Chapter 20

Cannabis use in adolescence

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Summary

- Cannabis is the illicit drug most commonly used by New Zealand adolescents. Estimates suggest that by the age of 21 in the region of 80% of young people will have used cannabis on at least one occasion with 10% developing a pattern of heavy dependent use.
- There is increasing evidence to suggest that the regular or heavy use of cannabis may have a number of adverse consequences including increased risks of: mental health problems; other forms of illicit drug use; school dropout and educational under-achievement; motor vehicle collisions and injuries.
- Current approaches to reducing cannabis-related harms for adolescence have focused on: legislation, drug education and the provision of clinical services.
- There is a sound case for reviewing New Zealand's legislation on the possession of cannabis to obtain a better balance between prohibition and harm avoidance strategies.
- While drug education is widely advocated as a means of reducing adolescent substance use the evidence for the effectiveness of this approach as a means of reducing risks of drug use is limited.
- There is growing evidence to suggest a number of effective treatments for addressing problems of cannabis abuse and dependence. These treatments include cognitive behavioural therapy motivational enhancement, contingency training and family based intervention.
- Future policy developments should consider: a) a re-assessment of current legislation regarding the regulation of cannabis; b) evaluation of the effectiveness of drug education programmes as a means of reducing risks of illicit drug use, abuse and dependence; c) the development of best practice clinical guidelines for the treatment and management of young people having cannabis-related problems.

1. Introduction

The purpose of this chapter is to examine the use and abuse of cannabis by young people; to describe the likely harms of regular and heavy cannabis use and to outline policy options for regulating cannabis and reducing cannabis-related harms.

2. What is the question?

Cannabis is the most commonly used illicit drug in New Zealand and in many other developed countries [1-4]. The use of cannabis in young people has been examined in New Zealand's major longitudinal studies—the Christchurch Health and Development Study (CHDS) and the Dunedin Multidisciplinary Health and Development study (DMHDS). Both studies have followed the life history of cohorts of over 1000 children from birth to adulthood. Both studies report that by the age of 21 nearly 80% of young people have used cannabis on at least one occasion and 10% have developed a pattern of heavy use consistent with a diagnosis of cannabis dependence [1, 3, 5, 6]. Heavy cannabis use is more common in males and amongst Māori [1, 3, 5-7]. These findings have been based on South Island samples recruited in Dunedin and Christchurch but it is likely that the patterns of use found in these samples will apply to North Island settings. The high rates of cannabis use, abuse and dependence amongst young New Zealanders raise three important questions:

- The first question concerns the extent to which the use of cannabis has harmful consequences for young people.
- The second question concerns best ways of regulating the use of cannabis to minimise the harms faced by young people.
- The third question concerns the development of services aimed at the prevention, treatment and management of cannabis abuse and dependence.

The evidence regarding each of these questions is reviewed below.

3. Why is cannabis use important in the transition to adolescence?

Until relatively recently, cannabis has been viewed as a relatively harmless drug that has few adverse effects [8]. However, in the last two decades there has been an accumulation of evidence suggesting that cannabis may have multiple harmful effects with these effects being particularly marked for adolescent users [2, 9-13]. It is believed that the greater vulnerability of adolescent users may be due to the biological effects of cannabis on the developing adolescent brain [14-16]. Amongst the adverse effects that have been documented are the following.

3.1 Increased risks of psychosis/psychotic symptoms

Psychosis refers to severe mental illness marked by such features as hallucinations, delusions and general social alienation [17]. The most well known psychosis is schizophrenia. There is now mounting evidence to suggest that the regular, heavy or abusive use of cannabis is associated with increased risks of symptoms of psychosis and psychotic symptoms with young people using cannabis regularly having rates of these symptoms which are between 1.5 to 2.5 times higher than those not using cannabis [8, 11, 18-23]. Associations between cannabis and psychosis/psychotic symptoms have been found to persist after statistical control for other factors and appear to be most marked amongst young people who are

predisposed to psychotic illness as result of a family history of psychotic disorder [18-21] or who have genetic vulnerabilities [22, 23].

3.2 Increased risks of other mental disorders

In addition to findings linking cannabis use to increased risks of psychosis/psychotic disorders, there is growing evidence to suggest increased rates of depression, anxiety and suicidal thoughts amongst heavy cannabis users [24-29]. Again, the evidence suggests that these risks are greater for adolescent users [2, 11, 13].

3.3 Increased risks of other illicit drug use

A large number of studies have shown the presence of strong statistical linkages between the use of cannabis and the use of other illicit drugs with the onset of cannabis use preceding the use of other illicit drugs [30-37]. For example, research conducted by the Christchurch Health and Development Study found that rates of subsequent or other illicit drug use were over 100 times higher amongst adolescent weekly users of cannabis when compared with non users of cannabis [30]. These statistical associations have raised the possibility that cannabis may be a 'gateway drug' with the use of this drug increasing the risks of other forms of drug usage by various routes. While the 'gateway' hypothesis has been highly controversial [38-41] there is growing evidence to suggest that the use of cannabis may increase the risks of using other illicit drugs with this association being particularly marked for adolescent populations [30-37].

3.4 Increased risks of school dropout and educational under-achievement

An increasing number of studies including New Zealand studies [3, 7, 42-51] have examined the linkages between the use of cannabis and educational achievement. This research has found that young people who begin the use of cannabis before the ages of 18 are at increased risks of high school drop out and educational under-achievement. Adolescent cannabis users are less likely to leave school with qualifications, less likely to enter university and less likely to acquire a degree. These associations have been found to persist after statistical control for other factors raising the clear possibility that by various routes the early use of cannabis may increase risks of school dropout and educational underachievement [3, 7, 42-51].

3.5 Increased risks of motor vehicle accidents

Motor vehicle accidents are a major source of mortality for adolescents and also account for a substantial number of hospital admissions [52, 53]. There is now growing evidence from both laboratory studies and epidemiological research to suggest that driving under the influence of cannabis is associated with increased risks of motor vehicle collisions and associated injuries [13, 54-61].

Consideration of the risks associated with cannabis shows a range of adverse outcomes that span mental health risks, possible gateway effects, educational under-achievement and risks of motor vehicle collisions. All of these outcomes are particular areas of risk for the adolescent years. When considered in conjunction with the high rates of cannabis use amongst New Zealand adolescents these findings clearly suggest that the use and abuse of cannabis is a factor that may contribute to increased adolescent vulnerability in a number of areas.

However, this conclusion needs to be leavened by a number of other considerations. The first is that while the evidence clearly points towards the possibility that the abuse of cannabis may have multiple adverse effects, there have been ongoing debates about the extent to which the linkages between cannabis use and adverse outcomes reflects cause and effect associations in which the use of cannabis leads to increased risks of various adolescent problems. These debates have focused around the extent to which the existing observational evidence can be used to draw cause and effect conclusions [11, 62]. Nonetheless, there is an emerging consensus that cannabis is not a benign substance and heavy or regular use may have adverse consequences for a number of areas of adolescent functioning.

A second issue is that given the widespread use of cannabis by New Zealand adolescents it is evident that large numbers of young people use cannabis only occasionally and for this group it is unlikely that cannabis has substantial harm effects [63]. These observations raise complex issues about the legal regulation of a drug that is widely used but whose harmful effects are largely confined to a minority of heavy and regular users.

4. What is the scale of the problem?

As noted above the use of cannabis by young people is very common with nearly 80% of young people using cannabis before the age of 21. However, much of the problematic use of cannabis is likely to be confined to 10-15% of the adolescent population who use cannabis in a heavy and abusive way [26, 51].

5. What does research tell us about causative factors?

Research conducted by the Christchurch Health and Development Study has examined the role of social, personal and family factors in development of illicit drug use in a birth cohort of over 1000 Christchurch born young people studied from birth to the age of 25 [1, 6]. Key risk factors for later illicit drug use and dependence included:

- demographic factors, including male gender and Māori ethnic identification;
- family-related factors including parental use of illicit drugs and exposure to childhood sexual abuse;
- individual factors including novelty-seeking behaviour, conduct disorder, use of alcohol or tobacco;
- affiliation with substance use peers.

These factors appear to act cumulatively with the individual's risk of use or abusing illicit drugs increasing the number of risk factors to which the young person is exposed.

6. Prevention, treatment and management of cannabis use in adolescence

6.1 The legal regulation of cannabis use

An area that has been the source of ongoing social, legal and political debate concerns the legal regulation of cannabis. These debates have centred on the weight that should be given to three different approaches to the social and legal regulation of cannabis.

The first approach currently followed by New Zealand is that of prohibition in which the possession and supply of cannabis is illegal. Cannabis is currently classified as a class C substance with possession attracting a fine of up to $500 or 3 months imprisonment and supply a prison sentence of up to 14 years. The difficulties with cannabis prohibition have been noted in a number of reviews [64-67] which have pointed to the difficulties and injustices of attempting to criminalise the use of a substance which is widely used. In commenting on this issue the Global Cannabis Commission report [67] concludes:

> *"The rationale for severe penalties for possession offences is weak on both normative and practical grounds. In many developed countries a majority of adults born in the last half century have used cannabis. Control regimes that criminalise users are intrusive on privacy, socially divisive and expensive." (p. 180)*

In addition there is further evidence to suggest that the laws for cannabis possession are applied in unfair and socially inequitable ways. In particular, research from the Christchurch Health and Development Study [68] found that the current administration of cannabis laws was: (a) inefficient, since only a small fraction of users are arrested or convicted; (b) discriminatory, with males, Māori and those with a previous criminal record being more likely to be convicted; and (c) ineffective since there was no evidence of a reduction in cannabis use following arrest or conviction for the possession of cannabis. These findings highlight the problems with the current New Zealand approach to the regulation of cannabis.

At the other extreme there has been advocacy for the legalisation of cannabis so that cannabis would have the same legal status as tobacco and alcohol. Arguments in favour of the legalisation of cannabis have pointed to: (a) the difficulties, costs and inequities of cannabis prohibition; (b) uncertainties in the evidence on the harms of cannabis; and (c) the greater health risks of the legal drugs of alcohol and tobacco [67, 69-71]. It has been argued that on all three grounds treating cannabis as a legal drug subject to regulation is preferred to the present option of prohibition. There are, however, two major objections to proposals to legalise cannabis. The first centres around concerns that the legalisation of cannabis would, over time, increase the use of cannabis and thence the overall burden of cannabis-related harm [72, 73]. These concerns have been reinforced by ongoing social debates about the need for greater regulation of legal drugs and particularly the use of tobacco [74]. The second major barrier to the proposal to legalise cannabis is that New Zealand is a signatory to the Single Convention on Narcotic Drugs [67]. This convention classifies cannabis as a Schedule IV substance with this classification making it virtually impossible for signatories to remain within the Convention and to legalise the use of cannabis even if there was a strong social and political consensus that such action was desirable.

Between the extremes of complete prohibition and legalisation there have been a number of attempts to liberalise the laws on cannabis possession and use, in ways which fall short of full legalisation but which are designed to reduce what are seen as the undesirable features of complete prohibition [67, 69, 70]. These approaches have varied from country to country but as a general rule have focused around the decriminalisation or de-penalisation of cannabis use. A good example of this approach is provided by the reforms set in place in Western Australia [75]. Since 2004, a fine from $100 to $200 with 28 days to expiate is served if a person is found in possession of smoking equipment, up to 30 grams of marijuana, or two non-hydroponic cannabis plants. An alternative to paying the fine or appearing in court is to attend a cannabis education session. The general aims of this

approach have been to retain the illegal status of cannabis whilst mitigating the adverse effects of strict prohibition.

An increasing number of jurisdictions have attempted to introduce legislation that in various ways de-penalises or decriminalises the use of cannabis. In a review of these approaches the Global Cannabis Commission Report [67] concluded:

> *"Measures to reduce penalties or decriminalise possession have been adopted in numerous jurisdictions without any upsurge in use. Moreover, these reform measures have had some success in ameliorating the adverse consequences of prohibition." (pp. 180-181)*

However, most of the debate about the legalisation, de-penalisation or decriminalisation of cannabis use has focused on adult users subject to the provisions of the criminal justice system. Less consideration has been given to the regulation of cannabis use in adolescent populations. In commenting on this issue the New Zealand Law Commission has recommended that any amendments to the laws for adults should not apply to children and young people [65]. They also note that the majority of police apprehensions for drug related offences by children and young persons under 16 are dealt with by various forms of diversion and that only a minority (16%) result in prosecution. These findings clearly suggest that the New Zealand Youth Justice system has evolved a system in which the majority of young people coming to attention are dealt with by diversion rather than prosecution. There is a clear case for extending these provisions to older adolescents in the age range of 18-21 years.

An important legislative issue that requires attention is the issue of the supply of cannabis to young people under the age of 18. There is increasing evidence to suggest that this age group is the most vulnerable to the effects of cannabis [2, 9-13] and accordingly there are grounds for suggesting that sentencing in cases of the supply of cannabis should take into account the ages of the individuals to whom cannabis is being supplied with supply to adolescent populations attracting more severe penalties.

7. The prevention and treatment of cannabis-related conditions

Whilst legislation provides a general context for the regulation of cannabis use, there is clearly a need to develop further policies for the prevention and treatment of cannabis related harms [76].

7.1 Drug education in schools

One approach that has been widely advocated has been the use of drug education in schools. In particular it has been argued that by educating young people about the harms of drugs including cannabis, risks of future drug use and abuse may be reduced [77-79]. However, the evidence in support of school-based drug education is not strong [80-84]. In general, studies of drug education programmes have found these programmes to be most effective in increasing knowledge about the risks of drug abuse [79]. However this increased level of knowledge does not always translate in reductions of drug use behaviours [83]. An example of these issues has been provided by the evaluation of the US drug education programme Drug Abuse Resistant Education (DARE). This programme brings police officers into the class to educate young people about the risks of drug abuse. Evaluations have found that the programme is effective in increasing student knowledge but that the effects decrease with time and do not appear to alter later risks of drug abuse [85-89]. Because of concerns about the effectiveness of DARE, the US Department of

Education now prohibits public schools from spending federal funding on the programme [90]. The difficulties found with programme such as DARE highlight important issues about the funding and delivery of school-based drug prevention programmes. While it remains possible that well constructed and well delivered programmes may have beneficial effects in reducing rates of drug abuse [78, 80, 91], it is important that all programmes in this area are subject to thorough evaluation using randomised controlled trials before public funding is widely committed to this approach [81, 83, 92].

7.2 The treatment of cannabis abuse and dependence

As note above a substantial number of New Zealand adolescents engage in the heavy and abusive use of cannabis with this use being associated with further risks. It is clear that the needs of this group will not be addressed by either legislation that criminalises their problems or through drug education and that there is a need to develop effective clinical services for the treatment and management of cannabis abuse and dependence. There are now an increasing number of studies that have examined the use of a number of therapeutic approaches to the treatment of cannabis abuse and dependence. These approaches include cognitive behavioural therapy, motivational enhancement and contingency management training [93-96]. While these treatments have been found in randomised controlled trials to have some efficacy [96], their major benefits appear to be a reduction in levels of cannabis use rather than ensuring complete abstinence from cannabis. These results raise issues about the extent to which such therapy should focus on moderation of cannabis use rather than complete abstinence.

8. Where is policy/intervention currently focused?

8.1 Legislation

Despite ongoing social debates about the desirability or otherwise of liberalising New Zealand's cannabis laws little progress has been made in this area over the last decade. However, recently the New Zealand Law Commission presented a major review of New Zealand's Drug Law including recommendations on the regulation of cannabis [65, 66]. The central theme of the Law Commission's report is the need to revise New Zealand's drug laws to increase the range of options for addressing the possession of cannabis and other illicit drugs. Underlying these recommendations was a focus on striking a better balance between prohibition and harm reduction in the administration of New Zealand's drug laws. The extent to which these recommendations will be reflected in corresponding changes in Government policy is unclear [65-67].

8.2 Drug education

Currently a number of organisations and agencies provide drug education programmes. These organisations include:

- the Ministry of Education through school Boards of Trustees, principals and teachers as part of the health and physical education curriculum [97];
- the DARE foundation which offers a New Zealand version of the US DARE programme [98].

While substantial investments into drug education are being made in New Zealand there has been a general lack of research evaluating the efficacy of these approaches.

8.3 Treatment for cannabis abuse and dependence

Treatment for cannabis abuse and dependence is offered by the Child and Adolescent Mental Health Services (CAMHS) administered by District Health Boards. However, it is likely that the nature, quality and extent of these services will vary among DHBs depending on the availability of staff, funding and local DHB policies [99].

9. Implications for future policy

Given that a large number of young New Zealanders use cannabis with a substantial minority using cannabis heavily or abusively, there is a clear case for developing clear policies regarding the prevention, treatment and management of cannabis use in adolescence. The case for such policy investment is reinforced by growing evidence of the harmful effects of cannabis use in the areas of mental health, educational achievement, the transition to other drug use and in motor vehicle collisions and injuries. Four lines of policy development are of high priority.

The first is for a thorough review of current legislation regarding the possession of cannabis with the aim of considering the appropriate balance between prohibition and harm avoidance approaches for addressing cannabis possession by young people. The recent Law Commission review provides a thorough and useful framework for developing reforms and new approaches to the existing legislation [65, 66].

The second is through a review and evaluation of current drug education policies and investments. While drug education policies and programmes have been popular as a possible means of preventing adolescent drug use and abuse, the weight of the evidence suggests that these programmes are often of very limited efficacy in reducing the use and misuse of drugs [80-84]. Accordingly, there is a case for investing in adequate evaluation of existing drug education initiatives before further investments are made in this area.

The third is upon the development of adequate evidence based services to provide young people with cannabis-related problems. The best approach to this issue may be through the development of best practice guidelines for the management of cannabis-related disorders with these guidelines being used as a blueprint for the provision of services by CAMHS and other organisations. A useful model for the development of such clinical guidelines has been developed by the Australian National Cannabis Prevention and Information Centre (NCPIC) and it would seem sensible to build on these guidelines to develop common trans-Tasman strategies for the treatment and management of cannabis related problems in young people [100, 101].

Finally, as with a number of adolescent problems, risks of cannabis use, abuse and dependence are higher amongst young Māori. These findings clearly highlight the need to develop culturally appropriate strategies and methodologies for addressing these problems in Rangatahi.

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Appendix 1: Summary of evidence on effective treatments

A small but growing number of studies have examined the extent to which various treatments may reduce rates of the use of cannabis by young people meeting diagnostic criteria for cannabis abuse and dependence [93-96]. Research in this area has suggested that a number of treatments may result in modest reductions in rates of cannabis use. These treatments include: (a) Motivational Enhancement Therapy (MET); (b) Cognitive Behavioural Therapy (CBT); (c) Contingency Management; and (d) Family Based Treatments.

The strongest evidence in this area comes from the Cannabis Youth Treatment (CYT) study, which was a large multisite study involving 600 adolescents presenting at four treatment sites with a diagnosis of cannabis abuse or dependence [102-104]. Participants were randomised to receive one of five outpatient interventions. These interventions were:

- a 6 week intervention comprising two sessions of MET and three sessions of CBT;
- a 12 week intervention comprising two sessions of MET and 10 sessions of CBT;
- the 12 week MET/CBT intervention plus Family Support Therapy that included parent education, family therapy and case management over 20 sessions;
- a 12 week intervention involving 14 sessions based around the Adolescent Community Reinforcement approach; and
- up to 15 sessions of Multidimensional Family Therapy.

All five interventions showed significant pre-post treatment effects: compared to base line, at 12 months follow up there was an increase in reported abstinence and decreases in symptoms of cannabis abuse and dependence. However, the effects of the intervention were relatively modest and at 12 months follow up two thirds of the participants were still reporting substance use or similar problems [102-104].

Whilst the CYT is the largest and most ambitious study in this area, further studies have also shown that various therapies may have modest effects in reducing rates of cannabis abuse and dependence. These treatments assessed include Multidimensional Family Therapy [105], Multi-systemic Therapy [106] and Brief Strategic Family Therapy [107]. The major conclusion that emerges from this body of research is that any of a range of relatively brief interventions is effective in reducing rates of cannabis-related problems but that the benefits of these programmes in reducing the number of young people with cannabis related problems are relatively modest.

Appendix 2: Cost-benefit of effective programmes for the treatment of cannabis abuse and dependence

Because of the limited research in this area no long-term studies have been conducted of the relative costs and benefits of providing treatments to young people with cannabis abuse or dependence. However, as part of the Cannabis Youth Treatment Study (CYT) limited cost comparisons were made by estimating two cost-benefit statistics for the five interventions studied (See Appendix 1 for details) [104]. These statistics were:

- the cost per day's abstinence over a 12 month period;
- the total cost of recovery over a 12 month period.

This analysis revealed that although the five programmes investigated produced similar outcomes, the costs of these outcomes varied quite widely. The most cost effective treatment was the brief 6-session (MET/CBT) intervention and the most expensive was Family Support Network (FSN) intervention. The costs per day of abstinence for the brief 6 session MET/CBT intervention varied from $US 4.91 to $US 9.00 depending on site. In comparison, the cost per day of abstinence for the FSN intervention was $US 15.13. Similar differences in treatment costs were evident for the total cost of recovery over a period of 12 months. Depending on site, the brief 6 session MET/CBT intervention cost between $US 3,938 and $US 6,611 per recovered case. In contrast, the FSN intervention was estimated to cost $US 15,116 per recovered case. These differences reflected the different amounts of treatment time involved in each programme, with the brief 6-session MET/

CBT intervention requiring a minimum of 200 minutes of therapy to complete compared with a minimum of 800 minutes therapy time to complete the FSN intervention [104].

These findings clearly suggest that in terms of cost benefit, relatively brief and simple interventions for the treatment of cannabis abuse and dependence are likely to be more effective than more complex and lengthy interventions. The large differences in the cost of outcomes per intervention that was found by the CYT also highlights the needs for the evaluation of therapeutic programmes to include estimates of cost benefit in addition to estimates of the efficacy of the treatment in reducing rates of cannabis abuse and dependence.