High Adherence to HIV Pre-Exposure Prophylaxis among Veterans

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INTRODUCTION

HIV pre-exposure prophylaxis (PrEP) with daily oral tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) has been shown in clinical trials to be efficacious in preventing HIV infection in high-risk adults.¹ Cases of failure and incident HIV infection in the major clinical trials were associated with poor medication adherence.² Despite a large number of individuals who would benefit from PrEP use, concerns about poor medication adherence remain a barrier to wider dissemination of this intervention.³ Few studies have evaluated adherence to HIV PrEP in routine clinical settings. The Department of Veterans Affairs (VA) is the largest HIV care provider in the United States. PrEP is a covered benefit for all enrolled Veterans.

METHODS

This was a retrospective cohort study of Veterans who initiated PrEP between July 2012 and June 2016, using data extracted from the VA clinical and administrative databases. PrEP adherence was measured as the proportion of days covered (PDC). PDC was calculated by dividing the total number of non-hospitalized days during which TDF/FTC was supplied, by the number of days in the observation period. Though previous studies have demonstrated that high PrEP efficacy may be achievable with 60% adherence,⁴ standard adherence measures in other clinical settings using pharmacy refill data define adherence as $\geq 80\%$.⁵ In this study, we defined $<60\%$ PDC as suboptimal, 60–79% PDC as acceptable, and $\geq 80\%$ PDC as optimal adherence. Incident HIV infections were identified by screening records for HIV ICD-9 codes, ICD-10 codes, and HIV polymerase chain reaction (PCR) results. Diagnoses were confirmed with manual chart review.

RESULTS

We identified 1074 patients who initiated PrEP between July 2012 and June 2016. Among these, 989 had more than one

medication fill and were included in our final cohort for analysis (Fig. 1).

The mean age of a patient starting PrEP was 41.5 years (SD 12.37), and the majority of this cohort were men (96%). Most initial PrEP prescriptions were prescribed by infectious disease specialists (72%), though 22% of PrEP was initiated by a primary care provider; these were similar for both adherent and non-adherent patients. The mean PDC was 83% for the entire cohort (SD 21%; Table 1).

We observed an increasing trend in PrEP adherence for each subsequent calendar year during which PrEP was initiated. In 2012, 75% of patients initiating PrEP achieved protective levels of adherence ($\geq 60\%$ PDC); this proportion rose to 90% of patients who started PrEP in 2016 ($p = 0.004$; Fig. 1). Fifty-six percent of patients achieved optimal adherence in 2012, and this proportion rose to 76% of patients who started PrEP in 2016 ($p = 0.004$).

In multivariable analysis, age, race, year of PrEP initiation, and number of other chronic medications were significantly associated with optimal adherence. Adherence increased by 9% per year for new PrEP starts (adjusted relative risk [aRR] 1.09; 95% CI 1.03, 1.15; $p = 0.001$). There were no differences in adherence between patients who were prescribed PrEP by an infectious disease provider versus primary care or other providers, between patients who initiated PrEP at a community-based outpatient clinic/health care center (CBOC/HCC) versus a VAMC, or between patients who lived in rural/highly rural areas versus urban areas. However, black race remained significantly associated with less than optimal ($<80\%$) adherence, even after adjusting for covariates (aRR 0.76; 95% CI 0.66, 0.86; $p < 0.001$).

Six incident HIV infections were observed among our cohort. Three patients were diagnosed with HIV while on PrEP (0.3% of the cohort), and three were diagnosed after PrEP discontinuation. All three patients who seroconverted while on PrEP were diagnosed at their first 3-month follow-up. One reported missing several days of medication prior to an HIV exposure, and all three had M184V mutations (conferring resistance to FTC) on subsequent genotype testing.

DISCUSSION

PrEP adherence within the VA has increased in recent years, and current rates of adherence are high, with 90% of PrEP

Figure 1 Change in percentage of VA PrEP users with protective levels (acceptable or optimal) of adherence ($\geq 60\%$ PDC) over time.

users achieving protective levels. However, black patients, who are already disproportionately affected by HIV, remain at risk for less than optimal adherence. Simplification of medication regimens in general may help promote better PrEP

adherence. Few cases of HIV seroconversion occurred in patients while on PrEP. Overall, real-world adherence to PrEP has improved over time, and the vast majority of patients are at acceptable levels.

Table 1 Demographic Characteristics of PrEP Users in the VA

Characteristic*	Entire cohort N = 989	Optimal adherence ($\geq 80\%$ PDC) n = 674 (68.15%)	Acceptable or suboptimal adherence (<80% PDC) n = 315	p value
Age, mean (SD), years	41.49 (12.37)	42.39 (12.40)	39.58 (12.11)	<0.001
Sex, no. (%)				0.75
Male	951 (96.16)	649 (96.29)	302 (95.87)	
Female	38 (3.84)	25 (3.71)	13 (4.13)	
Race, no. (%)				<0.001
White	613 (61.98)	444 (65.88)	169 (53.65)	
Black	225 (22.75)	122 (18.10)	103 (32.70)	
Other	151 (15.27)	108 (16.02)	43 (13.65)	
Ethnicity, no. (%)				0.59
Hispanic	132 (13.35)	85 (12.71)	47 (14.92)	
Non-Hispanic	797 (80.59)	545 (81.46)	252 (80.00)	
Unknown	60 (6.06)	44 (5.83)	16 (5.08)	
Rurality, no. (%)				0.29
Urban	887 (89.69)	598 (88.86)	289 (92.04)	
Rural/Highly rural	100 (10.11)	75 (11.14)	25 (7.96)	
Provider specialty, no. (%)				0.31
Infectious disease	712 (71.99)	489 (72.55)	223 (70.79)	
Primary care	222 (22.45)	149 (22.11)	73 (23.17)	
Other	55 (5.56)	36 (5.34)	19 (6.03)	
VA facility type, no. (%)				0.11
CBOC/HCC	115 (11.94)	77 (11.74)	38 (12.38)	
VAMC	848 (88.06)	579 (88.26)	269 (87.62)	
Number of other chronic medications, no. (%)				0.02
1–4	679 (68.66)	448 (66.47)	231 (73.33)	
≥ 5	310 (31.34)	226 (33.53)	84 (26.67)	
Proportion of days covered, mean (SD)	0.83 (0.21)	0.95 (0.06)	0.57 (0.19)	<0.001

*Data analyzed were at the time of the index TDF/FTC prescription (i.e., at the time of PrEP initiation)

PrEP pre-exposure prophylaxis, PDC proportion of days covered, CBOC/HCC community-based outpatient clinic/health care center, VAMC VA Medical Center

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Compliance with Ethical Standards:

Prior Presentations: None.

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