The effectiveness of digital health technologies for reducing substance use among young people: a systematic review & meta-analysis

Jessica O’Logbon a, Alice Wickersham b, c, Charlotte Williamson d, Daniel Leightley b, d

a GTK School of Medical Education, Hodgkin Building, Newcomen St, London, UK
b Department of Psychological Medicine, King’s College London
c Department of Child and Adolescent Psychiatry, King’s College London
d King’s Centre for Military Health Research and Academic Department of Military Mental Health, King’s College London

Aims

We conducted a systematic review and two meta-analyses to assess the effectiveness of digital interventions for reducing substance use (alcohol, smoking, and other substances) among young people aged 10 to 24 years.

Methods

Figure 1: PRISMA flow diagram

Inclusion criteria

- Published in English
- The mean age of participants was <10 years or >24 years
- Quantitatively evaluated the effectiveness of a digital health intervention (exposure) for substance use (outcome)
- Assessed passive digital health technologies, such as those developed for the sole purpose of screening, assessment or lacked any user input
- Participants who were 10-24 years of age
- Participants with self-reported current problematic substance use at baseline or a formally diagnosed substance use disorder.

Table 1: Inclusion & Exclusion criteria

Table 2: Sensitivity analysis stratified by control arms

Methods (cont.)

• Alcohol use outcome measure = weekly alcohol consumption (continuous).
• Smoking outcome measure = 30-day continuous abstinence (dichotomous).

Post hoc sensitivity analyses investigated whether pooled effect sizes varied by the type of control group under study: face-to-face intervention, assessment only/no intervention, and passive intervention (e.g., leaflets, helplines).

Results

The pooled SMD (Figure 2) demonstrated a small but statistically significant effect of digital interventions on reducing weekly alcohol consumption at follow-up compared to control arms (SMD=-0.12, 95% CI=-0.17 to -0.06). There was evidence of low heterogeneity (I²=0%; Q(10)=6.20, P=.80).

There was no statistically significant effect of digital interventions on 30-day smoking abstinence (OR=1.12, 95% CI=0.70 to 1.80) (Figure 3). There was evidence of considerable and statistically significant heterogeneity (I²=81%; Q(6)=32.09, P<0.0001).

Table 2: Sensitivity analysis stratified by control arms

Digital interventions led to more reductions in alcohol use than no intervention, and comparable reductions to passive interventions and face-to-face therapies (Table 2). For smoking, effect sizes were non-significant regardless of control arm.

Conclusion

In young people, digital interventions produced a small but significant reduction in alcohol consumption compared to no intervention, but were not effective for smoking abstinence. Overall, improvements were short-lived and inconsistent.