

Implementation of a Mobile Phone Intervention Method to Improve Clinical Outcomes in Patients with HIV

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ABSTRACT

Background:

Antiretroviral therapy (ART) adherence decreases morbidity and mortality; however, this is often complicated by various external factors. Strategies implementing cellular technology have demonstrated improved medication adherence. The objective of this pilot study was to assess the effectiveness of utilizing weekly mobile phone calls or text messages to improve clinical outcomes among patients with HIV.

Methods:

This study was conducted at an infectious disease clinic at an academic medical center 2019-21. Twenty-two patients were selected based on a history of poor ART adherence. For a period of 6 months, patients were contacted weekly by text message or phone call to determine medication adherence and to encourage continued adherence. Outcomes during the 12-month intervention period (6m intervention and subsequent 6m) were compared to the 12-month pre-intervention period and included viral load, CD4 count, clinic visits, emergency department (ED) visits, hospitalizations, and new-onset opportunistic infections (OI). Wilcoxon signed rank test and McNemar's test were performed, though study is not powered for true analysis.

Results:

Twenty-two patients were selected for inclusion and 13 (55%) maintained persistent communication throughout the intervention. For all 22 enrolled participants, this intervention resulted in increased mean yearly clinic visits (2.6 vs 3.8), decreased median viral load (32,979 vs 852 copies/mL, $p=0.017$), and increased median CD4 (142.5 vs 249 cells/uL). This also led to a decrease in patients with ≥ 1 ED visit (54.6% vs 36.4%), ≥ 1 inpatient hospitalization (36.4% vs 13.6%), and diagnosis of an OI (18.2% vs 13.6%). These outcomes were most remarkable in the 13 patients who maintained scheduled communication [mean yearly clinic visits (2.9 vs 5.2), median viral load (27,633 vs 118 copies/mL, $p=0.0248$), median CD4 cells/uL (76 vs 253), ≥ 1 ED visit (61.5% vs 30.8%), ≥ 1 inpatient hospitalization (38.5% vs 23.1%), and new OI (23.1% vs 7.7%)].

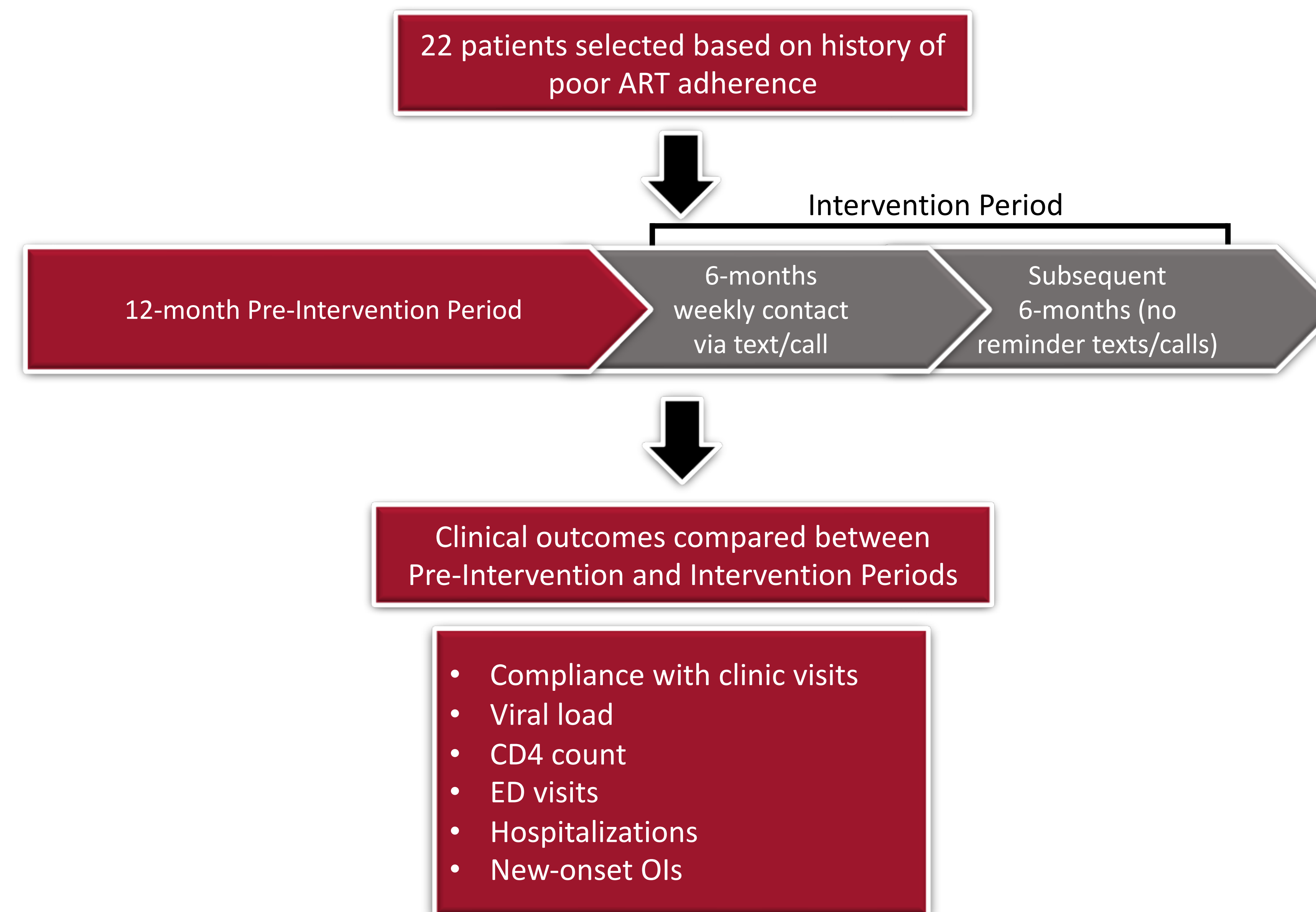
Conclusions:

Enhanced communication through weekly mobile phone reminders may serve as a useful tool in the outpatient setting to improve ART adherence and reduce morbidity among adults with HIV. The findings of this small pilot study provide support for the need of a larger study to prove the benefit of this care model.

BACKGROUND

- For patients with HIV, ART adherence is important for individual health and well-being, reducing disease progression and transmission, and minimizing drug resistance [1]
- Previous studies have shown that poor ART adherence contributes to negative health outcomes and to the emergence of treatment-resistance strains
- Level of ART adherence has been associated with a suppression of the HIV viral load, and a consistently suppressed viral load leads to reduced disease transmission and decreased morbidity and mortality [2]
- As mentioned in the World Health Organization's "Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection," mobile phones provide a potential reminder tool for promoting adherence to ART [3]
- Strategies that involve the implementation of cellular technology have demonstrated improved medication adherence and decreased HIV viral RNA levels [2]
- The objective of this pilot study was to assess the effectiveness of utilizing weekly mobile phone calls or text messages to improve clinical outcomes among patients with HIV

METHODS



RESULTS

- 13 of 22 (55%) patients maintained persistent communication
- Intervention resulted in increased mean yearly clinic visits, decreased median viral load, and increased median CD4
- Intervention led to a decrease in patients with ≥ 1 ED visit, ≥ 1 inpatient hospitalization, and diagnosis of an OI
- Outcomes were most remarkable in the 13 patients who maintained weekly communication

TABLE

Per Protocol Analysis	Enrolled Cohort (N=22)			Completed Cohort (N=13)		
	Routine Communication	Enhanced Communication	P value	Routine Communication	Enhanced Communication	P value
Clinic Visits						
Completed Clinic Visits, mean (SD)	2.6 (1.8)	3.8 (2.9)	0.1111	2.9 (2.2)	5.2 (2.8)	0.0139
Offered Clinic Visits, mean (SD)	4.6 (3.0)	7.0 (3.0)	0.0065	4.1 (3.6)	7.0 (2.6)	0.0206
HIV Viral Load						
HIV VL, copies/mL, median (IQR)	32,979 (4,833-143,934)	852 (0-42,600)	0.0165	27,633 (15.8-119,727)	118 (0-852)	0.0248
HIV VL <200 copies/mL, no (%)	3 (13.6)	7 (31.8)	0.2891	3 (23.1)	7 (53.9)	0.2891
CD4 T cell						
CD4 cells/uL, median (IQR)	142.5 (26-625)	249 (63-621)	0.7172	76 (18-625)	253 (170-622)	0.1330
CD4 %, median (IQR)	9.8 (5-27)	10 (6-32)	0.5317	6 (2-28)	10 (8-32)	0.0536
Outcomes						
≥ 1 ED Visit, N (%)	12 (54.6)	8 (36.4)	0.2891	8 (61.5)	4 (30.8)	0.2188
≥ 1 Inpatient Hospitalizations, N (%)	8 (36.4)	5 (13.6)	0.4531	5 (38.5)	3 (23.1)	0.6250
Opportunistic Infections, n (%)	4 (18.2)	3 (13.6)	1.0000	3 (23.1)	1 (7.7)	0.5000

CONCLUSIONS

- During the intervention period, clinical outcomes improved for the 22 patients with a history of poor ART adherence
- Clinical outcomes most notably improved for the 13 patients that maintained persistent communication throughout the entire intervention period
- Enhanced communication through weekly mobile phone reminders may serve as a useful tool in the outpatient setting to improve ART adherence and reduce morbidity among adults with HIV
- The findings of this small pilot study provide support for the need of a larger study to prove the benefit of this care model

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