Factors influencing adherence in a remote observational study with multiple immunology and neurology disease cohorts

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Methodological Issue

Remote digital assessments in clinical trials promise rich, high frequency data able to capture intra-individual fluctuations in symptoms. But a key challenge in such studies is achieving the right balance between signal and patient burden. Evidence from prior work can help estimate likely adherence to remote active digital assessments. However, it can be questionable whether we can generalise across patient groups who may have quite different physical, cognitive or other symptom burden that may impact on adherence

Introduction

The IDEA-FAST (www.idea-fast.eu) clinical observational study is recruiting 2000 neurology and immunology patients from disease groups known to be impacted by fatigue, as well has healthy volunteers. All participants follow the same protocol providing a rare opportunity to examine the relationship between disease group membership and adherence amongst patients with high levels of fatigue likely to make them especially sensitive to protocol burden.

Methods

Participants (Table 1) take part in 4 remote assessment bursts over six months, including multiple wearable devices and smartphone based active assessments three times a day. The first burst is 10 days duration including three days onboarding. The remaining bursts last one week. Each burst period was initiated with a phone call from site staff to the participant. The study schedule is shown in figure 1. During study bursts participants are promoted to complete PRO and cognitive tests (Figure 2).

For each assessment we calculated the average adherence across all cohorts (Figure 3). We analyzed the relationship between adherence, cohort and time of day (Figure 4), and we examined potential relationships between participant characteristics (age, sex and cohort) and study variables (site, site size, burst and time of day) on adherence (Table 2).

Results

Adherence to the active assessments was high with 75% to the morning, 67% to the afternoon and 83% to the evening sessions. The factors that significantly predicted adherence were Site ($F(17,968) = 3.57$, $p < .001$), Age: ($r(984) = 0.16$) and burst ($F(3,1776) = 25.83$, $p < .001$) driven by a drop in participation from the first to second burst. Disease cohort was not a significant predictor.

Conclusions

In this transdiagnostic study, disease cohort was not significantly related to adherence to daily assessments. Assessments including cognitive tasks had higher adherence than the PRO-only assessments suggesting these tasks were not burdensome. The strongest predictor was time of day with the afternoon session having the lowest adherence. Site was also a significant contributor to adherence with a medium effect size. While this was a remote study, each burst was initiated by a phone call from site staff to participants, suggesting the relationship between site staff and participant may contribute to the high adherence achieved in this study.

Study Design and Demographics

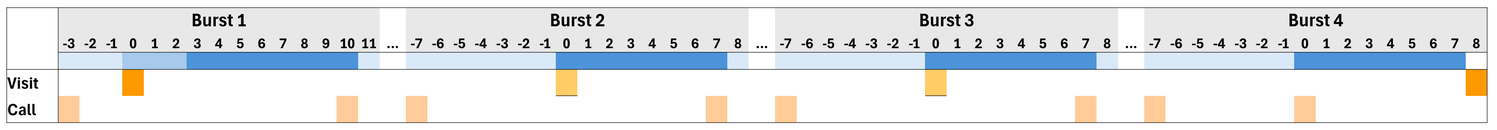

Figure 1: IDEA-FAST clinical observation study design. At Visit/Call at day 0 of a burst investigator ensures that subject puts on the devices properly; ensures that apps are installed on the subject's own phone or study phone, reminds participant of schedule of assessments and remotely initiates data collection.

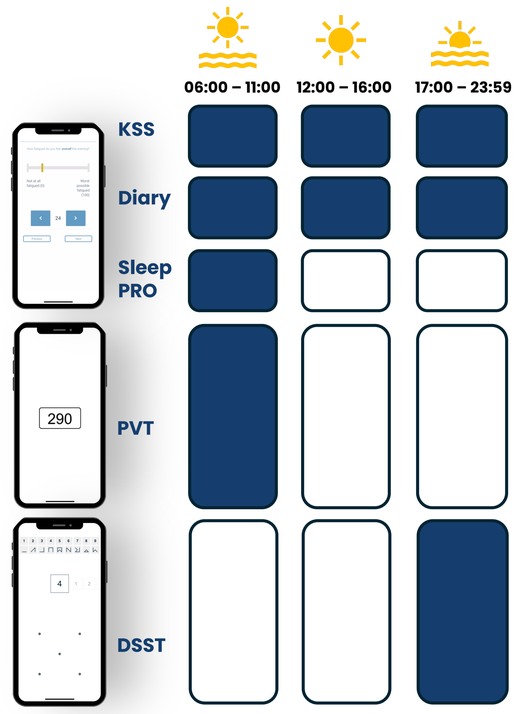

Figure 2: Schedule of assessments within each burst day.

Table 1: Demographic and Clinical Characteristics of the Healthy Volunteer (HV) neurodegenerative disease (NDD), Immune-Mediated Inflammatory Disease (IMID), and Cohorts.. IMID comprised of Parkinson's Disease (PD) and Huntington's Disease (HD). IMID groups were Irritable Bowel Disease (IBD), Sjogren's syndrome (PSS), Systemic Lupus Erythematosus (SLE) and Rheumatoid Arthritis (RA).

Cohort	Disease Group	N	Age Mean (SD)	Sex (%F)	Years Since Diagnosis Mean (SD)
HV	-	79	47.6 (15.2)	73.42%	-
PD	NDD	298	64.1 (9.1)	35.57%	6.0 (5.3)
HD	NDD	58	48.4 (12.9)	58.23%	5.6 (5.5)
IBD	IMID	225	45.4 (14.0)	55.17%	13.9 (10.7)
PSS	IMID	74	57.0 (12.5)	80.00%	8.3 (7.0)
SLE	IMID	70	46.8 (11.6)	86.49%	14.9 (11.3)
RA	IMID	65	59.3 (12.1)	97.14%	11.3 (10.3)
Overall	-	869	54.4 (14.6)	58.81%	9.7 (9.2)

Results

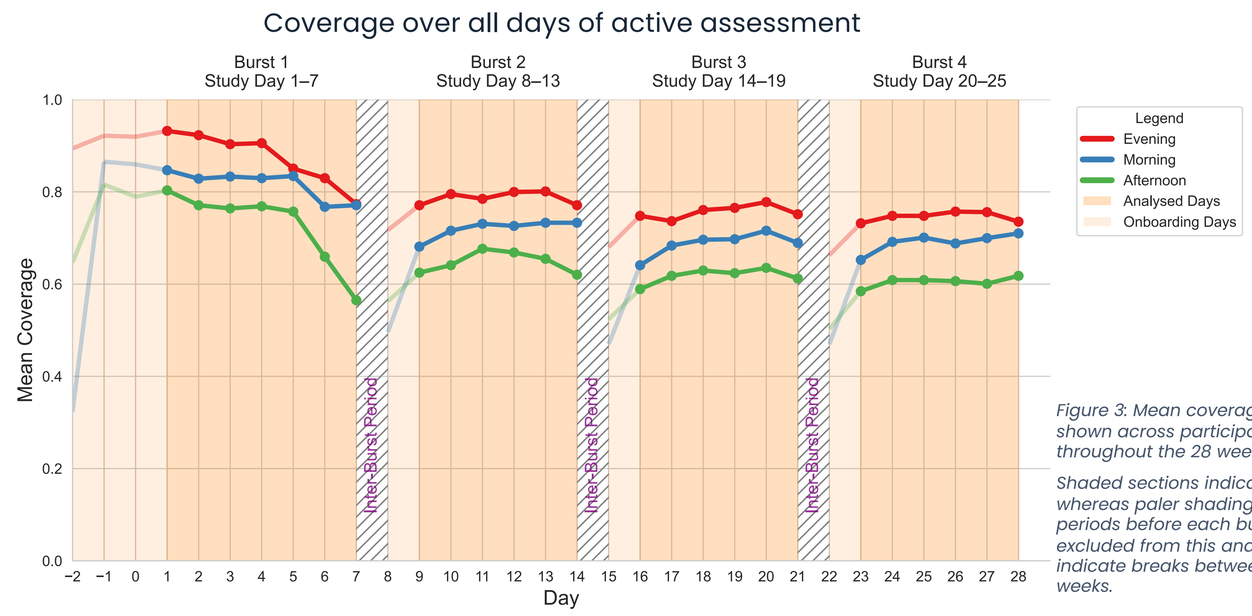

Figure 3: Mean coverage by session period is shown across participants who were enrolled throughout the 28 weeks.

Shaded sections indicate analysed days, whereas paler shading indicates familiarisation periods before each burst of participation, excluded from this analysis. Non-shaded sections indicate breaks between bursts of approx. six weeks.

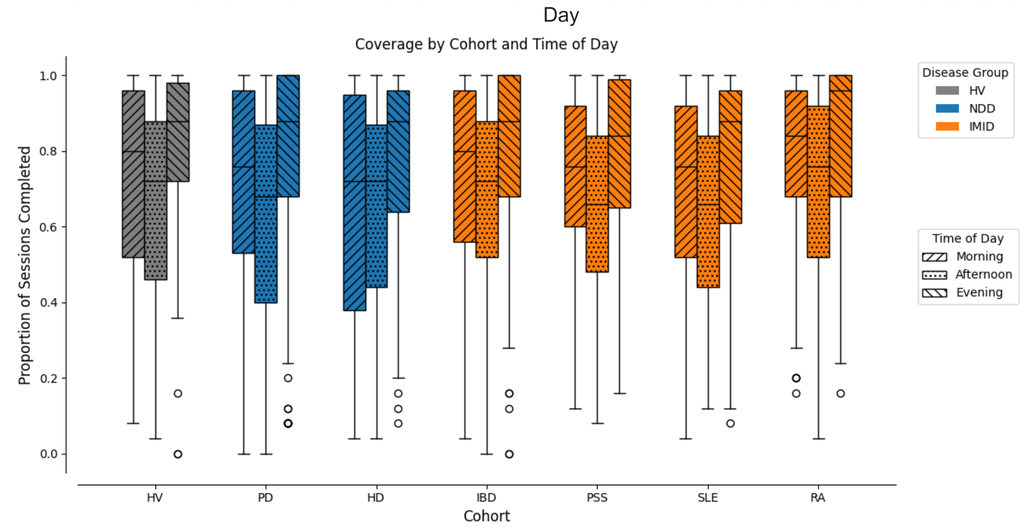

Figure 4: Coverage by cohort and time of day.

Boxplots depict the distribution of per-subject completion proportions for morning, afternoon, and evening sessions across seven cohorts. Coverage differed significantly by time-of-day ($p < .001$), with highest adherence in the evening, intermediate in the morning, and lowest in the afternoon; no cohort-level differences were observed relative to healthy volunteers.

Factor	Parameter Estimate	P-value	Effect size, Cohen's f
Cohort	$F(6,862) = 0.92$	$p = 0.482$	η^2=0.006 (negligible); f=0.080
Site	$F(17,851) = 3.15$	$p < .001$ ***	η^2=0.059 (small); f=0.251
Site size	$r(16) = 0.41$	$p = 0.095$	medium
Age	$r(867) = 0.15$	$p < .001$ ***	small
Sex	$F(1,867) = 0.68$	$p = 0.408$	η^2=0.001 (negligible); f=0.028
Burst	$F(3,2604) = 51.75$	$p < .001$ ***	η^2=0.056 (small); f=0.244
Time of Day / Period	$F(2,1736) = 420.53$	$p < .001$ ***	η^2=0.326 (large); f=0.696
Study-day trend	Slope = -0.672% per day	$p < .001$ ***	partial R^2=0.002 (f^2=0.002, negligible)

Table 2: Analysis of potential factors related to adherence.

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