Review

Mobile Apps Supporting Medication Adherence in Substance Use Disorder Treatment: Narrative Review

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Abstract

Background: Substance use disorders (SUDs) and related public health harms have risen significantly in Canada over the past decade. While existing medications for addiction treatment have shown efficacy, poor treatment adherence remains a challenge. With growing rates of smartphone adoption, mobile apps represent an opportunity for digital interventions that can support medication adherence.

Objective: This study provides a narrative review of current app-based interventions supporting medication adherence for individuals with SUDs and analyzes the common features for advantages and limitations.

Methods: A literature search was conducted on the MEDLINE, APA PsycInfo, CINAHL, PubMed, Scopus, and Web of Science Core Collection databases from inception to October 2026 using the combination of keywords related to *substance use*, *medication adherence*, and *mobile app*. Selected papers focused on specific apps to support medication adherence for SUDs. Common technological features, potential advantages, and limitations of the identified technology apps were extracted and analyzed.

Results: This review examined 22 articles. A total of 7 feature types were identified: reminders or reinforcers (eg, contingency management), patient-health care professional communication, information, community boards to connect with support or other anonymous patients, self-monitoring or goal tracking with patient self-report, external tracking (eg, location or electronic medication dispensing), and gamification. The most frequently occurring features across the apps were reminder messages (14/22, 64%), self-assessment and goal-tracking tools (n=14, 64%), and patient-provider communication (n=13, 59%). Across the studies, interpretation of efficacy was limited, as many studies were not designed to assess effectiveness. They also examined small, geographically and demographically homogeneous samples with substantial reliance on self-reported outcomes and incomplete data. In contrast, feasibility and acceptability were consistently high, with generally positive usability ratings and participant engagement across interventions.

Conclusions: This narrative review summarizes the technical features and various advantages and limitations of apps designed to support medication adherence for SUDs in the literature. This information provides a useful tool to guide the development and selection of future apps designed to improve medication adherence outcomes. Future studies are needed to determine which specific app features and implementation strategies are most effective in supporting adherence for specific populations and medications.

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Keywords: mHealth; mobile health; substance use disorders; mobile app; adherence; treatment

Introduction

Substance use disorders (SUDs) and related public health harms, such as hospitalization, health care system strains, and deaths, have risen substantially both in Canada and globally during the last decade. In Canada, this has been reflected in an estimated CAD $13.4 billion (CAD $1=US $0.71 as of November 9, 2026) in annual direct health care costs and more than 190,000 annual acute hospital stays in 2023 [1]. While multiple substance types contribute to this burden, a class of particular concern is opioids and their attendant risk for fatal overdose, with a rapid rise of 2900 opioid-related Canadian deaths in 2016 to 8049 in 2023 [2]. Pharmacological management has demonstrated safety and efficacy for many SUDs, but poor adherence remains a limiting factor behind low retention rates observed relative to patients with other conditions [3-5]. *Adherence* refers to the extent to which patients follow prescribed medication regimens as directed by a health care provider. Examples of poor adherence in the context of SUD care can include skipping doses, taking doses that are higher or lower than prescribed, or discontinuation of treatment [6].

In recent years, the rapid proliferation of mobile technologies and increasing rates of smartphone ownership have offered a new opportunity to address the challenge of medication adherence [7]. Given the growing ubiquity of smartphones, the potential of mobile apps to promote adherence by providing point-of-care support and improving convenience to patients with SUDs has been identified [8,9]. Despite these opportunities, only a small number of mobile apps have been developed for this specific purpose, which are additionally limited to a handful of features such as text alerts and delivering monetary rewards [10-12]. Determining the most effective features and functionalities for these apps remains uncertain. A recent review has outlined technology-based medication adherence and monitoring interventions used in psychiatric disorders as a whole, but not specific to SUDs [13]. A compiled summary and assessment of the features of currently available mobile apps targeting medication adherence in SUDs is needed to better understand the emerging evidence base and to inform the design and development of future interventions. The aims of this narrative review are to (1) analyze existing literature on mobile apps targeting medication adherence in addiction and the implemented features for user engagement and (2) identify their benefits and limitations for future work.

Methods

Literature Search

A narrative literature review of existing literature was conducted using the MEDLINE, APA PsycInfo, CINAHL, PubMed, Scopus, and Web of Science Core Collection databases from inception to October 2026, which provide broad coverage of biomedical literature relevant to mobile apps and SUDs. This design allows for a comprehensive synthesis and interpretation of existing literature to gain foundational understanding and identify key insights [13] and was chosen due to the heterogeneity and evolving practices in this area of mobile apps. The key search terms included “substance use,” “misuse,” “abuse,” “dependence,” “addiction,” “drug,” “alcohol,” “cocaine,” “cannabis,” “marijuana,” “heroin,” “opioid,” “opiate,” “amphetamine,” “stimulant,” “mobile application,” “mobile health,” “smartphone application” “telemedicine,” “mHealth,” “eHealth,” “digital health,” “medication adherence,” “medication taking,” “treatment adherence,” “medication compliance,” and “treatment compliance.” The appropriate search terms were selected through a preliminary search of a variety of terms on Google Scholar. When conducting the full search, terms were combined using logical operators “OR” and “AND” and were restricted to searches within titles and abstracts only.

Eligibility Criteria

Studies were included in this narrative review if they described primary research on mobile apps for SUD medication adherence. All study methods were included. Only articles published in English with their full text available were included. Studies were excluded if they did not focus on apps available via mobile devices such as smartphones. Apps not developed for patients with SUDs were also excluded. Study selection was performed manually and independently by 2 reviewers using this set of eligibility criteria. The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool [14] (Multimedia Appendix 1).

Data Extraction and Information Synthesis

Data were extracted independently by the authors using an a priori created data extraction form designed for this study, including the target and test populations, major characteristics of each app, patient satisfaction, and efficacy. Extracted data from the final pool of articles were summarized qualitatively and categorized according to features. To categorize app features, we used an inductive approach of three steps: (1) open coding of implementation features in each article; (2) consolidation of codes into higher-order categories using constant comparison and identifying recurring functionalities; and (3) grouping of categories into broader feature categories. After independent categorization by 2 authors, discrepancies were resolved through discussion, and unresolved cases were adjudicated by a senior reviewer through rechecking of the original papers. Thematic analysis was also conducted to identify barriers and facilitators to the different app characteristics. The authors reviewed articles and extracted verbatim text segments detailing barriers and facilitators to app feature uses and their effectiveness associated with medication adherence. Extracted quotes were compared across studies and grouped by similarity to generate overarching themes. Where possible, category labels were retained from the

original articles to preserve the authors' intended conceptualization of the features. Individual features could contribute to multiple themes when they reflected more than 1 relevant concept. All identified codes and themes were discussed with authors, and a consensus was reached.

Results

Study Selection and Characteristics

Of the 22 reviewed articles, the majority (n=18, 82%) were published between March 2020 and May 2025. The identified studies were published primarily in the United States (n=10, 45%), followed by England (n=6, 27%), Canada (n=4, 18%), Ireland (n=1, 4%), and Switzerland (n=1, 4%). A total of 9 (41%) studies assessed or planned to assess for efficacy in the form of randomized trials as a single-arm or parallel-group design. All trials were open label due to the nature of the intervention. Furthermore, 13 studies were nonexperimental, assessing for feasibility or initial acceptability and usability through a pilot trial or qualitative interviews with patients and clinicians (Table 1).

Table 1. A description of included mobile apps[a].

App name	Target population	Year	Country	Trial type	App aims	Trial population	Results	Limitations
MySafeRx	Individuals with OUD[b]	2018	England	Efficacy	Improve daily medication adherence, reduce medication diversion, enhance treatment outcomes, and avoid patient burdens	12 patients aged 18-39 y with OUD and prescribed buprenorphine	72% medication adherence, average 78.8 usability score, overall satisfaction in last week 6.5 ± 0.7 (maximum 7)	Small sample size, treatment dropout, discrepancy between self-report and supervised administration
ART-CHESS	Individuals with HIV and SUDs[c]	2024	Canada	Efficacy	Improve medication adherence to ART[d]	208 participants aged >18 y, receiving medical care for HIV infection, with a history of SUDs	Linked to reduced alcohol and stimulant use and greater medication adherence	Small sample size, missing survey data
A-CHESS	Individuals with SUDs	2016	United States	Efficacy	Improve abstinence from illicit opioid use, medication adherence and engagement with other forms of treatment	414 patients with OUD of at least moderate severity and on methadone, injectable naltrexone, or buprenorphine	Associated with greater abstinence from opioids but not among those using illicit drugs or experiencing withdrawal	Homogeneous sample, unequal sample sizes for different medication types, unavailable dosage information
Not specified	Individuals with OUD	2021	Ireland	Efficacy	Promote buprenorphine treatment adherence	41 adults with OUD and interest in buprenorphine treatment	Incentivized participants more likely to enroll in treatment (71.4%) over nonincentivized (30%), but few adhered to treatment and no between-group differences found in positive urine samples	Low treatment adherence, self-report data, homogeneous patient population
TIES	Individuals with heroin addiction	2020	England	Efficacy	Improve adherence to methadone treatment	10 adults prescribed oral methadone and owning a mobile phone	Found to be feasible and well-liked by patients and health care staff	Low recruitment rates of target population
WEconnect	Individuals with OUD	2024	United States	Efficacy	Provide contingency management and medication adherence	600 patients receiving MOUD[e]	Fewer days of opioid use and longer treatment retention found with app	Nonrandomized participants, homogeneous population, less than 1/5 of sample used app

App name	Target population	Year	Country	Trial type	App aims	Trial population	Results	Limitations
Pillsy	Individuals with OUD	2023	Canada	Feasibility and acceptability	Improve medication adherence	20 participants aged 18 years or older and receiving opioid substitution treatment	Received positive feedback for features that reinforce taking medications (>80%)	Small sample size, homogeneous sample, participants did not use app themselves
Mobile Contingency Management	Individuals with OUD	2025	United States	Feasibility and acceptability	Improve OAT[f] adherence and encourage heroin abstinence	40 participants receiving OAT who continue to use heroin	N/A[g]	Small sample size
Not specified	Individuals with past or current illicit drug use	2017	England	Feasibility and acceptability	Improve retention in care and medication adherence	19 participants older than 18 and with an HIV viral load greater than 1000 copies/mL	Intervention components, mHealth[h] and peer navigation, found to be acceptable and responsive	Small sample size
HOPE	Individuals with OUD	2021	Canada	Feasibility and acceptability	Improve OUD treatment adherence	25 participants with OUD	Found to be feasible with high usability scores	Small sample size
HOPE	Individuals with OUD	2022	England	Feasibility and acceptability	Improve OUD treatment adherence	25 participants at least 18 years old and diagnosed with moderate or severe OUD	Most participants retained in care at 6 months and active on app	Small sample size, limited ability to track retention, no urine drug screen comparisons
APP+	MSM[i] with HIV and StUD[j]	2019	United States	Feasibility and acceptability	Achieve optimal Anti-Retroviral Therapy adherence	90 MSM living with HIV who use stimulants	Higher self-reported ART[d] adherence in intervention group (89%) vs control (77.2%) in 30 days at 4-month time point	Small sample size, not all participants in intervention arm provide self-reports
DynamiCare	Individuals with SUD	2021	United States	Feasibility and acceptability	Improve treatment adherence through contingency management	61 patients with AUD[k] of at least moderate severity and alcohol as primary substance	66% of participants exhibited high utilization and adherence, found to be feasible to use in community treatment programs; higher treatment retention rates found with app than without	Small and homogeneous sample, missing satisfaction data, low and unequal participation rates in interviews
DynamiCare	Individuals with OUD	2022	Switzerland	Feasibility and acceptability	Promote adherence to buprenorphine treatment	20 participants with OUD and history of stimulant use	High adherence found throughout the study, with decreasing trend over time; all 20 participants retained throughout study	Small sample with no baseline data collected; 40% classified as not high risk for treatment dropout
PROCare Recovery	Individuals with OUD	2022	Canada	Feasibility and acceptability	Improve treatment adherence through contingency management	10 patients receiving buprenorphine for OUD	High perceived usability and acceptability	Small and homogenous sample
DIDE	Individuals with SUD	2024	England	Feasibility and acceptability	Improve treatment adherence	24 adult patients with any type of addiction	Good acceptability rates, 70.8% met primary end point and 29.2% attrition rate	Small sample, single center design, short study duration
Not specified	Individuals with OUD	2020	England	Feasibility and acceptability	Improve buprenorphine adherence	Participants aged 18 years or older, within their first 28 days of either starting or restarting prescribed sublingual	N/A	Small sample size

App name	Target population	Year	Country	Trial type	App aims	Trial population	Results	Limitations
						buprenorphine treatment		
MIAPP	Individuals with OUD	2025	United States	Feasibility and acceptability	Improve buprenorphine adherence	20 participants aged 18 years or older, prescribed buprenorphine, and use of methamphetamine within the past 30 days	N/A	Small sample, single center design
Pillsy	Individuals with OUD	2024	United States	Efficacy	Improve buprenorphine adherence	41 participants prescribed buprenorphine	Medication adherence was nonsignificantly higher in the intervention group (84%) compared to control (75%)	Small and homogenous sample
emocha	Individuals with OUD	2021	United States	Feasibility and acceptability	Improve medication adherence and substance use	40 participants aged 18 to 65 years and prescribed buprenorphine	Most participants (71%) "very satisfied" with application	Pilot study, small sample size
ReSET-O	Individuals with OUD	2026	United States	Efficacy	Improve MOUD adherence	48 participants on MOUD (28 on buprenorphine and 20 on methadone)	18.9% rate difference for 24-wk MOUD adherence in the intervention group compared to the control group	Small sample size, underpowered
Recovery Connect	Individuals with OUD	2025	United States	Efficacy	Improve MOUD adherence and treatment continuance	Patients in outpatient MOUD clinics	Patients who downloaded and linked with mental health professional had 81.3% likelihood of retention, compared with 72% (P<.001) among those not linked	No external comparator, short-term outcomes (30 d)

[a]Information presented is restricted to details available in the included papers. Results are N/A for protocol papers.
[b]OUD: opioid use disorder.
[c]SUD: substance use disorder.
[d]ART: antiretroviral therapy.
[e]MOUD: medications for opioid use disorder.
[f]OAT: opioid agonist therapy
[g]N/A: not applicable.
[h]mHealth: mobile health.
[i]MSM: men who have sex with men.
[j]StUD: stimulant use disorder
[k]AUD: alcohol use disorder.

Of 22 studies, 16 (73%) focused on participants with OUD, 3 (14%) on SUD, and 3 (14%) on participants with HIV and concurrent substance use. The most common treatments studied were medications for opioid use disorder (n=17, 77%) and antiretroviral therapy for HIV (n=3, 14%).

Major Themes for App Features and Characteristics

Overview

The identified app features were categorized into 7 major groups based on their technical design and adherence supporting functions: reminders or reinforcers (eg, contingency management), patient-provider communication, information, community boards to connect with support or other anonymous patients, self-monitoring or goal tracking with patient self-report, external tracking (eg, location, video monitoring, or electronic medication dispensing), and gamification (Table 2).

Table 2. A summary of app features and their description.

App features	Description
Reinforcers	Positive monetary and nonmonetary reinforcers used as rewards for consistent engagement in treatment; monetary rewards included prepaid or gift cards and cell phone data and minutes, often tied to video verifications, and nonmonetary reinforcers included visual streaks and completion bars, timely reminders, and messages of praise, congratulations, or goals
Patient-provider communication	Facilitating patient interactions with health care providers to support treatment engagement; support personnel included individuals with lived experience, counselors, clinicians, and recovery coaches; patients and providers can privately or securely message through the app interface. Optional adjunct support meetings provided daily or weekly
Information	Access to psychoeducation through online learning modules or informational links to institution-specific patient portals and local community or support groups, clinic phone numbers, medication and treatment information
Community boards	Discussion forums for patients to interact with other users and provide emotional, informational, and instrumental support, often moderated by the development team or anonymous
Self-monitoring	Interface and pages for patients to observe and track daily goals, behaviors, and symptoms (eg, craving, anxiety, sleep, and motivation) as measures of data collection and pattern awareness; visualized with charts, graphs, or tailored feedback upon completion
External tracking	Optional location permissions for periodic user tracking and local recommendations around potential high-risk sites such as bars
Gamification	Inclusion of game-like elements in app for additional motivation and satisfaction; examples can include storytelling, collecting rewards or accomplishments, or leaderboards

The following sections outline the common app features gathered from the existing literature. Some features were counted under multiple headings. An example is progress visualizations (eg, a bar graphic showing progress toward a treatment goal), which could be considered as all of the following: a reinforcer, an instance of goal tracking, and an example of gamification. Feature categorizations were dependent on their description in the original text and interpretation of the authors.

Reinforcers

Of 22 studies, 11 (50%) used monetary reinforcers to reward patients for consistently engaging in treatment [9-11,15-21], with 5 of these specifically using contingency management. Contingency management is a behavioral intervention wherein people receive rewards for achieving their treatment and recovery goals [22]. Monetary reinforcers were tied to video submissions of medication adherence in 6 of these apps. In addition, 1 study found the majority (78.9%) of their participants to be amenable to taking a selfie video while taking medication doses [18]. These videos were encrypted and transmitted to a secure web portal, where they were reviewed by staff to verify and deliver incentives. These rewards were typically delivered via prepaid cards with restrictions on eligible spending locations such as liquor stores. Other rewards included gift cards and cell phone data and minutes.

Apps also made use of nonmonetary reinforcers. Of 17 apps, 7 (41%) used progress visualization (eg, completion bars and streak numbers). A total of 5 studies (29%) made explicit mention of messages of praise or congratulations. Moreover, 11 apps (65%) sent treatment reminders delivered as push notifications or SMS text messages. Reminders were one of the most consistent features across apps, varying from simple fixed daily treatment reminders to random test alerts and intelligent reminders based on user data. A total of 3 apps (18%) contained options for users to record their personal motivations, goals, or reasons for gratitude. Users were occasionally prompted to re-engage with this content. Furthermore, 1 app displayed uplifting quotations in its emergency support system [23]. Users suggested further opportunities for improvement, such as displaying self-selected motivations, compatibility with external calendar apps, and messages worded to preserve privacy and minimize disclosure of treatment purpose.

Patient-Provider Communication

Of 22 studies, 13 (59%) used the app to improve patient-provider communication [10,12,17,19,21,23-30]. Design and functionality components included private and secure messaging, session scheduling, and facilitated phone and video calls with preapproved clinicians and peer support coaches. In addition, 1 app sent automated alerts to counselors so they could intervene promptly through tailored messages when relapse risk or treatment disengagement was detected [24]. A total of 6 studies out of 13 (46%) described a dashboard for the clinical team, with features such as patient history, medication adherence, and substance use reports, and the ability to release codes to open an electronic pill dispenser.

Information

A total of 11 apps (50%) included information on medication treatment, clinician contact information, and local community and social support resources [9,19-21,23,24,26,28,29,31,32]. The information was presented in various ways, including cards appearing on the home page, educational learning modules, contact information, links to external resources, frequently asked questions, and videos. Treatment content included evidence-based therapeutic interventions and resources, such as cognitive behavioral therapy skills and medications for opioid use disorder treatment information. Furthermore, 1 study provided participants with the opportunity to earn rewards for accessing resources in their psychoeducational library as a method of helping educate, support, and encourage patients [9].

Community Boards to Connect With Support or Other Anonymous Patients

A total of 5 apps (23%) had a community board for patients to communicate with each other, with the intention of fostering an exchange of support among patients [23-25,27,28]. Participants could communicate with each other on topics of their choice, with monitored discussions to ensure appropriate use. In addition, 1 app allowed participants to join online support meetings facilitated by certified peers, improving access to support spaces. Furthermore, 1 study found their community board to be used by 36% of their cohort, with an overall average for the full cohort of 0.9 posts per participant during their first month of app use [28]. Posts on the community board reporting substance use were also used by 1 study to gauge each participant's risk threshold for relapse and alert a clinician or trigger further support if needed.

Self-Monitoring or Goal Tracking With Patient Self-Report

A total of 14 apps (64%) included self-assessment and goal-tracking tools [9,11,16,18-21,23-25,27-29,31]. These encompassed a wide range of behaviors, including medication adherence, substance use, readiness to change, craving, mood, sleep, activity, and encouraging experiences. Participants of 1 study were encouraged to set daily goals of their own choosing, including both substance use and self-care (eg, attending a treatment session), which in turn served as treatment goals that were financially reinforced upon completion [16]. A total of 4 apps used surveys related to drug use or emotional states as a method of prevention against relapse by offering immediate support and linkage to needed services upon concerning responses [9,20,27,29]. Patients were prompted to complete questionnaires of multiple choices independently or through an optional conversation with a chatbot in 1 app. In addition, 1 study found more than half of the patients (58.3%) to complete 2 or more questionnaires each day they used the app; however, a small percentage also reported experiencing too strong cravings to fill the questionnaires or self-stigma when recording drug use [27]. Participants recommended push notifications and reminders to complete questionnaires. Furthermore, 7 apps (32%) also included visualized assessments, such as graphs, streak records, or progress bars of how many doses each patient reported taking during the last or current week.

External Tracking

A total of 4 apps (18%) featured location tracking: 1 to detect the patients' presence at therapy appointments, 2 to detect their presence at a distributing pharmacy, and 1 to detect the patient's presence at locations that the patient had identified as high risk [10,11,15,24]. For each patient that approached a high-risk location, the app initiated a previously defined recovery process, starting with a beep, a vibration, and then a list of preapproved contacts and options for support. GPS was also used as a method of finding nearby support groups or meetings. Participants had the option to turn off the location tracker if perceived to be too burdensome or invasive. Furthermore, 3 apps worked in conjunction with smart packaging: displaying the code for an electronic pill dispenser and a companion app for a Bluetooth-enabled pill bottle cap that tracks adherence.

Gamification

Gamification refers to the incorporation of game-like elements (eg, points, leaderboards, levels, and loot boxes) into nongame contexts [33]. A total of 7 apps (32%) had basic game-like elements, including virtual points and streak systems with bonuses and resets. Only 1 app made use of a storyline-based feature to enhance engagement and make the content more relatable to patients. This was an optional Choose-Your-Own-Adventure–style narrative that contained medication adherence tips. Of 34 participants who downloaded the app during the intervention period, 22 (62%) made use of this feature [31]. Another app that did not include gamification features received feedback from their participants wishing for more gamified elements to be included in future iterations [27].

Discussion

Principal Findings

This narrative review provides an overview of the technical features and their advantages and limitations in mobile apps targeting medication adherence for SUDs reported in the literature. A total of 22 studies and 7 feature categories were identified, with the most common features implemented being reminder messages (n=14), self-assessment and goal-tracking tools (n=14), and patient-provider communication (n=13). Where efficacy outcomes were reported, results were not statistically significant but directionally positive. In contrast, feasibility and acceptability outcomes were consistently strong across studies. The apps generally demonstrated good acceptability rates, with high usability scores and positive qualitative feedback from participants.

One prominent feature of apps was contingency management, which has been observed to be an effective intervention in OUD treatment [34]. Mobile apps carry the potential to streamline contingency management through remote behavior verification and reward delivery, which could make its implementation more affordable and scalable [35]. Among the reviewed apps, both monetary rewards and video verification were found to be acceptable to users. There was, however, substantial heterogeneity in design and reward amount, suggesting a need for further research to identify the most effective reward structures. This review also found video-based medication treatment verification delivered via mobile apps to offer a low-barrier alternative for patients who may have difficulty reaching clinics, including rural populations [36]. On the other hand, the multistep nature of video verification can be procedurally complex, increasing patient burden through technical difficulties, such as poor video quality or trouble filming or uploading videos [37]. Another risk would involve patients forgetting to self-record as they ingest their medication, which may lead to inaccurate reports of medication adherence. Successful implementation would require streamlined verification processes and adequate

user training to ensure that the varying degrees of technological restrictions per feature are minimized as much as possible. Despite such potential limitations, studies have consistently reported high feasibility and acceptability of video verifications, which may improve their future adoption and integration of medication adherence monitoring technologies in clinical settings. As apps scale, the need for strong encryption and privacy measures will also increase [38]. Similar to this are location tracking features, which provide users with the opportunity to locate and track participation at local resources, clinics, and support groups. One app also demonstrated a use case for tracking the patient's presence at self-identified risk locations and then initiating a sequence of intervention prompts, such as vibrations and a list of contacts. However, privacy remains a major factor influencing the adoption of location tracking and other remote monitoring technologies, with each patient's privacy concerns varying from person to person [39]. As with video verification, attention to security and privacy, including options for users to disable tracking features, would be important for future app development.

Other features with positive responses from patients included improved access to support resources and peer support personnel. Implementation of greater clinician or peer support personnel engagement facilitated via apps could be achieved in part through improved training but would represent a resource challenge in any scaled intervention. Self-monitoring and goal-tracking features were also commonly implemented across apps to empower and engage users in their own treatment, as well as to serve as a safety measure for situations and environments with a high risk for relapse. Several apps included the ability to send data directly to clinicians or to automated systems when concerning substance use patterns were detected, allowing for timely interventions. However, evidence of efficacy remains low, and some users suggested that tracking triggers or cravings could be discouraging or triggering in themselves. To account for the variability in user preference and personalization of their app experience, a recent systematic review has highlighted the need for balance between the use of passively collected app engagement data and user-directed triggers [40]. Studies of other apps also received suggestions on the specific phrasing of questions, which may have different connotations for different populations and would require greater tailoring.

Some less common features included information, community boards, and gamification. There was very limited reporting on the efficacy of medical adherence information, even though several teams had developed learning modules, searchable databases, informational videos, and, in 1 case, a story-based game that delivered adherence tips. More research is required to discover the most effective means of delivering information and which types of information have the greatest impact on adherence. Community boards were consistently perceived as valuable by participants, particularly for social and emotional support. However, actual use was often low due to a lack of board activity, as a result of small sample sizes. A more effective implementation of this feature would likely require a larger user base and active support from a team of moderators. Additionally, patients responded positively to gamified features that tracked their treatment streaks and records of achievement. Through the lens of behavior change theory, gamification may be seen as a potential means of allowing users to gain control and actively engage with the intervention [41]. While high levels of use and patient preferences suggest a potential role for these features in supporting user engagement, gamification was found to be underused and represents a potential area for future research in SUD interventions [38].

These findings can furthermore be interpreted through the fit between individuals, task, and technology (FITT) framework, which proposes that technology adoption depends on the fit between individual users, the technology, and the clinical tasks and processes [42]. From this perspective, the potential complexities behind verification procedures may reflect a poor task-technology fit, while privacy concerns may affect the individual-technology fit and users' willingness to engage with the intervention. Future work should analyze the facilitators and barriers of their local implementation and include features that can positively affect the alignment between the technology with the user and tasks, respectively, including but not limited to external motivation and training of users, easily accessible user support, and reduction of technical workload (eg, appropriate number of steps for verification and frequencies of reminders).

Comparison With Prior Work

One important observation of our review is that all apps differed in the number of features implemented and that the combined impact of features was often not considered in usability or acceptability studies. Studies have shown that technological features are a fundamental aspect of the success of health care apps [40]. Despite the commonness of all features described in this and other similar reviews, each app was found to include a relatively low number of features for medication adherence, with a range of 2 to 6 features per app. It may be possible that the overlap of multiple features, and thus the option for users to choose their own features to their liking and progress, may be an enabler of increased engagement with the app. A potential option could be to match the number and content of features with the level of engagement observed from users, with more intensive features, such as contingency management and location tracking, provided to patients with lower rates of use, compared to less and more passive features, such as community boards, provided to patients with demonstrated higher levels of engagement. Given the added complexity and challenge of retaining patients in SUD treatment, future studies should explore how to stratify findings of efficacy and patient satisfaction by the number and functionality of features.

Limitations

This narrative review has some limitations. Our database selection and search strategies may not have been extensive enough to capture all published literature, along with the inclusion of studies only published in English. Furthermore, we did not attempt to download any of the apps

and interact with them, which means that some design elements, such as messages of congratulation upon adherence or progress visualization, may have been present but not explicitly described. Across the studies, evidence of efficacy was limited as many studies were pilots or feasibility trials with small sample sizes and demographically homogeneous user populations, restricting generalizability. Future studies will need to take into consideration the diversity of SUDs and the settings in which research is conducted. Despite these limitations, this study found an overall lack of dedicated apps for SUDs relative to need and offers insights into the optimal design and features for future apps designed for this population. As the adoption and development of mobile-based interventions continues to increase, understanding their key characteristics will be vital to creating solutions catered to user needs.

Conclusions

This narrative review provides an overview of the technical features found in apps designed to support medication adherence for SUD treatment reported in the literature, along with the advantages and limitations of the features. A total of 7 main categories of app features were identified, with the most common being reminder messages, self-assessment and goal-tracking tools, and patient-provider communication. Further research is needed to determine which specific app features and implementation strategies are most effective in supporting medication adherence. These findings may inform the design and implementation of future mobile app interventions, supporting their broader adoption and effectiveness.

Generative AI Use

The authors attest that there was no use of generative artificial intelligence (AI) technology in the generation of text, figures, or other informational content of this manuscript.

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Data Availability

All data generated or analyzed during this study are included in this published article and its supplementary information file.

Authors' Contributions

Conceptualization: BN (lead), PA (equal)
Data curation: JK
Formal analysis: LB (lead), JK (equal)
Funding acquisition: BN
Investigation: BN
Methodology: JK
Project administration: JK (lead), LB (supporting)
Resources: PA
Supervision: AB
Validation: AB
Visualization: EF (lead), AB (supporting)
Writing – original draft: AB (lead), CD (supporting)
Writing – review & editing: AB (lead), CD (supporting), EF (supporting)

Conflicts of Interest

None declared.

Multimedia Appendix 1

Critical appraisal of quantitative studies.
[DOCX File (Microsoft Word File), 2632 KB-Multimedia Appendix 1]

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