Cell Phone Support to Promote Medication Adherence Among Adolescents and Young Adults With Chronic Illness

NCT04241627

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This randomized pilot trial tested three different digital health interventions against one another (CPS-C, n = 11, CPS-T, n = 12, and ATR, n = 11). We are interested in the impact on self-reported medication adherence. We have 6 different measures of dependent variables (VAS1w, VAS2w, VAS3w, VAS1m, VAS2m, VAS3m). We assessed our dependent variables 4 occasions, at 0 weeks (pre-tx), 6 weeks (mid-tx), 12 weeks (post-tx), and 18 weeks (follow-up). We would like to run mixed-effect models to test for intervention effects of 1) both CPS conditions (CPS-C and CPS-T, n = 23) versus ATR (n = 11); and 2) the CPS conditions against each other, ignoring ATR (CPS-C, n = 11 versus CPS-T, n = 12). I also have covariates (sex assigned at birth, diagnosis, age) that we can include during nested model building procedures, and include in final reported models if they lead to best fit.

Can we begin by examining the distributions of our dependent variables, and discuss whether we should use linear mixed-effects models; otherwise, we may need to transform or dichotomize the outcome or use a different type of model (poissson? Negative binomial?) to ensure model assumptions are met?

Then, can we evaluate the impact of missing data on my results by re-running these analyses using inverse probably weighting. It is possible that missing data will not be completely at random (i.e., participants with lower medication adherence may also be less likely to adhere to the online survey schedule).

Finally, I would like to calculate effect sizes for subgroups (see the final table). See tables on the next pages.

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Table 5

Best-Fitting Models Predicting Self-Reported Adherence for Both CPS Conditions (C and T) versus ATR (N = 34)

Dependent Variables	VAS1w			VAS2w			VAS3w			VAS1m			VAS2m			VAS3m		
	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*
Fixed Effects																		
Intercept																		
Time																		
Intervention Group (both CPS versus ATR)																		
Random Effects																		
σ^2																		
τ_{00}																		
τ_{11}																		
ρ_{01}																		
ICC																		
N																		
Observations																		
Marginal R^2 / Conditional R^2																		
AIC																		

Note—Make ATR the reference group so the estimate tells us how the combined CPS groups compare

Table 6

Best-Fitting Models Predicting Self-Reported Adherence for CPS-T versus CPS-C (N = 23)

Dependent Variables	VAS1w			VAS2w			VAS3w			VAS1m			VAS2m			VAS3m		
	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*	Estimates	*CI*	*p*
Fixed Effects																		
Intercept																		
Time																		
Intervention Group (CPS-T versus CPS-C)																		
Random Effects																		
σ^2																		
τ_{00}																		
τ_{11}																		
ρ_{01}																		
ICC																		
N																		
Observations																		
Marginal R^2 / Conditional R^2																		
AIC																		

Note—Make CPS-C the reference group so the estimate tells us how CPS-T compares

Table 7

Exploratory Analyses Estimating Effect Sizes Using Self-Reported Outcomes Past Week (Pre-Post… Baseline to 12 weeks)

Subgroup	*n*	*d*	*CI*	*p*	Subgroup	*n*	*d*	*CI*	*p*
VAS1w									
Total Sample	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR	34				CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR	14				CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR	10				CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR	10				CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
VAS2w									
Total Sample (*N* = 34)	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease (n = 14)	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant (*n* = 10)	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes (*n* = 10)	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
VAS3w									
Total Sample (*N* = 34)	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease (n = 14)	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant (*n* = 10)	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes (*n* = 10)	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				

Table 8

Exploratory Analyses Estimating Effect Sizes Using Self-Reported Outcomes Past Month

Subgroup	*n*	*d*	*CI*	*p*	Subgroup	*n*	*d*	*CI*	*p*
VAS1m									
Total Sample	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
VAS2m									
Total Sample	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
VAS3m									
Total Sample (*N* = 34)	--	--	--	--	Young Men	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Sickle Cell Disease (n = 14)	--	--	--	--	Young Women	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Solid Organ Transplant (*n* = 10)	--	--	--	--	Latinx	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				
Type 2 Diabetes (*n* = 10)	--	--	--	--	Black	--	--	--	--
CPS Combined vs. ATR					CPS Combined vs. ATR				
CPS-T vs. CPS-C					CPS-T vs. CPS-C				