Technologies for assessment and interventions to improve and accelerate dementia care research

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#DementiaCareSummit
Couples & Caregiving Analysis: Time spent together

EVALUATE - AD
Ecologically Valid, Ambient, Longitudinal and Unbiased Assessment of Treatment Efficacy in Alzheimer’s Disease

Together: 1285 minutes (21.4 hrs/day)
Apart: 155 minutes (2.6 hrs/day)

Reynolds et al., 2017 unpublished
Thomas et al., AAIC 2017

Digital Biomarkers in ADCS PEACE-AD RCT: Prazocin for
Agitation in AD RCT: BMDs in Agitation (Peskind & Raskin, PIs; NIA-ADCS RCT)

Digital Agitation Assessment -
Wrist-worn devices with long battery life, H₂O-proof. Activity levels monitored continuously during entire 12-week titration study using wrist actigraphy. Continuous monitoring critical as study employs a flexible dose titration schedule, and the use of rescue medication (lorazepam) for agitation..

Outcome measures -
Motor activity (total activity over a 24 hour period and the 12 hour period from 6 PM to 6 AM for each wk for the 12 wk study. Percent change in total activity counts at wk 1 (pre-TX) compared to wk 12 (post-TX).

Exploratory analyses –
Activity in those receiving lorazepam and in those discontinuing prazosin; Sleep disruption/continuity; and sensed environment mediators.
Evidence...


Summary of Evidence - Gaps

- The technologies used are wide-ranging (passive sensors, wearables, apps, integrated multi-domain systems...), and have been used in many types of assessments and interventions;
- Overall there are few studies relative to other research areas – this is a small field;
- Within a specific technology there is variability in the devices or technologies used (hardware/software), and poor specification of the systems deployed and the analytic algorithms applied;
- There is little research on the usability of these technologies;
- Various benefits may be reported but are mainly based on low-quality studies (small sample size, short study periods, biased designs, non-diverse populations);
- Barriers to deployment of technologies in dementia care are prevalent (ease of use, research expertise, costs).
Recommendations

1. Feasibility research is still important - to be most effective:
   a. Involve persons with dementia and their caregivers in the earliest stages of all research
   b. Include iterative development designs as the norm
2. Technology research needs to include more diverse populations: ethnic/cultural, technical savvy and naïve, encompass the heterogeneity of dementia
3. Different outcome measures are used in efficacy and effectiveness studies: Develop consensus on the use of device/sensor ontologies, data specifications and outcome measures
4. Research into the effectiveness of technologies must move beyond explorative studies - Conduct more and adequately powered RCTs, as well as innovative designs (adaptive, n-of-1).
5. Embed technologies in ‘conventional’ studies whenever possible

Thank you!