

Home-Based Outpatient Telepsychiatry to Improve Adherence With Treatment Appointments: A Pilot Study

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Objective: This study examined whether patients who had been nonadherent with outpatient appointments and who were randomly assigned to receive treatment through a telepsychiatry intervention (home-based video teleconferencing) would show improvement in adherence to appointments, compared with a treatment-as-usual group.

Methods: Participants (N=22) were randomly assigned to home-based video teleconferencing or to outpatient treatment as usual during a six-month study. The primary outcome measure was improvement in visit adherence, which was analyzed using a two-sample t test.

Results: Percentage improvement in visit adherence did not differ significantly between the telepsychiatry and treatment-as-usual groups (14%, compared with 15%). A greater number of participants in the telepsychiatry group reported less subjective difficulty in keeping appointments.

Conclusions: A small number of participants, short study period, selection bias, and the Hawthorne effect may have limited measured impact in this study. The findings implied that visit nonadherence among frequently nonadherent individuals is largely unrelated to inconvenience.

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Patient nonattendance is a ubiquitous but disruptive and expensive problem in outpatient care. Rates of nonadherence with appointments as high as 50% of all visits have been reported (1,2), and nonadherence costs health care systems millions of dollars in wasted resources (2). This problem stems from a variety of social, psychological, and logistical factors, but both survey data and direct correlational data have shown that inconvenience and increased travel time are associated with nonadherence (3–5).

Attempts to improve visit adherence have utilized human factors interventions such as automated reminders, with mixed results (6), and there have been several encouraging efforts to improve convenience of access to specialty services by using telepsychiatric consultation (7).

Home-based telepsychiatry is a recent technological intervention that would theoretically remove much of the inconvenience involved in clinic attendance. Previous trials involving telepsychiatry focused on clinic-based treatment and found telepsychiatry to be comparable with in-person treatment with regard to assessment and doctor and patient satisfaction (8,9). There are no prospective studies considering treatment adherence, but a single retrospective study of office-based telepsychiatric visits showed significant benefits in adherence (10). Few published studies have examined home-based telepsychiatry, and those that have

examined this intervention involved retrospective survey data (11), case reports (12), and psychotherapeutic interventions (13,14).

We undertook a pilot, prospective randomized controlled study to consider the effect on visit adherence of home-based telepsychiatric care, compared with in-person office visits. The goal of the study was to determine whether individuals at high risk of nonattendance who received treatment through home-based teleconferencing would show increased adherence, compared with a treatment-as-usual group. We explored the feasibility of such an intervention by using survey data on providers' and patients' sentiment regarding the use of this technology.

METHODS

The Zucker Hillside Hospital outpatient clinic, located in Glen Oaks, New York, serves a socioeconomically diverse population and has a census of approximately 3,500 individuals. All outpatient providers (attending physicians, residents, and nurse practitioners) at the clinic were approached by using an online survey to determine their willingness to conduct patient visits through telepsychiatry. The survey included questions about four possible areas of concern: hassle, safety, technical issues, and therapeutic alliance.

Participants were recruited from the clinic population from October 1, 2014, through October 31, 2015. Patients who met inclusion criteria and who were deemed appropriate for the study by their providers were approached by study personnel to determine their willingness to enroll. All participants who agreed to participate in the study signed written consent forms after discussion with study personnel about the risks and benefits of study participation.

An online random number generator was used to randomly assign study participants to a telepsychiatry intervention or to treatment as usual. Participants randomly assigned to the telepsychiatry intervention were seen in the community through video teleconferencing by psychiatric providers located at the Zucker Hillside Hospital clinic. Teleconferencing was performed through Webex, a certified HIPAA-compliant platform, and patients used their own computers or smartphones to access the application. Participants randomly assigned to the treatment-as-usual group continued to see their providers in person. The frequency of participants' visits continued as clinically indicated in both treatment groups. Participants in both groups were treated with psychotropic medication and talk therapy by their psychiatrist as clinically indicated.

Each participant agreed to participate in the study for a six-month period. At the conclusion of this period, all participants were asked to complete a short questionnaire regarding satisfaction with their treatment. Missed and attended visits were recorded as part of routine clinical documentation.

Participants received no monetary compensation for participation in the study, but all fees were waived if not covered by participants' health insurance because of the use of telepsychiatric visits. The study was approved by the institutional review board (IRB) at the Feinstein Institute of Northwell Health system and was in compliance with the principles outlined in the Declaration of Helsinki.

The study participants were recruited from active patients in the outpatient clinic who were between the ages of 18 and 65. Inclusion criteria required participants to have missed two scheduled clinic appointments due to no-show or cancellation with less than 24 hours notice over a two-month period at any point over the past six months. Participants were considered eligible if they reported access to a computer or smartphone with a webcam and with the capability of connecting to the Internet. Participants were included regardless of gender, psychiatric diagnosis (including personality disorder or substance use disorder), and comorbid medical conditions. Patients who had active suicidal ideation, those who had other acute safety concerns (as reported by their providers), and those previously offered telepsychiatric care were not eligible for the study.

The primary outcome measure was improvement in visit adherence from a six-month baseline. Distributions of all variables were inspected using histograms, quantile-quantile plots, and Shapiro-Wilk tests before conducting statistical analysis. Differences between groups in participants' characteristics were examined by using chi-square analysis for categorical variables and the independent-samples *t* test or

Wilcoxon rank sum test for continuous variables. SAS, version 9.4, was used for all analyses.

No previous data were available to provide a meaningful estimate of effect size. Nevertheless, a power analysis was performed prior to the study by using a standardized difference (effect size) of .6 for percentage of missed appointments, at 80% power and 5% significance. Thus originally the study set out to recruit 100 participants, assuming a dropout rate of 10%. However, we did not succeed in recruiting our intended sample size, given that recruitment proved to be more difficult than expected.

RESULTS

Recruitment was more difficult than expected because of the limited number of providers (six of 48) who agreed to participate and who also completed IRB training. Of the patients seen by these providers, 222 individuals were identified as meeting the study criteria. Less than one-half of this group (61 patients) were considered appropriate for the study by their providers. Approximately one-third of those patients (22 patients) ultimately signed consent forms, were enrolled in the study, and were randomly assigned to a study group. There were no significant differences between study groups in age, gender, diagnosis, distance traveled to the clinic (calculated using Google Maps navigation Web site), or baseline rate of nonadherence with visits in the past six months (Table 1).

Twenty-two participants were enrolled in the study, and all were included in the final analysis. One individual refused telepsychiatry and was seen in person despite having been randomly assigned to the telepsychiatry group. This participant was included in the analysis in an intention-to-treat manner as part of the telepsychiatry group. A second individual (randomly assigned to the treatment-as-usual group) asked to change treatment venues after completing two months of the study. Available data for this participant were included in an intention-to-treat manner as well.

The baseline no-show rate across both groups during the six months prior to study recruitment was a mean \pm SD of $41\% \pm 19\%$. The no-show rate was $28\% \pm 22\%$ during the study. Participants in the telepsychiatry group missed $23\% \pm 25\%$ of scheduled visits, and the treatment-as-usual group missed $31\% \pm 19\%$. The percentage improvement from baseline did not differ significantly between the telepsychiatry group ($14\% \pm 20\%$) and the treatment-as-usual group ($15\% \pm 22\%$).

Participants in the telepsychiatry and treatment-as-usual groups were both seen once a month on average. All participants were seen for medication management at each contact, and one individual in each group also participated in weekly psychotherapy provided by their prescribing psychiatrist.

No adverse events (suicide attempts, completed suicides, hospitalizations) occurred in the telepsychiatry group. There were two hospitalizations due to exacerbations of underlying psychiatric illness in the treatment-as-usual group. In the telepsychiatry group, a single visit (1.6% of total visits) was missed because of technical issues.

Thirty-one providers (65% of all clinic providers) responded to an e-mail request to complete an online survey on attitudes toward and concerns about telepsychiatry, and 12 expressed willingness to participate as providers. Concerns about technical issues were most common (83%±13%) followed by extra hassle (65%±17%). Fewer providers considered safety and negative impact on the doctor-patient relationship as concerning. [Further details about providers' concerns are available as an online supplement to this article.]

Responses from participants' surveys showed no statistically significant differences between treatment groups with regard to satisfaction with the provider, likelihood to recommend clinic services to a friend, instances of missing appointments due to inconvenience, or ease of scheduling appointments [see online supplement]. A significantly greater number of participants in the telepsychiatry group reported that they had no difficulty or minor difficulty in keeping appointments ($p=.01$).

DISCUSSION

To the best of our knowledge, this was the first study to prospectively compare home-based telepsychiatry with usual psychiatric care. The study failed to find a difference in attendance improvement between groups, possibly due to type II error. Despite absence of improvement in the primary outcome measure, several other important findings emerged. Data gathered from participants' surveys showed a significant decrease in subjective difficulty in keeping appointments in the telepsychiatry group. It is striking that despite significantly less subjective difficulty making visits, participants in this group missed approximately the same percentage of visits as participants who were seen in person. It would appear that factors other than improving convenience must be addressed to improve adherence with outpatient visits.

The findings also demonstrated the feasibility of a study involving home-based telepsychiatric visits without the necessity of providing specialized teleconferencing equipment. Participants were seen through use of their own personal computers, tablets, or smartphones. Despite a lack of technical support, the rate of missed visits due to issues with teleconferencing equipment was low. There were also no reports of adverse events among participants seen through telepsychiatry, and there were no significant differences in survey responses between groups with regard to satisfaction or likelihood to recommend clinic services to a friend. This lack of difference may have been due to the small sample size but is consistent with previous studies reporting similar levels of patients' satisfaction and rapport between in-person and telepsychiatric care. The low percentage of participation among providers may have been related to concerns regarding hassle and technical issues, given that these were the most common concerns reported in the providers' survey.

Lack of significant improvement may have been due to type II error resulting from the small sample size but points to a lack of significant effect size for this intervention.

TABLE 1. Baseline characteristics of outpatients randomly assigned to receive treatment through a telepsychiatry intervention or in-person treatment as usual

Characteristic	Telepsychiatry (N=11)		Treatment as usual (N=11)	
	N	%	N	%
Age (M±SD)	42±15		37±10	
Male	5	45	3	27
Caucasian	8	73	5	45
Black	1	9	2	18
Asian	1	9	3	27
Hispanic	1	9	1	9
Diagnosis				
Schizophrenia spectrum disorder	1	9	4	36
Mood disorder	6	55	4	36
Anxiety disorder	4	36	3	27
Multiple axis I diagnoses	5	45	5	45
Comorbid personality disorder	1	9	3	27
Comorbid substance use disorder	2	18	3	27
Comorbid general medical condition	9	82	9	82
Distance to clinic (M±SD miles)	9.4±7.4		8.1±7	
Baseline adherence (M±SD percentage) ^a	58±19		52±20	

^a Percentage of visits attended during the six months prior to study recruitment

Beyond the small sample size, study weaknesses included the lack of objective measures of participants' symptom severity at baseline and follow-up, the short study period, the Hawthorne effect, and possible selection bias resulting in participation by high-functioning patients. Survey data from both providers and participants also relied on questionnaires that were developed by the study investigators and had not been validated empirically.

CONCLUSIONS

In light of the growing popularity of teleconferencing as a mode of communication in society, further study is required in this area. In considering the appropriateness of additional studies of a similar design, the study results suggest the need for a much larger sample size. This might be better accomplished with a randomized trial of clinical sites rather than of individual participants. This would be a more efficient study design and would also more closely mirror real-world interventions in which this service is offered to the general clinical population. Intervention applied on a larger scale would provide the opportunity to identify subgroup populations that would be more or less likely to benefit from home-based telepsychiatric visits.

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