Substance use in youth at risk for psychosis

R. Carney a,⁎, A.R. Yung a,b, G.P. Amminger c,d, T. Bradshaw e, N. Glozier f, D.F. Hermens f, I.B. Hickie f, E. Killackey c, P. McGorry c, C. Pantelis g, S.J. Wood g,h, R. Purcell c

a Institute of Brain, Behaviour and Mental Health, University of Manchester, UK
b Greater Manchester West Mental Health NHS Foundation Trust, UK
c Orygen - The National Centre of Excellence in Youth Mental Health, University of Melbourne, Victoria, Australia
d The Centre for Youth Mental Health, The University of Melbourne, Australia
e School of Nursing, Midwifery and Social Work, University of Manchester, UK
f Brain & Mind Centre, University of Sydney, New South Wales, Australia
g Melbourne Neuropsychiatry Centre, University of Melbourne and Melbourne Health, Victoria, Australia
h School of Psychology, University of Birmingham, UK

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Background: People with schizophrenia have high rates of substance use which contributes to co-morbidity and premature mortality. Some evidence suggests people at-risk for psychosis have high rates of substance use. We aimed to assess substance use in a help-seeking cohort, comparing those at-risk and not at-risk for psychosis, and to establish any relationship with clinical symptoms.

Method: Participants were help-seeking youth presenting to mental health services in Sydney and Melbourne. 279 (34.8%) were at-risk for psychosis, and 452 (56.4%) did not meet criteria for a psychotic disorder or risk for psychosis. The excluded individuals were made up of 59 (7.4%) young people who met criteria for a psychotic disorder and 11 (1.4%) who were unable to be evaluated. We assessed the association of substance use involvement with risk status and clinical symptoms using multivariate regression.

Results: Individuals at-risk for psychosis had significantly higher tobacco, alcohol and cannabis use than those not at-risk. Multivariate analysis revealed at-risk status was significantly associated with higher alcohol involvement scores when adjusting for age and gender, but no association was found for cannabis or tobacco. At-risk status was no longer associated with alcohol involvement when cannabis or tobacco use was added into the analysis.

Conclusion: Tobacco smoking, alcohol consumption and cannabis use are common in help-seeking youth, particularly those at-risk for psychosis. It is important to consider co-occurring use of different substances in adolescents. Early substance misuse in this phase of illness could be targeted to improve physical and mental health in young people.

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1. Introduction

People with schizophrenia have high rates of substance use including tobacco, alcohol and cannabis use (Addy et al., 2012; Davidson et al., 2001; McCreadie, 2003). This increases the risk of later cardiovascular disease. Together with the metabolic side effects of antipsychotics, these unhealthy lifestyle factors contribute to the increased morbidity and premature mortality of this population. (De Hert et al., 2011; Saha et al., 2007; Wahlbeck et al., 2011). High rates of substance use are observed early in the illness course, in individuals with first-episode psychosis (FEP) (Barnett et al., 2007; Wade et al., 2006).

The ultra-high risk state (UHR), also called the prodromal, clinical high-risk (CHR) or at-risk mental state (ARMS) (Fusar-Poli et al., 2013), identifies people at imminent high risk of developing a psychotic disorder, that is, they may be in the prodromal phase for psychosis. In order to meet UHR status an individual must exhibit one or a combination of the following characteristics: presence of attenuated psychotic symptoms, brief intermittent psychotic symptoms, or a genetic-risk combined with a recent decline in functioning (Yung et al., 2004). These are assessed with established criteria (Miller et al., 2002; Yung et al., 2002; Yung and McGorry, 1996; Yung et al., 1998).

Two recent reviews suggest UHR individuals have high rates of poor physical health and unhealthy lifestyle behaviours such as smoking, cannabis and alcohol use (Addington et al., 2014; Carney et al., 2016). In at-risk samples, more severe symptoms are also associated with higher levels of substance use (Auther et al., 2012; Svirskis et al., 2005). Previous research has indicated that cannabis significantly
increases the risk for psychosis, with the greatest risk associated with early age of first use (Donoghue et al., 2014; Helle et al., 2016), use of high potency cannabis or ‘skunk’ (Di Forti et al., 2014; Marconi et al., 2016) and in those with an underlying genetic predisposition for psychosis (Henquet et al., 2008). Additionally, recent meta-analyses suggest there is a dose-response relationship between heavy cannabis use and transition to psychosis in UHR individuals (Kraan et al., 2015).

Despite these findings, there is little research into physical health and associated risk behaviours in UHR youth and these factors are poorly monitored in clinical services (Carney et al., 2015). Studies assessing lifestyle factors in UHR individuals rarely have substance use as a primary outcome. Those that do are often underpowered, with small samples (Allen et al., 2014; Rapp et al., 2013). Additionally, many fail to include an adequate control group (Dragt et al., 2012; Kristensen and Cadenhead, 2007; Phillips et al., 2002; Rapp et al., 2013) and often use unvalidated measurement tools (Stone et al., 2012; van Tricht et al., 2013). There is also a lack of evidence to link psychological and psychosocial factors to rates of substance use, as this has not yet been assessed in large cohorts.

To address this gap we aimed to:

(1) Assess rates of substance use, in help seeking individuals, to establish whether those with a specific risk for psychosis have higher rates of substance involvement than those without, using a World Health Organisation substance use assessment tool (ASSIST; (WHO, 2002)). This tool measures degree of substance involvement, taking into account current and lifetime use of substances, frequency of use, desire, problematic use, failure to meet expectations, concern expressed by others and failed attempts to quit.

(2) Identify any relationship between substance involvement, clinical symptoms and other psychosocial variables.

2. Method

2.1. Participants and setting

Data from the Transitions Study (Purcell et al., 2014) were used to conduct a cross-sectional analysis of a help-seeking cohort presenting at youth mental health services in Australia. The Transitions Study has been described in detail elsewhere (Purcell et al., 2015; Purcell et al., 2014). Participants were help-seeking individuals aged 12–25 years who had engaged with one of four ‘headspace’ clinics in Melbourne and Sydney, Australia, between January 2011 and August 2012 (Rickwood et al., 2014). ‘headspace’ was established by the Australian Government to provide mental health services for young people. Of 1615 individuals receiving help from these services, 801 young people consented to participate in the study, of whom 279 were at-risk for psychosis, 59 had established psychotic disorder and 452 met neither psychosis risk nor psychosis criteria (at-risk for psychosis status could not be evaluated in 11 participants) (Fig. 1), (Purcell et al., 2014). Those who could not be evaluated or who had a psychotic disorder were excluded, leaving 731 individuals.

2.2. Procedure

Baseline assessment measures were administered after participants gave informed consent. Research assistants (RAs) with a minimum of 4-years graduate psychology degrees administered assessments. RAs had very good (kappa > 0.8) inter-rater reliability on interviewer-rated measures. Self-report measures were completed by participants on an iPad. A $20 gift voucher was provided to each participant. The Human Research Ethics Committees at the University of Melbourne and University of Sydney approved the study.

Fig. 1. Flow diagram of individuals included in the analysis.
2.3. Measures

The Positive Symptom Scale of the Comprehensive Assessment for At-Risk Mental State (CAARMS) (Yung et al., 2005) was used to determine whether an individual was at-risk for psychosis. This consists of four subscales: (i) unusual thought content; (ii) non-bizarre ideas; (iii) perceptual abnormalities; and (iv) disorganised speech. Scores for each of the subscales are rated according to intensity, frequency and duration of symptoms. An individual was considered at-risk of psychosis if they scored above a pre-set threshold on both intensity and frequency on any of these subscales, consistent with previous definitions (Yung et al., 2004).

Further clinician rated measures included; 16-item adolescent version of the Quick Inventory of Depressive Symptomatology (QIDS, (Rush et al., 2003)), Social and Occupational Functioning Assessment Scale (SOFAS, (Morosini et al., 2000)), and Young Mania Rating Scale (YMRS, (Young et al., 2000)). Self-report clinical measures included; Kessler 10 (K10, (Andrews and Slade, 2001)), Somatic and Psychological Health Report (SPHERE 12, (Berryman et al., 2012)), Generalised Anxiety Disorder scale (GAD-7, (Spitzer et al., 2006)), Overall Anxiety Severity and Impairment Scale (OASIS (Campbell-Sills et al., 2009)), WHO Disability Assessment Schedule (WHO-DAS-12, (Östun, 2010)) a question on quality of life taken from the WHOQOL, (Group, T.W, 1994) and a 5-item eating disorder screening tool (SCOFF, (Morgan et al., 1999)). Substance use was assessed using the WHO Alcohol, Smoking and Substance Involvement Screening Test (WHO-ASSIST, (WHO, 2002)). Personality characteristics were assessed using the Behavioural Inhibition/Activation Scale, (BIS/BAS, (Carver and White, 1994)).

2.4. Statistical analysis

Categorical variables were analysed using a χ² test and continuous variables were compared using t-tests. When the assumptions for parametric statistics were violated, determined by distribution of data on histograms, non-parametric tests were employed (such as Mann Whitney U). Current use of substances was defined as use within the past three months (WHO, 2002). Use of substances other than tobacco, alcohol and cannabis was minimal; therefore, data was not included in further analysis. Substance involvement was calculated by taking into account current and lifetime use of substances, frequency of use, desire, problematic use and failure to meet expectations, concern expressed by others and failed attempts to quit.

Regression analyses were performed on the whole sample using each of the substance involvement scores (alcohol, tobacco and cannabis) as the dependent variables and risk-status, demographic information and clinical variables as independent variables (predictors). Where the outcome data was skewed, quantile median regression was used (alcohol and tobacco involvement). Predictors of cannabis involvement were modelled using mean regression, as median quantile regression models failed to converge. The clinical variables used in the multivariate analysis related to clinically significant outcomes such as depression, psychological distress, anxiety and functioning. Personality characteristics and symptoms of mania or eating disorders were therefore, excluded from the multivariate analysis, as they were deemed non-significant clinical variables. A significance level of 0.05 was used for all statistical tests, and two-tailed tests were applied. All data analysis was conducted using SPSS 22.0 (IBM, 2013).

3. Results

The sample consisted of young people presenting to youth mental health services in Australia. Individuals at-risk for psychosis and help-seeking controls did not differ according to age (psychosis risk 18.19; help-seeking control 18.33), or gender ratio (see Table 1). A higher proportion of females than males was found in both groups (psychosis risk 66.7% and help-seeking controls 65.7%), which is representative of the ‘headspace’ cohort (Rickwood et al., 2014).

3.1. Substance use in individuals at-risk for psychosis compared to help-seeking controls

3.1.1. Tobacco

Tobacco involvement scores were significantly higher in individuals at-risk for psychosis (7.90) than help-seeking controls (5.94; p = 0.01). Scores 0–3 indicate low risk, 4–26 moderate risk and 27 or higher suggests high risk. Compared to help-seeking controls, those at-risk for psychosis were more likely to have high risk tobacco use (5%, 1%; X² = (1)12.79, p = 0.001; OR 7.28, 95% CI 2.06, 25.79), daily, lifetime and current tobacco use. Problematic use (at least weekly use of tobacco) was not significantly different between the groups.

3.1.2. Alcohol

Individuals at-risk for psychosis had significantly higher alcohol involvement (6.40) than help-seeking controls (5.16; p = 0.01). Scores 0–10 indicate low risk, 11–26 moderate risk and 27 or higher suggests high risk. High-risk alcohol use was no different between groups (2%). No differences were found between groups for current, daily, problematic or lifetime use.

3.1.3. Cannabis

Those at-risk for psychosis had higher cannabis involvement scores (4.45) than help-seeking controls (3.20; p = 0.02). The criteria for low, moderate and high risk cannabis use were the same as tobacco use. Individuals at-risk for psychosis had higher rates of high risk cannabis use (psychosis risk 7.6%, help-seeking controls 1.6%) and moderate risk cannabis use (psychosis risk 25.4%, help-seeking controls 21.2%; X² = (2) 6.67, p = 0.01). Significantly more participants at-risk for psychosis used cannabis in their lifetime, and currently used cannabis (33%), than help-seeking controls (26%). Problematic use was higher in those at-risk (16.1%) than help-seeking controls (14.4%) but the difference was not significant.

3.2. What predicts substance use in help-seeking youth?

Regression analyses controlling for at-risk status, age and gender can be found in Table 2. Independent of group (at risk or not at risk), substance involvement was associated with a range of clinical factors. For example, across the whole sample, a reduction in quality of life was associated with increased alcohol (b = 0.47, 95% CI – 0.82, – 0.12), tobacco (b = −1.24, 95% CI −2.34, −0.14) and cannabis involvement (b = −0.94, 95% CI −1.45, −0.44). An increase in depression was associated with increased substance involvement scores across the whole group; however, there was no association for anxiety (Table 2).

At-risk status was independently associated with a 0.90 increase in median alcohol involvement score after adjusting for age, gender and clinical variables (b = 0.90, 95% CI 0.11, 1.69). However, no significant association was found for tobacco use or cannabis involvement (Table 3).

Building on the initial analysis (Table 3), use of other substances was factored into the regression for alcohol involvement. Further multivariate analyses showed that at-risk status was no longer predictive of alcohol involvement scores when adjusted for tobacco (b = 0.51, 95% CI −0.34, 1.36), or cannabis use (b = 0.67, 95% CI −0.19, 1.52), as both scores significantly predicted alcohol use (Table 4). Additionally, no significant interactions were found between at-risk status and tobacco use, or at-risk status and cannabis use.

4. Discussion

In our large sample of help-seeking youth, those at-risk for psychosis had significantly higher tobacco, alcohol and cannabis use than help-
seeking controls. At-risk status predicted higher alcohol involvement, after adjusting for clinical and demographic variables, but did not predict cannabis or tobacco scores. Additionally, UHR status was no longer independently associated with alcohol involvement after controlling for tobacco and cannabis involvement scores, as these variables demonstrated much stronger associations with alcohol involvement.

Table 2

| Clinical measure* all adjusted for at-risk group, age and gender | Alcohol involvement | Tobacco involvement | Cannabis involvement |
|---------------------------------------------------------------|---------------------|---------------------|---------------------|
| K10                                                           | 0.03 0.14           | 0.03 0.12           | 0.07 0.11           |
| SPHERE Psych 6                                                | 0.02 0.09           | 0.13 0.40           | 0.22 0.01           |
| SPHERE Soma 6                                                 | 0.13 0.02           | 0.17 0.32           | 0.24 0.01           |
| GAD7                                                          | 0.14 0.06           | 0.05 0.61           | 0.08 0.08           |
| OASIS                                                         | 0.14 0.05           | 0.10 0.60           | 0.15 0.01           |
| SOCOFF                                                        | 0.48 0.01           | 1.50 0.01           | 0.59 0.01           |
| WHOQOL                                                        | 0.47 0.01           | 0.24 0.03           | 0.04 0.01           |
| WHOQOLS2                                                      | 0.01 0.53           | 0.14 0.03           | 0.09 0.01           |
| QIDS                                                          | 0.12 0.01           | 0.24 0.03           | 0.22 0.01           |
| SOFAS                                                         | 0.10 0.00           | 0.07 0.14           | 0.11 0.01           |
| YMRWS                                                         | 0.11 0.03           | 0.04 0.01           | 0.18 0.01           |
| BAS driven                                                     | −0.21 0.01          | −0.40 0.05          | −0.28 0.01          |
| BAS fun seeking                                               | 0.37 1.00           | 0.07 0.76           | −0.01 0.98          |
| BAS reward                                                    | 0.10 0.11           | 0.18 0.27           | 0.04 0.56           |

Abbreviations: BAS, Behavioural Activation Scale; BIS, Behavioural Inhibition Scale; GAD, Generalised Anxiety Disorder Scale; K10, Kessler 10; OASIS, Overall Anxiety Severity and Impairment Scale; QIDS, Quick Inventory of Depressive Symptomatology; SOCOFF, 5-item eating disorder scale; SOFAS, Social and Occupational Functioning Assessment Scale; SPHERE, Somatic and Psychological Health Report (P-Psychological, S-Somatic); WHOQOLS, World Health Organisation Disability Assessment Schedule; WHOQOL, World Health Organisation Quality of Life Scale; YMRWS, Youth Mania Rating Scale.

Abbreviations: S.D., standard deviation; ASSIST, Alcohol, Smoking and Substance Involvement Screening Test.
The strong association between substances indicates that polysubstance use is likely in both groups, and reflects observations from the general population in this age group (Redonnet et al., 2012), and the at-risk group (Auther et al., 2015). Both help-seeking groups had higher rates of smoking and substance use than the general Australian population (Scollo and Winstanley, 2008). For example, the National Drug Strategy Household Survey 2013 reported 18.6% of young people (18–24) currently smoked tobacco (AIHW, 2014), compared with 52% of our at-risk sample and 45% help-seeking controls. Our findings therefore support previous research reporting elevated levels of substance use in help-seeking adolescents (Hermens et al., 2013).

People with schizophrenia have high rates of smoking (de Leon and Diaz, 2005), alcohol and cannabis use (Addy et al., 2012; Drake and Mueser, 2002). Our findings support recent research suggesting risk factors for poor health and long term outcome occur prior to the onset of psychosis (Addington et al., 2014; Carney et al., 2016). Substance use is linked to poor psychological outcome and high rates of relapse in patient groups (Hides et al., 2006; Lambert et al., 2005), particularly in individuals who continue to use substances after the onset of psychotic symptoms (Colizzi et al., 2015a). Therefore, in both help-seeking groups, high rates of substance use may have a detrimental effect on mental health.

Similar research has found help-seeking youth with mood disorders were significantly more likely to use substances such as cannabis and tobacco if they presented with a high degree of distress and functional disability (Scott et al., 2013; Scott et al., 2014). Additionally, previous research with the UHR group suggests enhancement in mood is the primary reason for using substances (Gill et al., 2015). Despite some significant results, the majority of associations between substance involvement and individual clinical variables were weak, and we did not clearly identify any significant clinical predictors of substance use. Therefore, despite these factors being higher in the at-risk group, our findings suggest there may be mediating variables not present in the analysis that explain the increased risk of substance use in the UHR group. We can speculate about several possibilities.

### Table 3
Regression analysis of UHR status and substance involvement scores, adjusting for age, gender and clinical variables.

| Variables | Coefficient | p-Value | 95% CI |
|-----------|-------------|---------|--------|
| Alcohol involvement score | | | |
| Model 1 | | | |
| At-risk status (UHR) | 0.50 | 0.03 | 0.11–1.69 |
| Sex (female) | −0.08 | 0.84 | −0.89–0.72 |
| Age | 0.61 | 0.01 | 0.49–0.72 |
| K10 | 0.44 | 0.02 | −0.28–0.12 |
| WHODQL | −0.68 | 0.01 | −1.15–0.21 |
| WHOQOL | 0.03 | 0.36 | −0.03–0.09 |
| SOFAS | 0.02 | 0.27 | −0.02–0.06 |
| OASIS | −0.08 | 0.15 | −0.19–0.03 |
| SPHERE psych 6 | −0.19 | 0.04 | −0.36–0.01 |
| SPHERE somatic 6 | 0.12 | 0.10 | −0.02–0.26 |
| Constant | −5.51 | 0.01 | −11.02–3.41 |
| Tobacco involvement score | | | |
| Model 1 | | | |
| At-risk status (UHR) | 0.52 | 0.68 | −1.94–2.97 |
| Sex (female) | −0.43 | 0.74 | −2.93–2.07 |
| Age | 0.51 | 0.01 | 0.15–0.87 |
| K10 | 0.18 | 0.12 | −0.05–0.40 |
| WHOQOL | −1.26 | 0.10 | −2.73–0.22 |
| WHOQOL | 0.08 | 0.40 | −0.26–0.04 |
| SOQAS | −0.05 | 0.37 | −0.06–0.06 |
| OASIS | −0.31 | 0.08 | −0.66–0.28 |
| SPHERE psych 6 | −0.27 | 0.33 | −1.36–1.50 |
| SPHERE somatic 6 | −0.04 | 0.85 | −0.48–0.39 |
| Constant | −0.28 | 0.97 | −13.06–12.50 |
| Cannabis involvement score | | | |
| Model 1 | | | |
| At-risk status (UHR) | 0.61 | 0.25 | −0.45–1.75 |
| Sex (female) | 0.43 | 0.94 | −1.18–1.16 |
| Age | 0.40 | 0.01 | 0.24–0.56 |
| K10 | −0.14 | 0.78 | −0.11–0.86 |
| WHOQOL | −0.58 | 0.08 | −1.25–0.08 |
| WHOQOL | 0.03 | 0.53 | −0.57–0.11 |
| SOFAS | −0.08 | 0.01 | −0.13–0.03 |
| OASIS | −0.12 | 0.13 | −0.18–0.03 |
| SPHERE psych 6 | 0.07 | 0.59 | −0.18–0.32 |
| SPHERE somatic 6 | 0.16 | 0.11 | −0.04–0.35 |
| Constant | 2.57 | 0.38 | −3.17–8.32 |

### Abbreviations:
- K10, Kessler 10
- OASIS, Overall Anxiety Severity and Impairment Scale
- SOFAS, Social and Occupational Functioning Assessment Scale
- WHOQOL, World Health Organisation Quality of Life Scale
- WHOQOL, World Health Organisation Disability Assessment Schedule
- UHR, Ultra-high risk for psychosis
- WHODAS, World Health Organisation Disability Assessment Schedule
- SPHERE, Somatic and Psychological Health Report (P=Psychological, S=Somatic)

### Table 4
Alcohol involvement score adjusting for tobacco and cannabis involvement.

| Model | Variables | Co-efficient | p-Value | 95% CI |
|-------|-----------|--------------|---------|--------|
| Model 2 | At-risk status (UHR) | 0.51 | 0.24 | −0.34–1.36 |
| Tobacco involvement | 0.24 | 0.01 | −0.20–2.93 |
| (+ Model 1) | − | − | − |
| Model 3 | At-risk status (UHR) | 0.75 | 0.21 | −0.43–1.93 |
| Tobacco involvement | 0.25 | 0.01 | 0.18–0.32 |
| Model 4 | At-risk status (UHR) | 0.33 | 0.06 | −1.15–1.81 |
| Tobacco involvement | 0.22 | 0.01 | 0.13–0.32 |
| Tobacco involvement × UHR | 0.09 | 0.21 | −0.05–0.22 |
| Model 5 | At-risk status (UHR) | 0.67 | 0.13 | −0.19–1.52 |
| Cannabis involvement | 0.22 | 0.01 | 0.16–0.28 |
| (+ Model 1) | − | − | − |
| Model 6 | At-risk status (UHR) | 0.6 | 0.18 | −0.27–1.47 |
| Cannabis involvement | 0.24 | 0.01 | 0.17–0.31 |
| Cannabis involvement × UHR | −0.04 | 0.47 | −0.14–0.07 |
| Model 7 | At-risk status (UHR) | 0.53 | 0.21 | −0.31–1.38 |
| Tobacco involvement | 0.21 | 0.01 | 0.16–0.27 |
| Cannabis involvement | 0.08 | 0.01 | 0.02–0.15 |

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First, there may be a shared vulnerability to schizophrenia spectrum disorders and substance use disorders. Although early intervention may prevent the onset of full threshold psychotic symptoms, it may be that at-risk individuals are also at-risk for substance misuse. This possibility arises from the high degree of heritability and comorbidity of substance use disorders and schizophrenia (Chambers et al., 2001). An overlap in genes which are implicated in schizophrenia and substance abuse, such as those responsible for the modulation of dopamine systems could account for this (Volkow, 2009).

Similarly, shared psychosocial vulnerabilities such as social deprivation or childhood adversity have been found to increase the liability for both factors (Howes et al., 2004; Redonnet et al., 2012). At-risk status was not independently associated with cannabis use in our sample, despite rates being higher in this group. Therefore, some people may possess other underlying vulnerabilities to psychosis which may be moderated by the effects of substance use at an early age (Caspi et al., 2005; Colizzi et al., 2015b; Henquet et al., 2008). For example, cannabis use when combined with social adversity is believed to increase the risk for psychotic disorder beyond just the individual factors (Stilo et al., 2015).

Finally, substance use could increase vulnerability to schizophrenia, which may explain the higher rates of substance use in those at-risk for psychosis. Cannabis use, particularly at an early age, is associated with the onset of psychotic symptoms (Donoghue et al., 2014; Helle et al., 2016; Stefanis et al., 2013), and tobacco use may also contribute to the onset of psychotic symptoms (Guirillo et al., 2015). Recent research with the UHR group suggests that there is a dose-response relationship, where cannabis abuse or dependence increases the risk for transition, although this relationship is weakened when alcohol use is taken into account (Auther et al., 2015; Kraa et al., 2015).

4.1. Study limitations

Our cross-sectional study means we cannot determine causality. Longitudinal follow up will establish any variables which determine continued substance use, as well as highlighting any relationship with transition. Additionally, our sample may not represent the general UHR population. Although the CAARMS positive subscales were used to determine psychosis risk, additional criteria such as functioning and neurocognitive scores, were not applied. However, we note that Cornblatt et al. used only the attenuated psychotic symptoms group in their recent study (Cornblatt et al., 2015). Another limitation is that individuals presented to youth mental health clinics and may differ from traditional help-seeking populations presenting to primary care. Finally, we did not control for multiple comparisons, which may have increased the risk of Type II error. As quantitative median regression was not an acceptable approach to use for cannabis involvement scores (due to a failure of the models to converge), any conclusions derived about cannabis use should be made with caution.

4.2. Clinical implications

The increased substance use observed in at-risk youth has clinical implications. First, it places young people at increased risk of metabolic disturbances if they do transition to a first-episode of psychosis and receive anti-psychotic medication. Second, these behaviours are modifiable, and young people may wish to engage in lifestyle interventions such as smoking cessation programs. Regardless of whether an individual later experiences psychosis or not, the UHR phase represents an opportunity for early intervention to prevent or minimise future ill-health. Third, high rates of unhealthy lifestyle factors may increase the risk of psychosis (Di Forti et al., 2014; Guirillo et al., 2015). Co-morbid substance use disorders are common in people with schizophrenia (Volkow, 2009), depression (Boschloo et al., 2011), and anxiety (Conway et al., 2006). Therefore, promoting a healthier lifestyle and encouraging cessation of substances could improve outcome.

4.3. Conclusion

This current study adds to growing evidence suggesting increased rates of substance use are common in young people presenting with mental health difficulties, particularly those at-risk for psychosis. The negative consequences of continued substance use may be more pronounced in this group, who are already at risk for poor physical and mental health in the future. Therefore, this phase is an important stage to intervene with lifestyle interventions to promote healthy living, and has the potential to improve physical health, and benefit mental health and wellbeing.

Contributors

RC conducted the statistical analysis of the data, with supervision from AY and TB. RP was the overseeing author on the paper and director of the study. All authors advised on the appropriate statistical analysis and interpretation of results. RC wrote the first draft of the manuscript; all authors critically revised the manuscript and approved the final submitted document.

Conflict of interest

None.

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