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Fergusson DM, Horwood LJ. Cannabis use and dependence in a New Zealand birth cohort. *New Zealand Medical Journal*, 2000; 113(1109): 156-158.

Cannabis use and dependence in a New Zealand birth cohort

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Abstract

Aims. To describe the development of cannabis use in a birth cohort studied to the age of 21 years.

Methods. The data were gathered during the Christchurch Health and Development Study. In this study a cohort of 1265 children born in the Christchurch urban region in mid 1977 has been studied to the age of 21 years. Information was gathered on patterns of cannabis use and dependence during the period from 15 to 21 years.

Results. By age 21 year, 69% of the cohort had used cannabis. The extent varied widely with 24% reporting use of cannabis on less than 10 occasions while 5% reported use on over 400 occasions.

Over 9% of the cohort met DSM-IV criteria for cannabis dependence by the age of 21 years.

Cannabis use and dependence were higher in males and in Maori. Key predictors were gender and measures of adolescent risk taking behaviours including cigarette smoking, adolescent conduct problems, affiliations with delinquent peers and novelty seeking.

Conclusions. Levels of cannabis use in this cohort reached a point where it was considered “normal”. For the majority of users cannabis use did not lead to problems of dependence.

Nonetheless, nearly 10% of the cohort showed clear symptoms of cannabis dependence by the age of 21 years, especially males who were prone to other forms of risk taking behaviours.

There have been ongoing debates about cannabis use amongst young New Zealanders culminating in the recent Select Committee report ¹ on the mental health effects of cannabis use. The report recommended that Government review and reconsider its policy on the legal status of cannabis.

This recommendation was made, principally, on the grounds that the weight of evidence suggested cannabis use was not harmful for the majority of recreational users and an appropriate strategy for addressing the issue should centre around a harm minimisation approach whereby those with problems associated with cannabis can seek treatment without fear of stigmatisation or criminalisation.

There is clearly a need for detailed epidemiological information on the prevalence of cannabis use, the variation in cannabis consumption amongst users and the proportion of the population which meets standardised diagnostic criteria for cannabis abuse/dependence. There is increasing evidence that cannabis use is, in fact, common amongst New Zealanders, particularly the young . In a nation wide survey, Black and Casswell ² found that over 40% of respondents reported using cannabis on at least one occasion, the user rates being higher in young males and Maori. Data from the Christchurch ³ and Dunedin ⁴ longitudinal studies suggested that by age 18 years, over 40% of young people have used cannabis on at least one occasion, with 5%-10% reporting patterns of use consistent with DSM-IV diagnostic criteria for substance dependence. Less is known about the frequency with which cannabis is used by young people. It is likely that there is a spectrum ranging from experimental or occasional use to regular use where a pattern of abuse and dependence may develop.

This paper provides a descriptive account of the development of cannabis use in the cohort of young people studied in the Christchurch Health and Development Study up to the age of 21 years.

Methods

Data were collected during the course of the Christchurch Health and Development Study (CHDS) which is a longitudinal study of a cohort of 1265 children born in the Christchurch urban region during mid 1977³. This cohort has been studied at birth, 4 months, 1 year, annual intervals to the age of 16 and again at 18 and 21 years.

At each assessment from age 15 to age 21 years, sample members were questioned about their use of cannabis, specifically the age at which they first reported using it and their estimated frequency of use in each year from age 14-15 years to 20-21 years. Estimates of frequency of use in each year were summed to derive an estimate of the subject's cumulative use over the period 14 to 21 years. In addition respondents were questioned about symptoms of cannabis dependence using questions based on the generic DSM-IV⁵ criteria for substance dependence derived from the Composite International Diagnostic Interview (CIDI)⁶. This questioning was not started until age 16 years, thus estimates of the prevalence of cannabis dependence are reported from 16 to 21 years.

At age 21 years, an assessment of the ethnic identification of Maori members of the cohort was conducted using the 1996 census questions on ethnicity as well as a questionnaire designed by the Ngai Tahu Maori Health Research Unit. Fifteen percent of the cohort reported Maori descent, while 11% reported Maori cultural identification. In this paper those reporting a Maori cultural identification were classified as Maori.

To examine predictors of cannabis use, measures of social, family and childhood circumstances were considered. These included family social background, family functioning, individual characteristics, adolescent behaviours and peer affiliations. Statistical modeling revealed that the following measures were significant predictors of cannabis use or dependence: gender, parental illicit drug use, frequency of cigarette smoking at age 15, the extent of childhood conduct problems assessed at age 15 using a combination of parent and self reports of conduct disordered

and oppositional behaviours ⁷, the extent of novelty seeking behaviour assessed at age 16 using the Tridimensional Personality Questionnaire ⁸, and the extent of affiliations with delinquent or substance using peers at age 15 ⁹.

The analyses reported represent all observations available at each point, sample sizes ranging from 893 to 990. These represented at least 70% of the original cohort and 80% of cohort members resident in New Zealand at each point.

Results

Table 1 shows a high rate of usage in the cohort. Overall, just under 70% had used cannabis by age 21 years, with rates of use being slightly higher for males (73%) than for females (65%).

Table 2 shows estimates of the total frequency of cannabis use over the period 14-21 years. There was considerable variation in patterns of cannabis use, 24% reporting that they had used it on fewer than 10 occasions whereas 4.7% reported use on more than 400 occasions. The results make it clear that not only were males more likely to use cannabis (see Table 1) but they tended to use it more heavily ($p < 0.0001$).

Table 3 shows life table estimates of the probability that by age 21 years cohort members would have met DSM-IV criteria for cannabis dependence. The results indicate a relatively high rate of dependence with 9% of the cohort meeting criteria for cannabis dependence. Rates of dependence were significantly ($p < 0.0001$) higher in males (13%) than in females (5%).

Table 4 provides life table estimates of the risk of cannabis use and dependence amongst Maori and non Maori respondents. Maori had both a significantly higher rate of cannabis usage (84% using cannabis compared to 67% of non Maori, $p < 0.0001$) and higher rates of cannabis dependence (1.8 times higher than amongst non Maori, $p < 0.05$).

The results raise issues about the extent to which patterns of cannabis use and dependence could have been predicted from factors present by age 15 years. This issue was explored by fitting proportional hazards regression models in which the hazards or instantaneous risks of onset of cannabis use and dependence by age 21 years were modelled as linear functions of a range of social, childhood and related factors. The fitted models showed that gender ($p < 0.0001$), deviant peer affiliations ($p < 0.0001$) and novelty seeking ($p < 0.0001$) were significant predictors of both use and dependence. In addition, parental illicit drug use ($p < 0.0001$) and cigarette smoking in adolescence ($p < 0.0001$) were significant predictors of cannabis use, whereas conduct problems in adolescence ($p < 0.05$) predicted cannabis dependence. Ethnicity was found to be unrelated to risks of cannabis use and cannabis dependence when due allowance was made for other risk factors.

Discussion

We have presented a longitudinal description of patterns of cannabis use by members of the CHDS cohort up to the age of 21 years. The following major themes and issues emerged from the analysis. First, it is clear that cannabis use had reached levels at which it could be regarded as a “normal” experience with over two thirds of the cohort having used cannabis by age 21 years. Similar high rates of cannabis use were reported by the Dunedin Study^{1,4} which found that by age 21 years, over 60% of their birth cohort reported using cannabis on at least one occasion. It is likely that these rates may be even higher in North Island where, because of climatic and other conditions, cannabis may be more readily available.

Second, users were not an homogeneous group but rather varied widely in their use from the occasional and experimental to the heavy and regular. In the region of 8% of males and 1% of females reported using cannabis on at least 400 occasions by age 21 years. Whilst these estimates are likely to be subject to some imprecision owing to errors of reporting, they nonetheless make it clear that there is a minority of teenagers who were using cannabis heavily and regularly.

A substantial minority (9%) of this cohort met DSM-IV criteria for cannabis dependence by age 21 years. This is consistent with the findings of the Dunedin longitudinal study that reported nearly 10% of their cohort met criteria for cannabis dependence by age 21 years⁴.

Cannabis use was more prevalent amongst males. Furthermore, males more frequently using cannabis heavily and rates of cannabis dependence were over twice those of females. These differences in cannabis use parallel gender differences in conduct and related problems found in this cohort and appear to reflect greater tendencies to externalising behaviours amongst males³.

In agreement with previous studies^{1,2}, we observed greater usage of cannabis by Maori than non Maori. Subsequent analysis showed that this reflected a more general tendency for Maori to engage in a range of risk taking behaviours in adolescence including affiliations with delinquent or substance using peers, greater use of tobacco, higher rates of novelty seeking behaviours and higher rates of conduct problems. Clearly, elevated rates of cannabis use and dependence amongst Maori are likely to be a specific manifestation of a more general tendency to adolescent risk taking behaviours. This conclusion is broadly consistent with the submission of the Mental Health Commission to the Select Committee¹ which suggested a need to focus on the underlying factors that give rise to cannabis use rather than focussing specifically on drug use by Maori.

This analysis suggests that the profile of the young person most likely to engage in cannabis use or dependence was a young male who by the age of 15 years had exhibited a range of risk taking and norm violating behaviours including, affiliations with deviant peers, high rates of novelty seeking behaviours, cigarette smoking or significant conduct problems. Our results suggest that the risk factors and life pathways that lead to cannabis use and dependence are likely to overlap heavily with risk factors and life pathways associated with other adolescent problems including criminal offending, other forms of illicit drug use and mental health problems.

The above results and conclusions illustrate the problems and dilemmas that arise in current debate about whether cannabis should be treated as an illicit drug or its use should be decriminalised or legalised. This issue can be approached from two standpoints that lead to

mutually contradictory conclusions. First, it is clear that the use of cannabis was “normal” teenage experience with nearly three quarters of the cohort using the drug by age 21 years. Furthermore, amongst users the consumption of cannabis was often moderate and the majority did not develop patterns of dependence. This evidence may be used to support the view that cannabis use should be decriminalised since use is widespread and the majority appear not to suffer harmful consequences. Nonetheless, the use of cannabis is not without risks and a minority in this cohort reported high levels of consumption and significant symptoms of cannabis dependence. These problems were particularly evident for a vulnerable group characterised by high levels of adolescent risk taking behaviour. It may be argued, plausibly, that the relatively high rate of cannabis dependence in the cohort was a direct consequence of its ready availability and that decriminalisation will only further increase these problems by increasing the availability and social acceptability of cannabis use.

Acknowledgements. This research was funded by grants from the Health Research Council of New Zealand, the National Child Health Research Foundation, the Canterbury Medical Research Foundation and the New Zealand Lottery Grants Board. We would also acknowledge the comments of Mr A Sporle of the Ngai Tahu Maori Health Research Unit on issues relating to the classification of ethnicity.

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Table 1. Estimated cumulative risk (%) of cannabis use by a given age for females, males and the total sample.

Age (years)	Females %	Males %	Total Sample %
15	9.4	9.2	9.3
16	21.6	21.1	21.4
17	40.2	42.6	41.4
18	48.2	51.4	49.8
19	56.8	65.8	61.2
20	62.5	70.2	66.3
21	64.9	73.1	68.9
N	499	491	990

Log rank test of gender difference: $\chi^2 (1) = 3.7$; $p = 0.054$

Table 2. Distribution of the estimated frequency of cannabis use (14-21 years) for females, males and the total sample.

Frequency of cannabis use (14-21 years)	Females %	Males %	Total Sample %
Never used	34.3	26.9	30.7
1-9 times	26.6	21.8	24.3
10-99 times	24.9	19.5	22.3
100-199 times	6.8	7.8	7.3
200-299 times	3.9	8.3	6.1
300-399 times	2.1	7.4	4.7
400+ times	1.3	8.3	4.7
N	458	435	893

Chi squared test of gender difference: $\chi^2 (6) = 52.0$; $p < 0.0001$

Table 3. Estimated cumulative risk (%) of cannabis dependence by a given age for females, males and the total sample.

Age (years)	Females %	Males %	Total Sample %
16	0.0	0.0	0.0
17	2.6	4.6	3.6
18	3.0	5.3	4.1
19	4.3	12.2	8.2
20	4.8	12.4	8.5
21	5.0	13.1	9.0
N	470	460	930

Log rank test of gender difference: $\chi^2 (1) = 16.6$; $p < 0.0001$

Table 4. Cumulative risk (%) of cannabis use and cannabis dependence by a given age amongst Maori and non-Maori.

Age (years)	Cannabis Use		Cannabis Dependence	
	Maori %	Non-Maori %	Maori %	Non-Maori %
15	16.8	8.3	-	-
16	31.1	20.1	0.0	0.0
17	61.4	38.8	9.0	2.9
18	66.9	47.6	9.0	3.5
19	67.0	59.2	12.1	7.7
20	80.7	64.4	14.2	7.8
21	83.5	67.0	15.3	8.2
N	113	877	101	834
Log- rank test of Maori/non-Maori differences	$\chi^2 (1) = 17.6$ p<0.0001		$\chi^2 (1) = 5.5$ p<0.05	