The impact of patient-provider attachment on HIV-1 RNA plasma viral load suppression among people living with HIV/AIDS in British Columbia

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Background

- Scientific advances in the treatment of HIV/AIDS through highly active antiretroviral therapy (HAART) have resulted in substantial reductions in morbidity, mortality, and secondarily, HIV transmission.

- However, engaging and retaining people living with HIV (PLHIV) in HIV care continue to pose significant challenges to optimizing the health benefits of HAART.

- Continuity with healthcare providers can positively impact patient- and health system-related outcomes, including better adherence to medications and reduced healthcare costs.

Objective

- The objective of this study was to examine whether patient-physician attachment can play a role in improving HIV treatment outcomes among PLHIV, in the interest of informing effective interventions and health system changes to meet the UNAIDS 90-90-90 target.

Methods

- The STOP HIV/AIDS BC cohort is a provincial-level linkage of a series of surveillance, laboratory and health administrative databases of all identified PLHIV in BC.

- We included all PLHIV in BC following their first dispensation of HAART.

- The main explanatory variable, patient-provider attachment, was defined as the percentage of HIV-related services provided by the physician who provides the most services in the calendar year.

- The main outcome variable, HIV-1 RNA plasma viral load (VL) suppression, was defined as having at least one episode of at least 3 months with an undetectable VL within the calendar year and was calculated based on VL testing technology available at the time of measurement: <500 copies/mL for 1996, <400 copies/mL for 1997-1998, and <50 copies/mL for 1999-2013.

- Unadjusted and adjusted generalized linear mixed effects regression models were constructed to determine the relationship between patient-provider attachment and VL suppression.

Results

- Between 1996 and 2013, 6,228 individuals were included in the study; 980 (15.7%) were female and the median age was 42 years (Q1-Q3: 36-49) (Table 1).

- At baseline, the median patient-provider attachment was 83% (Q1-Q3: 60-100%) and 2,536 (40.7%) of individuals achieved VL suppression (Table 1).

- The top three primary physician specialties at baseline included: general practice (5070; 81.4%); internal medicine (719; 11.5%); and infectious diseases (203; 3.3%).

TABLE 1. Baseline characteristics of 6228 HIV-positive individuals in British Columbia, Canada

Characteristic	Total (%) (n = 6228)	VL suppression* Yes (%) (n = 2536)	VL suppression* No (%) (n = 3692)
% Attachment* (median, Q1-Q3)	83 (60-100)	93 (70-100)	80 (55-100)
Calendar year (median, Q1-Q3)	2006 (2001-2010)	2007 (2003-2010)	2005 (2000-2009)
Age (median, Q1-Q3)	42 (36-49)	44 (37-51)	41 (35-48)
Female sex	980 (15.7)	316 (12.5)	664 (18.0)
Charlson comorbidity index (median, Q1-Q3)	7 (6-8)	7 (6-8)	7 (6-8)
Ever injected illicit drugs	2538 (40.8)	740 (29.2)	1798 (48.7)
CD4 cell count* (median, Q1-Q3)	340 (190-510)	435 (295-600)	270 (130-430)
≥95% HAART adherence*	3706 (59.5)	1962 (77.4)	1744 (47.2)
Visited an HIV specialist*	5769 (92.6)	2385 (94.0)	3384 (91.7)

VL: viral load; Q: quartile; HAART: highly active antiretroviral therapy
*Measurements obtained in a calendar year

TABLE 2. Unadjusted and adjusted estimates of patient-provider attachment on HIV-1 plasma viral load suppression among 6228 HIV-positive individuals in British Columbia, Canada

Characteristic	Odds Ratio (OR) Unadjusted OR (95% CI)	Odds Ratio (OR) Adjusted OR (95% CI)
Patient-provider attachment*		
[11%-60%] [Min-Q1]	reference	reference
[60%-83%] [Q1-Median]	1.82 (1.64 – 2.02)	1.48 (1.31 – 1.66)
[83%-100%] [Median-Q3]	1.84 (1.62 – 2.09)	1.41 (1.22 – 1.63)
100% [Q3-Max]	2.32 (2.10 – 2.55)	1.50 (1.34 – 1.67)
Calendar year (per year increase)	1.21 (1.20 – 1.22)	1.08 (1.07 – 1.09)
Age (per 10 year increase)	2.24 (2.11 – 2.38)	1.47 (1.40 – 1.55)
Sex (male vs female)	2.67 (2.28 – 3.13)	-
Charlson's comorbidity index (per unit increase)	1.04 (1.02 – 1.06)	-
Ever injected illicit drugs		
No	reference	reference
Yes	0.25 (0.22 – 0.28)	0.63 (0.56 – 0.70)
Unknown	0.67 (0.55 – 0.83)	0.84 (0.68 – 1.03)
CD4 cell count* (per 100 cell increase)	1.65 (1.61 – 1.68)	1.40 (1.37 – 1.43)
HAART adherence* (≥95% vs. <95%)	8.48 (7.85 – 9.17)	5.95 (5.47 – 6.47)
Visited an HIV specialist*		
Never	reference	-
Yes, but not primary physician	1.14 (0.96 – 1.36)	-
Yes, primary physician	1.96 (1.67 – 2.30)	-

CI: confidence interval; Q: quartile; HAART: highly active antiretroviral therapy
*Measurements obtained in a calendar year

- Indicated in Table 2, bivariable analyses indicated a positive relationship between patient-provider attachment and VL suppression when compared to 11-59% attachment: 60-82% attachment (odds ratio [OR] = 1.82; 95% confidence interval [CI]: 1.64 – 2.02); 83-99% attachment (OR = 1.84; 95%CI: 1.62 – 2.09); and 100% attachment (OR = 2.31; 95%CI: 2.10 – 2.55).

- Shown in Table 2, in a multivariable model adjusted confounders, there remained a positive and independent association between patient-provider attachment and VL suppression when compared to 11-59% attachment: 60-82% attachment (adjusted OR [AOR] = 1.48; 95%CI: 1.31 – 1.66); 83-99% attachment (AOR = 1.41; 95%CI: 1.22 – 1.63); and 100% attachment (AOR = 1.50; 95%CI: 1.34 – 1.67).

- In a sensitivity analysis where we treated patient-provider attachment as a continuous variable, there was a positive and independent relationship between the explanatory variable and VL suppression, even after adjusting for confounding variables (AOR = 1.08; 95%CI: 1.06 – 1.09; data not shown).

Conclusions

- In this study, we found that patients who had a higher level of engagement with their provider for HIV-related services were more likely to achieve VL suppression.

- However, the findings indicate that beyond having engaged with the same physician 60% of the time, there were no significant benefits in patients' HIV treatment outcomes.

- Our findings demonstrate that continuity of care between patients and their providers contribute to optimize VL suppression in this setting.

- These findings point to the potential for health system and organizational changes (e.g., human resource allocation, integrated models of care) that may lead to better continuity of care among PLHIV.

Acknowledgements

AIDS 2016

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