Cannabis use and Associated Health Problems – What's the Harm?

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Abstract

Aim
Cannabis is the most widely used illegal drug in Ireland. We sought to describe the changing pattern of cannabis use and cannabis related health harms.

Methods
Data was collated from two national population surveys and three national treatment databases, focusing on people under 34 years.

Results
Past month cannabis use among adolescents and young adults increased after 2011, coinciding with a decline in perceived risk of regular use. The prevalence estimate for cannabis dependence increased from 1.1% to 3.6% from 2011 to 2015. From 2008 to 2016, there were increases in the rates of cannabis related addiction treatment episodes among adolescents and among young adults of 40% and 168% respectively. Cannabis related admissions to general and psychiatric hospitals increased by 90% and 185% respectively.

Conclusion
A concerted public health response is required to address escalating cannabis related health harms which have coincided with the arrival of more potent cannabis.

Introduction

Cannabis is the most widely used illegal drug in Ireland, as elsewhere.[1] While there has been a tremendous amount of discussion nationally and internationally about the best political and social response to the challenges which cannabis use poses, there has been less attention paid to cannabis related health harms.

Cannabis is a complex plant. It contains a wide array of chemicals, many of which are unique to the plant, called cannabinoids. The two cannabinoids of greatest interest are tetrahydrocannabinol (THC) and cannabidiol (CBD).[2] It is THC which causes the intoxication effects which many users find pleasurable. CBD does not appear to have hedonic effects but may have anxiolytic effects. There is emerging evidence that CBD may be an effective treatment for some children with Dravets syndrome.[3]

Cannabinoids exert their effects in the endocannabinoid system where CB1 and CB2 receptors have been identified.[2] Modern intensive horticultural practices has resulted in increased availability of high potency cannabis, with greater THC and reduced CBD, in Ireland and across the world in the past 20 years.[4-6]

Of all illegal drugs, cannabis is the one which causes the greatest amount of disability adjusted life years for older teenagers.[7] There is increasing evidence of cannabis related risks in recent decades. Firstly, it is certainly clear that there is a risk of dependence.[6] Among adults in USA who have used cannabis in the past year, about one third have a cannabis use disorder (CUD), this being either cannabis dependence or cannabis abuse.[8] The risk of dependence is highest in those who commence in adolescence.[6] CB1 receptors appear to have a particular role during the remodelling of the brain which occurs during adolescence and this may partially explain the observation that many of the adverse risks of cannabis use are heightened during the adolescent years.[2]

Cannabis use appears to contribute to the development of psychosis.[5,6,9] Risk of psychosis increases with higher potency of THC in cannabis.[10,11] Adolescent cannabis use is associated with depression and suicidality in early adulthood.[12] There is growing evidence that heavy cannabis use during adolescence has a negative impact on cognitive development and functioning.[2,13-15]

In the context of increasing discussion regarding liberalizing of the legislative response to cannabis use and potential roles for cannabinoids as medicines in Ireland, this study seeks to examine the recent changes in metrics of cannabis use and cannabis related harm among Irish youth in the 21st century.

Methods

Data on cannabis use was obtained from the European School Survey Project of Alcohol and other Drugs (ESPAD) for adolescents and from the General Population Survey (GPS) for young adults. [1,16] ESPAD is conducted across Europe every four years. The average age of respondents is 16 years. The GPS was first conducted in 2002/2003, and has been repeated every four years. From both surveys, the main variable of interest was the prevalence of past month use. Data on perceived risks of regular cannabis use is also obtained from the GPS.[1] We included GPS data for people in the 15 to 34-year-old age range. Commencing in 2010/2011, an estimate of cannabis dependence was measured in the GPS using the Munich Composite International Diagnostic Interview (M-CIDI).

The number of individuals treated for a primary CUD is reported by the Health Research Board (HRB) since 2004, via the National Drug Treatment Reporting System (NDTRS).[17] This was converted into a rate of attendance by using the annual population estimates from the CSO census data. For under 18s, we used the annual population estimates for 13 to 17 year olds inclusive as the denominator, as treated CUDs in under 13s are very unusual in Ireland.[18]

Data on cannabis related psychiatric admissions was obtained via the HRB, National Psychiatric In-Patient Reporting System (NPIRS). This is a national database of all psychiatric admissions in Ireland. At discharge the treating psychiatrist assigns diagnoses to the patient using ICD-10 criteria. Data are reported on those admissions where there was a F12.x diagnosis as either the primary or secondary diagnosis. Revisions were made to both mental health legislation and policy in 2006 in Ireland which potentially impacted upon likelihood of admissions of patients with addiction issues. Consequently, data was included from the ten-year period after these changes from 2008 to 2017 inclusive.

Data on cannabis related medical hospital admissions were extracted from the Hospital In-Patient Enquiry (HIPE) database, a national database of all admissions to general hospitals in Ireland. At discharge, the treating doctors assign diagnoses to the patient using ICD-10 criteria. Cases are included on those admissions where there was a F12.x diagnosis amongst the discharge diagnoses. Data was available for the years from 2005 to 2017 inclusive.


Results

Population Prevalence & Attitudes
Past month cannabis use declined substantially among adolescents from 2003 to 2011, from 17% to 7%, before increasing in 2015 back to 10%. See Table 1 & Figure 1.

Table 1. Measures of cannabis use, risk perception and rates of cannabis related harms among Irish youth from 2003 to 2017

	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	14	15	16	17	% change '08 to '16
Past month use by 15 to 34yo (%)	4.3				4.3				4.5				8.1			
Past month use by 16yo (%)	17				10				7				10			
Perceiving regular cannabis use as low risk (%)	19.8				18.5				10.1				19.5			
Prevalence cannabis dependence in 15-34yo (%)									1.1				3.6			
Psychiatric admissions by 18-34yo/100,000						6.5	7.1	7.6	6.7	12.7	14.8	14.3	17.3	18.5	17.1	+185%
General Hospital Admissions by 15-34yo/100,000			8.9	10.7	12.1	15.3	16.6	18.5	17.8	17.2	24.6	24.5	23.6	29.1	30.1	+90%
Treated CUD*/100,000 for under 18yo		114	109	89	97	121	157	188	171	200	198	209	190	170		+40%
Treated CUD*/100,000 for 18-34yo		55	58	63	48	57	80	107	125	131	155	170	177	153		+168%

* CUD = Cannabis Use Disorder

Figure 1. Trends in cannabis use, risk perceptions and health related harms among Irish youth, from 2011 to 2017
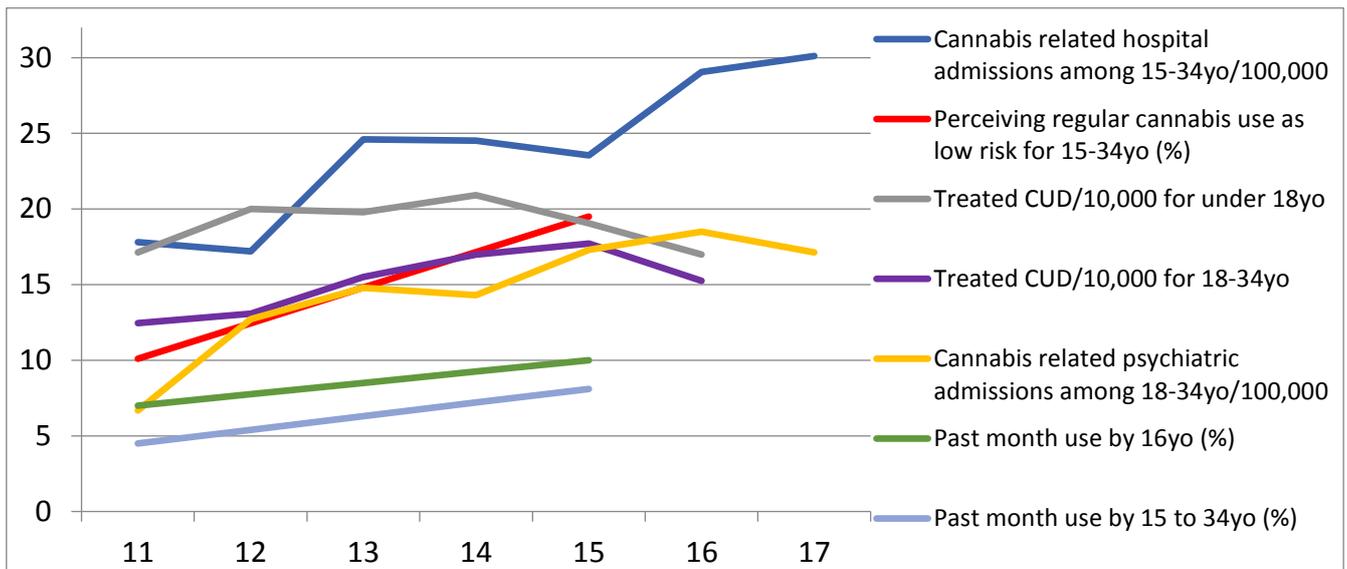
Past month cannabis use among young adults was flat at 4.3 to 4.5% from 2002/3 to 2010/11. It then increased to 8.1% in 2014/15. The proportion of young people who perceived regular cannabis use as posing little or no risk declined from 2003 to 2011, and then increased again in 2015.

The M-CIDI indicated that 1.1% of young adults were cannabis dependent in 2010/11 and this increased to 3.6% in 2014/15.

Treated Cannabis use disorders
Over the 12-year period, there is evidence of an increase in the rates of attendance at addiction treatment for both adolescents and for young adults. The period of steepest increase for adolescents was from 2008 to 2010. During the period 2004 to 2008, the average rate of attendance was 106 episodes/100,000/year. The mean was 190/100,000/year during the years 2010 to 2016, a 79% increase in average rate.

For young adults, the period of steepest increase was 2008 up to 2015. During the baseline period of 2004 to 2008, the average rate was 56/100,000/year. The rate did not fall below 150/100,000/year during the period 2013 to 2016. The recent trends are depicted in Figure 1, but rates are demonstrated /10,000 population for ease of presentation alongside the other reported data.

Cannabis Related Hospital Admissions
The baseline rate of cannabis related psychiatric admissions was quite flat at an average of 7.0/100,000/year from 2008 to 2011 inclusive. It then doubled from 2011 to 2013. Since 2013, the average rate has been 17/100,000/year, a 140% increase on the baseline rate. The rate of cannabis related admissions to general hospitals increased three-fold from 2005 to 2017. The most common primary diagnoses for these medical admissions are provided in Table 2.

Table 2. The top 10 primary diagnoses among admissions to general hospitals where episode included a cannabis related disorder (F12) diagnosis, 2005 to 2017

ICD 10 codes	Diagnosis	Number	% of total*
G40 / R56	Epilepsy / convulsions	423	13.0%
T42 / 43	Sedative or other psychotropic medication overdose	178	5.5%
R07	Chest pain	174	5.4%
F12	Cannabis related disorder	165	5.1%
F10	Alcohol related disorder	145	4.5%
S06/01/02	Head injury / laceration / Fracture	134	4.1%
T39	Analgesic overdose	109	3.4%
R55	Syncope	102	3.1%
T40 ~	Illicit drug OD	71	2.2%
R00	Arrhythmia	61	1.9%

* The % provides the proportion of the total number (3252 episodes) of cannabis related admissions

~ T40 includes overdoses related to a range of illegal drugs, including heroin, cocaine and cannabis.

Discussion

There is evidence of substantial changes in all examined measures over the relatively short period from 2003 to 2017, especially during the middle and later portions of this time period.

From 2003 to 2007, there was relatively little change across most measures, although adolescent cannabis use did decline as did the proportion of young adults who perceived regular cannabis use as posing little or no risk. These two trends persisted during the 2007 to 2011 period. There is good evidence from international studies that use tends to decline as perceived risk increases.[6]

During the period from 2007 to 2011, there was a rapid increase in the rates of attendance at addiction treatment services by both adolescents and young adults with CUDs. There were also steady increases in the number of hospital admissions involving cannabis over this period. These changes cannot be explained by increases in use at the population level, as use by young adults was relatively flat. It is possible that some of the increase in treatment attendance has its origins in increased availability of addiction treatment in Ireland, especially for adolescents. Another possibility relates to an alteration in the type of cannabis being used in Ireland. Cannabis users moved progressively from use of resin or 'hash' to use of more potent herbal cannabis or 'weed'.[19] An Irish study in 2010 of samples of hash and weed found that the median THC concentration in hash was 2.5% and for weed it is was 6%.[4] The Irish grown 'weed' samples had higher THC concentrations of 11-16%, with CBD of less than 0.5%.[4]

There is evidence of increased movement of the black market to Irish grown plants from 2006 onwards.[4] Increased potency increases the risk of dependence.[20] Therefore, while the proportion of the population who were using was either static or in decline during the period 2007 to 2011, the move towards more potent 'weed' among users may partially explain the increased rate of treatment attendance and general hospital presentations.[11,20] Cannabis certainly became the dominant drug driving referrals to adolescent addiction treatment services during this period.[18]

Elsewhere in Europe there has been an increasing attendance at addiction services by people with a CUD, with a 70% increase in new treatment episodes between 2008 and 2015, in spite of relatively stable rates of use in the general population.[21] Harms related to cannabis use have also been observed to vary across Europe in parallel with the proportion of users who smoke high potency cannabis.[18]

During the period 2011 to 2017, all measures support the need for a high level of concern about cannabis in Ireland. Use increased substantially among both adolescents and young adults. The rate of adolescent attendance at addiction treatment services peaked in 2014 before falling back to 2011 levels in 2016. The rate of attendance by young adults continued to escalate, peaking in 2015. The GPS indicated that one in 28 young adults was cannabis dependent in 2015. Cannabis related psychiatric admissions more than doubled. General hospital admissions continued their relentless upward trend.

In spite of this increased harm, there was a worrying increase in the proportion of young adults who saw little or no risk in regular cannabis use.[22] This mismatch between a reduction in perceived risk and the growing scientific evidence that cannabis use is associated with multiple risks is a major concern from a public health perspective.[6,23] It suggests that there has been a major failure to communicate risks to the general public. Alternatively, it seems possible that the very positive media coverage generated by campaigns which are seeking to persuade politicians and the public that cannabis has substantial medicinal properties are contributing to confusion among the public regarding its many known hazards.[23,24] This phenomenon has been observed elsewhere. [23,24]

Strengths of this study include use of national datasets and a wide range of health measures. The absence of any unique patient identifier is a weakness as single individuals may be counted multiple times if they have a number of presentations.

Overall, the trends in cannabis use and related harms examined in this study indicate a concerning picture from a health perspective for Irish youth. A combination of displacement of low potency hash by higher potency 'weed', a recent growing perception that cannabis is relatively safe and increased use appears to be driving harms upwards. There is a need for a public information campaign to ensure young people are better informed about the hazards posed by cannabis. Doctors have been reluctant to enter the cannabis debate in Ireland, as elsewhere.[25] Given the evidence of escalating health harms, doctors should become more involved in these discussions.

Declaration of Conflicts of Interest:
B.P. Smyth works in adolescent addiction services and has publically advocated for an increased public health response to escalating cannabis related health harms. The other authors have no conflicts of interest to declare.

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