






## Original Research

# Risk and protective factors for cannabis use in adolescence: a population-based survey in schools

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## Abstract

**Background:** Cannabis is the most commonly used illicit substance in Ireland and globally. It is most likely to be used in adolescence, a period of biopsychosocial vulnerability to maladaptive behaviours. This study aims to investigate the risk and protective factors for cannabis use among adolescents.

**Methods:** This study is a secondary analysis of the cross-sectional Planet Youth survey (2021). The sample comprised 4,404 adolescents aged 15–16 from one urban and two rural areas in Ireland. The outcome of interest was current cannabis use, defined as cannabis use within the last 30 days. Independent variables i.e., risk and protective factors, were selected a priori following a literature review. Associations between cannabis use and the independent variables were explored using mixed-effects logistic regressions.

**Results:** The prevalence of current cannabis use was 7.3% and did not differ significantly between males and females. In fully-adjusted models, significant risk factors for cannabis use were: Having peers that used cannabis (Adjusted Odds Ratio (aOR) 10.17, 95% CI: 5.96–17.35); Parental ambivalence towards cannabis use (aOR 3.69, 95% CI: 2.41–5.66); Perception of cannabis as non-harmful (aOR 2.32, 95% CI 1.56–£.45); Other substance use (aORs ranging from 2–67–3.15); Peer pressure to use cannabis (aOR 1.85, 95% CI 1.05–3.26), and Low parental supervision (aOR 1.11, 95% CI: 1.01–1.22).

**Conclusions:** This study identified key individual, peer-to-peer and parental risk factors associated with adolescent cannabis use, several of which have the potential to be modified through drug prevention strategies.

**Keywords:** Adolescence; cannabis; epidemiology; early intervention; risk factors

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## Introduction

Cannabis is the most widely used illicit substance among adolescents and is a significant contributor to global disability-adjusted life years (Engelhardt et al., 2023; Degenhardt et al., 2013). Cannabis use typically begins in adolescence, with youth aged 12–17 years accounting for two-thirds of the new cannabis users (Meyers and Dick 2010). Adolescence marks a period of increased autonomy and risk-taking, that can influence how health and health-related behaviours develop. The aetiology of drug use, specifically cannabis use in adolescence is multifactorial and involves a complex interplay between biopsychosocial determinants (Meyers and Dick 2010).

Data from the Growing Up in Ireland study found that 10% of 17–18 year olds reported currently smoking cannabis occasionally

or more than once per week (Mangan-Ryan et al., 2020; O'Mahony et al., 2021). The 2019–20 National Drug and Alcohol Survey (NDAS) found that past-month cannabis use among 15–24-year-olds had increased from 5.6% in 2002–3 to 6.8% in 2019–20 (Mongan et al., 2021; Dunne 2021). The 2019 European Schools Project on Alcohol and Other Drugs (ESPAD) survey found that past-month cannabis use among 15–16-year-olds in Ireland (9%) was higher than the average across participating ESPAD countries (7.1%). Most adolescents participating in the 2019 ESPAD study did not perceive significant risk in cannabis use, and 42% reported that it would be 'fairly' or 'very easy' to get cannabis if they wanted to (ESPAD Group, 2020).

Evidence has indicated that long-term use has the potential to lead to addiction, with 1 in 3 adolescent regular users (weekly or daily) becoming addicted (Leung et al., 2020). The 2019–20 NDAS Study found 19.6% of young people who had used cannabis in the past year met the criteria for Cannabis Use Disorder (Mongan et al., 2021; Dunne 2021). Cannabis use also has the potential to exacerbate mental health concerns such as psychosis. Cannabis users are at a 3–4-fold increased risk of developing an acute psychosis, with evidence that this association is increased to 5–6-fold

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with early use of high potency cannabis (Di Forti *et al.*, 2015; Marconi, *et al.*, 2016). In addition, the number of people entering cannabis addiction treatment has increased in Ireland (Millar *et al.*, 2021). Cannabis-related psychiatric admissions for people aged 15–34 in Ireland increased by 140% between 2011 and 2017 (Smyth *et al.*, 2019) and have remained at this elevated level since then. In 2021, the majority (88.1%) of those entering addiction treatment under 18 years of age, reported cannabis as their primary problem drug (HRB National Drugs Library 2024). Furthermore, the adverse effects associated with cannabis use are more likely to present if use begins at a young age, impacting aspects of life aside from physical and mental health such as social, educational and professional achievements (Gobbi *et al.* 2019; Carver *et al.*, 2021).

Despite the above evidence of increased risks, adolescents continue to use cannabis. Research has demonstrated various continuation factors, such as boredom relief, appetite increase, sleep improvement and increased social opportunities (Lehman *et al.*, 2023). However, qualitative data suggests alternative explanations such as personal factors including low self-esteem and insecurity, or family problems including interfamilial violence or bullying (González-Cano-Caballero *et al.*, 2023). Other salient factors may contribute to increased cannabis use in adolescences, including recent media coverage involving the decriminalisation of cannabis and the potential use of cannabis in medical treatment (Cohn *et al.*, 2023). All of which have contributed to a growing societal acceptance of cannabis use and an incorrect perception by some that its use is without risk (Willoughby *et al.*, 2023).

Risk and protective factors for cannabis use have previously been grouped into different domains including individual, familial and community or individual, interpersonal, community, societal and multilevel (Hawkins *et al.* 1992; Butler *et al.*, 2022; Nawi *et al.*, 2021). Protective factors within these domains can include mindfulness, harmful beliefs related to substance use, personal health goals, parental drug awareness, and structured school related activities. However research has indicated the strongest protective factors include family norms and structured leisure times (Woodward *et al.*, 2023).

Risk factors can include increased impulsivity, deficits in regulatory ability, screen time, decreased beliefs related to substance use harms, and low parental education. Recent research has demonstrated significant risk can be associated with two key factors; peer substance use and peer substance use norms (Woodward *et al.*, 2023). Mental health concerns such as depression and anxiety are also associated with an increased risk of substance use, particularly during the period of COVID-19 (Libuy *et al.*, 2024; Mehra *et al.*, 2023). Gender can be a risk factor, as adolescent males (8.5%) appear to be more likely than females (5.8%) to use cannabis (Doyle *et al.*, 2022). However more research is required as the available evidence is mixed regarding gender and potential intervention pathways (Tinner *et al.*, 2022).

The rationale for identifying risk and protective factors for cannabis use in adolescents is to provide national policymakers and local service providers with up-to-date and identifiable targets for prevention and early intervention. Identifying protective factors is important as the majority of research to date has focused on identifying risk factors, many of which are difficult to behaviourally modify.

A key goal is to delay the onset of substance use, to prevent possible harm to the adolescent development, and to reduce the risk of problematic substance use later in life (Department of Health 2017).

Therefore, the aim of this study was to examine individual, familial, peer, school and community factors associated with cannabis use in a general population sample of adolescents in Ireland.

## Methods

### Study design

This study involves analysis of cross-sectional data collected in November 2021 as part of the Planet Youth Programme in the East of Ireland (Planet Youth Partner Ireland 2021). This programme is based on the Icelandic Prevention Model, an international evidence-based primary prevention model developed by the Icelandic Centre for Social Research and Analysis at Reykjavik University (Kristjánsson *et al.*, 2020). The programme was initially created in the early 1990s to reduce youth substance use rates in Iceland, and its impact has been profound (Sigfúsdóttir *et al.*, 2009). The Icelandic Prevention Model is based on the perspective that adolescent health-related behaviours are part of a young person's broader lifestyle, and health is viewed in its social context. It is a collaborative upstream model designed to identify, and subsequently influence, risk and protective factors within the community (school, peer, family networks) related to adolescent substance use (Halsall *et al.*, 2020). A core element of this model is to identify local risk and protective factors through repeated surveys, around which prevention strategies can be developed (Carver *et al.*, 2021).

### Setting

The survey was undertaken in North Dublin, Cavan and Monaghan. These regions encompass a mix of urban, suburban and rural areas. All schools and YouthReach centres (official programme for early school leavers) in these areas were invited to participate.

### Participants

The target population for the Planet Youth study were students in their fourth/fifth year of secondary school, aged 15–16 years old (with some schools including a wider age range). In schools that agreed to participate, students and parents were given information about the survey and invited to opt-out if they wished.

### Procedure

Surveys were completed during school hours September–November 2021. All surveys were carried out on portable tablets. All surveys were undertaken during school hours, in classrooms and ranged from 45 minutes to 1 hour. Research subjects were anonymous.

### Outcome: cannabis use

Participants were asked, 'During the last 30 days: How often have you used cannabis products?' The response categories ranged from 'Never' to '40 times or more'. For the purposes of the analysis and due to small cell issues in several outcome levels ( $n < 30$ ), those responding 'Never' were categorised as current non-users (reference) and those providing any other response were categorised as current users.

### Predictors

All predictor factors were self-reported by the adolescent and were grouped into sociodemographic, individual, family, peer group, and school/community factors.

## Sociodemographic factors

### Gender

Participants reported their gender as male, female, non-binary and/or transgender, or 'prefer not to say' which were categorised as male (reference), female and 'other' for the purposes of the analysis.

### Socio-economic status

Maternal education level was included as an indicator of familial socio-economic status and had 3 levels: college/university (reference), secondary school/primary school, or unknown.

## Individual factors

### Mental health

Participants rated their mental health on a likert scale which was categorised to 'very good/ good/okay' (reference) and 'very bad/ bad'.

### Other substance use

Current use of alcohol, cigarettes and e-cigarettes referred to the binary use of each substance (yes/no (reference)) in the past 30 days.

### Perception of cannabis

Participants reported their perception of cannabis as 'harmful' (reference), 'not harmful' or 'unsure'.

## Family-related factors

Level of parental supervision was measured as a continuous cumulative score from two items: 'My parents know who I am with in the evenings' and 'My parents know where I am in the evenings'. A total possible score for parental supervision was 10. The five response categories ranged from 'strongly agree' to 'strongly disagree' and were scored from 1 to 5 with higher scores indicating less parental supervision.

### Parental attitudes to cannabis

Participants reported how their parents would react if they used cannabis substances. Responses were dichotomised into '[Totally] Against' (reference) or 'A bit against/don't care'.

Parent-peer knowledge referred to the strength of social links between the participants peer group and parents. Participants responded to 'My parents know my friends' and 'My parents know my friend's parents' on a 5 point scale from 'strongly agree' to 'strongly disagree', which were also converted to numeric scores and summed to form a total score with higher scores indicating lower levels of parental-peer knowledge.

## Peer group related factors

Peer cannabis use was measured as at least one friend using cannabis.

Peer pressure to use cannabis was measured by participants' agreement with the statement 'Sometimes you need to smoke cannabis, so you're not left out of a group of friends'. Responses were dichotomised to 'No' (reference) and 'Yes'.

## School and community factors

Participation in team sports was included as a 3-category frequency variable with options 'Almost never' (reference), '1-3 times per week', and '≥4 times per week'. §

School engagement was calculated from participants' level of frequency of the following experiences: 'I find the schoolwork pointless', 'I find schoolwork boring', 'I am poorly prepared for classes', and 'I feel I do not put enough effort into my schoolwork'. Responses were converted to numeric scores ranging from 1 ('Almost always') to 4 ('Almost never'), and were summed to form a total score, with higher scores indicating higher levels of school engagement.

Measures of parental supervision, parent-peer knowledge, and school engagement are consistently incorporated in previously published Icelandic Prevention Model research (Sigfúsdóttir et al., 2009; Kristjánsson et al., 2021; Kristjánsson and Sigfúsdóttir 2009; Kristjánsson et al., 2016).

## Data analysis

Specific respondents were removed as part of the data cleaning process in Reykjavik to ensure survey accuracy. The criteria for elimination included insufficiently completed questionnaires i.e., insufficient participant demographic data, reporting the use of a fictitious drug or reporting to have tried every substance 40 times or more (Kristjánsson et al., 2020).

Statistical analysis was performed using Stata statistical software, version 18. Youthreach centres taking part in the survey were merged to form an overarching 'Youthreach' school unit for each county, creating a single combined unit for the purposes of the analysis. Descriptive analyses were conducted to characterise cannabis users and non-users'. Prevalence calculations were based on self-reported cannabis use in the last 30 days.

Associations between cannabis use and sociodemographic, familial, peer, school and community factors were explored using mixed-effects logistic regression models, unadjusted and the multivariable models were adjusted for all other factors included in the analysis. School location was modelled as the random effect. Multicollinearity was tested for using variance inflation factors. Assumptions were assessed using the Box-Tidwell test for the purposes of the analysis. Odds ratio, 95% confidence intervals, and two-tailed P-values were calculated for all analyses, with the significance level set at 5% ( $p < 0.05$ ).

## Results

### Characteristics of the sample

A total of 45 schools were invited to participate in the survey, with 40 schools deciding to participate (88.9%). Over 5,000 survey responses were anticipated, with 4,404 valid surveys returned, as shown in Table 1, resulting in a final student response rate of 80.1%. There were 4,404 15–16-year-olds eligible for inclusion in this study, 4,072 of which had given information on current cannabis use (92.5%). Overall, 7.3% ( $n = 302$ ) were current cannabis users. When looking at current users by county, Cavan had 8.5% reporting current cannabis use, Monaghan had 5.6% and North Dublin had 7.6%. See Table 1 for school and student response rates by county (Table 1).

### Results of multivariable logistic regression

#### Sociodemographic factors

The results of the univariable and multivariable logistic regression models are shown in Table 2 and indicate there were no significant associations between gender or maternal education and cannabis use.

**Table 1.** School and student response rates for the 2021 planet youth survey

Area	Schools invited	Schools responded	School response rate	Target population	Valid surveys returned	Student response rate
Cavan	12	12	100%	1,008	882	87.5%
Monaghan	13	13	100%	966	845	87.5%
North Dublin	20	15	75%	3,522	2,677	76%
<b>Total</b>	<b>45</b>	<b>40</b>	<b>88.9%</b>	<b>5,496</b>	<b>4,404</b>	<b>80.1%</b>

### Individual factors

In the unadjusted analysis, lower socio-economic status and poor mental health were significant risk factors but were not significant in the adjusted model. Within the adjusted multivariable model, current cannabis users were significantly more likely to report current alcohol use (aOR 2.67, 95% CI: 1.77–4.02), smoking (aOR 3.15, 95% CI: 2.16–4.59) and e-cigarette use (aOR 2.73, 95% CI: 1.87–3.99). Adolescents who did not perceive cannabis use as harmful were also significantly more likely to be current cannabis users compared to those who did (aOR 2.32, 95% CI: 1.65–3.45).

### Family-related factors

In the unadjusted analysis, parent knowledge of peers was significant but did not retain significance in the adjusted model. From the multivariable model, adolescents who felt their parents would be ambivalent towards their use of cannabis were significantly more likely to be current cannabis users than those who thought their parents were strongly against cannabis use (aOR 3.69, 95% CI: 2.41–5.66). Low parental supervision was significantly associated with higher odds of current cannabis use (aOR 1.11, 95% CI: 1.01–1.22).

### Peer-related factors

Those who reported that their friends used cannabis had a 10-fold increased odds of cannabis use themselves compared to those that did not (aOR 10.17, 95% CI: 5.96–17.35). Participants who felt it was necessary to use cannabis to fit in with their friends had significantly increased odds of current cannabis use compared to those who did not feel peer pressure to use cannabis (aOR 1.85, 95% CI: 1.05–3.26).

### School and community related factors

The results from the unadjusted model found significant protective effects for cannabis use but these did not retain significance in the adjusted model.

Key differences between cannabis users and non-users are shown in Figure 1.

## Discussion

### Epidemiology of cannabis use

This study found that among a general population sample of 15–16-year-olds in Ireland, 7.3% had used cannabis in the last 30 days, indicating cannabis use remains an issue among Irish adolescents (Doyle *et al.*, 2022; Sunday *et al.*, 2020; Költő *et al.*, 2020).

### Individual level risk factors associated with cannabis use

A notable finding in this study was the lack of an association between gender and cannabis use. Historically, male gender has been noted as a risk factor for cannabis use, with more recent evidence suggesting this gap is narrowing (Doyle *et al.*, 2022; Sunday *et al.*, 2020; Coffey and Patton 2016; Vidourek *et al.*, 2017;

Kuhn 2015; Matteau-Pelletier *et al.*, 2020). To our knowledge, this is the first study in the Irish setting to find no significant difference in cannabis use between males (50.5%) and females (45.3%).

The odds of cannabis use were higher for current alcohol users, smokers and e-cigarette users, adjusted for all other factors. This finding is in keeping with the literature that risky substance use behaviours co-occur among adolescents (Myers and Kelly 2006). The fact that adolescents are likely to engage in polysubstance use is significant and needs to be factored into any interventions targeting cannabis prevention among adolescents in Ireland.

We found that 36% of participants in this study were either unsure or felt cannabis use was not harmful. Those who did not perceive cannabis use as harmful had significantly higher odds of cannabis use than those who did perceive it as harmful. This finding is consistent with the international literature on adolescent cannabis use (Mariani and Williams 2021; Mennis *et al.*, 2023). Over the last decade, there has been a cultural shift both nationally and internationally towards legalising cannabis use (Willoughby *et al.*, 2023). This cultural shift has led to an attitude among many adolescents and adults that cannabis is a relatively harmless drug (Leung *et al.*, 2020; Sunday *et al.*, 2020). This shift in perception regarding cannabis-related harm may impact Irish adolescents' decision to use cannabis, as suggested by our findings.

### Parental risk factors for adolescent cannabis use

This study has demonstrated the importance of parental attitudes to cannabis use. Adolescents who perceived parental ambivalence towards cannabis use had almost four times the odds of using cannabis. This is a very significant finding as it is a readily modifiable risk factor that may be targeted with prevention initiatives (Vermeulen-Smit *et al.*, 2015). This indicates the critical importance of understanding parental attitudes towards adolescent cannabis use, and the potential modifications needed for drug prevention strategies in order to mitigate against this. In association with the decline in perceived risks of cannabis among teenagers, adults in Ireland as now less inclined to perceive cannabis as harmful (Mongan *et al.* 2023). Cannabis use has been legalised in several countries internationally which can influence public opinion about cannabis and reduce knowledge about harms (Cohn *et al.*, 2023). There should be clearer public health messaging around the significant health and social harms associated with cannabis use for youth (Rutherford *et al.*, 2023).

In keeping with previous literature, we found that less supervised adolescents had significantly increased odds of cannabis use compared to their more supervised peers. The odds of cannabis use significantly increased with each unit decrease parental supervision scale. Strengthening parental supervision was a key element implemented in Iceland as part of their drug prevention model. Parents in Iceland were invited to school meetings where research findings were shared. Parents then mutually agreed not to allow substance use in their homes, to prevent unsupervised parties, and to increase parental monitoring

**Table 2.** Descriptive statistics for cannabis and non-cannabis users, and the ability of various factors to distinguish groups (unadjusted and adjusted). Percentages refer to proportion of cannabis users/non-users

	Non-Cannabis users (N = 3770)	Cannabis users (N = 302)	Unadjusted effect	Adjusted effect
	N (%)		Odds ratio (95% CI)	
<b>Gender</b>				
Male	1903 (50.5%)	163 (54.0%)	–	–
Female	1707 (45.3%)	122 (40.4%)	0.79 (0.61–1.03) <i>P</i> = 0.08	0.76 (0.52–1.10) <i>P</i> = 0.14
Other*	158 (4.2%)	17 (5.6%)	1.29 (0.76–1.21) <i>P</i> = 0.35	0.80 (0.37–1.72) <i>P</i> = 0.57
Missing	2 (0.1%)	0 (0%)		
<b>Maternal education</b>				
College or University Course	2401 (63.7%)	154 (51.0%)	–	–
Primary/Secondary School	895 (23.7%)	108 (35.8%)	1.78 (1.36–2.33) <i>P</i> < 0.001	1.11 (0.77–1.62) <i>P</i> = 0.57
Unknown	471 (12.5%)	40 (13.2%)	1.23 (0.85–1.79) <i>P</i> = 0.28	1.17 (0.70–1.95) <i>P</i> = 0.56
Missing	3 (0.1%)	0 (0%)		
<b>Self-rated mental health</b>				
[Very] good/okay	2728 (72.4%)	165 (54.6%)	–	–
[Very] Bad	1020 (27.1%)	136 (45.0%)	2.08 (1.63–2.65) <i>P</i> < 0.001	0.94 (0.65–1.36) <i>P</i> = 0.73
Missing	22 (0.6%)	1 (0.3%)		
<b>Current cigarette use</b>				
Yes	305 (8.1%)	188 (62.3%)	18.73 (14.18–24.73) <i>P</i> < 0.001	3.15 (2.16–4.59) <i>P</i> < 0.001
Missing	7 (0.2%)	3 (1.0%)		
<b>Current alcohol use</b>				
Yes	1154 (30.6%)	244 (80.8%)	11.24 (8.15–15.52) <i>P</i> < 0.001	2.67 (1.77–4.02) <i>P</i> < 0.001
Missing	103 (2.7%)	9 (3.0%)		
<b>Current e-cig/vape use</b>				
Yes	485 (12.9%)	215 (71.2%)	15.58 (11.83–20.51) <i>P</i> < 0.001	2.73 (1.87–3.99) <i>P</i> < 0.001
Missing	85 (2.3%)	1 (0.3%)		
<b>Perceptions of cannabis</b>				
Harmful	2533 (67.2%)	50 (16.6%)	–	–
Not Harmful	1021 (27.1%)	236 (78.1%)	10.86 (7.92–14.90) <i>P</i> < 0.001	2.32 (1.56–3.45) <i>P</i> < 0.001
Unsure	186 (4.9%)	10 (3.3%)	2.72 (1.36–5.46) <i>P</i> = 0.005	1.71 (0.67–3.47) <i>P</i> = 0.26
Missing	30 (0.8%)	6 (2.0%)		
<b>Friends use cannabis</b>				
Yes	1106 (29.3%)	273 (90.4%)	30.68 (19.18–49.07) <i>P</i> < 0.001	10.17 (5.96–17.35) <i>P</i> < 0.001
Missing	60 (1.6%)	10 (3.3%)		
<b>Cannabis to avoid peer exclusion</b>				
Disagree	3277 (86.9%)	219 (72.5%)	–	–
Agree	199 (5.3%)	37 (12.3%)	2.89 (1.96–4.27) <i>P</i> < 0.001	1.85 (1.05–3.26) <i>P</i> = 0.03
Neither	225 (6.0%)	36 (11.9%)	2.15 (1.45–3.19) <i>P</i> < 0.001	0.92 (0.56–1.52) <i>P</i> = 0.76
Missing	69 (1.8%)	10 (3.3%)		
<b>Sports outside school</b>				
Almost never	1556 (41.3%)	175 (57.9%)	–	–
1–3x week	1419 (37.6%)	76 (25.2%)	0.51 (0.38–0.68) <i>P</i> < 0.001	0.79 (0.54–1.16) <i>P</i> = 0.23
>=4x week	771 (20.5%)	45 (14.9%)	0.54 (0.38–0.77) <i>P</i> = 0.001	0.92 (0.57–1.48) <i>P</i> = 0.73
Missing	24 (0.6%)	6 (2.0%)		
<b>School engagement score (4–20)</b>				
Mean (SD)	12.9 (2.77)	11.2 (2.96)	0.79 (0.76–0.83) <i>P</i> < 0.001	0.95 (0.89–1.00) <i>P</i> = 0.07
Median [Min, Max]	13.0 [4.00, 20.0]	12.0 [4.00, 18.0]	–	–
Missing	62 (1.6%)	7 (2.3%)		

(Continued)

Table 2. (Continued)

	Non-Cannabis users (N = 3770)	Cannabis users (N = 302)	Unadjusted effect	Adjusted effect
	N (%)		Odds ratio (95% CI)	
<b>Parent reaction to cannabis</b>				
[Totally] Against	3596 (95.4%)	198 (65.6%)	-	-
A bit against/do not care	132 (3.5%)	95 (31.5%)	12.20 (8.82–16.88) $P < 0.001$	3.69 (2.41–5.66) $P < 0.001$
Missing	42 (1.1%)	9 (3.0%)		
<b>Parental supervision score (2–10)</b>				
Mean (SD)	3.94 (1.65)	5.32 (2.16)	1.45 (1.36–1.54) $P < 0.001$	1.11 (1.01–1.22) $P = 0.03$
Median [Min, Max]	4.00 [2.00, 10.0]	5.00 [2.00, 10.0]	-	-
Missing	27 (0.7%)	5 (1.7%)		
<b>Parent knowledge score (2–10)</b>				
Mean (SD)	4.40 (1.78)	5.06 (1.93)	1.20 (1.12–1.28) $P < 0.001$	0.93 (0.83–1.03) $P = 0.17$
Median [Min, Max]	4.00 [2.00, 10.0]	5.00 [2.00, 10.0]	-	-
Missing	25 (0.7%)	7 (2.3%)		

Adjusted effect means that the OR was adjusted for all other factors in the multivariable analysis. 3,620 participants were included in the adjusted analysis (263 users [7%] Vs 3,357 non-users).

and the amount of time they spend with their children each week (Kristjánsson et al., 2020). Intervention evaluation showed that parental monitoring increased and substance use decreased in specific communities in Iceland (Kristjánsson et al., 2010). This suggests that low parental supervision is a modifiable risk factor which Irish drug prevention initiatives may target.

The vast majority of cannabis users reported having friends who also use cannabis (93.5%). The odds of using cannabis were almost ten times higher in those whose friends' used cannabis compared to adolescents whose friends did not use cannabis. This finding is consistent with the literature, which identifies peer cannabis use as one of the strongest risk factors for adolescent cannabis use (Suárez-Maldonado et al., 2022; Thomas et al., 2021). Also in keeping with the literature, this study found that the odds of cannabis use were almost double for those who felt peer pressure to use cannabis compared to those who did not (Keyzers et al., 2020).

### Strengths and limitations

The strengths of this study include its large sample size, high response rate (88.9% of schools and 80.1% of students) and its basis in recently collected data (2021). This study progresses the current understanding of risks and protective factors for cannabis use in adolescence, and in doing so bridges current research gaps as highlighted by previous reviews (Butler et al., 2022). Reviews have noted issues relating to the exclusion of community and school factors, and lack of insight into interpersonal, individual and gender factors. This paper attempted to overcome these issues exploring such factors, while adopting a robust, fully adjusted statistical analysis. Moreover, this paper underscores that potential protective factors can also act as risk factors if not appropriately managed. For instance, parental supervision, when high, acts as a protective factor, whereas inadequate supervision becomes a risk factor.

There are however limitations to this study, perhaps the most significant being that it is cross-sectional. Causality cannot be established and the temporal direction of relationships between protective and risk factors for cannabis use cannot be proven. Sociodemographic information was not available for those who did

not take part in the study, and they may systematically differ from those who did. Previous studies have found non-responders are often more likely to be those who would report risk behaviours, which could lead to underestimation of risk factor prevalence (Cheung et al., 2017).

Surveys were completed during school hours and on school premises, which may introduce bias in the reporting of behaviours, particularly cannabis use although this is mitigated by the anonymous nature of the survey. Early school dropouts were not included. However, this limitation is mitigated by including Youth Reach centres in the survey.

This study does not differentiate those who use cannabis infrequently from the heavier daily users who are more at risk of cannabis-related harms. Furthermore, this study does not account for polysubstance use within current cannabis users, as previous research has demonstrated users often engage in polysubstance use (Connor et al., 2013).

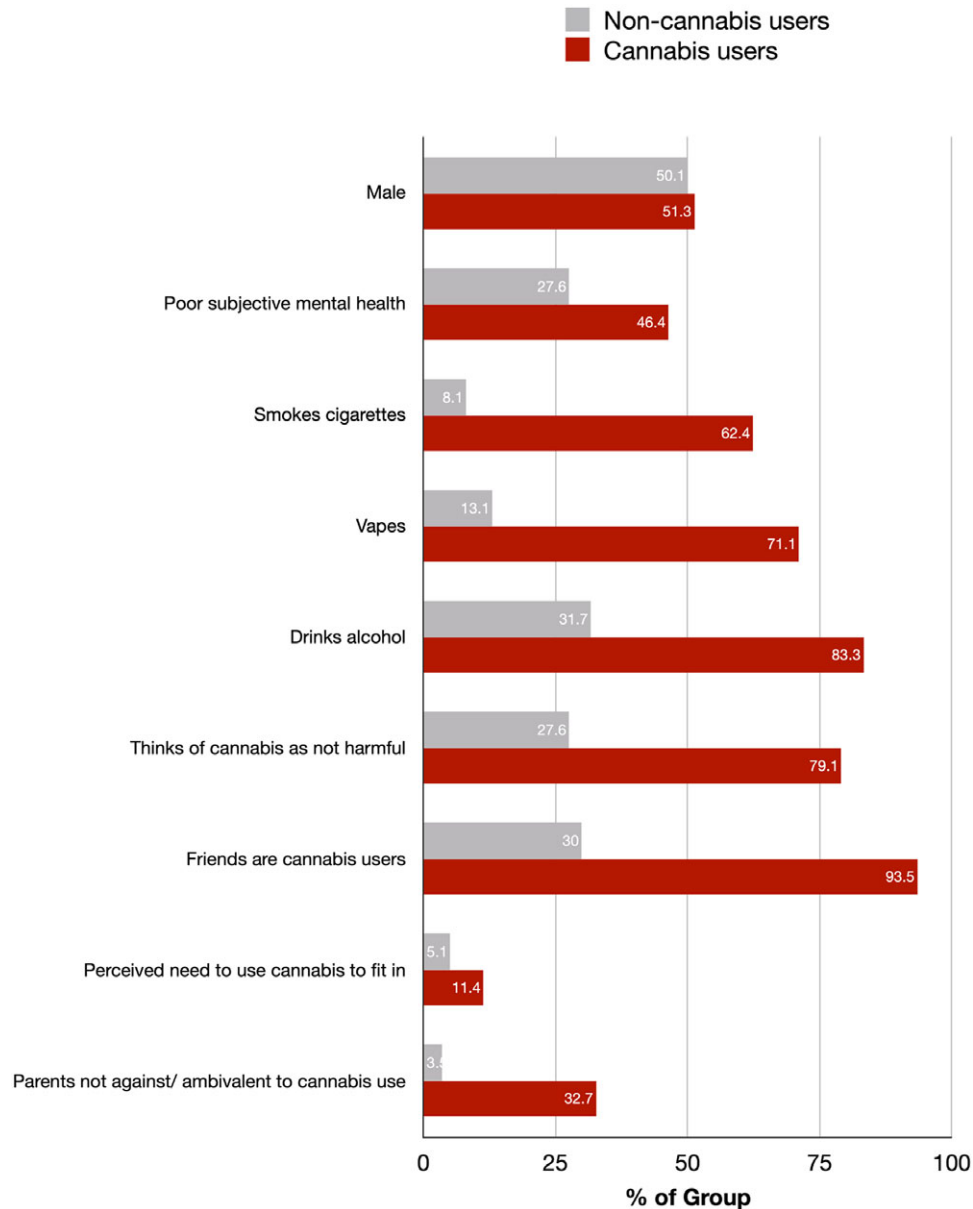
Finally, while many of the risk and protective factors identified in this study are consistent with previous international literature, this study is based on adolescents living in Ireland and its generalisability to other contexts may be limited.

### Conclusions

This study examined the prevalence of and potential risk and protective factors for cannabis use among 15–16-year-old adolescents in the North East of Ireland.

This study found five risk factors (alcohol use, smoking, e-cigarette use, peer cannabis use and peer pressure to use cannabis) and three protective factors (belief in cannabis-related harm, parental supervision and perception that parents are against cannabis use) independently associated with cannabis use. Importantly, for policymakers, many of these factors are modifiable.

A tailored public health messaging campaign addressing the known harms and complications of cannabis use in young people, is urgently required. Recent conversations around the decriminalisation and legalisation of cannabis and potential use of cannabis for medicinal purposes have contributed to a growing



**Figure 1.** Prevalence of risk factors between current cannabis users ( $n = 302$ ) and non-users ( $n = 3770$ ) in adolescence.

societal acceptance of cannabis use and a perception by some that its use is without risk. The public health community and policymakers must act to ensure greater awareness of cannabis harms among both teenagers and their parents.

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The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation and with the Helsinki Declaration

of 1975, as revised in 2008. The authors assert that ethical approval for publication of this study has been provided by their local Ethics Committee (RCPI RECSAF 144).

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