

DIGITAL TECHNOLOGIES

IN THE TREATMENT OF SUD

Tyler Oesterle MD, MPH
Chair of the Addiction Division Mayo Clinic



1

DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIP(S) WITH INELIGIBLE COMPANIES

- Nothing to disclose

REFERENCES TO OFF-LABEL USAGE(S) OF PHARMACEUTICALS OR INSTRUMENTS

- Nothing to disclose

All relevant financial relationships have been mitigated.

2

LEARNING OBJECTIVES

- Know the current state of the research on Substance use disorder (SUD) treatment through telehealth
- Know the different SUD telehealth treatment options
- Know how hybrid models can be used to support SUD treatment outcomes
- Know how digital therapeutics can support SUD treatment and recovery

©2022 Mayo Foundation for Medical Education and Research | WF2698306-3

3

What is Telehealth Or Telemedicine

- Telehealth, Telemedicine, eHealth, mHealth
- Delivery of health care using telecommunications technology
- Shown to improve access to care (especially for rural populations)
- Produce similar results to in-person treatment
- Reduce perception of stigma
- Maintain a high degree of patient and provider satisfaction



Shore JH, Yellowlees P, Caudill R, Johnston B, Turvey C, Mishkind M, et al. Best practices in videoconferencing-based telemental health April 2018. *Telemedicine and e-Health*. 2018;24(11):827-32.
 Hilty DM, Crawford A, Teshima J, Chan S, Sunderji N, Yellowlees PM, et al. A framework for telepsychiatric training and e-health: competency-based education, evaluation and implications. *International Review of Psychiatry*. 2015;27(6):569-92.

©2020 MFMER | 3967379-4

4

Telehealth for SUD

- A 2012 analysis showed that <1% of SUD treatment centers had adopted telemedicine technologies.
- Research shows a rapid (approximately 20-fold), increase in the use of SUD in the years from 2010 to 2017
- The pandemic increased adoption significantly with some programs going 100% virtual during COVID “lockdowns”



Hilty DM, Crawford A, Teshima J, Chan S, Sunderji N, Yellowlees PM, et al. A framework for telepsychiatric training and e-health: competency-based education, evaluation and implications. *International Review of Psychiatry*. 2015;27(6):569-92.

Lin LA, Casteel D, Shigekawa E, Weyrich MS, Roby DH, McMenamin SB. Telemedicine-delivered treatment interventions for substance use disorders: A systematic review. *Journal of substance abuse treatment*. 2019;101:38-49.

Huskamp HA, Busch AB, Souza J, Uscher-Pines L, Rose S, Wilcock A, et al. How is telemedicine being used in opioid and other substance use disorder treatment? *Health Affairs*. 2018;37(12):1940-7.

Cowan KE, McKean AJ, Gentry MT, Hilty DM, editors. *Barriers to Use of Telepsychiatry: Clinicians as Gatekeepers*. Mayo Clinic Proceedings; 2019: Elsevier.

Tofighi B, Abrantes A, Stein MD. The Role of Technology-Based Interventions for Substance Use Disorders in Primary Care: A Review of the Literature. *Med Clin North Am*. 2018;102(4):715-31. ©2020 MFMER | 3967379-5

5

Barriers to Acceptance

- Patient-based
 - relied upon intrapersonal, face-to-face interactions that may be disrupted by the fluidity of virtual interactions
 - many may not have reliable phone service or internet access and some lack basic necessities
 - privacy concerns
- Provider-based factors.
 - clinicians tend to be most concerned about patient outcomes
 - work efficiency due in part to the implementation of new technology
 - reimbursement
 - HIPPA compliance

Cowan KE, McKean AJ, Gentry MT, Hilty DM, editors. *Barriers to Use of Telepsychiatry: Clinicians as Gatekeepers*. Mayo Clinic Proceedings; 2019: Elsevier.

Tofighi B, Abrantes A, Stein MD. The Role of Technology-Based Interventions for Substance Use Disorders in Primary Care: A Review of the Literature. *Med Clin North Am*. 2018;102(4):715-31.

Moffenter T, Boyle M, Holloway D, Zwick J. Trends in telemedicine use in addiction treatment. *Addict Sci Clin Pract*. 2015;10:14.

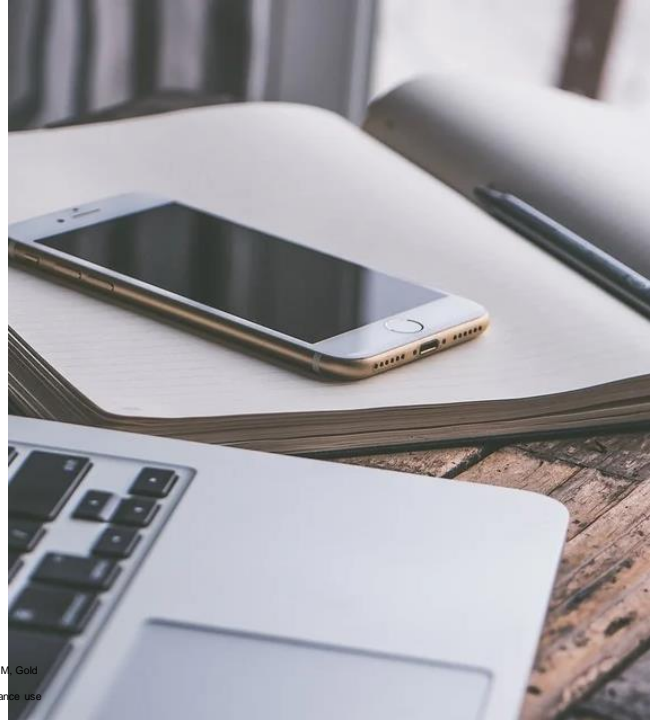
Fowler LA, Holt SL, Joshi D. Mobile technology-based interventions for adult users of alcohol: A systematic review of the literature. *Addict Behav*. 2016;62:25-34.

©2020 MFMER | 3967379-6

6

Telehealth Modalities in Substance Use Treatment

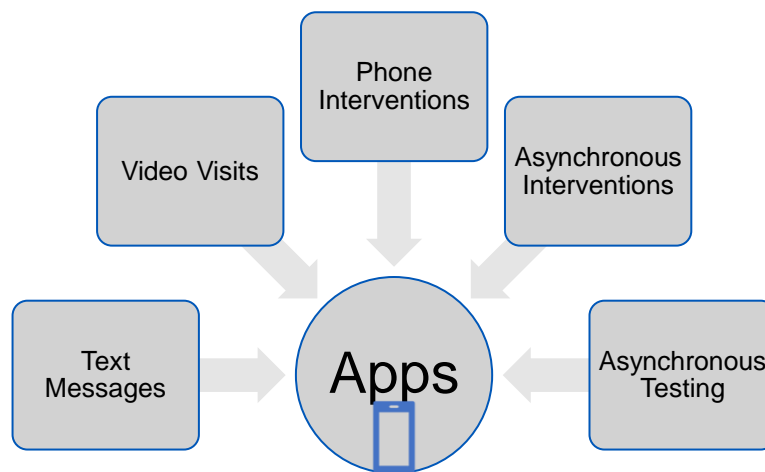
- Pre-Pandemic the most common modes of telehealth in SUD treatment programs are:
- Asynchronous
 - Apps, Computerized assessments and content (45%)
- Synchronous
 - Telephone-based recovery support (29%)
 - Telephone-based therapy (28%)
 - Video-based therapy (20%).



Oesterle TS, Kolla B, Risma CJ, Breiting SA, Rakocevic DB, Loukianova LL, Hall-Flavin DK, Gentry MT, Rumans TA, Chauhan M, Gold MS. Substance Use Disorders and Telehealth in the COVID-19 Pandemic Era: A New Outlook. *Mayo Clin Proc.* 2020
 Lin LA, Casteel D, Shigekawa E, Weyrich MS, Roby DH, McMenamin SB. Telemedicine-delivered treatment interventions for substance use disorders: A systematic review. *Journal of substance abuse treatment.* 2019;101:38-49.

7

Smart Phone Apps



©2020 MFMR | 3967379-8

8

GAMING / POKEMON / ENTERTAINMENT

The Pokémon Go grandpa's bike evolves to hold 64 smartphones

I don't think this is his final form.

<https://www.theverge.com/tldr/2020/6/24/21301924/pokemon-go-64-smartphones-taiwanese-grandpa>



Photo generated by DALL E 3

- 90% of Americans own a smartphone, up from just 35% in 2011.
- The average American spends 5 hours and 24 minutes daily on their mobile device.
- Americans check their phones on average 96 times daily or once every ten minutes.
- There are roughly 6.92 billion smartphone users across the world. That's 86.29% of the global population as of 2023.
- 59.16% of website traffic comes from mobile devices as of 2022.

Pew Research Center Mobile Fact Sheet

©2020 MPMER | 3967379-9

9

Engagement

- Engagement in health-related apps is low overall.
 - Average health app engagement period was 5.5 days (1).
 - Popular mental health apps from commercial marketplaces found that only 4% of users who downloaded an app opened it again after 15 days (2).
 - Total app downloads have not correlated with increased engagement, with some of the most downloaded mental health-related apps being the least used (3).
- Engagement is improved by
 - CM to encourage CBT-module utilization (4)
 - Support from a clinician or peer via messaging or telephone produces significantly more engagement than fully automated apps (1).
 - Providing timely, positive, data-driven feedback to users throughout the day (5)



(1) Pralap A, Neto EC, Snyder P, et al. Indicators of retention in remote digital health studies: a cross-study evaluation of 100,000 participants. *npj Digital Medicine*. 2020;3(1):21.

(2) Baunial A, Muench F, Egan S, Kane JM. Objective User Engagement With Mental Health Apps: Systematic Search and Panel-Based Usage Analysis. *J Med Internet Res*. 2019;21(9):e14567.

(4) Luderer HF, Campbell AN, Nunes EV, et al. Engagement patterns with a digital therapeutic for substance use disorders: Correlations with abstinence outcomes. *Journal of Substance Abuse Treatment*. 2022;132:108585.

(3) Carlo AD, Hosseini Ghomi R, Renn BN, Strong MA, Areán PA. Assessment of Real-World Use of Behavioral Health Mobile Applications by a Novel Stickiness Metric. *JAMA Netw Open*. 2020;3(8):e2011979-e2011978.

(5) Tison GH, Hsu K, Hsieh JT, et al. Abstract 21029: Achieving High Retention in Mobile Health Research Using Design Principles Adopted From Widely Popular Consumer Mobile Apps. *Circulation*. 2017;136(suppl_1):A21029-A21029.

10

App Based Modules

- Contingency management
 - CM is a therapeutic intervention based on principles of operant conditioning for behavior modification where monetary or prize-based reinforcers are delivered contingent on objective evidence of drug abstinence and abstinence-promoting behaviors
 - CM does not provide education or concepts for individuals to learn; instead, it positively reinforces the desired outcome or behavior.
- Cognitive Behavioral Therapy
 - CBT addresses cognitive distortions (unhelpful thinking) and problematic behaviors through the development of healthy cognitions and adaptive behaviors.
- Digital Recovery Support Services
 - RSS are "an individualized, intentional, dynamic, and relational process involving sustained efforts to improve wellness".

Oesterle et al.

©2020 MFMER | 3967378-11

11

App Based Modules

- Motivational Interviewing (MI)
 - require a dynamic interaction between provider and patient that is difficult to emulate through a computer-based module.
- Approach based modification (ABM)
 - repeatedly presents individuals with substance-related pictures to which they must make an "avoidance" movement (e.g., pushing away images of alcohol using a joystick) and conversely perform an "approach movement" in response to non-substance-related image (e.g., pulling on the joystick).
- Behavioral activation
 - is an approach that attempts to replace the negative behaviors of substance use with positive behaviors, typically involving physical activity

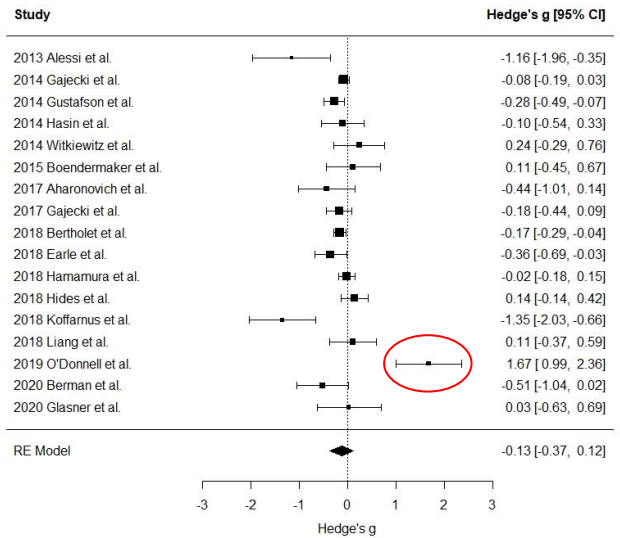
Oesterle et al.

©2020 MFMER | 3967378-12

12

Review of Reviews

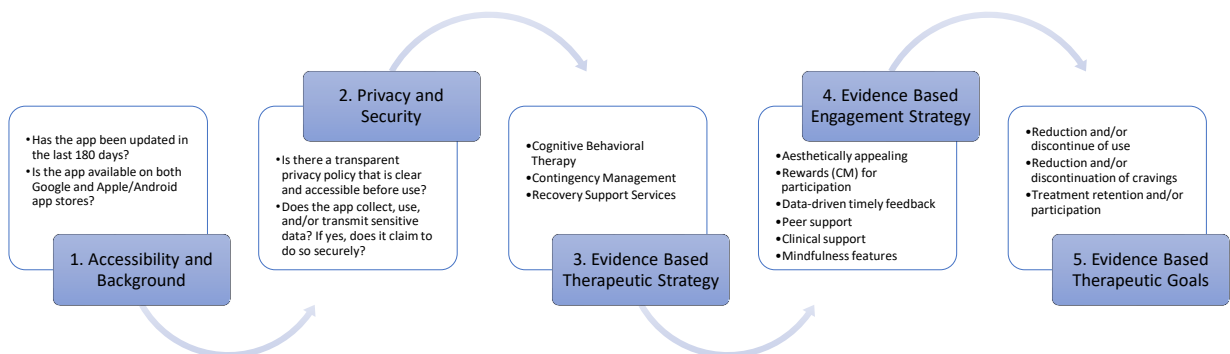
- CBT and CM sub-groups were significant, however, these both resulted from only two apps each; the remaining modalities were not significant.
- While CM had a large effect size, the study samples were small. All other sub-group effect sizes were non-significant
- Not all app interventions are benign



©2020 MFMR | 3967379-13

13

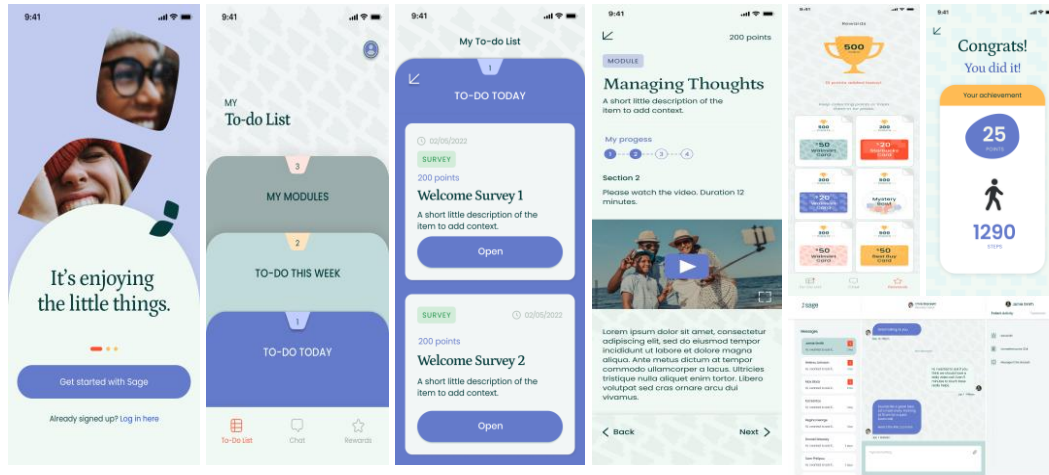
Assessing a substance use disorder app



Oesterle et al.

14

[Mayo \(senyohealth.org\)](https://senyohealth.org)



©2020 MFMER | 3967379-15

15

MAYO CLINIC VIDEO TELEMEDICINE: PATIENT VIEW BEST PRACTICES

ROOM

- COLOR**
 - Solid color, clean walls with matte finish
- LIGHTING**
 - Place lighting in front of the provider's face
 - Back light dimmed and windows closed.
- DÉCOR**
 - Keep décor simple and balanced
 - Minimal highlights of blue and gray
 - Display a medical degree
 - Decor balances medical and nature elements including Mayo logos
- LOCATION**
 - Quiet, easily accessible
 - Minimal exposure to outside noise

PROVIDER

- APPEARANCE**
 - Provider should have a professional, clean appearance
 - Attire is a suit or white jacket
 - Display a Mayo Clinic badge
 - Smile and be personable
- POSITION**
 - Provider should be centered in the image and close to the screen without cropping any of their image
 - Always face and make eye contact with the camera

AVOID

BUSY, CLUTTERED, PERSONAL ITEMS

SERVICE TIPS

EDUCATE & REMIND

Remind patients of the purpose for the visit and value of video visits. *"Isn't it great that we can meet to check in on your surgical scar without a long drive here?"*

WELCOME

Remember to give the patient a nice, warm welcome as you would in person. *"Hi Mrs. Lopez! It's great to see you. Thanks for doing a video visit with me."*

REASSURE

Reinforce patient privacy and the security of video visits. *"I'm here in my office. We have full privacy and security using Mayo Clinic technology."*

PERSONALIZE

Personalization helps patients feel important. Address them by name and inquire about an item unique to them. *"Hi Mrs. Lopez! How are you? How is the weather in Tampa?"*

SIMPLIFY

Simplify movements and explain when you need to look at files. *"Make sure to use clear, succinct explanations. 'I'm looking at your file to review your last test results.'"*

16

Virtual Groups

- In 2015, 25% SUD treatment facilities offered telehealth
- 2020 increased to 58.6%
- Review
 - virtual SUD vs in-person
 - 7/8 studies found virtual treatment as effective as in-person treatment
 - retention
 - therapeutic alliance
 - substance use



Alvarado HA. Telemedicine Services in Substance Use and Mental Health Treatment Facilities (The CBHSQ Spotlight). Rockville, MD; 2021.

Mark TL, Treiman K, Padwa H, Henretty K, Tzeng J, Gilbert M. Addiction Treatment and Telehealth: Review of Efficacy and Provider Insights During the COVID-19 Pandemic. *Psychiatr Serv.* May 2022;73(5):484-491. doi:10.1176/appi.ps.202100088

©2020 MFMER | 3967379-17

17

Virtual Groups

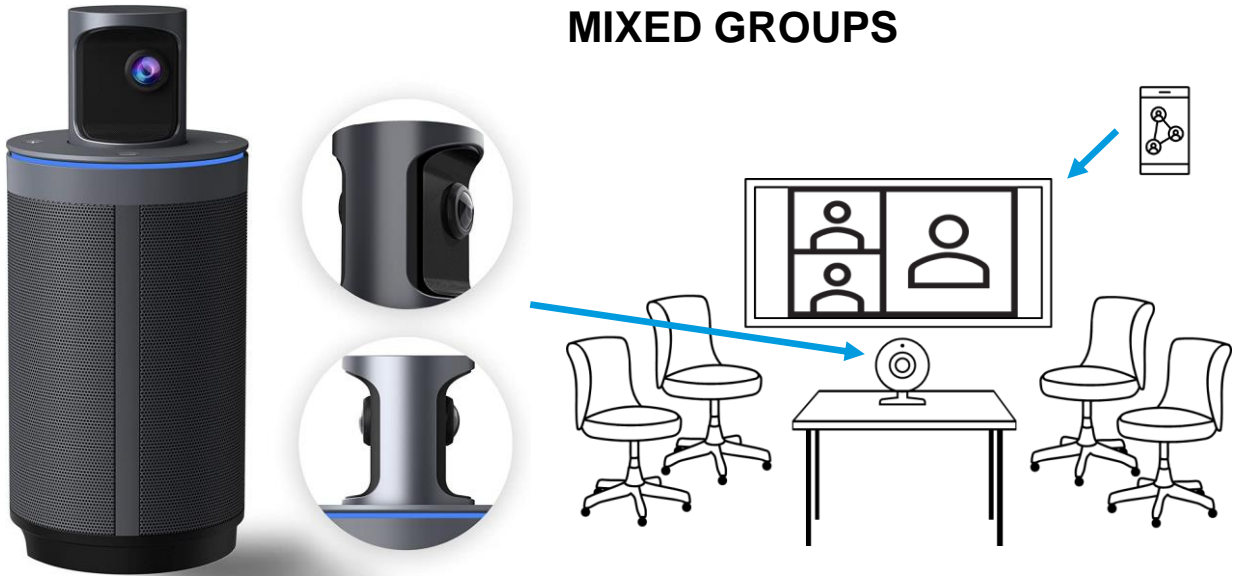
- Majority of research is in person groups
- Video group therapy positives
 - evidence for targeting tobacco, alcohol, and opioid use disorders
 - safe intervention, high patient satisfaction, and appear to have similar outcomes to in-person treatments.
- Video group therapy negatives
 - a few studies indicated there may be a reduction in patient-reported group cohesion and treatment alliance.
 - unfortunately, few studies have directly assessed specific group therapy process outcomes.



This Photo by Unknown Author is licensed under CC BY.

18

MIXED GROUPS

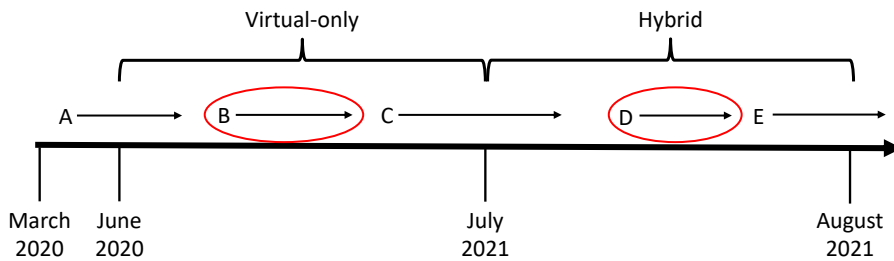


KanDao Meeting 360 All-in-One Conference Video Camera

©2022 Mayo Foundation for Medical Education and Research | slide-19

19

STUDY TIMELINE



©2024 Mayo Foundation for Medical Education and Research | WF2698306-20

20

HYBRID-ONLY GROUP HAD BETTER RETENTION

	Virtual-only	Hybrid	p-value ¹
Sample size (n)	234	624	
Completed treatment (n)	64	258	
Premature discharge ² (n)	170	366	
Rate of completed treatment (%)	27.4	41.3	
Odds ratio ³	ref	1.87	< 0.001
Treatment length (days, median)			
Completed treatment	90.5	119.0	< 0.001
Premature discharge	39.0	42.5	0.635

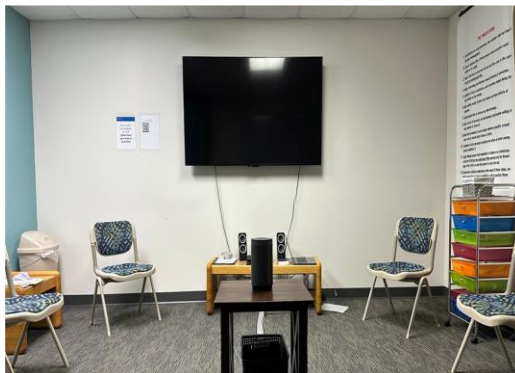


Table 1: Descriptive measures

¹Odds ratio p-value obtained from logistic regression assessing the effect of group (virtual-only versus hybrid) on outcome (discharge status); treatment length obtained from Mann-Whitney-U test

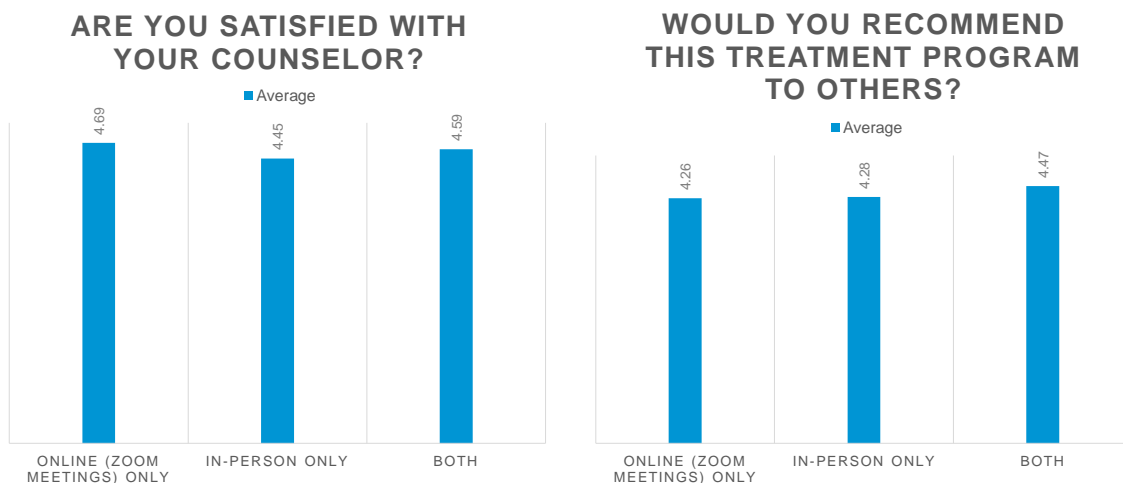
²All premature discharges were against medical advice (AMA) except for two staff requested discharges (SRD), both from a hybrid group

³Odds ratio from simple univariate logistic regression without site included.

©2024 Mayo Foundation for Medical Education and Research | WF2698306-21

21

PATIENT SATISFACTION



No statistical difference among groups in any satisfaction scores

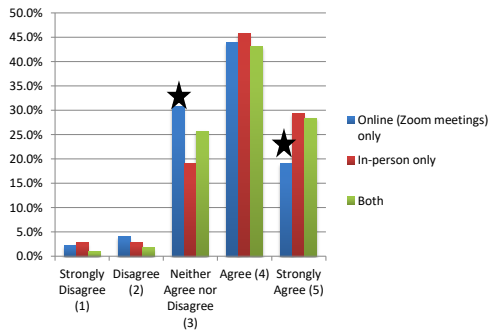
#ASAMAnnual2C



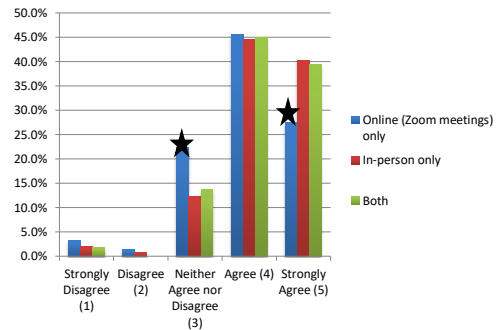
22

CONNECTIONS

I feel a strong connection to other group members



I feel a strong connection to my counselor



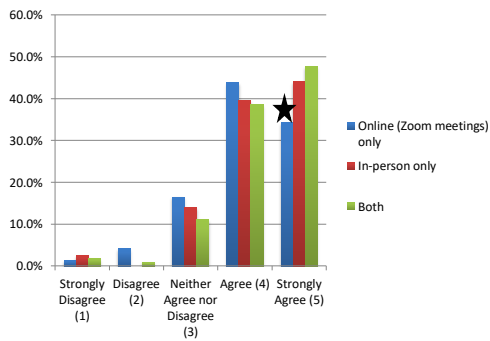
★ =Statistically Significant

©2021 Mayo Foundation for Medical Education and Research | WF155100-23

23

INSIGHT

I feel the program has helped me gain insight into the disease of addiction



©2021 Mayo Foundation for Medical Education and Research | WF155100-24

24

FINAL TAKEAWAYS

- Telehealth safe and effective
- Well received by patients and providers
- Opens asynchronous options in apps
- Increases access
- Not for everyone



25

QUESTIONS & DISCUSSION



26

ARS QUESTION

Use this WF2698306 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

What app-based therapy has the best evidence of efficacy

1. Recover Support Services
2. Cognitive Behavioral therapy
3. Motivational Interviewing
4. Behavioral activation

©2024 Mayo Foundation for Medical Education and Research | WF2698306-27

27

RATIONALE

Use this WF2698306 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

- Cognitive behavioral therapy independently has the best evidence of efficacy as a therapeutic strategy. Recovery support services combined with contingency management has good efficacy overall.

Reference: insert citation

©2024 Mayo Foundation for Medical Education and Research | WF2698306-28

28

ARS QUESTION

Use this WF2698306 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

A hybrid telehealth group is a group that incorporates...

1. More than one type of psychotherapy
2. Both virtual and in person options
3. Both individual and group therapy sessions
4. Both mental health and substance use disorder services

©2024 Mayo Foundation for Medical Education and Research | WF2698306-29

29

RATIONALE

Use this WF2698306 for your Audience Response (ARS) portion of your presentation. This format meets the requirements of MOC and AV.

- A hybrid group is a group that incorporates a virtual attendance option integrated with an in person attendance option. Data suggests that adding an in-person option to a virtual group can improve patient satisfaction, experience, and retention.

Reference: insert citation

©2024 Mayo Foundation for Medical Education and Research | WF2698306-30

30