Estimating effectiveness of components of a smartphone app (‘Drink Less’) to reduce excessive alcohol consumption: a factorial randomised control trial

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Background

• Excessive alcohol consumption is a problem in the UK
  – Highly prevalent amongst adults\(^1\)
  – Health, crime & lost productivity costs\(^2\)

• Brief interventions
  – Effective in primary care\(^3\)
  – Only 7% of excessive drinkers receive advice from their GP\(^4\)

• Digital interventions
  – Effective\(^5\)
  – Overcome barriers to brief interventions

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The role of apps

• Benefits of smartphone apps:
  – Low incremental costs
  – Broad reach
  – Highly convenient
  – Reduce issues of accessibility & availability
  – Able to engage users in real-time & everyday situations

• Apps to aid reduction in alcohol consumption are widely available\(^1,2\), but none have been…
  – developed based on theory and evidence\(^2\)
  – proven effective

1) Weaver et al. (2013). JMIR mhealth and uhealth; 2) Crane et al. (2015). JMIR
The ‘Drink Less’ app

- Development guided by:
  - MRC guidelines
  - Multiphase Optimisation Strategy (MOST)

Theory = COM-B model of behaviour

Multiple sources of evidence informed the intervention content:
- Expert consensus exercise
- App content analysis
- Evidence review

The ‘Drink Less’ app

- Structured around goal setting
- Five intervention modules:
  1. Self-monitoring
  2. Action planning
  3. Normative feedback
  4. Cognitive bias re-training
  5. Identity change
- Two versions: ‘intensive’ vs. ‘minimal’
Aim

To estimate the effectiveness of five intervention components in the ‘Drink Less’ app at reducing excessive alcohol consumption
Methods

• Full factorial study design
  – 32 ($2^5$) conditions

• Participants:
  – Excessive drinkers (AUDIT ≥ 8)
  – 18+ years old
  – From the UK
  – Making serious attempt to reduce drinking

• Sample size (n=672):
  – 80% power to detect mean difference in change of 5 units/week
Methods

• Outcome measures (change between one-month follow-up & baseline)
  – Primary: Past week alcohol consumption
  – Secondary: AUDIT score (*Alcohol Use Disorders Identification Test*); usability ratings & app usage data

• Analyses
  – Factorial between-subjects ANOVA
  – Intention-to-treat approach
Results – *Participants*

- Of 672 participants, 27% (n=172) responded to follow-up

- Participants were heavy drinkers
  - Mean past week alcohol consumption = 39.9 units
  - Mean AUDIT score = 19.1

- Socio-demographic characteristics:
  - Mean age = 39 years old
  - Over half were women
Results – Participants

- Pre-16 education: 28%
  - Post-16 education: 72%
- Not employed: 13%
- Employed: 87%
- Current smoker: 25%
- Not a smoker: 75%
- Not white: 5%
- White: 95%
Results – *Primary Outcome Measure*

- Change in past week alcohol consumption
  - Overall decline = 3.8 units/week (p<0.001)
Results – *Primary Outcome Measure*

- Change in past week alcohol consumption
  - Two-way interaction: $F=4.7$, $p=0.031$
Results – Secondary Outcome Measure

- Change in AUDIT score
  - Overall decline = 0.74 AUDIT points (p<0.001)
Results – Secondary Outcome Measure

• Change in AUDIT score
  – Two-way interaction: F=5.8, p=0.016
Results – Secondary Outcome Measures

• Number of sessions = 12
• Time per session = 4 min 23 secs

• Participants with ‘intensive’ self-monitoring module:
  – Logged in more often (p<0.001)
  – Rated the app higher for…
    • helpfulness (p=0.038)
    • satisfaction (p=0.011)
    • likelihood of recommending to a friend (p=0.027)
Conclusions

• Drink Less users:
  – Reduction in past week alcohol consumption
  – Reduction in AUDIT score
  – Used the app frequently
  – Rated the app highly

• Interactive effects between normative feedback & cognitive bias re-training and self-monitoring & action planning had significant reductions on alcohol-related outcomes

• These intervention modules may assist with drinking reduction and are worth retaining in future versions of the app
Limitations

• High attrition rate
  – Missing outcome data can undermine validity of inferences
  – Designed trial to minimise attrition (e.g. short follow-up; regular reminders)
  – ITT approach provides conservative estimate of intervention effectiveness

• ‘Minimal’ module versions too active?
  – Most alcohol reduction apps contain very few intervention techniques
  – All users could set alcohol reduction goals
  – ‘Minimal’ versions were ~ usual care
  – Estimates of effectiveness likely to be conservative
Future research

• Optimisation:
  – Intervention components with most promise further developed:
    • Self-monitoring; normative feedback; cognitive bias re-training, and action planning
  – Offer an optimised, integrated, treatment package app

• Further evaluation
  – Different settings: e.g. primary health care
  – Definitive randomised trial with long-term outcomes
Thank you

For further details:
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