Short communication

A pilot study comparing in-person and remote outpatient substance use treatment services on quality-of-life outcomes☆

Monica F. Tomlinson, PhD [a],[*], Monica P. Thomas, PhD [a], Bruce Goldman, LCSW [a],[b], Jessica Bourdon, PhD [d], Nehal P. Vadhan, PhD [b],[c]

[a] *Addiction Recovery Services, Zucker Hillside Hospital*
[b] *Zucker School of Medicine at Hofstra/Northwell*
[c] *Feinstein Institutes for Medical Research*
[d] *Wellbridge Center for Addiction Science*

ARTICLE INFO	ABSTRACT
	Background: The widespread shift from in-person to Telehealth services during the Covid-19 pandemic irreversibly shifted the landscape of outpatient substance use treatment. This shift was necessitated by health, rather than data-driven, reasons. As we reflect on whether to continue providing Telehealth services moving forward, we require empirical support on the effectiveness of Telehealth services (compared to in-person services) in terms of patient outcomes, such as Quality of Life (QOL), to support this decision. *Objective:* To present data from a pilot project comparing changes in QOL across patients receiving outpatient in-person versus Telehealth substance use treatment in five clinics across New York State. *Method:* To retrospectively compare total self-reported QOL scores from admission to 3-months later utilizing the Quality-of-Life Enjoyment and Satisfaction scale during in-person (pre-pandemic, $n = 298$) and Telehealth (pandemic, $n = 316$) services with a mixed repeated measures ANOVA. *Results:* Self-reported QOL scores significantly improved across the first three months, regardless of treatment modality *Conclusion:* Telehealth and in-person treatment appear comparable on QOL outcomes over the first 3 months of outpatient treatment. Both modalities are associated with improved QOL scores. *Scientific significance:* These preliminary findings provide evidence that Telehealth services are associated with positive patient outcomes and appear comparable to QOL outcomes among patients receiving in-person services. Future directions include further assessment of additional clinical outcomes and investigation into causal mechanisms.

Outpatient substance use treatment has historically been provided in-person to facilitate regular physical examinations, structured distribution of controlled substances (e.g., methadone), and regular urine toxicology practices (Lin et al., 2019). For psychosocial treatments, which would not require in-person contact, there was minimal infrastructure in place to provide Telehealth services effectively and ethically, and limited research on the effect of Telehealh on patient outcomes (Hall and McGraw, 2014). In a comprehensive literature review, Lin et al. (2019) found only 13 studies that compared in-person to Telehealth services with individuals who have SUDs. Of these articles that focused on treatment outcomes, no studies found differences in abstinence rates, and there was some evidence of a higher retention rate among patients treated through Telemedicine rather than in-

person services. The last two years have afforded us an opportunity to add to this research and gather large-scale outcome data on Telehealth services.

This brief report assesses whether Telehealth services were associated with comparable self-reported patient outcomes, operationalized here as quality of life (QOL) ratings, to exclusively pre-pandemic in-person SUD services. We anticipated that patients' QOL would improve over the first 3 months of treatment, regardless of whether services were in-person (pre-Pandemic: April-September 2019) or provided through Telehealth (Pandemic: April-September 2020). We also assessed whether these groups differed in their demographic make-up, and whether demographic variables were associated with differences in QOL scores at admission.

QOL is an important assessment measure for SUD treatment (Tiffany et al., 2012) and was proposed by the National Institutes on Drug Abuse in 2009 as a recommended SUD outcome measure (Manning et al., 2019). Low QOL is a major motivation for receiving treatment (Tiffany et al., 2012) and improvements in QOL are associated with reductions in substance use (Manning et al., 2019). Our hospital adopted QOL outcome measures at the recommendation of our accreditation organization and we have consistently implemented the Quality-of-Life Enjoyment and Satisfaction Questionnaire as part of routine clinical care since 2018. As a result, this measure provided a fortuitous source of ongoing data from which to support our preliminary empirical investigation into the effectiveness of Telehealth SUD services.

Methods

Two groups completed the Quality-of-Life Satisfaction and Enjoyment Questionnaire-Short Form (Q-LES-Q-SF; Endicott et al., 1993) at admission into outpatient substance use treatment and three months later as part of their routine clinical care. The first group was admitted between April to June 2019 and received exclusively in-person services. They were administered the same questionnaire between July to September 2019. The second group was admitted between April to June 2020 and completed the Q-LES-Q-SF again between July and September 2020 and received exclusively Telehealth services. Only patients who remained in the service for at least three months were included in analyses. This sample was drawn from five substance use clinics in New York State who provided exclusively in-person services in 2019 and then transitioned to Telehealth services for all psychosocial, medical, and psychiatric services, based on clinical need, during the Covid-19 pandemic on April 1st, 2020. The collection of all data was standardized across groups.

The Q-LES-Q-SF is a 16-item questionnaire assessing life satisfaction across 14 domains over the past week (e.g., physical health, mood, social relationships, work). The final two questions ask about satisfaction with medication and overall life satisfaction. Items are rated on a 5-point scale (1 = *very poor*; 5 = *very good*) and total scores range from 14 to 70. Scores are calculated by summing the answers to the first 14 questions.

Our analytic approach included chi-squared tests, Analyses of Variance (ANOVAs), and t-tests. Categorical demographic variables (e.g., race) were analyzed with the Chi-Square statistic to test differences in demographic make-up between groups. A one-way ANOVA was conducted to assess differences in samples on continuous demographic variables (e.g., age). A two-way mixed ANOVA was conducted to assess whether changes in QOL over the first 3 months of treatment differed between groups. We also conducted a one-way univariate ANOVA to assess differences in QOL among demographic groups at admission across conditions. This analysis served to appreciate the potential unique effects of the Pandemic on patients' QOL. Individual items on the Q-LES-Q-SF were also assessed for qualitative illustration.

This project (HSRD HSRD21–0184) was deemed to be not human subjects research and was exempt from Institutional Review Board IRB review.

Results

Demographics

Among the 1026 patients in 2019, 298 completed the Q-LES-Q-SF during both admission and 3 months later in the selected time frames. Among the 1020 admissions during the 2020 pandemic, 316 completed the Q-LES-Q-SF during both time frames. Across both samples, 38% of patients were biological females and 62% were biological males. All patients identified as the gender assigned to them at birth. Racial make-up was as follows, White: 57.7%, Black: 17.3%, Asian: 4.4%, "Other/Decline to Identify": 20.6%. The majority (78.9%) were Non-Hispanic/Latino. The majority (93%) identified as straight, 0.1% as gay,

4% as bisexual, and 2.9% as "Unsure/Refuse to answer". Patients reported their marital status as: single (59.3%), married (25.8%), divorced (5.8%), widowed (1.8%), separated (1.6%), and "Other/Refuse to Answer (5.6%). Twenty percent of patients had a history of legal problems.

This collective sample was diagnosed primarily with alcohol (38.8%) use disorders, followed by cannabis (21.9%), opiate (17.6%), cocaine (5.7%), benzodiazepine (2.1%), another stimulant (1.1%), hallucinogen (0.4%) and "Other/polysubstance use disorder with no primary substance" (12.2%). Almost half (46%) of this sample had secondary psychiatric diagnoses; primarily mood (15.6%) or anxiety disorders (12.5%).

The groups did not significantly differ by gender [$x^2(1) = 3.37$, $p = .06$], marital status [$x^2(4) = 2.52$, $p = .64$], or ethnicity [$x^2(1) = 1.52$, $p = .22$]. Differences in ethnoracial make-up [$x^2(3) = 36.07$, $p < .001$] indicated that there were proportionally more patients identifying as Black admitted during in-person services and more patients identifying as "Other/Decline to Identify" race category admitted during Telehealth services. The groups also significantly differed in age of patients $F(1, 2045) = 17.17$, $p < .001$), such that the in-person group ($M = 42.5$, $SD = 15.3$) had a higher average age than the Telehealth group ($M = 39.78$, $SD = 14.79$).

Quality of life

In line with hypotheses, analysis of the effect of condition on changes in QOL from admission to 3 months revealed a significant main effect of time, $F(1, 612) = 90.82$, $p < .001$. Total self-reported QOL improved from admission, $M = 50.1$, 95% CI [49.33 - 50.96] to 3 months later, $M = 53.58$, 95% CI [52.85–54.31]. There was no main effect of condition, $F(1, 612) = 0.433$, $p = .51$. To account for the differences between groups in race and age, a two-way mixed repeated measures ANOVA was conducted, adding age and dummy coded race variables as covariates. Once again, there was a significant main effect of time, $F(1, 608) = 14.51$, $p < .001$. From admission, $M = 50.14$, 95% CI [49.33 – 50.96], to 3 months later, $M = 53.58$, 95% CI [52.85–54.31], total self-reported QOL significantly improved. There was no main effect of condition, $F(1, 608) = 0.32$, $p = .57$. There were no statistically significant interactions between time and either race, age, or condition; and thus, the increases in QOL are not dependent on age, race, or condition.

A two-way univariate ANOVA assessing differences in QOL at admission across conditions (in-person, Telehealth) and ethnoracial group (White, Black, Asian, "Other") revealed a main effect of ethnoracial group, $F(3, 2037) = 5.77$, $p = <0.001$ on QOL scores. White patients ($M = 48.77$, $SD = 10.43$) had lower QOL scores entering treatment compared to both Black patients ($M = 50.63$, $SD = 9.86$) and those identifying as "Other" ($M = 50.64$, $SD = 10.19$) across conditions. No main effect of condition (in-person vs. Telehealth) emerged ($p = .69$). An interaction between ethnoracial group and condition, $F(3, 2037) = 107.17$, $p = 0.009$) indicated that this difference between White ($M = 47.88$, $SD = 11.28$) and Black ($M = 50.21$, $SD = 9.89$) patients on admission QOL was only significant during in-person services in 2019. There were no differences between ethnoracial groups at admission on QOL during Telehealth care in 2020.

Table 1 provides the differences in individual items for qualitative illustration. The in-person and Telehealth groups were collapsed, as there is no evidence for difference between them. Areas of economic satisfaction, leisure, mood, sexual desire/interest, social relationships, physical health, satisfaction with medication, general life satisfaction, and ability to function in daily life were identified as areas of improvement.

Conclusion and discussion

Consistent with our expectation, there were significant improvements in patients' self-reported QOL during the first 3 months of SUD treatment, and no differences between in-person and Telehealth services on QOL outcomes. Given that Telehealth services overcome the geographical and logistical barriers that may have prevented individuals

Table 1

Improvements in QOL across time.

Individual QOL Items ($N = 692$) *"Patients' satisfaction with ____ over the last week"*	Admission (April – June)[*]	3-Month follow-up (July-September)[*]	Mean Difference	Effect Size (Cohens' d)
Total QOL	$M = 50.14, SD = 10.25$	$M = 53.59, SD = 9.22$	−1.91[*]	−0.16
Economic Satisfaction	$M = 3.20, SD = 1.11$	$M = 3.46, SD = 1.04$	−0.13[*]	−0.13
Household Activities	$M = 3.58, SD = 1.02$	$M = 3.83, SD = 0.95$	−0.04	−0.04
Living/Housing Situation	$M = 3.72, SD = 1.07$	$M = 3.90, SD = 1.01$	−0.03	−0.28
Leisure Activities	$M = 3.36, SD = 1.12$	$M = 3.61, SD = 0.99$	−0.16[*]	−0.14
Work	$M = 3.27, SD = 1.29$	$M = 3.56, SD = 1.20$	−0.07	−0.05
Mood	$M = 3.32, SD = 1.04$	$M = 3.73, SD = 0.90$	−0.14[*]	−0.14
Family	$M = 3.65, SD = 1.08$	$M = 3.85, SD = 1.03$	−0.11	−0.10
Sexual Desire/Interest	$M = 3.27, SD = 1.28$	$M = 3.48, SD = 1.17$	−0.14[*]	−0.13
Social Relationships	$M = 3.55, SD = 1.08$	$M = 3.78, SD = 0.97$	−0.14[*]	−0.13
Physical Health	$M = 3.70, SD = 1.00$	$M = 3.90, SD = 0.89$	−0.12[*]	−0.13
Ability to get around without feeling dizzy/unsteady/falling	$M = 4.18, SD = 0.93$	$M = 4.38, SD = 0.79$	−0.11	−0.12
Vision (Eyesight)	$M = 4.11, SD = 0.96$	$M = 4.16, SD = 0.88$	0.01	−0.01
Medication	$M = 3.74, SD = 1.05$	$M = 4.12, SD = 0.84$	−0.28[*]	−0.15
General Life Satisfaction	$M = 3.39, SD = 1.07$	$M = 3.81, SD = 0.88$	−0.15[*]	−0.15
Ability to Function in Daily Life	$M = 3.70, SD = 1.08$	$M = 4.00, SD = 0.87$	−0.18[*]	−0.18
Overall Sense of Well-being	$M = 3.63, SD = 0.97$	$M = 3.92, SD = 0.85$	−0.08	−0.09

[*] Two-tailed paired samples *t*-test statistically significant at p=.05.

from receiving treatment historically, this is a highly encouraging finding. Until 2020, individuals with substance use disorders (SUDs) who did not have access to outpatients services (e.g., due to geographical, transportation, or family responsibility limitations) often did not receive evidence-based treatment (Hecksher and Hesse, 2009). As outpatient SUD treatment becomes available to a broader community, we do see differences in the populations receiving care. Demographically, proportionally more patients identifying as Black entered treatment when services were in-person, and more patients identifying as "Other"/Decline to Identify" entered Telehealth care. It is possible that more individuals are selecting "Other/Decline to Identify" rather than "Black" during Telehealth treatment as a response to the sociocultural events occurring in 2020 (e.g., Black Lives Matter campaigns) and a broader awareness of the considerable ethnoracial diversity that transcends historically narrow categories of race. It is also possible that, indeed, fewer Black patients are entering into Telehealth treatment. Anecdotally, more Black patients expressed concerns with lack of access to Technology/Wifi and less comfort with Telehealth. Future research is needed to better understand which ethnoracial groups are seeking out Telehealth services, and why. We also need more nuanced information regarding ethnoracial identity, geographic location of patients, and motivations to receiving in-person vs. Telehealth treatment to help us understand this finding.

The finding that younger individuals are more likely to enter Telehealth care may suggest that younger individuals are more familiar with videoconferencing technology and more open to Telehealth services. If this is the case, there needs to be more investigation into overcoming technological barriers where needed. Future research is needed to assess whether certain clinical groups benefit more from in-person vs. Telehealth services. In terms of QOL, specifically, future research is needed to understand how different domains of life are uniquely influenced by outpatient substance use treatment and what the moderating and mediating factors are.

There are several important limitations to this study. First, the associative design does not allow for causal interpretations. It is unclear whether the changes in QOL are a direct result of treatment, or a result of other factors (e.g., regression to the mean, individuals who were struggling the most did not seek out services). Further, QOL is only one of many important outcome variables that need to be assessed over time (Tiffany et al., 2012); changes in substance use, psychiatric functioning, and service utilization also need to be included. We are currently adding more evidence-based clinical outcome measures to our routine care to drive future research in the area. There is often limited time afforded to collecting, analyzing, and disseminating patient outcome data so that it

can be reviewed and implemented into clinical care and few clinicians have the methodological and analytic skills to oversee such projects. We have been fortunate to find increasing institutional support for addressing both concerns, which has allowed these authors to expand on Quality Improvement initiatives.

In summary, the results of this study suggest no differences in longitudinal improvement in QOL between Telehealth and in-person services, and no differences in admission QOL, despite the major stressors associated with the Pandemic in 2020. These preliminary findings suggest that QOL outcomes are not affected by the modality of treatment provision and offer a foundation for further study into the effectiveness of Telehealth services in SUD treatment.

Author disclosures

Declaration of Competing Interest

CRediT authorship contribution statement

Monica F. Tomlinson: Conceptualization, Methodology, Formal analysis, Writing – original draft. **Monica P. Thomas:** Conceptualization, Data curation, Writing – review & editing, Supervision. **Bruce Goldman:** Writing – review & editing, Conceptualization, Supervision. **Jessica Bourdon:** Writing – review & editing, Data curation, Supervision, Resources, Project administration. **Nehal P. Vadhan:** Conceptualization, Supervision, Writing – review & editing, Project administration.

Acknowledgements

References

Endicott, J., Nee, J., Harrison, W., Blumenthal, R., 1993. Quality of life enjoyment and satisfaction questionnaire: a new measure. Psychopharmacol. Bull. 29 (2), 321–326.

Hall, J.L., McGraw, D., 2014. For telehealth to succeed, privacy and security risks must be identified and addressed. Health Aff. 33 (2), 216–221.

Hecksher, D., Hesse, M., 2009. Women and substance use disorders. Mens Sana Monogr. 7 (1), 50–62. doi:10.4103/0973-1229.42585, PubMed.

Lin, L.(Allison), Casteel, D., Shigekawa, E., Weyrich, M.S., Roby, D.H., McMenamin, S.B., 2019. Telemedicine-delivered treatment interventions for substance use disorders: a systematic review. J. Subst. Abuse Treat. 101, 38–49. doi:10.1016/j.jsat.2019.03.007.

Manning, V., Garfield, J.B.B., Lam, T., Allsop, S., Berends, L., Best, D., Buykx, P., Room, R., Lubman, D.I., 2019. Improved quality of life following addiction treatment is associated with reductions in substance use. J. Clin. Med. 8 (9). doi:10.3390/jcm8091407.

Tiffany, S.T., Friedman, L., Greenfield, S.F., Hasin, D.S., Jackson, R., 2012. Beyond drug use: a systematic consideration of other outcomes in evaluations of treatments for substance use disorders. Addiction 107 (4), 709–718. doi:10.1111/j.1360-0443.2011.03581.x.