Psychotherapy for Depression in Older Veterans Via Telemedicine:

Effect on Quality of Life, Satisfaction, Treatment Credibility, and Service Delivery Perception

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ABSTRACT

Objective: To analyze the impact of telepsychology and same-room care on functioning, satisfaction, and perception of care based on a noninferiority trial of psychotherapy delivered via telemedicine or same-room care to elderly patients with depression.

Methods: 241 elderly patients with depression (meeting *DSM-IV* diagnostic criteria) were randomly assigned to either telemedicine (n = 120) or same-room treatment (n = 121) between April 1, 2007, and July 31, 2011. The primary outcomes included quality of life (36-item Short Form Survey [SF-36]), satisfaction (Charleston Psychiatric Outpatient Satisfaction Scale), treatment credibility, and service delivery perception scores obtained at 4 weeks, 8 weeks, 3 months, and 12 months. Comparisons of intervention means were carried out at each time point using independent sample *t* tests and SAS Procedure MIANALYZE to combine results across the multiply imputed complete data sets. If significant differences were detected for a given outcome within a domain, a Bonferroni correction was applied to determine if significance was maintained.

Results: None of the SF-36 scores showed a significant difference between the 2 treatment groups by the end of the study period, with little significance shown throughout the intermediate time points. Similarly, over all time points, there was no statistically significant difference in patient satisfaction or treatment credibility.

Conclusions: This study found that telemedicine is a viable alternative modality for providing evidence-based psychotherapy for elderly patients with depression. Results provide evidence that quality of life and satisfaction with care are not adversely influenced by the decision to use a telehealth modality instead of in-person treatment, and, as a result, resources can be devoted to offering services in patients' homes through telemedicine.

Trial Registration: ClinicalTrials.gov identifier: NCT00324701

J Clin Psychiatry 2016;77(12):1704–1711
dx.doi.org/10.4088/JCP.16m10951

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Depression is increasingly recognized as one of the most burdensome disorders due to its high prevalence, adverse impact on role transitions and role functioning, elevated risk of secondary disorders, and increased risk of mortality.[1,2] Worldwide, depression ranks as the leading cause of disability,[3] with 12-month prevalence estimates in 2003 ranging from 0.3% (Czech Republic) to 10% (United States).[3,4] Depression is associated with increased mortality risk secondary to a variety of highly prevalent comorbid conditions, as well as increased suicide risk.[1,2,5] Depression is also costly,[1] with the financial burden of depression in the United States now estimated at $210.5 billion: 45% due to direct costs, 50% due to workplace costs, and 5% due to suicide-related costs.[6] Although more prevalent in younger age groups, depression is often more detrimental in the elderly due to existing medical illnesses, cognitive impairment, and existing disability.[5,7,8] It is the most frequent cause of emotional distress in the elderly, and suicide in the elderly is nearly twice as frequent as in younger age groups.[7,9,10] Suicide rates are also high in the military, surpassing rates for civilian populations for the first time in 2010.[11]

While cognitive behavioral therapies are the most recommended form of psychotherapy for depression, pharmacologic treatment is the most widely used given that primary care settings are more likely to diagnose and treat geriatric depression.[12–14] Nonetheless, although effective treatment exists, treatment-seeking rates for individuals with depression remain low, with a treatment rate of 56% reported for 2010.[6] Depression often goes unrecognized and untreated, and negative attitudes (eg, stigma, shame) toward depression may lead people to deny symptoms and delay treatment, especially among older adults.[7,15,16] When provided, treatment reduces secondary symptoms, such as pain, and improves quality of life, in addition to reducing depressive symptoms.[12,17] However, numerous barriers to treatment exist, including mobility issues, stigma concerns, and geographic isolation.[18] Addressing the stigma attached to mental health treatment may be a means of improving access to care, specifically for older adults.[12]

Telemedicine may offer an important option to increase access to evidence-based psychotherapy while reducing stigma associated with obtaining this care.[19] Telemedicine offers advantages over standard, in-person office-based care, including decreased patient costs due to transportation

and missed work and increased coverage capabilities for providers (ie, multiple clinics or homes).[19] Telemedicine can overcome stigma and benefit older adults, specifically by providing access in rural communities, reducing the cost of health care, and improving functional independence.[20–24] Findings from studies on posttraumatic stress disorder show that telemedicine is satisfactory to patients, improves outcomes, and is cost-effective; however, methodologically sound evidence has been lacking on telemental health treatment of depression, until recently.[24–27] A noninferiority trial of psychotherapy delivered via telemedicine or same-room care to elderly patients with depression showed that telemedicine was not inferior to in-person care on the basis of the primary clinical outcomes of treatment response (50% reduction in symptoms from baseline to 12 months and no longer diagnosed with major depressive disorder at 12 months).[18]

The major question that remains unanswered is whether differences exist in patient perception, satisfaction, therapeutic alliance, and quality of life between telemental health and in-person care. While some studies[28–30] show similar levels of patient satisfaction, therapeutic alliance, and quality of life for those receiving telehealth, little work has investigated this topic in elderly patients with depression. A noninferiority trial of psychotherapy delivered via telemedicine reported primary outcomes of changes in depression,[18] but did not provide important secondary outcomes including quality of life and perception of care. The aim of this analysis was to analyze the impact of behavioral activation treatment delivered via telemedicine versus same-room treatment on functioning, satisfaction, and perception of care. We hypothesized that there would be no significant difference in quality of life, satisfaction, treatment credibility, and service delivery perception between the telemedicine and same-room treatment modalities.

Clinical Points

- Little work, specifically using randomized controlled design, has investigated differences in patient perceptions, satisfaction, therapeutic alliance, and quality of life between telemental health and in-person care.
- This study found telemedicine-delivered behavioral activation using in-home videophones to be noninferior to face-to-face treatment in terms of quality of life, satisfaction, treatment credibility, and service delivery perception.
- Telemedicine is an accessible, highly relevant option for rural areas or remote locations to address mental health needs while providing patient satisfaction and quality of life similar to that provided by face-to-face contact in clinics.

METHODS

Study Design and Participants

This study was a randomized, controlled, noninferiority trial with participants recruited from the Ralph H. Johnson Veterans Affairs Medical Center (VAMC) in Charleston, South Carolina, and 4 associated community outpatient-based clinics (Goose Creek, Beaufort, and Myrtle Beach, South Carolina, and Savannah, Georgia). The study design and methods have been published previously.[18,31] The initial eligibility requirement was veterans aged 60 years or older meeting *DSM-IV* criteria[32] for major depressive disorder; however, requests to lower the age limit to accommodate more veterans from the Vietnam War era led to the inclusion of veterans aged 58 years or older. Exclusion criteria included those with active psychosis or dementia, those with both suicidal ideation and clear intent, those meeting criteria for substance dependence, and those unable to provide informed consent. All other forms of psychopathology were not cause for exclusion. This trial is registered with ClinicalTrials.gov (number NCT00324701).

Recruitment and Randomization

All study procedures were approved by the Medical University of South Carolina Institutional Review Board and Veterans Affairs Research and Development Committee. Postcards were mailed to those meeting inclusion criteria asking them to contact study personnel if they felt sad or depressed and were interested in learning about a study assessing telemedicine-delivered care. All those contacting staff were offered standard clinic-based assessment and services for depression as an alternative to participation in the study. Study procedures were explained to those interested in the study, and all participants gave written informed consent.

Once eligibility criteria were verified, the study coordinator obtained informed consent from the patients and randomly assigned participants (1:1) into 1 of 2 study groups delivering behavioral activation for depression: telemedicine and same-room (ie, in-room) treatment. Randomization was computer-generated by the senior statistician using permuted-block randomization, stratified by race. Block size was varied between 2 to 6 to minimize chance that masking would be broken. Patients were allocated using sealed envelopes to determine random treatment assignment. Those conducting psychiatric interviews at baseline and 12 months and those assessing primary outcomes were masked to the treatment assignment.

Procedures

We required that antidepressant medication be stabilized 4 weeks before treatment initiation, and, during treatment, we requested prescribers to maintain dosage if at all possible for 3 months. Participants with no changes to prescription medication 4 weeks before enrollment started treatment 1 week after randomization. Participants with recent changes or who had recently begun new antidepressants or any other prescription waited 4 weeks after assignment to begin study treatment in order to ensure medication stabilization.

Patients received individual psychotherapy—behavioral activation for depression—for 8 weeks according to a previously published manual.[33,34] Treatment was not modified for the telemedicine group. Daily planners and

valued activity lists were used to increase the likelihood that reinforcing behaviors would be implemented because behavioral activation is based on the theory that patients' frequency of valued and reinforcing activities plays a part in how they feel.[34] Valued activity lists were used to schedule positively (eg, attendance at grandson's football game) or negatively (eg, completion of necessary chore resulting in spousal praise) reinforcing behaviors. Daily planners were used to schedule these behaviors and allowed obstacles to successful completion to be identified in advance. Patients received 60-minute sessions once per week, with the intervention group receiving therapy via telemedicine in their home and the control group receiving face-to-face therapy at the VAMC.

Treatment sessions for the telemedicine group used in-home videoconferencing technology operating via the standard telephone service. Equipment looked and functioned similar to a basic touchtone telephone, with an additional built-in camera and a 4-inch LCD color screen. Participants did not need broadband Internet access, only standard telephone service to use the analog videophone.[31] Therapists were master's-level counselors with at least 5 years of clinical experience, and each received training prior to the study in addition to weekly supervision meetings. Twenty percent of session audiotapes were randomly audited for treatment fidelity.

Primary outcomes were reported by Egede et al[18] in *Lancet Psychiatry*. Two hundred forty-one patients were screened and consented to participate between April 1, 2007, and July 31, 2011. One hundred twenty patients were randomly assigned to the telemedicine group, and 121 were randomly assigned to the same-room group. Eighty-three percent of those randomly assigned to the telemedicine group and 86% of those randomly assigned to same-room treatment returned for the final assessment. Additionally, average session attendance was high, with 81% of the telemedicine group and 79% of the same-room group completing all 8 sessions. More detailed information, including a CONSORT diagram of the trial profile and information regarding retention and session attendance, is provided in Egede et al.[18]

Table 1. Patient Demographics at Baseline

Characteristic	Total (N = 241)	Telepsychology (n = 120)	Same-Room (n = 121)
Age, mean ± SD, y	63.9 ± 5.1	63.5 ± 4.4	64.2 ± 5.6
Race, n (%)			
White	143 (59.3)	68 (56.7)	75 (62.0)
Black	94 (39.0)	49 (40.8)	45 (37.2)
Male gender, n (%)	235 (97.5)	116 (96.7)	119 (98.3)
Employed, n (%)	50 (21.0)	23 (19.2)	27 (22.3)
Working hours weekly if working, mean ± SD	30.3 ± 14.8	29.3 ± 16.1	31.0 ± 14.1
Married, n (%)	165 (68.5)	83 (69.2)	82 (67.8)
Education, mean ± SD, y	13.7 ± 2.6	13.5 ± 2.3	13.8 ± 2.9
Smoker, n (%)			
Current smoker	49 (20.3)	25 (20.8)	24 (19.8)
Former smoker	132 (54.8)	65 (54.2)	67 (55.4)
Nonsmoker	56 (23.2)	29 (24.2)	27 (22.3)
Percentage service-connected medical care, mean ± SD	45.1 ± 40.4	47.8 ± 39.7	42.5 ± 41.1
Health status, n (%)			
Better	39 (16.2)	20 (16.7)	19 (15.7)
About the same	104 (43.2)	61 (50.8)	43 (35.5)
Worse	96 (39.8)	38 (31.7)	58 (47.9)
Insurance coverage, n (%)			
Private	67 (27.8)	32 (26.7)	35 (28.9)
Government	72 (29.9)	41 (34.2)	31 (25.6)
Private and government	22 (9.1)	9 (7.5)	13 (10.7)
VA only	80 (33.2)	38 (31.7)	42 (34.7)
Income, n (%)			
$0–< $15,000	49 (20.3)	25 (20.8)	24 (19.8)
$15,000–< $25,000	56 (23.2)	24 (20.0)	32 (26.4)
$25,000–< $50,000	93 (38.6)	49 (40.8)	44 (36.4)
$50,000 or more	40 (16.6)	20 (16.7)	20 (16.5)
Days at least 20 min moderate/vigorous activities, mean ± SD	1.2 ± 1.2	1.1 ± 1.1	1.3 ± 1.2

Abbreviation: VA = Veterans Affairs.

Outcomes

Process outcome variables included quality of life, satisfaction, treatment credibility, and service delivery perception scores obtained at 4 weeks, 8 weeks, 3 months, and 12 months, as outlined in our protocol describing secondary process analysis.[31]

Quality of life. Quality of life was measured using the 36-item Short Form Survey (SF-36),[35] a 36-item questionnaire measuring health status and functioning over the past 4 weeks. Items include dichotomous (yes/no) responses and ratings on a 6-point Likert scale. Responses can be compiled into 8 dimensions, including physical function, limiting physical health, limiting emotional problems, energy/fatigue, emotional well-being, social functioning, pain, and general health. Final scores range from 0 to 100; the highest possible level of functioning is represented by a score of 100. Responses are averaged together within the appropriate category for a final score within each dimension.[35] The SF-36 has good internal consistency (Cronbach α exceeding 0.80 for each parameter in elderly populations), good test-retest reliability, and sensitivity to change in health status and distinguishes between groups with expected health differences.[36–39]

Satisfaction. Satisfaction was measured using the Charleston Psychiatric Outpatient Satisfaction Scale (CPOSS),[40] a 16-item measure with Likert scale response options. CPOSS has excellent reliability (α = 0.96) and good convergent validity with anchor items, such as, "Would you recommend this treatment to a friend or family member?" The overall score results from summing responses to individual questions for a possible range of 13 to 65, with higher scores indicating higher satisfaction.[40]

Treatment credibility. Treatment credibility was measured using the Treatment Credibility Questionnaire,[41] a 4-item measure using a 10-point Likert scale based on the scale developed by Borkovec and Nau. Treatment credibility assessed differences in outcome expectancy and included questions regarding how logical the treatment seemed, how confident participants were about treatment, and expectancy of success.[41] Final scores were calculated by summing responses to individual questions, resulting in a possible range of 4 to 40, with higher scores indicating better credibility.[41]

Table 2. Quality of Life (SF-36) Variables Over Time by Treatment Group

Variable	Quality of Life: Telepsychology (Mean ± SE)	Quality of Life: Same-Room (Mean ± SE)	Difference: Mean ± SE	Difference: *P* Value	Difference: 90% CI
Physical function					
4 weeks	44.0 ± 2.62	45.4 ± 2.56	−1.4 ± 3.60	.71	−7.3 to 4.6
8 weeks	46.7 ± 2.54	43.4 ± 2.83	3.3 ± 3.83	.39	−3.1 to 9.7
3 months	43.7 ± 2.96	41.8 ± 2.59	1.9 ± 4.02	.64	−4.8 to 8.6
12 months	43.5 ± 2.76	43.3 ± 2.56	0.1 ± 3.81	.97	−6.1 to 6.4
Limits due to physical heath					
4 weeks	78.5 ± 3.25	72.7 ± 3.49	5.8 ± 4.55	.20	−1.7 to 13.3
8 weeks	72.0 ± 3.65	68.7 ± 3.56	3.3 ± 5.28	.54	−5.4 to 12.0
3 months	76.4 ± 3.94	73.6 ± 3.98	2.7 ± 6.01	.65	−7.4 to 12.9
12 months	76.9 ± 3.42	74.4 ± 3.49	2.5 ± 4.97	.61	−5.7 to 10.8
Limits due to emotional problems					
4 weeks	74.7 ± 3.78	67.4 ± 3.76	7.3 ± 5.56	.19	−2.0 to 16.6
8 weeks	66.3 ± 4.06	58.1 ± 4.38	8.2 ± 5.99	.17	−1.7 to 18.2
3 months	70.2 ± 4.43	65.4 ± 4.46	4.8 ± 6.35	.45	−5.8 to 15.5
12 months	69.4 ± 3.95	67.4 ± 4.77	2.0 ± 6.32	.75	−8.6 to 12.6
Energy to fatigue					
4 weeks	30.7 ± 1.68	35.5 ± 1.94	−4.8 ± 2.54	.06	−9.0 to −0.6
8 weeks	35.1 ± 2.16	40.9 ± 1.95	−5.8 ± 2.83	.04	−10.5 to −1.1
3 months	34.0 ± 2.30	37.1 ± 2.22	−3.0 ± 3.11	.33	−8.2 to 2.1
12 months	36.0 ± 2.14	36.6 ± 2.14	−0.5 ± 3.16	.87	−5.8 to 4.7
Emotional well-being					
4 weeks	49.4 ± 1.73	52.7 ± 1.73	−3.2 ± 2.42	.18	−7.2 to 0.7
8 weeks	52.9 ± 2.25	55.7 ± 1.98	−2.8 ± 2.84	.32	−7.5 to 1.8
3 months	50.5 ± 2.50	52.8 ± 2.17	−2.3 ± 3.20	.47	−7.6 to 3.0
12 months	51.9 ± 2.26	52.2 ± 2.02	−0.3 ± 3.14	.92	−5.5 to 4.9
Social functioning					
4 weeks	48.8 ± 2.84	49.2 ± 2.34	−0.4 ± 3.58	.92	−6.3 to 5.5
8 weeks	47.6 ± 3.02	51.5 ± 2.19	−3.9 ± 3.42	.25	−9.6 to 1.7
3 months	42.1 ± 2.76	47.4 ± 2.67	−5.3 ± 3.77	.16	−11.6 to 0.9
12 months	46.4 ± 2.79	47.2 ± 2.37	−0.8 ± 3.59	.82	−6.8 to 5.2
Pain					
4 weeks	43.1 ± 3.19	39.5 ± 2.80	3.7 ± 4.05	.37	−3.0 to 10.4
8 weeks	48.5 ± 2.87	43.0 ± 3.10	5.5 ± 3.90	.16	−0.9 to 11.9
3 months	44.2 ± 3.10	42.9 ± 3.01	1.4 ± 4.36	.76	−5.9 to 8.6
12 months	42.4 ± 2.75	44.2 ± 3.00	−1.9 ± 3.91	.63	−8.3 to 4.5
General health					
4 weeks	36.5 ± 1.86	41.3 ± 2.04	−4.8 ± 2.78	.09	−9.3 to −0.2
8 weeks	39.3 ± 1.86	43.0 ± 2.04	−3.7 ± 2.78	.18	−8.3 to 0.8
3 months	38.6 ± 2.03	40.0 ± 2.02	−1.4 ± 2.87	.63	−6.1 to 3.4
12 months	41.1 ± 1.97	41.8 ± 2.12	−0.6 ± 2.88	.83	−5.4 to 4.1

Service delivery perception. Service delivery perception was measured using the Service Delivery Perception Questionnaire,[31] an 8-item measure assessing perceptions of treatment specifically related to the mode of service delivery. Questions include comfort with the therapist, communication, and willingness to use treatment or refer others. The 8 questions are each measured on a scale of 0 to 5, with higher scores indicating better perception of care.[31]

Statistical Analysis

Descriptive analyses of the patient baseline demographics by treatment group were carried out using mean and standard deviations for continuous variables and frequency distributions for categorical variables. Analysis was carried out using the intent-to-treat (ITT) and per protocol (PP) samples. The ITT sample comprised all randomized patients (N = 241, $n_{Telemedicine} = 120$, $n_{Same\text{-}Room} = 121$); the PP group was defined a priori as subjects who completed at least 4 treatment sessions and for whom all protocol-directed outcome measurements were made (N = 204, $n_{Telemedicine} = 100$, $n_{Same\text{-}Room} = 104$).

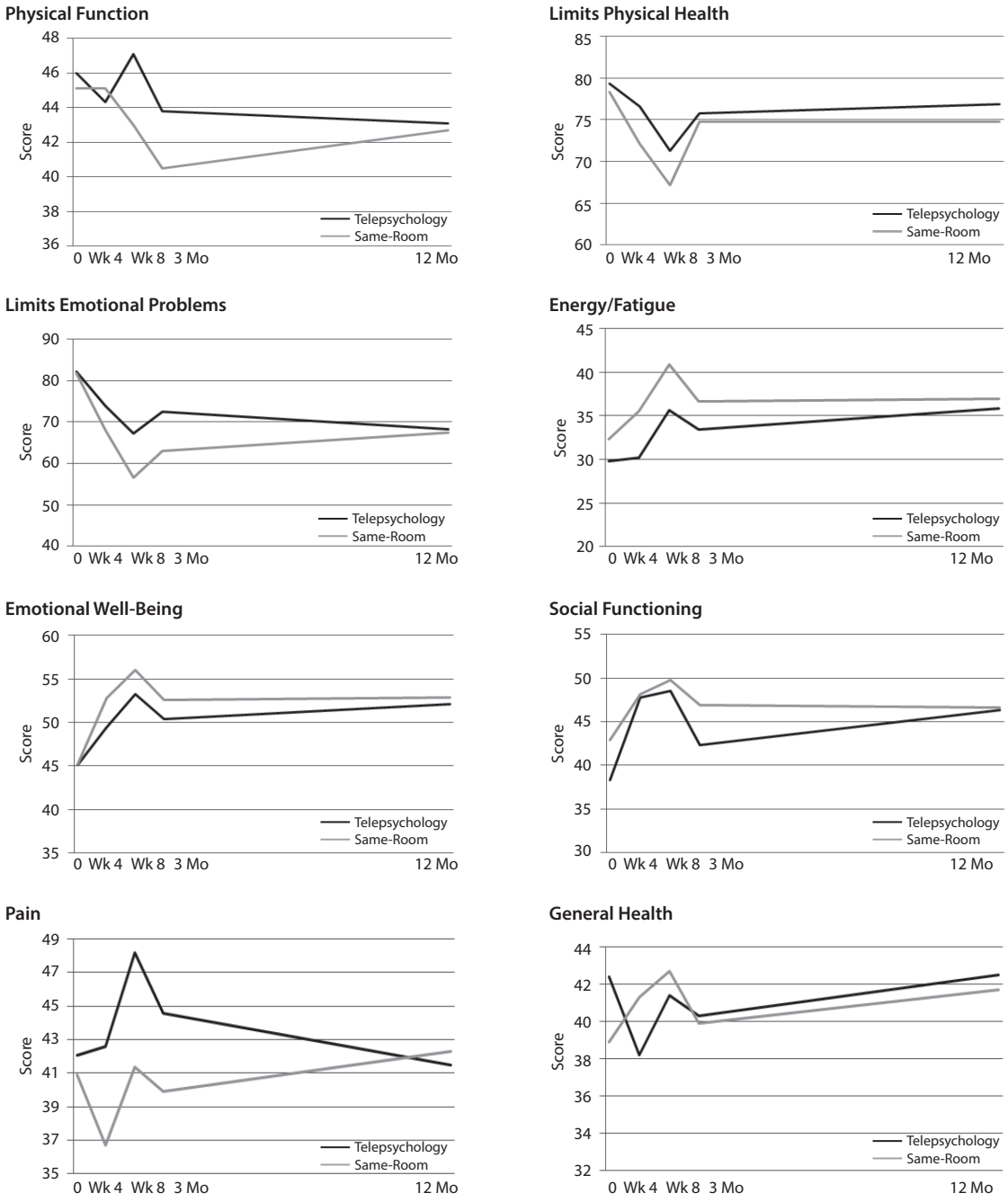
Missing data for the ITT and PP samples were imputed using multiple imputation methods[31,42,43] at each time point (4 weeks, 8 weeks, 3 months, 12 months) using SAS Procedures MI (Markov chain Monte Carlo method) and MIANALYZE (SAS version 9.4, Cary, North Carolina). The imputation model contained patient demographics (age, gender, marital status, education, employment status, income, and insurance variables) and observed outcome values. Comparisons of intervention means were carried out at each time point using independent sample *t* tests and SAS Procedure MIANALYZE to combine results across the multiply imputed complete data sets. The magnitude and direction of differences in treatment means were estimated at each time point using 90% confidence intervals (CIs). The order of subtraction was telemedicine minus same-room, with a positive value indicating a superior mean score for telemedicine and a negative value indicating an inferior mean score for telemedicine. For the observed sample, *t* tests and CIs were utilized for each variable by time point with no imputation for missing outcomes. SAS 9.4 was utilized for the performance of all secondary process variable analyses, and significance of differences was evaluated using 2-tailed level of significance of .05. Because further adjustment does not modify nonsignificance, adjustment for multiple outcomes within domains (quality of life, satisfaction, treatment credibility, service delivery) was not made if no significant treatment difference was observed for an outcome, and the unadjusted *P* values are reported. If significant differences were detected for a given outcome within a domain, a Bonferroni correction was applied to determine if significance was maintained.

RESULTS

Table 1 shows the characteristics of the ITT sample at baseline. Almost all (97.5%) participants were male, with the mean ± SD age of all study participants being 63.9 ± 5.1 years. The majority of patients were non-Hispanic white (59.3%) and were married (68.5%). The mean level of education was 13.7 ± 2.6 years. Approximately 20% of participants had incomes less than $15,000/year, while 17% had incomes of $50,000 or more per year. The mean percentage of service-connected medical care for the total group was 45.1% ± 40.4%. About 33% of the patients had only Veterans Affairs health insurance coverage, while about 28% and 30% also had private or government coverage, respectively.

Mean scores over time for the 8 SF-36 quality of life variables, as well as the difference in means, significance, and 90% CIs, are presented in Table 2. None of the SF-36 scores show a significant

Figure 1. Trajectory of Imputed Intent-to-Treat Mean Scores for Quality of Life (SF-36) Variables by Treatment Group



Abbreviation: SF-36 = 36-item Short Form Survey.

difference between the 2 treatment groups by the end of the study period, with little significance shown throughout the intermediate time points. Results were comparable for the ITT and PP populations. Figure 1 illustrates the trajectory of all SF-36 mean scores by treatment group over the course of the study. Similar trajectories are seen across all 8 dimensions.

Similarly, Table 3 gives the mean scores over time for the variables expressing patient satisfaction, treatment credibility, and CPOSS scores. Over all time points, there is no statistical difference in patient satisfaction as characterized by these variables. Results were again comparable for the ITT and PP populations.

Finally, mean scores over time for the service delivery perception variables are shown in Table 4. There is no statistical difference in mean score for most of the variables over the course of the study. However, the same-room group did produce statistically superior scores at study

Table 3. Satisfaction Variables Over Time by Treatment Group

Variable	Satisfaction: Telepsychology, Mean ± SE	Satisfaction: Same-Room, Mean ± SE	Difference: Mean ± SE	Difference: *P* Value	Difference: 90% CI
Treatment credibility[a]					
4 weeks	26.7 ± 0.74	28.7 ± 0.85	−1.9 ± 1.21	.12	−4.0 to 0.1
8 weeks	28.8 ± 0.65	30.1 ± 0.83	−1.3 ± 1.07	.24	−3.1 to 0.5
3 months	26.9 ± 0.76	28.6 ± 0.99	−1.7 ± 1.27	.18	−3.9 to 0.4
12 months	27.2 ± 0.87	28.1 ± 0.80	−0.9 ± 1.14	.43	−2.8 to 1.0
Charleston Psychiatric Outpatient Satisfaction Scale					
4 weeks	35.8 ± 0.97	36.5 ± 1.05	−0.6 ± 1.44	.67	−3.0 to 1.8
8 weeks	36.4 ± 1.03	39.1 ± 1.06	−2.7 ± 1.51	.08	−5.2 to −0.2
3 months	34.9 ± 1.05	36.9 ± 1.09	−2.0 ± 1.55	.20	−4.7 to 0.6
12 months	36.7 ± 0.92	37.2 ± 0.94	−0.5 ± 1.39	.72	−2.8 to 1.8

[a]Assessed by the Treatment Credibility Questionnaire.

Table 4. Service Delivery Perception (SDP) Variables Over Time by Treatment Group

SDP Item	Service Delivery Perception: Telepsychology, Mean ± SE	Service Delivery Perception: Same-Room, Mean ± SE	Difference: Mean ± SE	Difference: *P* Value	Difference: 90% CI
1. Personal comfort					
4 weeks	3.1 ± 0.14	3.4 ± 0.09	−0.3 ± 0.16	.07	−0.6 to −0.0
8 weeks	3.4 ± 0.11	3.5 ± 0.11	−0.1 ± 0.15	.53	−0.3 to 0.2
3 months	3.3 ± 0.10	3.4 ± 0.10	−0.1 ± 0.15	.63	−0.3 to 0.2
12 months	3.4 ± 0.10	3.3 ± 0.10	0.1 ± 0.15	.49	−0.2 to 0.4
2. Group comfort[a]					
4 weeks	4.9 ± 0.04	4.9 ± 0.05	0.0 ± 0.06	.70	−0.1 to 0.1
8 weeks	5.0 ± 0.03	4.9 ± 0.05	0.0 ± 0.06	.64	−0.1 to 0.1
3 months	4.9 ± 0.05	4.9 ± 0.08	0.0 ± 0.09	.80	−0.1 to 0.2
12 months	4.9 ± 0.04	4.9 ± 0.04	0.0 ± 0.06	.98	−0.1 to 0.1
3. Communication quality					
4 weeks	3.1 ± 0.09	3.4 ± 0.08	−0.3 ± 0.13	.01	−0.5 to −0.1
8 weeks	3.3 ± 0.08	3.6 ± 0.07	−0.3 ± 0.12	.04	−0.4 to −0.1
3 months	3.2 ± 0.09	3.3 ± 0.08	−0.2 ± 0.13	.25	−0.4 to 0.1
12 months	3.3 ± 0.07	3.4 ± 0.07	−0.1 ± 0.10	.31	−0.3 to 0.1
4. Willingness to drive to same-room treatment[b]					
4 weeks	1.8 ± 0.14	1.9 ± 0.13	−0.1 ± 0.20	.51	−0.5 to 0.2
8 weeks	1.9 ± 0.13	1.9 ± 0.13	−0.0 ± 0.18	.86	−0.3 to 0.3
3 months	1.9 ± 0.13	1.7 ± 0.12	0.2 ± 0.17	.37	−0.1 to 0.4
12 months	1.8 ± 0.13	2.0 ± 0.12	−0.1 ± 0.17	.43	−0.4 to 0.1
5. Willingness to drive to telepsychology treatment[b]					
4 weeks	1.2 ± 0.14	1.2 ± 0.16	−0.0 ± 0.22	.99	−0.4 to 0.4
8 weeks	1.4 ± 0.15	1.2 ± 0.16	0.2 ± 0.20	.36	−0.2 to 0.5
3 months	1.5 ± 0.15	1.1 ± 0.13	0.4 ± 0.22	.07	0.0 to 0.8
12 months	1.3 ± 0.14	1.2 ± 0.13	0.1 ± 0.18	.66	−0.2 to 0.4
6. Likelihood of return					
4 weeks	2.8 ± 0.12	3.1 ± 0.10	−0.3 ± 0.15	.06	−0.6 to −0.0
8 weeks	3.0 ± 0.10	3.2 ± 0.08	−0.2 ± 0.13	.09	−0.4 to −0.0
3 months	2.9 ± 0.10	3.3 ± 0.08	−0.4 ± 0.13	.00	−0.6 to −0.2
12 months	2.8 ± 0.11	3.2 ± 0.10	−0.4 ± 0.16	.02	−0.7 to −0.1
7. Likelihood of referring a friend					
4 weeks	2.9 ± 0.10	3.2 ± 0.09	−0.3 ± 0.14	.02	−0.6 to −0.1
8 weeks	3.0 ± 0.10	3.3 ± 0.09	−0.3 ± 0.13	.01	−0.5 to −0.1
3 months	2.9 ± 0.09	3.3 ± 0.08	−0.4 ± 0.12	.001	−0.6 to −0.2
12 months	2.9 ± 0.11	3.2 ± 0.09	−0.3 ± 0.14	.06	−0.5 to −0.0
8. Overall satisfaction					
4 weeks	3.2 ± 0.07	3.4 ± 0.07	−0.2 ± 0.11	.04	−0.4 to −0.0
8 weeks	3.4 ± 0.09	3.5 ± 0.08	−0.1 ± 0.13	.30	−0.4 to 0.1
3 months	3.1 ± 0.09	3.4 ± 0.08	−0.3 ± 0.13	.04	−0.5 to −0.1
12 months	3.0 ± 0.09	3.3 ± 0.08	−0.3 ± 0.12	.03	−0.4 to −0.1

[a]Comfort with group environment was asked despite individual sessions due to inclusion in validated scale.
[b]Willingness to drive to the treatment services if the therapist was to deliver them in person and willingness to drive to the services if it was delivered via telecommunication (higher numbers indicate further willingness to drive).

end in 2 categories "Likelihood of Return" and "Overall Satisfaction," which were consistent across the ITT and PP populations. The results became nonsignificant following a Bonferroni correction for multiple outcomes within the domain.

DISCUSSION

In conjunction with our earlier finding of noninferior efficacy of telemedicine compared to the same-room model of treatment delivery,[18] these findings offer insight on the impact of behavioral activation delivered via telemedicine or face-to-face on quality of life and perception of care. The lack of significance and small magnitude of difference between interventions for quality of life, satisfaction, and treatment credibility variables in this large, randomized trial provide support for the hypothesis that telemedicine is a viable alternative modality for providing evidence-based psychotherapy for elderly patients with depression. This intervention, delivered using an in-home phone, is distinct from telemedicine that requires patients to travel to a clinic with higher technology capabilities. As such, it provides an accessible, highly relevant option for rural areas or remote locations. These findings suggest that low-tech options, such as home-based telephones, may be an effective way to address mental health needs of rural patients, while providing similar patient satisfaction and quality of life to face-to-face contact in clinics.

Quality of life and satisfaction scores were high in this population of elderly patients with depression, with no decline in scores over time. Differences in the scales used to measure both quality of life and satisfaction make the comparison of actual scores with those from prior studies difficult, but trends are comparable. In 2 randomized trials of collaborative care for depression, Fortney et al[21,27] found little change in the physical component of quality of life, although there were increases in the mental component of quality of life. In a videoconference-delivered intervention for underserved Hispanic patients, quality of life increased significantly over time and was higher in the videoconference-delivered intervention than in face-to-face care.[44] A review of patient perceptions of telemental health[28] found that, in general, patient satisfaction is comparable between in-person delivery and telemedicine modalities, matching results found in the current study. Similarly, a review of telemedicine for depression[26] found that most studies that measured quality of life or satisfaction found no significant differences with face-to-face or usual care.

To our knowledge, this is the largest clinical trial examining noninferiority of face-to-face versus telemedicine delivery of evidence-based

psychotherapy.[18,45] While studies exist testing home-based telemedicine to deliver psychotherapy for posttraumatic stress disorder or to provide psychoeducation for depression, little exists in the literature regarding treatment of depression through telemedicine.[18,26] In addition, while previous studies have investigated satisfaction with care, there are none to our knowledge that provide evidence that home-based telehealth is noninferior to same-room treatment in quality of life, satisfaction, and service delivery perception.[25,28] In particular, little evidence exists on differences or changes in quality of life. The current study provides evidence that quality of life remains high and is comparable between face-to-face therapy and telemedicine-delivered psychotherapy.

Our study is important in the context of clinical care because it provides evidence that quality of life and satisfaction with care are not adversely influenced by the decision to use a telehealth modality instead of in-person treatment. In particular, our study shows that elderly patients with depression show similar levels of satisfaction and perception of delivery of treatment and maintain high quality of life while receiving home-based psychotherapy as compared to those receiving face-to-face treatment. This further demonstrates that evidence-based psychotherapy can be delivered via home-based telemedicine, overcoming barriers to care such as mobility issues, long distances to providers, waiting time, and absence from work, as well as stigma concerns resulting from mental health treatment. As a result, resources should be devoted to offering services in patients' homes through telemedicine.

Along with strengths of this study, including the methodologically rigorous, noninferior design and inclusion of both satisfaction and quality of life measures, there are some limitations. First, some patients were excluded, limiting generalizability to patients who have substance dependence, active psychosis, or dementia or are suicidal. Similarly, very few women were included in the sample population, so generalization to women is limited. However, we see few reasons why results should differ by gender. Finally, new technologies have emerged since this study was completed; however, these are likely only to improve satisfaction and quality of life by improving communication and access to these technologies.

In conclusion, this study found telemedicine-delivered behavioral activation treatment for elderly veterans with depression to be noninferior to face-to-face treatment in terms of quality of life, satisfaction, treatment credibility, and service delivery perception. Results further support the use of telemedicine as an alternative modality for evidence-based treatment and recommend that resources be devoted to provide home-based telemedicine to treat depression. These modalities may provide access to rural patients and remote locations, while offering similar satisfaction and quality of life as face-to-face clinic encounters.

Submitted: May 17, 2016; accepted September 15, 2016.

Online first: November 8, 2016.

Author contributions: Study concept and design: Drs Egede, Knapp, and Frueh; acquisition of data: Drs Egede and Acierno; analysis and interpretation of data: Drs Egede, Knapp, and Payne; drafting of the manuscript: Drs Walker, Egede, and Payne; critical revision of the manuscript for important intellectual content: Drs Egede, Acierno, Knapp, Walker, Payne, and Frueh; and study supervision: Dr Egede.

Potential conflicts of interest: The authors have no financial disclosure or conflict of interest to report.

Funding/support: This study was supported by grant IIR 04-421 funded by the US Veterans Affairs Health Services Research and Development program.

Role of the sponsor: The funding agency did not participate in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Disclaimer: The manuscript represents the views of the authors and not those of the US Department of Veterans Affairs or the Veterans Affairs Health Services Research and Development Service.

Acknowledgments: We deeply appreciate the veterans and Veterans Affairs primary care and mental health providers who contributed to this research effort.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Geriatric Psychiatry section. Please contact Helen Lavretsky, MD, MS, at hlavretsky@psychiatrist.com, or Gary W. Small, MD, at gsmall@psychiatrist.com.