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# Telepsychiatry: The Evaluation and Treatment of Seniors in Rural Retirement Communities

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ABSTRACT

Few studies examine the benefits from geriatric telepsychiatry in rural retirement communities. **Objectives:** 1. To demonstrate that using telepsychiatry (a) standard approaches to psychiatric evaluation would yield diagnoses in Diagnostic and Statistical Manual of Mental Disorders (DSM-V); (b) psychotherapies and pharmacotherapy could be effectively administered. 2. To examine the relationships among cognition, mood, agitation and functions at baseline and the response to treatment over time. **Design:** Prospective longitudinal study. **Measures:** Geriatric Depression scale (GDS), Mini Mental State Exam (MMSE), Barthel Index (BI), Pittsburgh Agitation Scale (PAS). **Setting:** Video Teleconferencing. **Interventions:** Psychotherapy, psychopharmacology. **Participants:** 428 Seniors over 55, met criteria for at least one DSM-V diagnosis. **Results:** Treatments were administered for a full range of psychiatric diagnoses and age-related medical conditions. The most frequently prescribed pharmacological agents were: antidepressants (78%) antipsychotics (64%), memory enhancers (38%). Participants (66%) received psychotherapy: individual (31%), couple (7%), family (13%). Variation in the MMSE scores were observed: 55% remained stable, 11% declined, 18% improved. GDS Scores improved from baseline to 26 weeks ( $p=0.02$ ,  $d=0.99$ : 95% CI 0.39-1.56). PAS scores declined from baseline to 52 weeks (McNemar's  $S=11.27$ ,  $p=0.0008$ ,  $d=1.17$ : 95% CI 0.63-1.68). Function (BI) at week 26 was not statistically significantly different from baseline ( $t(26)=1.66$ ,  $p=0.11$ ,  $d=0.65$ : 95%CI -0.16-1.42). Participants maintained independence (64.5%) at 52 weeks (McNemar's  $S=6.23$ ,  $p=0.013$ ,  $d=0.79$ : 95%CI 0.19-1.36) Conclusion: This study demonstrates the feasibility and benefit of providing a full complement of services via telepsychiatry to seniors and provides a rationale for more comprehensive reimbursement plans .

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## 1. Introduction

Telepsychiatry has proven feasible in a wide range of settings, across a complement of psychiatric treatments and in different ethnic groups<sup>[1,2]</sup>. Diagnoses can be made reliably using a variety of assessment measures<sup>[2]</sup>. Comparisons with in-person care (IP) report benefits attributed to telepsychiatry: shortened hospitalization, better medication adherence, symptom reduction from treatment with evidenced based therapies<sup>[3,4]</sup>.

With respect to geriatric telepsychiatry, a recent systematic review described 68 publications which reflect the current state of knowledge<sup>[5]</sup>. Of these, 35% investigated neuropsychological testing, had small sample sizes<sup>[6,7]</sup> with a few exceptions<sup>[8,9]</sup> confirmed feasibility, satisfaction and correlation between in person (IP) and videoconferencing (VC). Another focus (26%) was clinical diagnosis and treatment of dementia in community dwelling patients using a variety of study designs (one randomized controlled trial (RCT), three crossover, four prospective, six descriptive and two non-controlled feasibility studies). The reliability of the clinical diagnosis of dementia via VC was not inferior to IP<sup>[10]</sup>. There was a high degree of compliance and satisfaction in the VC group. RCT found comparable improvement in cognition for both groups<sup>[11]</sup>. Only 10% studied nursing homes for a total of 367 participants. Telepsychiatry in a rural setting was more cost effective for the physician in terms of time and travel than IP consultation<sup>[12]</sup>. Outpatient studies reported increased expenditures for both modalities<sup>[13]</sup> and even found VC to be more costly than IP due to the lack of collaboration of local physicians with follow up care<sup>[14]</sup>. Mixed results reflect different measurements, different venues, cultural variation and the general trend of increasing health care costs. Few papers provide results of psychotherapy: behavioral activation via VC was not inferior to IP (N = 241)<sup>[15]</sup>, improvements gained by problems solving therapy for the depressed and low income persisted longer for VC than IP care (n=158)<sup>[16]</sup> and cognitive behavioral therapy improved sleep and mood (N=5)<sup>[17]</sup>.

Our prospective longitudinal study collected data from all consecutive referrals meeting eligibility criteria. The assessments and treatment approaches are consistent with best practices in geriatric psychiatry.

## 2. Objectives

The study goals are: (1) to examine the characteristics and diagnoses of the population referred for telepsychiatry, (2) to determine what types of interventions could feasibly be provided to the participants via this venue, (3) to examine the relationships between cognitive status, mood, agitation

and level of independence at baseline and over the period of observation.

## 3. Methods

### 3.1 Videoconferencing Telepsychiatry

Forefront Telecare (FT) Inc. delivers behavioral health HIPAA-compliant TeleCare services to rural retirement facilities using high definition monitors and web cam. FT uses 13 technology products for its websites including WordPress (website construction), Vimeo (refined video production) and PHP (embedded server-side scripting ensuring maximum performance and non-interruptible functioning). FT identified the facilities in need of remote services, introduced the psychiatrist (SS) to their teams (nursing, social workers, internal medicine physicians and management) prior to scheduling the resident's appointments for telepsychiatry in order to establish a collaborative model of care known to improve outcomes<sup>[18]</sup>. Clinical care was scheduled in response to resident needs at the request of onsite physicians and their colleagues. Prior to consultations, the in-house teams provided the psychiatrist with information about the resident's medical health (lab results, imaging reports). The telepsychiatry sessions were staffed by an on-site social worker who accompanied the patient and family to the designated room for sessions with the "TV Doc." and remained throughout the interview. New evaluations required 90 minutes and follow up sessions 30 minutes. The psychiatrist would make recommendations for treatment and the onsite team would implement them. The research assessments were fixed at certain intervals as described in the measures section.

### 3.2 Participants

Participants were recruited and referred from 9 facilities in central and northern Pennsylvania for psychiatric evaluation and treatment via telepsychiatry all completed by the first author (SS). Baseline and follow up visits occurred from 2012 to 2015. Involvement was discontinued for the following reasons: 16 were discharged (4%), 7 had a lateral transfer to community care as telepsychiatry was ineffective (1.6%), 155 had a consultation only (36%) and 87 died (20%). After these exclusions the final cohort was N=428. The Crozer Keystone Institutional Review Board approved the study and all participants, or their representatives provided informed consent.

### 3.3 Eligibility Criteria

The participants were eligible if they were age 55 or over and included regardless of race, socioeconomic group,

or pre-existing medical conditions. Participants were excluded if they were receiving face-to-face therapy in their local community.

### 3.4 Measures

The measures supplemented a complete psychiatric evaluation using Diagnostic and Statistical Manual of Mental Disorders (DSM-V) criteria. The measures selected are widely used, well validated, brief, and were administered at baseline and every 6 months thereafter by the psychiatrist (SS).

*Geriatric Depression Scale (GDS)* The 15-item version Geriatric Depression Scale (GDS) was administered with a cut point of  $\geq 5$  suggesting depression. Remission was considered when the score was  $< 5$  or 50% of the baseline value.

*Mini-mental State Examination (MMSE)* The Mini-Mental State Exam is a test of global cognitive function. Scores range from 0-30. Commonly used cut scores for severity: normal 27-30; mild 21-26, moderate  $> 10-20$  and severe  $\leq 10$ .

*Pittsburgh Agitation Scale (PAS)* [19] tests four groups of behaviors: aberrant vocalizations, aggression, resisting care and agitation rated on a four point Likert scale with a maximum total score of 16. Participants with scores of 8 or more required treatment. Remission was defined as a 50% or more decrease from baseline.

*Barthel Index (Activities of Daily Living)* [20] is a measure of activities of daily living (ADLs) scored from 0-100. A clinically significant decline in independence was defined as a change from independence ( $\geq 50$ ) to dependence ( $< 50$ ) or a decline of 10% in the mean score from baseline.

### 3.5 Statistical Analysis

The analysis consists primarily of descriptives (i.e. means with standard deviation and frequencies/percent). Parametric analyses included t-test for comparison of a binary and continuous measures, ANOVA for comparison of a categorical and a continuous measure. To assess for relationships over repeated time points, we used the paired t-test for continuous measures, McNemar's test for binary measures. Cohen's d Effect sizes with 95% confidence intervals are derived for all continuous measures. For binary measures, odds ratio and chi-square tests are converted into Cohen's d per Chinn S (2000) [21], which allow the use of Cohen's guidelines of 0.2, 0.5 and 0.8 to classify the effect size as small, medium or large for clinical interpretation [22]. All analyses are two tailed with type I error  $< 0.05$ . All analyses were performed using SAS, version 9.4 [23].

## 4. Results

### 4.1 Characteristics of the Study Population

The mean age of the cohort at baseline (N=428) was 80.4 (sd = 9.6; range 55-102). Women constituted 64% of the sample. The population was 99% Caucasian, reflecting the demographics of the region. The majority was single (68%). Most participants (75%) had been skilled or unskilled laborers. Although they were living in retirement facilities, their level of independence varied. Most required long-term care (71%). Others had short stays for rehabilitation (12%) or lived relatively independently in apartments or cottages (7%). Few facilities had dementia units and only 11% of the participants resided there. (Table 1)

**Table 1.** Characteristics of the Population \*

Characteristic	Number	Percentage
<b>Age, years</b>		
55-64	28	7
65-84	236	54
85-99	161	38
100+	3	1
<b>Gender</b>		
Female	273	64
<b>Race</b>		
Caucasian	425	99
<b>Education, years</b>		
< 12	164	39
12-16	243	57
>16	18	4
<b>Marital Status</b>		
Married	136	32
Single	44	10
Divorced	44	10
Widowed	204	48
<b>Children</b>		
Yes	346	81
<b>Occupation</b>		
Management	38	9
Professional	38	9
Sales	31	7
Clerical	60	14
Skilled Laborer	43	10
Laborer	145	34
Homemaker	50	12
Not in workforce	22	5
<b>Residence</b>		
Dementia Unit	47	11
Assisted/Independent	28	7
Long Term Care	302	71
Short Term Care	51	12
<b>Primary Payer</b>		
Medicare	166	39
Medicaid	146	34
Commercial	58	14
Private pay	54	13

Note: \* N = 428

### 4.2 Psychiatric Disorders

Psychiatric history was present in 219 (51%). In Figure 1, some disorders have been clustered due to the sample size. For example, mood disorders include major depressive and bipolar disorders. Mood/Anxiety disorders due to a general medical condition were common 54(13%). Anxiety disorders 32(8%) include generalized anxiety disorder and panic disorder. Schizophrenia includes schizoaffective disorders, diagnosed in 23(5%). Adjustment disorders 53 (12%) include the different subtypes: anxiety, depression and conduct. Some disorders are noteworthy. Persistent Complex Bereavement Disorder occurred in 38 (9%) of participants. Personality Disorders 17 (4%), Alcohol Use Disorder 32(8%), Other Substance Use Disorder 3(0.7%) and Gambling Disorder 1 (0.2%) continue in late life. Hoarding Disorder was diagnosed in 5 (1%) of participants.

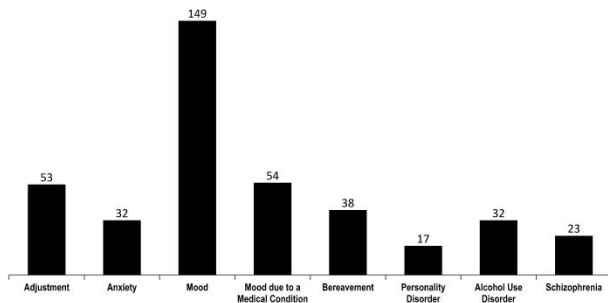


Figure 1. Psychiatric Disorders (N)

Major 218 (51%) and mild 102 (24%) neurocognitive disorders were present. Of these 67 (16%) were unable to complete the MMSE. The neurocognitive disorders were due to Alzheimer’s 114 (27%), Vascular 71(17%), Lewy Body Disease 16(4%), Parkinson’s 47(11%), Frontal Temporal Lobar Degeneration (FTLD) 8(2%) and a mixed group 53 (12%). The mixed group of neurocognitive disorders included: infections (Creutzfeldt Jacob Disease-CJD), Huntington’s disease (Figure 2). Those who met criteria for a major neurocognitive disorder were significantly more likely to have a psychiatric history ( $X^2=30.5$ ,  $df = 1$ ,  $p < 0.0001$ ,  $d=0.53$ : 95%CI 0.33-0.72).

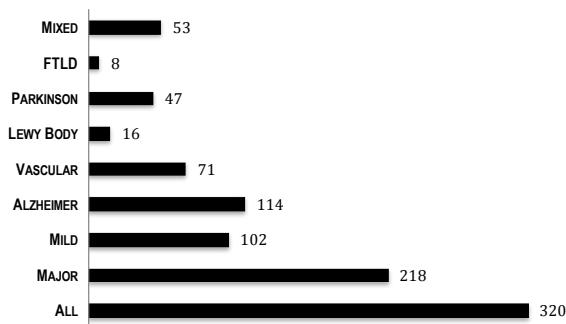


Figure 2. Neurocognitive Disorders (N)

Abbreviations: FTLD: Frontotemporal Lobar Degeneration

### 4.3 Medical Conditions

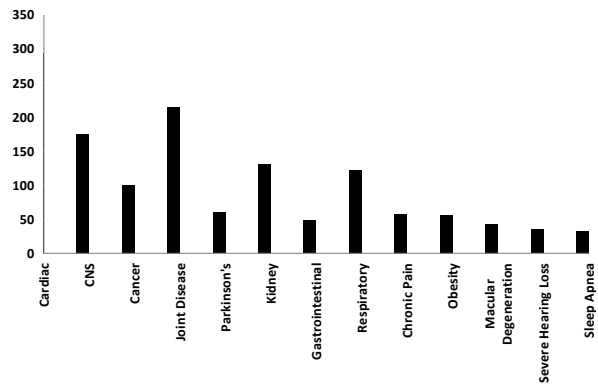


Figure 3. Pharmacotherapy (N)

The most common systems affected by moderate to severe pathology were Central Nervous System (CNS) 175 (41%), cardiac 294 (64%), renal 131(31%), rheumatologic 214 (50%), respiratory 122 (29%), gastrointestinal disease 48(21%). Specific medical conditions observed included chronic pain 58 (14%), cancer 100 (23%), macular degeneration 43 (10%), severe hearing loss 34 (8%), Parkinson’s Disease 60 (14%), obesity 56 (13%) sleep apnea 33 (7.7%), hematological conditions requiring blood transfusions 10 (2%), pseudobulbar affect 4 (1%), restless leg syndrome 16 (4%) and normal pressure hydrocephalus 9 (2%). Four or more co-morbid medical conditions were present in 109 subjects (25%) (Figure 3).

### 4.4 Correlations with Medical Conditions

Participants with macular degeneration were more likely to be agitated as measured by higher scores on the PAS ( $X^2 5.2$ ,  $df = 1$   $p = 0.02$ ,  $d=0.22$ : 95%CI 0.03-0.41). In fact, 42.9% of those with macular degeneration were agitated compared to 26.2% without macular degeneration. The strongest correlation with macular degeneration was with increasing age ( $t = -5.3$ ,  $df = 426$   $p < 0.0001$ ,  $d=0.51$ : 95% CI 0.32-0.71) with their mean age being 87.6 (sd=6.92) for those with macular degeneration compared to a mean age of 79.6 (sd=9.54) for this without. Participants with severe hearing impairment were more likely to be agitated as measured by higher scores on the PAS ( $X^2 4.9$ ,  $df = 1$   $p = 0.03$ ,  $d=0.21$ : 95%CI 0.02-0.40) and performed below the norm on the MMSE ( $X^2 3.8$ ,  $df = 1$ ;  $p = 0.05$ ,  $d=0.19$ : 95%CI 0.00-0.38). Those suffering chronic pain also performed below the norm on the MMSE ( $X^2 5.7$ ,  $df = 1$ ;  $p = 0.02$ ,  $d=0.23$ : 95%CI 0.03-0.42).

### 4.5 Reasons for Referral

The common reasons for referral were behavioral disturbances 173 (40%), depression 149 (35%), altered mental



status 77 (18%), psychotic symptoms (hallucinations or delusions) 72 (18%), adjustment to loss and change 42 (10%) and anxiety 33 (8%). The prominent behavioral disturbances were: unrelenting vocalizations 25 (6%), aggression or abuse 100 (23%), intrusive wandering 33 (8%), agitation 72 (17%), inappropriate sexual behavior 23 (5%) and resisting care 40 (9%).

#### 4.6 Treatments

##### Pharmacotherapy

The psychiatrist (SS), introduced to participants already receiving a myriad of psychotropic medications, took an active role in medication adjustments.

At baseline the majority were taking antidepressants 335 (78%). Antipsychotic agents were prescribed to 272 (64%). Participants on antipsychotic agents were more likely to die ( $X^2 = 8.5$ ,  $df 1$ ,  $p = 0.004$ ,  $d=0.28$ : 95%CI 0.09-0.47) than those who were not. This pattern was not observed with opioid analgesia ( $X^2 = 0.69$ ,  $df 1$ ,  $p = 0.40$ ,  $d=0.08$ : 95%CI -0.11-0.27). Mood stabilizers 65(15%) were useful for participants with bipolar disorders and for behavior disorders that were refractory to second-generation antipsychotics. The memory enhancers 162 (38%) were less often prescribed. ‘Sleep Aids’ 47 (11%) included trazodone, mirtazapine, melatonin. Only if these failed, non-benzodiazepine hypnotics were prescribed. Medications specific for neurological conditions were also administered: Seizure Disorder 29 (7), Parkinson’s disease 45 (11) and Restless Leg Syndrome 22(5). (Figure 4).

##### Psychotherapy

Participants could engage in the individual therapy 132 (31%)

(e.g. supportive/educational, cognitive behavioral, insight oriented, interpersonal psychotherapy). Couples were treated 29 (7%). Families received interventions 56 (13%). All team members used behavioral modification 171(40%). Most participants received a psychotherapeutic intervention 284 (66%).

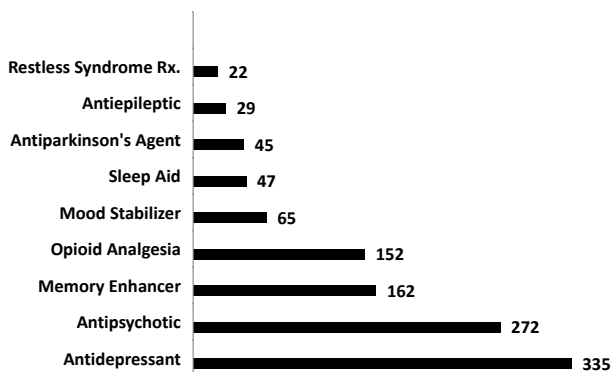


Figure 4. Pharmacotherapy (N)

#### 4.7 Correlations of Cognitive Status, Mood, Agitation and Function

The participants with major neurocognitive disorder were more likely to be dependent (Mean 37,  $sd=24.8$ ) compared to those without impairment (Mean 57,  $sd=27.8$   $p < 0.0001$ ,  $d=0.76$ : 95%CI -0.56-0.96). A similar pattern was observed for agitation. Participants with major neurocognitive disorder were more likely to be agitated (Mean 6.4,  $sd=5.4$ ) than those who were normal or only mildly impaired (Mean 2.1,  $sd=3.8$   $p < 0.0001$ ;  $d=0.92$ : 95%CI 0.72-1.12). Participants with major neurocognitive disorder were also more likely to be depressed (Mean 7.3,  $sd=5.8$ ) than those who were normal or only mildly impaired (Mean 5.9,  $sd=4.4$ ,  $p=0.003$ ,  $d=0.27$ : 95%CI 0.08-0.46).

#### 4.8 Cognitive Status At Baseline and Change Over Time (MMSE)

Baseline MMSE scores for the cohort were normal 65 (16%), mild 134 (32%), moderate 136 (32%), severe 18 (4%) and so severe that the MMSE could not be completed 67(16%). The mean score was 20.9 ( $N=353$ ,  $sd=5.96$ ). The McNemar’s test was used to assess if the proportion of patients impaired varied significantly at different time points when compared to baseline. While a significant difference from baseline was observed at 26 weeks (McNemar’s  $S=4.00$ ,  $p=0.046$ ,  $d=0.58$ : 95%CI 0.01-1.14), ( $N=26$ ), this effect was driven by 4 patients with normal MMSE scores who declined. This change was not observed at 52 or 78 weeks. Since it is well known that

Table 2. Cognitive Transitions: Weeks 26 & 52 vs. Baseline Using MMSE Categories\*

Baseline	Week 26	%	Baseline	Week 52	%
Normal	Stable	34	Normal	Stable	46
	Mild	54		Mild	36
	Moderate	17		Moderate	18
	Severe	0		Severe	0
Mild	Stable	67	Mild	Stable	50
	Moderate	22		Normal	20
	Severe	11		Moderate	25
Moderate	Stable	50		Severe	5
	Mild	30	Moderate	Stable	47
	Severe	20	Normal	6	
Severe	Stable	100		Mild	29
				Severe	18

Note: \* Mini-Mental State Exam (MMSE) Scores range from 0-30. Here are the commonly used cut scores for severity: normal 27-30; mild 21-26, moderate >10-20 and severe ≤ 10. Improvement is highlighted in grey.

change in cognitive function occurs gradually, we elected to search for patterns in the data descriptively. This inspection revealed that most seniors remain stable (55%). Some become severely impaired overtime (11%) and 18% improved. (Table 2).

#### 4.9 Geriatric Depression Scale Scores at Baseline and Overtime

As many as 173 (48%) had scores  $>5$  on the GDS with mean =6.35,  $sd = 4.11$ . For the 26 patients with both baseline and 26 weeks, using the continuous scale, we recorded a significant reduction in GDS scores from baseline (mean=6.35,  $sd=4.11$ ) to 26 weeks (mean=4.50,  $sd=3.64$ ) ( $t(25)=2.48$ ,  $p=0.02$ ,  $d=0.99$ : 95%CI 0.39-1.56). Of depressed individuals only 35% improved over a 6-month period. At weeks 52 and 78, no further improvement was observed.

#### 4.10 Pittsburgh Agitation Scale Scores at Baseline and Overtime

The frequency of agitation at baseline was 117 (27.9%). By week 26, 80% of the agitated patients transitioned to a non-agitated state, scores below 4 on the PAS or a 50% reduction from baseline (McNemar's  $S = 12.0$ ,  $p=0.0005$ ,  $d=1.20$ : 95%CI 0.66-1.71). Similarly by week 52 McNemar's  $S = 12.0$ ,  $p=0.0005$ ,  $d=1.20$ , 95%CI 0.66-1.71 and 78, 100% of the agitated patients transitioned to a non-agitated state (McNemar's  $S = 11.27$ ,  $p=0.0008$ ,  $d=1.17$ : 95%CI 0.63-1.68). For the 34 patients with both baseline and 26 weeks, using the continuous scale, there was a significant reduction in PAS scores from baseline (mean=5.38,  $sd=4.95$ ) to 26 weeks (mean=2.97,  $sd=3.91$ ) ( $t(33)=3.00$ ,  $p=0.005$ ,  $d=1.04$ : 95%CI 0.51-1.54).

#### 4.11 Barthel Index Scores: Activity of Daily Living at Baseline and Overtime

Of the 414 participants, the mean score on the Barthel Index was 47,  $sd=28$  with 48.3% of the cohort being independent. A subset of the population was followed over time with mean scores of 41.4 ( $sd=32.39$ ), 44.8 ( $sd=32.03$ ), and 40.3 ( $sd=20.59$ ) over weeks 26, 52, and 78 respectively. Decline in function at week 26 was not statistically significantly different ( $t(26)=1.66$ ,  $p=0.11$ ,  $d=0.65$ : 95%CI -0.16-1.42) but at 52 and 78 was statistically significant ( $t(48)=3.00$ ,  $p=0.0042$ ,  $d=0.87$ : 95%CI 0.26-1.45;  $t(35)=4.24$ ,  $p=0.0002$ ,  $d=1.43$ : 95%CI 0.77-2.04) Focusing on independent status when compared to baseline, by week 52, 35.5% (McNemar's  $S = 6.23$ ,  $p=0.013$ ,  $d=0.79$ : 95%CI 0.19-1.36) and by week 78, 59.1% transitioned to a dependent state (McNemar's  $S = 13.00$ ,  $p=0.0003$ ,

$d=1.04$ : 95%CI 0.42-1.62).

#### 4.12 Reimbursement for Telepsychiatry Services

The participants paid for the services primarily through state or federal funding (75%). Two other sources of payment were personal health insurance (13.5%) or private pay (12.2%).

### 5. Discussion

Telepsychiatric evaluation using DSM-V criteria supplemented by assessment tools yielded a full range of diagnoses and revealed interactions with medical comorbidities similar to office practice. The frequency of the various neurocognitive disorders in our cohort followed the same pattern reported in the literature: Alzheimer's Disease, cerebrovascular disorders, lewy body spectrum disorders and FTLD [24-26]. Rare causes of neurocognitive disorders were also diagnosed: CJD [27] and Huntington Disease [28]. Notable interactions with co-morbid medical conditions include a higher levels of agitation in participants with macular degeneration and severe hearing impairment. Those with chronic pain and hearing impairment performed below the norm on the MMSE.

Telepsychiatry permitted our participants to receive a variety of therapies with or without medication management. Individuals and couples responded to an eclectic approach to psychotherapies dependent on their needs (cognitive behavioral, interpersonal, insight oriented and supportive/educational). Family interventions varied from a single consultation to facilitate treatment post discharge to more commonly assisting families to manage caretaker burden. Psychopharmacology lends itself well to telepsychiatry. We used an evidence-based approach (reference to recent scientific publications, participants' medical records, laboratory and imaging) to plan treatment. For example, acetylcholinesterase inhibitors have been reported to be more effective in mild neurocognitive disorders [29]. Improved diagnostic precision resulted in a change of treatment for pseudobulbar affect [30]. The prescription of second-generation antipsychotics in seniors increases mortality rate. However, untreated psychosis in patients with Alzheimer's disease is strongly associated with nursing home admission and time to death when untreated [18]. The FDA Summary Basis of Approval reports for 28 pharmacological agents approved between 1990 and 2011 found that overall mortality risk was significantly associated with psychiatric diagnosis but was not further increased when patients were assigned to psychotropic agents versus placebo [31]. The current treatment recommendation for psychosis and agitation in late life remains antipsychotics

<sup>[32]</sup>. Similar to our study, antidepressants were the most frequently prescribed psychotropic medication <sup>[33]</sup>.

Lower scores on the MMSE were associated with depression, agitation, and dependence at baseline confirming earlier research. MMSE scores over time did not yield clear evidence of change in this 3-year study using standard statistical tools. In one study, the mean age at which the cognitively unimpaired transition to subjective memory complaints was 81.5 years. 55% of that cohort were diagnosed with mild cognitive impairment over a further 9 year period <sup>[34]</sup>. When we applied a purely descriptive approach to our data, variations were identified. In fact, most participants remained stable, some became severely impaired and some improved. Cognitive status shows variation even during this relatively short time span and allows an opportunity for intervention. The reasons for the improvements require research confirmation: treating the underlying medical condition, refinement of medication regime, reduction in agitation, decrease in family dysfunction, improved mood.

Depression was common in our cohort. GDS scores decreased significantly from baseline to 26 weeks but not beyond. Only 35% of depressed individuals responded to treatment over 6 months replicating findings reported from the face-to-face Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) <sup>[35]</sup>. The latter study provides an alternative health care approach (family physician and nurse manager) effective in decreasing depressed mood, suicidal ideas, morbidity and mortality <sup>[35-37]</sup>.

Agitation at baseline affected 28% of participants. By 52 weeks, 100% had significantly reduced PAS scores. Agitation is one of the variables found to most impact caretaker burden <sup>[38]</sup> and therefore a modifiable factor preventing or postponing admission to a retirement facilities.

Dependence at baseline was common. Further decline in activities of daily living was particularly noticeable at 52 and 78 weeks. Maintenance of mobility is another possible modifiable factor that may allow seniors to remain in the community. Research has demonstrated that vigorous physical activity improves memory and protects against cardiovascular risk factors; whereas a sedentary lifestyle is associated with decline in executive function <sup>[39]</sup>.

One study reported that a telemedicine program received comparable insurance reimbursement to in-person care with a mixture of 45% private, 50% medicare, and 5% self-pay <sup>[40]</sup>. In our study, insurance reimbursement for IP and telepsychiatry was similar, but most of the burden was on government payers.

Strengths: (1) This is a prospective longitudinal cohort study of 428 seniors using telepsychiatry to recreate best geriatric psychiatry office practices for those underserved

in rural areas. (2) The same psychiatrist completed the evaluations and scored the instruments, which avoided problems arising from poor inter-rater reliability. (3) These results are generalizable to seniors in other settings with similar demographics. Generalizability was further improved by the adoption of non-restrictive eligibility criteria. (4) Our results treating seniors via telepsychiatry are often consistent with the literature involving participants seen face-to-face.

Limitations: The study does not include a control group nor measure cost effectiveness nor does it examine the efficacy of any specific psychotherapeutic intervention. Brenes et al. 2015 addressed both these limitations in her a randomized control study comparing “telephone” delivered cognitive behavior therapy (CBT) with non-directive supportive therapy for older adults with generalized anxiety disorder with CBT proving superior <sup>[41]</sup>. The attrition of subjects over time due to death, discharge and significant physical decompensation resulted in smaller sample sizes by study year 3.

## 6. Conclusions

To our knowledge this the first longitudinal study of adults in late life living in rural retirement communities that demonstrates the feasibility of offering a full complement of geriatric psychiatry services via telepsychiatry. This study contributes to our understanding of the correlation of cognitive status, mood, agitation and dependence. It highlights the need for a new approach to health care delivery (i.e. telepsychiatry) to stem the decline in dependence, manage refractory depression and maintain cognitive resilience for seniors who are underserved both in rural or urban areas with the aim of extending their community living. This study argues for further research evaluating cost effectiveness of Telepsychiatry in seniors to support demands for a more inclusive payment policy from both managed care and government funding bodies.

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## Presentation

Steinberg Susanne I, Gallop Robert, Jani, Shraddha, Iqbal

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