

Assessing Efficiency and Comparability of Home-Based Assessment for Dementia Prevention Trials:

Results from a Pilot Study

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Background

This is a pilot study to a 4-year study of **in-home** evaluation using different technologies to assess community dwelling elders as they transition to cognitive loss and dementia in the elderly.

Purpose

- 1) Establish feasibility of recruitment, enrollment, and randomization into 3 types of in-home assessment
- 2) Develop standardized operating procedures for a multi-site protocol
- 3) Develop an efficiency measure

Methods

Independent non-demented (MMSE ≥ 26) elderly (≥ 75 years) were recruited from 3 sites. Exclusion criteria were: serious neurological or psychiatric conditions or use of prescriptive cognitive-enhancing drugs. After screening, subjects were randomly assigned to be trained and assessed by **1 of 3 in-home methods: phone (live tester) and mail (P&M), interactive voice response phone (IVR) or computer kiosk (KIO)**. Data included self-rated cognitive performance and objective measures of cognition, behavior, ADL, quality of life, resource use, and medication adherence (an ADL marker). The medication adherence measure was adapted to the format of each of the in-home methods. Of particular interest, the KIO arm made use of Medtracker, an instrumented 7-day reminder pill box, linked by Bluetooth to the in-home study computer to record precise times of pill-taking. Efficiency of each method was quantified as the number of contacts, and "study coordinator time" to train in the home-based assessment method, to complete assessments including answering questions and making reminder calls, and the time to complete cognitive assessment (live phone tester) in the P & M arm. All assessments were collected at baseline and one month, with a primary objective of demonstrating feasibility before launching a larger-scale study. Analyses presented here examined the ability to randomize to each arm, difference in efficiency scores, and the comparability of the cognitive assessments.

Results

Table 1 & 2

60 subjects were screened, of which 48 were randomized with 9 discontinued (6 KIO, 3 IVR) prior to baseline. Of 39 remaining, all but one completed the study. Randomization yielded comparable demographic and co-morbidities.

Table 3

At baseline more subjects in KIO required study coordinator contacts than other arms, but this difference was not significant at 1 mo.

Table 4

Mean time to train was significantly different across all groups ($p < 0.05$) with KIO time $>$ IVR time $>$ P&M time.

Contact time was lowest for P&M at baseline and for IVR at 1 mo but these differences were not significant.

Total Contact Time was lowest for IVR which was significantly less than P&M ($p < 0.05$). No other comparisons were significantly different.

Table 5

There were no significant differences across the 3 arms in either mean performance or variance across key experimental cognitive measures at one month, suggesting good comparability across methods.

Figure 1. Screening Visit Timeline

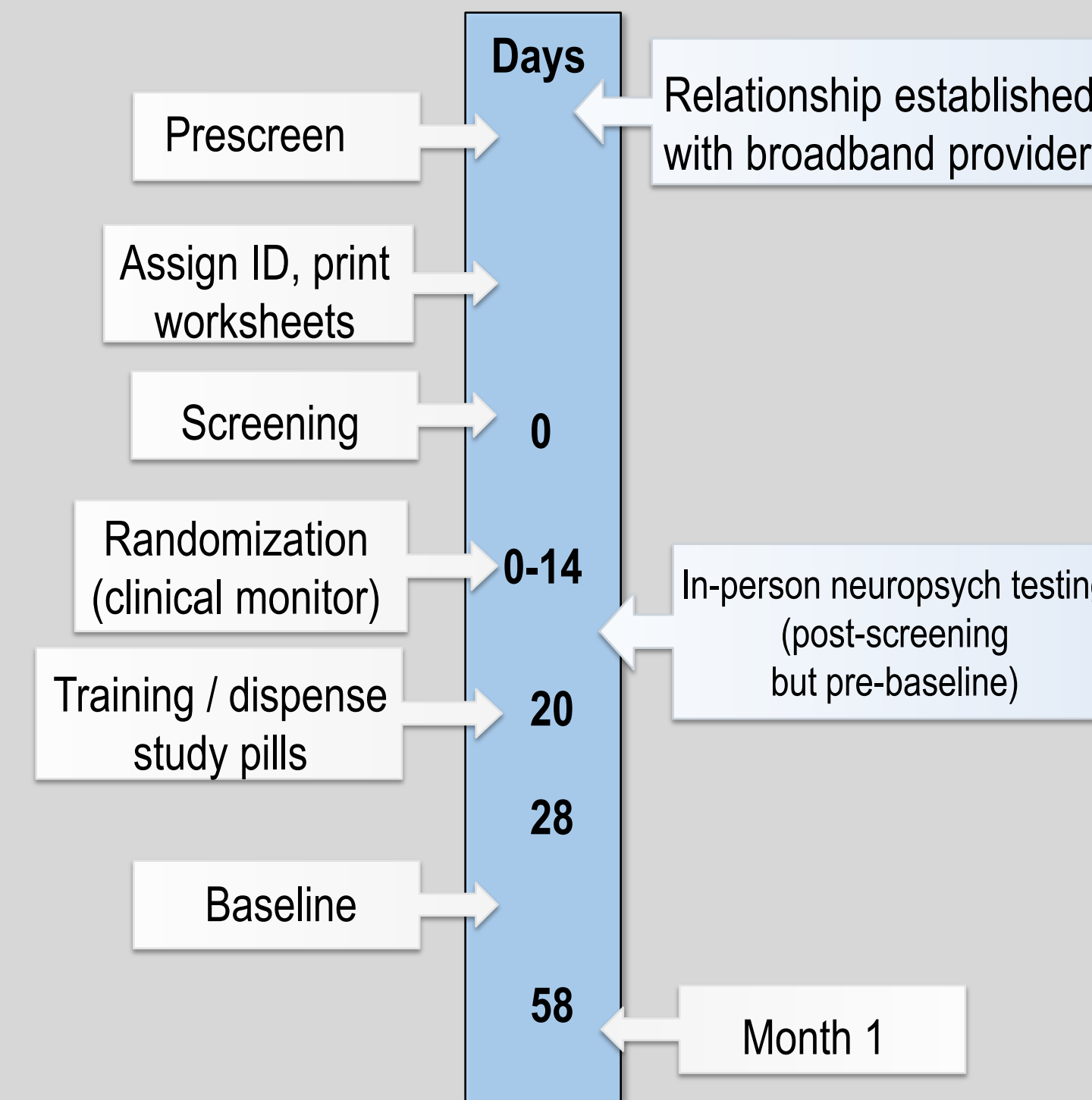


Table 1. Enrollment Summary

60 screened	IVR (N=16)	KIO (N=18)	P&M (N=14)
Randomized	13	12	14
D/C Pre-Baseline	3	6	0
Randomized subject retention	97.4%		

Table 2. Subject Characteristics (N=39)

MMSE	29.0 (1.2)
Age	82.1 (5.2)
Education	15.8 (2.9)
Gender	74% Female
Married	21% Married
Cardiovascular Condition	69% Yes
Memory Complaint (self-report)	46% Yes
Baseline MCI (based on algorithm)	18% Yes

Table 3. Efficiency: Number of Subjects Who Had Staff Contact Exclusive of Training and Assessment: N (%)

	IVR (N=13)	KIO (N=12)	P&M (N=14)	Fisher Exact (p)
Baseline	7 (54)	9 (75)	3 (21)	0.024
1-month	11 (85)	8 (67)	6 (43)	0.078
Baseline and/or 1 month	11 (85)	12 (100)	8 (57)	0.023

Table 4. Efficiency: Length of Components and Total Time of Staff/Subject Contacts for Experimental Cognitive Testing Only

Components of Staff/Subject Contact (minutes)	IVR (N=13)	KIO (N=12)	P&M (N=14)
	Mean (SD)		
Time to Train	31.6 (12.4)	104.2 (101.2)	15.2 (6.2)
Baseline Misc. Contact	4.2 (8.7)	13.3 (17.5)	1.2 (4.0)
Baseline Cognitive Testing	N/A	N/A	21.5 (3.0) ¹
1-Month Misc. Contact	8.5 (6.0)	12.0 (17.7)	10.9 (21.5)
1-Month Cognitive Testing	N/A	N/A	21.8 (5.7) ¹
Total Time	44.4 (21.5)	129.4 (117.0)	74.9 (29.9) ²

¹N= 12
²N = 11

Table 5. Comparability of Cognitive Experimental Tests Across Arms (1-Month Data)

Select Variables	IVR (N=12)	KIO (N=12)	P&M (N=14)
	Mean (SD)		
Immediate Word List Recall (max = 10) ¹	6.5 (1.8)	6.6 (1.3)	7.7 (1.1)
Delayed Word List Recall (max = 10) ¹	6.3 (2.1)	5.8 (2.8)	6.6 (2.3)
Immediate East Boston Memory Test Recall (max = 12)	5.0 (1.0)	3.9 (1.6)	4.6 (1.3)
Delayed (15-20 min) East Boston Memory Test Recall (max = 12)	4.7 (1.4)	3.9 (1.7)	4.6 (1.4)
Abbreviated TICS Total Score (max = 8)	6.9 (1.3)	6.7 (0.9) ²	7.5 (0.7)
Category Fluency Animal Total	18.9 (6.7)	18.3 (5.6)	19.5 (5.5)

¹Mean of 3 trials ²N=11 for this cell

Conclusion

This pilot study demonstrated the feasibility of recruitment of elderly individuals at risk for AD to in-home assessments. Assessment measures specific to each of the 3 technologies were found to be operational, including the KIO's objective home-based measure of medication adherence. Efficiency data suggested that time spent in training subjects on new technologies may provide savings in staff time in future longer studies. Comparability of cognitive measure scores, as assessed by the 3 different methods, shows promise. This pilot study informed the currently ongoing, much larger study designed to confirm these initial feasibility results. The new study also will compare the ability of the 3 methods to detect clinical decline over a 4-year period of in-home assessment.

Acknowledgments

This work was supported by the following NIA grants: U01AG10483, AG005138, and P30AG024978.