Leveraging mHealth and Wearable Sensors to Manage Alcohol Use Disorders: A Systematic Literature Review

Kruse C.S., Betancourt J. A., Madrid S.R., Lindsey C.W., Wall V. M.

School of Health Administration, College of Health Professions, Texas State University – San Marcos

Abstract

This study centers Treatments for AUD can be both inpatient and outpatient, and they often must be tailored to the individual. Wearable sensors have the ability to observe behavior and physiological constructs and combine them with location tracking. Tracking gait and sweat can provide feedback on abstinence and intoxication. A continuous growth of research combined with the rapid growth of technology compels scientists to systematically summarize available research and synthesize evidence. The study team found that most interventions resulted in a positive outcome (reduced depression, increased satisfaction, increased accessibility, increase quality of life, and decreased cost. Interventions included mobile health apps, eHealth (computer programs), telephone intervention, and 2-way video.

The authors used articles for analysis that were published in the last 10 years in peer-reviewed academic journals and in the English language. The articles must include participants who are adults (18+ years). Four data sources were queried: PubMed, CINAHL, Web of Science, and Science Direct. The study team used the Boolean search string in all databases, filtered the results, and screened the abstracts for applicability, in accordance with the Kruse Protocol. Studies were removed that did not address the objective statement

While not all mHealth interventions demonstrated statistically significant reduction in alcohol consumption, most are still clinically effective to treat AUD and provide a patient with their preference of a technologically inclined treatment Most interventions require training of users and some technology literacy, the barriers identified were very few compared with the litany of positive results.

Objective

To analyze the effectiveness of mHealth and wearable sensors to manage AUD, compared with the outcomes of the same conditions under traditional, face-to-face treatment, from evidence published in peer-reviewed and indexed journals over the last ten years. Effectiveness will be measured as improvements in AUD cravings, decrease in alcohol consumption, and a positive rating in patient satisfaction.

Effectiveness Themes and Observations

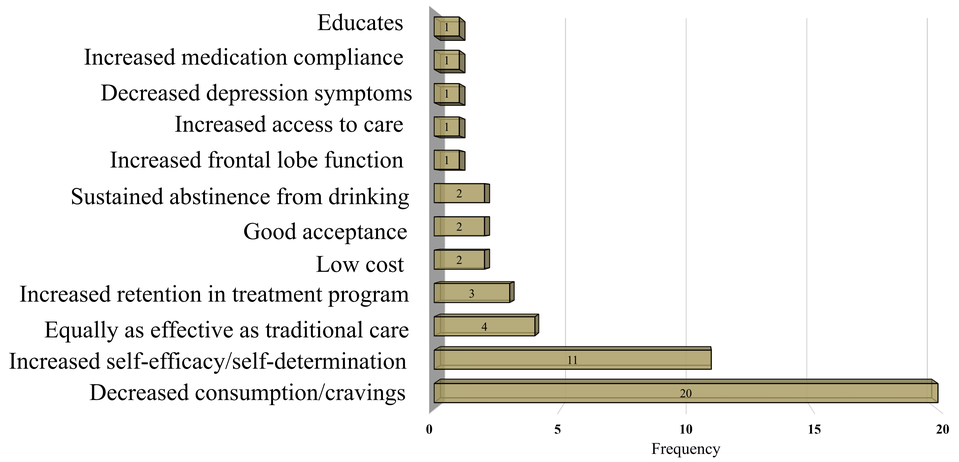


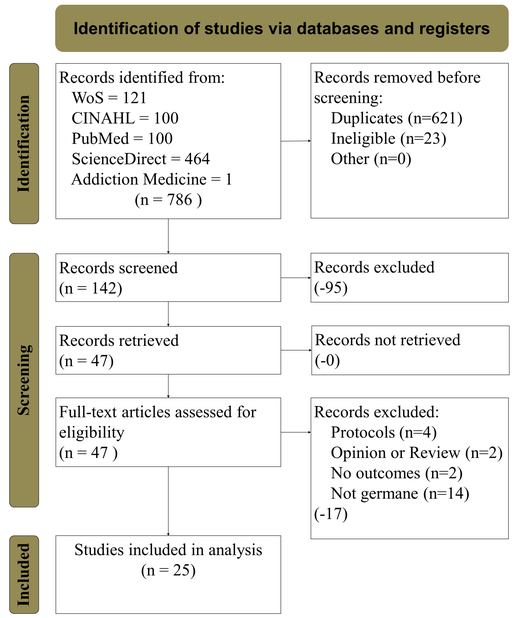
Table 5. Effectiveness Themes and Observations.

Introduction

Alcohol use disorder (AUD) is characterized by the inability to stop or control alcohol use despite social, occupational, or health consequences. Approximately 85.6% of people aged 18 years and older in the U.S. reported they drank alcohol, 69.5% reported they drank in the last year, and 54.9% reported they drank in the last month.

In general, a systematic literature review is conducted to summarize recent science on a particular subject. A continuous growth of research combined with the rapid growth of technology compels scientists to systematically summarize available research and synthesize evidence. These products form the basis for funded research, and they can provide a foundation for modifying evidence-based practice. As of the writing of this systematic review, 13 funded grant opportunities exist in the area of alcohol use disorder in the USA alone. Technology often serves as a fulcrum of change, and many mHealth solutions exist to help manage alcohol use disorder.

Methods



WoS, CINAHL, PubMed, Science Direct:

mhealth OR telemedicine OR “mobile app” OR biosensors) AND (“alcohol use disorder” OR “AUD”).

Figure 1. Study selection process.

Results

Results Themes and Observations	Frequency
Reduction in consumption	15
No significant difference in treatment outcomes	5
Good retention in treatment	3
Increased self-efficacy	3
Decreased binge drinking	2
Computer models can predict relapse	1
High rates of acceptance	1
Positive frontal lobe function	1

Table 3. Results to the studies.

Five interventions were identified, and 20/25 were effective at reducing alcohol consumption. Other interventions reported a decrease in depression and an increase in medication compliance. Primary barriers to the adoption of mHealth interventions are a requirement to train users, some are equally as effective as the traditional means of treatment, cost, and computer literacy. Reviewers identified themes and performed a second data extraction to ensure no themes were omitted.

Conclusion

mHealth and wearable sensors are effective tools to decrease alcohol consumption, increase self-efficacy and self-determination, and provide overall treatment of AUD. The evolution of studies on this topic has slowly grown over time. mHealth technology may require additional training of users at both ends, but its low cost and efficacy outweigh the disadvantages. Although some interventions are not statistically different from traditional care, the use of mHealth and wearable sensors may fulfill the preference of a patient and increase the success of treatment.

References

Kruse, C. S., Betancourt, J. A., Madrid, S., Lindsey, C. W., & Wall, V. (2022). Leveraging mHealth and Wearable Sensors to Manage Alcohol Use Disorders: A Systematic Literature Review. *Healthcare*, 10(9), 1672.