A Telemedicine Approach to Increase Treatment of Alcohol Use Disorder in Primary Care: A Pilot Feasibility Study

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Abstract

Background and Aims: Unhealthy drinking is a leading threat to health, yet few people with alcohol use disorder (AUD) receive treatment. This pilot study tested the feasibility of addiction medicine video consultations in primary care for improving AUD medication adoption and specialty treatment initiation.

Methods: Primary care providers (PCPs) received training and access to an on-call addiction medicine consultation service. Feasibility measures were training attendance, intention to use the service and/or AUD pharmacotherapy, and feedback after using the service. Secondary outcomes were utilization, prescription and treatment initiation rates, and case reports. Chi-square tests were used to compare prescription and treatment initiation rates for consult recipients and non-recipients.

Results: Ninety-one PCPs (71.1%) attended a training, and 60 (65.9%) provided feedback. Of those, 37 (64.9%) mentioned pharmacotherapy and 41 (71.9%) intended to use the video consult service. Of 27 PCPs who used the service, 19 provided feedback; 12 (63.1%) rated its value at 8 or above, on a scale of 1–10 (average rating 6.9). The most useful aspect was immediacy, and areas for improvement included an easier workflow and increased consultant availability. Of 32 patients who received a consult, 11 (34.4%) were prescribed naltrexone, versus 43 (6.4%) of non-recipients (p<.0001); 11 (34.4%) initiated specialty treatment, versus 105 (19.7%) of non-recipients (p<0.05).

Conclusions: PCP training attendance and feedback suggest that an addiction telemedicine consult service would be valuable to PCPs and might increase AUD medication uptake and

specialty addiction treatment initiation. However, future research should include significant modifications to the piloted telemedicine model.

Keywords

Alcohol use disorder; pharmacotherapy; naltrexone; telemedicine; telepsychiatry; primary care integration

INTRODUCTION

Unhealthy alcohol use is associated with many serious health conditions (Lembke et al., 2011; Praud et al., 2016; Ricci et al., 2018), and can complicate medical treatment (Grodensky et al., 2012) and increase service utilization and costs (R. Williams et al., 2018; Willmore et al., 2017). Screening, Brief Intervention, and Referral to Treatment (SBIRT) is an intervention designed to detect unhealthy drinking in primary care and facilitate addiction treatment if needed (Kaner et al., 2018; O'Donnell et al., 2014). Yet even in healthcare systems such as Kaiser Permanente Northern California (KPNC) and the Veterans Administration (E. C. Williams et al., 2014), which have mature SBIRT programs and readily available specialty treatment, fewer than 10% of people with alcohol use disorder (AUD) receive specialty treatment (Park-Lee et al., 2016). Even fewer receive naltrexone or acamprosate, FDA-approved medications that can be safely prescribed in general medical settings (Center for Substance Abuse Treatment, 2009; Substance Abuse and Mental Health Services Administration and National Institute on Alcohol Abuse and Alcoholism, 2015) and can improve AUD outcomes (Center for Substance Abuse Treatment, 2009; Kiritze-Topor et al., 2004). A large observational study found that patients with AUD who were engaged in primary care were more likely to receive pharmacotherapy than those with no primary care, but rates of prescribing remained low: 2.89% and 1.61%, respectively (Joudrey et al., 2019).

Efforts to increase adoption of AUD pharmacotherapy in primary care are in their infancy (E. C. Williams et al., 2019), with several early studies showing limited or no effect (Ford et al., 2017; Harris et al., 2017; Ornstein et al., 2013). In studies with some increases in adoption, it is unclear which strategies – e.g., patient care management, physician education and support, or a combination of factors – accounted for success (E. C. Williams et al., 2019). Adoption barriers such as stigma and lack of physician confidence in using these medications (Satre et al., 2012) suggest that provider education about AUD pharmacotherapy is necessary but probably insufficient.

The purpose of this study was to examine the feasibility of implementing a telemedicine intervention – brief PCP training and access to in-exam-room video consultation – designed to increase AUD medication uptake in primary care and patient connection to specialty treatment. There is ample evidence for telemedicine's utility in treating other chronic conditions (Abel et al., 2018; Hilty et al., 2018; Liang et al., 2011; Totten et al., 2016) and for improving detection and early treatment of dermatological problems (Trettel et al., 2018;). Video conferencing in particular was found to be associated with greater patient satisfaction in the treatment of severe mental illness (Hulsbosch et al., 2017) and with better

tuberculosis treatment completion (Lam et al., 2018). Nevertheless, no prior studies have examined whether video conferencing can increase real-time access to addiction medicine expertise in primary care or improve outcomes for patients with AUD. We focused specifically on video consultation because of patient- and clinician-rated importance of visual, non-verbal cues, especially for topics related to mental health (McKinstry et al., 2009), as well as findings about the superiority of video compared with audio-only communication for geographically distant medical teams (Bolle et al., 2009). This pilot was deemed by the KPNC Research Determination Office to be a quality improvement project and exempt from full review by the Institutional Review Board.

METHODS

Setting

KPNC is a non-profit, integrated health care delivery system serving more than 4 million members, more than 40% of the region's insured population. KPNC's SBIRT program was initiated in 2013 and is widely integrated into routine primary care practice (Mertens et al., 2015), with over 10 million screenings for unhealthy drinking and 621,318 brief interventions. This represents a screening rate of 88%; 65% of positive screens result in a PCP-delivered brief intervention such as advice to decrease alcohol intake or to consider specialty addiction treatment (Hirschtritt et al., 2018), which is included in most members' coverage. To start the process of initiating specialty treatment, KPNC members can telephone the treatment program or a PCP can request that program staff phone a patient.

This pilot occurred at KPNC Oakland Medical Center's nine Internal Medicine and Adult and Family Medicine clinics, including two clinics with a specialized sociolinguistic focus (Chinese- and Spanish-language). These clinics employed 128 PCPs serving more than 100,000 patients age 18+. KPNC Oakland's addiction medicine clinic is located in a different part of the city.

The pilot was conducted between March 1, 2017 and January 31, 2018 (11 months). Due to competing operational priorities at the medical center, clinics received training and were given access to the video consult service one at a time, over a period of 9 months. Thus, duration of video consult access ranged from 2 to 11 months, with an average of 6 months. This also resulted in varying amounts of time between training and implementation. Five clinics launched within a month of training, and four clinics launched 2–5 months after training.

Technology

The study leveraged KPNC's HIPAA-compliant video visit web and mobile apps, already used by PCPs for patient appointments (Reed et al., 2018). All KPNC members can access the video visit app, and all KPNC physicians have apps that enable phone, text, and video contact with colleagues, including on-call clinicians in other departments.

Video Consult Technical Procedures

Working with medical center information technology specialists and clinicians, we developed a step-by-step workflow for PCPs to request a consult via secure text and introduce their patient to the consultant via live, two-way video on a tablet computer (Table 1).

Video Consult Intervention

PCPs introduced patients to an addiction medicine consultant, in the primary care exam room, via two-way video. Unlike the existing multi-step referral process that requires phone and then in-person contact with new providers, the telemedicine intervention was designed to enable members to see a specialist via live video, with a personalized introduction from their physician, in a familiar primary care setting. Consultants offered further clinical assessment; motivational enhancement; psychoeducation about treatment options – including psychosocial, pharmacological, and combined treatments; and could schedule subsequent appointments in the specialty clinic. Consultants also offered guidance to PCPs about primary care-based pharmacotherapy, prescribed medications, and ordered labs.

Video Consult Staffing.—On-call staffing by addiction medicine physicians and nurse practitioners was intended to be available 40 hours per week, during primary care clinic hours, with one specialist on call for each 4-hour shift. Due to the small scale and limited budget of the pilot, consultants were 5 physicians and 3 nurse practitioners already working at 3 specialty addiction clinics within 50 miles of the medical center. Although these clinicians initially received approval from managers to prioritize video consultation requests, actual coverage was inconsistent; clinic staff shortages often resulted in designated video consultants being reassigned, last minute, to clinic tasks.

PCP Training.—PCPs attended a 1.5-hour continuing medical education (CME) session approved by the KPNC Physician Training and Development Department. Researchers presented information on AUD prevalence and health consequences, potential value of video introductions to specialists, and hands-on practice using study-issued tablet computers. KPNC addiction medicine physicians presented introductory information about AUD pharmacotherapy, and PCPs were encouraged to initiate AUD prescriptions independently if they already felt knowledgeable and confident enough to do so.

Trainings occurred during regularly scheduled clinic meeting times, as is typical for CME in this health system. PCPs were alerted in advance about the session topic (real-time video consultation for primary care patients with AUD); the only incentive was an opportunity to earn 1.5 CME credits.

Patient Eligibility.—PCPs were instructed to use the video consult resource with patients who were experiencing alcohol problems or met criteria for AUD, and who might not initiate treatment via existing pathways.

Technical Support.—Technical support for PCPs included an in-person question and answer session approximately one month after service initiation, printed workflow

reminders in exam rooms, and periodic email updates. Technical support for addiction medicine consultants included maintenance of an on-call schedule, communication via an addiction medicine liaison, and troubleshooting from information technology partners as needed.

Measures and Data Sources

PCP Training.—Attendance data were obtained from CME sign-in sheets, and feedback via an online survey. The survey included a write-in item asking PCPs two things they intended to do differently as a result of the CME, as well as items about usefulness of the CME content and interest in further education on the CME topic.

PCP User Experience Survey.—PCPs who used the consult service completed a written (paper or online) survey at the end of the pilot. The survey was designed by the authors and integrated concepts from system usability scales used in prior studies (Bangor et al., 2008; Satre et al., 2017). It included ratings (on a scale of 1 to 10) of the value and ease/difficulty of using the consult service, write-in items about what was most useful and what could be improved, and a yes/no item about whether they would use such a service in the future.

Consultant Activity Reports.—Information about utilization (date and time of request, PCP name, and whether the consult occurred) was documented daily by addiction medicine consultants and conveyed weekly to the researchers via secure email. Consultants reported duration of the consult, whether the PCP remained in the exam room with the patient, and patient medical record number (for extraction of prescription and specialty treatment program initiation data). Consultants also described verbally and via secure emails successes and challenges, including de-identified case summaries.

Patient Characteristics and Outcomes.—Although the pilot was not designed or powered to test differences in patient outcomes, we explored the potential effectiveness of the intervention by comparing video consult recipients' prescription and treatment initiation data with those for patients who received an AUD diagnosis in primary care but did not receive a video consult. Data for both groups' alcohol screening results, prescriptions for AUD medications naltrexone and acamprosate, and specialty treatment initiation (1+ post-consult visit with an addiction medicine provider) were extracted from the EHR.

Analyses

We descriptively examined PCP training attendance, CME feedback, and user experience data, as well as consultant activity reports. We compared alcohol screening results, prescription rates, and specialty treatment program initiation rates for consult and non-consult recipients using chi-square tests.

RESULTS

PCP Training Attendance and Feedback

Of 128 eligible PCPs, 91 (71.1%) attended a CME training, and of those, 60 (65.9%) completed the post-training survey. Almost all PCPs rated the training as very useful or

somewhat useful; only one attendee rated it as not useful. Most indicated that more training on the topic would help. Of the 57 PCPs who described how their practice would change as a result of the training, 37 (64.9%) mentioned pharmacotherapy, and 41 (71.9%) stated that they intended to use the video consult service. Only one PCP reported no intention to change (Table 2).

Among the smaller number (n=14) of attendees who wrote additional comments (not shown), there was one instance of familiarity with AUD pharmacotherapy ("already experienced with naltrexone"); 6 instances of increased knowledge, interest or confidence in prescribing ("more interest in prescription meds for this disorder," "more confident prescribing"); and two instances of continued hesitancy ("still do not feel comfortable prescribing these medications").

Consultant Activity Reports

Consultants logged 52 consult requests and 32 successful consults. Three consults occurred using telephone rather than video, due to technical problems. Five PCPs were repeat users, obtaining consults for multiple patients. Video consults lasted an average of 24 minutes (range: 9–50). In all but two cases, the PCP introduced the patient to the consultant and left the exam room to complete other tasks while the consult occurred. Consults occurred in 7 of the 9 primary care clinics; only one request, and no actual consults, occurred in the clinics specializing in serving Chinese- and Spanish-speaking patients.

Implementation Challenges

Of the 20 failed requests, 13 (65.0%) resulted from consultant unavailability related to staffing challenges specific to this pilot (see Methods). Other reasons for failed requests included problems with workflow (e.g., PCP not accurately following the necessary steps to obtain a consult) and technology (e.g., delayed receipt of requests due to loss of Wi-Fi connection). For 57% of consults, the consultant reported that technology problems impacted quality. The most frequent problems were video/audio lag and video freezing periodically.

PCP User Experience

Nineteen PCPs who utilized the service (70%) completed a user experience survey. The average rating of the value of the video consult service was 6.9 on a scale where 1 = not valuable and 10 = extremely valuable; 12 PCPs (63%) rated the usefulness of the service 8 or above. Average score for ease of use was 5.8 on a scale where 1 = extremely difficult and 10 = extremely easy. PCPs' comments about what was most useful focused on the immediacy of the consults; the most common requests for improvement were faster and easier workflow and increased consultant availability (Table 3). Most PCPs who used the resource (94%) indicated that they would use it again if technology and staffing issues were resolved.

Patient Characteristics and Outcomes

Video consult recipients and non-recipients' most recent SBIRT screening responses were similar with regard to rates of self-reported abstinence, average number of drinks per week,

and diagnosis of a substance use disorder other than AUD. Video consult recipients were significantly more likely to report having exceeded daily limits within the past 90 days and exceeding those limits 5+ times in the prior 90 days, a proxy for of AUD risk (Saitz et al., 2014) (Table 4). Notably, only 47% of consult recipients had received an AUD diagnosis in primary care (not shown), whereas the comparison group, by definition, was diagnosed with AUD in primary care. Screening rates did not differ by group.

Of 32 patients who received a consult, 11 (34.4%) were prescribed an AUD medication, versus 43 (6.4%) of non-recipients (p<.0001); 11 (34.4%) initiated specialty addiction treatment, versus 105 (19.7%) of non-recipients (p<0.05) (Table 5). Four patients who received a video consult were both prescribed an AUD medication and initiated specialty treatment (not shown).

Case Examples

Consultants' case summaries varied with regard to patient presentation, medical complexity, and scope of consultant and PCP intervention. Representative examples include:

> "Patient was a 40-year-old white female counseling intern with 3 alcohol-related emergency department visits in the prior 7 months. Consultant provided motivational interviewing, psychoeducation regarding naltrexone to reduce alcohol cravings, followed up with physician on prescribing, conducted telephone medication check with patient at 1 week, and communicated next steps to physician."

> "Patient was a 55-year-old white male in longtime recovery from AUD, who sought anti-craving medication to protect sobriety during an upcoming vacation. Consultant prescribed a 2-week supply, which patient picked up at pharmacy immediately after primary care visit."

> "Patient was a 35-year-old African-American female, 4 months postpartum, with a history of trauma and major depression, plus multiple recent deaths in family. Patient and her partner are currently drinking heavily. Consultant provided motivational interviewing and psychoeducation, coached physician to prescribe an antidepressant, and scheduled a follow-up phone call with patient to explore specialty treatment options."

DISCUSSION

This study examined the feasibility of providing training and live, real-time addiction medicine video consultation to PCPs and their patients, and explored whether this intervention might improve primary care–based AUD medication uptake and specialty addiction treatment initiation. While significant implementation challenges prevent definitive conclusions about feasibility of a full-scale training and video-consultation service, user engagement and feedback suggest potential value and important areas for improvement.

Training attendance and feedback suggest that physicians were interested in learning about AUD pharmacotherapy and obtaining new resources to help patients with AUD. Despite some concerns among PCPs about independently prescribing AUD medications, most indicated that the training and availability of an on-call consultant increased their likelihood of considering these medications as a treatment option. This is encouraging, given prior work on PCPs' potential discomfort with such prescribing relative to other aspects of SBIRT (Satre et al., 2012) and the need to improve medication availability (Hagedorn et al., 2016).

PCPs valued the opportunity to introduce patients directly and immediately to a specialty consultant, avoiding the temporal and geographic barriers of standard referral pathways. Providers also reported, anecdotally, that patients appreciated immediate, personalized introductions to the consultants and expanded treatment options such as pharmacotherapy, echoing findings from other recent studies (Haley et al., 2019).

The pilot generated actionable user feedback that should be considered in future small- or large-scale modifications of the pilot resource. PCP feedback suggests that a simpler and more flexible workflow is needed; texting a consult request via smartphone and initiating the video meeting on a tablet computer may be too complex and time-consuming in a busy primary care environment. Two-way, synchronous video communication requires stable, high-bandwidth internet access, and lack of consistent access in some locations reduced video quality. Potential solutions include more flexibility in mode of communication – e.g., enabling PCPs to choose video, phone, or asynchronous communication via the electronic health record. Improvements in technology may also lessen these challenges in the future.

Another challenge, inconsistent availability of addiction medicine consultants, was largely related to the limited scope and resources of this pilot. A full-scale project would need to include robust, dedicated staffing in order to provide more reliable coverage, enable economies of scale (e.g., centralized staff serving multiple medical centers), and expand the reach of specialists who are in short supply. Future research should explore costs and benefits of addiction medicine staffing by physicians, nurse practitioners, and/or clinical pharmacists, and should measure whether specialty consultation increases PCPs' subsequent ability to prescribe AUD medications independently. There is some evidence that primary care-based pharmacotherapy for opiate use disorder increases specialty treatment initiation (D'Onofrio et al., 2015), and future research should examine whether AUD pharmacotherapy also increases patients' likelihood of engaging in psychosocial treatment.

Although the study was not designed or powered to test patient outcomes, preliminary evidence suggests that a combination of PCP training and real-time addiction medicine consultation may improve rates of AUD pharmacotherapy and specialty treatment initiation. A larger sample would be needed to rigorously evaluate patient outcomes, and a longer timeframe would be necessary to evaluate PCP adoption of the resource, since diffusion of new technologies and other innovations is typically gradual (Rogers, 2003). As with successful implementation of other SBIRT components such as EHR-based screening tools (Hirschtritt et al., 2018), sustained effort would likely be necessary to establish addiction telemedicine consultation as part of the SBIRT toolbox.

Using telemedicine to access addiction medicine expertise may be of particular value in rural settings and for other populations with limited access to specialty treatment, consistent with recommendations of major professional health organizations and national agencies, including the American Society of Addiction Medicine (Clark et al., 2017), APA (American Psychiatric Association, 2018), and HRSA (Health Resources and Services Administration, 2019). Limited utilization of the pilot consultation resource by the medical center's Chinese- and Spanish-language clinics highlights the need for further attention to how an improved resource might serve diverse populations and reduce health disparities (Abel et al., 2018).

This study had several limitations: It was a pilot, with a small number of patients at a single medical center. It was conducted with insured patients, most of whose coverage included specialty addiction medicine treatment, potentially limiting generalizability. The pilot sample was too small to draw firm conclusions about patient-level outcomes, and the comparison group (patients diagnosed with AUD in primary care who did not receive a video consult) was inexact; future research should examine the potential role of demographic and clinical characteristics (e.g., comorbidities) in consult service utilization and outcomes. The intervention included both brief training and a consultation resource, and no definitive conclusions can be drawn about which aspect was most important or effective. PCP feedback about the consult resource was limited to those who utilized it and did not include detailed feedback from non-utilizers. Finally, feasibility data were limited to the clinician perspective. Future studies should include patient feedback.

Conclusion

This pilot study suggests that with significant modifications, it may be feasible to implement real-time, specialty addiction medicine consultations for PCPs and their patients. Necessary modifications to the pilot model include robust staffing, easier and more flexible technology, and sustained implementation effort necessary for adoption of a new clinical workflow. Preliminary evidence suggests that telemedicine consults in primary care may be a valuable resource for increasing initiation of pharmacotherapy and specialty treatment, with potential impact to the public health problem of untreated AUD. With further development of the intervention model, telemedicine may prove to be a highly valuable extension of SBIRT initiatives and increase access to AUD treatment.

Acknowledgements

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Table 1.

Video consult workflow for primary care providers

1. Text consult request to on-call addiction medicine consultant.

2. Retrieve tablet computer and assist patient in logging in to video app.

3. Introduce patient to consultant; remain in exam room or attend to other clinic tasks while consultant and patient communicate via video.

4. Conclude primary care visit and return tablet to storage (with medical assistant help if needed).

5. Review consultant's progress note in electronic health record, and participate in collaborative treatment plan.

Table 2.

PCP training attendance and feedback (N=128)

	n (%)
Attended	91 (71.1)
Completed evaluation	60 (65.9)
Usefulness	
Very	33 (55.0)
Somewhat	25 (41.7)
Not	1 (1.7)
More training on this topic would help	
Definitely	25 (41.7)
Maybe	32 (53.3)
Not	3 (5.0)
Intend to change (2 behaviors, write-in)	
Pharmacotherapy	37 (64.9)
Video consult	41 (71.9)
None	1 (1.7)

Table 3.

Post-pilot PCP video consult feedback

A. **What was most useful about the video consult service? (N=17)**	**n**
Immediacy	9
Addresses patient ambivalence about treatment	3
Medication recommendations	1
Getting to know specialists in the health system	1
Post-consult follow-up between patient/specialist	1
General ("amazing")	1
B. **What improvements would make the service more useful? (N=19 PCPs, 23 suggestions)**	
Easier/faster process	12
Consultant availability	4
Alternative location (exam rooms in short supply)	3
Better video/internet, or non-video option	2
Post-consult follow-up for PCP by specialist	1
Reminders from consultant about the service	1

Table 4.

Pre-pilot characteristics of video consult recipients and non-recipients

	Video consult recipients (n=32)	Non-recipients[*] (n=534)	P
Alcohol screening responses [**]			
Abstained, n (%)	10 (31.25)	247 (46.25)	0.10
Exceeded NIAAA daily limit	11 (34.38)	84 (15.73)	<0.01
Exceeded NIAAA weekly limit	12 (37.5)	123 (23)	0.06
Exceeded daily limit 5+ times	9 (28.13)	61 (11.42)	0.01
Average drinks per week (sd)	14 (20.21)	8 (14.36)	0.10
Non-AUD substance use diagnosis [***]			
Including tobacco	14 (43.75)	195 (36.52)	0.41
Excluding tobacco	6 (18.75)	87 (16.29)	0.72

[*] Non-recipients received an alcohol use disorder diagnosis in primary care in the year preceding the pilot (3/1/16–2/28/17), visited primary care during the pilot (3/1/17–2/28/18), and did not receive a video consult.

[**] Alcohol screening responses are patient self-report, based on NIAAA healthy drinking limits, for the 90 days prior to screening. Responses shown are for the most recent screening during the 2 years prior to index primary care visit.

[***] Substance use diagnoses were given in primary care during the year preceding the pilot.

Table 5.

AUD medication prescription and specialty addiction treatment initiation, through one month post-pilot

	Video consult recipients (n=32)	Non-recipients (n= 534)	*P*
Acamprosate, n (%)	0 (0)	3 (0.56)	1.00
Naltrexone	11 (34.38)	43 (6.39)	<.0001
Specialty addiction treatment initiation *	11 (34.38)	105 (19.66)	<0.05

*
Initiation is defined as at least one visit with a specialty addiction treatment provider. For consult recipients, the visit occurred after the consult; for non-recipients, it occurred after the start of the pilot period.