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Efficacy and outcomes of a mobile app targeting alcohol use in young people

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HIGHLIGHTS

- Few clinical trials of mobile apps targeting youth alcohol use have been conducted.
- A 1-month immediate versus delayed-access randomized controlled trial was conducted.
- App outcomes were assessed at 2, 3 and 6 months follow up.
- Immediate app use was associated with increased alcohol knowledge at 1-month.
- Both groups achieved reductions in alcohol use and related problems.

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ABSTRACT

Mobile apps provide a highly accessible way of reducing alcohol use in young people. This paper determines the 1-month efficacy and 2, 3 and 6 month outcomes of the *Ray's Night Out* app, which aims to increase alcohol knowledge and reduce alcohol use in young people. User-experience design and agile development processes, informed by the Information-Motivation-Behavioral skills model and evidence-based motivational interviewing treatment approaches guided app development. A randomized controlled trial comparing immediate versus 1-month delayed access to the app was conducted in 197 young people (16 to 25 years) who drank alcohol in the previous month. Participants were assessed at baseline, 1, 2, 3 and 6 months. Alcohol knowledge, alcohol use and related harms and the severity of problematic drinking were assessed. App quality was evaluated after 1-month of app use. Participants in the immediate access group achieved a significantly greater increase in alcohol knowledge than the delayed access group at 1-month, but no differences in alcohol use or related problems were found. Both groups achieved significant reductions in the *typical* number of drinks on a drinking occasion over time. A reduction in *maximum* drinks consumed was also found at 1 month. These reductions were most likely to occur in males and problem drinkers. Reductions in alcohol-related harm were also found. The app received a high mean quality (M = 3.82/5, SD = 0.51). The Ray app provides a youth-friendly and easily-accessible way of increasing young people's alcohol knowledge but further testing is required to determine its impact on alcohol use and related problems.

1. Introduction

Alcohol use is intrinsic to youth culture in developed countries. There is concern about the growing culture of drinking to intoxication in young Australians (Little et al., 2013). Young adults (18–24 years) have the highest rates of risky alcohol use (> 4 standard drinks on a single occasion) across all age groups, with almost a quarter reporting risky drinking at least monthly, which more than doubles their risk of injury (Australian Institute of Health and Welfare, 2013).

Motivational interviewing (MI) is a client-centred therapeutic approach designed to assist clients resolve ambivalence about problem drinking and set tangible goals for change (Miller & Rollnick, 2002). Brief MI for reducing alcohol use in young adults has received strong empirical support, but has been criticized for achieving small effect sizes, which tend to decay over time (Foxcroft et al., 2014; Grant et al., 2016). Web and mobile-based programs provide an anonymous and highly accessible way of delivering high quality MI to young adult drinkers in their natural environment, which even with small effects

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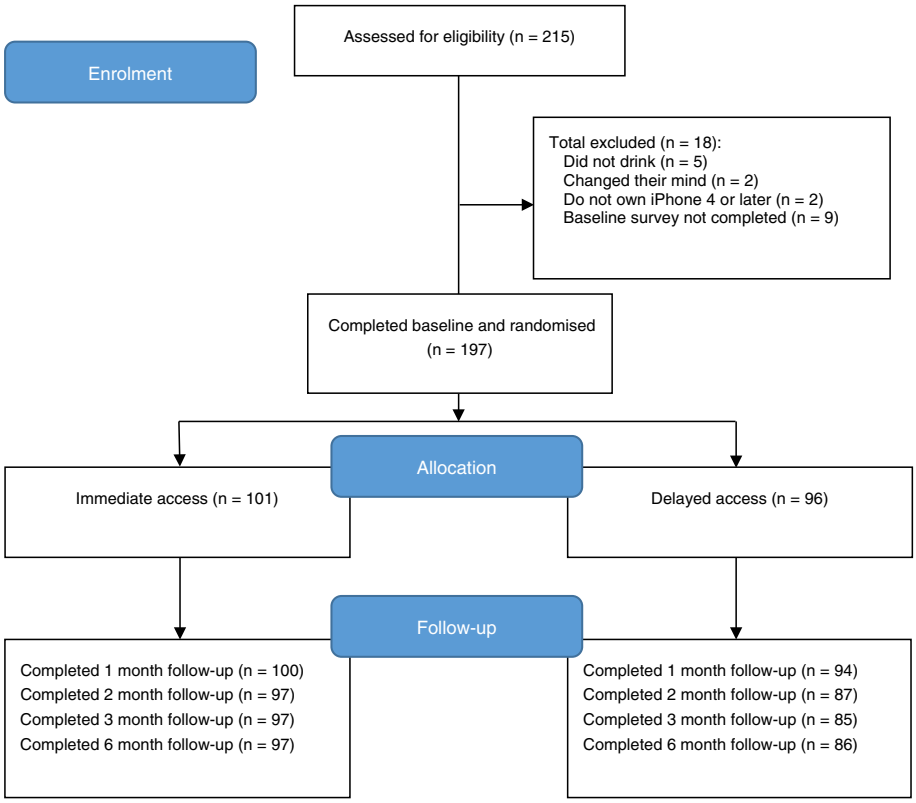

Fig. 1. CONSORT diagram.

could have a beneficial population-level impact (Grant et al., 2016).

A meta-analysis of standalone (no therapist contact/support) web-based programs targeting alcohol use in college students revealed reductions in the quantity and frequency of alcohol use compared to no-treatment control conditions (Carey et al., 2012). However, effects were small, with no significant differences between web-based programs compared to more active control conditions targeting alcohol use (Carey et al., 2012). A more recent review reported standalone very-brief web-based interventions were associated with reductions in alcohol use but not related problems, and that multi-component interventions which contained feedback, information and protective behavioral strategies (e.g., slow pacing drinks) were more effective (Leeman et al., 2015). A growing number of mobile apps targeting alcohol use are available but few have been tested in randomized controlled trials (RCTs) (Cohn et al., 2011).

Two apps targeting alcohol use disorders in *adults* have been evaluated. Patients (n = 170) randomized to receive the Addiction–Comprehensive Health Enhancement Support System (A-CHESS) app, providing continuing care following discharge from residential alcohol treatment, achieved greater reductions in risky drinking at 4-months follow-up compared with those who did not receive the app (n = 179) (Gustafson et al., 2014). Similarly, recipients of the standalone Location-Based Monitoring and Intervention for Alcohol use disorders (LBMI-A) app (n = 28) achieved significantly higher percentage days abstinent than adults who received a web-based MI program and information pamphlet (n = 26) at 6 weeks follow-up (Gonzalez & Dulin, 2015).

App studies in young people have shown less promising results. Witkiewitz et al., (2014) conducted a 14-day RCT with 94 American college students who engaged in heavy episodic drinking (HED) and concurrent smoking. Participants were randomized to receive a mobile intervention (daily random mobile assessments + Brief Alcohol Screening and Intervention for College Students (BASICS)), daily mobile assessments alone, or an assessment only control condition. No group differences on alcohol use, HED or alcohol-related problems were found after 1 month, although all groups achieved significant improvements on these variables. A second study compared an alcohol BAC estimation (eBAC) app and a party planner app (eBAC + alcohol goal setting) with an assessment only control among 1923 Swedish university students (Gajecki et al., 2014). At 7 weeks follow-up, no differences between groups were found. However, males in the eBAC app group reported a significant increase in the frequency of alcohol use compared to controls.

eHealth research to date, has tended to focus on the direct translation of evidence-based alcohol interventions (e.g., MI, relapse prevention) into websites and apps. In contrast, the *Ray's Night Out* app which aims to increase alcohol knowledge and reduce alcohol use in young people, was co-designed by young people and a multidisciplinary research team using a series of participatory design workshops and agile development processes. App development was also informed by the dynamic Information-Motivation-Behavioral skills (IMB) health behaviour model (Cooperman et al., 2015; Ingersoll et al., 2011), social learning theory and evidence-based MI approaches to substance use [see 15 for a description]. This paper reports the 1 month efficacy and 2, 3 and 6 month outcomes of the *Ray's Night Out* app. User ratings of app quality, utility and acceptability were also examined.

2. Method

2.1. Participants and recruitment

Participants were Australian residents aged 16–25 years who drank alcohol at least monthly and had an iPhone. In total, 197 young people were allocated to an immediate or delayed access group. Follow-up rates were high with 98.0% (n = 194), 93.4% (n = 184), 92.4% (n = 182) and 92.9% (n = 183) completing the 1, 2, 3 and 6 months follow-ups respectively. Fig. 1 displays the CONSORT diagram.