabis use would imply. Finding that 24% of cannabis dependent study members had been convicted and thus were known to law enforcement agencies suggests that the police are reasonably effective in identifying high rate participants in the drug economy. Our data (Figure 1) suggest that it is heavy users of cannabis who are of greatest concern, not cannabis users *per se*. Finally, despite the fact that the police do appear to be detecting significant proportions of those who are dependent high-rate users, the perception among users is that police are ineffective in enforcing cannabis laws.

Other recent findings from the Dunedin and Christchurch longitudinal studies have suggested that the relation between cannabis use and common mental health disorders in adolescence and young adulthood is modest¹⁶ but that using cannabis may serve as a 'gateway' to harder drug use for some individuals.¹⁷ With regard to physical health, cannabis dependence (ie not casual use) in the DMHDS sample up to the age of 21 years was found to be associated with a range of negative respiratory symptoms after controlling for tobacco use and current asthma.¹⁸

The current findings confirm that cannabis use is commonplace among young New Zealanders. Cumulatively, close to 3/4 had been at risk for a drug conviction by the time they had reached their mid-twenties. Recognition of the widespread nature of use should have implications for social policy as prohibition fails to dissuade many people from using cannabis in their teens and twenties.

Casual use *per se* does not appear to constitute a serious problem. Most problematic are the minority of casual users who go on to develop cannabis dependence. The size of this group (ie approximately 20% of users or 10% of the entire population), together with its constellation of accompanying problems, is sufficient to warrant immediate and serious concern. The parallels with alcohol are obvious: both alcohol

and cannabis enjoy widespread social use and acceptance, but cause serious problems in a minority who develop dependence, thereby necessitating effective prevention and treatment programmes. We know that cannabis dependent users have an excess of respiratory problems compared to non-users.¹⁸ At age 26, the majority were also users of other, harder drugs, so it is possible that cannabis is their 'substitute' when other drugs are unavailable to them, and if so, the health problem that will require treatment is hard drug dependence. They are also the group who is most likely to be traffickers of drugs, and thus of most concern to the police.

Chen and Kandel³ reported that heavy cannabis use peaks in the early twenties and declines thereafter, reaching relatively low levels by the early thirties. Reasons for this decline are unclear but are likely to include the illicit status of cannabis, expense or unwanted side effects (eg paranoia, low energy, weight gain). Significantly, rates of cannabis use and dependence have remained stable between age 21 and 26 years suggesting that the health risks of heavy use among contemporary New Zealanders can not be regarded as trivial.^{4,5}

Against this background, the New Zealand Government's Harm Minimisation approach appears appropriate.^{6,7} The challenge is to harmonise this policy with current patterns of use and attitudes to use, as well as legal/enforcement difficulties, and this may require changes in the law relating to cannabis use. However, we suggest that more information about changing patterns of use with age (and their relation to the legal status of cannabis) is required. This will take time and require follow-up of the New Zealand birth cohorts as they enter their early thirties to determine if the predicted decline in use³ has simply been delayed or, alternatively, if we are witnessing a more fundamental generational shift in patterns of cannabis use in New Zealand. More immediately, additional information is required about the individual and public health consequences associated with varying levels of cannabis use so as to better inform the Government's policy of Harm Minimisation.

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Does a delay in transfer to a rehabilitation unit for older people affect outcome after fracture of the proximal femur?

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Abstract

Aims. To determine the relationship between delay in transfer to rehabilitation wards and outcome for patients aged over 75 years with fracture of the proximal femur.

Methods. An observational study in a district general hospital of all patients admitted to hospital aged over 75 years with fracture of the proximal femur over 3½ years. Outcome data collected included the number of patients discharged back to their usual residence and total hospital length of stay related to age, gender, usual residence and delay in transfer to a rehabilitation ward.

Results. 58% of 455 patients were transferred to a rehabilitation ward. For those patients who were

transferred to a rehabilitation ward only age predicted discharge to a more dependent residence. The relative risk for discharge to a more dependent residence for people aged over 85 years compared to younger people was 1.47 (95% CI 1.15-1.88). Delay in transfer to rehabilitation was associated with a longer total hospital length of stay of 0.64 (95% CI 0.23-1.05) days per day of delay in transfer.

Conclusions. Delay in transfer to a rehabilitation ward was associated with a disproportionate increase in total hospital length of stay for patients aged over 75 with fracture of the proximal femur.

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Hip fracture represents an important health problem for older New Zealanders. The rate of hip fracture in New Zealand is 647 per 100 000 for women and 243 per 100 000 for men aged 60 years and older (overall 468 per 100 000 for people aged 60 years or older).¹ The mean length of stay for two New Zealand Hospitals which provided a structured program for care of older people with hip fracture was 20 days.^{2,3} For both these programs about 20% of people were discharged to a more dependent residential status than prior to the fracture. High levels of ongoing disability have been reported after fracture of the proximal femur, particularly for instrumental activities of daily living,^{4,5} even in the presence of a systematic multi-component rehabilitation program.⁶ 35 day mortality in New Zealand after hip fracture is 8%, and one year mortality 24%.⁷ A 1995 New Zealand study calculated the first year costs for an osteoporotic hip fracture to be NZ \$27 110, and a more recent study from Belgium put first year costs at around NZ \$41 000.^{8,9} Structured care for older people admitted to acute care hospitals with fracture of the proximal femur has been the subject of a recent review¹⁰ which found little evidence to support rehabilitation wards specialising as ortho-geriatric care but did find some evidence to support the use of mixed assessment and rehabilitation units. Such a system of care has been running at our institution for some years. Recent changes to the health system have led to a reduction in the number of beds available for rehabilitation of older adults at our institution. As this seemed likely to lead to a reduced ability to transfer patients promptly to the rehabilitation wards, observational evidence, based on the register of people aged over 75 years admitted to our hospital with fracture of the proximal femur, was used here to examine the influence of delay in transfer to a rehabilitation unit, on the probability of being discharged back to the same type of residence as the admission residence, and on total hospital length of stay.

Methods

Wellington Public Hospital provides secondary care for a population of 250 000 amongst whom 11% are over age 64 years. Acute surgery for orthopaedic trauma is carried out in one ward at Wellington Hospital and the ortho-geriatric liaison service reviews all patients aged over 75 years after femoral neck fracture. The very elderly, those with significant pre-morbid functional problems and those with multiple co-morbidities are usually placed on the waiting list for one of two rehabilitation wards for older adults on the day they are assessed. Other patients are placed on the waiting list if they do not make rapid progress towards discharge within a week of assessment. Patients are transferred to the rehabilitation ward in the chronological order in which they are placed on the waiting list. Delay until transfer in this study means the delay, in days, from when the patient was seen by the liaison service until they moved to the rehabilitation ward. The liaison service sees patients with fracture of the proximal femur within a median of two days (inter-quartile range 1-3) of admission. The data presented here are based on patients aged over 75 years admitted with fracture of the proximal femur during 3½ years of the liaison service (July 1997 to December 2000).

Statistical analysis. For subjects transferred to the rehabilitation ward, multiple logistic regression, with backwards selection, was used to model the probability of being discharged to the same sort of residence as the admission residence. The explanatory variables entered into the model were age, which of the two rehabilitation wards was used, gender, and delay in transfer to rehabilitation in days after assessment. For those subjects transferred to a rehabilitation ward, multiple linear regression with backwards selection was used with total hospital length of stay in days as the response variable. Two outliers (lengths of stay 118 days and 96 days), were removed from the data set. Explanatory variables tested were age, which of the two rehabilitation wards was used, gender, admission residential status, and delay in transfer to rehabilitation in days after assessment. SAS, version 8 (SAS Institute) was used.

Results

A description of the patients is presented in Table 1. The percentage of people transferred to the rehabilitation wards was 58%. For the logistic regression, only age predicted discharge to a more dependent residence. The model fit was satisfactory with a Hosmer Lemeshow goodness of fit test statistic of 11.51 on 9 df, p=0.24. Table 2 presents the numbers of people in each of four age bands who were discharged back to their admission residence and who were



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